



# AZPDES

## Municipal Stormwater Permit AZS000001-2010

Third Annual Report  
September 2014

*Prepared By:*

The City of Tucson  
Department of Transportation  
Stormwater Management Section

*In Co-operation with the following*

*City Departments:*

GENERAL SERVICES

ENVIRONMENTAL SERVICES/HOUSEHOLD HAZARDOUS WASTE

FIRE

HUMAN RESOURCES/CENTRAL SAFETY SERVICES

PARKS AND RECREATION

PLANNING AND DEVELOPMENT SERVICES

WATER

TRANSPORTATION/ENGINEERING AND STREETS & TRAFFIC MAINTENANCE DIVISION

AND

PIMA ASSOCIATION OF GOVERNMENTS

TUCSON CLEAN AND BEAUTIFUL

UNIVERSITY OF ARIZONA

**The City of Tucson’s  
Stormwater Annual Report  
(Fiscal Year 2013–14)**

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Annual Report Form  
For Phase I MS4s -Due September 30<sup>th</sup> Each Year

**PART 1: GENERAL INFORMATION**

- A. Name of Permittee: City of Tucson
- B. Permit Number: AZS000001-2010
- C. Reporting Period: July 1, 2013 - June 30, 2014
- D. Name of Stormwater Management Program Contact:  
Beverley Hester, Environmental Engineer  
Mailing Address: P.O. Box 27210  
City: Tucson Zip: 85726-7210 Phone: (520) 837-4935  
Fax Number: (520) 791-4238 Email Address: Bev.Hester@tucsonaz.gov
- E. Name of Certifying Official: Daryl W. Cole  
Title: Director of Transportation  
Mailing Address: P.O. Box 27210  
City: Tucson Zip: 85726-7210 Phone: (520) 837-6692  
Fax Number: (520) 791-4238 Email Address: Daryl.Cole@tucsonaz.gov

**PART 2: ANNUAL REPORT CERTIFICATION**

The Annual Report Form 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.*

  
\_\_\_\_\_  
Signature of Certifying Official

  
\_\_\_\_\_  
Date



## PART 3: SUMMARY OF STORMWATER MANAGEMENT ACTIVITIES

### Overview

The City of Tucson was covered under Municipal NPDES Stormwater Permit AZS000001 from March 19, 1997 to August 31, 2011. During that time period, the City developed several programs to improve stormwater quality and maintain compliance with the permit. On September 1, 2011, ADEQ issued the City of Tucson AZPDES Stormwater Permit AZS000001-2010. Most of the programs developed under the previous permit are currently utilized to protect stormwater quality. The City is shifting the planning and construction of main arterial routes to include Green Infrastructure concepts. Additionally, Low Impact Development is becoming part of the culture in design. Other requirements under the new permit are utilized to fine tune the stormwater program. This is the third reporting year of its five-year term. The City has completed the third year requirements as summarized in this annual report.

### I. Public Education and Outreach

#### A. REPORT OUTREACH EVENTS AND TOPICS

This section identifies the City departments involved in public outreach activities that enhance public awareness and understanding of stormwater pollution. In addition to City departments, regional assistance is provided by Pima Association of Governments (PAG) and Tucson Clean and Beautiful. Outreach Topics and numbers reached are presented in Table I.A.i., Stormwater Public Awareness Program Activities.

##### 1. Stormwater Management Section

The Stormwater Management Section's Stormwater Public Awareness Program encouraged the public to keep stormwater clean and report stormwater concerns. The program extended to messages about flood safety, water harvesting, and promoting the preservation of naturally vegetated washes.

The *Water Harvesting Guidance Manual* is still available on CD, on the City's website, and in hard copy. This guidance manual was designed to assist the development community in complying with Land Use Code requirements to maximize use of water harvesting in new development. Water Harvesting is a low-impact development Best Management Practice (BMP) that promotes infiltration and serves to reduce pollutants in stormwater runoff. In addition, residents with existing homes or businesses can use the *Water Harvesting Guidance Manual* to retrofit their property to harvest stormwater. This year, 125 *Water Harvesting Guidance Manuals* were distributed to the general public.

In the City's ongoing catch basin identification program, catch basins located where there is a high potential for illegal dumping are identified with a weather-resistant metal disk bearing the slogan, "Only Rain in the Drain." The marked catch basins are included on the City's interactive, GIS Stormwater Map that will be included in a future annual report.

In order to inform citizens about the importance of preserving naturally vegetated watercourses, the City has continued a program to install signs that identify washes by name at significant road crossings. If the public is aware of the location and name of their local washes, citizens may be more likely to protect them as a natural resource. The wash

signs get damaged periodically and are replaced. These wash sign locations are included in a layer on the City's GIS Stormwater Map.

In this report period, the Stormwater Management Section distributed outreach materials at: Ward IV Back to School Bash, Water Festival, Tucson Children's Earth Day, Environmental Health and Safety Fair at Raytheon, and Monsoon Safety Awareness Week that were intended to encourage the public to prevent stormwater pollution. The message "Only Rain in the Drain" was used on a variety of promotional give-away materials as listed in Table I.A.i.

The *Desert Wash Safety Activity Book*, that presents basic stormwater quality messages, was provided to younger residents and continued to be popular among elementary schools, recreation centers, libraries and other facilities. These activity books were distributed in both English and Spanish.

*Stormwater in the Desert*, another book produced by the City that is geared toward students in middle school blends aspects of the *Water Harvesting Guidance Manual* with messages about flood safety and stormwater quality. This middle school activity book introduces students to complex technical concepts and includes interactive activities using the City's website, particularly the MapGuide and Stormwater Management Section websites. During this reporting period, the books were delivered to students and teachers at schools in the Tucson area. The book is keyed to Arizona's educational curriculum guidelines and also includes a Teacher's Guide.

In this report period, Stormwater Management Section continued to distribute construction information packets containing guidance on complying with the AZPDES General Permit for Construction. Topics included are listed in Table I.A.ii.

During the previous report period, the Stormwater Management Section began a Certificate of Excellence Program to reward industrial facilities demonstrating exceptional effort in complying with Stormwater regulations. In this second year of the program, eight facilities received a "Certificate of Excellence." Additionally, the Stormwater Management Section continued to distribute information packets and guidance materials to industrial facilities. The Industrial AZPDES Packet includes information on the No Exposure certification process among other topics as shown in Table I.Aii.

## **2. Planning and Development Services**

The Planning and Development Services Department continued outreach through daily interactions with counter staff, handout materials and monthly meetings with contractors and developers. Post-construction maintenance of retention/detention basins was encouraged through direct mailings and inspections. Staff also attended Southern Arizona Homebuilders Association (SAHBA) meetings. Table I.A.iii., includes outreach topics and numbers reached.

### **3. Tucson Water**

Tucson Water engages in a wide variety of educational outreach activities intended to increase awareness and encourage citizen action in water-related areas. The training and workshops reported in Table I.A.iv., focused on water harvesting techniques that may improve stormwater quality.

### **4. Other Outreach Activities**

Other outreach activities promoted by City of Tucson departments, Ward Offices, and outside agencies included:

- Poster contest held by the City of Tucson Environmental Services Department for Middle School students highlighting the importance of recycling.
- Recycling Collection Event and Recycling Facility Open House held by Environmental Services.
- Household Hazardous Waste expanded collection sites and on demand home pick-up
- Santa Cruz River Cleanup organized by Tucson Clean and Beautiful and Ward 1.
- Rainwater/Stormwater Professionals Network Meetings held by the Water Resource Research Center
- ADEQ - Hazardous Waste Workshops.

Newsletters published by the Ward Offices contained information about other public outreach events and volunteer opportunities. The following are a few examples:

- News about Watershed Management Group.
- Beat Back Buffelgrass events.
- Tree recycling (Christmas Trees).
- Information about Rainwater Harvesting Rebates offered by the Water Department.
- Volunteer opportunities with Tucson Clean and Beautiful.

### **5. Pima Association of Governments Stormwater Management Working Group**

Stormwater outreach is considered an important aspect of stormwater protection and member jurisdictions are required under their permits to conduct outreach and education. In 2003, the Working Group and PAG initiated an annual multi-media outreach campaign. A total of \$21,408 was spent this year on public outreach for vendor contracts.

The primary activities of the Working Group members included the following topics:

- Planning and approving annual stormwater outreach activities.
- Planning, conducting and participating in a seminar for the construction industry.
- Working Group coordination, management and information sharing.
  - Meeting as needed or sharing information via email updates and the phone.
  - Attending stormwater-related webcasts at PAG.
  - Sharing stormwater regulation information.
  - Providing input to PAG's watershed planning program for stormwater-related work.

### Stormwater Outreach

This fiscal year's media campaign, beginning the week of July 1, 2013, was strongly emphasized through the summer monsoon season, but also included some features now available year-round.

The slogan "Clean Water Starts with Me" became the campaign name in 2008 and continues to gain familiarity. The successful message has been repeated by other entities across the state. Artwork and style complements the imagery used by the local jurisdictions in school programs.

PAG directly addressed several required outreach topics within local jurisdictions with Municipal Separate Storm Sewer System Permits (MS4s). The topics emphasized this fiscal year were wash protection, illicit discharges and illegal dumping.

#### Topics Covered:

- Animal Waste (ads, brochures, stickers, pocket guides, radio, web, Facebook).
- Management and disposal of used oil including proper washing of vehicles (ads, brochures, rack cards, pocket guides, radio, web, Facebook).
- Residential practices including Low Impact Development (LID) methods (ads, rack cards, pocket guides, outreach signage, web, Facebook).
- Post Construction LID/Rainwater Harvesting (ads, rack cards, pocket guides, radio, web).
- Improper dumping and litter (ads, brochures, trash bags, web, Facebook).
- Construction-related ordinances, grading, illicit discharges, spill prevention, hazardous waste, proper disposal and storage, BMPs and SWPPPS (ads, rack cards, pocket guides, radio, web, Facebook) .

#### Target Groups that PAG reached:

- General Public (Cat Tran, radio, movie theater ads, magazines, pocket guides, rack cards, dog stickers, trash bags, Mrs. Green, website, Facebook, outreach events).
- Residential (TV).
- Home Owners (Brochures, rack cards, pocket guides, yard tips on website).
- Schools/Children (Bear Essential News; Activities, Coloring Sheets & Word Search handed out at events; Arizona Project WET (Water Education for Teachers) partnership; Facebook; web).
- Development Community, Construction Site Operators (SAHBA visits, web, materials, vehicle magnets for stormwater inspectors).

### Continuing and Expanding Efforts

Many aspects of the outreach campaign continued from previous years and some efforts grew. PAG ran the ads in new places by adding updated "De-pollute your commute" rack cards, new Spanish language rack cards, "Clean Water Starts with Me" trash bags, Cat Tran posters, advertising in the Daily Wildcat, an ad in Bike Life Tucson, radio spots on KOHN (Tohono O'odham station) and through a partnership with Arizona Project WET to develop Science Technology Engineering and Math (STEM) approved stormwater curriculum for teachers. We also expanded our outreach program by participating in new outreach events, including "Gather 'Round the Watering Hole" in April 2014, and created new engaging signs to display at events.

Movie theater ads, Spanish language TV spots, radio ads, Cat Tran posters and magazine ads were run through the monsoon season, starting in July and running as late as September 2013. New rack cards, radio spots and magazine ads were developed to reach Spanish-speaking populations, and additional radio spots were developed for KOHN, serving the Tohono O'odham Nation.

#### Construction, Development and Business Industries Outreach

PAG provided stormwater pollution prevention outreach to the construction industry and businesses through materials and on the Web. Information also was regularly shared at monthly meetings with the Southern Arizona Homebuilders Association.

#### Stormwater Management Working Group Coordination

Local Municipal Separate Sewer Systems (MS4s) participated in meetings held throughout the year in order to coordinate stormwater programs, plan general public outreach, plan construction industry outreach, and share regulatory information. Meetings for Working Group coordination also included webinars, program planning meetings, Impact Development focus meetings, as well as individual meetings conducted by PAG staff in support of the stormwater program.

PAG and the Working Group addressed construction industry concerns through several other means of discussion and engagement. PAG reached out to the construction industry by participating in meetings of the Southern Arizona Home Builders Association (SAHBA) Technical Committee. ADEQ meeting announcements and information were regularly shared on the topic of the draft Construction General Permit. Construction professionals also were invited to attend each quarterly Working Group meeting.

Table I.A.v., illustrates the many topics and multiple media used by PAG in this report period to raise awareness of stormwater issues.

### **6. University of Arizona, Cooperative Extension Service**

The University of Arizona's Cooperative Extension Services continued training on the proper storage, use, and disposal of pesticides, herbicides, and fertilizers to the general public, and landscape professionals. These numbers only reflect the trainings conducted by and reported by the Integrated Pest Management (IPM) teams of the Arizona Pest Management Center for non-agricultural audiences (general public and landscape professions).

Numbers are lower because they do not reflect any trainings conducted by Pima County Cooperative Extension personnel that work out of the county office in Tucson. This information was not available. The number of people who received training is tabulated in Table I.A.vi.

Table I.A.i

City of Tucson-Department of Transportation		
Target Group	Outreach Materials	Number
General Public	• Water Harvesting Guidance Manual	125
	• Swimming Pool Discharge Flyer	20
	• Yard and Landscape Waste Disposal brochure	25
	• Leaky vehicle flyer	25
	• Promotional materials given away at Public Outreach Events	2,100
	○ July 27 - Ward IV Back to School Bash	
	○ October 9 - Raytheon Environmental Health and Safety Fair	
	○ April 17 - Water Festival	
	○ April 12 - Tucson Children's Earth Day	
Elementary Schools	• <i>Desert Wash Safety Activity Book</i> for grade school children	1,848
	○ Stormwater runoff issues and residential stormwater management practices	
	○ Illicit discharges and illegal dumping	
Middle Schools	• <i>Stormwater in the Desert</i> book for middle school children and interactive website	427
	○ Stormwater runoff issues and residential stormwater management practices	
	○ Potential water quality impacts of application of pesticides, herbicides and fertilizer	
	○ Potential impacts of animal waste on water quality	
	○ Illicit discharges and illegal dumping	
	○ Spill prevention, proper handling and disposal of toxic and hazardous materials	
	○ Proper management and disposal of used oil	

Table I.A.ii

City of Tucson-Department of Transportation		
Target Group	Outreach Materials	Number
Construction Site Operators, Development Community	• Construction information packets	1
	○ Planning ordinances and grading and drainage design standards for stormwater management in new developments and significant redevelopments	
	○ Municipal stormwater requirements and management practices for construction sites	
	○ Illicit discharges and proper management of non-stormwater discharges	
	○ Spill prevention, proper handling of toxic and hazardous materials, and measures to contain and minimize discharges to the storm sewer system	
	○ Proper management and disposal of used oil and other hazardous or toxic materials, including practices to minimize exposure of materials/wastes to rainfall and minimize contamination of stormwater runoff	
	○ Stormwater management practices, pollution prevention plans, and facility maintenance procedures	
Industrial Commercial Businesses	• Industrial Information packets	20
	○ Illicit discharges and proper management of non-stormwater discharges	
	○ Spill prevention, proper handling of toxic and hazardous materials, and measures to contain and minimize discharges to the storm sewer system	
	○ Proper management and disposal of used oil and other hazardous or toxic materials, including practices to minimize exposure of materials/wastes to rainfall and minimize contamination of stormwater runoff	
	○ Stormwater management practices, pollution prevention plans, and facility maintenance procedures	
Subtotal Reached:		4,541
Cost:		\$3,759

Table I.A.iii.

City of Tucson -Planning and Development Services		
Target Group:	Development Construction	
	Outreach Materials	Number
• 12 Monthly Outreach meetings, approximately 15 attendees		
Subtotal Reached:		15
Cost:		\$1,200

Table I.A.iv.

City of Tucson -Water		
Target Group:	General Public	
	Outreach Materials	Number
• Rainwater Harvesting Manuals (several hundred distributed)		1,000
• Rainwater Harvesting Rebate (flyer in water bill)		250,000
Target Group:	General Public	
	Outreach Materials	Number
• 30 "Water-Wise Landscaping" Workshops		727
Subtotal Reached:		251,727
Cost:		\$89,800

Table I.A.v.

<b>Pima Association of Governments</b>		
<b>Target Group:</b>	<b>Construction Industry</b>	
	<b>Outreach Materials</b>	<b>Number</b>
• Meetings with the Southern Arizona Homebuilders Association		4
• PAG Stormwater website hits		1,077
○ Erosivity Calculator		
○ Example SWPPPs and Inspection Checklists		
○ Links to City's Stormwater Ordinance		
<b>Target Group:</b>	<b>General Public</b>	
	<b>Outreach Materials</b>	
• Dog poop stickers		1,625
• Public service announcements (PSA's)		37,000
• Magazine ads		230,000
• Brochures		600
• Bus interior posters (UA Cat Tran)		62,000
• Webpages, social media, blogs, internet radio		758,500
• Displays at community events		24,800
• Displays at Professional Events		445
• Rack cards		822
• Bumper stickers		505
• Vehicle magnets		15
• Sunshades		664
• Litter Bags		4,770
• Children's Workbooks		632
• Watershed Pocket Guide		5,230
• Movie Theater PSA's		60,000
• Spanish language TV PSAs		440,000
	Subtotal Reached:	1,549,308
	Cost:	\$21,292

Table I.A.vi.

<b>University of Arizona, Cooperative Extension Service</b>		
<b>Target Group:</b>	<b>General Public</b>	
	<b>Outreach Materials</b>	<b>Number</b>
• Proper use of fertilizer, insecticides, herbicides, and other pesticides		230
• Integrated Pesticide Management (IPM)		215
	Subtotal Reached:	445
	Costs:	Unknown

**7. Table I.A.vii Summary of Public Education and Outreach**

Table	Jurisdiction	Reached	Costs
I.A.i/ii	City of Tucson -Transportation Department	4,541	\$3,759
I.A.iii	City of Tucson -Planning and Development Services Department	15	\$1,200
I.A.iv	City of Tucson -Water Department	251,727	\$89,000
I.A.v	Pima Association of Governments	1,549,308	\$21,292
I.A.vi	University of Arizona -Cooperative Extension Service	445	Unknown
	<b>TOTALS:</b>	<b>1,806,036</b>	<b>&gt;\$115,251</b>

## II. Stormwater Public Involvement Program

### A. ACTIVITIES, NUMBER OF PEOPLE

#### 1. Stormwater Management Section

The City of Tucson Stormwater Management Section website contains a contact page allowing citizens to “Report a Concern,” including spills that threaten to enter the storm-drain system, dry weather flows, construction or industrial site runoff, and illegal dumping in stormdrains or washes. The City website received hits that are listed in Table II.A.i.

#### 2. Household Hazardous Waste

During the reporting period public participation in the City’s Household Hazardous Waste Collection Program was encouraged through a variety of educational outreach materials advertising this service, including a product-specific brochure describing the collection site locations, hours of operations, and tips on how to reduce environmental impacts entitled, “Protect Our Environment from Household Hazardous Waste”.

The program distributed outreach materials to the general public through direct mailings, handouts at public events and facilities on topics including disposal of the following:

- auto fluids
- batteries
- solvents
- pool chemicals
- pesticides
- paints

In addition, the program provided brochures and online information to businesses through their Small Business Waste Assistance Program (SBWAP). The SBWAP provides an affordable and environmentally safe alternative to qualifying businesses – Conditionally Exempt Small Quantity Generators (CESQGs) operating within Pima County - for proper disposal of their hazardous waste at the Household Hazardous Waste facility (HHW). Registration is required with company certification of generator status.

Businesses and the general public participated in the HHW program by dropping off household hazardous waste at the designated collection facilities.

Program outreach materials, public participation, and operating costs for this reporting period are summarized in Table II.A.ii.

#### 3. Tucson Clean & Beautiful

Through the Adopt a Park and Public Areas program, 258 public sites in the Tucson area have been officially adopted by community volunteer groups. Volunteer removal of litter and illegally dumped material from public areas helps to reduce impacts to stormwater quality. Volunteer efforts continue to grow, with more than 26,500 service hours provided in the past year. An increase of more than 5,000 documented hours during that time compared to the previous year.

Trees for Tucson provided shade trees to the public to help trap pollutants to improve water quality, stabilize soil, and prevent soil erosion.

Tucson Clean and Beautiful provided periodic email newsletters and maintained their website. These online resources were complemented by phone, in person and in brochure format, highlighting local environmental education events and community volunteer opportunities. These programs, as well as the central message of Tucson Clean and Beautiful, encourage the public to act responsibly in ways that improve and promote stormwater quality. Table II.A .iii, below provides an overview of the scope and audience of their program.

Table II.A.i.

<b>Stormwater Management Section</b>		
<b>Target Group:</b>	<b>General Public</b>	
	<b>Outreach Materials</b>	<b>Number</b>
•	Stormwater Section website “Report a Concern” web hits	3,364
Subtotal Reached:		

Table II.A.ii.

<b>Household Hazardous Waste (HHW)</b>		
<b>Target Group:</b>	<b>General Public</b>	
	<b>Outreach Materials</b>	<b>Number</b>
•	Number of Brochures printed on properly disposing of auto fluids, batteries, paints, and solvents, pool chemicals, and pesticides	1,500
•	HHW webpage visits	30,703
•	New’s releases on HHW collections	13
<b>Target Group:</b>	<b>General Public</b>	
	<b>Outreach Materials</b>	
•	Household Hazardous Waste Collection Program	
○	Participants in the program	30,485
•	ABOP drop-off sites	
○	Participants in the program (Counted in HHW Collection Program above)	12,527
<b>Target Group:</b>	<b>Small Businesses</b>	
	<b>Outreach Materials</b>	
•	Small Business Waste Assistance Program	
○	Participants in the program	122
Subtotal Participants:		30,607
Subtotal Program Cost:		\$821,044

Table II.A.iii.

