CITY OF TEMPE

2016-2017

ANNUAL PHASE I MS4 REPORT

As Prescribed by AZPDES Permit No. AZS000005-2010 Appendix B

August 2017

Prepared by the City of Tempe
Public Works Department
Water Utilities Division
Environmental Services Section
Regulatory Compliance Group

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1. General Information

A. Name of Permittee

City of Tempe

B. Permit Number

AZPDES Permit No. AZS000005-2010

C. Reporting Period

July 1, 2016 – June 30, 2017

D. Stormwater Management Program Contact

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2. Annual Report Certification

The Annual Report Form (ARF) must be signed and certified by either a principal executive officer or ranking elected official; or by a "duly authorized representative" of that person in accordance with Sections 9.2 and 9.12 of the Permit.

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 gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering 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.

Certifying Official

9/27/17
Date

3. Narrative Summary of Stormwater Management Program Activities Report

This section provides a status summary addressing stormwater management program activities required by AZPDES Permit No. AZS000005-2010 (Permit). Included is a brief description of program or activity implementation and progress or challenges, where applicable, in each area during the reporting year. If applicable, any significant developments or changes to the number or type of activities, frequency or schedule of activities, or the priorities or procedures for specific management practices are explained. This section includes language required by Appendix B of the Permit and additional information provided by Tempe.

A. Public Awareness Activities Including Outreach

Tempe Activities

Tempe has surpassed minimum Permit requirements outlined in Appendix A, Sections I.A and I.B, by coordinating and participating in many public and business sector awareness and outreach activities. During the 2016-2017 reporting year, Tempe reached ten target groups totalling approximately 421,997 people and/or businesses while covering a wide array of stormwater topics. The significant increase in the number of people reached, above the 2015-2016 estimated reach of 129,388, is due to increased messaging in Tempe newsletters such as Tempe Today. In some cases this number includes the same audience, though the stormwater message varies (e.g., Tempe resident messages through *Tempe Today* articles and Tempe businesses through *E-Bulletin* distribution, Tempe events STORM messaging and Tempe specific materials.). Table 1 summarizes events, topics, estimated numbers of people reached (where possible), numbers and types of materials distributed, and target groups. Examples of outreach materials, brochures, articles, and E-Bulletins are included as **Attachment A**.

Table 1: Summary of Public Awareness Activities and Outreach

Outreach Events	Date	Topic(s)	Number of People or Businesses Reached	Type of Materials Distributed	Target Groups
Industrial Facilities, Restaurants	All Year	Stormwater information for industrial, commercial facilities and restaurants	259	BMP brochures and FOG information given during inspections	Industrial, Commercial Businesses, Restaurants
Tempe Today Article	Jul-16	Green Waste Recycling/Compost	44,000	Article in Tempe Today inserted into water bills and posted on website	General Public, Residents, Industrial, Commercial Businesses

E-Bulletin (3Q2016)	Sep-16	Construction Stormwater Pollution Prevention Plan, Tempe's Annual Stormwater Report	206	Environmental Bulletins via E-mail and Posted to Website	Commercial, Industrial Businesses
Tempe Today Article	Sep-16	Xeriscape, Water Conservation, Landscape Maintenance Workshops	44,000	Article in Tempe Today inserted into water bills and posted on website	General Public, Residents, Industrial, Commercial Businesses
ASU Homecoming Event	Oct-16	Stormwater pollution prevention information	37	Best Management Practice Brochures: Home repair, Yard & Garden, Pet waste, Pools, FOG, Copper, Auto repair & Pet waste bags.	Downtown Visitors
Neighborhood Outreach	Oct-16	Pet Waste Disposal	60	Pet Waste Brochures and Doggie Bags	HOA
Tempe Today Article	Oct-16	Zero Waste Event, Prescription Drug Take Back	44,000	Article about special waste collection events. All items will be recycled, reused or disposed of in an environmentally safe manner.	General Public, Residents, Industrial, Commercial Businesses
Tempe Today Article	Nov-16	Recycle Cooking grease	44,000	Article in Tempe Today inserted into water bills and posted on website	General Public, Residents, Industrial, Commercial Businesses
E-Bulletin (4Q2016)	Dec-16	EPA Stormwater Program Regulations, Green Infrastructure, Stormwater Pollution Prevention Tips, Training Opportunities	206	Environmental Bulletins via E-mail and Posted to Website	Commercial, Industrial Businesses
Municipal Facilities	Dec-16	Construction Best Management Practices (BMP's)	60	Brochures to Community Development and Engineering Groups	Development Community and Construction Site Operators
School Outreach	Dec-16	Stormwater Information	20	Activity book for Middle Schools	Schools

Social Media	Dec-16	Stormwater Pollution Prevention: Why do storm drains matter?	6,688	Facebook Post on Stormwater Pollution Prevention	General Public, Residents
Tempe Arts Festival	Dec-16	Stormwater Pollution Prevention, Stormwater Management Plan(SWMP) available for review & feedback	554	Best Management Practice Brochures: Home repair, Yard & Garden, Pet waste, Pools, FOG, Copper, Auto repair & Pet waste bags.	General Public, Residents, Downtown Visitors
Tempe Today Article	Dec-16	Holiday Tree Recycling/Compost	44,000	Article in Tempe Today inserted into water bills and posted on website	General Public, Residents, Industrial, Commercial Businesses
AZ Science Center Engineers Day	Feb-17	Stormwater Pollution Prevention	143	Best Management Practice Brochures: Home repair, Yard & Garden, Pet waste, Pools, FOG, Copper, Auto repair & Pet waste bags.	General Public, Schools
Neighborhood Outreach	Feb-17	Pet Waste Disposal	54	Pet Waste Brochures and Doggie Bags	HOA
Tempe Today Article	Feb-17	Xeriscape, Water Conservation, Landscape Maintenance Workshops, Zero Waste, Green Organics	44,000	Article in Tempe Today inserted into water bills and posted on website	General Public, Residents, Industrial, Commercial Businesses
Urban Gardening Event	Feb-17	Stormwater Pollution Prevention	70	Best Management Practice Brochures: Home repair, Yard & Garden, Pet waste, Pools, FOG, Copper, Auto repair	General Public, Residents
AZ Water for People 5K	Mar-17	Stormwater Pollution Prevention	40	Best Management Practice Brochures: Home repair, Yard & Garden, Pet waste, Pools, FOG, Copper, Auto repair & Pet waste bags.	General Public, Residents

E-Bulletin (1Q2017)	Mar-17	Commercial Best Management Practices (BMP's)	206	Environmental Bulletins via E-mail and Posted to Website	Commercial, Industrial Businesses
Geek's Night Out	Mar-17	Stormwater Pollution Prevention Information	227	Runoff demonstration, School Activity Books, Best Management Practice Brochures (Home repair, Yard & Garden, Pet waste, Pools, FOG, Copper, Auto repair) & Pet waste bags.	General Public, Residents, Schools
Social Media	Mar-17	Event Announcement: Protect Water Supplies	1,830	Facebook Post: Link to Tempe Stormwater website	General Public, Residents
Tempe Arts Festival	Mar/Apr-17	Stormwater Pollution Prevention, Stormwater Management Plan(SWMP) available for review & feedback	458	Best Management Practice Brochures: Home repair, Yard & Garden, Pet waste, Pools, FOG, Copper, Auto repair & Pet waste bags.	General Public, Residents, Downtown Visitors
Social Media	Apr-17	Pollution Prevention Grease Cooperative, Commercial Best Management Practices, Prescription Drug Take Back	9,874	Facebook/Twitter Posts: Event Announcements and Links to Tempe Program Webpages	General Public, Residents
Tempe Today Article	Apr-17	Prescription Drug Take Back	44,000	Article about special waste collection events. All items will be disposed of in an environmentally safe manner.	General Public, Residents, Industrial, Commercial Businesses
Municipal Facilities	May-17	Proper Pool Discharge	100	Brochures & Door Hangers to Solid Waste Inspectors	Residents

Neighborhood* Outreach	May-17	Proper Pool Discharge	212[1]	Facebook Post for Pool Maintenance Best Management Practices	HOA and Residential Community
Social Media	May-17	Proper Pool Discharge Guidelines	4,391	Link to Best Management Practice Brochure	General Public, Residents, Schools
Tempe Today Article	May-17	Stormwater Safety and Pollution Prevention	44,000	Article in Tempe Today inserted into water bills and posted on website	General Public, Residents, Industrial, Commercial Businesses
Downtown / Tempe Business Outreach	Jun-17	Stormwater Awareness Material Specific to Downtown Tempe	96	Flyers Stormwater Awareness Near Tempe Town Lake	Commercial Businesses, Restaurants, Downtown Tempe Businesses
E-Bulletin (2Q2017)	Jun-17	Monsoon Preparation and Stormwater tips, ADEQ Multi-Sector General Permit Requirements (MSGP), MyDEQ portal	206	Environmental Bulletins via E-mail and Posted to Website	Commercial, Industrial Businesses
Tempe Today Article	Jun-17	Monsoon Preparedness and Pollution Prevention	44,000	Article in Tempe Today inserted into water bills and posted on website	General Public, Residents, Industrial, Commercial Businesses
Tempe Channel 11 Video Broadcast	All Year(10 times/mo.)	Stormwater Pollution Prevention Information	26,161 [2]	Video on Stormwater pollution prevention Information	General Public, Residents
			421,997	**Estimated annual total of people or businesses reached through 23 awareness and outreach activities**	

[1] Neighborhood outreach messages sent to 212 organizations (132 HOA's and 80 Neighborhood Associations) unknown # of residents reached.
[2] Tempe Channel 11 viewership numbers were not included in the total numbers reached since viewership could not me measured. Tempe Channel 11 has 26,161 subscribers, an unknown portion of whom were reached by the video.

Regional Activities

- Since the beginning of 2012, Tempe Environmental Services has coordinated and hosted quarterly Arizona Phase I MS4 Coalition Meetings. These meeting are an opportunity for Arizona Phase I municipalities to discuss program challenges, successes, innovations, and experiences. These meetings also allow for a more consistent understanding and implementation of the MS4 program statewide.

- The City of Tempe is an active member of Stormwater Outreach for Regional Municipalities, known as STORM. STORM is a regional organization promoting stormwater quality education within the greater Phoenix metropolitan area. STORM was founded in 2002 in response to regulations requiring municipalities to implement measures to educate the public on ways to protect the quality of stormwater runoff. Benefits for the region include increased public awareness of the impacts of stormwater pollution, shared experience and knowledge, pooled financial resources to address concerns common to all communities, protected environments, and improved quality of life.

  The purpose of STORM is to provide a platform for collaborative effort by which educational outreach may be provided to residents in the greater Phoenix area with the message of pollution prevention to keep our waters clean.

  The STORM organization is composed of and benefits small, medium and large municipalities throughout the greater Phoenix metropolitan area. It has brought together the experience and resources of Phase I MS4s, including Phoenix, Mesa, Tempe, Glendale, Scottsdale and Arizona Department of Transportation (ADOT) with Phase II MS4s of Apache Junction, Avondale, Buckeye, Casa Grande, Chandler, El Mirage, Flood Control District of Maricopa County (FCDMC), Fountain Hills, Gilbert, Goodyear, Guadalupe, Litchfield Park, Luke Air Force Base, Maricopa County, Paradise Valley, Peoria, Pinal County, Queen Creek, Surprise, and Tolleson. A Tempe representative regularly attends the monthly STORM meetings. Additionally, as of June 2016, Tempe has a representative on the STORM Board of Directors allowing the city to directly shape the future of this regional organization.

  Key STORM accomplishments for fiscal year 2016-2017 include the following:

  - Events – 108 events 15,000 direct contacts engaging with the public on the importance of stormwater pollution prevention. These interactions continue to be a substantial part of STORM's public education effort.
  - Social Media – increased audience engagement on social media by nearly 400% through the use of ABC15 creative advertising; a combination of displays, Facebook ads and posts, and high-impact units. Overall, the use of digital media performed very well with more than 3.5M impressions and nearly 15,000 clicks (General Public 18+ years of age);

- Website – received a total of 13,871 webpage views; an increase of 33% from FY16. Webpage sessions increased by 112% from FY16 to reach 8180 sessions in FY17. A session is defined as a period of time a user is engaged in the website. Meaning, more people are actively using and searching the STORM website. Users, or individuals increased when compared to FY16 by 126%, to 6328 users (Table 1);
- Middle School Activity Books – developed and purchased 38,000 activity books to support messaging to school-aged children about stormwater pollution prevention (Children ages 6-12);
- Promotional Items – minimized variety of items and focused on relevant messaging and gadgets (Cups, Fliers, and Stamps) (Ages 6-70); and,
- Future Plans – established a baseline plan to target audiences via specified messages on a rotating basis.

The Fiscal Year 2017 STORM annual report is included as **Attachment B**. Tempe outreach events previously listed in Table 1 are included in the STORM report to account for distribution of STORM specific materials within the region.

B. Public Involvement Activities Including Outreach

"Adopt-A" and Other Volunteer Programs

Tempe implements various City "Adopt-A" (street, path, park) and other volunteer programs as components of the public involvement and participation portion of the city's stormwater program. In addition to the aesthetic value of keeping roads and rights-of-way clean, the public and community service workers have helped Tempe to remove an estimated 1,422 bags of trash and debris that could have otherwise ended up in the MS4 system and/or subsequently a Water of the U.S. Information on Tempe's "Adopt-A" programs can be found at the website listed below.

- http://www.tempe.gov/adopt

Table 2 summarizes the number of events that occurred during the 2016-2017 reporting year, number of participants, and amount of trash removed.

