2017 ANNUAL REPORT
APDES Permit No. AKS-052558

Submitted by:
Municipality of Anchorage

Alaska Department of Transportation and Public Facilities

Prepared for:
Alaska Department of Environmental Conservation

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WATERSHED MANAGEMENT

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Contents

Tables and Figures

Appendices

Acronyms

AK-CESL	Certified Erosion and Sediment Control Lead
ADEC	Alaska Department of Environmental Conservation
AMC	Anchorage Municipal Code
APDES	Alaska Pollutant Discharge Elimination System
ADOT&PF/DOT	Alaska Department of Transportation and Public Facilities
ARDSA	Anchorage Road and Drainage Service Area
AWC	Anchorages Waterways Council
BMP	Best Management Practice
CBERRSA	Chugiak Birchwood Eagle River Rural Road Service Area
CGP	Construction General Permit
CO	Certificate of Occupancy
DCM	Design Criteria Manual
EPA	Environmental Protection Agency
ESCP	Erosion Sediment Control Plan
FHWA	Federal Highway Administration
GIS	Geographic Information System
GPS	Global positioning system
HMCP	Hazardous Material Control Plan
HGDB	Hydrogeodatabase
LID	Low Impact Development
M&O	ADOT&PF Central Region Division Maintenance and Operation
MASS	Municipality of Anchorage Standard Specifications
MEP	Maximum Extent Practicable
MOA	Municipality of Anchorage
MS4	Municipal Separate Storm Sewer System
MS4GDB	MS4 Geodatabase
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
OGS	Oil and Grit or Oil and Grease Separator
ROW	Municipal Rights of Way
SOP	Standard Operating Procedures

SWPPP	Storm Water Pollution Prevention Plan
SWTPRGM	Storm Water Treatment Plan Review Guidance Manual
WMS	Watershed Management Services

Introduction

The Municipality of Anchorage (MOA) and the State of Alaska, Department of Transportation and Public Facilities (ADOT&PF), submit this Report in fulfillment of the annual reporting requirements of Alaska Pollutant Discharge Elimination System (APDES) Permit No. AKS 05255-8, *"Authorization to Discharge Under the National Pollutant Discharge Elimination System"* (Permit), effective date August 1, 2015. This report satisfies the criteria set forth in Permit Section 4.4 and is organized by program to demonstrate compliance with the *"Storm Water Management Plan"* developed to meet the requirements laid out in Permit Section 2. Documents produced in compliance with this Report are included in associated Appendices A through H.

The permittees responsibilities are both joint and individual; they are laid out in their Inter-jurisdictional Agreement describing their respective roles and responsibilities related to this Permit. Coordination between groups within the permittees organizations are laid out in their Program Coordination Plans.

Responsibilities for certain requirements have been shared with the Anchorage Waterways Council (AWC). The delegated activities are in the areas of Public Education for General Audiences located in Permit Part 3.6, Watershed Planning located in Permit Part 2.7, and program evaluation of Animal Facilities, located in Part 3.3.3.

1. Program Organization

1.1 Storm Water Management Plan

The actions and activities of the Anchorage MS4 program have been documented in its Storm Water Management Plan (SWMP). The SWMP is intended to reduce the discharge of pollutants from the MS4 into receiving waters to the maximum extent practicable (MEP). The permittees have identified the prescribed best management practices (BMP) including control measures, system design, engineering methods, and other provisions appropriate to the control and minimization of pollutants and addressed the Permit requirements as described in Sections 3 and 4 of the Permit.

The annual reports document the compliance measures taken during the year in fulfillment of the SWMP. Both documents are laid out consistent with Sections 3 and 4 of the Permit. Activities are identified in their appropriate program summaries along with results of information collected, summaries of activities, and appendix references and web-links to associated supporting materials. Also, in each program section are self-assessments of performance and summaries of planned activities for future reporting cycles.

The SWMP has been updated based on 2017 information and is provided in Appendix A1.

Program Effectiveness

The reporting date for the 2017 Annual Report fell in the fifth month of the third year of the new permit. The Permittees accomplished the work required for submittal with the third annual report and some of the activities required by the end of the third year which ends in July 2018. The remaining activities due the third year will be reported in the 2018 annual report.

Each of the monitoring program reports presented with this submittal provides a detailed presentation of results from the current monitoring year. These reports indicate what follow-up actions need to be taken as a result of the program findings.

The Quality Assurance Plan (QAP), Appendix B, Snow Site Monitoring Plan has been updated based on information obtained in the 2017 snow site monitoring project.

Pollutant load allocations, in the form of total maximum daily loads (TMDL), are assigned by the State to a number of creeks and lakes in Anchorage based on the State's *Primary Use* designation as drinking water sources. Dry and wet weather screening provide indicators of bacterial impacts from storm water to identified receiving systems. Wet weather bacteria results that are regularly high at one outfall (SWM07) were investigated in follow-up to regular field screening; they are introduced in Section 7.2.3. In effort to address the sources of most bacteria, the permittees are continuing to provide public education about pet waste management with the Scoop the Poop message. They are also continuing to participate in efforts to manage waterfowl populations and resulting water quality impacts.

A change to street sweeping assessment activities was continued in 2017 to assist with improving sweeping operations. Real-time assessment provided qualitative feedback to help operators adjust practices for development of a visually clean standard.

The operations of the storm sewer system were implemented by primary coordinating groups. Coordination is managed through agreements between Municipal Watershed Management Services (WMS) and each of the participating MS4 operators; these were updated in the nine-month submittal. The M&O operators have provided 2017 MS4 Summaries for their areas of permit compliance. They are provided in Appendix A2.

Program Resources

The permittees have broken their program costs into two functional categories: Operations & Maintenance (O&M) and Program Management/Project Administration. The maintenance costs are summarized from the program breakdowns contained in the MS4 Summaries. The 2017costs are presented in Table 1.1

1: Table 1.1 – 2017 SWMP Program Costs

	ADOT&PF	Municipality	CBERRSA	GRSA	Total
Maintenance & Operations	$3.1M	$2.3M	$0.49M	$0.56M	$6.6M
Program Management/ Administration	$0.40M	1.0M	-	-	$1.4M
	$3.5M	$3.3M	$0.49M	$.56M	$8.0M

1.2 Watershed Planning

The permittees are required to evaluate two existing watershed plans and submit them with the third annual report. The *Little Campbell Creek Watershed Plan* and the *Chester Creek Watershed Plan* were developed under the guidance of working groups composed of diverse agency interests and supported by staff from Watershed Management Services (WMS), U.S. Fish and Wildlife Service, and the Anchorage Waterways Council. The reports are available on the WMS website at http://anchoragestormwater.com/watershedplanning.html.

The MOA began the plan evaluations for both watersheds in 2016. They are discussed in the Anchorage Waterways Council (AWC) summary report presented in Appendix G1.

The permittees are also required to complete a scoping document for one individual watershed plan for a specific water body prior to the expiration of the permit. The scoping document must identify whether activities carried out in the watershed are beneficial in accomplishing site-based LID practices and recommend future actions to obtain identified goals. The scoping document will be used to determine if a watershed plan will be developed in the next permit cycle. In 2017 the culverts on Campbell Creek were mapped and their condition assessed for fish passage and any needed corrections. Additionally, areas were field checked where bank stabilization was performed to address known issues. The details are presented in Appendix G1.

2 Construction Site Management

2.1 Regulatory Mechanism and Standards

Ordinance and/or Regulatory Mechanism

ADOT&PF Projects. The ADOT&PF Statewide Design & Engineering Services' mission is to provide technical services to ADOT&PF, and other state and federal agencies and governments. They develop, publish, and manage standard construction contract specifications, standard modifications for highways and statewide special provisions for highways and airports, as well as coordinate with and advise others in development and use of specifications for buildings, marine highways, and harbors. The ADOT&PF Chief Engineer issues directives informing ADOT&PF of new specifications, manuals and other standards to use on ADOT&PF projects. Since June 2016, ADOT&PF Chief Engineer issued 26 directives; nine of these directives deal with stormwater management.

ADOT&PF regulates stormwater management of their highway and aviation construction projects through its Statewide and Central Region Standard Specifications: Section 641 Erosion, Sediment and Pollution Control for Highway Construction; and Item P-157 Erosion, Sediment and Pollution Control for Airport Construction. These Specifications were updated in their entirety in 2016 for two reasons. In September 2015, the Consent Decree between the ADOT&PF and the US EPA was lifted, and reference to all Consent Decree language was removed. However, some of the requirements from Consent Decree were incorporated into our Standard Specifications as standard practice. On February 1, 2016 the ADEC 2016 ACGP was issued, and the regulatory changes needed to be addressed. The revised Standard Specification Section 641 and Item P-157 were made a contract requirement.

In 2017, the Aviation Standard Specification Item P-157 Erosion, Sediment, and Pollution Control began a review process to reconcile the State of Alaska Aviation Standard Specifications with the FAA Standard Specifications. A name change will occur, changing Item P-157 Erosion, Sediment, and Pollution Control to Item P-156 Erosion, Sediment, and Pollution Control. Other minor alterations to the specification will take place, but it will remain substantially the same. Currently, Item P-156 is in a final draft form awaiting acceptance from the FAA. Upon finalization of the statewide specification Item P-156, a regional special modification will be developed to reflect regional engineering practices. Further changes to Item P-156 are expected during 2018. The current revision to Item P-157 Erosion, Sediment, and Pollution Control Specification was issued in January 2017.

The SWPPP construction forms provided by the ADOT&PF, and contractually required to be used to document permit compliance, were modified and made available for use in 2016. Form 25D-126H, Erosion, Sediment and Pollution Control – Liquidated Damages, was further modified to meet specification requirements. The revised Construction form 25D-126H was made a contract requirement April 21, 2017.