<b>Tucson Clean and Beautiful</b>			
<b>Target Group:</b>	<b>General Public</b>		
	<b>Outreach Materials</b>		<b>Number</b>
• Newsletter			5,000
• Website			45,000
• Outreach presentations and event participants			14,500
<hr/>			
<b>Target Group:</b>	<b>General Public</b>		
	<b>Outreach Materials</b>		<b>Number</b>
• Adopt a Park and Public Areas, including Streets and Washes (Participants in the program)			5,500
• Trees for Tucson Program			
o Households Receiving Trees - Reduces soil erosion, improves stormwater quality			3,700
		Subtotal Participants:	73,700
		Subtotal Program Cost:	\$145,430

#### 4. Table II.A.iv Summary of Public Involvement

<b>Table</b>	<b>Jurisdiction</b>	<b>Reached</b>	<b>Costs</b>
II.A.i	City of Tucson -Transportation Department-Stormwater	3,364	0
II.A.ii	City of Tucson -Household Hazardous Waste	30,607	\$821,044
II.A.iii	Tucson Clean and Beautiful	73,700	\$145,430
<b>TOTALS:</b>		<b>704,671</b>	<b>\$966,474</b>

### III. Illicit Discharge Detection and Elimination (IDDE) Program

#### A. MUNICIPAL EMPLOYEE TRAINING

##### 1. Specialized Stormwater Training

The stormwater team participated in weekly training/discussion sessions. The focus varied on all activities related to the stormwater program. These activities included complaints, sanitary sewer overflows, illicit discharges, sampling activities, sample results and action needed, field screen outfall investigations, Multi-Agency Inspection Team (MAITs) inspections, industrial inspections, procedures, policies, and enforcement protocol. The stormwater inspectors completed their annual Occupational Safety and Health Administration (OSHA) training that included direction on who to contact if they encounter a spill.

There were no new stormwater employees hired during this reporting period.

##### 2. Non-Stormwater Employees

Non-stormwater employees received training from Central Safety Services on topics including: spill prevention and response, proper storage, handling and disposal of used oil and other toxics, reporting spills, reporting spills that threaten the stormdrain system, and reporting suspicious non-storm flows. This training was provided at orientation in the "City of Tucson Employee Safety Handbook" and by watching our Stormwater DVD "Municipal Storm Water Pollution Prevention Storm Watch" and answering questions after viewing the DVD. City employees also attended training of a Power Point presentation called "Stormwater Awareness Training" through "City Learn," an online

program that allows staff to take training individually. Therefore, no dates are reported. The specialized 40 hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training was provided to fire personnel. The 8-hr HAZWOPER refresher training is taken annually by Tucson Water and Environmental Services staff. The numbers of employees trained are tabulated in Part 4.

## **B. SPILL PREVENTION AND RESPONSE**

### **1. Municipal Facility Assessments**

During the previous report year, Stormwater Management Section assessed City owned and operated facilities for the presence of materials that have the potential to impact stormwater quality, and prioritized these facilities based on the risk of these impacts. The City utilized a Multi-Agency Inspection Team (MAITs) to perform annual inspections of all City owned and operated facilities. The team consisted of representatives from City agencies with expertise in Industrial Hygiene, Occupational Safety and Health Administration (OSHA) Compliance, Risk Management, Fire Code, and Stormwater. Facility assessments have been conducted in conjunction with the MAITs inspections, and were focused on determining the potential for each facility to impact stormwater quality.

### **2. Identification of Higher Risk Facilities**

The City continued to annually review, inspect, and prioritize the list of municipal facilities. Control measures are in use to minimize potential stormwater exposure. During this reporting year the stormwater inspector found the following issues that were corrected.

- Tucson Water Plant #1. In the equipment storage yard (PIO Storage, Bldg. 15) vehicles and equipment were washed out next to an existing curbed concrete pad. The sediment flowed onto the pad and left through a damaged straw wattle along the west side fence line. Tucson Water was directed to replace the damaged wattle. The wattle was replaced.
- Tucson Community Center Arena. Outside of the northern rollup access door to the arena floor a 25 pound bag of salt crystals was stored. The bag had rips along the bottom and salt crystals had spilled out on to the concrete. The facility contractor was directed to remove the bag from this location and store or dispose of it properly. The bag was properly disposed.
- Tucson Water Hayden Udall Treatment Facility. An oil spill was found next to a dumpster containing used oil filters. The dumpster was adjacent to the disinfection building. Tucson Water was directed to properly clean the oil spill. A follow up inspection observed that the spill was cleaned.

### **3. Spill Tracking**

Several years ago, the City developed a Spill Response Program, S-020C, used to provide direction on how to handle spills. Part of the program includes tracking of the number of spills that occurred. This year, 14 spills were reported to Environmental Services, as required by the program. Additionally, the Spill Response Program is going through an extensive revision process that should be finalized by the end of 2014.

## **C. DRY WEATHER SCREENING OF MAJOR OUTFALLS**

### **1. Outfall Inventory**

In the early 1990s, the City of Tucson followed the procedures outlined in 40 CFR 122.26 to identify 500 outfalls that have been subsequently utilized to detect non-storm flows. Fifteen outfalls have been added this year. These outfalls have been mapped on the City's Geographic Information System (GIS) Stormwater Map. A map showing the identified outfalls (currently there are 536) will be included in PART 13 (Attachments) by the 4<sup>th</sup> year report.

### **2. Outfalls Inspected**

In this report period, the Stormwater Management Section conducted dry weather outfall screening inspections of 96 outfalls plus the priority outfalls.

### **3. Priority Outfall Inspected**

During this year, four more priority outfalls were identified, totaling 17. 14 were inspected. They will be added to the field screening outfall map. The priority outfalls are inspected annually. The locations of the priority outfalls are upstream from Lakeside Lake in the Atturbury Wash Watershed. There were no dry weather flows found at any of these outfall locations.

### **4. Results of Dry Weather Screening**

Of the 96 outfall inspections conducted, none of the outfalls had flow other than from irrigation, and there were referred to Tucson Water. A few were referred to the Streets Department for minor repair of concrete, soil erosion, or removal of excess debris. Information collected during dry weather field screening is recorded and tracked through the Field Screen Outfall Database.

### **5. Eliminate Illicit Discharges (Cross Connections and Other Sources)**

Within City owned parks, there are approximately 48 miles of drainage channel/washes. The City annually inspects key areas of the stormdrain system located outside of City owned parks for the presence of illicit discharges.

### **6. Reports of Dry Weather Flows**

In this report period, the City received 75 reports of dry weather flow and responded to all of them. The reports were received from citizens, other City Department staff, Ward office staff, and people from other agencies. Reports of dry weather flow are considered to be a priority for inspection. Investigations conducted revealed that the source water originated from a variety of sources including: pool draining, pool back-flushing, grey water, sanitary sewer overflows, potable water releases, and small hydraulic oil and fuel spills.

There were 26 discharges reported for sanitary sewer overflows. Of the discharges reported 23 remained on private property, three entered the public right-of-way, and two entered a wash or a storm drain. Each sanitary release was properly cleaned up, sanitized, and flushed, as required. The flows were from overflowing cleanouts, manholes, grease traps, and/or broken pipes.

There were 18 reports that were from pool draining or pool filter backwashing. The inspections resulted in verbal warnings and outreach flyers were provided to pool owners for swimming pool discharges onto an unpaved right-of-way. In areas where there were discharges into an unpaved area, the discharger was directed to stop and remove the discharge pipe or hose from the area and ensure that backwash water remains on-site. Five pool discharge flyers were left at properties when no one answered the door during the inspectors visits.

There were nine reports of spills. None of them entered a storm drain or wash in the City's MS4. There were eight reports of discharges from construction sites that did not need a Stormwater Pollution Prevention Plan (SWPPP), allowable De Minimis Permitted discharges, or water line repairs that resulted in verbal warnings or requests for better communication. There were three reports of discharges that originated from grey water that were referred to Pima County for enforcement. There were nine reports of discharges from commercial operations. Finally, two other dry weather flows were reported. One was attributed to excess irrigation and there was not any flow observed at the other. All of the reports of spills or discharges were inspected.

## IV. Municipal Facilities Pollution Prevention/Good Housekeeping Program

### A. MUNICIPAL EMPLOYEE TRAINING

#### 1. New and Current Employees

All new City employees attend orientation where they each receive a "Safety First Manual." This employee safety manual includes details on what to do with spills. This report year there were 327 new employees that attended orientation. Additionally, City employees attend mandatory OSHA training during their first year and ongoing employees receive OSHA training every other year through the City's online program entitled "City Learn." The numbers of employees trained are tabulated in Part 4. Because classes are taken individually, no dates can be reported for the majority of employees. For those employees who do not have access to a computer, the City Learn training is conducted in a class setting. OSHA training for City of Tucson employees included the following key subject areas:

- Spill Training: Topics covered include prevention, response, and practices to prevent or minimize spills or discharges to the City's stormdrain system.
- Proper Handling, storage, transport and disposal of used oil and other toxics and hazardous materials and wastes to prevent spills, exposure to rainfall, and contamination of stormwater runoff.

More extensive training on these subjects is provided for first responders and staff who routinely work with hazardous or toxic products. New employees receive the preliminary 40 hours HAZWOPER training, and existing employees receive the HAZWOPER refresher classes.

#### 2. Specialized Stormwater Training

Stormwater Management Section staff received extensive training during their first year of employment and refresher training every other year. New Stormwater employees each receive a copy of the Stormwater Ordinance (SWORD), the Stormwater Management Plan (SWMP), the Watercourse Maintenance Guidelines, and any applicable ordinances and regulations. However, this year we did not have any new employees.

The Stormwater Management Section employees (three) received training at the 2014 Annual RCRA Seminar hosted by SAEMS on May 15, 2014. Three stormwater employees received Auto Sampler training provided by Environmental Engineering Consultants (EEC) on September 10, 2013. Additionally, two stormwater inspectors participated in the following training;

- OSHA Annual 8 hour Refresher,
- State of Arizona General Pesticide 6 hour CEU (April 4, 2014),
- 8 hour HAZWOPER refresher (June 27, 2014),
- Construction Stormwater Seminar (April 8, 2014),
- MS4 Statewide Summit (June 4, 2014),
- ADEQ Hazardous Waste Workshop (March 19, 2014).

The Stormwater Management Section conducted and attended weekly training that focused on the following:

- Recent incidents and how handled.
- Issues at construction sites during excessive rains.
- Discussions on industrial inspection results and activities.
- Wet weather sample results and dry weather screening findings.
- Success/failures/participation with outreach activities.

On-going training for Planning and Development Services Department Stormwater staff included frequent review and discussion of City Ordinances, development standards, and stormwater regulations. New staff are trained by existing staff in a mentoring process.

## **B. MUNICIPAL FACILITY ASSESSMENTS**

### **1. Municipal Facility Inventory**

To date, the City has identified 203 City owned and operated facilities that has been tabulated and is maintained on an inventory list. The list includes the latitude/longitude, facility contact, the operational status (operating or closed), the Standard Industrial Classification (SIC) code(s) that best reflects the services provided by each facility and a brief description of operational practices that could potentially impact stormwater quality. The City will investigate adding information from the inventory to the GIS Stormwater Map.

### **2. Higher Risk Facilities**

#### **(a) MAITs Inspections**

This fiscal year, the stormwater inspector assigned to the MAITs inspection team assessed the potential of City owned and operated facilities to impact stormwater quality. The City prioritized municipally owned facilities based on the following criteria:

- Proximity to Lakeside Lake, an impaired water
- Need for an MSGP
- Potential for impacting stormwater quality based on:
  - Quantity and location of materials used and/or stored at the facility;
  - Potential for exposure to stormwater; and
  - Potential to discharge a substantial pollutant load to the MS4 or to a water of the U.S.

Seven City facilities that don't need an MSGP were considered higher risk during this reporting period. These were: Thomas O. Price Service Center, Fred Enke, El Rio, Silverbell, and Randolph Golf Courses, Fire Department Maintenance (HAZMAT) and Household Hazardous Waste. Additionally, facilities with an MSGP are considered higher risk. They are: Los Reales Landfill, (AZMSG-61695), Sun Tran Bus Terminal AZMSG-61745, Sun Tran Bus Terminal Northwest AZMSG-61747, and Sun Van AZMSG-61746.

**(b) Proper Management of Used Oils and Toxics**

The Tucson Fire Department manages the City of Tucson Hazardous Waste Disposal Program, a citywide program to ensure proper handling and disposal of all toxic wastes generated by City operations. The General Services Department, located at Thomas O. Price Service Center, has an automotive fluids handling procedure to contain fluids in designated storage areas.

**(c) Controls for Pesticides, Herbicides, and Fertilizers**

Responsibility for proper storage and application of pesticides, herbicides, and fertilizers at City owned facilities is shared by two City Departments, City of Tucson Parks and Recreation Department, and the City of Tucson Department of Transportation, Streets and Traffic Maintenance Division. Proper storage practices in terms of stormwater BMPs were verified during the Multi-Agency Inspection Team (MAITs) inspections. Separate costs for implementation of these controls are limited or were not available at the time of this report.

**C. INSPECTIONS**

**1. Prioritizing Areas of MS4 for Inspection**

The City of Tucson, Department of Transportation, Streets and Traffic Maintenance Division shared responsibility for inspection and maintenance of the City's MS4 drainage System with the City Parks and Recreation Department. The drainage channels/washes located within City owned parks are considered priority and are normally inspected once a year. Based on system history, citizen complaints, and known maintenance concerns, the City annually inspects key areas of the stormdrain system located outside of City owned parks for the presence of illicit discharges, excess sediment, litter, debris or other pollutants that may obstruct flow or be transported in stormwater. In this report period, the City considered 394 miles of the MS4 drainage system outside of City owned parks as priority and 340 miles of these were inspected.

**2. Municipal Facility Assessments**

The City's Multi-Agency Inspection Team (MAITs) conducted annual inspections of all (203) City owned and operated facilities. As required, follow-up inspections occurred to verify that corrections had been made. During the last fiscal year, the Stormwater Inspector assigned to MAITs performed assessments of City facilities to determine if five or more gallons of potential stormwater pollutants were stored in areas exposed to stormwater. Based on this assessment, on the types of activities performed, material stored, and proximity to receiving waters, the City determined which of these facilities are considered high risk.

The City of Tucson Environmental Services owns and maintains 15 closed landfills and one active landfill; Los Reales. Los Reales Landfill operates under the MSGP 2010 (AZMSG-61695). The Los Reales Landfill Stormwater Pollution Prevention Plan (SWPPP) was written in accordance with the MSGP 2010. On June 24, 2014, the City conducted an inspection of Los Reales Landfill. This inspection is an additional measure to ensure that pollutants from landfills and municipal waste facilities are controlled. No violations or concerns were noted during the inspection of Los Reales Landfill. The Los Reales Landfill is maintained in good operating condition.

The City of Tucson Environmental Services Department conducted quarterly inspections of the closed landfills. Additionally, the Stormwater Management Section and the Environmental Services Department conducted joint inspections of the 15 closed landfills on October 8 and October 30, 2013. The closed landfills are maintained in good condition. No concerns or violations were noted. The Tumamoc landfill has been capped. At the time of inspection, hydro-seeding was in effect to re-establish vegetation. A Notice of Termination (NOT) will be submitted to ADEQ when 70% vegetation is re-established.

The City's fleet maintenance facility, Thomas O. Price Service Center, is not regulated under an MSGP however, it is covered under the City's MS4 permit. The Thomas O. Price Service Center maintained a SWPPP and had a Stormwater Pollution Prevention Team that conducted quarterly stormwater inspections of the facility. The Stormwater Management Section conducted an inspection of the Service Center on February 25, 2014; No violations were found.

### **3. MSGP Facilities**

To date, the only city owned and operated facility that qualifies for coverage under the Multi-Sector General Permit is Los Reales Landfill. Los Reales is covered under authorization number AZMSG-61695; however, as an additional landfill control measure, Los Reales is inspected annually by the Stormwater Management Section.

There are three City of Tucson owned transit facilities that are privately managed and staffed. They are two Sun Tran Bus Maintenance Facilities and the Sun Van Facility that are operated under separate MSGP 2010 permits. These facilities were inspected on October 17, 2013. Only minor housekeeping issues were identified during inspections and were immediately addressed. The MSGP permit numbers for these facilities are listed below.

- Sun Tran Bus Terminal AZMSG-61745
- Sun Tran Bus Terminal Northwest AZMSG-61747
- Sun Van AZMSG-61746

### **4. Summary of Follow-Ups**

Concerns noted during FY 2013-14 MAITs inspections of municipally owned and operated facilities were at three City facilities. The concerns were for the following deficiencies: vehicle and equipment wash water carrying sediment through a non-functioning straw wattle, leaking of automotive fluids on to asphalt next to an oil filter recycling container, and at the last location, a deteriorated bag of rock salt was stored outside without secondary containment.

During the City facility inspections, minor adjustments to good housekeeping practices were recommended and usually addressed during the inspection. All inspections included a representative of the facility to observe any deficiency. Reports were sent to the facility managers and the responsible party. The report described the deficiencies and included instructions to notify the MAITs team, within 30 days of the corrective action, or to provide an abatement schedule. Follow-up inspections were conducted to verify that appropriate actions were taken to resolve concerns.

## D. INFRASTRUCTURE MAINTENANCE

### 1. Stormdrain System

- Miles visually inspected:  
Within City Parks, there were not any drainage channels/washes inspected. Outside Parks, City Street and Traffic Maintenance Inspectors inspected 340 miles of drainage channels/washes. Stormwater Inspectors inspected an additional 20 miles of stormdrain /washes. In total, approximately 360 linear miles of the City's MS4 were inspected.
- Miles Cleaned or Debris Removed:  
In this report period, approximately 51 miles of drainage channels outside City parks were cleaned and there was no report of cleaning any drainage channels within City parks.
- Cleaning of Closed Conduit:  
Contracted vector services are utilized whenever there is need to clean City-owned closed conduit facilities. During this reporting period, approximately 0.05 linear miles of closed conduit were cleaned within City of Tucson owned Parks.
- Retention/Detention Basins Cleaned:  
Accumulated sediments and debris in retention/detention basins are removed seasonally, or as necessary, contingent on flow. During this reporting period, Retention/Detention basins located in City owned Parks were not cleaned, and one located elsewhere was cleaned.
- Number of Catch Basins Identified:  
The City identified 1,000 catch basins.
- Number of Catch Basins Cleaned:  
No catch basins within City parks were cleaned, and 27 outside City parks were cleaned.

### 2. Roadway System

- Street and Parking Lot Sweeping Program:  
The Streets and Traffic Maintenance Division's current schedule for street sweeping for major arterial and collector streets is twice monthly, and sweeping streets in the central business district is three times each week. These priorities are reassessed annually. Street and parking lot sweeping in public parks is conducted through the Parks & Recreation Department.
- Broom Miles:  
The Streets and Traffic Maintenance Division swept 30,842 broom miles of roadways and Parks and Recreation Department swept 2.67 miles of park paths.
- Total Waste Collected:  
The total amount of waste collected from Streets and Traffic Maintenance Division sweeping was 8,008 tons and 100 cubic yards was collected by Parks and Recreation Department.

## E. MAPPING STATUS

The City's GIS mapping system is formatted as an Environmental Systems Research Institute (ESRI) Geodatabase feature class North America Datum of 1983 (NAD83) High Accuracy Reference Network (HARN) in State Plane Arizona Central Fips 0202 International Feet. The GIS based Stormwater Map, <http://maps.tucsonaz.gov/stormwater> currently contains the following information:

- Linear Drainage Structures: Line layer showing the location of stormwater system pipes. The direction of flow can be determined based on the topographic layer.
- Stormdrain Grates and Catch Basins: Point layer showing the locations of stormdrain grates and catch basins.
- Outfalls: Point layer showing the location of all major outfalls (field screen locations); polygon layer showing the drainage area associated with each of the five sampling sites where stormwater is monitored.
- Detention/Retention Basins: Point or polygon layer showing the locations of all identified City-owned retention and detention basins.
- Jurisdictional Boundary: Line or polygon layer showing the jurisdictional boundaries of the MS4, including any new land annexations during the permit term.

During the first four years of this permit, the City plans to incorporate mapping of additional features identified in the new MS4 permit. Completion of this effort is anticipated by September 30, 2015. In addition, the City plans to complete a study by September 30, 2015 that will evaluate the costs, methods and time needed to further develop the City's GIS Stormwater Map.

## **V. Industrial Stormwater Program**

### **A. MUNICIPAL EMPLOYEE TRAINING**

The Stormwater Management Section did not hire anyone in this reporting year. However, current employees met weekly to discuss stormwater activities and reviewed/developed procedures.

### **B. STATUS OF INVENTORY**

#### **1. Industrial Facility Database**

The Stormwater Management Section maintains a list of Industrial and Commercial facilities that have the potential to discharge pollutants to the City's storm sewer system. Currently the list consists of 225 facilities that are targeted by the Multi-Sector General Permit (MSGP). During this reporting year there were 247 facilities on the list. However, the industrial inspector learned during the year that a number of facilities were no longer in business or are not in the City's jurisdiction. The Industrial Facility list currently includes the following facilities:

- Industrial facilities identified in 40 CFR 122.26(d)(2)(iv)(C);
- Industrial facilities subject to MSGP requirements, including those facilities that have submitted for a no exposure exclusion; and
- Other industrial and commercial sources (or categories of sources) that the City has inspected over the last permit term.

#### **2. Higher Risk Facilities**

During the previously reporting period, the Stormwater Management Section identified 33 higher risk facilities that are more likely to be sources of stormwater pollution. The priority list was re-evaluated and risk assessment was based on the type of facility, the products or services provided by the facility, proximity to receiving waters, receiving water quality, and other factors that indicate the potential to impact water quality. This list has not changed.

#### **3. AZPDES Non-filers**

The City continued with the program to determine whether or not a facility has obtained coverage under the Arizona Multi-Sector General Permit. When the City identifies a facility that has not obtained the required coverage, the City will report that facility's location and information to the ADEQ Unit Manager, Field Services Unit, Water Quality Compliance Section semi-annually, by June 30 or December 31. During this report period, one facility, A1 Towing Company, was reported to ADEQ on October 30, 2013 because they claimed to be a towing company but appeared to be salvaging vehicles and did not have an MSGP. Additionally, they would not allow the Stormwater Inspector to inspect the facility.

### **C. INSPECTIONS**

#### **1. Inspection Findings**

During the facility inspections, recommendations were made to improve control measures to assure permit compliance. There were no enforcement actions that involved City court. All corrective actions were minor and corrected at the time of inspection or, if needed,

were corrected by the time of a scheduled re-inspection. Notable corrections made at inspected facilities included the following:

- Obtained required MSGP.
- Created a facility SWPPP and/or updated a facility SWPPP.
- Placed secure lids on 55-gallon drums and relocated to areas with overhead protection and secondary containment.
- Reduced inventory of 55-gallon drums used for waste.
- Improved housekeeping at fueling areas by cleaning spills with absorbents and having spill kits stationed at fueling areas.
- Placed overhead cover at fleet wash areas to prevent run-off into the MS4.
- Improved control measures/BMP's at material storage areas to prevent discharges into MS4.
- Installed control measures to prevent discharges into the MS4.
- Improved general housekeeping by cleaning spills promptly, training employees, and having spill kits available at work areas.