Table 2: Summary of "Adopt-A" and Volunteer Involvement and Participation

Adopt Events	Number of Events	Volunteers or Community Service Workers Involved	Bags of Trash Removed
Tempe Adopt-A-Path	20	67	50
Tempe Adopt-A-Street	34	417	226
Tempe Adopt-A-Park	36	734	1146
Totals	**90**	**1218**	**1422**

Open Meeting Events

Tempe must, at least biannually, incorporate "open meeting events" into community activities or other public events. These open forums are used for public education, input, and feedback on the city's stormwater management program and review of the Stormwater Management Plan (SWMP). Since many of Tempe's stormwater awareness and outreach activities/events occur during community activities and/or public events and are hosted by city staff who are experienced with Tempe's program, these venues are utilized as "open meeting events." During the 2016-2017 reporting year, Tempe advertised and conducted two open meeting events at the Tempe Arts Festivals. See Table 1 for details.

Parks

Tempe's Parks Maintenance Section continues to maintain 65 "doggy bag" dispensers at various Tempe parks. This activity specifically involves the public in the reduction of pet waste that has a potential to reach the MS4.

Communication and Public Reporting

Tempe continues to provide the public with the opportunity to participate in the city's stormwater program by providing avenues for the reporting of spills, discharges, or illicit dumping within the community. Tempe continues to operate its stormwater hotline and web-reporting for public reporting of illegal discharges to the city's storm drain system. In an effort to consolidate city service information and contacts, Tempe utilizes a 311 system, which allows residents to call the 311 number, visit the 311 website and mobile Tempe311 app to report potential illicit discharges. A summary of public reporting can be found in Section 3.C of this report. Means of reporting are as follows:

- 480-350-2811 Stormwater Hotline
- 480-350-4311 City Hall Call Center
- http://www.tempe.gov/311
- http://www.tempe.gov/stormwater

- Tempe311 mobile app (iPhone and Android)

In addition, Tempe regularly disseminates the general Environmental Services Section phone number and stormwater webpage for purposes of allowing public discussion of stormwater issues and providing copies of stormwater material and the most current SWMP. The general contact number and program information location are as follows:

- 480-350-2678
- http://www.tempe.gov/stormwater

Participation is encouraged during outreach events and public awareness activities, and contact information is provided with all outreach materials. See Section 3.A of this report for a detailed listing of outreach events.

Household Products Collection Center

Tempe continues to operate its Household Products Collection Center (HPCC), which opened in 1999. The HPCC provides Tempe residents with an outlet for disposing of and recycling potentially hazardous household products to prevent possible stormwater pollution. Materials commonly collected at the facility include e-waste, batteries, used motor oil, paint, antifreeze, pesticides, herbicides, and solvents. Materials are either recycled or disposed of in accordance with local, state, and federal regulations. Usable materials, such as paint, are processed, packaged, and made available to Tempe residents free of charge. Information on the HPCC, and on the proper handling and disposal of household waste, is available at:

- http://www.tempe.gov/householdproducts

In reporting year 2016-2017, HPCC advertised and hosted two special Zero Waste Events. The first event was in November 2016 the other was in April 2017. The events had 615 and 556 vehicles, respectively; pass through the center to dispose of household hazardous materials. These special events are included in the summary below.

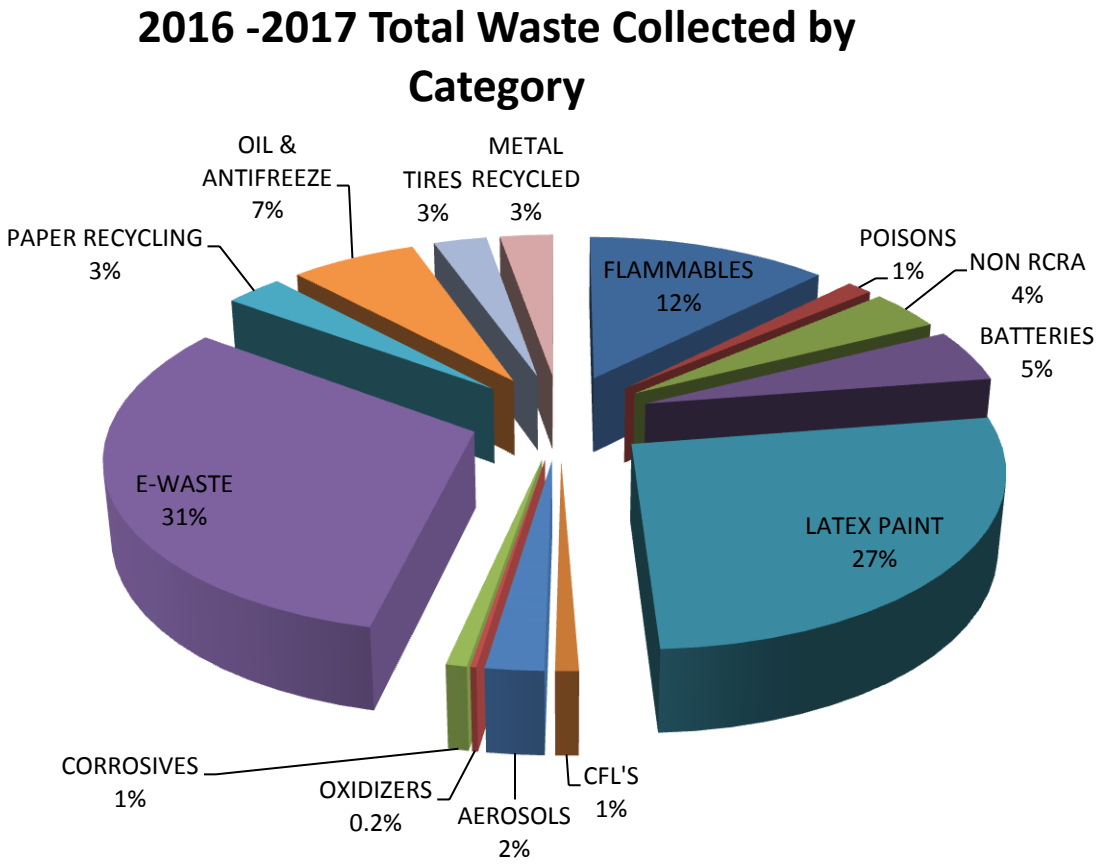
Table 3 summarizes HPCC events during the 2016-2017 reporting year.

Table 3: Summary of HPCC Activities

Number of Days Open to the Public	Number of People that Utilized HPCC Services	Amount of Household Hazardous Waste Collected
104	9,619	435,740 pounds

Below is a breakdown of all waste collected at the center, of which 93% was recycled.

Figure 1: HPCC Waste



Tempe Grease Cooperative

In 2014, Tempe launched the Tempe Grease Cooperative (TGC), an innovative voluntary partnership program, between the City of Tempe and its restaurants to better manage fats, oils and grease (FOG). In the program, Tempe brokers both pricing and service quality for grease trap and interceptor maintenance on behalf of community restaurants and food service establishments. Proper cleaning and maintenance of grease traps and interceptors helps prevent backups potentially reducing sanitary sewer overflows which could enter the MS4. The partnership is a gateway to open communications between businesses and Tempe's Environmental Services Section and fosters compliance with several environmental programs including stormwater. Because of their potential to impact the MS4, restaurants are identified as a priority for commercial inspections. In this reporting year, 28 restaurants joined for a total of 187 enrollments in the cooperative.

C. Illicit Discharge Detection and Elimination (IDDE) Program Activities

Tempe's Illicit Discharge Detection and Elimination (IDDE) program consists of several components designed to educate, involve, and solicit participation from City employees and the public, proactively prevent illicit discharges, and detect and eliminate illicit discharges. Below is a summary of these IDDE program components:

Training

During the 2016-2017 reporting year, Tempe maintained a staff of seven Environmental Compliance Inspectors (ECI), four Water Quality Specialists (WQS), two Environmental Compliance Supervisors (ECS), an Environmental Quality Specialist (EQS) and an Environmental Program Supervisor (EPS) with direct stormwater responsibilities. All inspectors are cross-trained in pretreatment, cross-connection control, and stormwater inspections. During the 2016-2017 reporting year, stormwater training for this group consisted of one two-day training event. The MS4 Compliance & Enforcement Inspection Seminar was attended by six ECIs, one ECS, an EQS, and an EPS.

External training focused on IDDE components, inspections, tracking, enforcement, and overall program management of a MS4.

As an efficiency measure in 2013-2014, Tempe's WQSs were assigned to conduct outfall screening. WQSs will receive updated training in the 2017-2018 reporting year.

Of the 253[1] Tempe employees who received training during the 2016-2017 reporting year, approximately 242 non-Environmental Services field employees received site specific Municipal Facility training that included the identification and reporting of illicit and non-stormwater discharges. IDDE topics were discussed during these Municipal Facility training events, though are not specifically categorized as IDDE training for purposes of this report. See Section 3.K of this report for a summary of training events, number of employees trained, and topics discussed. See **Attachment C** for copies of training sign-in sheets.

These Tempe employees, many of whom work in the field, have been specifically trained to contact Tempe's Environmental Services Section in the event that a potentially illicit discharge is identified.

Outreach – Pollution Prevention

Tempe continues to implement a comprehensive outreach program that conveys a message of pollution prevention and encourages the reporting of illicit discharges or other potential sources of stormwater pollution. For details about this program, please see Sections 3.A and 3.B of this report.

Infrastructure Inspection and Maintenance

One of Tempe's most proactive IDDE measures is the inspection and cleaning of municipal stormwater infrastructure. These activities are divided between five City workgroups:

[1] Number includes employees that may have attended more than one training event.

Environmental Services, Parks Maintenance, Streets, Water Engineering, and Water Operations. Each section maintains responsibilities for various aspects of stormwater infrastructure inspection and cleaning. Note that infrastructure is not limited to catch basins, but includes all aspects of the MS4 such as catch basins, drywells, bubbler boxes, inlet structures, outfalls, streets, conveyance pipes, retention basins, etc. Outfall inspections are covered further in this section. Environmental Services maintains contracts for infrastructure cleaning services.

- Environmental Compliance Inspectors continue to conduct Alternative Retention Criteria Area (ARCA) catch basin inspections after large downtown events such as 4th of July festivities and the New Year's Eve Block Party. See Section 3.G of this report for a description of the ARCA. During the 2016-2017 reporting year, two ARCA area catch basin inspection events occurred. As a result, 35 catch basins were inspected, one of which required referral for cleaning, and these are included in Table 4 under Environmental Services infrastructure cleaned.

  Environmental Compliance Inspectors also conducted six additional infrastructure inspections in other sections of the city as a result of calls or complaints.

  A numeric summary of infrastructure inspection and cleaning events can be found in Table 4 of this section. Inspection forms, narratives, and other inspection related information are included as **Attachment D**. A summary of contracted cleaning events is included as **Attachment E**.

Tempe's Parks Maintenance Section provides routine maintenance for various parks, retention areas, public common areas, public open areas, and recreational areas throughout the city. During routine visits to each of these facilities, cursory inspections are conducted of stormwater infrastructure. Detailed inspections are conducted annually. During the 2016-2017 reporting year, the Tempe Parks Maintenance Section inspected 280 stormwater assets including catch basins, inlet structures, drywells, bubbler boxes, and retention basins. Forty-one of the 280 inspected stormwater assets were referred for cleaning. Cleaning referrals are verified before contracted cleaning services are scheduled. If the structure only requires minor debris pick-up it may be performed by city staff. A numeric summary of inspections and cleaning events, contracted through the Environmental Services service contract, can be found in Table 4. Inspection forms are included as **Attachment F**.

During the 2016-2017 reporting year Tempe Parks Maintenance Section worked to clear litter and green waste from riparian areas and preserves in northern Tempe. The overgrowth allowed for urban encampments and the accumulation of additional litter, waste and debris along areas which lead to waterways. It was estimated approximately 82.24 tons of debris was removed in these areas at an estimated cost of $13,043, excluding labor.

- Tempe's Street Maintenance Section is tasked with the maintenance and cleaning of Tempe streets and various other MS4 components, including street sweeping and routine infrastructure inspections. To reduce the amount of debris entering the MS4, Tempe continues to implement an effective street sweeping program using the following schedule (adherence to this schedule varies occasionally due to unforeseen events that require staff and/or equipment reprioritization):

    - Arterial streets are swept once every two weeks.
    - Residential, Collector, and Industrial streets are swept once every month.
    - City-owned parking lots and large City facility schedules vary upon condition.
    - Upon request (e.g., water main breaks, emergency road repairs, trackout, special events, etc.).

  During the 2016-2017 reporting year, Tempe cleaned approximately 21,888 linear miles of streets effectively removing approximately 1,126 tons of debris. A numeric summary of these events can be found in Table 4.

  Streets Maintenance also conducts visual inspections of catch basins and other similar infrastructure. During the 2016-2017 reporting year, this section completed inspections of 124 catch basins. Of the 124 catch basins inspected, nine were referred for cleaning. A numeric summary of these events can be found in Table 4. Inspection forms are included as **Attachment G**.

  In addition to the inspections and cleaning outlined above, two additional street programs are used to conduct infrastructure inspections. Structures located on arterial roadways are inspected as part of the city's right-of-way weed control program and structures located on streets other than arterials are inspected as part of the city's street sweeping program. These inspections are not specifically documented unless further detailed inspection or cleaning is deemed necessary.

- Tempe's Water Utilities Division, Water Operations Section, currently operates one sanitary sewer closed-circuit television (CCTV) crew. As a component of the MS4 program, this crew is available to conduct underground infrastructure inspections for any of the above-listed Tempe work groups. This crew also conducts MS4 CCTV inspections. During the 2016-2017 reporting year, Tempe inspected 8,645 feet (1.64 miles) of underground MS4 conveyance. Inspection records are included as **Attachment H**. Areas of debris identified as a result of these inspections are referred for cleaning. Linear mileage cleaned, debris removed, and CCTV activities are summarized in Table 4.

- Tempe's Water Utilities Division, Water Operations Section is responsible for the operation and maintenance of Tempe's water, wastewater, and raw water irrigation and beginning in 2017-2018 stormwater infrastructure.