These stormwater specifications are contractually enforced. ADOT&PF provides guidance on contract stormwater administration to its project staff through three mechanisms, the Alaska Construction Manual, Chapter 3.11 & 9.9, ADOT&PF Chief Engineer's directives and by having two stormwater specialists dedicated solely to stormwater guidance and education. Previously, the Alaska Construction Manual was last published on July 7, 2014 and outlines procedures for implementing and monitoring construction SWPPPs. Modifications to the Alaska Construction Manual, reflecting the new requirements in the 2016 ACGP and eliminating language associated with the terminated EPA Consent Decree were completed in 2016. After obtaining the necessary final approvals from federal regulatory agencies, the Alaska Construction Manual was updated on May 1, 2017 and is required to be used on all ADOT&PF highway and airport construction projects.

Highway Standard Modification for Section 641 (see Highway 2017 Edition Standard Modifications) and Item P-157 for Airports, Erosion, Sedimentation and Pollution Control link

http://www.dot.state.ak.us/stwddes/dcsspecs/index.shtml

ADOT&PF Construction Forms Link:

http://www.dot.state.ak.us/stwddes/dcsconst/pop_constforms.shtml

Alaska Construction Manual link:

http://www.dot.state.ak.us/stwddes/dcsconst/constructionmanual.shtml

ADOT&PF Chief Engineer's Directives link:

http://www.dot.alaska.gov/stwddes/dcspubs/directives.shtml

Private Development. The Municipality regulates stormwater management at private construction sites through Anchorage Municipal Code (AMC) Title 21. The Municipal ordinance 2010-81, first adopted in 2010, amended Title 21 to require a permit, entailing plan review and approval, for ground disturbing activities. This ordinance added a new section, AMC 21.67.09, to municipal code. The re-write of Title 21, effective January 1, 2014, carried this permit language forward. It can be found in AMC 21.07.04.E,.. This code is available at: https://www.municode.com/library/ak/anchorage/codes/code_of_ordinances?nodeId=TIT21LAUSPLNECOFFJA12014_CH21.07DEDESTNECOFFJA12014_21.07.040DRSTWATRERCOPRDI.

Municipal Projects. The Municipality regulates stormwater management during construction of its own (public) projects through Municipality of Anchorage Standard Specifications (MASS), Division 20 (MASS Section 20.02). These standard specifications are contractually enforced. In 2012, MASS Section 20.02 was updated to incorporate requirements of Alaska's 2011 Construction General Permit. A link to the MASS is found at http://www.muni.org/Departments/works/project_management/Pages/MASS.aspx.

Construction Storm Water Manual

Use of the Alaska Storm Water Pollution Prevention Plan (SWPPP) Guide and other related materials directed by the ADOT&PF Chief Engineer. These materials are available for download on a dedicated Stormwater/Water Quality webpage managed and maintained by the ADOT&PF Statewide Design and Engineering Services Statewide Environmental Office.

ADOT&PF revised its Alaska SWPPP Guide in December 2015. Separately, ADOT&PF updated and made available for immediate use the Alaska SWPPP Guide Appendix B, BMP Guide to reflect emerging technologies and practices for 53 new BMP details and descriptions, and six M&O and Good

Housekeeping descriptions. Revisions to the main body of the Alaska SWPPP Guide, modifications to incorporate the changes to the 2016 ACGP, have received final approvals from the FAA and the FHWA. The Alaska Storm Water Pollution Prevention Plan Guide, 2017 Edition was made an official reference document and authorized for use on March 31, 2017.

ADOT&PF Statewide Design & Engineering Services Statewide Environmental Office Stormwater/Water Quality Website Link:

http://www.dot.state.ak.us/stwddes/desenviron/resources/stormwater.shtml

Alaska SWPPP Guide, 2017 Edition (Body only) Link:

http://dot.alaska.gov/stwddes/desenviron/assets/pdf/swppp/english/2017/swppp_guide_2017.pdf

Alaska SWPPP Guide, 2017 Edition (entire guide with appendices) Link:

http://dot.alaska.gov/stwddes/desenviron/assets/pdf/swppp/english/2017/swppp_guide_2017_w_apdx.pdf

Private and Municipal Projects. The Municipality has updated its Storm Water Plan Review and Treatment Guidance Manual (SWTPRGM) to reflect the regulatory program based on the Term III APDES permit and the update to the 2016 Alaska Construction General Permit. It is incorporated as Volume 2 of the Anchorage Stormwater Manual recently adopted by the Anchorage Assembly. It is available at www.anchoragestormwater.com.

2.2 Plan Review and Approval

ADOT&PF Projects. During 2017, ADOT&PF reviewed and approved SWPPPs for eight (8) projects allowed to discharge construction stormwater under the requirements of the 2016 ACGP within the Municipality of Anchorage MS4 permit area. All eight projects filed for and received an NOI. An additional ten (10) projects were carried over from the 2016 construction season. All 18 projects were contracted and administered by ADOT&PF. A list of these 18 projects is provided in Appendix B1.

Since 2011, ADOT&PF Central Region (CR) has a yearly-renewable term contract with STANTEC, Inc., to perform a Quality Assurance (QA) document review for all required Specification Section 641 and Item P-157 documentation, prior to project certification and field implementation. In 2016, ADOT&PF Public Facilities began using the services provided by STANTEC. QA review is performed by the Water and Wastewater group within STANTEC for all projects requesting the service. On average between 45 and 50 ADOT&PF projects with an NOI take advantage of this service.

Before projects apply for an NOI, STANTEC reviews the initial SWPPP and provides comments for the project to incorporate, taking into account all pertinent environmental permits. During the project, STANTEC reviews the project-site inspection reports, and all other generated documentation, and provides comments to edit and correct documentation with the intent of preventing any permit non-compliance caused by paperwork errors. The CR ADOT&PF will continue using this QA contract for the foreseeable future and has no plans to terminate the service.

ADOT&PF is a co-operator on these projects with the Construction Contractor performing the work. After construction activities begin, most ADOT&PF active projects are subject to a documentation review performed by a Central Region Stormwater Specialist. This review is based on the EPA Appendix R NPDES Industrial Storm Water Investigation and Case Development Worksheet.

Private and Municipal Projects. The WMS continues to review construction SWPPPs for projects conducting ground disturbance greater than 10,000 square feet. The types of projects reviewed include any

work requiring a building permit, utility work, new subdivisions and road projects. In 2011, WMS began regulatory review of all Municipal projects 1 acre and greater. The reviews encompass construction erosion control measures and permanent stormwater management practices.

In 2017, WMS reviewed and approved approximately 330 Residential permits and 118 commercial buildings, and a number of commercial and government building additions. WMS also conducted Storm Water Pollution Prevention Plan reviews of 18 Municipal Projects.

The Municipal Development Services Division computer-based building permit administration system continues to track and document plan reviews and approvals in 2017. It also handles documentation for Construction Site Inspections and Enforcement.

2.2.1 Inspection and Enforcement Tracking

ADOT&PF Projects. A summary of inspection activities shows the ADOT&PF conducted 347 site inspections on 18 projects within the Municipality of Anchorage. ADOT&PF performed:

- 267 site inspections on 13 highway projects ranging from major highway realignment to repaving arterial roads
- 80 site inspections on five (5) airport projects for the Ted Stevens Anchorage International Airport including major taxiway reconstruction, drainage projects, and facility support projects

For each of these inspections, ADOT&PF reviewed the SWPPP or other site documentation and performed a physical inspection of the site to confirm there were no illicit discharges or incidences of permit noncompliance. At the conclusion of the visit, ADOT&PF prepared an inspection report and included the report in the SWPPP. Any required corrections were given to the site representative. In 2017, no stop work orders were given on any ADOT&PF construction project within the Municipality of Anchorage. The records for site inspections along with associated compliance follow-up are available for review at individual project offices.

Municipal: A summary of inspection activities reveals that 255 commercial site inspections and 424 residential site inspections were conducted during 2017 including 12 construction related inspections from the illicit discharge reporting website located at: http://www.muni.org/Departments/OCPD/development/BSD/Pages/CodeEnforcement.aspx For each of these inspections the SWPPP or other site documentation was reviewed and a physical inspection of the site was performed to confirm there were no illicit discharges. At the conclusion of the visit an inspection report of findings and any required corrections were given to the site representative. Where corrections were indicated a re-inspection was scheduled to confirm compliance. When compliance isn't achieved within the specified period of time a stop work order is issued until compliance is achieved. In 2017 no stop work orders were given. The records for site inspections along with associated compliance follow-up are available for review at WMS.

2.2.2 Enforcement Response Policy

ADOT&PF: ADOT&PF's Enforcement Response Policy is contained in the following documents:

- Alaska Construction Manual, 2017 Edition, Chapter 9.9 SWPPP & HMCP Implementation and Monitoring, most current edition is dated May 1, 2017
- Standard Specification Item 641 Erosion, Sediment and Pollution Control for Highway Construction, most current edition is dated April 30, 2017

- Item P-157 for Erosion, Sediment and Pollution Control Airport Construction, most current edition is dated January 2017. Sometime during 2018, Item P-156 is expected to replace Item P-157.

The Alaska Construction Manual spells out the inspector qualifications and duties, non-compliance reporting and monitoring paperwork. The standard specifications provide project and administration requirements relating to control of erosion, sedimentation, and discharge of pollutants. The work must follow applicable local, state, and federal requirements, including the CGP and the MS4 Permit. The standard specifications are contractually enforced.