## **2. Inspect 20% of all Facilities**

The City continued to include photographs and summaries in the inspection reports. This detail ensures the owner and operator clearly understand what recommendations need to be applied. Additionally, the focus was on facilities of higher risk that take much longer to complete than those of low risk. This year, the target of inspecting 20% of the facilities was achieved. The City inspected 54 facilities targeted under the MSGP. This total is 24% of all of the MSGP targeted facilities in the Industrial Facility Database. Of the 33 high risk facilities, 12 were inspected. The City will continue to review and revise the facility list, and will ensure that a minimum of 20% of facilities on the list receive inspections.

## **3. Enhancing the Industrial Facility Program**

During the permit term, the Stormwater Management Section enhanced the industrial/commercial stormwater program by increasing the number of inspections of commercial and industrial facilities through outreach or other innovative measures. During this report year, inspections were increased from the previous year.

During this report period the Stormwater Management Section continued educating facility operators regarding the MSGP 2010 and the sector specific requirements for their respective industry. During facility inspections, additional time was dedicated to discuss and explain the MSGP 2010 and sector specific requirements. This was performed to assist facility operators to be in compliance with stormwater regulations. Also, stormwater inspectors attended hazardous waste and Resource Conservation and Recovery Act (RCRA) training. This training improves the stormwater inspectors' ability to identify hazardous wastes. In addition, a "Certificate of Excellence" program continued to be utilized to acknowledge industrial facilities that have displayed commendable compliance with Stormwater Regulations. Eight facilities were awarded the certificate this report period; Abrams Airborne, Arizona Shuttle, BE Aerospace, Fairfax Companies, L&L Manufacturing Company, Saia LTL Freight, Sasol North America, and VIP Taxi.

## **VI. Construction Site Controls**

### **A. MUNICIPAL EMPLOYEE TRAINING**

#### **1. New and Existing Employee Training**

The Stormwater Management Section did not hire anyone in this report period. New Stormwater Management staff receive extensive training during their first year. Stormwater training incorporates both SWPPP review and inspections. An emphasis on cross training allows a small staff to fill in as needed to meet fluctuations in workload. They receive extensive written materials, such as, a copy of the Stormwater Ordinance (SWORD), the Stormwater Management Plan, the Watercourse Maintenance Guidelines, a copy of the AZPDES Construction General Permit, and any applicable ordinances and regulations and outreach materials for stormwater management for construction facilities.

### **B. PLANNING AND LAND DEVELOPMENT**

The City recognizes the need to understand Low Impact Development (LID) and Green Infrastructure Practices (GI). The City has recently completed a “Green Streets Active Practice Guidelines” for City streets construction projects.

### **C. PLAN REVIEW AND APPROVAL**

#### **1. Plan Review**

Following SWPPP review and plan approval, the Planning and Development Services Department (PDSD) issues grading and building permits.

#### **2. Plan Approval**

Verification that the SWPPP and Notice of Intent to Discharge (NOI) are complete is a requirement for the issuance of a grading permit. SWPPPs were submitted and reviewed and ground disturbing permits were issued that met the AZPDES Construction General Permit eligibility requirements.

#### **3. Pre-Construction Meetings**

Planning and Development Services Department (PDSD) held pre-construction meetings for private construction projects. The meetings provided an opportunity to review the City’s requirements that included providing a copy of ADEQ’s authorization document at the preconstruction meeting. Other requirements are aimed at ensuring the contractor understood that the stormwater controls (BMPs) to be utilized for all sites regardless of the size, if pollutants potentially leave the site.

#### **4. Transportation Projects**

The Department of Transportation administers the construction of roads and stormdrains within the publicly owned right-of-ways. The Stormwater Management Section reviews plans and ensures the SWPPPs for these projects meet all the requirements of the Arizona Construction General Permit. The City does not issue a Notice to Proceed until a copy of ADEQ’s authorization document is received.

In addition to administering construction, the Department of Transportation, Permits and Codes Section issues Right-of-Way (ROW) use permits for private activities, including

utility work, that takes place within City owned right-of-ways and insures that ROW and Public Improvement projects meet the requirement for an AZPDES Construction General Permit. All required SWPPPs were reviewed and approved prior to the start of work.

#### **D. STATUS OF INVENTORY**

##### **1. Permits Plus Database**

The City continued to utilize the Permits Plus Database to track private development activities and inspections. Information in the database included: requirements for a Construction General Permit, plan and SWPPP review comments, number of submittals, site location, construction inspections, enforcements and other information. This database is continually updated as plans are submitted and reviewed, permits are issued, and construction sites are inspected.

##### **2. Smart NOI Database**

A search is performed annually through ADEQ's NOI Construction Stormwater General Permit Database for permits the City has filed. Expired permits or finished projects are noted and the City's signatory is notified to file a Notice of Termination (NOT) with ADEQ.

#### **E. INSPECTIONS**

Many construction projects are small and do not come under the AZPDES requiring a SWPPP. However, a number of projects do. Inspections are prioritized by performing inspections on those that need a SWPPP as the higher priority and those that do not need a SWPPP are a lower priority. Additionally, projects that have had a lot of problems, such as track out, or are near a receiving water, are put on the highest priority list.

##### **1. Inspection Findings**

During this reporting period, PDSO inspected 44 construction sites. The findings were typical of construction sites and inspectors communicated what was needed in order to comply with AZPDES construction general permit.

##### **2. Enforcement Actions**

During this reporting period, PDSO issued 392 enforcement requests for corrective actions due to site deficiencies. These included the location, installation, and maintenance of controls, and the requirement for on-going inspections. 235 enforcement actions were resolved at the time of the follow-up inspection, and the remaining are in progress.

##### **3. Transportation Projects**

During this reporting period 272 inspections of 11 Capital Improvement Projects (CIP) and Public Improvement Agreement (PIA) projects involving road construction were performed. SWPPP deficiency(s) were reported to the on-site superintendent, field engineer, or designated representative. Verbal warnings were given to correct the discovered deficiency(s) that ranged from track-out, sediment accumulation along the roadway, stormdrain inlet protection maintenance, improperly installed BMPs, stockpile management, concrete washout use, and record keeping. Follow-up inspections determined that all concerns were quickly addressed and resolved satisfactorily.

## **VII. Post-Construction Site Controls**

### **A. MUNICIPAL EMPLOYEE TRAINING**

Municipal employee training for construction and post-construction is discussed under Section VI Construction Site Controls.

### **B. POST-CONSTRUCTION CONTROLS**

In this report period, the City did not implement any new post-construction controls for municipal projects. The City will develop an inspection, maintenance, and tracking program for Post-Construction Controls.

#### **1. Inspection of Privately owned Retention/Detention Basins**

The Planning and Development Services Department (PDSD) has an on-going program for inspection of privately owned retention/detention basins to ensure that the basins continue to operate as designed. Every year PDSD inspects privately owned basins and performs follow up inspections if deficiencies are found.

#### **2. Inspection of 75% of City Permitted Sites**

In this report period, the City inspected all of the permitted sites. Planning and Development Services Department inspectors conducted post construction inspections of privately developed sites to ensure vegetative landscape cover was established to stabilize the site. The Stormwater Management Section conducted post-construction inspections for Capital Improvement Projects and Private Improvement Agreement projects that were completed during this report period. Permits and Codes Section performed post-construction inspections for AZPDES projects. No concerns or deficiencies were noted.

### **C. COMPLIANCE ACTIVITIES/ENFORCEMENT**

#### **1. Privately Owned Retention/Detention Basins Enforcement**

No major enforcement actions (citations) were issued in this report period. However, verbal and/or written requests for basin maintenance are still given.

#### **2. Summary of Follow-up Actions**

Upon follow-up, all requested maintenance had been performed to keep basins functional.



## PART 4: NUMERIC SUMMARY OF STORMWATER PROGRAM ACTIVITIES

### I. Illicit Discharge Detection & Elimination Program

#### A. MUNICIPAL EMPLOYEE TRAINING

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2011-12	2012-13	2013-14	2014-15	2015-16
Number of training sessions (on non-stormwater discharges and the IDDE program)	• 18	• 85	• >13	•	•
Number of employees attending training	• 128	• 273	• 448	•	•

#### B. SPILL PREVENTION

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2011-12	2012-13	2013-14	2014-15	2015-16
Number of municipal facilities identified with hazardous materials	• 9	• 231	• 243	•	•
Number of spills at municipal facilities with hazardous materials that occurred in outside areas	• 9	• 12	• 15	•	•
Number of facility assessments completed	• 213	• 212	• 302	•	•
Date of last review of site-specific materials handling and spill response procedures	• 6/12	• 4/13	• 6/24	•	•

#### C. OUTFALL INSPECTION

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2011-12	2012-13	2013-14	2014-15	2015-16
Total number of major outfalls identified to date	• 521	• 521	• 536	•	•
Total number inspected	• 113	• 127	• 110	•	•
Number of 'priority outfalls' identified to date	• 10	• 13	• 17	•	•
Number of 'priority outfalls' inspected	• 10	• 13	• 14	•	•
Number of potential dry weather flows detected	• 0	• 0	• 0	•	•
Number of potential dry weather flows investigated	• 0	• 0	• 0	•	•
Number of major outfalls sampled during dry weather flow	• 0	• 0	• 0	•	•
Number of illicit discharges identified	• 0	• 0	• 0	•	•
Number of illicit discharges eliminated	• 0	• 0	• 0	•	•

**D. MS4 INSPECTIONS**

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2011-12	2012-13	2013-14	2014-15	2015-16
Amount of Stormwater drainage system inspected (length)	• 29	• 24	• 20	•	•
Number of stormdrain cross connection investigations	• 3	• 1	• 1	•	•
Number of illicit connections detected	• 1	• 1	• 1	•	•
Number of illicit connections eliminated	• 1	• 1	• 0	•	•
Number of corrective or enforcement actions initiated within 60 days of identification	• 1	• 7	• 1	•	•
Percent of cases resolved or transferred to City Court System within 1 calendar year of original enforcement action	• 100%	• 100%	• 100%	•	•
Illicit discharge from irrigation, misting, overflow and ponding	• 486	• 501	• 543	•	•
○ Verbal warnings for above	• 275	• 409	• 457	•	•
○ Written warnings for above	• 68	• 30	• 19	•	•
○ Turned over to court for above	• 4	• 7	• 2	•	•

**E. INSPECTION DUE TO REPORTS OF DRY WEATHER FLOW**

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2011-12	2012-13	2013-14	2014-15	2015-16
Number of illicit discharge reports received	• 120	• 123	• 75	•	•
Percent of illicit discharge reports responded to	• 100%	• 100%	• 100%	•	•
Percent of responses initiated within 3 business days	• 100%	• 100%	• 100%	•	•

**II. Municipal Facility Stormwater Program**

**A. MUNICIPAL EMPLOYEE TRAINING**

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2011-12	2012-13	2013-14	2014-15	2015-16
Number of training events (*Various)	• >66*	• >79*	• >79*	•	•
Number of staff trained	• 3,800	• 4,196	• 4,437	•	•
Number of Stormwater Staff Training Sessions/number trained	• 5/27	• 7/4	• 61/20	•	•

**B. MUNICIPAL FACILITY INVENTORY**

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2011-12	2012-13	2013-14	2014-15	2015-16
Total number of facilities on inventory	• 203	• 203	• 203	•	•
Date identification of “higher risk” facilities complete and date of prioritization of municipal facilities completed	• Nxt yr	• 10/12	• 10/12	•	•
Number of municipally-owned high risk facilities identified	• Nxt yr	• 7	• 7	•	•

**C. INSPECTIONS**

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2011-12	2012-13	2013-14	2014-15	2015-16
Miles of MS4 drainage system prioritized for inspection	• 426	• 441	• 442	•	•
Miles of priority drainage system visually inspected	• 250	• 341	• 340	•	•
Number of “higher risk” municipal facilities inspected	• 4	• 10	• 9	•	•
Number of “higher risk” municipal facilities found needing improved stormwater controls	• 0	• 1	• 0	•	•

**D. INFRASTRUCTURE MAINTENANCE**

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2011-12	2012-13	2013-14	2014-15	2015-16
Linear miles of drainage channel cleaned	• 161	• 99	• 51	•	•
Linear miles of closed conduit cleaned	• 0.05	• 0.3	• 0.05	•	•
Street sweeping (broom miles)	• 24,709	• 31,056	• 30,842	•	•
Record amount of waste collected from street and lot sweeping (tons)	• 7,027	• 8,856	• 8,008	•	•
Number of retention/detention basins cleaned	• 10	• 15	• 1	•	•
Total number of catch basins identified to date	• 1,000	• 1,000	• 1,000	•	•
Number of catch basins cleaned	• 43	• 26	• 27	•	•

### III. Industrial Stormwater Program

#### A. MUNICIPAL EMPLOYEE TRAINING

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2011-12	2012-13	2013-14	2014-15	2015-16
Number of training events for MS4 staff	• 5	• 2	• 1	•	•
Number of staff trained	• 3	• 4	• 2	•	•

#### B. INVENTORY

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2011-12	2012-13	2013-14	2014-15	2015-16
Number of Industrial facilities inspected	• 19	• 44	• 54	•	•
Total number of facilities on the priority list	• 33	• 33	• 33	•	•

#### C. INSPECTIONS AND ENFORCEMENT ACTIONS

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2011-12	2012-13	2013-14	2014-15	2015-16
Number of corrective or enforcement actions initiated on industrial facilities	• 7	• 8	• 3	•	•
Percent of cases resolved within one (1) calendar year of original enforcement action	• 100%	• 100%	• 100%	•	•
Number of cases referred to the City Court System	• 0	• 0	• 0	•	•

#### IV. Stormwater Construction Program Activities

##### A. MUNICIPAL EMPLOYEE TRAINING

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2011-12	2012-13	2013-14	2014-15	2015-16
Number of training events for SWPPP plan review staff	• 1	• 2	• 1	•	•
Number of staff trained	• 3	• 5	• 3	•	•

##### B. PLAN REVIEW

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2011-12	2012-13	2013-14	2014-15	2015-16
Number of grading plans/SWPPPs submitted for review	• 47+	• 121	• 121	•	•
Number of ground disturbing permits issued that meet the AZPDES Construction General Permit eligibility	• 19+	• 54	• 62	•	•
Number of construction/grading plans reviewed for those that fall under AZPDES	• 24	• 37	• 52	•	•
Number of AZPDES permitted construction sites	• 24	• 51	• 67	•	•

##### C. INSPECTIONS AND ENFORCEMENT ACTIONS

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2011-12	2012-13	2013-14	2014-15	2015-16
Number of AZPDES construction sites inspected	• 24	• 47	• 55	•	•
Number of corrective or enforcement actions initiated on construction facilities	• 415	• 566	• 414	•	•
Number of corrective actions resolved	• 262	• 361	• 257	•	•
Number of corrective actions turned over to the City Court System	• 0	• 0	• 0	•	•

#### V. Post Construction Program Activities

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2011-12	2012-13	2013-14	2014-15	2015-16
Number of post-construction inspections completed	• 1,921	• 2,318	• 2,127	•	•
Number of corrective or enforcement actions initiated for post-construction activities	• 15	• 30	• 34	•	•



## **PART 5      EVALUATION OF THE STORMWATER MANAGEMENT PROGRAM**

The City's Stormwater Management Program has been effective during this report year. The City's Stormwater Management Program had very minor changes this year and the revision was completed in April. The feedback and responses regarding education and outreach has shown the Stormwater Management Section that people have a better understanding of the need for keeping pollutants from contacting stormwater. During industrial and construction inspections, staff have noted that the operator's base knowledge is improving and are amiable to learning and complying with the stormwater regulations. Contact, through outreach events, has demonstrated that the general public is interested in keeping stormwater clean and willing to do their part to help. A number of volunteer groups that clean up washes is an example of the dedication the public has for the environment.

The City continued providing the "Certificate of Excellence" to facilities that do an outstanding job managing their facility for stormwater quality. Eight were issued this year; all to industrial facilities.



## **PART 6      STORMWATER MANAGEMENT PROGRAM MODIFICATIONS**

The Stormwater Management Program (SWMP) has been in use for about two years. During this last year, only minor modifications have occurred that better describe the stormwater program. The updated SWMP was posted on the City's Internet site in April of this year. Recently, there have been organizational changes that affect the Stormwater Management Section that will need to be reflected in the Stormwater Management Program. The Stormwater Management Section consisted of two Environmental Inspectors and one Outreach personnel who reported to an Engineer. However, as of September, there is no longer a Stormwater Management Section. The two Environmental Inspectors have been re-classified to Construction Inspectors and now report to a Lead Construction Inspector, the Outreach person reports to someone else without stormwater expertise, and the Engineer was re-classified to an Engineer Project Manager. The intent of the organizational changes is to have access to more inspectors to help with the stormwater program, with the intent on utilizing staff more efficiently. These changes, along with a better description on how they affect the Stormwater Management Program, should be detailed in the next update.

Changes that will need to be clarified in the next Stormwater Management Program modification include:

- A clear understanding of the chain of command for staff who are expected to work on stormwater issues,
- Identify training needs for Construction Inspectors who will be working with stormwater,
- Train Construction Inspectors



## PART 7 MONITORING LOCATIONS

Stormwater is monitored at five locations within the City of Tucson. They are:

Site	Land Use	Physical Location	Location	Watershed Area (acres)	Receiving Water
1	Single Family Residential	Grant Road & Wilson Avenue	32° 15' 02.83" N 110° 56' 15.23" W	400	SC
2	Multi-family Residential	Greenlee Road	32° 16' 14.9" N 110° 53' 56.88" W	49	R, SC
3	Commercial	El Con Mall / Randolph Way	32° 13' 16.16" N 110° 55' 04.77" W	38	SC
4	Industrial	17 <sup>th</sup> Street	32° 12' 48.33" N 110° 57' 12.33" W	91	SC
5	Mixed Use	First Avenue at Limberlost Road	32° 16' 58.28" N 110° 57' 40.35" W	380	R, SC

SC = Santa Cruz River, R = Rillito River, P = Pantano Wash

The flow from Sites 2 and 5 goes to the Rillito River and then to the Santa Cruz River. The other sites flow directly into the Santa Cruz River. At the discharge points, the Santa Cruz and Rillito are both normally dry, ephemeral washes with no aquatic habitat.

All five of the City's monitoring stations are equipped with automated sampling equipment. The automated equipment is programmed to collect flow-weighted samples at fixed time intervals. However, due to constant equipment malfunctions, sampling is conducted manually. Samples are composited at the laboratory based on storm hydrographs to achieve a flow-weighted composite for analysis.

ADEQ advised the City on May 9, 2013, to utilize automatic samplers. The City responded and obtained quotes and training on a variety of automatic samplers and how they worked. They learned that it is nearly impossible to collect flow proportional samples with automatic samplers and be in compliance with this permit at the same time. As convenient as it would be to have automatic samplers, the City decided against implementing automatic samplers in an effort to stay in compliance with the permit.



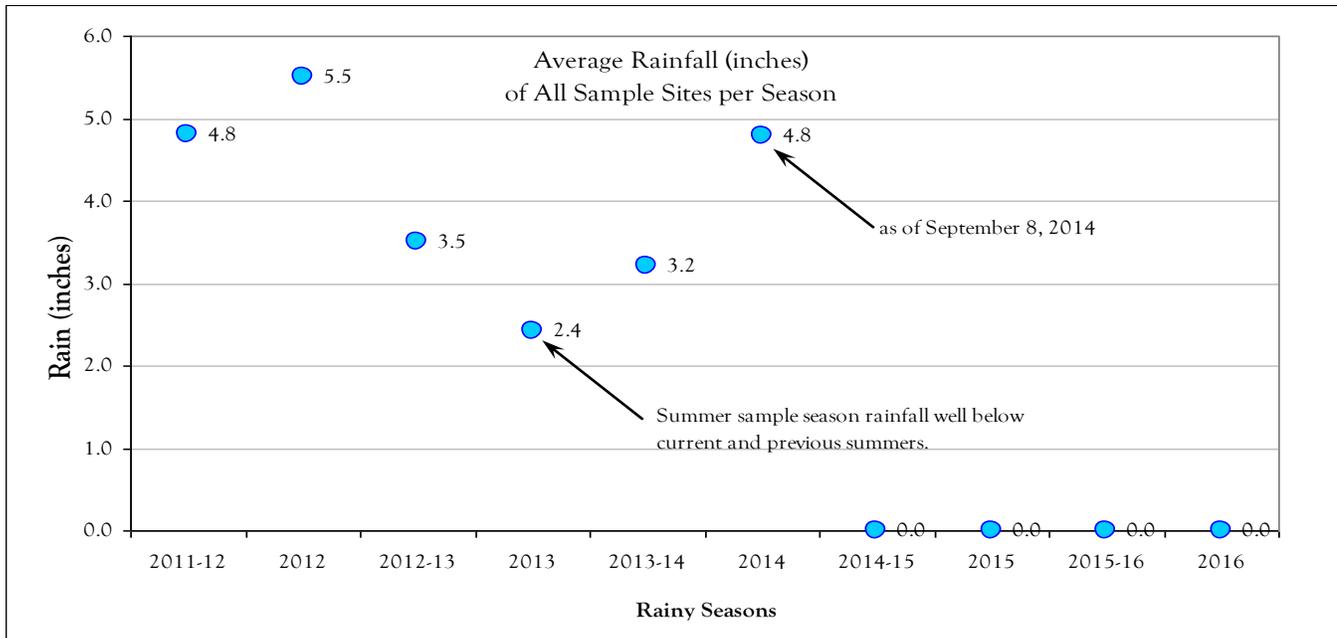
## PART 8 STORM EVENT RECORDS

Rainfall (RF) in inches at each site (1,2,3,4,5) along with the status of the site and sampling.