In FY 2015-2016 Tempe City Council approved the addition of two vehicles and three staff members for stormwater infrastructure inspection, cleaning and maintenance. Positions were filled and vehicles were requisitioned in 2016-2017. One utility truck was invoiced in the 2016-2017 reporting year for the amount of $50,320. The second vehicle, a vactor truck, was invoiced in the 2017-2018 reporting year for the amount of $401,717. Its expense will be included in the 2017-2018 annual report. The section will begin assuming stormwater inspection, cleaning and maintenance responsibilities in 2017-2018.

Table 4: Summary of MS4 Infrastructure Inspections

Location/ Description	Infrastructure Inspected		Infrastructure Cleaned		Amount of Debris Removed
	Number	Miles	Number	Miles	Tons
ARCA	35	-	1	-	
Environmental Services (other)	6	-	70	0.41	*
Parks/Common and Rec. Areas	280	-	-	-	
Streets (excluding street sweeping)	124	-	-	-	
Pipe (CCTV)		1.64	-	-	
Water Operations	-	-	-	-	
Streets (including street sweeping)	124	-	-	2,188	1,126
Totals	**569**	**1.64**	**71**	**2,188**	**1,126**

Note: Infrastructure includes catch basins, drywells, bubbler boxes, inlet structures, streets, conveyance pipes, etc. All previously mentioned cleanings are included in the Environmental Services count. Referral for cleaning numbers may not match the number of structures cleaned due to verification process for in-house cleaning and contractor service schedule.

*Hauling wasn't conducted in 2016/2017, therefore tonnage was not reported. Waste collected will be reported in 2017/2018

Call-Outs

Tempe's Stormwater Permit requires that the city respond to at least 90 percent of all reported illicit discharges and investigate at least 80 percent of potential illicit discharges reported by the public within three days of report. Of the 75 call-outs that Tempe's Environmental Services Section received, 75 were either directly or indirectly related to stormwater concerns. All calls were responded to and investigated. Note that some of the "call outs" were preventative inspections. A summary of all call-outs pertaining to these reports can be found in **Attachment I**. Table 5 summarizes the response and investigation percentages.

Table 5: Summary of Potential Illicit Discharge Reports

Reports (hotline, web form, other calls)	Reports Responded To	Percent Responded To	Reports Investigated	Percent Investigated
75	75	100	75	100

Inspections – Municipal, Industrial, Commercial, Outfall

Tempe's stormwater inspection program for municipal, industrial, and commercial facilities is an important component of the IDDE program. Aside from identifying and eliminating discharges, these inspections compel the use of stormwater Best Management Practices (BMPs), bring awareness to stormwater pollution issues, and ultimately prevent the occurrence of illicit discharges that could impact the MS4 or receiving waters. These specific programs are further summarized in Sections 3.D and 3.E of this report. Tempe's outfall inspection program also serves as an important component of this program. This program is further summarized in Section 3.H of this report.

IDDE Screening Program, Investigations, Identified Sources, and Corrective or Enforcement Actions

Tempe's IDDE screening program can be initiated by notifications from persons participating in any of the previously listed components (e.g., public notifications, field staff notifications, inspections, etc.). Tempe responds to all reported discharges, regardless of the source, to determine whether they are illicit discharges, and initiates investigation of these discharges within three business days of detection or report. Discharges known to not be a significant source of pollutants or otherwise exempt are not subject to further investigation. If a discharge is found to be illicit, corrective actions, including enforcement mechanisms, are used to eliminate the illicit discharge. Identified wastewater discharges, such as raw sewage or grease, are immediately investigated and eliminated as quickly as possible. Discharges found to not be a significant source of pollutants, exempt from CWA discharge provisions, or permitted under an ADEQ AZPDES permit are not necessarily investigated each time they are identified (e.g. irrigation water, tail-water, permitted De Minimis discharges).

If the source of an illicit discharge cannot be identified through physical investigations and field screening, grab samples will be collected at the outfall or field location where the prohibited discharge occurred and analyzed at a state certified lab. During the 2016-2017 reporting year, all discharges were investigated and/or identified through physical investigations and/or field screening, or characterized through laboratory analysis.

Tempe Environmental Compliance Inspectors identified the following as a result of 46 outfall inspections, 140 industrial/commercial inspections, 119 restaurant inspections, and 75 call-outs:

- Two discharges from two outfalls were determined to not be sources of pollutants (TD-05 and SR-18)). Further information can be found in Section 3.H of this report.

- Three potential or actual illicit discharges to the MS4 resulted in the issuance of official violation/warning letters to commercial businesses. Enforcement documents are in **Attachment J**. Note that violation/warnings are issued in accordance with Tempe's Enforcement Response Plan and points are assessed to the discharger. See **Attachment K** for the plan details.

The numeric summary for the 2016-2017 reporting year was updated to include one industrial/commercial inspection from June 2015 not included in the 2015-2016 annual report.

Table 6 summarizes the Environmental Services Section's non-municipal inspections and findings.

Table 6: Environmental Services Non-Municipal Facility Inspection Summary

Inspection Type	Number of Inspections	Official Findings/Enforcement
Outfalls	46	2 dry weather flows from 2 outfalls (investigated and determined to not be a significant source of pollutants.) TD-05 and SR-18
Industrial/Commercial (non-restaurant)	140	3 Violation/Warning Letters
Restaurant	119	
Call-Out (stormwater)	75	
Catch Basins and Other Infrastructure	41	71 Infrastructure Cleaning Events
Total	**421**	

D. Municipal Facilities

Inventory

The total number of Municipal Facilities is 149. A list of facilities and a map of general facility locations is maintained and kept on file with Tempe's Environmental Services Section and can be reviewed by ADEQ upon request. This inventory is subject to change based upon internal annual reviews.

All facilities were reviewed for potential reclassification to allow for a stronger emphasis on sediment control, storage practices, site activities, and general housekeeping. Ranking criteria was modified to accommodate this focus, but no changes were made in facility classifications because impacted facilities were already classified at a higher level. In 2017, Well #16, was changed from a priority #3 to a priority #2. Table 7 summarizes the Municipal Facility inventory prioritization.

Table 7: Summary of Priority Municipal Facilities

Department/ Division	Priority #1 Facilities	Priority #2 Facilities	Priority #3 Facilities	Number of Facilities
PW-Water	3	13	17	33
Fire	1	8	1	10
Parks	4	3	57	64
Community Services	0	5	11	16
Transportation	1	2	3	6
Police	0	4	1	5
PW-Other	3	0	0	3
Miscellaneous	0	3	9	12
Totals	**12**	**38**	**99**	**149**

All Priority #1 facilities are on a biennial (every other year) inspection schedule. Priority #2 facilities are inspected every three years and Priority #3 facilities are inspected every five years. New facilities and those with significant changes in purpose and/or inventory will be inspected as they come on line or change.

Inspections

Consistent with Tempe's Municipal Facility Stormwater Inspection Program, Tempe inspected and prioritized all 149 sites over the previous reporting years. In the 2016-2017 reporting year, 64 inspections were conducted at 60 facilities.

Table 8 summarizes all 2016-2017 inspection activities. Inspection reports can be found in **Attachment L**.

Table 8: Summary of Municipal Facility Inspections

Facility type/ inspection frequency	Number of Facilities	Number of Facilities Inspected	Number of Facility Inspections	Percent Inspected
Priority 1	12	10	13	83
Priority 2	38	19	20	50
Priority 3	99	31	31	31
Totals	**149**	**60**	**64**	**40**

Results

Results and/or activities and control measures implemented as a result of the 64 inspections conducted in the 2016-2017 reporting year are as follows:

- There were no significant findings and no follow up actions required, other than described below, for the 64 inspections conducted this reporting year.

- All inspected facilities storing a single container exceeding five gallons of a hazardous material post or maintain documentation of practices and procedures designed to prevent and respond to spills that have potential to come into contact with stormwater. See **Attachment M**. These practices are in addition to Tempe's Hazardous Waste Management Plan (HWMP), found in **Attachment N**, which requires the proper handling, storage, transport and disposal of hazardous wastes associated with municipal operations and facilities.

- During facility inspections, basic stormwater awareness and housekeeping practices are discussed with facility representatives. These discussions are separate and in addition to formalized stormwater training.

- Parks has secured funding to upgrade storm drainage for five facilities (Tempe Diablo Maintenance, Kiwanis Maintenance, Optimist, Goodwin and Stroud Parks). Engineering studies have begun and Parks projects have been placed on a prioritization schedule.

Chemical Handling, Storage, Disposal Practices, and Spills

Several Permit sections require various plans, documents, or procedures to ensure the proper handling, storage, and disposal of chemicals and effective response to chemical spills. Tempe's efforts in this area involve several city sections, all of which serve an

important role related to the protection of human life and the environment. Below is a summary of activities performed by the various city sections.

- **Environmental Services**

  Tempe's Environmental Services Section is responsible for all initial facility stormwater inspections required by the Permit. In part, the purpose of these inspections is to ensure proper housekeeping and the implementation of stormwater BMPs. During these inspections, facility chemical storage practices are reviewed from an environmental protection perspective. Facilities at which any single container exceeding five gallons of a hazardous material is stored are required to post or maintain documentation of practices and procedures designed to prevent and respond to spills that may come into contact with stormwater. This document was designed to provide a simple, easy-to-read message of proper chemical handling, storage, disposal, and spill response practices. It was developed by representatives from Environmental Services, Risk Management, and HPCC. This document is included as **Attachment M**.

  One municipal facility spill incident was reported to the Environmental Services Section during the 2016-2017 reporting year. On August 12, 2016, a small non-hazardous spill of hydraulic fluid from the gate arm at the JGM Tempe Water Treatment facility spilled. The spill occurred on a paved surface. Total volume of the spill was estimated to be approximately two gallons. The spilled material was cleaned by a commercial contractor. All internal spill reporting procedures were followed, which allowed for quick response.

  Additionally, one municipal sanitary sewer overflow (SSO) occurred in the 2016-2017 reporting year. Notification of the event was reported to the appropriate regulatory agencies at the time of the occurrence. On May 11, 2017 a release of approximately 75 gallons occurred in the public right of way along at 1510 N. Scottsdale Rd, Tempe. Nearby stormwater infrastructure received flow from the release. The ground and storm drain where the overflow was collected were disinfected with a bleach solution and a vactor truck was used to collect the waste for proper disposal. The SSO was determined to be caused by an unknown source of flushable wipes, sanitary paper, and potential construction debris in the sanitary sewer. Tempe will continue ongoing preventative maintenance, which has shown to be effective in the reduction of SSOs. Internal SSO response procedures were followed limiting public exposure and minimizing impact to the MS4.

  Tempe's Environmental Services Section is also responsible for most city-wide MS4 stormwater training. This training includes proper chemical handling, storage, disposal, and spill response practices. See Section 3.K for a summary of training events.

- **Household Products Collection Center (HPCC)**

  HPCC staff provides various levels of support for all aspects of chemical handling, storage, disposal, and spill response practices. The HPCC is a city-wide liaison for the acquisition of necessary spill prevention and response equipment and Tempe's in-house facility for the disposal of chemical wastes. The HPCC staff also maintains Tempe's Hazardous Waste Management Plan (HWMP). The HWMP was updated in 2011 to include practices to minimize exposure of hazardous waste to precipitation. The Plan was most recently updated in August 2017 by Tempe's Hazardous Waste Compliance Supervisor. A review of the updates is being conducted by an Environmental Quality Specialist (EQS) from Environmental Services and will be submitted with the 2017-2018 annual report. The most recently approved HWMP (2014) is included as **Attachment N**. In addition to these responsibilities, HPCC staff provided assistance with various municipal facility stormwater BMP needs during the 2016-2017 reporting year.

- **Risk Management**

  Risk Management provides support, guidance, and training in areas related to chemical handling, storage, and spill response. All city-wide safety programs are managed by this section and include the City of Tempe Hazard Communication Program, which was developed to inform employees of their "right to know" about all physical and health hazards associated with handling materials that contain hazardous substances. Annually, Risk Management provides an eight-hour HazWoper training to WQSs and ECIs.

- **Fire Department**

  The Tempe Fire Department provides emergency response services for incidents involving hazardous materials. Stormwater protection is a critical part of emergency response procedures and is included as part of the city's emergency response training. The Tempe Fire Department's Hazardous Materials Policy addresses containment of hazardous materials as a critical component of spill response procedures.

Pesticides, Herbicides, and Fertilizers

Tempe has significantly reduced the amount of pesticides and herbicides used by employing integrated pest management practices. However, when pesticide and/or herbicide use is needed, established application BMPs are implemented. These practices were developed by Tempe-certified applicators and Tempe's Environmental Services Section in 2011 and updated in 2016. A copy of this plan is included as **Attachment O**. The plan is reviewed

annually by a Parks Maintenance Section representative.

- Tempe's Parks Maintenance Section applies fertilizer to city parks during the growing season using calibrated broadcast spreaders. Application rates are based on recommendations from the University of Arizona Cooperative Extension Turf Grass Research Facility. Soil and tissue analyses are periodically used to confirm or modify application rates. Currently, some parks and the city golf courses can inject liquid fertilizers through programmable irrigation controllers. When fertilizer is applied in this manner, it is done in small applications over several days to reduce or eliminate chemical run-off. In some turf areas, aeration methods are used which allow for better infiltration of water, fertilizers, chemicals, and soil amendments. In addition, all City of Tempe pesticide applicators are licensed through the Arizona Office of Pest Management, and are required to complete Continuing Education Units (CEUs) every year, which include training on BMPs.

- Tempe maintains area-wide AZPDES Pesticide General Permit (PGP) coverage for the application of pesticides and herbicides to city-owned and operated urban lakes. Tempe does not conduct the actual application of pesticides to these water bodies; rather, applications are conducted by contracted pesticide applicators licensed through the Arizona Office of Pest Management. All contracted applicators are required to comply with PGP conditions and Tempe-specific BMPs.