These specifications authorize ADOT&PF personnel to verbally warn and provide written notices to the construction after each inspection. The SWPPP Construction Inspection Report and the Corrective Action Log document the timely maintenance or corrective actions required. ADOT&PF revised the Section 641 and Item P-157 Statewide and Regional Specifications in 2016 because of:

- EPA terminated the ADOT&PF Consent Decree; ADOT&PF removed Consent Decree language references from the specifications and modified the attendant requirements
- ADEC issued a new 2016 ACGP; ADOT&PF updated the specifications to reflect changes from the 2011 ACGP

Escalation enforcement measures include:

- Orally suspending the work if the suspension is to protect workers, the public or the environment from imminent harm
- Written suspension of work explaining the defects, reasons, corrective actions and time allowed to complete the corrective actions
- Withhold monies from the construction contractor until corrective actions is completed
- Assess damages or equitable adjustments against the contract amount
- Employ others to perform the corrective action and deduct the costs from the Contract amount
- Alaska Construction Manual link:
- http://www.dot.state.ak.us/stwddes/dcsconst/constructionmanual.shtml
- Highway Standard Modification for Section 641 and Item P-157 for Airports, Erosion, Sedimentation and Pollution Control link:
- http://www.dot.state.ak.us/stwddes/dcsspecs/index.shtml
- *Municipal.* The Municipality updated its escalating enforcement policy and provided it with the 2015 annual report, in advance of the required second year of this term Permit.

2.2.3 Construction General Permit Violation Referrals

ADOT&PF. CR ADOT&PF Erosion and Sediment Control Advisors provide guidance to its project staff on reporting noncompliance in the Alaska Construction Manual, Chapter 9.9. In 2017, ADOT&PF filed one (1) non-compliant stormwater discharge report to the ADEC on their projects within the Municipality of Anchorage. Project No. 58304 AMATS: O'Malley Road Reconstruction, Phase I had a non-allowable discharge on August 17, 2017, see Appendix B.2 for a copy of the discharge report.

There were four (4) instances of non-compliance with the ACGP within the Municipality of Anchorage MS4 permit area by ADOT&PF projects. Three (3) were performing site inspections late, and one (1) was for

completing a corrective action late. None of these instances rose to the level of assessing Liquidated Damage withholding. Project No. CFHWY00162, Seward Highway: Dimond Boulevard to Dowling Road Reconstruction, Phase I was visited by the Alaska Department of Environmental Conservation (ADEC) for a compliance inspection on December 14, 2017. ADEC sent ADOT&PF a Notice of Violation on January 24, 2018, see Appendix __. However, ADOT&PF has not drafted an official response to ADEC's notice of violation.

Municipal. The Permit requires the Municipality to report to ADEC when they find projects which failed to comply with the Construction General Permit prior to breaking ground. In 2017, MOA did not file any reports of non-compliance to the ADEC.

2.3 Construction Program Education and Training

During the Permit's second term, agreement was reached by agencies and interest groups for a standardized training course targeted for construction site owners and operators and their key personnel. In 2012, the Memorandum of Understanding to establish Certified Erosion and Sediment Control Leads in Alaska (AK-CESCL) was updated by eight governing members comprised of the Alaska Department of Environmental Conservation, the Alaska Department of Natural Resources, ADOT&PF, the Alaska Railroad Corporation, the Associated General Contractors, the Municipality, the US Army Corp of Engineers, and the Associated Builders and Contractors Alaska. The original agreement, training requirements, and course elements for the AK-CESCL program were provided in the 2010 Annual Report. The updated agreement, provided in the 2013 Annual Report, made some minor revisions to clarify the procedures of the training program. In 2015, the Alaska Storm Water Steering Committee approved a one-day eight-hour Refresher Course to satisfy the Alaska Certified Erosion Sediment Control Lead (AK-CESCL) renewal requirements. In 2017 the agreement was updated to continue the program as laid out in the 2012 amendment. It is available in Appendix B.3.

The refresher course is a summary of the two-day initial AK-CESCL class. To be eligible to take this training, you must have an active AK-CESCL number and taken the two-day (16-hour) class or Refresher class within the last three years. It thoroughly examines erosion and sediment pollution control concepts and design procedures as they apply to construction projects. The Refresher Course is a training and certification program to comply with the ADEC CGP and the Municipality's SWTPRGM. The Refresher Course will stress risk management, review proper best management practices, and provide guidance. Upon passing the 8-hour refresher course, the applicant will be granted an AK-CESCL certificate. Applicants not passing the (8-hour) refresher course will be required to retake the two-day (16-hour) class.

ADOT&PF. ADOT&PF participated in the following trainings:

- AK CESCL Course: Alaska Certified Erosion and Sediment Control Lead is a two day, 16 hour course. This program requires recertification every 3 years. 27 participants were enrolled in the course held on May 11-12, 2017.
- AK CESCL Refresher Course: Alaska Certified Erosion and Sediment Control Lead Refresher Course is a 1 day, eight hour course. This program requires recertification every 3 years. 23 participants were enrolled in the course held on March 16, 2017. 27 participants were enrolled in the course held on April 20, 2017.
- AK CESCL: The Central Region ADOT&PF sponsored AK CESCL classes are taught by Mary Cunningham and Joshua James, ADOT&PF Central Region Stormwater Specialists.

- International Erosion Control Association 2017 Environmental Connection (IECA EC17): ADOT&PF sent Mary Cunningham to the IECA EC17 in Atlanta, Georgia to further her knowledge and training as a Stormwater Specialist. The event took place February 21 -24, 2017. The event is the largest stormwater event and exposition in the world, and attracts participants from around the world. The four day event has over 1220 technical and training sessions taught by industry experts. The Expo hall gathers hundreds of vendors giving product demonstrations and providing independent education sessions.

Municipality. The Municipality conducted or participated in the following training:

- 2017 Watershed Update/APDES Annual Meeting: March 29, 2017. This half-day meeting reviewed the findings of monitoring, assessments, mapping, and new programs associated with the permit. It was attended by members of MOA, ADOT, and the private sector.
- AK CESCL Course: Alaska Certified Erosion and Sediment Control is a two day, 16 hour course. This program requires recertification every 3 years. 39 participants, of which 26 were refresher course participants, were enrolled in the course held on March 6 and 7, 2017.
- 2017 Anchorage Transportation Fair, 02-08-18, is an evening event to reach out to a wide audience. WMS presented information included permanent controls requirements and examples and construction practices for erosion and sediment control.

3 Storm Water Management for Areas of New and Redevelopment

3.1 Regulatory Mechanisms and Standards

3.1.1 Ordinance and/or Regulatory Mechanism

ADOT&PF. ADOT&PF regulates project development through the Alaska Highway Preconstruction Manual and Alaska Aviation Preconstruction Manual. Both manuals require ADOT&PF to comply with local ordinances. Therefore, all projects within the Municipality of Anchorage follow the Municipal Design Criteria Manual (DCM).

Alaska Highway Preconstruction Manual link:

http://www.dot.state.ak.us/stwddes/dcsprecon/preconmanual.shtml

Alaska Aviation Preconstruction Manual link:

http://www.dot.state.ak.us/stwddes/dcsprecon/pop_aviation_preconstman.shtml

Municipal Projects. The Municipality regulates permanent stormwater controls on its own projects through the Municipal Design Criteria Manual (DCM). The DCM has been updated by a committee of local of community experts to guide better drainage management and to reflect the goals of Permit, as discussed in Section 3.1.2. The 5-year Implementation Plan created for this term will guide the Municipality through the transition to their new design criteria.

Private Projects. The Municipality regulates permanent stormwater controls through the Anchorage Municipal Code Title 21, which refers to the DCM for policy and technical details. The DCM is discussed in the following section.

3.1.2 Storm Water Design Criteria Manual

ADOT&PF Projects. Effective August 1, 2016, it is the policy of DOT&PF Central Region to apply the guidance contained within the latest approved version of the Municipality of Anchorage, Anchorage Stormwater Manual to projects located within the boundaries of the Municipality of Anchorage with the following exceptions:

- DOT&PF will be conducting all required management and reporting for its projects internally.
- Section 1.6 Drainage Variances – Replace with the following: Approval from the Preconstruction Engineer is required for all variances from the drainage design requirements.
- Section 3.3.2 Stormwater Management Report Components – Add the following at the end of the first paragraph: The Stormwater Management Report shall also meet the requirements of the Highway Preconstruction Manual 1120.5.6 Hydrologic and Hydraulic Reports when applicable.

Private and Municipal Projects. The Municipality establishes design criteria for permanent stormwater controls through Chapter 2 of its Design Criteria Manual (DCM), which is referenced from AMC Title 21. *Volume I, Management and Design Criteria*, of the recently update manual provides guidance for new development This manual has been updated to reflect current regulations and stormwater management practices; it may be found on the Municipal website, www.anchoragestormwater.com .

The DCM has been revised through a process that incorporates Permit requirements and community input. The Municipality referred the new draft DCM to the Anchorage Planning and Zoning Commission for review and recommendation for adoption by the Assembly. It was subsequently adopted, and given an adoption period incorporating a choice between the old and new DCM to give the development community time to adjust to the new requirements consistent with the *Low Impact Development Implementation Plan*. Except for the new and significantly larger storm events we are finding most designers prefer the new manual.

The Low Impact Development Implementation Plan Update, provided in 2015, for the new design criteria and stormwater manual lays out a schedule and strategy for moving forward with demonstration projects and new criteria for incorporating LID into linear and vertical projects throughout Anchorage. It moves the Permittees from struggles experienced with the retention requirement in the previous permit term toward solutions in the form of detention and water quality treatment through LID/Green Infrastructure in this permit term. With the implementation of the new DCM low development projects will increase in number and provide more information to apply to low impact development strategies.

3.2 Green Infrastructure/LID Strategy and Demonstration Projects

3.2.1 LID Incentives Strategy

The Municipality continues to sponsor an incentive program for rain gardens and Low Impact Development (LID) projects. This program continued to support all types of vegetated Low Impact Development (LID) techniques, however in 2017, there was no financial cost sharing available for projects. Subsequently, there were no projects completed this year. Incentive support includes, but is not limited to, technical guidance, manuals, brochures, websites, tours, hands-on workshops, private consultations, ongoing classroom support for school projects, and ongoing maintenance for public rain gardens.

However, new incentives became available with the implementation of the DCM and Stormwater Manuals. They include…..