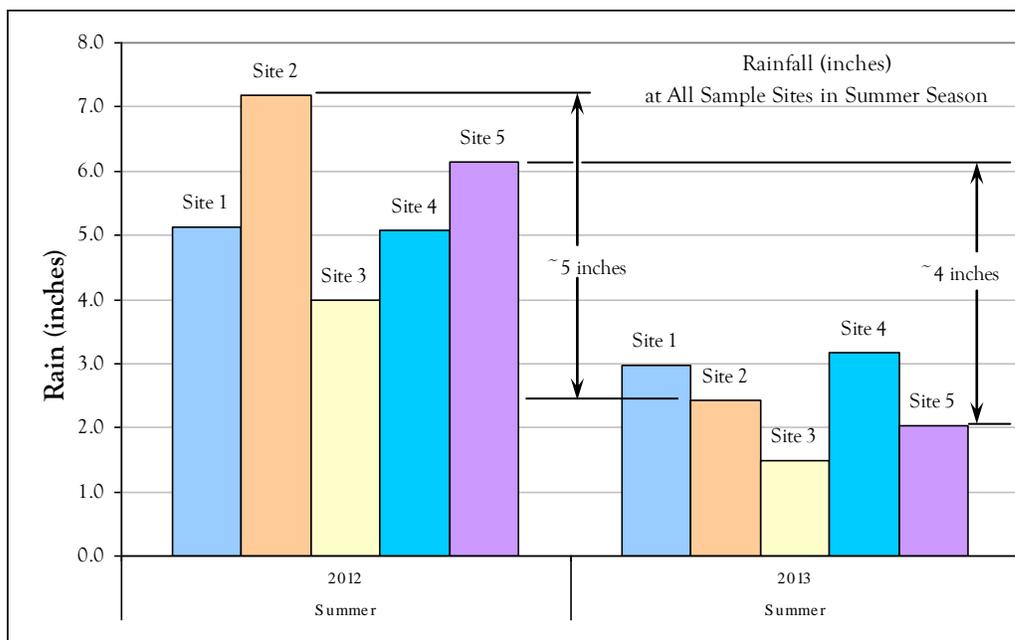
	Date	1	RF	2	RF	3	RF	4	RF	5	RF
Summer Season	07/01	IF	0.14	IF	0.19	IF	0.11	C	0.19		
	07/02									NC	0.16
	07/07							C	0.10		
	07/11	IF	0.11			IF	0.1	C	0.11		
	07/12							C	0.14		
	07/15					SC	0.15				
	07/19	IF	0.11	IF	0.18						
	07/20	72	0.26					C	0.31		
	07/24	IF	0.13	IF	0.17			C	0.41		
	07/27							72	0.51		
	08/02	SC	0.44							IF	0.10
	08/06							IF	0.10		
	08/20			NC	0.63						
	08/25			NF	0.10						
	09/06							SC	0.28	IS	0.34
	09/09				IF	0.18				72	0.13
09/10				72	0.32				72	0.11	
10/28				NF	0.14						
Winter Season	11/03	NF	0.12	NF	0.11			NF	0.13		
	11/22	SC	0.94	SC	0.87	IS	0.33	IS	0.89	EF	0.99
	11/23					72	1.22	72	1.21	72	1.03
	12/05					IF	0.23	IF	0.22	EF	0.12
	12/20					IS	0.35	IS	0.32	SC	0.33
	03/01					SC	0.42	SC	0.28		

### Key

72	Station closed for 72 hours	IS	Insufficient Staff
C	Site Closed -Waiting to sweep streets	LB	Laboratory Closed
DC	Dangerous Conditions	NC	Not on-call -no rain forecasted
EF	Equipment Failure	NF	No Flow
IF	Insufficient Flow (to collect sample)	SC	Sample Collected



The table above shows that during the summer of 2013, the City received a lot less rain than other summers. In the summer of 2012, the average rainfall at all 5 sample sites was 5.5 inches. In the summer of 2013, the average rainfall at all the sample sites was 3.1 fewer inches than in 2013, totaling 2.4 inches of rain.



Sites 2 and 5 were not sampled because they received very little rain as shown in the above table. Site 2 received 4.8 fewer inches of rainfall (66.2 %) in the summer of 2013 compared to the summer of 2012. Similarly, Site 5 received 4.1 fewer inches of rainfall (66.8 %) in the summer of 2013 compared to the summer of 2012. The watershed of Site 2 has a lot of pervious areas that require a lot of rainfall and saturated conditions to get enough flow to sample. Site 5 has a small watershed and is more impervious. The flow comes fast and stops quickly. With the shortage of rain and these other conditions, sampling these sites was not attainable.

# PART 9 SUMMARY OF MONITORING DATA (BY LOCATION)

## I. Sample Site 1

Site ID: 1 Grant/Wilson		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Santa Cruz		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: SFR		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		11/7/11	7/20/12	12/19/12	8/2/13	11/22/13	7/3/14				
Monitoring Parameters	SWQS										
<b>Conventional Parameters</b>											
Flow	n/a	2.01	1.18	1.24	12.57	1.55	2.04				
pH	6.5 - 9	7.07	7.33	8.55	8.11	8.2	5				
Temperature	n/a	54	84	49	84	62	92				
Hardness	<400	60	48	53	56	34	110				
TDS (mg/L)	n/a	120	180	110	88	69	390				
TSS (mg/L)	n/a	180	110	120	250	180	310				
BOD (mg/L)	n/a	25	74	110	20	25	21				
COD (mg/L)	n/a	230	250	110	190	240	750				
<b>Inorganics</b>											
Cyanide, total (ug/L)	84	<100	<100	<5.0	<38	<38	41				
<b>Nutrients (mg/L)</b>											
Nitrate + Nitrite as N	n/a	<0.0015	1.3	<0.1	1.1	1	1.7				
Ammonia as N	n/a	0.63	1.8	<0.5	0.87	<0.50	3.7				
Total Kjeldahl Nitrogen (TKN)	n/a	3.4	4.9	1.9	3.1	2.7	23				
Total Phosphorus	n/a	0.43	0.38	0.6	2.4	0.44	2.1				
Total Orthophosphate	n/a	<0.045	0.22	<0.5	0.51	<0.50	0.65				
<b>Microbiological (MPN)</b>											
Escherichia coli (E. coli)	575	>2400	2000	>2400	>2400	>2400	2400				
<b>Total Metals (ug/L)</b>											
Antimony	747	3.1	1.9	0.82	1.6	2.1	1.9				
Arsenic	200	<4.8	6.7	<40	<4	<40	9				
Barium	98,000	130	92	66	110	98	160				
Beryllium	1,867	<0.19	<2.0	<2.0	<0.17	<2.0	<0.93				
Cadmium	<3 <sup>Note 1</sup>	<0.31	0.29	<2.0	<0.16	<2.0	<0.82				
Chromium	1,000	<0.61	5.1	<30	<0.35	30	8.1				
Copper	<3 <sup>Note 2</sup>	87	50	33	46	47	110				
Lead	<17 <sup>Note 3</sup>	21	8.6	14	24	21	20				
Mercury	5	<0.014	<1.0	0.09	<0.049	<1.0	<0.039				
Nickel	<882 <sup>Note 4</sup>	<1.1	9.6	<50	<4.1	50	16				
Selenium	33	<0.062	0.68	0.35	0.4	0.14	1.1				
Silver	<0.14 <sup>Note 5</sup>	<0.46	0.87	0.067	0.23	0.23	<0.029				
Thallium	75	<0.0036	0.048	<0.063	<0.043	0.055	<0.013				
Zinc	<235 <sup>Note 6</sup>	230	140	100	150	170	310				

Site ID: 1 Grant/Wilson		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Santa Cruz		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: SFR		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		11/7/11	7/20/12	12/19/12	8/2/13	11/22/13	7/3/14				
SWQS											
Organic Toxic Pollutants (mg/L)											
Total Petroleum Hydrocarbons	n/a	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00				
Total Oil and Grease	n/a	6.4	<5.00	<5.00	<5.00	6	6.4				
VOCs, Semi-VOCs, and Pesticides (ug/L)											
Acrolein	467	<10		<10	<10						
Acrylonitrile	37,333	<10		<10	<10						
Benzene	3,733	<2.0		<2.0	<2.0						
Bromoform	18,667	<2.0		<2.0	<2.0						
Carbon tetrachloride	1,307	<2.0		<2.0	<2.0						
Chlorobenzene	18,667	<2.0		<2.0	<2.0						
Chlorodibromomethane	n/a	<2.0		<2.0	<2.0						
Chloroethane	n/a	<5.0		<5.0	<5.0						
2-chloroethylvinyl ether	n/a	<2.0		<10	<10						
Chloroform	9,333	<2.0		<2.0	<2.0						
Dichlorobromomethane	n/a	<2.0		<2.0	<2.0						
1,2-dichlorobenzene	5,900	<2.0		<2.0	<2.0						
1,3-dichlorobenzene	n/a	<2.0		<2.0	<2.0						
1,4-dichlorobenzene	6,500	<2.0		<2.0	<2.0						
1,1-dichloroethane	n/a	<2.0		<2.0	<2.0						
1,2-dichloroethane	186,667	<2.0		<2.0	<2.0						
1,1-dichloroethylene	46,667	<2.0		<2.0	<2.0						
1,2,-dichloropropane	84,000	<2.0		<2.0	<2.0						
1,3,-dichloropropylene	n/a	<2.0		<2.0	<2.0						
Ethylbenzene	93,333	<2.0		<2.0	<2.0						
Methyl bromide (Bromomethane)	n/a	<2.0		<2.0	<2.0						
Methyl chloride (Chloromethane)	n/a	<5.0		<5.0	<5.0						
Methylene chloride	n/a	<10		<10	<10						
1,1,2-tetrachloroethane	93,333	<2.0		<2.0	<2.0						
Tetrachloroethylene	9,333	<2.0		<2.0	<2.0						
Toluene	373,333	<2.0		<2.0	<2.0						
1,2-trans-dichloroethylene	n/a	<2.0		<2.0	<2.0						
1,1,1-trichloroethane	186,666,667	<2.0		<2.0	<2.0						
1,1,2-trichloroethane	3,733	<2.0		<2.0	<2.0						
Trichloroethylene	280	<2.0		<2.0	<2.0						
Trimethylbenzene	n/a			<2.0	<2.0						
Vinyl chloride (chloroethylene)	2,800	<2.0		<2.0	<2.0						
Xylene	186,667	<6.0		<6.0	<6.0						

Site ID: 1 Grant/Wilson		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Santa Cruz		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: SFR		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		11/7/11	7/20/12	12/19/12	8/2/13	11/22/13	7/3/14				
SWQS											
<b>SVOCs - Acid Extractables (ug/L)</b>											
2-chlorophenol	4,667	<9.8		<9.8	<10						
2,4-dichlorophenol	2,800	<9.8		<9.8	<10						
2,4-dimethylphenol	18,667	<9.8		<9.8	<10						
4,6-dinitro-o-cresol (4,6-Dinitro-2	3,733	<20		<20	<20						
2,4-dinitrophenol	1,867	<49		<49	<50						
2-nitrophenol	n/a	<9.8		<9.8	<10						
4-nitrophenol	n/a	<49		<49	<50						
p-chloro-m-cresol (4-Chlor-3-metl	n/a	<9.8		<9.8	<10						
Pentachlorophenol	<18 <sup>Note7</sup>	<29		<29	<1.5						
Phenol	180,000	<9.8		<9.8	<10						
2,4,6-trichlorophenol	130	<9.8		<9.8	<10						
<b>SVOCs - Bases/Neutrals (ug/L)</b>											
Acenaphthene	56,000	<4.9		<4.9	<5.0						
Acenaphthylene	n/a	<4.9		<4.9	<5.0						
Anthracene	280,000	<4.9		<4.9	<5.0						
Benzo(a)anthracene	0.2	<0.63		<0.6	<0.62						
Benzo(a)pyrene	0.2	<0.51		<4.9	<0.77						
Benzo(b)fluoranthene	n/a	<9.8		<1.6	<1.6						
Benzo(g,h,i)perylene	n/a	<4.9		<4.9	<5.0						
Benzo(k)fluoranthene	1.9	<1.3		<1.6	<1.6						
Chrysene	19	<4.9		<4.9	<5.0						
Dibenzo(a,h)anthracene	1.9	0.48		<0.93	<0.96						
3,3'-dichlorobenzidine	3	<1.1		<0.99	<1.0						
Diethyl phthalate	746,667	<9.8		<9.8	<10						
Dimethyl phthalate	n/a	<9.8		<9.8	<10						
Di-n-butyl phthalate	n/a	<9.8		<9.8	<10						
2,4-dinitrotoluene	1,867	<9.8		<9.8	<10						
2,6-dinitrotoluene	3,733	<9.8		<9.8	<10						
Di-n-octyl phthalate	373,333	<9.8		<9.8	<10						
1,2-diphenylhydrazine (as azoben	1.8	<9.8		<9.8	<10						
Fluoranthene	37,333	<4.9		<4.9	<5.0						
Fluorene	37,333	<4.9		<4.9	<5.0						
Hexachlorobenzene	747	<9.8		<9.8	<10						
Hexachlorobutadiene	187	<9.8		<9.8	<10						
Hexachlorocyclopentadiene	11,200	<9.8		<9.8	<10						
Hexachloroethane	850	<9.8		<9.8	<10						
Indeno(1,2,3-cd)pyrene	1.9	0.91		<0.8	<0.83						
Isophorone	186,667	<9.8		<9.8	<10						

Site ID: 1 Grant/Wilson		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Santa Cruz		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: SFR		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		11/7/11	7/20/12	12/19/12	8/2/13	11/22/13	7/3/14				
SWQS											
<b>SVOCs - Bases/Neutrals (ug/L) continued</b>											
Naphthalene	18,667	<4.9		<4.9	<5.0						
Nitrobenzene	467	<9.8		<9.8	<10						
N-nitrosodimethylamine	0.03	<0.18		<1.6	<1.6						
N-nitrosodi-n-propylamine	88,667	<9.8		<9.8	<10						
N-nitrosodiphenylamine	n/a	<9.8		<9.8	<10						
Phenanthrene	n/a	<4.9		<4.9	<5.0						
Pyrene	28,000	<4.9		<4.9	<5.0						
1,2,4-trichlorobenzene	9,333	<9.8		<9.8	<10						
<b>Pesticides (ug/L)</b>											
Aldrin	<0.003 <sup>Note8</sup>	<0.097		<0.098	<0.10						
Alpha-BHC	n/a	<0.097		<0.098	<0.10						
Beta-BHC	n/a	<0.097		<0.098	<0.10						
Gamma-BHC	n/a	<0.097		<0.098	<0.10						
Delta-BHC	n/a	<0.097		<0.098	<0.10						
Chlordane (alpha, gamma)	3.2	<0.097		<0.0134	<0						
4,4'-DDT	n/a	<0.097		<0.098	<0.10						
4,4'-DDE	n/a	<0.097		<0.098	<0.10						
4,4'-DDD	n/a	<0.097		<0.098	<0.10						
Dieldrin	<0.003 <sup>Note8</sup>	<0.097		<0.098	<0.10						
Alpha-endosulfan (Endosulfan I)	n/a	<0.097		<0.098	<0.10						
Beta-endosulfan (Endosulfan II)	n/a	<0.097		<0.098	<0.10						
Endosulfan sulfate	3	<0.097		<0.098	<0.10						
Endrin	0.004	<0.097		<0.098	<0.10						
Endrin aldehyde	0.7	<0.097		<0.098	<0.10						
Heptachlor	0.9	<0.097		<0.098	<0.10						
Heptachlor epoxide	0.9	<0.097		<0.098	<0.10						
PCB-1016 (Aroclor 1016)	n/a	<0.09		<0.97	<1.0						
PCB-1221 (Aroclor 1221)	n/a	<0.09		<0.97	<1.0						
PCB-1232 (Aroclor 1232)	n/a	<0.09		<0.97	<1.0						
PCB-1242 (Aroclor 1242)	n/a	<0.09		<0.97	<1.0						
PCB-1248 (Aroclor 1248)	n/a	<0.09		<0.97	<1.0						
PCB-1254 (Aroclor 1254)	n/a	<0.09		<0.97	<1.0						
PCB-1260 (Aroclor 1260)	n/a	<0.09		<0.97	<1.0						
Toxaphene	0.005	<0.97		<0.98	<1.0						

## II. Sample Site 2

Site ID: 2 Greenlee		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Rillito Wash		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: Multi-Family Residential		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		3/18/12	7/15/12	1/26/13		11/22/13	8/12/14				
Monitoring Parameters	SWQS										
<b>Conventional Parameters</b>											
Flow	n/a	0.1	3.32	1.02		0.19	0.09				
pH	6.5 - 9	7.97	8.61	6.3		7.09	7.4				
Temperature	n/a	49	79	62		59	82				
Hardness	<400	30	27	16		10	32				
TDS (mg/L)	n/a	160	79	43		24	71				
TSS (mg/L)	n/a	15	70	24		<10	87				
BOD (mg/L)	n/a	37	16	20		15	15				
COD (mg/L)	n/a	160	89	64		51	110				
<b>Inorganics</b>											
Cyanide, total (ug/L)	84	<100	<100	<100		<100	<38				
<b>Nutrients (mg/L)</b>											
Nitrate + Nitrite as N	n/a	<0.1	<0.1	<0.10		<0.6	0.74				
Ammonia as N	n/a	0.87	<0.5	0.56		1.1	0.72				
Total Kjeldahl Nitrogen (TKN)	n/a	2.5	2.2	1.2		1.8	2.8				
Total Phosphorus	n/a	0.32	0.36	0.35		0.1	0.4				
Total Orthophosphate	n/a	<0.50	0.19	<0.50		<0.50	<0.5				
<b>Microbiological (MPN)</b>											
Escherichia coli (E. coli)	575	87	>2400	770		54	32				
<b>Total Metals (ug/L)</b>											
Antimony	747	<0.50	0.34	0.25		0.3	<0.5				
Arsenic	200	<40	<40	<40		<40	8				
Barium	98,000	<50	49	<50		<50	<50				
Beryllium	1,867	<2.0	<2	<2.0		<2.0	<2.0				
Cadmium	<3 <sup>Note 1</sup>	<2.0	0.4	<2.0		<2.0	<2.0				
Chromium	1,000	<30	1.8	<30		<30	2.8				
Copper	<3 <sup>Note 2</sup>	<20	19	<20		<20	23				
Lead	<17 <sup>Note 3</sup>	0.96	2.7	1.4		0.49	3.8				
Mercury	5	<1.0	<1	<1.0		<1.0	<0.039				
Nickel	<882 <sup>Note 4</sup>	<50	3	<50		<50	2.4				
Selenium	33	<2.5	0.26	<2.5		0.18	0.39				
Silver	<0.14 <sup>Note 5</sup>	<10	0.99	0.014		<0.007	<0.029				
Thallium	75	<0.50	0.022	<0.5		<0.043	<0.013				
Zinc	<235 <sup>Note 6</sup>	56	78	<40		<40	76				

Site ID: 2 Greenlee		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Rillito Wash		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: Multi-Family Residential		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		3/18/12	7/15/12	1/26/13		11/22/13	8/12/14				
SWQS											
Organic Toxic Pollutants (mg/L)											
Total Petroleum Hydrocarbons	n/a	<5.00	<5.00	<5.00		<5.00	<5.00				
Total Oil and Grease	n/a	<5.00	<5.00	<5.00		<5.00	<5.00				
VOCs, Semi-VOCs, and Pesticides (ug/L)											
Acrolein	467	<10		<10							
Acrylonitrile	37,333	<10		<10							
Benzene	3,733	<2.0		<2.0							
Bromoform	18,667	<2.0		<2.0							
Carbon tetrachloride	1,307	<2.0		<2.0							
Chlorobenzene	18,667	<2.0		<2.0							
Chlorodibromomethane	n/a	<2.0		<2.0							
Chloroethane	n/a	<5.0		<5.0							
2-chloroethylvinyl ether	n/a	<2.0		<10							
Chloroform	9,333	<2.0		<2.0							
Dichlorobromomethane	n/a	<2.0		<2.0							
1,2-dichlorobenzene	5,900	<2.0		<2.0							
1,3-dichlorobenzene	n/a	<2.0		<2.0							
1,4-dichlorobenzene	6,500	<2.0		<2.0							
1,1-dichloroethane	n/a	<2.0		<2.0							
1,2-dichloroethane	186,667	<2.0		<2.0							
1,1-dichloroethylene	46,667	<2.0		<2.0							
1,2-dichloropropane	84,000	<2.0		<2.0							
1,3-dichloropropylene	n/a	<2.0		<2.0							
Ethylbenzene	93,333	<2.0		<2.0							
Methyl bromide (Bromomethane)	n/a	<2.0		<2.0							
Methyl chloride (Chloromethane)	n/a	<5.0		<5.0							
Methylene chloride	n/a	<10		<10							
1,1,2-tetrachloroethane	93,333	<2.0		<2.0							
Tetrachloroethylene	9,333	<2.0		<2.0							
Toluene	373,333	<2.0		<2.0							
1,2-trans-dichloroethylene	n/a	<2.0		<2.0							
1,1,1-trichloroethane	186,666,667	<2.0		<2.0							
1,1,2-trichloroethane	3,733	<2.0		<2.0							
Trichloroethylene	280	<2.0		<2.0							
Trimethylbenzene	n/a			<2.0							
Vinyl chloride (chloroethylene)	2,800	<2.0		<2.0							
Xylene	186,667	<6.0		<6.0							