Multi-Sector General Permit (MSGP) and other AZPDES Tracking

Two Tempe-owned and/or operated facilities (Priest Maintenance Yard and East Valley Bus Operations and Maintenance) currently maintain coverage under the Multi-Sector General Permit (MSGP), and two additional facilities (HPCC and Kyrene Waste Water Treatment Facility) maintain No Exposure Certifications (NECs). No other facilities to which the MSGP is applicable have been identified. Tempe identifies facility environmental regulatory requirements when operations at an existing facility change or new facilities are constructed. Complete records for MSGP regulatory requirements are maintained onsite at each permitted facility. Compliance tracking, for other ADEQ and EPA requirements, occurs electronically through a compliance management solution known as Intelex (http://www.intelex.com/).

Inventories and Mapping

Tempe's Permit contains a series of inventory and mapping requirements with various completion dates ranging from the submittal of the first annual report to the fourth year annual report. Table 9 summarizes Permit mapping requirements that have been met, the reporting year in which they were completed or updated, and the map title. These maps will be updated to reflect changes and Permit requirements as needed. During the 2013 reporting year, the drainage basin map was updated to reflect changes at Tempe Town

Lake. The Tempe Town Lake eastern dam was deflated in Q2-2013, which resulted in an expanded lake that now directly accepts flow from an outfall that previously discharged east of the lake. Additionally, recent construction on the western dam involved stormwater infrastructure modifications. As a result of these changes, many of the maps listed below will, again, be updated. All maps are maintained on file with Tempe's Environmental Services Section and can be reviewed by ADEQ upon request. Note that all other inventories are addressed in their respective reporting sections.

Table 9: Summary of Mapping Status

Map Description	Reporting Year Map Completed or Updated	Map Name
Identification and mapping of Waters of the U.S. (including Tempe area canals) that may receive discharges from the MS4	2017	SWMP ATTACHMENT H Map 1: Tempe MS4 Surface Waters
An up-to-date map or map(s) showing MS4 boundaries.	2010-2011	All Maps
An up-to-date map or map(s) showing locations where Tempe's storm sewer discharges to Waters of the U.S.	2017	SWMP ATTACHMENT H Map 2: Tempe MS4 Monitoring and Discharge Locations, Tempe MS4 Drainage System
An up-to-date map or map(s) showing wet weather stormwater monitoring location(s) and the associated drainage basins. (Including acreage and land uses).	2010-2011	SWMP ATTACHMENT G: KP-01, SR-05, SR-08, TD-01, TD-03 Stormwater Monitoring Location Fact Sheets
Map of all major outfalls and other field screening points.	2017	SWMP ATTACHMENT H Map 3: Tempe MS4 Major Outfalls
Map of facilities owned or operated by the MS4 that have the potential to discharge pollutants to Waters of the U.S.	2017	SWMP ATTACHMENT H Map 4: Tempe MS4 Municipal Facilities
An up-to-date drainage system map.	2017	SWMP ATTACHMENT H Map 5: Tempe MS4 Drainage System
Drainage Basins	2013	SWMP ATTACHMENT H Map 6: Tempe MS4 Stormwater Basins
ARCA	2016	SWMP ATTACHMENT H Map 7: Tempe ARCA Map 2016

Below is a status summary of mapping capabilities required as outlined in Appendix A, Section IV.E (first measurable goal).

- **Linear Drainage Structures**

  Line layer showing the location of all stormwater system pipes and the direction of stormwater flow.

  Status: Tempe's mapping system currently maintains this capability.

- **Storm Drain Inlets and Catch Basins**

Point layer showing the location of all storm drain inlets and catch basins.

Status: Tempe's mapping system currently maintains this capability.

- **Outfalls**

  a) *Point layer showing the location of all outfalls.*
  b) *Polygon layer showing the drainage area associated with each of the monitored outfalls identified in Table 1 of the Permit.*

  Status: Tempe's mapping system currently maintains this capability.

- **Detention/Retention Basins**

  Point or polygon layer showing the locations of all identified City-owned retention and detention basins that are connected to the municipal stormwater conveyance system (i.e., that receive drainage from or discharge to a stormwater conveyance).

  Status: Tempe's mapping system currently maintains this capability.

- **Jurisdictional MS4 Boundary**

  Line or polygon layer showing the jurisdictional boundaries of the MS4, including any new land annexations during the Permit term.

  Status: Tempe's mapping system currently maintains this capability.

Tempe completed a study that evaluated the cost, method, and time it would take to complete future potential mapping requirements outlined in Appendix A, Section IV.E (second measurable goal). The results of the study were included in the 2013-2014 annual report.

E. Industrial Facilities

Status of Identification and Inventory of Industrial/Commercial Facilities

In 2014 the City of Tempe Environmental Services Section updated the inventory of all industrial and commercial facilities within the city that are subject to inspection under Tempe's MS4 Permit. This inventory was developed using the following Permit-required criteria:

- Industrial facilities identified in 40 CFR 122.26(d)(2)(iv)(C);
- Industrial facilities subject to MSGP requirements, including those facilities that have submitted a no exposure certification; and
- Other industrial and/or commercial sources (or categories of sources) Tempe determines are contributing a substantial pollutant load to the MS4.

The inventory for Title III Superfund Amendments and Reauthorization Act (SARA) and MSGP Facilities was developed by acquiring information from the following sources (See **Attachment P** for listing of these facilities):

- Arizona State Emergency Response Commission – (Tempe facilities subject to SARA Title III) – 159 Facilities
- InfoGroup, Government Division – ReferenceUSAGov Data Base (Tempe facilities subject to MSGP as identified in 40 CFR 122.26[b][14][i,ii,iv-ix, xi]) – 798 Facilities

Other sources used by the city to identify industrial and/or commercial sources (or categories of sources) that may be contributing a substantial pollutant loading to the MS4 are:

- Utility billing records
- Multi-media inspections conducted by Environmental Compliance Inspectors
- Internet research based on visual field observation

The inventory of SARA Title III and MSGP facilities is duplicative in many respects and is inclusive of facilities within Tempe that are subject to industrial pretreatment permitting requirements. Industrial pretreatment facilities are prioritized for annual stormwater inspections. In addition to the above-listed facilities, Tempe has added restaurants as a "category of sources" with a potential to impact the MS4. Accordingly, all inspected restaurants are evaluated for stormwater compliance.

The inventory list was expanded during the 2016-2017 reporting year to include auto body SIC 7532), auto repair (including dealership service) (SIC 5511, 753-7, -8, -9) and car washes (SIC 7542). The list will be reviewed annually to include businesses with Standard Industrial Codes (SIC) that have been noted, during the term of the permit, to demonstrate a potential to contribute pollution to the MS4. Additional information provided from ADEQ on facilities in Tempe with MSGP or No Exposure Certifications (NEC) will also be used to update the inventory list.

Overview of Inspection Findings and Significant Findings

Tempe ECIs conducted stormwater inspections at 140 industrial/commercial facilities subject to SARA Title III, MSGP, and Industrial Pretreatment requirements; and 119 restaurants. Restaurants were inspected for compliance with stormwater requirements along with other regulatory program requirements. As a result of these inspections, findings ranged from minor to significant. Minor findings, such as inadequate use or lack of BMPs, or inadequate material/chemical storage, did not result in enforcement escalation and were quickly addressed by the inspected entity. Three significant findings as the result of drive-by inspections or call-outs resulted in corrective and enforcement actions.

Industrial/commercial inspection documentation and restaurant inspection documentation are included as **Attachment Q** and **R**, respectively.

Corrective and Enforcement Actions Needed and Taken in Response to Inspections

During inspections, Tempe inspectors routinely identify minor corrective needs that do not escalate to formal enforcement action. These corrections are usually addressed during or shortly after the inspections occur and are verified by the inspector. These findings are generally documented on inspection forms or addressed verbally.

As mentioned in Section 3.C. there were a total of three findings requiring formal enforcement related to illicit discharges to the MS4. Enforcement actions taken were at a carpet cleaning business and a pool maintenance company for non-stormwater discharges into the MS4. See **Attachment J** for violation/warning letters and NOVs.

In addition to addressing minor and major deficiencies, Tempe inspectors regularly provide facilities information that may require coverage with ADEQ. During the 2016-2017 inspection year, Tempe identified 10 facilities to which the MSGP may be applicable but for which a demonstration of coverage was not provided. Tempe provided ADEQ with information for these potential non-filers on January 9, 2017, and July 12, 2017. See **Attachment S** for copies of non-filer notifications.

F. Construction Program Activities

Status

Tempe's stormwater construction program is managed by the Public Works Engineering and Community Development/Development Services Divisions. The program encompasses plan review, inventory, prioritization, inspection, and enforcement of private and Capital Improvement Project (CIP) construction projects that will result in a land disturbance of one acre or more, and those that disturb less than one acre but are part of a larger common plan of development. For the 2016-2017 reporting year, Tempe has reviewed and inventoried 100 percent of all 44 construction projects meeting the land disturbance criteria. During the 2016-2017 reporting year Tempe identified 38 private development projects and six CIP projects requiring review inventory, prioritization, and inspection.

Inspection Findings

Stormwater BMPs are checked as a part of other inspections on site. During the 2016-2017 reporting year, construction site stormwater inspections occurred.

For private development, 38 qualifying sites were inspected in the reporting period. Thirteen were active construction sites and were prioritized for a higher frequency of

inspection. One active private development site was inspected in early July 2016 as a carryover from the 2015-2016 reporting year. It was reported in the 2015-2016 annual report a second active construction site, carried over from 2015-2016, would be inspected in July 2016. That site (Howe Ave. Apts., 2185 E. Howe Ave.) is no longer an active construction site and was removed from the inventory list. The site was shut down by the contractor before an active construction inspection was conducted. An inspection will be performed when and if the site resumes an active status. Twenty-four sites were finalized and inspected for post construction controls. One additional post construction site inspected in July 2017 will be included with the inspection count for the 2017-2018 reporting period.

For CIP projects, five qualifying sites were inspected in the reporting year. They include one active CIP site inspection and four sites were finalized and closed following inspections for post construction controls. The one remaining site (Tempe Gardens) was scheduled for a final post construction inspection in 2015 but instead was shut down by the inspector. Due to the unusual circumstances with this site, the post construction inspection was not performed until July 2017. It will be included with the inspection count for the 2017-2018 reporting period.

Each site will have at least one annual inspection during the next reporting period per permit requirements. All inspection reports are included as **Attachment T**.

Note that the number of inspected sites does not necessarily reflect the number of sites inventoried or prioritized since the annual inspection requirement is a "rolling" target based upon the project's grading and drainage permit issuance.

Corrective Action and Enforcement

No corrective or enforcement actions were needed or taken during this reporting period for construction activities.

No non-filers were identified. The Tempe Engineering and Development Services Divisions require proof of ADEQ's AZPDES Construction General Permit (CGP) Notice of Intent (NOI) Authorization from the project's owner or developer prior to issuance of a grading and drainage permit and, therefore, do not anticipate the identification of non-filers.

Training

Stormwater training for employees directly involved with construction activities occurred on March 2-3, 2017 and April 11, 2017 for Engineering staff. Training for Community Development employees with stormwater responsibilities was held on April 5, 2017. See Section 3.K of this report for a summary of training events, the number of employees trained, and topics discussed.

G. Post-Construction Controls

Summary of Controls

Consistent with EPA's Low Impact Development (LID) recommendations and urban stormwater BMPs, Tempe's most effective post-construction control remains on-site retention as implemented by Tempe's Stormwater Retention Ordinance - Chapter 12, Article IV, of the Tempe City Code; see **Attachment U**. This ordinance is an effective control measure by providing containment for approximately 50 percent of the rainfall in Tempe, and consequently limiting discharges of pollutants to Waters of the United States. Tempe's Stormwater Retention Ordinance has been in effect since 1967 and has undergone modifications to accommodate denser development in and around downtown Tempe and the Rio Salado corridor, an area designated as the Alternative Retention Criteria Area (ARCA). Outside the ARCA, all new development or substantial improvements to existing developments that may impact Tempe's MS4 must provide storage of sufficient volume (i.e., on-site retention) to hold the runoff from the 100-year design storm. Inside the ARCA, new development or substantial improvements to existing developments must provide on-site retention for the two-year design storm. The two-year requirement may be waived within the ARCA subject to approval by the City of Tempe Public Works Director if equivalent BMPs for on-site pollutant removal are implemented.

Overview of Program

Post-construction inspections are conducted on 100 percent of all permitted residential, commercial, and CIP projects that result in a land disturbance of one acre or more, and those that disturb less than one acre but are part of a larger common plan of development. These post-construction inspections are part of the warranty period inspections and occur within 12 months after completion of construction. The inspections provide an opportunity to identify corrective actions to be implemented by the developer or responsible contractor for a variety of items, including stormwater and/or drainage controls. Stormwater control measures can utilize one feature or a combination of several features. These control measures will be examined during post-construction site inspections for which an ADEQ NOI is required.

Corrective Action and Enforcement

See section 3.F. Twenty- four qualifying private construction sites completed construction and received post-construction inspections. Four qualifying Engineering CIP construction sites completed construction and received post-construction inspections in the reporting year.

No corrective or enforcement actions were needed or taken during this reporting period for post construction activities. Post-construction inspection documents are included as **Attachment T**.

New or Revised Post-Construction Requirements

Since Tempe's last annual report, there have been no new or revised post-construction requirements related city-issued permits. Tempe will not issue a grading permit, building permit, or a certificate of occupancy to an owner/developer until notification from the City Engineer is received indicating that a drainage plan and on-site grading and drainage improvements are in compliance with Chapter 12, Article IV, of the Tempe City Code. In addition, the City Engineer will not issue this notification unless a project provides the required retention or unless the project is in the ARCA and the Public Works Deputy Director has approved alternative on-site pollutant removal BMPs. Sections 12-71 and 12-73 of Tempe's on-site retention ordinance contains the administrative requirements that ensure implementation of this program. The ordinance provides some flexibility to developments outside the ARCA that discharge directly to Waters of the U.S., as long as: drainage does not enter the MS4, BMPs for pollutant removal are included in the design, and stormwater is discharged consistent with AZPDES and all other regulatory requirements.