- 20% Area Allowance: This provision allows runoff from up to 20% of a site to be untreated as long as an equivalent volume of water is treated from somewhere else on the site using Green Infrastructure techniques. This provision is helpful for areas with unique grading challenging or roadway projects with super-elevated curves.

- Utilizing Landscape: Provisions and design criteria are provided for incorporating stormwater treatment facilities into site landscaping and grading. This helps maximize utilization of space on a site.

- Detention and Downstream Analysis Modification: The detention and downstream analysis requirements have been modified to allow more flexibility in designing on-site stormwater controls. Designers can now choose from two options to meet these requirements. The first option remains the same as what was in the old criteria, where designers provide on-site detention and ensure that there is adequate capacity in the receiving system. The second option offers a pathway for increased on-site detention with no analysis of downstream capacity.

- Local Criteria for Stormwater Controls: The new DCM offers detailed design criteria for a menu of stormwater "tools" that have been tailored to Anchorage's site development challenges. These criteria demonstrate how to incorporate green infrastructure efficiently, even on challenging sites.

- Streamlined Reporting Requirements: The new DCM has streamlined and simplified drainage reporting requirements. For small and mid-size projects, full drainage reports have been replaced with drainage certification forms to help guide the designer through necessary considerations. For large projects, the report format has been updated and simplified.

- Alternative Compliance: The new DCM offers a pathway forward for projects that may have a difficult time incorporating Green Infrastructure based on other, conflicting municipal requirements. The Alternative Compliance route may waive conflicting requirements to encourage the use of Green Infrastructure at the discretion of the MOA.

3.2.2 Demonstration projects

The ADOT&PF and the Municipality intend to construct five projects as required by Part 3.2.3 of the Permit for incorporation of LID. The new projects will be evaluated for hydrologic performance and information will be used to update LID design criteria.

ADOT&PF Projects. ADOT&PF Central Region Design Section has identified the following three LID demonstration projects: 1) West Dowling Road Extension Phase II, C Street to Minnesota Drive: 2) Seward Highway: Dimond to Dowling Reconstruction, Phase I 3) Glenn Highway Capacity Improvement. These projects have been selected for hydrologic performance evaluation based on project construction schedules and readiness for monitoring.

Municipal Projects. The Municipality of Anchorage has completed a number of qualifying LID demonstration projects during the third term of the Permit. The permit requirement for demonstration LID improvements were completed in 2016. LID Projects were completed at Fire Station #9, the Kings Landing improvement project at Ship Creek, downhill of 3rd Avenue and the Saturday Market parking lot, and as part of the West Dimond Improvement Project. Additional MOA LID projects were completed in 2017 as discussed in section 3.2.5 of this report.

During 2018, LID demonstration projects will be monitored as required for the fourth-year deliverables for the permit. Evaluation for existing these LID projects was included the Implementation Plan that was included as Appendix C1 of the 2016 Annual Report.

3.2.3 Rain Gardens

The Permittees are required to quantitatively evaluate the effectiveness of select raingardens by the fourth year of the Permit. This requirement will be met through revisiting projects constructed in the second term of the permit. There were two rain gardens, both located within TMDL watersheds. One is located in Taku Park, part of the Campbell Creek watershed, capturing the parking lot runoff and adjacent road runoff from the bordering commercial neighborhood. The other is located at the Fisherman's Bank on Spenard Road, constructed through public-private partnership, in the Fish Creek watershed. These will be quantitatively re-evaluated with the results to be included in the LID Monitoring Report discussed in Section 3.2.2.

Other rain gardens were constructed in neighborhoods around Anchorage as part of the LID incentives program discussed in Section 3.2.1. Still others were constructed as part of private developments and identified through the LID/Green Infrastructure Working Group. In the interest of developing a performance record for various types of controls, private projects will be tracked/monitored as discussed in the Implementation Plan described in Section 3.1.2.

3.2.4 Riparian Zone Management

During the current permit term, the permitees are required to disconnect at least one MS4 outfall from discharging to receiving waters. During the fall of 2015, the MOA completed work on disconnecting one stormwater outfall in the Campbell Creek Watershed. The outfall drains Subbasin 1221 and is categorized as a major outfall as it receives stormwater flows from an area larger than 50 acres that is comprised entirely of industrial areas. Formerly, this subbasin drained to a single outfall located near the intersection of the Old Seward Highway and International Airport Road. As part of the project, subbasin flows were split, resulting into two new subbasins. One basin drains to the location of the original outfall and a second outfall was added in the 56th Avenue Right of Way, west of the Old Seward Highway. Both new outfalls convey stormwater to Campbell Creek via a swale after it has been treated in two, new oil and grit separators.

3.2.5 Street and Parking Lot Repair

ADOT&PF. In general the Department has few opportunities to repair or reconstruct parking areas. However, the ADOT&PF is implementing LID measures where possible in their projects. The Design sections are including LID practices into projects currently in design and also working to establish direction and guidelines on using LID on all projects where it is feasible.

. These LID measures include:

a. Soil Amendments - Spreading a layer of topsoil, compost or mulch on disturbed areas and then placing seed or sod.
b. Bioretention – Planting soil and plant-based filtration devices that remove pollutants through a variety of physical, biological, and chemical treatment processes.
c. Reverse Sidewalk Slopes – Sloping sidewalks to drain away from the road and into adjacent vegetated areas.

d. Dispersion – Channelizing (collecting and re-dispersing) stormwater into areas with either native vegetation or cleared land in areas outside of urban growth areas that do not have a natural or man-made drainage systems.

For example, in support of the MS4 Permit and the Green Roads initiative the AMATS: O'Malley Road Reconstruction Phase I project proposes a linear landscape drainage design that will aid in the infiltration, evaporation, and decontamination of the storm water runoff. Prior to discharging storm water into the right-of-way at the wetlands of Moose Meadows or the bioswale at the Seward Highway; runoff will be treated by the filtration and infiltration of grassy ditches. Silt deposits and debris will be settled out in the sumps of the storm drain system and rock lined ditches will filter and dissipate the water. At Moose Meadows the rock lined ditches will disperse the flow before entering the wetlands where the natural vegetation will further decontaminate the runoff and allow for infiltration and evaporation of the remaining water. At the Seward Highway a landscaped bioswale is proposed to filter off silts and contaminations through compost socks and will allow up to a half-foot of standing water for evaporation and infiltration. The wide and shallow ditch is intended to maximize the time water spends in the swale before it is discharged and conveyed into a series of culverts and grassy ditches prior to merging into the existing Old Seward Highway and O'Malley Road storm drain system.

Municipality. In 2017, the Municipality of Anchorage continued to evaluate the feasibility of incorporating rainfall runoff techniques in the repair and construction of public roads, streets, and parking lots.

As has been the case the last several years, within its transportation construction program, the MOA continues to focus on rehabilitation of existing roadways rather than re-construction of existing roads and the construction of new roads. The limited scope of these project leads to less opportunities to improve on-site drainage, including the inclusion of LID. During 2017, the MOA completed a project to address drainage problems in the 48th/Folker area. As a result of the improvements, water draining from the roadway is directed to an infiltration gallery, rather than flowing directly to Campbell Creek. The MOA also included LID components in the site drainage for the new Muldoon Park.

During the past year, three new subdivisions incorporated LID measures in road and drainage infrastructure to reduce stormwater runoff. These include:

- Harmany Ranch – Subsurface infiltration in swales
- Horizon Estates – Dry well infiltration
- Potter Highlands, Phase 3 – Infiltration galleries

3.2.6 Parking Lot Retrofit

During 2017, the permittees retrofitted a public parking lot to incorporate the use of LID for stormwater treatment. The Valley of the Moon Park parking lot along 17th Avenue was redesigned and reconstructed so that parking lot drainage flows to a bio-infiltration swale. The project will be evaluated and reported in 2018.

3.3 Permanent Storm Water Controls Plan Review and Approval

ADOT&PF Projects. ADOT&PF continues to review all projects during the three phases of the project development:

- Local Review (approximately 30 to 50 percent complete)
- Plans-In-Hand Review (approximately 75 percent complete)

- Plans, Specification and Estimate (PS&E) Review (approximately 95 percent complete)

The Central Region Hydrologist reviews drainage and erosion control features for projects at all three design phases for conformance to design criteria stated in Section 3.1.2.

The ADOT&PF Pre-Construction Manual requires Erosion and Sediment Control Plans (ESCP) to be developed for each project owned, designed or administered by the ADOT&PF. The ADOT&PF assigns design and environmental staff, the Central Region Hydrologist and an ADOT&PF Central Region Stormwater Specialist to review the ESCP. The review process for Airport projects is:

- The ESCP writer creates a project –specific ESCP at the Plans-in-Hand phase
- Individuals enter their review comments into the Design Review Comment web page or give the ESCP writer red-lined edits of the ESCP
- ESCP writer can discuss comments or the red-lined edits with the individual who wrote the comments. ADOT&PF enters all comment responses in the comment web page
- Individuals review the Revised ESCP at the Pre-PS&E phase
- Individuals review of Pre-PS&E ESCP and follow the same process as the Plans-in-Hand ESCP
- The ADOT&PF Design Project Manager checks and verifies the ESCP review comments are incorporated at the time bid documents receive Federal Aviation Administration (FAA) project certification. The FAA requires ADOT&PF Certifications stating that they will comply/have complied with statutory and FAA-imposed administrative requirements.
- The Design Project Manager files the ESCP comments after certification

The review process for Highway projects is:

- The ESCP writer creates a project–specific ESCP at the Pre-PS&E phase
- Individuals submit their written comments to the Design Project Manager or give the ESCP writer red-lined edits of the ESCP
- ESCP writer can discuss comments or the red-lined edits with the individual who wrote the comments. ADOT&PF enters a response to all comments
- The Design Project Manager checks and verifies the ESCP review comments are incorporated at the time bid documents receive Federal Highway Administration (FHWA) project certification. The FHWA requires ADOT&PF certification stating that the PS&E is complete and has been developed in accordance with applicable design standards and the Title 23 USC responsibilities assumed by ADOT&PF in the Stewardship and Oversight Agreement dated December 21, 2012.
- The Design Project Manager files the ESCP comments after certification

In addition, on larger projects, a separate ESCP-focused meeting occurs after the Pre-PS&E review. This meeting discusses the ESCP comments from above and project-specific stormwater issues. The Design Project Manager follows the same process as described above to check and verify ESCP review comments and then files the comments after certification.