Site ID: 2 Greenlee		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Rillito Wash		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: Multi-Family Residential		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		3/18/12	7/15/12	1/26/13		11/22/13	8/12/14				
SWQS											
<b>SVOCs - Acid Extractables (ug/L)</b>											
2-chlorophenol	4,667	<9.8		<9.9							
2,4-dichlorophenol	2,800	<9.8		<9.9							
2,4-dimethylphenol	18,667	<9.8		<9.9							
4,6-dinitro-o-cresol (4,6-Dinitro-2	3,733	<20		<20							
2,4-dinitrophenol	1,867	<49		<50							
2-nitrophenol	n/a	<9.8		<9.9							
4-nitrophenol	n/a	<49		<50							
p-chloro-m-cresol (4-Chlor-3-metl	n/a	<9.8		<9.9							
Pentachlorophenol	<18 <sup>Note7</sup>	<29		<30							
Phenol	180,000	<9.8		<9.9							
2,4,6-trichlorophenol	130	<9.8		<9.9							
<b>SVOCs - Bases/Neutrals (ug/L)</b>											
Acenaphthene	56,000	<4.9		<5.0							
Acenaphthylene	n/a	<4.9		<5.0							
Anthracene	280,000	<4.9		<5.0							
Benzo(a)anthracene	0.2	<0.63		<5.0							
Benzo(a)pyrene	0.2	<0.51		<0.75							
Benzo(b)fluoranthene	n/a	<9.8		<1.6							
Benzo(g,h,i)perylene	n/a	<4.9		<5.0							
Benzo(k)fluoranthene	1.9	<1.3		<1.6							
Chrysene	19	<4.9		<5.0							
Dibenzo(a,h)anthracene	1.9	0.48		<0.94							
3,3'-dichlorobenzidine	3	<1.1		<1.0							
Diethyl phthalate	746,667	<9.8		<9.9							
Dimethyl phthalate	n/a	<9.8		<9.9							
Di-n-butyl phthalate	n/a	<9.8		<9.9							
2,4-dinitrotoluene	1,867	<9.8		<9.9							
2,6-dinitrotoluene	3,733	<9.8		<9.9							
Di-n-octyl phthalate	373,333	<9.8		<9.9							
1,2-diphenylhydrazine (as azoben	1.8	<9.8		<9.9							
Fluoranthene	37,333	<4.9		<5.0							
Fluorene	37,333	<4.9		<5.0							
Hexachlorobenzene	747	<9.8		<9.9							
Hexachlorobutadiene	187	<9.8		<9.9							
Hexachlorocyclopentadiene	11,200	<9.8		<9.9							
Hexachloroethane	850	<9.8		<9.9							
Indeno(1,2,3-cd)pyrene	1.9	0.91		<0.81							
Isophorone	186,667	<9.8		<9.9							

Site ID: 2 Greenlee		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Rillito Wash		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: Multi-Family Residential		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		3/18/12	7/15/12	1/26/13		11/22/13	8/12/14				
SWQS											
<b>SVOCs - Bases/Neutrals (ug/L) continued</b>											
Naphthalene	18,667	<4.9		<5.0							
Nitrobenzene	467	<9.8		<9.9							
N-nitrosodimethylamine	0.03	<0.18		<1.6							
N-nitrosodi-n-propylamine	88,667	<9.8		<9.9							
N-nitrosodiphenylamine	n/a	<9.8		<9.9							
Phenanthrene	n/a	<4.9		<5.0							
Pyrene	28,000	<4.9		<5.0							
1,2,4-trichlorobenzene	9,333	<9.8		<9.9							
<b>Pesticides (ug/L)</b>											
Aldrin	<0.003 <sup>Note8</sup>	<0.097		<0.099							
Alpha-BHC	n/a	<0.097		<0.099							
Beta-BHC	n/a	<0.097		<0.099							
Gamma-BHC	n/a	<0.097		<0.099							
Delta-BHC	n/a	<0.097		<0.099							
Chlordane (alpha, gamma)	3.2	<0.097		<0.099							
4,4'-DDT	n/a	<0.097		<0.099							
4,4'-DDE	n/a	<0.097		<0.099							
4,4'-DDD	n/a	<0.097		<0.099							
Dieldrin	<0.003 <sup>Note8</sup>	<0.097		<0.099							
Alpha-endosulfan (Endosulfan I)	n/a	<0.097		<0.099							
Beta-endosulfan (Endosulfan II)	n/a	<0.097		<0.099							
Endosulfan sulfate	3	<0.097		<0.099							
Endrin	0.004	<0.097		<0.099							
Endrin aldehyde	0.7	<0.097		<0.099							
Heptachlor	0.9	<0.097		<0.099							
Heptachlor epoxide	0.9	<0.097		<0.099							
PCB-1016 (Aroclor 1016)	n/a	<0.09		<1.0							
PCB-1221 (Aroclor 1221)	n/a	<0.09		<1.0							
PCB-1232 (Aroclor 1232)	n/a	<0.09		<1.0							
PCB-1242 (Aroclor 1242)	n/a	<0.09		<1.0							
PCB-1248 (Aroclor 1248)	n/a	<0.09		<1.0							
PCB-1254 (Aroclor 1254)	n/a	<0.09		<1.0							
PCB-1260 (Aroclor 1260)	n/a	<0.09		<1.0							
Toxaphene	0.005	<0.99		<0.99							

### III. Sample Site 3

Site ID: 3 Randolph/Broadway		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Santa Cruz		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: Commercial		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		12/12/11	7/20/12	2/20/13	7/15/13	3/1/14	7/16/14				
Monitoring Parameters	SWQS										
<b>Conventional Parameters</b>											
Flow	n/a	1.59	2.25	1.25	1.15	3.73	5.75				
pH	6.5 - 9	6.74	8.39	7.5	5	5.5	5.5				
Temperature	n/a	54	88	44	86	59	92				
Hardness	<400	23	28	25	48	20	51				
TDS (mg/L)	n/a	33	92	63	120	40	66				
TSS (mg/L)	n/a	86	57	59	120	93	100				
BOD (mg/L)	n/a	20	100	15	10	10	11				
COD (mg/L)	n/a	140	110	130	180	110	110				
<b>Inorganics</b>											
Cyanide, total (ug/L)	84	<100	<100	<100	<38	<38	85				
<b>Nutrients (mg/L)</b>											
Nitrate + Nitrite as N	n/a	<0.0015	<0.10	<0.1	<0.1	<0.1	0.57				
Ammonia as N	n/a	<1.0	1.3	0.63	1.4	0.58	1.1				
Total Kjeldahl Nitrogen (TKN)	n/a	0.58	2.3	1.3	13	1.6	0.63				
Total Phosphorus	n/a	0.19	0.25	0.16	0.5	0.24	0.23				
Total Orthophosphate	n/a	<0.045	0.13	<0.50	<0.50	<0.50	<0.50				
<b>Microbiological (MPN)</b>											
Escherichia coli (E. coli)	575	770	370	580	130	170	1600				
<b>Total Metals (ug/L)</b>											
Antimony	747	3.3	3.5	2	4	3.5	3.9				
Arsenic	200	<4.8	<40	<40	<40	<40	8.4				
Barium	98,000	60	50	57	80	64	60				
Beryllium	1,867	<0.19	<2.0	<2.0	<2.0	<2.0	0.93				
Cadmium	<3 <sup>Note 1</sup>	<0.31	0.44	<2.0	<2.0	<2.0	0.82				
Chromium	1,000	<0.61	3.6	<30	<30	<30	3.7				
Copper	<3 <sup>Note 2</sup>	61	34	44	60	60	35				
Lead	<17 <sup>Note 3</sup>	19	7.9	12	16	20	14				
Mercury	5	<0.014	<1.0	<0.032	0.12	0.11	0.058				
Nickel	<882 <sup>Note 4</sup>	<1.1	4.8	<50	<50	<50	4.3				
Selenium	33	<0.062	<2.5	1.7	0.24	0.14	0.082				
Silver	<0.14 <sup>Note 5</sup>	<0.46	0.95	0.0054	0.086	0.21	0.12				
Thallium	75	<0.0036	0.018	0.018	<0.50	2.5	0.052				
Zinc	<235 <sup>Note 6</sup>	240	150	190	250	190	120				

Site ID: 3 Randolph/Broadway		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Santa Cruz		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: Commercial		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		12/12/11	7/20/12	2/20/13	7/15/13	3/1/14	7/16/14				
SWQS											
Organic Toxic Pollutants (mg/L)											
Total Petroleum Hydrocarbons	n/a	8	<5	<5.00	<5.00	<5.00	<5.00				
Total Oil and Grease	n/a	7.4	<5	5.9	<5.00	6	0.42				
VOCs, Semi-VOCs, and Pesticides (ug/L)											
Acrolein	467	<0		<10	<10						
Acrylonitrile	37,333	<0.92		<10	<10						
Benzene	3,733	<0.25		<2.0	<2.0						
Bromoform	18,667	<0.33		<2.0	<2.0						
Carbon tetrachloride	1,307	<0.18		<2.0	<2.0						
Chlorobenzene	18,667	<0.24		<2.0	<2.0						
Chlorodibromomethane	n/a	<0.20		<2.0	<2.0						
Chloroethane	n/a	<0.17		<5.0	<5.0						
2-chloroethylvinyl ether	n/a	<0.31		<10	<10						
Chloroform	9,333	<0.19		<2.0	<2.0						
Dichlorobromomethane	n/a	<0.21		<2.0	<2.0						
1,2-dichlorobenzene	5,900	<0.48		<2.0	<2.0						
1,3-dichlorobenzene	n/a	<0.35		<2.0	<2.0						
1,4-dichlorobenzene	6,500	<0.41		<2.0	<2.0						
1,1-dichloroethane	n/a	<0.17		<2.0	<2.0						
1,2-dichloroethane	186,667	<0.21		<2.0	<2.0						
1,1-dichloroethylene	46,667	<0.28		<2.0	<2.0						
1,2-dichloropropane	84,000	<0.0		<2.0	<2.0						
1,3-dichloropropylene	n/a	<0.30		<2.0	<2.0						
Ethylbenzene	93,333	<0.24		<2.0	<2.0						
Methyl bromide (Bromomethane)	n/a	<0.21		<2.0	<2.0						
Methyl chloride (Chloromethane)	n/a	<0.28		<5.0	<5.0						
Methylene chloride	n/a	<0.28		<10	<10						
1,1,2-tetrachloroethane	93,333	<0.50		<2.0	<2.0						
Tetrachloroethylene	9,333	<0.29		<2.0	<2.0						
Toluene	373,333	<0.22		<2.0	<2.0						
1,2-trans-dichloroethylene	n/a	<0.23		<2.0	<2.0						
1,1,1-trichloroethane	186,666,667	<0.23		<2.0	<2.0						
1,1,2-trichloroethane	3,733	<0.32		<2.0	<2.0						
Trichloroethylene	280	<0.19		<2.0	<2.0						
Trimethylbenzene	n/a			<2.0	<2.0						
Vinyl chloride (chloroethylene)	2,800	<0.32		<2.0	<2.0						
Xylene	186,667	<0.63		<6.0	<6.0						

Site ID: 3 Randolph/Broadway		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Santa Cruz		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: Commercial		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		12/12/11	7/20/12	2/20/13	7/15/13	3/1/14	7/16/14				
SWQS											
<b>SVOCs - Acid Extractables (ug/L)</b>											
2-chlorophenol	4,667	<9.2		<20	<10						
2,4-dichlorophenol	2,800	<7.9		<20	<10						
2,4-dimethylphenol	18,667	<2.4		<20	<10						
4,6-dinitro-o-cresol (4,6-Dinitro-2	3,733	<12		<41	<21						
2,4-dinitrophenol	1,867	<14		<100	<52						
2-nitrophenol	n/a	<7.3		<20	<10						
4-nitrophenol	n/a	<5.1		<100	<52						
p-chloro-m-cresol (4-Chlor-3-metl	n/a	<4.1		<20	<10						
Pentachlorophenol	<18 <sup>Note7</sup>	<9.2		<3	<1.5						
Phenol	180,000	<19		<20	<10						
2,4,6-trichlorophenol	130	<8.4		<20	<10						
<b>SVOCs - Bases/Neutrals (ug/L)</b>											
Acenaphthene	56,000	<5.1		<10	<5.2						
Acenaphthylene	n/a	<5.0		<10	<5.2						
Anthracene	280,000	<5.3		<10	<5.2						
Benzo(a)anthracene	0.2	<6.3		<1.2	<0.63						
Benzo(a)pyrene	0.2	<5.0		<1.5	<0.79						
Benzo(b)fluoranthene	n/a	<13		<3.3	<10						
Benzo(g,h,i)perylene	n/a	<7.4		<10	<5.2						
Benzo(k)fluoranthene	1.9	<13		<3.3	<1.7						
Chrysene	19	<2.5		<10	<5.2						
Dibenzo(a,h)anthracene	1.9	<3.7		<1.9	<0.98						
3,3'-dichlorobenzidine	3	<11		<2	<10						
Diethyl phthalate	746,667	<2.3		<20	<5.2						
Dimethyl phthalate	n/a	<3.2		<20	<10						
Di-n-butyl phthalate	n/a	<18		<20	<10						
2,4-dinitrotoluene	1,867	<2.1		<20	<10						
2,6-dinitrotoluene	3,733	<1.8		<20	<10						
Di-n-octyl phthalate	373,333	<4.5		<20	<10						
1,2-diphenylhydrazine	1.8	<9.7		<5.1	<10						
Fluoranthene	37,333	<5.9		<10	<5.2						
Fluorene	37,333	<5.8		<10	<5.2						
Hexachlorobenzene	747	<7.6		<20	<10						
Hexachlorobutadiene	187	<2.1		<20	<10						
Hexachlorocyclopentadiene	11,200	<9.7		<20	<10						
Hexachloroethane	850	<2.2		<20	<10						
Indeno(1,2,3-cd)pyrene	1.9	<6.9		<1.7	<0.85						
Isophorone	186,667	<1.8		<20	<10						

Site ID: 3 Randolph/Broadway		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Santa Cruz		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: Commercial		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		12/12/11	7/20/12	2/20/13	7/15/13	3/1/14	7/16/14				
SWQS											
<b>SVOCs - Bases/Neutrals (ug/L) continued</b>											
Naphthalene	18,667	<5.6		<10	<5.2						
Nitrobenzene	467	<3.0		<20	<10						
N-nitrosodimethylamine	0.03	<1.7		<3.3	<1.7						
N-nitrosodi-n-propylamine	88,667	<2.4		<20	<10						
N-nitrosodiphenylamine	n/a	<7.2		<20	<10						
Phenanthrene	n/a	<4.8		<10	<5.2						
Pyrene	28,000	<5.8		<10	<5.2						
1,2,4-trichlorobenzene	9,333	<1.7		<20	<10						
<b>Pesticides (ug/L)</b>											
Aldrin	<0.003 <sup>Note8</sup>	<0.0098		<0.10	<0.10						
Alpha-BHC	n/a	<0.020		<0.10	<0.10						
Beta-BHC	n/a	<0.020		<0.10	<0.10						
Gamma-BHC	n/a	<0.0098		<0.10	<0.10						
Delta-BHC	n/a	<0.020		<0.10	<0.10						
Chlordane (alpha, gamma)	3.2	<0.0076		<0.10	<0.10						
4,4'-DDT	n/a	<0.0029		<0.10	<0.10						
4,4'-DDE	n/a	<0.0069		<0.10	<0.10						
4,4'-DDD	n/a	<0.0098		<0.10	<0.10						
Dieldrin	<0.003 <sup>Note8</sup>	<0.0049		<0.10	<0.10						
Alpha-endosulfan (Endosulfan I)	n/a	<0.0098		<0.10	<0.10						
Beta-endosulfan (Endosulfan II)	n/a	<0.029		<0.10	<0.10						
Endosulfan sulfate	3	<0.088		<0.10	<0.10						
Endrin	0.004	<0.0059		<0.10	<0.10						
Endrin aldehyde	0.7	<0.0049		<0.10	<0.10						
Heptachlor	0.9	<0.020		<0.10	<0.10						
Heptachlor epoxide	0.9	<0.020		<0.10	<0.10						
PCB-1016 (Aroclor 1016)	n/a	<0.089		<0.98	<1.1						
PCB-1221 (Aroclor 1221)	n/a	<0.97		<0.98	<1.1						
PCB-1232 (Aroclor 1232)	n/a	<0.97		<0.98	<1.1						
PCB-1242 (Aroclor 1242)	n/a	<0.97		<0.98	<1.1						
PCB-1248 (Aroclor 1248)	n/a	<0.97		<0.98	<1.1						
PCB-1254 (Aroclor 1254)	n/a	<0.97		<0.98	<1.1						
PCB-1260 (Aroclor 1260)	n/a	<0.060		<0.98	<1.1						
Toxaphene	0.005	<0.98		<0.10	<1.0						

#### IV. Sample Site 4

Site ID: 4 17th Street		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Santa Cruz		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: Industrial		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		11/13/11	7/15/12	2/20/13	9/6/13	3/1/14	7/5/14				
Monitoring Parameters	SWQS										
<b>Conventional Parameters</b>											
Flow	n/a	3.82	1.89	0.9	2.43	2.43	0.54				
pH	6.5 - 9	7.95	7.78	7.7	6	6.5	7.2				
Temperature	n/a	60	75	44	94	59	82				
Hardness	<400	60	76	180	390	280	170				
TDS (mg/L)	n/a	98	44	130	170	100	490				
TSS (mg/L)	n/a	170	200	590	1100	650	300				
BOD (mg/L)	n/a	10	14	26	25	13	23				
COD (mg/L)	n/a	96	140	370	420	230	660				
<b>Inorganics</b>											
Cyanide, total (ug/L)	84	<100	<100	<100	<38	<38	65				
<b>Nutrients (mg/L)</b>											
Nitrate + Nitrite as N	n/a	<0.0015	<0.10	<0.10	1	0.62	3.5				
Ammonia as N	n/a	<0.068	0.74	0.99	0.96	0.81	3.2				
Total Kjeldahl Nitrogen (TKN)	n/a	1.5	1.7	2.4	4.3	2.2	17				
Total Phosphorus	n/a	0.33	0.39	0.5	2.6	0.75	1.3				
Total Orthophosphate	n/a	<0.045	0.12	<0.5	<0.50	<0.50	<0.22				
<b>Microbiological (MPN)</b>											
Escherichia coli (E. coli)	575	>2400	>2400	54	>2400	1000	2400				
<b>Total Metals (ug/L)</b>											
Antimony	747	1.2	1.2	2.5	1.9	0.97	4				
Arsenic	200	<4.8	6.1	<40	<4.0	23	12				
Barium	98,000	72	100	270	450	280	190				
Beryllium	1,867	<0.19	<2.0	<2.0	<0.17	<2.0	<0.93				
Cadmium	<3 <sup>Note 1</sup>	<0.31	0.5	<2.0	<0.16	<0.16	<0.82				
Chromium	1,000	<0.61	5.5	<30	<0.35	15	11				
Copper	<3 <sup>Note 2</sup>	52	67	160	340	130	190				
Lead	<17 <sup>Note 3</sup>	16	19	42	80	51	20				
Mercury	5	<0.014	<1.0	<0.032	0.16	0.31	<0.039				
Nickel	<882 <sup>Note 4</sup>	<1.1	6	<50	<4.1	14	6.3				
Selenium	33	<0.062	0.32	1.9	0.44	<0.082	1.7				
Silver	<0.14 <sup>Note 5</sup>	<0.46	0.85	0.24	1	0.51	<0.029				
Thallium	75	<0.0036	0.063	0.1	0.18	0.16	<0.013				
Zinc	<235 <sup>Note 6</sup>	190	220	440	800	330	690				

Site ID: 4 17th Street		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Santa Cruz		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: Industrial		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		11/13/11	7/15/12	2/20/13	9/6/13	3/1/14	7/5/14				
SWQS											
Organic Toxic Pollutants (mg/L)											
Total Petroleum Hydrocarbons	n/a	<5.00	<5.00	<5.00	6.1	<5.00	<5.00				
Total Oil and Grease	n/a	<0.570	11.5	8.5	40.5	8.4	<5.00				
VOCs, Semi-VOCs, and Pesticides (ug/L)											
Acrolein	467	<10		<10	<10						
Acrylonitrile	37,333	<0.92		<10	<10						
Benzene	3,733	<0.25		<2.0	<2.0						
Bromoform	18,667	<0.33		<2.0	<2.0						
Carbon tetrachloride	1,307	<0.18		<2.0	<2.0						
Chlorobenzene	18,667	<0.24		<2.0	<2.0						
Chlorodibromomethane	n/a	<0.21		<2.0	<2.0						
Chloroethane	n/a	<0.17		<5.0	<5.0						
2-chloroethylvinyl ether	n/a	<0.31		<10	<10						
Chloroform	9,333	<0.19		<2.0	<2.0						
Dichlorobromomethane	n/a	<0.20		<2.0	<2.0						
1,2-dichlorobenzene	5,900	<0.48		<2.0	<2.0						
1,3-dichlorobenzene	n/a	<0.35		<2.0	<2.0						
1,4-dichlorobenzene	6,500	<0.41		<2.0	<2.0						
1,1-dichloroethane	n/a	<0.17		<2.0	<2.0						
1,2-dichloroethane	186,667	<0.21		<2.0	<2.0						
1,1-dichloroethylene	46,667	<0.28		<2.0	<2.0						
1,2-dichloropropane	84,000	<2.0		<2.0	<2.0						
1,3-dichloropropylene	n/a	<0.17		<4.0	<4.0						
Ethylbenzene	93,333	<0.24		<2.0	<2.0						
Methyl bromide (Bromomethane)	n/a	<0.21		<2.0	<2.0						
Methyl chloride (Chloromethane)	n/a	<0.28		<5.0	<5.0						
Methylene chloride	n/a	<0.28		<10	<10						
1,1,2-tetrachloroethane	93,333	<0.50		<2.0	<2.0						
Tetrachloroethylene	9,333	<0.29		<2.0	<2.0						
Toluene	373,333	<0.22		<2.0	<2.0						
1,2-trans-dichloroethylene	n/a	<0.23		<2.0	<2.0						
1,1,1-trichloroethane	186,666,667	<0.23		<2.0	<2.0						
1,1,2-trichloroethane	3,733	<0.32		<2.0	<2.0						
Trichloroethylene	280	<0.19		<2.0	<2.0						
Trimethylbenzene	n/a			<2.0	<2.0						
Vinyl chloride (chloroethylene)	2,800	<0.32		<2.0	<2.0						
Xylene	186,667	<0.63		<6.0	<6.0						