H. Outfall Inspection Program

Staff training

Tempe developed an IDDE Program Guidance Manual to bring consistency and clarity to procedures involved during outfall inspections and investigations. During the 2016-2017 reporting year, Tempe conducted one detailed IDDE training event that covered conducting dry weather screening events and source investigations. A total of six ECIs and one ECS were trained.

Outfall inventory

Tempe has identified 42 major outfalls as defined by 40 CFR 122.26. A map and inventory of outfalls is maintained on file with Tempe's Environmental Services Section and can be reviewed by ADEQ upon request. The number of major outfalls is subject to change based upon system changes or the identification of previously unidentified outfalls.

Of these 42 major outfalls, 19 are identified as priority outfalls. The priority designation is based upon receiving water, history of illicit discharges or non-stormwater flow over the last five years, or any cause for prioritization identified by the city. The number of priority outfalls is subject to change based upon regulatory determinations in receiving water designation, detection of illicit discharges that have not been eliminated, elimination of illicit

discharges, confirmation that non-stormwater flows do not contain a significant source of pollutants, or other factors.

Inspection Tracking System

All major outfalls are inspected annually. If illicit discharges are identified, inspection frequencies may be increased to quarterly. Beginning in the 2014-2015 reporting year, WQSs are responsible for dry weather screenings at assigned outfalls at the required frequencies. If field screening procedures trigger the need for investigation, an ECI will conduct an inspection or make a source determination and follow-up as needed. Once screenings and inspections are completed, field data forms and investigation forms are provided to the ECS for review, after which all forms are provided to an EQS for MS4 Permit tracking and reporting.

Inspection and Screening Procedures

Outfall inspections are conducted using standard field screening procedures and are typically completed when rainfall, temperature, and moisture are lowest, but may be conducted at any time in dry weather conditions as long as the inspection occurs at least 72 hours after the latest rain event. There were no changes in the detailed protocol for Outfall Inspection, Field Screening or Illicit Discharge Elimination procedures this year. A summary of the procedures for Inspections, Investigations, and Illicit Discharge Elimination can be found in the Storm Water Management Plan Section 6.3, Section 6.4 and Section 6.5 respectively, see **Attachment DD**.

Findings

During the 2016-2017 reporting year, Tempe WQSs conducted 46 outfall inspections. Of these, 22 inspections were completed at priority outfalls, 24 were routine major outfall inspections. Five of the inspections identified flow from two outfalls (TD-05 and SR-18). All five events were screened in the field.

Flows from these two outfalls were determined to not be significant sources of pollutants and were identified as either irrigation tail water, irrigation flow, already permitted AZPDES discharges, or runoff coming from the Papago Park Ponds outside of Tempe's jurisdiction. The ongoing investigation of outfall SR-18 was concluded. The inspection frequency at the site has been reduced from quarterly to routine annual monitoring.
The outfall inspection reports and investigative conclusions are included in **Attachment V**.

I. New or Revised Ordinances, Rules, or Policies

Revised Ordinances

There were no new rules developed nor were revisions made to existing stormwater Code during the 2016-2017 reporting year.

Copies of Chapter 12, Articles IV and VI; and Chapter 19, Article IV, 50) B) of the Tempe City Code can be found in **Attachment U**.

Policies and Stormwater Management Plan (SWMP)

Tempe has not developed new or revised existing policy. The SWMP was updated in 2017 to reflect changes in control measures approved by ADEQ in 2016. It can be found in **Attachment DD**.

City of Tempe General Plan

The General Plan is the overarching planning document for the City of Tempe. It holds the community's vision for the future and is a reflection of how the community wants to grow and change over the next 30 years. During the 2012-2013 fiscal year, Tempe worked with the public to develop a new General Plan 2040. The concept of Low Impact Development was added to the plan in the form of General Plan strategies and goals. Voters approved the plan in May 2014. General Plan 2040 information can be found on the following website:

- http://www.tempe.gov/GP2040

City of Tempe Stormwater Master Plan

Appendix A, Section VII (A), of the Permit required Tempe to review the city's stormwater master plan in the second year of the permit term and report findings of the evaluation, including recommendations, in the third annual report. A team consisting of representatives from the Environmental Services Section, Water Engineering Section, and PW Engineering Division met for several months to evaluate the existing stormwater master plan. Findings and needed improvements were consolidated in August 2012 and reported in the 2012-2013 Annual Report. A portion of the work on the Tempe Area Drainage Master Study/Plan (ADMS) project being conducted by the Flood Control District of Maricopa County (FCDMC) was completed in 2016; however, the ADMS is again under revision by FCDMC. It is anticipated that the final County model will be available in several months.

The Tempe ADMS project will utilize FLO2D and Stormwater Management Model (SWMM) to meet most of Tempe's Master Plan update needs. Once the FCDMC projects are completed, Tempe will use the products to update the city's stormwater master plan.

Enforcement Response Plan

Appendix A, Section III (G), of the Permit required Tempe to create a stormwater specific Enforcement Response Plan (ERP) within two years of permit issuance. In December 2012,

Tempe City Council approved Tempe's new ERP. The ERP consolidates Tempe's pretreatment and stormwater program enforcement elements, and was received and approved by ADEQ. See **Attachment K** for a copy of the plan.

J. Fiscal Expenditures

Tempe's estimated 2016-2017 reporting year expenditures related to implementation of the stormwater program are $ 1,242,756. A more detailed analysis of fiscal expenditures can be found in Section 12 of this report.

K. Training Summary[1]

Tempe coordinated 11 employee training events covering Permit-required training topics over the course of the 2016-2017 reporting period. Nine training events were conducted internally by city staff and two sessions were external training programs. A total of 253[2] employees attended these events. Note that Municipal Facility training included the identification and reporting of illicit and non-stormwater discharges, but is not specifically categorized as IDDE training because the training event primarily focused on pollution prevention and good housekeeping. See training summary in Table 10 for specific training details.

Table 10: Summary of Training Activities

Date(s)	Target Groups	Topic(s)	Permit Training Type	Attendees	Trainer
Sep 21, 2016	*Parks - Direct Stormwater Responsibilities*	Pollution Prevention; Spill Management; Handling, Storage of Used Oil & Other Toxic/Hazardous Materials; Permit Requirements Including Identifying and Reporting Illicit and Non-Stormwater Discharges and Field Practices.	Municipal Employee Training	49	Tempe Environmental Services Staff
Sep 24-28, 2016	*Environmental Quality Specialist, Water Utilities Supervisor, Water Utilities Ops Mgr.- Direct Stormwater Responsibilities*	Best Management Practices, MS4 Program components, Post construction and Low Impact Development and Green Infrastructure	Municipal Employee Training	3	WEFTEC Stormwater Congress

[1] Section added by Tempe to provide a more detailed and centralized summary of training events.
[2] Number includes employees that may have attended more than one training event.

Mar 2-3, 2017	*Environmental Compliance Inspector, Capital Improvement Project Construction, Environmental Compliance Regulatory - Direct Stormwater Responsibilities*	MS4 Compliance & Enforcement Inspection Seminar	Municipal Inspector Training Program	14	NPDES Training Institute
Apr 05, 2017	*Community Development Staff - Direct Stormwater Responsibilities*	Construction and Post Construction, Grading and Drainage, Structural and Non-Structural BMPs, Inspection, Plan review	Construction/Post-Construction	4	Community Development Staff
Apr 11, 2017	*CIP Engineering Staff - Direct Stormwater Responsibilities*	Municipal Construction, Erosion and Sediment Controls, Maintenance Requirements for BMPs, Municipal Ordinances Related to Stormwater and Construction, Plan Review Procedures, Grading and Drainage Design Standards, Requirements for Structural and Non-structural BMPs on Construction Sites, Inspection Procedures, Enforcement Procedures, Post-Construction Stormwater Controls, Post-Construction Inspection Procedures.	Construction/Post-Construction	11	Tempe Public Works Engineering and Environmental Services Staff
May 11, 2017	*Solid Waste- No Direct Stormwater Responsibilities*	Pollution Prevention; Spill Management; Handling, Storage of Used Oil & Other Toxic/Hazardous Materials; Permit Requirements Including Identifying and Reporting Illicit and Non-Stormwater Discharges and Field Practices.	Municipal Facilities	48	Tempe Environmental Services
May 18, 2017	*Facilities Maintenance -No Direct Stormwater Responsibilities*	Pollution Prevention; Spill Management; Handling, Storage of Used Oil & Other Toxic/Hazardous Materials; Permit Requirements Including Identifying and Reporting Illicit and Non-Stormwater Discharges and Field Practices.	Municipal Facilities	11	Tempe Environmental Services
May 24, 2017	*Facilities Custodial -No Direct Stormwater Responsibilities*	Pollution Prevention; Spill Management; Handling, Storage of Used Oil & Other Toxic/Hazardous Materials; Permit Requirements Including Identifying and Reporting Illicit and Non-Stormwater Discharges and Field Practices.	Municipal Facilities	35	Tempe Environmental Services

Jun 12, 2017	*Water Operations - Direct and No Direct Stormwater Responsibilities*	Pollution Prevention; Spill Management; Handling, Storage of Used Oil & Other Toxic/Hazardous Materials; Permit Requirements Including Identifying and Reporting Illicit and Non-Stormwater Discharges and Field Practices, De Minimis discharges.	Municipal Facilities	25	Tempe Environmental Services
Jun 15, 2017	*Transportation Maint. & Traffic Operations - No Direct Stormwater Responsibilities*	Pollution Prevention; Spill Management; Handling, Storage of Used Oil & Other Toxic/Hazardous Materials; Permit Requirements Including Identifying and Reporting Illicit and Non-Stormwater Discharges and Field Practices.	Municipal Facilities	27	Tempe Environmental Services
Jun 21, 2017	*Fleet Services - No Direct Stormwater Responsibilities*	Pollution Prevention; Spill Management; Handling, Storage of Used Oil & Other Toxic/Hazardous Materials; Permit Requirements Including Identifying and Reporting Illicit and Non-Stormwater Discharges and Field Practices, De Minimis discharges.	Municipal Facilities	26	Tempe Environmental Services
			Total Number of Training Events:		**11**
			Total Number of Attendees:		**253**

4. Numeric Summary of Stormwater Management Program Activities

The table below provides a numeric summary of stormwater management practices and activities performed each year.

	Annual Reporting Year (July 1 – June 30)				
Stormwater Management Practice or Activity:	**2012 - 2013**	**2013 - 2014**	**2014 - 2015**	**2015 – 2016**	**2016-2017**
Illicit Discharge Detection & Elimination Program					
1. Municipal Employee Training					
Number of training sessions (on non-stormwater discharges and the IDDE program)	**4**	**3**	**3**	**5**	**1**
Number of employees attending training	**14**	**15**	**10**	**24**	**14**
2. Spill Prevention					
Number of Municipal Facilities identified with hazardous materials	**53**	**53**	**49**	**49**	**50**
Number of spills at Municipal Facilities with hazardous materials that occurred in outside areas	**1**	**1**	**1**	**1**	**1**
Number of facility assessments completed *(identify any issues found requiring follow-up in narrative and summarize new practices to minimize exposure*)	**59**	**98**	**95**	**70**	**64**
Date of last review of HWMP (*identify committee participant with stormwater expertise in narrative*)	**12/19/2012** **6/25/2013**	**2/19/2014**	**2/19/2014**	**2/2/2016**	**2/8/17**
3. Outfall Inspections					

	Annual Reporting Year (July 1 – June 30)				
Stormwater Management Practice or Activity:	**2012 - 2013**	**2013 - 2014**	**2014 - 2015**	**2015 – 2016**	**2016-2017**
Total number inspected *(attach or forward electronic copy of inventory or map of major outfalls and priority outfalls)*[1]	**66**	**62**	**64**	**65**	**46**
Number of 'priority outfalls' identified to date *(summarize findings and follow-up actions in narrative)*	**19**	**19**	**19**	**19**	**19**
Number of 'priority outfalls' inspected[2] *(summarize findings and follow-up actions in narrative)*	**41**	**39**	**40**	**42**	**22**
Number of dry weather flows detected	**12**	**11**	**7**	**5**	**2**
Number of dry weather flows investigated	**3**	**1**	**7**	**5**	**2**
Number of major outfalls sampled[3]	**17**	**11**	**7**	**5**	**2**
Number of illicit discharges identified	**0**	**0**	**0**	**1**	**0**
Number of illicit discharges eliminated	**0**	**0**	**0**	**1**[4]	**0**
Amount (percentage, linear miles, etc.) of storm drain inspected[5]	**9,331 feet**	**10,223 feet**	**8,619 feet**	**8,668 feet**	**8,645 feet**
Number of storm drain cross connection investigations	**0**	**0**	**0**	**0**	**0**
Number of illicit connections detected	**0**	**0**	**0**	**0**	**0**
Number of illicit connections eliminated	**0**	**0**	**0**	**0**	**0**

[1] All maps and inventories are maintained on file with Tempe's Environmental Services Section and can be reviewed by ADEQ upon request.
[2] Number reflects the number of priority outfall inspections.
[3] Includes field screening and analysis.
[4] See Findings in 2015-2016 Report Section 3.H. for a description of the investigation.
[5] CCTV inspections only.