Private Development. The Municipality continues to review all work requiring building permits and new subdivisions for permanent stormwater runoff practices. Issuance of a building or stormwater permit will serve as written approval as specified by the APDES MS4 Permit. The Municipality manages construction reviews through an electronic submittal and tracking system which applies a comprehensive review

checklist to all projects. Records are available on request. Qualified review staff are trained in detention and other permanent control techniques through a number of programs including those covered in Section 3.5.

Municipal Projects. The Municipality performs a regulatory review of all Municipal projects 10,000sf and greater in compliance with our MS4 Permit requirement under part 3.2.4. The reviews encompass construction erosion control measures and permanent stormwater management practices. Reviews are documented through the Municipality's online tracking system and are a requirement for development project permit issuance. The MOA will continue to coordinate with ADEC to insure our projects meet the ADEC waste water regulations.

3.4 Permanent Storm Water Management Controls Tracking and Enforcement

3.4.1 Inventory and Tracking

The Municipal Street Maintenance Division acquired and began implementing an asset management database they use to inventory and track municipal- and state-owned stormwater controls. This inventory and tracking database allows Street Maintenance to access information about the condition and maintenance requirements of the stormwater controls owned by the permittees.

The ADOT&PF and CBERRSA worked with WMS to capture information about state owned and area-wide controls. During the second term of the permit, they mapped stormwater controls using GPS instruments and populated the asset management database. During the third term they make periodic updates to incorporate MS4 public improvements as well as new information from construction record drawings.

Private Storm Water Controls. During the second term of the permit WMS developed a database for new and existing stormwater controls and, has since, updated it annually to include new development. As-built drawings of private stormwater controls are required prior to closing a Municipal Building Permit for new and redeveloped properties. These as-builts are scanned and recorded into the database. The Municipality also requires submittal of an Operations and Maintenance (O&M) agreement for private stormwater controls. During 2018, WMS is looking to improve on the functionality and accessibility of this database using web-based GIS functionality. The goal is to try and better integrate data input, data recall and site inspection.

3.4.2 O&M Agreements

In 2015, WMS started requiring a legally enforceable and transferable O&M agreement for private stormwater controls on new and redeveloped properties to generate regular maintenance on private stormwater controls and demonstrate it to the Municipality. These O&M agreements are entered into a municipal database created to assist tracking and inspection of the permanent controls.

In 2017 the MOA received 5 legally recorded O&M agreements.

3.4.3 Inspection and Enforcement

The Permittees must ensure proper long term operation and maintenance of permanent storm water management practices through an inspection program.

ADOT&PF and Municipal Storm Water Infrastructure. See Section 5 for details on inspection and maintenance of ADOT&PF and Municipal stormwater management controls and infrastructure.

Private Storm Water Management Controls. Under the updated SWTPRGM, the Municipality now requires as-built (record) drawings of all constructed stormwater controls that were approved under a Municipal permit for projects 10,000 sf and above. They are scanned into a tracking database.

Projects falling under this new requirement must request a permanent control inspection to obtain a conditional certificate of occupancy. As part of this process, projects must provide a surveyed as-built of permanent stormwater controls and a recorded maintenance agreement with the Municipality for the upkeep of these controls. The Municipality manages installed permanent stormwater controls as a "use permit" similar to elevators and will require periodic re-certification and inspections based on site sensitivity and past compliance. Maintenance records will be required from the owner/operator prior to renewal. High priority sites, requiring, annual inspection, will be identified based on Checklist #3 of Building Safety Handout AG 21.

In 2016, four as-builts were received through the permanent controls process, and inspections were performed on the associated sites. In each case the sites were constructed as represented in the plans. Because finalized projects are trickling in during this start-up phase, MOA has not been successful in meeting the inspection schedule called out in the Permit (August – October). However, in 2018 that schedule will be met. Additionally, MOA will develop a more specialized inspection form for 2018 inspections.

3.5 Permanent Storm Water Controls Training

ADOT&PF. ADOT&PF conducts quarterly design meetings for all design and environmental staff, including topics related to permanent stormwater controls. In addition, ADOT&PF technology transfer staff set up annual training schedules with some courses specifically focused on storm water and drainage issues.

Municipality. MOA staff received training on Stormwater Post-Construction BMPs, and LID at a number of presentations throughout the year:

- The Important Role of Vegetation in Storm Water Management, Storm Water Solutions Webinar, October 17-20, 2017.
- Real-world Residential Preferences for Green Infrastructure Incentives: An Urban Case Study, Storm Water Solutions Webinar, October 17-20, 2017.
- Leveraging Storm Water Cloud Technology on Industrial and Commercial Sites, Storm Water Solutions Webinar, October 19, 2017
- Municipal Water Supplies & Winter Road Maintenance: Determining Vulnerability for Midwestern MS4 Communities, Storm Water Solutions Webinar, October 17-20, 2017
- Stormtank: Finding the True Test for Calculating the Load-Rating Capacity of Stormwater Storage Systems, Storm Water Solutions Webinar, October 17, 2017
- Clean Way Environmental Partners Stormwater Filtration: Solution Session, Storm Water Solutions Webinar, October 23, 2017
- Developing an Innovative Storm Water Management System, Storm Water Solutions Webinar, October 19, 2017

MOA conducted training on:

- Design Criteria Updates at the 2017 Watershed Update/APDES Annual Meeting: March 29, 2017
- Design Criteria Update Outreach to the Anchorage Homebuilders Assoc., and the Anchorage Assembly
- Raingarden Presentation to American Society of Landscape Architects, by MOA WMS, 08-31-17
- WMS GIS Portal Training for Project Management and Engineers, by MOA WMS, 031317

4 Industrial and Commercial Discharge Management

4.1 Inventory of Industrial and Commercial Facilities

An inventory and map of facilities discharging to the MS4 was updated during the second year of the Permit, a year ahead of schedule. It contains the industrial sectors currently tracked as well as all industrial sectors listed in 40 CFR 122.26(b)(14), and a number of commercial locations including vehicle or equipment wash systems and animal facilities with the potential of negatively impacting the MS4. A revised inventory and map were provided in the 2016 report. In comparing the 2016 review to prior years' inventories, the permittees identified facilities that did not appear to have current Industrial SWPPPs. ADEC was notified of the discrepancies. The 2016 inventory will be reviewed again in 2018.

4.2 Snow Disposal Sites

Part 3.3.2 requires permittees, within one year of the Permit effective date, and annually thereafter, to "...inventory and map locations of all permittee-owned and privately owned snow disposal sites that discharge directly to the MS4 or to receiving waters.." with mapping updates performed annually thereafter. In 2015, the permittees reviewed conditional use permits, interviewed rights of way staff, and WMS inspectors for changes to the map and list of all permittee-owned and all known privately-owned snow disposal sites and found there were no changes from previous submittals. In 2017 field checks demonstrated some of the permitted snow disposal sites have been developed for other uses and are no longer being used for hauled snow disposal, and they were removed from the inventory. A map of snow disposal sites operating in the MOA can be found at: http://bit.ly/1eDh4XA.

During the second permit term a decision was made to place additional regulation on snow disposal sites as part of the Anchorage Municipal Code Title 21 revision of December 2010 and the larger Title 21 Land Use Code re-write expected to be adopted in February of 2013. This project summary of considerations and resulting regulatory updates was submitted in 2011. The relevant ordinance in Title 21.07.004.F of the Land Use Code was implemented January 2014. It is available at www.muni.org . As follow-up to this regulatory change, and by the end of the fourth year of the third term, the MOA must evaluate the program for effectiveness in protecting water quality.

During the second year the permittees began the evaluation of the additional regulation of the snow sites for water quality protection. The private snow sites were visited and their conditional use permits reviewed. We found that sites frequently were being used for more than one purpose, and that these uses sometimes conflicted with each other. In response to this finding, we placed language in the new DCM (2017 update) that allowed multi-uses but specified requirements for maintenance of the site to protect water quality during snow melt runoff periods. With the new DCM in place, our next action will be to send letters to

private snow site owners regarding multi-use requirements and then follow up during the third and fourth years of the permit to improve site performance.

4.3 Animal Facilities

The Municipality of Anchorage continues to track animal control facilities under the current program, based on Permit Part 3.3.3. The Municipality must, within three years of the effective date of the permit, evaluate the program implemented in 2010 for animal facilities to prevent waste from facilities or other locations from entering the MS4 and protect water quality. This project will be submitted in the 2018 annual report. An interim update is provided in Appendix G1.

The results from the animal facility program evaluation must be applied as needed to revise all requirements by the end of the fourth year of the permit.

4.4 Storm Sewer System Inventory and Mapping

The Municipality and ADOT&PF annually update their MS4 inventory from construction record drawings as required under Permit part 3.4.1. This inventory includes:

- Pipe systems
- Inlets, catch basins and outfalls
- Structural stormwater treatment controls
- Receiving waters of the MS4
- Subbasin of each outfall
- MS4 roads and parking lots, and
- MS4 maintenance and storage facilities and snow disposal sites.

In 2016, the Municipality and ADOT&PF began work on additional requirements of the Permit Section 3.4.1 that must be completed within 3 years of the effective date of the Permit. These include developing a maintenance tracking base for the portions of the MS4 that are not covered by current databases, updating existing coverages, and collecting information related to OGSs outlined in Permit Section 3.4.1.7. Work continued in 2017 and will be completed in 2018.