Site ID: 4 17th Street		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Santa Cruz		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: Industrial		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		11/13/11	7/15/12	2/20/13	9/6/13	3/1/14	7/5/14				
SWQS											
<b>SVOCs - Acid Extractables (ug/L)</b>											
2-chlorophenol	4,667	<9.2		<20	<20						
2,4-dichlorophenol	2,800	<7.9		<20	<20						
2,4-dimethylphenol	18,667	<2.4		<20	<20						
4,6-dinitro-o-cresol (4,6-Dinitro-2	3,733	<12		<39	<40						
2,4-dinitrophenol	1,867	<14		<98	<100						
2-nitrophenol	n/a	<7.3		<20	<20						
4-nitrophenol	n/a	<5.1		<98	<100						
p-chloro-m-cresol (4-Chlor-3-metl	n/a	<4.1		<20	<20						
Pentachlorophenol	<18 <sup>Note7</sup>	<9.2		<2.9	<3						
Phenol	180,000	<19		<20	<20						
2,4,6-trichlorophenol	130	<8.4		<20	<20						
<b>SVOCs - Bases/Neutrals (ug/L)</b>											
Acenaphthene	56,000	<5.1		<9.8	<10						
Acenaphthylene	n/a	<5.0		<9.8	<10						
Anthracene	280,000	<5.3		<9.8	<10						
Benzo(a)anthracene	0.2	<6.3		<1.2	<1.2						
Benzo(a)pyrene	0.2	<5.0		<1.5	<15						
Benzo(b)fluoranthene	n/a	<13		<3.2	<3.3						
Benzo(g,h,i)perylene	n/a	<7.4		<9.8	<10						
Benzo(k)fluoranthene	1.9	<13		<3.2	<3.3						
Chrysene	19	<2.5		<9.8	<10						
Dibenzo(a,h)anthracene	1.9	<3.7		<1.9	<1.9						
3,3'-dichlorobenzidine	3	<11		<2.0	<20						
Diethyl phthalate	746,667	<2.3		<20	<20						
Dimethyl phthalate	n/a	<3.2		<20	<20						
Di-n-butyl phthalate	n/a	<18		<20	<20						
2,4-dinitrotoluene	1,867	<2.1		<20	<20						
2,6-dinitrotoluene	3,733	<1.8		<20	<20						
Di-n-octyl phthalate	373,333	<4.5		<20	<20						
1,2-diphenylhydrazine (as azoben	1.8	<97		<4.9	<20						
Fluoranthene	37,333	<5.9		<9.8	<10						
Fluorene	37,333	<5.8		<9.8	<10						
Hexachlorobenzene	747	<7.6		<20	<20						
Hexachlorobutadiene	187	<2.1		<20	<20						
Hexachlorocyclopentadiene	11,200	<9.7		<20	<20						
Hexachloroethane	850	<2.2		<20	<20						
Indeno(1,2,3-cd)pyrene	1.9	<6.9		<1.6	<1.6						
Isophorone	186,667	<1.8		<20	<20						

Site ID: 4 17th Street		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Santa Cruz		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: Industrial		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		11/13/11	7/15/12	2/20/13	9/6/13	3/1/14	7/5/14				
SWQS											
<b>SVOCs - Bases/Neutrals (ug/L) continued</b>											
Naphthalene	18,667	<5.6		<9.8	<10						
Nitrobenzene	467	<3.0		<20	<20						
N-nitrosodimethylamine	0.03	<1.7		<3.2	<3.2						
N-nitrosodi-n-propylamine	88,667	<2.4		<20	<20						
N-nitrosodiphenylamine	n/a	<7.2		<20	<20						
Phenanthrene	n/a	<4.8		<9.8	<10						
Pyrene	28,000	<5.8		<9.8	<10						
1,2,4-trichlorobenzene	9,333	<1.7		<20	<20						
<b>Pesticides (ug/L)</b>											
Aldrin	<0.003 <sup>Note8</sup>	<0.0098		<0.099	<0.099						
Alpha-BHC	n/a	<0.020		<0.099	<0.099						
Beta-BHC	n/a	<0.020		<0.099	<0.099						
Gamma-BHC	n/a	<0.0098		<0.099	<0.099						
Delta-BHC	n/a	<0.020		<0.099	<0.099						
Chlordane (alpha, gamma)	3.2	<0.0076		<0.099	<0.099						
4,4'-DDT	n/a	<0.0029		<0.099	<0.099						
4,4'-DDE	n/a	<0.0068		<0.099	<0.099						
4,4'-DDD	n/a	<0.0097		<0.099	<0.099						
Dieldrin	<0.003 <sup>Note8</sup>	<0.0049		<0.099	<0.099						
Alpha-endosulfan (Endosulfan I)	n/a	<0.0098		<0.099	<0.099						
Beta-endosulfan (Endosulfan II)	n/a	<0.029		<0.099	<0.099						
Endosulfan sulfate	3	<0.088		<0.099	<0.099						
Endrin	0.004	<0.0059		<0.099	<0.099						
Endrin aldehyde	0.7	<0.0049		<0.099	<0.099						
Heptachlor	0.9	<0.020		<0.099	<0.099						
Heptachlor epoxide	0.9	<0.020		<0.099	<0.099						
PCB-1016 (Aroclor 1016)	n/a	<0.090		<1.0	<1.0						
PCB-1221 (Aroclor 1221)	n/a	<0.98		<1.0	<1.0						
PCB-1232 (Aroclor 1232)	n/a	<0.98		<1.0	<1.0						
PCB-1242 (Aroclor 1242)	n/a	<0.98		<1.0	<1.0						
PCB-1248 (Aroclor 1248)	n/a	<0.98		<1.0	<1.0						
PCB-1254 (Aroclor 1254)	n/a	<0.98		<1.0	<1.0						
PCB-1260 (Aroclor 1260)	n/a	<0.060		<1.0	<1.0						
Toxaphene	0.005	<0.98		<0.99	<0.99						

## V. Sample Site 5

Site ID: 5 Limberlost/1 rst		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Rillito Wash		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: Mixed		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		2/14/12	7/10/12	1/26/13		12/20/13	7/3/14				
Monitoring Parameters	SWQS										
<b>Conventional Parameters</b>											
Flow	n/a	1.07	10.19	6.52		4.2	3.34				
pH	6.5 - 9	7.75	8.25	6.5		7.67	7				
Temperature	n/a	53	85	66		53	82				
Hardness	<400	100	92	28		30	130				
TDS (mg/L)	n/a	300	120	49		83	330				
TSS (mg/L)	n/a	170	500	160		92	260				
BOD (mg/L)	n/a	100	27	17		14	21				
COD (mg/L)	n/a	470	260	130		120	540				
<b>Inorganics</b>											
Cyanide, total (ug/L)	84	<100	<100	<100		<38	53				
<b>Nutrients (mg/L)</b>											
Nitrate + Nitrite as N	n/a	2	1.1	<0.10		1.1	1.8				
Ammonia as N	n/a	3.7	1.1	<0.50		1.5	3.3				
Total Kjeldahl Nitrogen (TKN)	n/a	8.8	19	0.97		2.6	13				
Total Phosphorus	n/a	0.69	0.9	0.55		0.32	1.1				
Total Orthophosphate	n/a	0.5	0.16	<0.5		<0.50	<0.22				
<b>Microbiological (MPN)</b>											
Escherichia coli (E. coli)	575	93	>2400	>2400		210	580				
<b>Total Metals (ug/L)</b>											
Antimony	747	<0.2	2.2	0.99		1.3	4				
Arsenic	200	<40	7.3	<40		<4.0	8.4				
Barium	98,000	130	180	<50		60	150				
Beryllium	1,867	<2.0	<2.0	<2.0		<0.17	<0.93				
Cadmium	<3 <sup>Note 1</sup>	<2.0	<2.0	<2.0		<0.16	<0.82				
Chromium	1,000	<30	12	<30		<0.35	8.1				
Copper	<3 <sup>Note 2</sup>	99	97	22		33	130				
Lead	<17 <sup>Note 3</sup>	<0.04	40	12		7.4	20				
Mercury	5	<1.0	<1.0	0.04		<0.049	0.056				
Nickel	<882 <sup>Note 4</sup>	<50	13	<50		<4.1	7.4				
Selenium	33	<0.04	0.36	0.36		0.21	1				
Silver	<0.14 <sup>Note 5</sup>	<10	<10	0.013		0.11	<0.029				
Thallium	75	<0.05	0.04	<0.5		0.048	<0.013				
Zinc	<235 <sup>Note 6</sup>	720	420	210		260	1000				

Site ID: 5 Limberlost/1 rst		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Rillito Wash		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: Mixed		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		2/14/12	7/10/12	1/26/13		12/20/13	7/3/14				
SWQS											
Organic Toxic Pollutants (mg/L)											
Total Petroleum Hydrocarbons	n/a	8.9	<5.00	<5.00		<5.00	<5.00				
Total Oil and Grease	n/a	10.6	13	6.2		7	5.6				
VOCs, Semi-VOCs, and Pesticides (ug/L)											
Acrolein	467	<50		<50							
Acrylonitrile	37,333	<50		<50							
Benzene	3,733	<10		<10							
Bromoform	18,667	<10		<10							
Carbon tetrachloride	1,307	<10		<10							
Chlorobenzene	18,667	<10		<10							
Chlorodibromomethane	n/a	<10		<10							
Chloroethane	n/a	<25		<25							
2-chloroethylvinyl ether	n/a	<50		<50							
Chloroform	9,333	<10		<10							
Dichlorobromomethane	n/a	<10		<10							
1,2-dichlorobenzene	5,900	<10		<10							
1,3-dichlorobenzene	n/a	<10		<10							
1,4-dichlorobenzene	6,500	<10		<10							
1,1-dichloroethane	n/a	<10		<10							
1,2-dichloroethane	186,667	<10		<10							
1,1-dichloroethylene	46,667	<10		<10							
1,2-dichloropropane	84,000	<10		<10							
1,3-dichloropropylene	n/a	<10		<10							
Ethylbenzene	93,333	<10		<10							
Methyl bromide (Bromomethane)	n/a	<10		<10							
Methyl chloride (Chloromethane)	n/a	<25		<25							
Methylene chloride	n/a	<50		<50							
1,1,2-tetrachloroethane	93,333	<10		<10							
Tetrachloroethylene	9,333	<10		<10							
Toluene	373,333	<10		<10							
1,2-trans-dichloroethylene	n/a	<10		<10							
1,1,1-trichloroethane	186,666,667	<10		<10							
1,1,2-trichloroethane	3,733	<10		<10							
Trichloroethylene	280	<10		<10							
Trimethylbenzene	n/a			<10							
Vinyl chloride (chloroethylene)	2,800	<10		<10							
Xylene	186,667	<30		<30							

Site ID: 5 Limberlost/1 rst		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Rillito Wash		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: Mixed		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		2/14/12	7/10/12	1/26/13		12/20/13	7/3/14				
SWQS											
<b>SVOCs - Acid Extractables (ug/L)</b>											
2-chlorophenol	4,667	<9.9		<10							
2,4-dichlorophenol	2,800	<9.9		<10							
2,4-dimethylphenol	18,667	<9.9		<10							
4,6-dinitro-o-cresol (4,6-Dinitro-2	3,733	<9.9		<20							
2,4-dinitrophenol	1,867	<49		<50							
2-nitrophenol	n/a	<9.9		<10							
4-nitrophenol	n/a	<49		<50							
p-chloro-m-cresol (4-Chlor-3-metl	n/a	<9.9		<10							
Pentachlorophenol	<18 <sup>Note7</sup>	<30		<30							
Phenol	180,000	<9.9		<10							
2,4,6-trichlorophenol	130	<9.9		<10							
<b>SVOCs - Bases/Neutrals (ug/L)</b>											
Acenaphthene	56,000	<4.9		<5.0							
Acenaphthylene	n/a	<4.9		<5.0							
Anthracene	280,000	<4.9		<5.0							
Benzo(a)anthracene	0.2	<0.64		<0.61							
Benzo(a)pyrene	0.2	<4.9		<0.76							
Benzo(b)fluoranthene	n/a	<1.3		<1.6							
Benzo(g,h,i)perylene	n/a	<4.9		<5.0							
Benzo(k)fluoranthene	1.9	<1.3		<1.6							
Chrysene	19	<4.9		<5.0							
Dibenzo(a,h)anthracene	1.9	<0.37		<0.95							
3,3'-dichlorobenzidine	3	<1.1		<1.0							
Diethyl phthalate	746,667	<9.9		<10							
Dimethyl phthalate	n/a	<9.9		<10							
Di-n-butyl phthalate	n/a	<9.9		<10							
2,4-dinitrotoluene	1,867	<9.9		<10							
2,6-dinitrotoluene	3,733	<9.9		<10							
Di-n-octyl phthalate	373,333	<9.9		<10							
1,2-diphenylhydrazine (as azoben	1.8	<9.9		<10							
Fluoranthene	37,333	<4.9		<5.0							
Fluorene	37,333	<4.9		<5.0							
Hexachlorobenzene	747	<9.9		<10							
Hexachlorobutadiene	187	<9.9		<10							
Hexachlorocyclopentadiene	11,200	<9.9		<10							
Hexachloroethane	850	<9.9		<10							
Indeno(1,2,3-cd)pyrene	1.9	<0.7		<0.82							
Isophorone	186,667	<9.9		<10							

Site ID: 5 Limberlost/1 rst		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31									
Receiving Water: Rillito Wash		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
Land Use: Mixed		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sampling Date(s):		2/14/12	7/10/12	1/26/13		12/20/13	7/3/14				
SWQS											
<b>SVOCs - Bases/Neutrals (ug/L) continued</b>											
Naphthalene	18,667	<4.9		<5.0							
Nitrobenzene	467	<9.9		<10							
N-nitrosodimethylamine	0.03	<0.18		<1.6							
N-nitrosodi-n-propylamine	88,667	<9.9		<10							
N-nitrosodiphenylamine	n/a	<9.9		<10							
Phenanthrene	n/a	<4.9		<5.0							
Pyrene	28,000	<4.9		<5.0							
1,2,4-trichlorobenzene	9,333	<9.9		<10							
<b>Pesticides (ug/L)</b>											
Aldrin	<0.003 <sup>Note8</sup>	<0.099		<0.10							
Alpha-BHC	n/a	<0.099		<0.10							
Beta-BHC	n/a	<0.099		<0.10							
Gamma-BHC	n/a	<0.099		<0.10							
Delta-BHC	n/a	<0.099		<0.10							
Chlordane (alpha, gamma)	3.2	<0.099		<0.10							
4,4'-DDT	n/a	<0.099		<0.10							
4,4'-DDE	n/a	<0.099		<0.10							
4,4'-DDD	n/a	<0.099		<0.10							
Dieldrin	<0.003 <sup>Note8</sup>	<0.099		<0.10							
Alpha-endosulfan (Endosulfan I)	n/a	<0.099		<0.10							
Beta-endosulfan (Endosulfan II)	n/a	<0.099		<0.10							
Endosulfan sulfate	3	<0.099		<0.10							
Endrin	0.004	<0.099		<0.10							
Endrin aldehyde	0.7	<0.099		<0.10							
Heptachlor	0.9	<0.099		<0.10							
Heptachlor epoxide	0.9	<0.099		<0.10							
PCB-1016 (Aroclor 1016)	n/a	<0.99		<1.0							
PCB-1221 (Aroclor 1221)	n/a	<0.99		<1.0							
PCB-1232 (Aroclor 1232)	n/a	<0.99		<1.0							
PCB-1242 (Aroclor 1242)	n/a	<0.99		<1.0							
PCB-1248 (Aroclor 1248)	n/a	<0.99		<1.0							
PCB-1254 (Aroclor 1254)	n/a	<0.99		<1.0							
PCB-1260 (Aroclor 1260)	n/a	<0.99		<1.0							
Toxaphene	0.005	<0.99		<1.0							

## VI. Range of Hardness and pH Dependent SWQS Constituents at all Sites

This table was generated to assist in the review of constituents that vary with hardness or pH, according to the Surface Water Quality Standards (SWQS).

Notes from Samples at all Sites for Constituents Standards that vary based on Hardness or pH

SWQS for constituents (ug/L) for Hardness Range (mg/L) of:	Min	Max	SWQS Table
Cadmium (Note 1)	2.42	85.49	6
Copper (Note 2)	2.66	83.85	12
Lead (Note 3)	10.35	577.51	15
Nickel (Note 5)	593	13,151	18
Silver (Note 6)	0.06	33.42	19
Zinc (Note 7)	158	3523	21

Hardness Range of All Samples	
Min	Max
10	390

pH Range of All Samples	
Min	Max
5	8.61

	Min	Max	SWQS Table
<b>For pH Range of</b>	<b>5.0</b>	<b>8.61</b>	
Pentachlorophenol (Note 8)	4.925	183.534	24

SWQS are for dissolved  
Assume 1:1 ratio

Sum	
Aldrin + Dieldrin (Note 9)	< 0.003 ug/L

SWQS A.A.C. Title 18, Ch. 11  
Surface Water Quality Standards

The Surface Water Quality Standards (SWQS) for cadmium, copper, lead, nickel, silver and zinc, are all based on hardness of the stormwater sample. Pentachlorophenol SWQS is based on pH. To understand how to read this table, look at the heading that shows "Min" and "Max". These represent the range of hardness at all of the sites that is from 10 to 390 mg/L. These hardness values are used to find the minimum and maximum range of each constituent (cadmium, copper, lead, nickel, silver and zinc) in the SWQS. For example, Table 6 of the SWQS shows the standard for cadmium at a hardness of 10 as 2.42 µg/L. Similarly, the standard for cadmium at a hardness of 390 mg/L is 85.49 µg/L. Each of the constituents is found in the SWQS. Copper is tabulated in table 12, lead is tabulated in table 15 etc. Further discussions are in Part 10.



## PART 10 ASSESSMENT OF MONITORING DATA

### I. Stormwater Quality

This report is the second of a five year permit. The sampling results are similar to those submitted last year and in the last permitting term. Sampled stormwater exhibited typical constituent concentrations for stormwater runoff from an arid or semi-arid southwestern city. This fiscal year's samples were well within the historical range of sampling data collected in earlier permit reporting periods. Sample Site 4's value for copper concentration increased during this sampling season (discussed in Part 10. III.)

### II. Water Quality Standards (WQS)

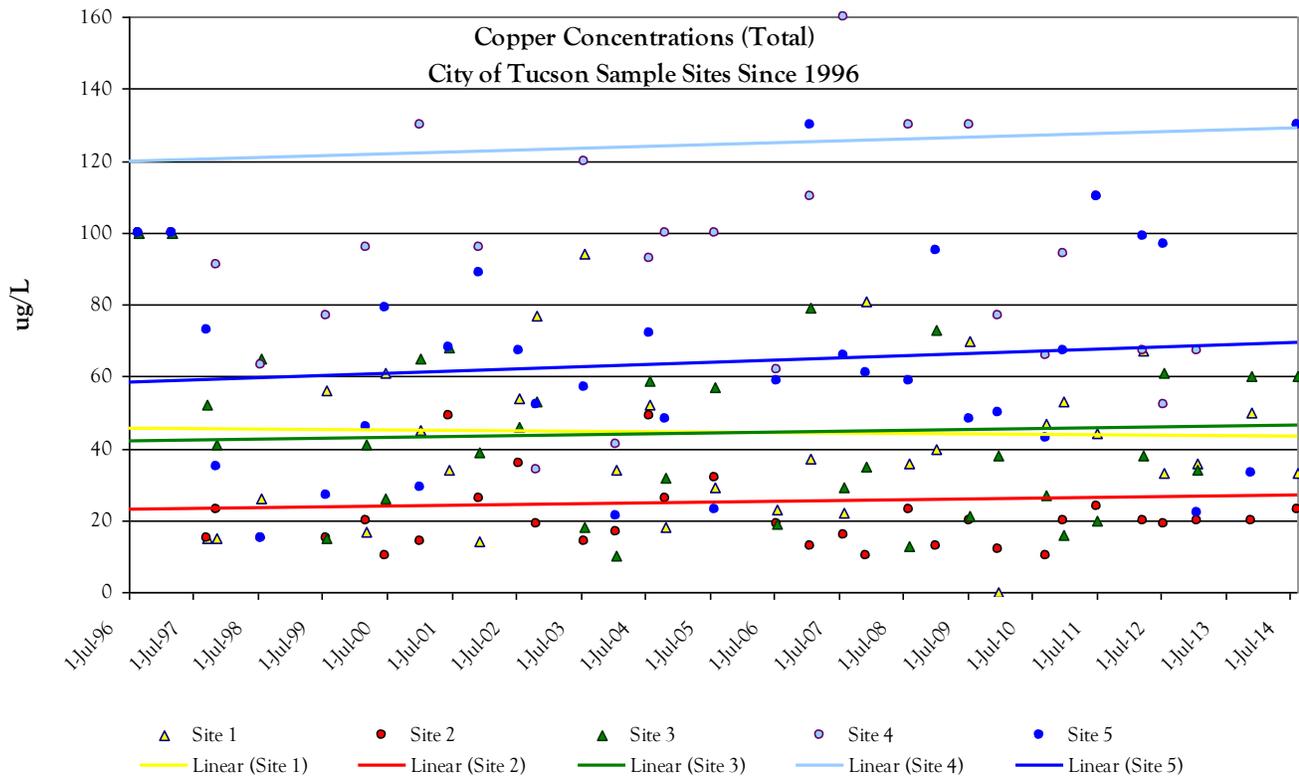
The surface water quality standards are listed in the tables found in Part 9 and Part 10 III (below). All sites were well below the surface water quality standards excluding those listed and discussed in Part 10. III.

### III. Exceeding Water Quality Standards (WQS)

The concentration of copper continues to exceed the SWQS in all sample sites. A review was performed and updated to compare the results since 1996 (see below). The results that were below the detection limit of the laboratory equipment (less than) were reported for this report as the value. For example, <0.1 was reported as 0.1 rather than 0. Therefore the actual value is lower than what is graphed below. There continues to be a lot of scatter in the data, yet trend lines indicate the copper concentration is declining at most of the sites or the laboratory detection/reporting limits are getting lower. It appears from the data since 1996 that the copper concentrations, on the most part, have not changed. However, the trend lines for Sites 4 and 5 are increasing. Again, the Stormwater Inspectors combed through all the sites trying to determine the cause of the copper in the stormwater. In the watershed of Site 4, the Stormwater Inspectors found a shop that winds alternators (with copper wire) that had poor management practices. Our Industrial Stormwater Inspector did a thorough inspection of the site, identified areas where they needed improvement and provided them with assistance. During a follow-up inspection the Industrial Stormwater Inspector noted that the site was very clean and all of his concerns had been addressed. We are convinced that the cause of higher copper values resulted from this site and should be reflected in future sample results.

The Stormwater Team continues to believe that the higher levels of copper at the sites likely is from native background in soils and landscape material and possibly brake dust from automobiles. However, to test the hypotheses that copper may be attributed to brake dust, Site 4's watershed was swept with a street sweeper on August 17, 2013 in effort to clean the copper before it was sample on September 6, 2013. The sample results were almost twice as high as the previous sample! We believe the higher value was due to the facility discussed in the previous paragraph.