	Annual Reporting Year (July 1 – June 30)				
Stormwater Management Practice or Activity:	**2012 - 2013**	**2013 - 2014**	**2014 - 2015**	**2015 – 2016**	**2016-2017**
Number of corrective or enforcement actions initiated within 60 days of identification[1]	**36**	**12**	**0**	**5**	**3**
Percent of cases resolved within one calendar year of original enforcement action	**100**	**100**	**100**	**100**	**100**
Number of illicit discharge reports received from public	**37**	**59**	**90**	**61**	**75**
Percent of illicit discharge reports responded to	**100**	**100**	**100**	**100**	**100**
Percent of responses initiated within three business days	**100**	**100**	**100**	**100**	**100**
Municipal Facilities					
1. Employee Training					
Number of training events *(dates and topics to be included in narrative)*	**6**	**5**	**9**	**11**	**9**
Number of staff trained	**123**	**157**	**214**	**248**	**236**
2. Inventory, Map, or Database of MS4 Owned & Operated Facilities					
Total number of facilities on inventory	**143**	**143**	**149**	**149**	**149**
Date identification of 'higher risk' facilities completed	**12/26/2012**	**12/26/2012**	**12/26/2012**	**12/26/2012**	**12/26/12**
Date prioritization of municipal facilities completed	**12/26/2012**	**12/26/2012**	**12/26/2012**	**12/26/2012**	**12/26/12**
3. Inspections					
Miles of MS4 drainage system prioritized for inspection	**101.5**	**101.5**	**101.5**	**101.5**	**1.5**

[1] Total number of corrective and enforcement action for the FY excluding minor construction and post-construction.

	Annual Reporting Year (July 1 – June 30)				
Stormwater Management Practice or Activity:	**2012 - 2013**	**2013 - 2014**	**2014 - 2015**	**2015 – 2016**	**2016-2017**
Miles visually inspected[1]	**127**	**122.1**	**101.6**	**202.5**	**1.6**
Number of municipal facilities inspected[2]	**48**	**76**	**95**	**70**	**64**
Number of 'higher risk' municipal facilities inspected	**8**	**10**	**11**	**21**	**13**
Number of 'higher risk' municipal facilities found needing improved stormwater controls	**2**	**0**	**0**	**0**	**0**
4. Infrastructure Maintenance					
Linear miles of drainage system cleaned each year (*city to maintain records documenting specific street cleaning events*)	**21,890**	**22,499[3]**	**21,891.5**	**21,889**	**21,888**
Record amount of waste collected from street and lot sweeping (reported in pounds, gallons, etc.)	**937 Tons**	**1,148 Tons**	**1,175.7 Tons**	**1,007 Tons**	**1,126 Tons**
Total number of catch basins[4]	**1,047**	**814**	**558**	**503**	**569**
Number of catch basins cleaned	**197**	**218[4]**	**175**	**63**	**71**
Amount of waste collected from catch basin cleaning (tons)	**27.8**	**31.3**	**20.9**	**24.2**	**---[5]**
Industrial and Commercial Sites Not Owned by the MS4					
Number of training events for MS4 staff	**11**	**3**	**3**	**5**	**1**

[1] Includes CCTV and above-ground linear inspections of the drainage system. Does not include cursory street inspections.
[2] This numeric parameter was added by Tempe to provide a more detailed explanation of the municipal inspection program.
[3] Number amended after FY2013-2014 report was submitted. See Attachment E (2014-2015 Annual Report).
[4] Inspected, includes other stormwater infrastructure such as drywells, bubbler boxes, inlets, etc.
[5] Hauling was not conducted in 2016-2017 weight will be included with next Annual Report.

	Annual Reporting Year (July 1 – June 30)				
Stormwater Management Practice or Activity:	**2012 - 2013**	**2013 - 2014**	**2014 - 2015**	**2015 – 2016**	**2016-2017**
Number of municipal staff trained	**9**	**11**	**14**	**24**	**14**
Number of industrial facilities inspected[1] (see Appendix A, Part V.B)	**122**	**124**	**122**	**126**	**140**
Number of corrective or enforcement actions initiated on industrial facilities[1]	**22**	**2**	**2**	**1**	**0**
Percentage of cases resolved under the ERP within one (1) calendar year of original enforcement action	**100**	**100**	**100**	**100**	**100**
Construction Program Activities[2]					
Number of training events for MS4 staff *(include topics in narrative summary)*	**2**	**1**	**2**	**1**	**3**
Number of municipal staff trained	**16**	**5**	**24**	**6**	**29**
Number of construction/grading plans submitted for review	**13**	**24**	**42**	**26**	**15**
Number of construction/grading plans reviewed	**13**	**24**	**57**	**26**	**15**
Number of construction sites inspected[3]	**24**	**0**	**59[4]**	**20**	**15**
Number of corrective or enforcement actions initiated on construction facilities (*identify the type of actions in narrative summary*)	**9**	**1**	**2**	**0**	**0**
Post Construction Program Activities					
Number of post-construction inspections completed	**3**	**1**	**17**	**29**	**28**

[1] Number excludes restaurant inspections. 2015-2016 number amended see Section 3.C. of 2016-2017 Annual Report.
[2] Includes private and CIP activities.
[3] Number may not match review and prioritization number based upon date of grading and drainage permit issuance.
[4] See narrative in Section 3.F. in 2015-2016 Annual Report.

	Annual Reporting Year (July 1 – June 30)				
Stormwater Management Practice or Activity:	**2012 - 2013**	**2013 - 2014**	**2014 - 2015**	**2015 – 2016**	**2016-2017**
Number of corrective or enforcement actions initiated for post-construction activities (*identify the type of actions in narrative summary*)	**0**	**0**	**0**	**0**	**0**

5. Evaluation of the Stormwater Management Program

In accordance with Section 5.4 of the Permit, this section provides an evaluation of the progress and success of the stormwater management program, including an assessment of the effectiveness of stormwater management practices in reducing the discharge of pollutants to and from the municipal storm sewer system.

Much of Tempe's stormwater program progress during the 2016-2017 reporting period consisted of continued fine tuning of existing programs and the completion of permit required tasks. Quantifiable program successes include the following:

- Updated customized stormwater training materials for site specific municipal facility training.
- Hired consultant to provide specific MS4 Inspector training which included hands-on inspection site visits to an industrial facility and construction site.
- Explored new outreach opportunities to reach Neighborhoods, Home owner Associations and Businesses through neighborhood coordinator on social media and by adding newly inspected business emails to the quarterly e-Bulletin newsletter.
- Continued to enroll restaurants into the fats, oils and grease management program. The program reduces public health and safety concerns, plumbing backups and sewer overflows.
- Continued weekly operation of the HPCC to provide Tempe residents with an outlet for proper disposal of hazardous household products, potentially reducing their release into the environment or MS4.
- LID activities **(Attachment EE)**:
    - The efforts of Tempe's Water Conservation group provide benefit to the stormwater program by reducing chemical products necessary for landscape maintenance and water runoff. The conservation group hosted several workshops throughout the year on xeriscape landscape design, proper maintenance and irrigation, rain water and grey water harvesting. Tempe also offers landscape rebates to single family and multi-family residential properties. Ninety-six rebates were processed in this reporting year. http://www.tempe.gov/conservation
    - Continued development of Tempe Urban Forestry program with LID components www.tempe.gov/urbanforest. Several presentations given on the Urban Forestry program provide emphasis on LID as an important strategy for proper planting in the desert.
    - Continued participation with and Tempe is the Chair of the Sustainable Cities Network (SCN) who actively discuss urban issues associated with tree and shade, structural shade, the urban canopy, stormwater management, and low impact development (LID) techniques. The goal of the Workgroup is to

standardize best practices in the area of urban forestry and expand knowledge of green infrastructure across the Valley and state of Arizona.

- In 2016, Tempe rejoined participation in the Specifications and Standards Sub-Workgroup of SCN. The Specifications and Standards Sub-Workgroup is working to develop and collect uniform standards and specifications for green infrastructure and low-impact development projects to be adopted by Maricopa Association of Governments and used throughout the region.

While implementation of many of these stormwater management practices is assumed to have effectively reduced the discharge of pollutants to and from the MS4, this reduction is not always quantifiable. For example, due in large part to Tempe's on-site retention policy, it cannot be assumed that all debris removed from the system or all waste collected by HPCC would have ended up in a discharge to a Water of the U.S. Tempe will continue to review analytical data in the effort to identify correlations between pollutant concentration and stormwater management practices.

6. Stormwater Management Program Modifications

In accordance with Section 5.5 of the Permit, this section provides a description of modifications, if applicable, to the stormwater management program each year as follows:

A. Addition of New Control Measures

Tempe did not implement new control measures in the 2016-2017 reporting year. The last new control measures implemented were accepted by ADEQ in January 2013.

B. Addition of Temporary Control Measures

Tempe continues to implement temporary control measures related to discharge concentrations of *E. coli* and copper that were higher than applicable Surface Water Quality Standards (SWQS). The temporary measures are related to outreach/education messages. The topics and frequency focus mostly on industrial/commercial inspections. See Section 10.C of this report for details.

At the request of Parks staff, as described in Section 3.D of this report, increased facilities inspections were implemented temporarily to ensure that BMPs were maintained at several Priority 1 and 2 sites. Inspection frequency is anticipated to decrease as temporary BMPs are replaced with permanent infrastructure and/or practices.

C. Increase of Existing Control Measures

Tempe did not have an increase of existing control measures in the 2016-2017 reporting year.

D. Replacement of Existing Control Measures

Tempe requested in the 2015-2016 Annual Report and ADEQ approved on November 4, 2016, **(Attachment FF)** the following replacements of existing control measures.

Tempe made the following updates to existing control measures:

- Sections 9.4 Inventory and 9.5 Prioritization of the Stormwater Management Plan were amended to reflect an annual reporting frequency, from quarterly, of construction site inventory and prioritization records.

- Tempe reduced priority outfall inspection frequency to annual, from semi-annual, as required by Permit Appendix A (III)(D). Tempe inspects all major and priority outfalls once per year and conducts follow-up inspections as required by the Permit.

- Tempe modified streets linear mileage inspection criteria from linear mileage of streets inspected to 80 catch basins inspections.

7. Monitoring Locations

There have been no changes to the stormwater monitoring locations for the duration of the permit other than designated use of the receiving water for SR-08 which was reported to ADEQ in the 2013-2014 Annual report. All outfall information is maintained on file with Tempe's Environmental Services Section and can be reviewed by ADEQ upon request.

Note: Modifications to monitoring locations will not be implemented without a Permit modification.

8. Storm Event Records

For each monitoring location identified in Section 7.0, Table 1.0 of the Permit, summarize all measurable storm events (0.1 inch or greater) occurring in the drainage area of each monitoring location within the winter and summer wet seasons, respectively, until samples have been collected for the monitoring location. Include the date of each event, the amount of precipitation (inches) for each event, and whether a sample was collected, or if not collected, information on the conditions that prevented sampling. (Note: If unable to collect stormwater samples due to adverse climatic conditions, provide, in lieu of sampling data, a description of the conditions that prevented sampling. Adverse climatic conditions which may prevent the collection of samples include weather conditions that create dangerous conditions for personnel, such as local flooding, high winds, electrical storms, etc.)

Tempe has consolidated the permit requested information which is included as **Attachment W.**

Tempe tracks all sampling events required by the Permit. **Attachment X** summarizes sampling status throughout the 2016-2017 reporting year. SR-08 was not collected during the Summer Wet Season due to equipment malfunctions and the lack of representative storm events.

Tempe's annual rainfall is calculated using a precipitation group on the Maricopa County Flood Control District website (http://alert.fcd.maricopa.gov/showrpts_mc.html). The group is named G054: CITY OF TEMPE and is comprised of four storm gauges in and bordering Tempe.

9. Summary of Monitoring Data (By Location)

A summary of all monitoring data for each site is provided in **Attachment Y**. The table for SR-08 includes the most recent data. This site had a change in designated use for the receiving water in the 2013-2014 reporting year. All Laboratory Reports are included as **Attachment Z**.

From 2011 through September 2014, Tempe collected orthophosphate samples without field filtration, based on its MS4 permit requirement to sample total orthophosphate. However, based upon Arizona Department of Health Services (ADHS) guidance from the EPA, filtration of samples in the field is a valid component of EPA criteria for orthophosphate sampling. Tempe has modified procedures per EPA and ADHS guidance to include filtration of the sample within 15 minutes of collection.

10. Assessment of Monitoring Data

A. Stormwater Quality

Tempe has reviewed all sampling event results collected from November 2011 through December 2016. A full trending of data is included as **Attachment AA**. The trending was done by a comparison of the previous year's data maximum and average to this reporting year's (2016-2017) maximum and average by site location.

Below is a brief summary of findings:

- In the 2016-2017 reporting year there were 14 sampling events; from which 1,203 analytical results were produced. From those results a total of 169 parameters were detected (conventional parameters, microbiological, metals, nutrients), 156 of the parameters were detected at levels <SWQS. There were only 13 SWQS exceedances (for *E. coli*, Copper) which will be discussed more in this section. Overall, there was little significant difference in the results of 2016-2017 compared to previous year's data. There were a few instances where results increased (greater than three times the standard deviation of the average result) when this year's data was compared to previous site averages for the permit term. The increases were for TKN at SR-05, TDS, Arsenic, Selenium and Alpha Endosulfan at TD-01. The values were below SWQS and there was no indication of degradation to stormwater quality from Tempe's MS4.

- For the entire dataset 2011-2016, 50 sampling events were conducted during the winter wet season (November through May during 2011-2017), and 40 sampling events were conducted during the summer wet season (June through October 2012-16).

- Averages for rate, volume, duration, pH, and Temperature for all sites from 2011-2016 sites are as follows:

    - Average Rate (GPM): 1979
    - Total Volume (gallons): 166,200
    - Duration (mins): 93
    - pH (S.U.): 7.5
    - Temperature (C°): 22.4

Conventional Parameters

- Although all sites were observed to have similar ratios of conventional laboratory parameters (i.e., Hardness, TDS, TSS, BOD, COD), the relative levels of parameters observed from site to site varied. TD-01 was observed to have the highest values for Hardness, TDS BOD and COD. KP-01 had the highest TSS.