These maps showing the combined ADOT&PF and MOA infrastructure, are updated regularly and are available at: http://www.anchoragestormwater.com/maps.html .

4.5 Catch Basin and Inlet Inspections and Maintenance

In compliance with Permit part 3.4.2 the permittees are required to conduct an inspection program to evaluate all permittee-owned or operated catch basins and inlets at least annually and take appropriate maintenance action based on these inspections. All principle MS4 maintenance agencies of the permittees have implemented an inspection and maintenance program.

Central Region Division's Maintenance & Operations (M&O), the maintenance arm for ADOT&PF's Anchorage MS4 jurisdiction, is continuing mapping efforts to correct existing ADOT&PF pipe mapping as well as capture new pipe features for inclusion in maintenance mapping sets. In 2017, ADOT&PF

inspected 3,246 structures and cleaned 1,770 catch basins. In addition, they inspected and cleaned 43 OGS. In all, they cleaned 21,240 linear feet of pipe in the MS4 system.

The Municipality's authorized MS4 maintenance agency for the Chugiak-Birchwood-Eagle River Rural Road Service Area (CBERRRSA) implemented a comprehensive catch basin and inlet inspection and maintenance program for their service area. In 2017, 1,416 structures were inspected, and 522 catch basins, 376 catch basin manholes, 13 oil & grit separators (OGS) and 11 drywells were cleaned.

The Municipality's authorized MS4 maintenance agency for the Girdwood Road Service Area (GSA) implemented a comprehensive catch basin and inlet inspection and maintenance program for their service area. In 2017, 45 catch basin and manhole structures were inspected and 37 were cleaned.

The Municipality's Anchorage Road and Drainage Service Area (ARDSA) comprising most roads in Anchorage not maintained by road service areas or owned by ADOT&PF continued its ongoing OGS and catch basin inspection and maintenance program. During 2017, 9695 controls were inspected, 247 OGS units and 3590 catch basins were cleaned.

By the fourth year of the Permit term, the Permittees will develop rate of fill data for the catchbasins and update their respective cleaning schedules accordingly. This project is being undertaken, for each the Municipality and ADOT&PF, by identifying representative basins according to landuse and tracking their fill rates over a three year period. These rates will then be applied to basins of similar character, and basins will be cleaned according to the rate-of-fill schedule unless information is gained about specific basins which supersedes the applied rate.

Additionally Permittees will develop SOPs for treatment and disposal of their catchbasin and OGS wastes by the fifth year of the permit.

4.6 Street and Road Maintenance

4.6.1 Standard operating procedures

Standard Operating Procedures are reviewed annually for Municipal and ADOT&PF street maintenance agencies. The full submission for them was in the 2016 annual report. Subsequent updates, when they are made, are included with the Operations reports in Appendix A1.

4.6.2 Inventory of materials

Part 3.4.4.2 of the Permit requires permittees to "..maintain an inventory of street/road maintenance material, including use of sand and salt.." and report the inventory in the annual report. Road maintenance materials used by all Anchorage MS4 operators include primarily winter traction enhancing materials. The types of materials used vary somewhat from agency to agency and from street to street but mostly include application of traction-enhancing sands and a variety of deicers and anti-icers. The bulk of deicers are added to the sand prior to its application to the road surface to maintain sand fluidity in sanding vehicles and to help embed the sand particles in road ice. Sand gradations vary by agency with ADOT&PF operators typically using a somewhat finer gradation for their mostly higher speed roads than Municipal operators both for safety reasons and to improve stability of the sand on the road surface. Inventory tables of these materials are summarized in Table 5.1 below.

2: Table 5.1 – Anchorage MS4 Street Materials Inventory, 2017

Item	Type	Units	Amt. Stored 2016	Amt. Ordered 2016	Amt. Used 2016	Storage Location
ADOT&PF						
Sand	M&O spec.	ton	12,000	6,000	9,984	Anchorage
Sand	M&O spec.	ton	7,000	1,000	0	Birchwood
Sand	M&O spec.	ton	3,000	6,000	4,471	Girdwood
NaCl	granular	ton	700	1,000	400	Anchorage
NaCl	granular	ton	0	0	0	Birchwood
NaCl	granular	ton	0	150	150	Girdwood
MgCl2	brine	gal	-	-	-	Girdwood
MOA-CBERRRSA						
Sand	ARDSA spec.	ton	18,750	6,000	5233	Hiland
NaCl	granular	ton	5	5	0	Hiland
MgCl2	brine	gal	5250	As needed	6,552	Hiland
MOA-ARDSA						
Sand	ARDSA spec.	ton	17,000		8,000	Anchorage
NaCl	Granular	Ton	100		100	Anchorage
MgCl2	brine	gal	25,000		16,726	Anchorage
MOA-GRSA						
Sand	E-chips	Ton	600	940	1070	Girdwood
NaCl	Granular	Ton	38	60	64	Girdwood
MgCl2	brine	gal	0	0	0	Girdwood

4.6.3 Covered Sand Storage

Within four years of the effective date of the Permit the Permitees must complete an evaluation of the performance of the sand storage facilities developed during the second term at each of their primary materials storage locations. The evaluation must include an analysis of the amount of salt reduction resulting from the warm.

In 2017, the permittees discussed a scope for this evaluation. There was agreement that individual storage sites would be evaluated for how their use allowed maintenance crews to reduce the amount of salt in their stored sand piles and whether the amount of salt applied annually was reduced from pre-covered years. However, this difference of salt use measure may be challenged by variable climate patterns, with more frequent ice generating mid-winter melt events.

4.7 Street and Road Sweeping

4.7.1 Sweeping Management Plan

The permittees updated their Street Sweeping Management Plans to address recommendations of the *Anchorage Street Sweeping and Storm Water Controls: 2013 Performance Evaluation*. In the second term MOA and ADOT submitted a combined plan, however, in the third term the permittees each developed individual sweeping plans, submitted with the 9-month report as required by Permit Part 3.4.5.1., to accommodate differences in their respective sweeping operations.

A list of roads where sweeping is technically infeasible was provided in the 2015 Annual Report, and it included alternative control measures as required by Permit Part 3.4.5.3. A visual inspection was performed to identify trash or other pollutant issues, and addressed and documented in the form of ditch cleaning and catch basin cleaning. Additional measures may be identified for these roads as needed.

In 2017 the Permittees began sweeping the streets according to the new schedules and sweeping plan. The 2017 sweeping activities were performed consistent with their new plan and schedule. The ADOT&PF and MOA Sweeping Reports are provided in Appendices E2 and E3.

4.7.2 Sweeping Assessment

Permit Part 3.4.5.4 requires the permittees to "…perform annual assessments of street sweeping effectiveness to minimize pollutant discharges to storm drains and creeks..." on the basis of the permit defined performance factors.. The permittees have provided their 2017 summaries of street sweeping activities in their sweeping reports. Table 5.2 presents volumes of road materials picked up during the spring, summer, and fall sweeps.

3: Table 5.2 – Anchorage MS4 Sweeping Summary, 2017

Spring 2017						
	EPA Category	**Drainage Type**	**Street Miles**	**PickUp Miles**	**Total Volume* (cyds)**	**Unit Volume* (cyds/mile)**
DOT	**Arterial**	OC	5.1	25.5	130.0	5.1
		CG	43.9	198.8	2756.0	13.9
		Mixed	48.5	188.2	3150.0	16.7
		Total	97.5	412.5	6036.0	14.6
	Residential	OC	55.8	144.4	769.0	5.3
		CG	3.1	20.3	159.0	7.8
		Mixed	26.9	107.7	499.0	4.6
		Total	85.8	272.4	1427.0	5.2
ARDSA	**Arterial**	Mixed	45.8	91.6	1800.0	19.7
	Residential	Mixed	580.6	1161.3	1835.0	1.6
CBERRRSA	**Residential**	OC	117.2	179.5	840.0	4.7
		CG	31.6	63.4	441.0	7.0
		Mixed	50.5	101.6	231.0	2.3
		Total	199.4	344.4	1512.0	4.4

Fall 2017

	EPA Category	Drainage Type	Street Miles	PickUp Miles	Total Volume* (cyds)	Unit Volume* (cyds/mile)
DOT	**Arterial**	OC	5.1	25.5	40.0	1.6
		CG	43.9	198.8	788.0	4.0
		Mixed	48.5	188.2	754.0	4.0
		Total	97.5	412.5	1582.0	3.8
	Residential	OC	55.8	144.4	281.0	1.9
		CG	3.1	20.3	62.0	3.1
		Mixed	26.9	107.7	193.0	1.8
		Total	85.7	272.4	536.0	2.0
ARDSA	**Arterial**	Mixed	45.8	91.6	100.0	1.1
	Residential	Mixed	580.6	1161.3	250.0	0.2
CBERRRSA	**Residential**	OC	50.2	72.9	99.0	1.4
		CG	16.5	32.9	42.0	1.3
		Mixed	132.7	254.1	150.0	0.6
		Total	199.4	359.9	291.0	0.8

Summer 2017

	EPA Category	Drainage Type	Street Miles	PickUp Miles	Total Volume* (cyds)	Unit Volume* (cyds/mile)
DOT	**Arterial**	OC	5.1	25.5	32.0	1.3
		CG	43.9	198.8	581.0	2.9
		Mixed	48.5	188.2	548.0	2.9
		Total	97.5	412.5	1161.0	2.8
	Residential	OC	55.8	144.4	231.0	1.6
		CG	3.1	20.3	41.0	2.0
		Mixed	26.9	107.7	144.0	1.3
		Total	85.7	272.4	416.0	1.5
ARDSA	**Arterial**	Mixed	45.8	91.6	40.0	0.4
	Residential	Mixed	580.6	*	25.0	*
CBERRRSA	**Residential**	OC	117.2	179.5	No Data Reported	
		CG	31.6	63.4	No Data Reported	
		Mixed	50.5	101.6	No Data Reported	
		Total	199.4	344.4	No Data Reported	