The cause of the *E.coli* is suspected to be from birds (aves), cat (feline) and dog/coyote (canine) droppings.



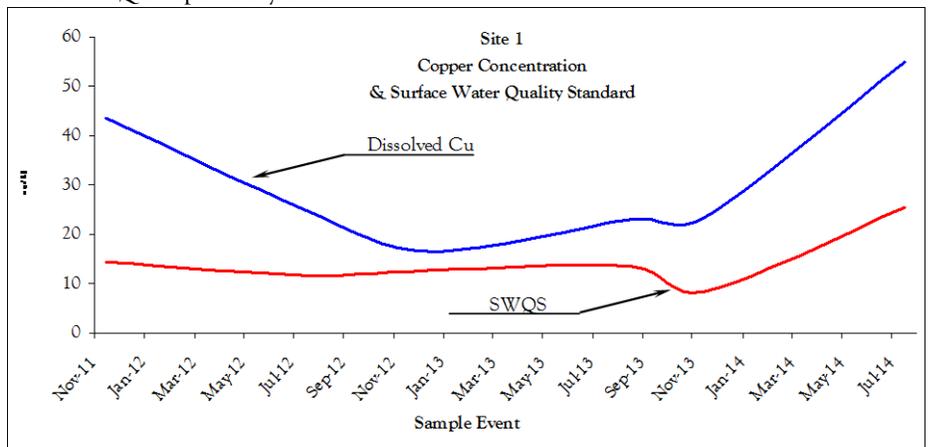
In a number of samples, the laboratory could not measure as low as the SWQS's for a number of constituents. They were: copper, silver, pentachlorophenol, cyanide, benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, 1,2-diphenylhydrazine, n-nitrosodimethylamine, aldrin, dieldrin, endrin, and toxaphene.

A. SUMMARY OF CONSTITUENTS SWQS THAT VARIES WITH HARDNESS OR PH AT SITE 1.

Site ID: 1 Grant/Wilson		Winter 2011-12	Summer 2012	Winter 2012-13	Summer 2013	Winter 2013-14	Summer 2014	Winter 2014-15	Summer 2015	Winter 2015-16	Summer 2016
Sample Date:		1/7/11	7/20/12	12/19/12	8/2/13	11/22/13	7/8/14	10/6	10/6	10/6	10/6
Receiving Water: Rillito		<b>Hardness</b>		<b>60</b>	<b>48</b>	<b>53</b>	<b>56</b>	<b>34</b>	<b>110</b>	0	0
Cadmium	(Note 1) SWQS: Table 6 (ug/L) Dissolved	13.87	11.17	12.30	12.97	7.98	25.02				
	Value (ug/L) Total	0.31	0.29	2	0.16	2	<0.82	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	0.155	0.145	1	0.08	1	0.41	0	0	0	0
	Exceed Cadmium Standard?	No	No	No	No	No	No	No	No	No	No
Copper	(Note 2) SWQS: Table 12 (ug/L) Dissolved	14.37	11.65	12.79	13.47	8.42	25.45				
	Value (ug/L) Total	87	50	33	46	47	110	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	43.5	25	16.5	23	23.5	55	0	0	0	0
	Exceed Copper Standard?	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Lead	(Note 3) SWQS: Table 15 (ug/L) Dissolved	77.83	60.78	67.85	71.11	41.38	151.18				
	Value (ug/L) Total	21	8.6	14	24	21	20	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	10.5	4.3	7	12	10.5	10	0	0	0	0
	Exceed Lead Standard?	No	No	No	No	No	No	No	No	No	No
Nickel	(Note 4) SWQS: Table 18 (ug/L) Dissolved	2699	2235	2430	2546	1669	4508				
	Value (ug/L) Total	1.1	9.6	50	4.1	50	16	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	0.55	4.8	25	2.05	25	8	0	0	0	0
	Exceed Nickel Standard?	No	No	No	No	No	No	No	No	No	No
Silver	(Note 5) SWQS: Table 19 (ug/L) Dissolved	1.34	0.91	1.08	1.19	0.5	3.79				
	Value (ug/L) Total	0.46	0.87	0.067	0.23	0.23	<0.029	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	0.23	0.435	0.0335	0.115	0.115	0.0145	0	0	0	0
	Exceed Silver Standard?	No	No	No	No	No	No	No	No	No	No
Zinc	(Note 6) SWQS: Table 21 (ug/L) Dissolved	721	597	649	680	446	1206				
	Value (ug/L) Total	230	140	100	150	170	310	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	115	70	50	75	85	155	0	0	0	0
	Exceed Zinc Standard?	No	No	No	No	No	No	No	No	No	No
<b>pH</b>		<b>7.07</b>		<b>8.55</b>	<b>8.11</b>			0	0		
PCP	(Note 7) SWQS: Table 24 (ug/L) Dissolved	40		166	111						
	Value (ug/L) Total	29		29	1.5			0	0		0
	Exceed Pentachlorophenol Standard?	No		No	No			No	No		No
Aldrin/Dieldr	Aldrin Value (ug/L)	<0.097		<0.098	<0.10			0.000	0.000		0.000
	Dieldrin Value (ug/L)	<0.097		<0.098	<0.10			0.000	0.000		0.000
	(Note 8) SWQS Aldrin + Dieldrin < 0.003 ug/L	<0.194		<0.292	<0.2			0.000	0.000		0.000
	Exceed Aldrin/Dieldrin Standard?	Unk		Unk	Unk			No	No		No
<b>E.coli (MPN)</b>		<b>&gt;2400</b>	<b>2000</b>	<b>&gt;2400</b>	<b>&gt;2400</b>	<b>&gt;2400</b>	<b>2400</b>	0	0	0	0
<b>Exceed E.coli Standard ? (575)</b>		<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	No	No	No	No

This table shows copper and *e. coli* exceed SWQS repeatedly at Site 1.

The concentration of copper increased at Site 1 (blue line). We suspect the increase may be due to collecting samples after several months of dry weather. Site 1 has a small watershed in a residential area. The source of copper is unknown and could not be determined and is suspected to be native to soils. SWQS is the red line.

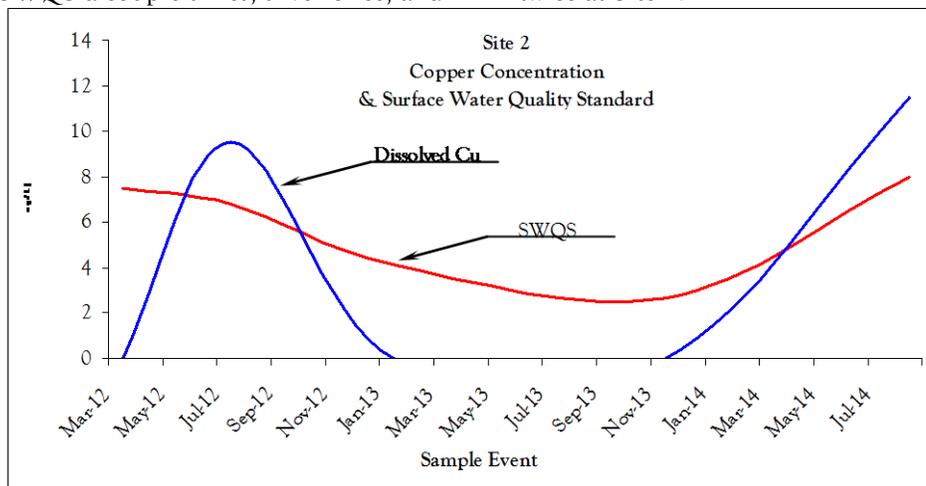


B. SUMMARY OF CONSTITUENTS SWQS THAT VARIES WITH HARDNESS OR PH AT SITE 2.

Site ID: 2 Greenlee		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Receiving Water: Rillito		3/8/12	7/5/12	1/26/13	10/00	11/22/13	8/12/14	10/00	10/00	10/00	10/00
Sample Date: Hardness		30	27	16	0	10	32	0	0	0	0
Cadmium	(Note 1) SWQS: Table 6 (ug/L) Dissolved	7.06	6.37	3.83		2.42	7.52				
	Value (ug/L) Total	2	0.4	2	0	2	<2.0	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	1	0.2	1	0	1	<1.0	0	0	0	0
	Exceed Cadmium Standard?	No	No	No	No	No	No	No	No	No	No
Copper	(Note 2) SWQS: Table 12 (ug/L) Dissolved	7.48	6.77	4.14		2.66	7.95				
	Value (ug/L) Total	<20	19	<20	0	<20	23	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	<10	9.5	<10	0	<10	11.5	0	0	0	0
	Exceed Copper Standard?	Unk	Yes	Unk	No	Unk	Yes	No	No	No	No
Lead	(Note 3) SWQS: Table 15 (ug/L) Dissolved	35.96	31.95	17.69		10.35	38.66				
	Value (ug/L) Total	0.96	2.7	1.4	0	0.49	3.8	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	0.48	1.35	0.7	0	0.245	1.9	0	0	0	0
	Exceed Lead Standard?	No	No	No	No	No	No	No	No	No	No
Nickel	(Note 4) SWQS: Table 18 (ug/L) Dissolved	1502	1374	882		643	1586				
	Value (ug/L) Total	50	3	50	0	50	2.4	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	25	1.5	25	0	25	1.2	0	0	0	0
	Exceed Nickel Standard?	No	No	No	No	No	No	No	No	No	No
Silver	(Note 5) SWQS: Table 19 (ug/L) Dissolved	0.41	0.34	0.14		0.06	0.45				
	Value (ug/L) Total	<10	0.99	0.014	0	0.007	<0.029	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	<5	0.495	0.007	0	0.0035	<0.015	0	0	0	0
	Exceed Silver Standard?	Unk	Yes	No	No	No	No	No	No	No	No
Zinc	(Note 6) SWQS: Table 21 (ug/L) Dissolved	401	367	235		158	423				
	Value (ug/L) Total	56	78	40	0	40	76	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	28	39	20	0	20	38	0	0	0	0
	Exceed Zinc Standard?	No	No	No	No	No	No	No	No	No	No
pH		7.97		6.3	0			0	0		0
PCP	(Note 7) SWQS: Table 24 (ug/L) Dissolved	100		18							
	Value (ug/L) Total	29		<30	0			0	0		0
	Exceed Pentachlorophenol Standard?	No		Unknown	No			No	No		No
Aldrin/Dieldrin	Aldrin Value (ug/L)	<0.097		<0.099	0.000			0.000	0.000		0.000
	Dieldrin Value (ug/L)	<0.097		<0.099	0.000			0.000	0.000		0.000
	(Note 8) SWQS Aldrin + Dieldrin < 0.003 ug/L	<0.194		<0.198	0.000			0.000	0.000		0.000
	Exceed Aldrin/Dieldrin Standard?	Unk		Unk	No			No	No		No
E.coli (MPN)		87	>2400	770	0	54	32	0	0	0	0
Exceed E.coli Standard ? (575)		No	Yes	Yes	No	No	No	No	No	No	No

This table shows copper exceeding SWQS a couple times, silver once, and *e. coli* twice at Site 2.

The concentrations of copper collected at Site 2 (blue line) are variable. The minimum detection of samples from the Winter of 2011-12, 2012-13, and 2013-14 were above the Surface Water Quality Standard so it is not known if they exceeded the standard. The sources of the metal could not be determined. The watershed from Site 2 is multi-family residential. SWQS is the red line.

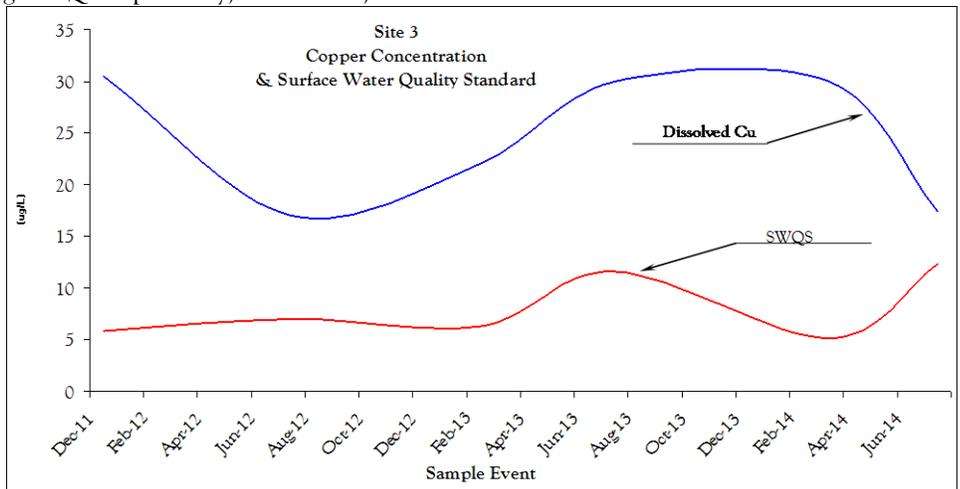


C. SUMMARY OF CONSTITUENTS SWQS THAT VARIES WITH HARDNESS OR PH AT SITE 3.

Site ID: 3 Randolph/Broadway		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sample Date:		12/2/11	7/20/12	2/20/13	7/5/13	3/1/14	7/16/14	10/00	10/00	10/00	10/00
Receiving Water: Santa Cruz		Hardness	23	28	25	48	20	51	0	0	0
Cadmium	(Note 1) SWQS: Table 6 (ug/L) Dissolved	5.45	6.60	5.91	11.17	4.76	11.84				
	Value (ug/L) Total	0.31	0.44	2	2	2	0.82	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	0.155	0.22	1	1	1	0.41	0	0	0	0
	Exceed Cadmium Standard?	No	No	No	No	No	No	No	No	No	No
Copper	(Note 2) SWQS: Table 12 (ug/L) Dissolved	5.82	7.01	6.30	11.65	5.11	12.33				
	Value (ug/L) Total	61	34	44	60	60	35	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	30.5	17	22	30	30	17.5	0	0	0	0
	Exceed Copper Standard?	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Lead	(Note 3) SWQS: Table 15 (ug/L) Dissolved	26.67	33.28	29.3	60.78	22.77	65.01				
	Value (ug/L) Total	19	7.9	12	16	20	14	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	9.5	3.95	6	8	10	7	0	0	0	0
	Exceed Lead Standard?	No	No	No	No	No	No	No	No	No	No
Nickel	(Note 4) SWQS: Table 18 (ug/L) Dissolved	1199	1416	1287	2235	1066	2352				
	Value (ug/L) Total	1.1	4.8	50	50	50	4.3	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	0.55	2.4	25	25	25	2.15	0	0	0	0
	Exceed Nickel Standard?	No	No	No	No	No	No	No	No	No	No
Silver	(Note 5) SWQS: Table 19 (ug/L) Dissolved	0.26	0.36	0.30	0.91	0.2	1.01				
	Value (ug/L) Total	0.46	0.95	0.0054	0.086	0.21	0.12	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	0.23	0.475	0.0027	0.043	0.105	0.06	0	0	0	0
	Exceed Silver Standard?	No	Yes	No	No	No	No	No	No	No	No
Zinc	(Note 6) SWQS: Table 21 (ug/L) Dissolved	320	378	344	597	284	629				
	Value (ug/L) Total	240	150	190	250	190	120	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	120	75	95	125	95	60	0	0	0	0
	Exceed Zinc Standard?	No	No	No	No	No	No	No	No	No	No
pH		6.74		7.5	5			0	0		0
PCP	(Note 7) SWQS: Table 24 (ug/L) Dissolved	27		61	5						
	Value (ug/L) Total	9.2		<3	<1.5			0	0		0
	Exceed Pentachlorophenol Standard?	No		No	No			No	No		No
Aldrin/Dieldrin	Aldrin Value (ug/L)	<0.0098		<0.10	<0.10			0.000	0.000		0.000
	Dieldrin Value (ug/L)	<0.0049		<0.10	<0.10			0.000	0.000		0.000
	(Note 8) SWQS Aldrin + Dieldrin < 0.003 ug/L	<0.0147		<0.20	0.000			0.000	0.000		0.000
	Exceed Aldrin/Dieldrin Standard?	Unk		Unk	Unk			No	No		No
E.coli (MPN)		770	370	580	B0	170	1600	0	0	0	0
Exceed E.coli Standard ? (575)		Yes	No	Yes	No	No	Yes	No	No	No	No

This table shows copper exceeding SWQS repeatedly, silver once, and e. coli twice at Site 3.

The concentration of copper collected at Site 3 (blue line) declined. However, it is still above the Surface Water Quality Standard (red line). Site 3's stormwater flows from a small shopping mall. The site is impervious; there are not any industrial or construction activities that are more likely sources of the metal.

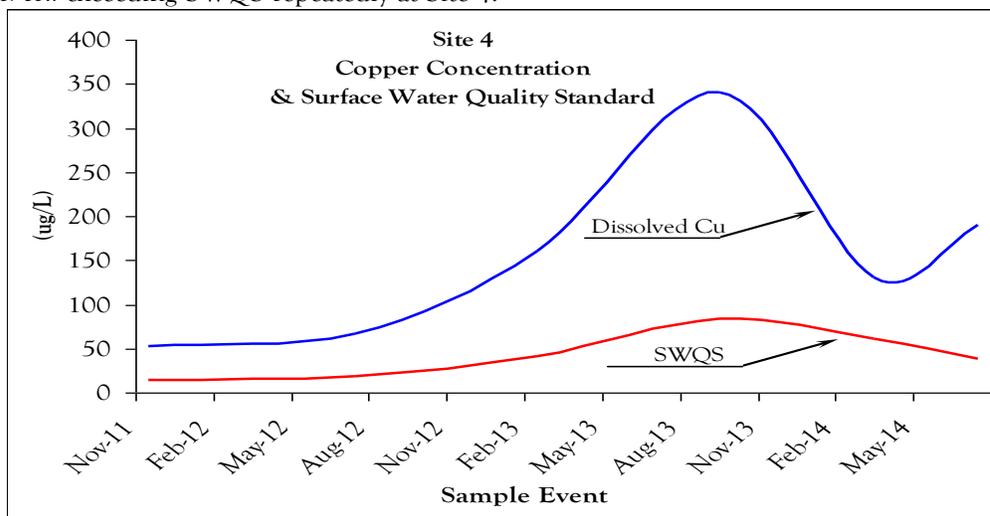


D. SUMMARY OF CONSTITUENTS SWQS THAT VARIES WITH HARDNESS OR PH AT SITE 4.

Site ID: 4 17th Street		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Sample Date:		1/13/11	7/15/12	2/20/13	9/6/13	3/11/14	7/5/14	10/6	10/6	10/6	10/6
Receiving Water: Santa Cruz		Hardness		60	76	180	390	280	170	0	0
Cadmium	(Note 1) SWQS: Table 6 (ug/L) Dissolved	13.87	17.46	40.37	85.49	61.99	38.19				
	Value (ug/L) Total	0.31	0.5	2	0.16	0.16	<0.82	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	0.155	0.25	1	0.08	0.08	0.41	0	0	0	0
	Exceed Cadmium Standard?	No	No	No	No	No	No	No	No	No	No
Copper	(Note 2) SWQS: Table 12 (ug/L) Dissolved	14.37	17.96	40.47	83.85	61.37	38.35				
	Value (ug/L) Total	52	67	160	340	130	190	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	26	33.5	80	170	65	95	0	0	0	0
	Exceed Copper Standard?	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Lead	(Note 3) SWQS: Table 15 (ug/L) Dissolved	77.83	100.97	256.85	577.51	409.62	241.64				
	Value (ug/L) Total	16	19	42	80	51	20	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	8	9.5	21	40	25.5	10	0	0	0	0
	Exceed Lead Standard?	No	No	No	No	No	No	No	No	No	No
Nickel	(Note 4) SWQS: Table 18 (ug/L) Dissolved	2699	3297	6837	13151	9936	6514				
	Value (ug/L) Total	1.1	6	50	4.1	4.1	6.3	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	0.55	3	25	2.05	2.05	3.15	0	0	0	0
	Exceed Nickel Standard?	No	No	No	No	No	No	No	No	No	No
Silver	(Note 5) SWQS: Table 19 (ug/L) Dissolved	1.34	2.01	8.84	33.42	18.9	8.01				
	Value (ug/L) Total	0.46	0.85	0.24	1	0.51	<0.029	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	0.23	0.425	0.12	0.5	0.255	0.0145	0	0	0	0
	Exceed Silver Standard?	No	No	No	No	No	No	No	No	No	No
Zinc	(Note 6) SWQS: Table 21 (ug/L) Dissolved	721	881	1830	3523	2661	1743				
	Value (ug/L) Total	190	220	440	800	330	690	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	95	110	220	400	165	345	0	0	0	0
	Exceed Zinc Standard?	No	No	No	No	No	No	No	No	No	No
pH		7.95		7.7	6			0	0		0
PCP	(Note 7) SWQS: Table 24 (ug/L) Dissolved	100		74	13						
	Value (ug/L) Total	9.2		<2.9	3			0	0		0
	Exceed Pentachlorophenol Standard?	No		No	No			No	No		No
Aldrin/Dieldrin	Aldrin Value (ug/L)	<0.0098		<0.099	<0.099			0.000	0.000		0.000
	Dieldrin Value (ug/L)	<0.0049		<0.099	<0.099			0.000	0.000		0.000
	(Note 8) SWQS Aldrin + Dieldrin < 0.003 ug/L	<0.0147		<0.198	<0.198			0.000	0.000		0.000
	Exceed Aldrin/Dieldrin Standard?	Unk		Unk	Unk			No	No		No
E.coli (MPN)		>2400	>2400	54	>2400	1000	2400	0	0	0	0
Exceed E.coli Standard ? (575)		Yes	Yes	No	Yes	Yes	Yes	No	No	No	No

This table shows copper and e. coli exceeding SWQS repeatedly at Site 4.

Similar to Site 1, the concentration of copper (blue line) collected at Site 4 has increased. Site 4's storm-water flows from an industrial site where the possible source of copper may have originated from a facility with poor BMP's that have been corrected. Further sample results may reveal this to be the case. (Red line is SWQS.)