- Based upon the assessment of conventional parameter results, there does not appear to be any specific trends indicating the degradation of stormwater quality from Tempe's MS4.

- Metals and nutrients comprised the largest groups of components detected, with results observed for nearly all components in these groups, for nearly all sites, and at nearly every event.

Microbiological

- *E. coli* was above the SWQS at each sampling location in eight of the nine sampling events it was measured. SR-05 was less than 575 MPN during the summer 2016 event.

- *E. coli* concentrations were observed to have a moderate decrease from the permit term average 2011-2016 result (1,609 MPN) to 2016-2017 result (1,114 MPN), for all sites and all events during the respective periods. There is no indication of degradation of stormwater quality discharges due to *E. coli* from Tempe's MS4. As stated in the permit, "*E. coli* values above the SWQS are prevalent in Arizona in high flow precipitation events." There is no indication of the *E. coli* source being linked to wastewater or sanitary sewer overflows. Tempe continues to provide educational material to the public about picking up pet waste. It is difficult to determine if this outreach effort is directly related to the decrease in E. coli.

Metals

- Copper was observed to be above the SWQS during five of the nine sampling events at three of the five sampling locations, KP-01 and SR-08 each had two events <SWQS, TD-01 had one summer event <SWQS.

- Copper concentrations were observed to be relatively consistent from event to event in both the summer and winter wet seasons at individual sites; however, levels varied among the sites. When the 2011-2016 results (average all sites, all events 18.71µg/L) and 2016-2017 results (average all sites, all events 18.1 µg/L) were compared, there appears to be an insignificant yet slight decrease in overall copper level discharged.

- Although average copper levels have been observed to decrease in the recent sampling period when compared to previous wet seasons, no discernible trends have been identified. Copper is abundant in the environment, both naturally occurring and in forms associated with industrial and residential uses. Tempe will continue to monitor copper trends and determine best practices for the reduction of copper concentrations in runoff. There is no indication of degradation of stormwater quality due to copper discharges from Tempe's MS4.

Nutrients

- Average nutrients observed at each site in 2016-2017 demonstrate relative consistency despite differing land uses. Nutrients, although a common stormwater pollutant in many areas in the country, do not appear to be a significant contributor to stormwater pollution in the City of Tempe. Nitrogen and phosphorous species show no specific trends and there is no indication of degradation of stormwater quality discharges from Tempe's MS4.

Organic Pollutants (TPH and O&G, VOCs, SVOCs, and Pesticides)

During the 2016-2017 reporting period one organic parameter was detected. Alpha-Endosulfan, a pesticide, was detected below the SWQS, near the reporting limit.

Of all Organics analyzed throughout the entire dataset (2011-2017) (i.e., Organic Toxic Pollutants – two parameters; Volatile Organic Components (VOCs) – 33 parameters; Semi-Volatile Organic Components (SVOCs) – 45 parameters; and Pesticides – 25 parameters), only 13 detects have been observed– and each consisted of detection near the Practical Quantitation Level (PQL) and well below the SWQS.

Between 2011-2013, the detected Organics were comprised of three Total Oil and Grease detects, which were all observed during the winter wet season and from three different sites. There are no numeric SWQS for these analyses. There were two phenol (SVOC) detects, which

occurred in the summer wet season (both from the same site, in July and September) and one diethyl phthalate (SVOC) detect, which occurred in the winter wet season.

During the 2013-2014 reporting year, two detects were observed for 2,4-dinitrophenol (SVOC) from two sites, and four detects for 4-nitrophenol (SVOC) at the same two sites as well as two others (all during the winter season). Due to the low levels and the lack of additional data points, conclusions cannot be drawn as to trending of Organics related data.

No Volatile Organic Components (VOCs) have been detected during the permit term.

There is no indication of degradation of stormwater quality discharges from Tempe's MS4 by Organics.

Conclusions

Based on the data collected during this permit term, no obvious discernible and consistent trends, improvements or degradation of stormwater quality from the MS4 were observed.

During the 2012-2013 Annual Report, Tempe suspected that TD-01 sampling was being impacted by "Tempe Ditch" flow. During large rain events the flow in the "Tempe Ditch" has the potential to back-up into the TD-01 outfall, possibly comingling other sources of stormwater and/or non-stormwater. Further evaluation of the data collected (2011-2013) has led to the conclusion that TD-01 is not impacted by "Tempe Ditch" flow. This conclusion was reached by evaluating the data for TD-01, and comparing the collected data to the remaining four sites. If standing water is observed to be "backed up" into the outfall prior to storm sampling events, it is suspected that the volume of the storm flush is sufficient to ensure that samples collected from TD-01 are primarily related to storm runoff. Tempe will continue to watch this potential concern.

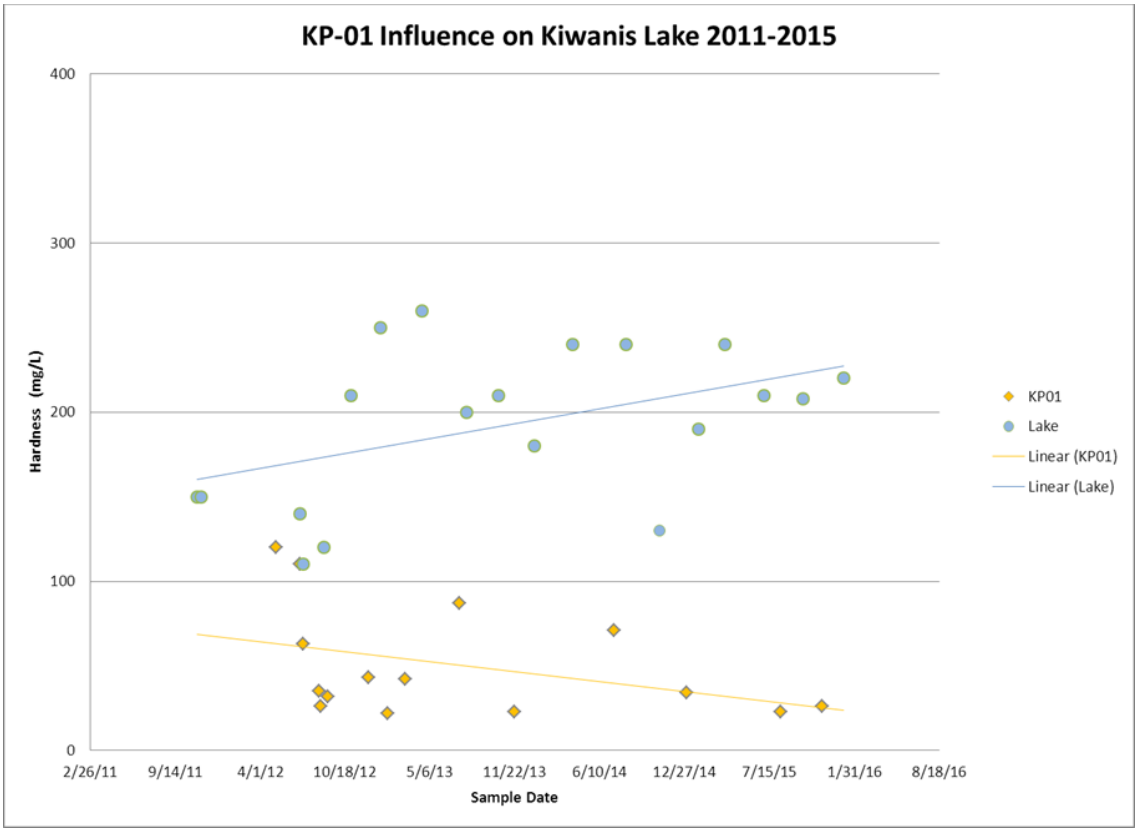
B. Surface Water Quality Standards (SWQS)

Stormwater monitoring sample results conducted consistent with Permit sampling conditions have been compared to SWQS for the applicable receiving water. Summary of Monitoring Data sheets **in Attachment Y** allow for this comparison. Note that any result found to be above a SWQS is shaded in red.

The Permit allows for the testing of dissolved metals and collection of Hardness data used to calculate corresponding SWQS. Since the 2012-2013 reporting year, Tempe's approach to collecting ambient Hardness data for a perennial water body, for the purposes of SWQS comparison, has been to monitor hardness in the waterbody during times that stormwater discharges are not occurring. An evaluation to compare storm event and lake water quality over

time demonstrated stormwater as significantly lower in hardness than the ambient water body (Kiwanis Park Lake). The trend showed hardness in the stormwater decreasing over time as the lake hardness continued to increase (See figure below). The data demonstrates that stormwater does not significantly alter the water quality of the lake ambient conditions. Continuing to use the hardness value of ambient lake conditions to calculate the SWQS of hardness-dependent analytes is the most appropriate method for protecting the aquatic habitat.

Figure 2: Kiwanis Lake Hardness Evaluation



C. Exceeding a SWQS

Tempe has been experiencing concentrations greater than SWQS for *E. coli* and copper since the 2011-2012 reporting period. Tempe identified only these two parameters as having concentrations greater than the applicable SWQS during the 2016-2017 reporting period. *E. coli* was found to be higher than the SWQS at five sites and eight of the nine sampling events. Site SR-05 was below the SWQS in July 2016. Dissolved copper was found to be higher than the applicable hardness-dependent standard at three sites and five of the nine sampling events. KP-01 has not experienced an event of copper greater than the SWQS since July 2013. SR-08 has not experienced an event of copper greater than the SWQS since July 2014. SR-08 has had only

two events where copper was greater than the SWQS in this permit term. The last event of copper greater than the SWQS at TD-01 was September 2015.

In 2014-2015, KP-01 experienced a single pH event of 9.1, greater than the SWQS. This result was a deviation from typical pH values at this outfall location. Throughout 2011-2013, the site average pH was 7.3 pH units with the previous highest pH result at the site being of 7.6. There is no known cause for the atypical result. An inspector investigated the area around KP-01 and could not pin point a specific source in the residentially zoned area that may have contributed to the higher pH level. Tempe will continue to monitor this site for pH values greater than SWQS on subsequent sampling events. Please see **Attachment BB** for details pertaining to sampling date, location, impacted receiving water, SWQS and results.

During the 2011-2012 reporting period, Tempe began the implementation of provisions outlined in Permit Section 4.0, relating to the recurrence of discharges higher than SWQS for *E. coli* and copper. After a full review of all sample results during the 2012-2017 reporting periods, there does not appear to be an immediate or obvious correlation between implemented control measures and *E. coli* and copper concentrations. The concentrations of these pollutants appear to correspond more directly to when the sample was taken (time of year and season). Tempe will continue to evaluate existing and future analytical data in an effort to better understand impacts on pollutant concentrations in addition to following the control measures identified in Table 11 and Table 12.

Potential pollutant sources and applicable control measures are summarized in the tables below.

Table 11: Copper Investigation, Evaluation, and Action

Potential Sources of Copper	
Vehicle brake pads	CCA pressure treated wood
Mobile cleaning	Air emissions
Vehicle washing and service	Soil erosion
Architectural copper	Irrigation water
Pool/spa/fountain algaecides	SSO
Pesticides, algaecides, root killers, and fungicides	Cooling towers
Industrial use of copper	Discharges to POTWs
Evaluated Control Measures	
Industrial Inspections - Focus on copper sources and applicable BMPs.	
Evaluate service facilities for automotive waste disposal practices.	
Outreach/Education - Pools, spa, fountain use of copper treatment and discharge practices.	
Outreach/Education - Alternatives for copper bearing pesticides, algaecides, & fungicides.	
Outreach/Education - Proper use of copper bearing pesticides, algaecides, & fungicides.	
Newly Developed/Implemented or Continued Control Measures	
Industrial Inspections - Inspection focus on potential sources of copper. BMPs discussed if applicable.	

Industrial Outreach/Education – Copper focused education and Prevention BMPs directed to industrial users.
Public Outreach/Education – Copper focused education and Prevention BMPs directed to the general public.
General - Continued implementation of IDDE program.

Table 12: *E. coli* Investigation, Evaluation, and Action

Potential Sources of *E. coli*	
Animal feces (domesticated, wild, farm)	Wastewater treatment plants
Manure	On-site septic systems
Wastewater discharges	Illicit connections
Evaluated Control Measures	
Review of SSO Control Practices	
Maintenance and cleaning of sewers	
Septic tank policies	
Outreach/Education - Clean up after your pet	
Outreach/Education - Feeding wild animals at waterside locations.	
Newly Developed/Implemented or Continued Control Measures	
Review of SSO Control Practices - Continued review of practices related to response and reporting of SSO events.	
Maintenance and cleaning of sewers - Continued implementation of comprehensive sanitary sewer cleaning program.	
Septic tank policies - Continued non-allowance of septic tank use.	
Public Outreach/Education - *E. coli* focused education and prevention BMPs directed to the general public.	
Public Outreach/Education - BMP focused education and prevention BMPs directed to the general public.	
Public Outreach/Education - Continued BMP focused on pet waste pick-up in public places.	

11. Estimate of Annual Pollutant Loadings

An estimate of the pollutant loadings each year from the municipal storm sewer system to Waters of the U.S. for each constituent listed in Section 7.4 of the Permit detected by stormwater monitoring within the Permit term. Pollutant loadings and event mean concentrations may be estimated from sampling data collected at the representative monitoring locations, taking into consideration land uses and drainage areas for the outfall. Include a description of the procedures for estimating pollutant loads and concentrations, including any modeling, data analysis, and calculation methods. Compare the pollutant loadings estimated each year to previous estimates of pollutant loadings.

There was little significant change in pollutant loads when comparing the 2016-2017 pollutant loading data with the data of previous years. The pollutant loads decreased more than three times the standard deviation of the permit term average results for four parameters at two of the seven sites and increased for one parameter at another location. The calculated pollutant loading for MS4 discharges to the Gila River decreased in COD, TSS and Copper loads. Total Phosphorous decreased at the Papago Park South pond. The pollutant load into Tempe Town Lake was greater than three

times standard deviation of the permit term average for Antimony. Table 13 provides a summary of 2016-2017 pollutant loading estimates and **Attachment CC** contains detailed analysis information.