*ARDSA and CBERRRSA Residential roads were swept on an "as-needed" basis to maintain a "visually clean" standard during the summer sweep period

Fall 2017						
	EPA Category	Drainage Type	Street Miles	PickUp Miles	Total Volume* (cyds)	Unit Volume* (cyds/mile)
DOT	Arterial	OC	5.1	25.5	40.0	1.6
		CG	43.9	198.8	788.0	4.0
		Mixed	48.5	188.2	754.0	4.0
		Total	97.5	412.5	1582.0	3.8
	Residential	OC	55.8	144.4	281.0	1.9
		CG	3.1	20.3	62.0	3.1
		Mixed	26.9	107.7	193.0	1.8
		Total	85.7	272.4	536.0	2.0
ARDSA	Arterial	Mixed	45.8	91.6	100.0	1.1
	Residential	Mixed	580.6	1161.3	250.0	0.2
CBERRRSA	Residential	OC	50.2	72.9	99.0	1.4
		CG	16.5	32.9	42.0	1.3
		Mixed	132.7	254.1	150.0	0.6
		Total	199.4	359.9	291.0	0.8

* Volumes represent only swept materials collected along reported/estimated Curb/PickUp Miles
OC = Open Channel Drainage
CG = Curb and Gutter Drainage

For 2017 ADOT&PF reported 100% completeness for all road segments and operational areas for the spring, summer, and fall sweep periods. The contractor finished the DOT sweeps for the spring event behind schedule on 7/6/2017. The reason for this late finish was primarily cold weather delaying the opening of hydrants, which are the sweeper water source until April 25, 2017, a full 25 days after the start of the spring sweeping schedule. There were also approximately 12 rain days during this period where the contractor was unable to sweep. With the delayed start and rain days, the DOT felt that the delayed schedule was still within an acceptable timeline of completion. This information was relayed to DEC, and the recommended action was to take note of the delays and include this information in the annual report.

CBERRRSA reported 100% completeness for the 2017 spring and fall sweep periods with no reported road segments or operational areas falling below permit requirements. For the 2017 summer sweep period CBERRRSA reported that roads were swept 'as needed' in order to maintain a 'visually clean standard' (as prescribed in the Street Sweeping Management Plan). CBERRRSA took and submitted before-sweep and after-sweep photos to support their assessment that roads were deemed 'visually clean' after sweeping.

ARDSA reported a sweeping completeness of 100% for designated streets within its administrative authority for the 2017 spring and fall sweep periods. For the 2017 summer sweep period ARDSA reported sweeping all of the Arterial type roads within its administrative authority, and swept Residential roads as needed in order to maintain a 'visually clean standard'.

In 2017, operators for the Girdwood Service Area (GSA) reported a total of 74 cubic yards of sediment collected for all sweeping operations in 2017. GSA reported 100% completeness for 2017 sweeping operations and all surfaces are swept until "visually clean".

4.8 Pesticide, Herbicide, and Fertilizer Applications

The Municipal pesticide code is located in Title 15.75, available at: http://library.municode.com/index.aspx?clientId=12717. It was updated during the second term to strengthen application restrictions, notifications, and certification requirements. These code requirements are enforced at Municipal facilities and an applications log is maintained.

During 2017 permittees used pesticides in their greenhouses, the application log is presented in Appendix E4.

4.9 Storm Water Pollution Prevention Plans

Stormwater Pollution Prevention Plans for certain permittee-owned activities were developed in the second term of the Permit term. Permittees developed plans for their material storage facilities, maintenance yards, and snow disposal sites. They are updated regularly and available at the italicized facilities for each owner in Table 5.3 and where practical at each facility site.

Inspection

In 2017 inspections indicated by Stormwater Pollution Prevention Plans were performed at the facilities indicated in Table 5.3. Corrections were made as needed. The inspection reports are on file at each of the facility offices and provided in Appendix E5.

4.10 Training

The Municipality and ADOT&PF met periodically during 2017 to coordinate their respective activities and discuss operational issues. Street managers from ADOT&PF and MOA participated in the 2017 Annual Meeting summarized in Section 2.4.

ADOT&PF crew members participated in a number of the following meetings:

- 3/29/17 MS4 Annual Meeting – Presented by MOA
- 10/17/17 Stormwater Virtual Expo
- 2/1/17 AK-CESCL Storm Water Training
- 1/19/17 – When Basic BMPs are Not Enough Webinar
- 1/23/17 – Designing Erosion Control solutions for Extreme Storm Events Webinar
- Various – SWPPP-SPCC Regulations and Procedures Training for Maintenance Districts

Municipal Maintenance crews, at regular staff meetings, are given information regarding APDES Permit requirements in a variety of presentations and staff meetings to assist their understanding, decisions, and record-keeping about activities associated with Permit compliance. Training was conducted for:

- Ongoing at Regular Staff Meetings -Sweeping Practices/Protocol, project BMP's, SOP's and Spill Prevention/Response using SOPs and *Illicit Discharge Detection & Elimination, a Grate Concern* video, Excal Visual;
- 3/29/17 - APDES Annual Meeting
- MOA-ARDSA has over 20 trained/certified AK-CESCL staff.

4: Table 5.3 – MS4 Facilities with Storm Water Pollution Prevention Plans

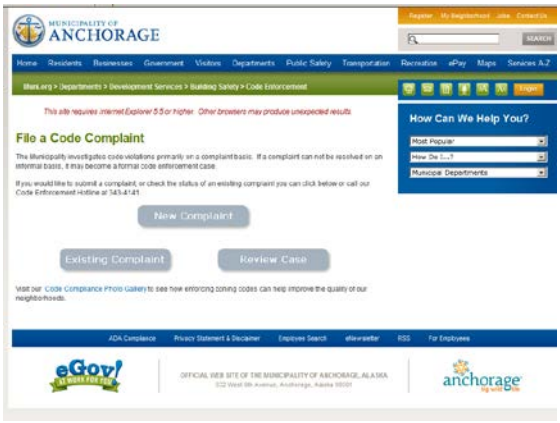
Facility	Location	Activities
ADOT&PF		
Birchwood Maintenance	20651 Birchwood Spur Rd., Birchwood	Equipment & Materials Storage
Girdwood Maintenance	MP 90 Seward Hwy., Girdwood	Equipment & Materials Storage, Maintenance
Anchorage Maintenance	5300 E. Tudor Rd., Anchorage	Equipment & Materials Storage, Maintenance
O'Malley Snow Disposal	10675 Old Seward Hwy, Anchorage	Snow Storage
Tudor Snow Disposal	6110 Tudor Road, Anchorage	Snow Storage (operating under ARDSA SWPPP)
Hiland Road Snow Disposal	8500 Hiland Road, Eagle River	Snow Storage
CBERRRSA		
Eagle River Maintenance	8501 Hesterberg Ln, Eagle River	Equipment & Materials Storage
Chugiak Maintenance Facility	19200 Kerbow Ln., Chugiak	Equipment & Materials Storage
ARDSA		
Kloep Maintenance Facility	5701 Northwood Drive, Anchorage	Equipment Maintenance, Materials Storage & Snow Storage
Muldoon Maintenance & Storage Facility	7909 Boundary Ave., Anchorage	Equipment Maintenance & Materials Storage
Native Heritage Snow Disposal	8902 Heritage Center Drive, Anchorage	Snow Storage
Commercial Dr. Snow Disposal	2941 Commercial Drive, Anchorage	Snow Storage
Mountain View Snow Disposal	5100 Mountain View Drive, Anchorage	Snow Storage
Sitka Street Snow Disposal	1525 Sitka Street, Anchorage	Snow Storage
Tudor Snow Disposal	5300 Tudor Road, Anchorage	Snow Storage
C Street Snow Disposal	395 W 100th Avenue, Anchorage	Snow Storage
Dowling Snow Disposal Site	6531 Spruce Street, Anchorage	Snow Storage

5 Illicit Discharge Management

5.1 Illicit Discharge Regulatory Strategy

The Municipal regulatory authority for water pollution control is founded on Title 21.07.040, http://library.municode.com/index.aspx?clientId=12717. This code provides the basis for managing discharges to the storm sewer and waters of the U.S. It was updated effective January 2011 to conform to Permit requirements consistent with Part 3.5.1.1, provide a stormwater permit for discharges not covered under building permits, and accommodate CGP review authorities. It was carried forward into the Title 21 rewrite to its new position in Title 21.07.04. It is up to date for current permit requirements.

5.2 Illicit Discharge Reporting and Response



The Pollution Hotline, 343-4141, continues to operate with staff taking calls during regular business hours and retrieving messages from callers with complaints during non-business times. These hotline complaints are recorded into the Municipality's Hansen Complaint Management System and forwarded to the appropriate department for response.

The Infor Public Sector System (a new version of the Hansen System software, implemented in 2015) is also available to community members on the Municipal Development Services Building Safety Land Use Code Enforcement website http://www.muni.org/Departments/OCPD/development/BSD/Pages/CodeEnforcement.aspx for on-line complaint recording and tracking.

Table 6.1 (below) tallies complaints recorded through the on-line tracking system. Complaints were followed up within the required two working days, and resolved within a week. *Stormwater – construction* complaints were handled with the inspections in the Construction Site Management Program. *Prohibited discharges* complaints were handled as illicit discharge complaints.

5: Table 6.1 – Service Requests by Complaint Type, 2017

Department	Complaint Type	Number of Requests	Number Resolved
WMS	Stormwater – Construction	13	13
WMS	Prohibited Discharges – Private property	11	11
ROW	Prohibited Discharges – ROW	7	7

Illicit Discharge mapping

Appendix F1 contains a location map of 2017 Anchorage prohibited discharge complaints. Inspectors visited all sites and, where appropriate, initiated clean-up. There were no recurrences associated with any of the discharges.