For pollutant loading calculations, Tempe's annual rainfall is calculated using a precipitation group on the Maricopa County Flood Control District website. The group is named G054: CITY OF TEMPE and is comprised of four storm gauges in and bordering Tempe.

Table 13: 2016-2017 Annual Pollutant Loading Estimate* (tons)

Analyte	Gila River	Kiwanis Park Lake	Salt River (above TTL EDW)	Indian Bend Wash	Tempe Town Lake	Salt River (Below TTL)	Papago Park South Pond
BOD	11.8	1.04	7.49	2.4	17.8	59.8	0.053
COD	55.6	4.93	35.4	11.3	84.2	282	0.25
TSS	54	4.8	34	11	82	270	0.24
TDS	80	7.1	51	16	120	410	0.36
Total Nitrogen	1.6	0.14	1	0.33	2.5	8.3	0.0073
TKN	1.28	0.114	0.816	0.261	1.94	6.51	0.0057
TP	0.17	0.015	0.11	0.034	0.25	0.85	0.00074
Antimony	0	0	0	0	0.00066	0.0022	0
Arsenic	0	0	0	0	0.00053	0.0018	0
Barium	0.011	0.0009	0.0067	0.0022	0.016	0.054	0
Chromium	0	0	0	0	0	0.001	0
Copper	0.0052	0	0.0033	0.0011	0.0079	0.027	0
Lead	0	0	0	0	0	0.0012	0
Selenium	0	0	0	0	0	0.001	0
Zinc	0.015	0.0013	0.0094	0.003	0.022	0.075	0

Table notes: metals with non-detects are not listed and zero (0) is < 1 lb. (0.0005 tons).

12. Annual Expenditures

Tempe's stormwater program expenditures for the July 1, 2016-June 30, 2017 reporting period is conservatively estimated to be $1,242,756. Funding for the program comes from Tempe's CIP fund, various Public Works Department general and enterprise funds. Explanation of these expenditures and funding sources can be found further in this section.

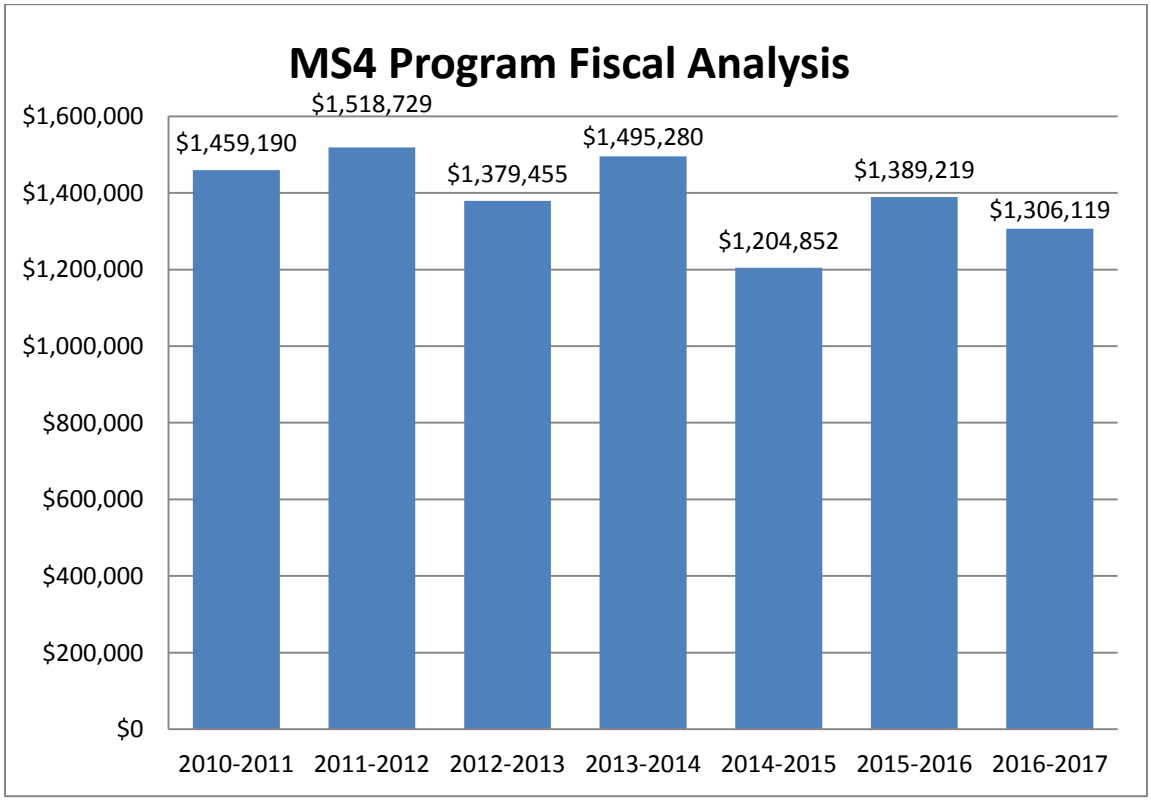
The following factors were considered when developing this fiscal analysis:

- Public involvement and participation programs are not exclusively related to the stormwater program. Accordingly, stormwater expenditures in these areas were either estimated to be one-half of the total operational budget, or the time and materials specific to stormwater activities.
- Most of the operational street sweeping activities are funded as a stormwater program component and are reflected as such.
- Employee attendance at training events hosted internally is not incorporated as a stormwater expenditure, though cost to develop and conduct training is considered.
- Adopt-A-Park programs are volunteer events that have been restructured to run solely on a volunteer basis; Tempe expenses are negligible.

Tempe's stormwater expenditures reflect a decrease over the 2015-2016 reporting year. The following considerations help to explain the overall and specific decreased expenditures:

- Engineering stormwater upgrade and inspections project expenditures decreased significantly from last year.
- Expenses for Private construction projects decreased.
- Inspections/Enforcement expenses decreased.
- There were no municipal stormwater facility upgrades this fiscal year

Figure 3: Fiscal Analysis



Tempe cannot accurately estimate the scope of budget changes and cost allocations for the 2017-2018 reporting year; however, the city does anticipate expenditures similar to previous years. Tempe will continue to streamline various city processes and increase operational efficiencies to ensure that all stormwater regulatory mandates are met in an economically and environmentally responsible manner. A full summary of this Fiscal Analysis can be found in Table 14.

Table 14: Tempe MS4 Annual Expenditures and Fiscal Analysis Fiscal Year 2015-2016

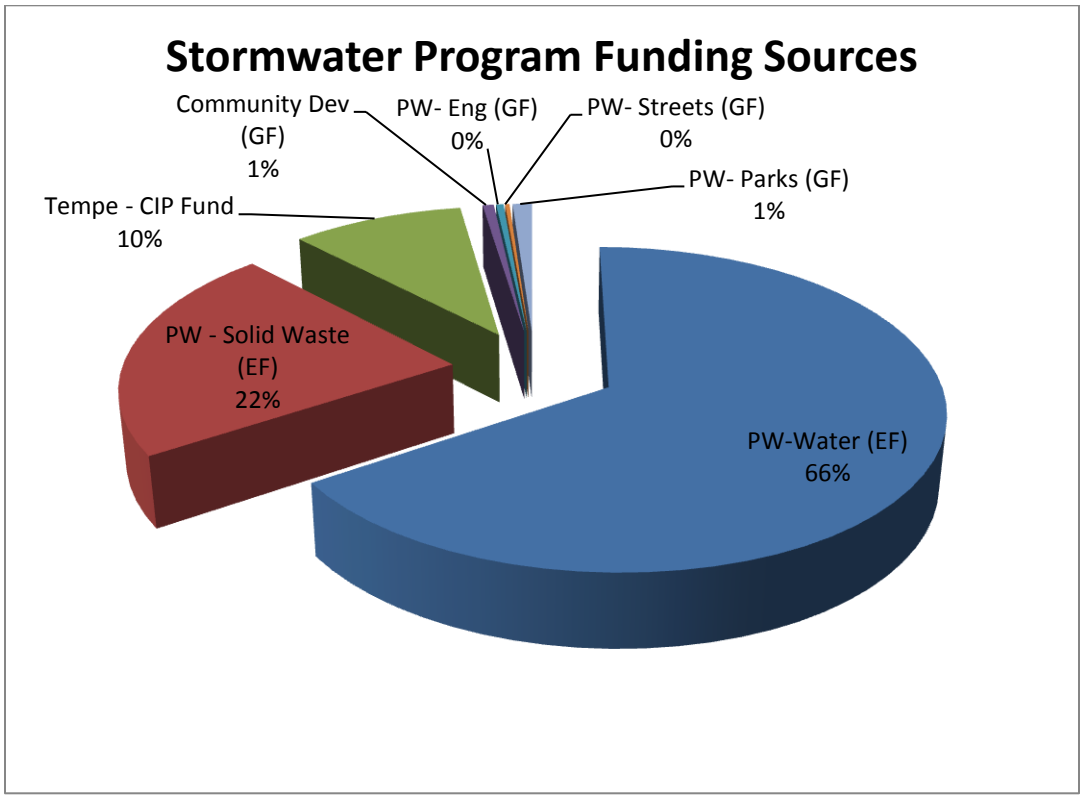
Activity	Amount in U.S. Dollars	Funding Source(s)	Notes
Program Administration (annual reporting, SWMP development and implementation, training, etc.)	$339,206	PW - Water (EF)	1.75 EQS 0.25 EPS
Legal Counsel	$2,000	PW - Water (EF)	Legal counsel - time
Municipal Facility Stormwater Upgrades and Infrastructure Repair	$0		Cost for facility BMPs and infrastructure repair
Public Education and Outreach			
Materials	$100	PW- Water (EF)	BMP Brochure Printing
Memberships	$2,500	PW-Water (EF)	STORM Dues
Other	$900	PW-Water (EF)	Outreach Booth for Festival of Arts
Public Involvement and Participation			
Hazardous Mat Safety/HPCC	$289,205	PW - Solid Waste (EF)	(1/2 Full operational expenses including SWPPP @ Priest)
Adopt-A-Park	$0	PW - Parks (GF)	Operated by volunteers no City staff costs
Adopt-A-Path/Street	$1,400	PW - Streets (GF)	Full Program Expense
Training (External)	$12,969	PW - Water (EF)	WEFTEC (2.5), NPDES Training Inst.
Capital expenses for new, replaced, or repaired stormwater sewers, capital for facility replacement.	$127,503	Tempe - CIP Fund	Repair/Replace storm sewer

Operational expenses for cleaning and/or repairing stormwater sewers.			
Cleaning / Repair (Internal)	$2,375	PW - Water (EF)	Staff Time & Equipment
Cleaning / Repair (Contract)	$35,082	PW - Water (EF)	
Engineering Capital Construction Stormwater Program	$5,507	PW- Eng. (GF)	Staff Time
Private Construction Stormwater Program	$8,301	CD - DS (GF) Developer Fees	Staff Time
Stormwater GIS development, maintenance, and operations, staff time, etc..	$17,100	PW - Water (EF)	Staff Time
Inspection / Enforcement (IDDE, Industrial / Commercial, etc.)	$90,310	PW- Water (EF)	Staff Time & Equipment
Outfall Inspections / Wet weather Sampling	$44,910	PW- Water (EF)	Staff Time & Equipment
Analytical			
Analytical	$18,332	PW - Water (EF)	
Staff Time - Chemists	$15,152	PW - Water (EF)	
CCTV	$9,000	PW - Water (EF)	Staff Time & Equipment
Utility Truck (#819)	$50,320	PW - Water (EF)	Equipment
Parks	$14,443	PW-Parks (GF)	Staff Time (inspections) /encampment cleanup
Streets			
Inspections	$1,920	PW - Streets (GF)	Staff Time
Street sweeping	$207,584	PW - Water (EF)	4 FTEs - Stormwater Expenditures
Permit Fee	$10,000	PW - Water (EF)	Permit Fee
Total	**$1,306,119**		

*Adopt-A-Park Program is now run entirely by volunteers and no City staff members are involved.

A summary of funding sources can be found below.

Figure 4: Funding Sources



13. Attachments

In an effort to save resources and paper, Tempe is providing all attachments in electronic format. In the event ADEQ feels that there is missing information or would like paper copies of any attachment, please feel free to contact Tempe's stormwater representative. Table 15 summarizes the attachments.

Table 15: Summary of Report Attachments

Attachment Letter Designation	Attachment Name	Attachment Letter Designation	Attachment Name
A	Outreach, Education, Awareness	Q	Industrial Commercial Inspections
B	STORM Annual Report	R	Restaurant Inspections
C	Training Sign-In Sheets	S	Non-Filer Notifications
D	ESS ARCA Infrastructure Inspections	T	Construction Inspections
E	MS4 Cleaning Summary	U	Tempe City Code
F	Parks & Open Spaces Infrastructure	V	Outfall Inspections
G	Streets Infrastructure Inspections	W	Sampling Event Parameters
H	WUD Eng. CCTV reports	X	MS4 Sample Event Tracking
I	Call-out Summary	Y	Summary of Monitoring Data
J	Enforcement Documents	Z	Laboratory Reports
K	City of Tempe ERP	AA	Data Trending
L	Municipal Facility Inspections	BB	SWQS Comparison
M	Municipal Facility Chemical Handling and Spill Procedures	CC	Pollutant Loading report
N	Hazardous Waste Management Plan	DD	Stormwater Management Plan (Minus Attachments)
O	COT MS4 Pesticide Herbicide Plan	EE	LID Evaluation
P	MSGP- SARA Inventory	FF	ADEQ Review 2015-2016 Tempe MS4 Annual Report