5.3 Dry Weather Screening

The permittees continued to implement the re-designed dry weather screening program in compliance with Permit requirements. The 2017 report is provided in Appendix F2. In 2017, there were two exceedances for fecal coliform. The first site was at outfall 5-1 draining the Botanical Garden subdivision into Furrow Creek in Johns Park. The first sample was 890 col/100mL, therefore the site was resampled, 4.9 and 6.6 col/100mL, and found to be within the threshold. The second site was Outfall 1335-1 draining portions of Eagle River Road including the Walmart super Center and the southern slopes of Mount Magnificent in Chugach State Park into Eagle River. The primary samples were 690 and 410 col/100mL and the follow-up samples were 19 and 18 col/100mL.

Both sites exceedances were determined to be due to random coliform rather than as a result of an ongoing source. No further action was taken.

5.4 Spill Prevention and Response

The permittees must prevent, respond to, contain and clean up all sewage and other spills that may discharge into the MS4. To meet this requirement the permittees convened a group of interested participants and mapped out current Anchorage response. The information that came from these discussions was drafted into a Spill Response Program Agreement. The working group continues to coordinate the spill response program and they updated the Agreement in 2016 to reflect administrative changes.

2017 Spill Response

In 2017 the Municipality of Anchorage responded to two spills. The first spill was of an unknown amount of sewage/grey water that had overflowed from a sewer manhole located between the Crestview Condos on 22nd Ave. and the condos on Clover Hollow Ct. (Loussac Place condos). The spill was reported by a neighbor who smelled sewage and noticed a flow of liquid between the buildings. MOA WMS staff responded to the spill and found that the flow had ceased, and no liquid was observed in the area, though an obvious flow path through vegetation could be traced to a sewer manhole located on the slope between the buildings. The flow path smelled of grey water and the area had been treated with powdered lime and flagged off with caution tape. WMS staff traced the flow path from its origin, and it appeared that the flow did not travel far enough to enter the storm drain system on the west side of the Loussac Place condos.

WMS staff checked several storm drain structures in line with the spill as well as Chester Creek, but did not observe any evidence of contamination, supporting the conclusion that no sewage/grey water had entered the MS4. WMS staff contacted AWWU and determined that AWWU staff had already responded to the spill, cleared a blockage in the service line, and cleaned up the overflow from the manhole, including applying lime and taping off the contaminated area. AWWU returned and cleaned up the lime, taking care to not wash any of it into the MS4. The second spill was also an overflow from a sewage service line that was self-reported to the MOA by the business owner at 2347 Azurite Ct. MOA WMS and ROW staff responded to the report and determined that although sewage/grey water had overflowed onto the parking lot of the business, the spill had been contained within the paved lot and cleaned up prior to MOA staff arrival. Drying patterns on the parking lot pavement, as well as inspections of the storm drain inlets on property and along Azurite Ct. indicated that the spill was contained on property and did not enter the MS4.

ADOT&PF reported no hazardous material spills on any DOT&PF Construction projects or to DOT&PF owned MS4 in 2017.

5.5 Used Oil and Toxic Materials

5.6 The permittees have an ongoing program for accepting hazardous materials including used oil and toxic waste at the Anchorage Regional Landfill and Central Transfer Station. Those locations will accept up to five gallons of household hazardous waste for free. Information and public education materials for this program are found on the Municipal Solid Waste Services homepage at http://www.muni.org/departments/sws/pages/default.aspx

5.7 Training

Training for identifying and eliminating illicit discharges, spills, and illicit connections to the MS4 was performed with the implementation of the Dry Weather Screening Monitoring as outlined in the Monitoring Plan.

Staff training was supported by:

- Clean Way Environmental Partners Stormwater Filtration: Solution Session, Storm Water Solutions Webinar,October 23, 2017
- Developing an Inovative Storm Water Management System, Storm Water Solutions Webinar,October 19, 2017

6 Public Education and Involvement

6.1 Public Education and Involvement

The Municipality, on behalf of the permittees, entered into an agreement with the Anchorage Waterways Council (AWC) to conduct the ongoing public education required by the Permit. A full account of education activities for 2017 is provided in Appendix G1 and summarized below.

6.2 Targeted Education and Training

See the following sections of this Annual Report regarding targeted training for permittee staff:

- Construction - Section 2.4

- New and Redevelopment - Section 3.5
- Stormwater Infrastructure - Section 4.10
- Illicit Discharge - Section 5.6

6.3 Annual Meeting

The 2017 Annual Meeting provided information to participants about the activities related to the Municipal Separate Storm Sewer System (MS4) Permit. The meeting was held the morning of March 29th at the BP Energy Center and attended by over 50 people with an interest in stormwater management. This was fewer than previous years due to an active snowstorm and impassable roadways. The meeting used an "open house" format and included poster displays summarizing first year permit activities. Information was presented about relevant topics including a proposed stormwater utility, catch basin and OGS waste management, and ADOT&PFs Green Streets program. A description of the planned 2017 activities was provided. Additionally, there was an update of the status of the MOA DCM update. The final event of the meeting was a Q&A session where MOA, ADOT staff and contractors were on hand to answer any questions about the items that were presented as part of the meeting. Presentation slides, program agenda, and poster summary are available in Appendix G2.

6.4 Semi-Annual Meetings

Semi-annual meetings between the permittees and Alaska Department of Environmental Conservation (ADEC) were conducted in 2016 to provide a forum of discussion regarding permit activities and issues. These meeting summaries are available in Appendix G3.

6.5 Storm Water Website

In 2017 the permittees provided access to their website found at www.AnchorageWatershed.com or www.AnchorageStormwater.com . This homepage, contains all program information including draft and final project reports, data, map products, forms, permit applications, Storm Water Pollution Prevention Plan (SWPPP) guidance, and watershed plans. This site is accessible additionally through the municipal website: http://www.muni.org/Departments/works/project_management/WM/Pages/Default.aspx .

7 Monitoring and Assessment

7.1 Discharges to Water Quality Impaired Waters

As listed in the Permit, pollutants of concern in Anchorage receiving waters include fecal coliform, petroleum products, and, for one lake, dissolved oxygen. The Municipality, acting on behalf of the permittees, will measure and evaluate the effectiveness of activities to control these pollutants of concern through the following means:

- Stormwater outfall monitoring
- Controls effectiveness monitoring
- Dry weather screening and follow-up
- Public education and involvement program

7.2 Monitoring Plan

The Municipality, on behalf of the permittees, updated the "Quality Assurance Project Plan" for third term activities. The Municipality, on behalf of the permittees, conducts monitoring for various purposes as summarized in Table 8.1.

6: Table 7.1 – Storm and Surface Water Monitoring Program Schedule

Monitoring Program Component				Proposed Sampling Dates	
	2015	2016	2017	2018	2019
Pesticide Screening	None	Aug-Sept	none	Aug-Sept	None
Dry Weather Screening	May-Sept	May-Sept	May-Sept	May-Sept	May-Sept
Control Measure Effectiveness	April-Nov	April-Nov	April-Nov	April-Nov	April-Nov
Snow Storage Site Retrofits	None	None	Mar-Jun	Mar-Jun	None
Stormwater Outfalls	Apr-Nov	Apr-Nov	Apr-Nov	Apr-Nov	Apr-Nov
LID Monitoring	May-Oct	May-Oct	May-Oct	May-Oct	May-Oct

7.2.1 Pesticide Screening

This sampling program is a continuation of the program began with the first permit term. Sampling was conducted in the second year and will be repeated in the fourth year of the permit term. The results of the second year were reported with the 2016 annual report. The fourth year will be sampled in fall of 2018.

7.2.2 Snow Storage Site Retrofits

The APDES stormwater discharge permit for the Anchorage MS4 requires monitoring of the retrofitted public snow storage sites relative to criteria already developed and published by the MOA-Watershed Management Section regarding siting, design and operation of these types of facilities.

The permittees are required to perform monitoring at Tudor Road Municipal disposal site and Spruce Street Municipal snow disposal site twice during two years of the third permit term. Original plans to sample in 2016 were revised in response to lack of snow in the storage sites based on the low 2015-16 snow season. Sampling was performed in 2017, see data report in Appendix H1, and it will be done again in 2018 or as soon as conditions allow.

7.2.3 Storm Water Outfall Monitoring

Storm Water Outfall Monitoring was continued in 2017 according to the plan approved for the third term. Results are provided in Appendix H2. Also included in the report is an analysis of trends and observations for the data year.

The sampling sites were adjusted prior to starting the 2016 sampling season were continued in 2017. Results are presented in the Stormwater Outfall Monitoring Report provided in Appendix H2.

An evaluation of monitoring results is required in years one and four of the Permit term with results provided with the applicable annual report. The first year evaluation discussing the effectiveness of street sweeping to reduce turbidity and fecal coliform in the outfall and public education to reduce fecal coliform bacteria in the outfall was provided in the 2016 annual report.

Monitoring Followup

In 2017 the permittees, at the request of ADEC, explored Chester Creek Outfall 07 to gain information regarding the frequently high fecal coliform results found in storm water monitoring results. The sub-basin draining to the outfall was mapped and, in October, field crews took samples from several of its access points. The laboratory results ranged from non-detect to 6500 colonies per 100 milliliters. These results are an order of magnitude below the bacteria levels frequently observed, and there was no single flow source that visually looked like a possible cross connect source. The permittees will revisit the outfall at some point when bacteria levels are again at high levels to continue looking for possible sources. The report for the exploration effort is available in Appendix H3.

7.2.4 Quality Assurance Plan

The Quality Assurance Plan (QAP) Appendix C for snow site monitoring activities has been updated to correct details missed in the previously updated plan and account for field changes based on the 2017 field effort. The QAP excerpt is provided in Appendix H4.