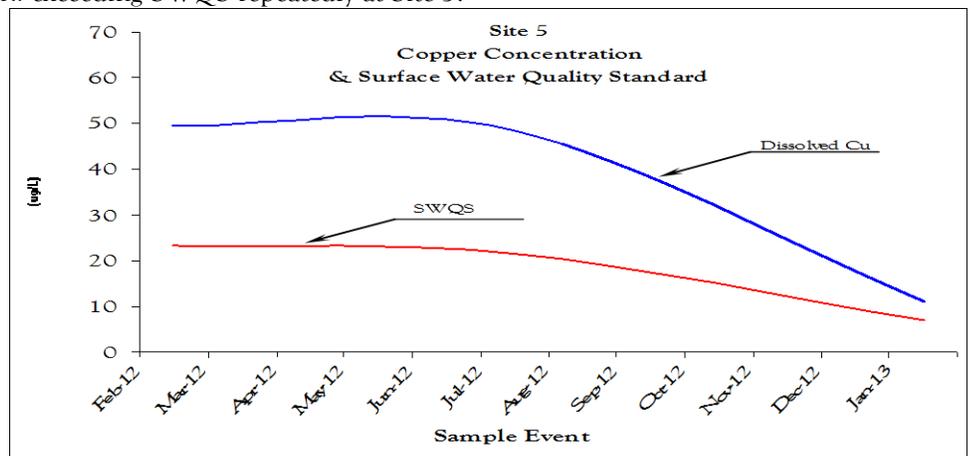


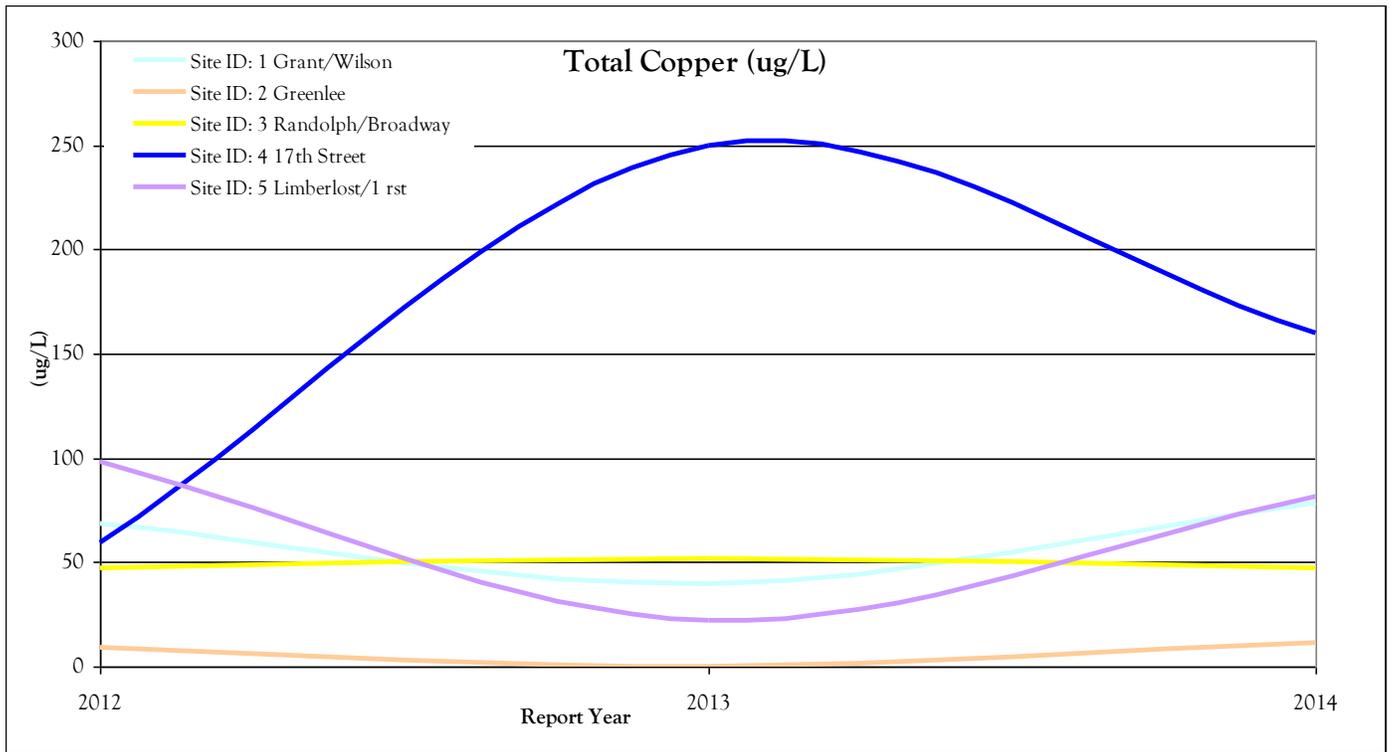
E. SUMMARY OF CONSTITUENTS SWQS THAT VARIES WITH HARDNESS OR PH AT SITE 5.

Site ID: 5 Limberlost/1 rst		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	
		2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016	
Receiving Water: Rillito		Sample Date:		2/4/12	7/10/12	1/26/13	10/6/13	12/20/13	7/8/14	10/6/14	10/6/14	10/6/14
Hardness		100	92	28	0	30	130	0	0	0	0	0
Cadmium	(Note 1) SWQS: Table 6 (ug/L) Dissolved	22.81	21.03	6.60		7.06	29.43					
	Value (ug/L) Total	2	2	2	0	0.16	<0.82	0	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	1	1	1	0	0.08	0.41	0	0	0	0	0
	Exceed Cadmium Standard?	No	No	No	No	No	No	No	No	No	No	No
Copper	(Note 2) SWQS: Table 12 (ug/L) Dissolved	23.26	21.50	7.01		7.48	29.78					
	Value (ug/L) Total	99	97	22	0	33	130	0	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	49.5	48.5	11	0	16.5	65	0	0	0	0	0
	Exceed Copper Standard?	Yes	Yes	Yes	No	Yes	Yes	No	No	No	No	No
Lead	(Note 3) SWQS: Table 15 (ug/L) Dissolved	136.3	124.45	33.28		35.96	181.14					
	Value (ug/L) Total	0.04	40	12	0	7.4	20	0	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	0.02	20	6	0	3.7	10	0	0	0	0	0
	Exceed Lead Standard?	No	No	No	No	No	No	No	No	No	No	No
Nickel	(Note 4) SWQS: Table 18 (ug/L) Dissolved	4158	3875	1416		1502	5192					
	Value (ug/L) Total	50	13	50	0	4.1	7.4	0	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	25	6.5	25	0	2.05	3.7	0	0	0	0	0
	Exceed Nickel Standard?	No	No	No	No	No	No	No	No	No	No	No
Silver	(Note 5) SWQS: Table 19 (ug/L) Dissolved	3.22	2.79	0.36		0.41	5.05					
	Value (ug/L) Total	<10	<10	0.013	0	0.11	<0.029	0	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	<5	<5	0.0065	0	0.055	0.0145	0	0	0	0	0
	Exceed Silver Standard?	Unk	Unk	No	No	No	No	No	No	No	No	No
Zinc	(Note 6) SWQS: Table 21 (ug/L) Dissolved	1112	1036	378		401	1389					
	Value (ug/L) Total	720	420	210	0	260	1000	0	0	0	0	0
	Assume 1:1 Ratio Total to Dissolved	360	210	105	0	130	500	0	0	0	0	0
	Exceed Zinc Standard?	No	No	No	No	No	No	No	No	No	No	No
pH		7.75		6.5								
PCP	(Note 7) SWQS: Table 24 (ug/L) Dissolved	100		22								
	Value (ug/L) Total	30		<30	0			0	0		0	0
	Exceed Pentachlorophenol Standard?	No		Unk	No			No	No		No	No
Aldrin/Dieldrin	Aldrin Value (ug/L)	<0.099		<0.10	0.000			0.000	0.000		0.000	0.000
	Dieldrin Value (ug/L)	<0.099		<0.10	0.000			0.000	0.000		0.000	0.000
	(Note 8) SWQS Aldrin + Dieldrin < 0.003 ug/L	<0.198		<0.20	0.000			0.000	0.000		0.000	0.000
	Exceed Aldrin/Dieldrin Standard?	Unk		Unk	No			No	No		No	No
E.coli (MPN)		93	>2400	>2400	0	210	580	0	0	0	0	0
Exceed E.coli Standard ? (575)		No	Yes	Yes	No	No	Yes	No	No	No	No	No

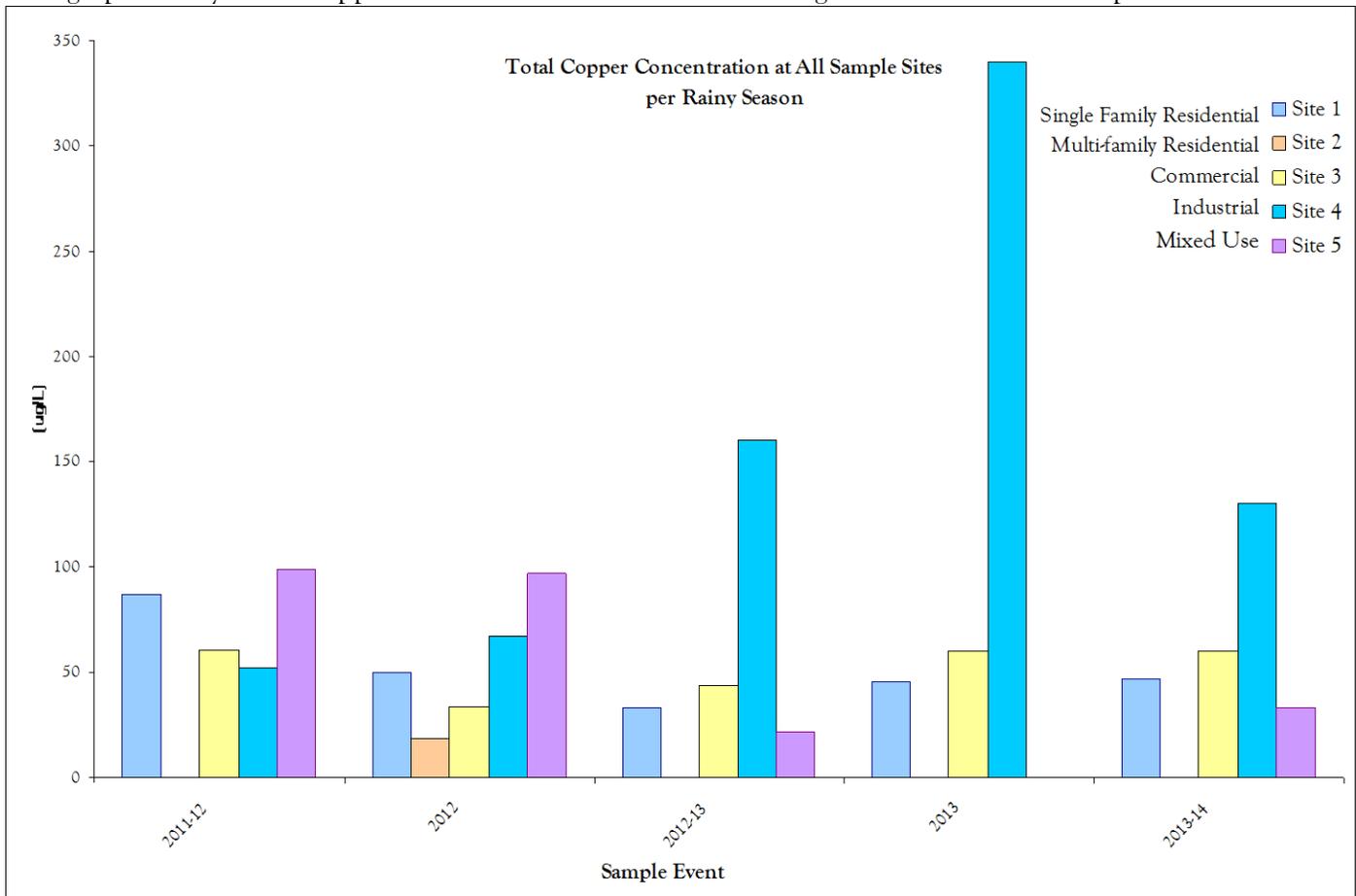
This table shows copper and e. coli exceeding SWQS repeatedly at Site 5.

Similar to Site 3, the concentration of copper (blue line) collected at Site 5 has declined. Site 5's stormwater flows from a mixed use area. The recent values are close to the Surface Water Quality Standard (red line).





This graph clearly shows copper concentration at Site 4 is much higher than the other Sample Sites.



Similarly, this graph shows Site 4's higher copper concentration than the other Sample Sites.

## PART 11 ESTIMATES OF ANNUAL POLLUTANT LOADINGS

To estimate the annual pollutant load, rainfall totals are collected at each of the five stations, tabulated monthly, and used to calculate the event mean concentration for constituents monitored under the City's MS4 permit, along with the pollutant loading calculations.

Laboratories report constituent values that were below the detection limit as less than the minimum Practical Quantitation Limit (<PQL) or the Minimum Detection Limit (MDL). These values are reported as zero for calculating purposes.

Runoff volumes were calculated for each drainage area, utilizing the area and impervious fraction developed by Pima County Flood Control District specifically for the Tucson metropolitan area, along with rainfall data collected at each sample site. Runoff volumes are shown in Table 11.3.

Annual pollutant load estimates were developed in accordance with guidance found in the EPA's "Guidance Manual for the Preparation of Part 2 of the NPDES Permit Applications for Discharges from Municipal Separate Storm Sewer Systems." The simple method described in this document was followed. This method involves using the event mean concentrations and multiplying by the runoff volumes for each watershed. The following formula was used to determine the annual load of each pollutant for each drainage basin:

$$L = (R)(C)(A)(N)$$
$$V = (R)(A)$$

- L = Pollutant load (tons/year).
- R = Runoff (inches)
- C = Pollutant concentration (mg/L)
- A = Area (acres)
- N = Conversion ( $1.65 \times 10^{-3}$ )
- V = Volume of runoff (acre-feet).

$$R = (P)(P_j)(R_v)$$

- P = Rainfall (inches)
- $P_j$  = Fraction of annual rainfall events that produce runoff
- $R_v$  = Runoff coefficient
- $I_a$  = Impervious fraction

$$R_v = 0.05 + 0.9(I_a)$$

P is obtained and averaged from raw data collected from sample sites where  $P_j$  is calculated from actual rain events at sample sites that produce flow for the winter and summer seasons. In the last annual report  $P_j$  was 0.77 for the summer rainy season and 0.62 for the winter rainy season. It has been updated and averaged over the previous seasons to 0.65 and 0.59 respectfully. Therefore the values in the following tables have changed and are reflected with the updated constant  $P_j$ .

**Table 11.1**  
Average Annual Load for the City of Tucson's Monitoring Program 2011 – 2016

mg/L	TDS	TSS	BOD	COD	N	TKN	PO <sub>4</sub>
2012	123	156	42	195	1.1	4.7	0.4
2013	87	261	28	179	0.6	3.0	0.9
2014	166	207	17	292	1.6	6.7	0.7
2015							
2016							

ug/L	Sb	As	Ba	Be	Cd	Cr	Cu	Pb	Hg	Ni	Se	Ag	Tl	Zn
2012	1.7	2.0	86	0.0	0.2	3	57	14	0.0	4	0.2	0.4	0.0	244
2013	1.5	0.0	103	0.0	0.0	0	73	21	0.0	0	0.6	0.2	0.0	235
2014	2.2	6.9	106	0.1	0.1	8	76	18	0.1	10	0.5	0.1	0.3	315
2015														
2016														

**Table 11.2a**  
Drainage Characteristics

Drainage Basin	Area (sq mi)	Impervious Fraction	Rv no units
	"A"	"I"	
SANTA CRUZ RIVER	142.96	8.72	8.95
RILLITO CREEK	19.73	0.22	4.28
PANTANO WASH	29.06	0.08	2.44
TANQUE VERDE CREEK	10.91	0.16	1.74
SABINO CREEK	0.6	0.43	0.26
Atterbury Wash (into Lakeside Lake)	11.66	0.06	0.10

**Table 11.2b**  
Total Runoff "V" (acre-feet)

	Winter	Summer								
	2011-12	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016
Santa Cruz River	5,897	7,330	4,679	2,970	4,277	5,870				
Rillito Creek	1,392	1,730	1,105	701	1,010	1,386				
Pantano Wash	722	897	573	364	523	718				
Tanque Verde Creek	507	631	403	256	368	505				
Sabino Creek	24	29	19	553	17	23				
Total (City Wide)	8,541	10,618	6,777	4,844	6,195	8,502				

The runoff volumes have changed from the previous reports because the runoff coefficient ( $P_i$ ) was obtained from real data at the sample sites and averaged for each of the rainy seasons.

Table 11.3

## Drainage Basin Sizes, Impervious Fraction, and Rv

Drainage Basin	Area (sq mi) "A"	Impervious Fraction "I"	Rv no units
<b>SANTA CRUZ RIVER</b>	142.96	8.72	8.95
Silvercroft Wash (DL)	13.44	0.12	0.16
West Branch Santa Cruz River (CG)	10.22	0.08	0.12
Hughes Wash (AC)	8.33	0.42	0.43
El Vado Wash (AG)	2.29	0.36	0.37
Santa Clara Wash (AH)	0.39	0.26	0.28
Valencia Wash (AL)	1.64	0.42	0.43
Airport Wash (AW)	24.17	0.09	0.13
Wyoming Wash (BC)	0.7	0.25	0.28
Irvington Wash (BL)	0.25	0.25	0.28
Rodeo Wash (BR)	8.39	0.21	0.24
Tucson Diversion Channel (BW)	43.53	0.20	0.23
Mission View Wash (CC)	1.62	0.48	0.48
18th Street Wash (CL)	3.59	0.42	0.43
Cushing Street Wash (CR)	0.5	0.57	0.56
Downtown Wash (CT)	0.31	0.85	0.82
Arroyo Chico (CW)	11.17	0.52	0.52
West University Wash (DA)	0.76	0.63	0.62
Bronx Wash (DC)	1.26	0.50	0.50
Grant Road Wash (DD)	0.77	0.69	0.67
Kruerger Wash (DF)	0.38	0.46	0.46
Flowing Wells Wash (DG)	6.47	0.42	0.43
Ruthrauff Wash (EG)	2.78	0.52	0.52
<b>RILLITO CREEK</b>	19.73	0.22	4.28
Stone Avenue Wash (HG)	0.6	0.61	0.60
First Avenue Wash (GR)	0.5	0.37	0.38
North Mountain Avenue Wash (GQ)	0.62	0.25	0.28
Tucson General Wash (GM)	0.42	0.34	0.36
Christmas Wash (GL)	3.28	0.45	0.46
Alvernon Wash (GG)	3.24	0.54	0.54
Christopher City Wash (GF)	0.21	0.49	0.49
Alamo Wash (GC)	9.81	0.46	0.46
Swan Road Wash (GD)	0.52	0.42	0.43
Creekside Wash (GE)	0.53	0.27	0.29

**Table 11.3 continued**  
**Drainage Basin Sizes, Impervious Fraction, and Rv**

Drainage Basin	Area (sq mi) "A"	Impervious Fraction "I"	Rv no units
<b>PANTANO WASH</b>	29.06	0.08	2.44
Rose Hill Wash (UL)	2.11	0.49	0.49
Guillermo Wash (UZ)	0.75	0.42	0.43
Atterbury Wash (UG)	16.71	0.06	0.10
Mesquite Ranch Wash (UN)	1.15	0.05	0.10
Civano Wash (UR)	3.07	0.05	0.10
Owens Park Wash (UJ)	0.75	0.35	0.37
Rolling Hills Wash (UC)	1.17	0.39	0.40
Eastview Wash (TW)	0.75	0.17	0.20
Spanish Trail Wash (TR)	1.46	0.10	0.14
Escalante Wash (TL)	1.14	0.08	0.12
<b>TANQUE VERDE CREEK</b>	10.91	0.16	1.74
Udall Park Wash (MD)	1.03	0.35	0.37
Robb Wash (MW)	3.51	0.31	0.33
Este Wash (MG)	2.49	0.30	0.32
Wrightstown Wash (ML)	0.67	0.19	0.22
Reyes Wash (MC)	1.18	0.17	0.20
Hidden Hills Wash (MR)	2.03	0.28	0.30
<b>SABINO CREEK</b>	0.6	0.43	0.26
Fahringer Wash (MN)	0.6	0.23	0.26

**Table 11.4**  
**Annual Pollutant Loading for the City of Tucson's Monitoring Program**  
**Annual Pollutant Load (tons/rainy season)**

	Winter 2011-12	Summer 2012	Winter 2012-13	Summer 2013	Winter 2013-14	Summer 2014	Winter 2014-15	Summer 2015	Winter 2015-16	Summer 2016
Total Runoff (Acre-Ft)	8,541	10,618	6,777	4,844	6,195	8,502				
TDS	2,007	1,807	885	1,009	647	3,785				
TSS	1,753	3,288	2,135	3,922	2,078	2,970				
BOD	542	811	421	147	158	256				
COD	3,094	2,979	1,801	2,108	1,538	6,098				
N	15	17	5	9	8	34				
TKN	47	106	17	54	22	159				
PO <sub>4</sub>	6	8	5	15	4	14				
Sb	0	0	0	0	0	0.0				
As	0.0	0.1	0.0	0.0	0.0	0.0				
Ba	1.1	1.7	0.9	0.8	0.0	0.1				
Be	0	0	0	0	1	1.6				
Cd	0	0	0	0	0	0.0				
Cr	0.0	0.1	0.0	0.1	0.0	0.0				
Cu	0.8	0.9	0.6	0.4	0.1	0.1				
Pb	0.2	0.3	0.2	0.2	0.6	1.4				
Hg	0.0	0.0	0.0	0.0	0.2	0.2				
Ni	0.0	0.1	0.0	0.1	0.0	0.0				
Se	0.0	0.0	0.0	0.0	0.1	0.1				
Ag	0	0	0	0	0	0.0				
Tl	0	0	0	0	0	0.0				
Zn	4.1	3.5	2.1	1.5	0.0	0.0				

The runoff volumes have changed from the previous report because actual rainfall and the runoff coefficient ( $P_j$ ) was averaged obtained from real data at the sample sites and averaged for each of the rainy seasons. These averaged values also changes the Pollutant Load calculations from the previous reports.



## PART 12 ANNUAL EXPENDITURES

Expenditures for the many components of the City's Stormwater Program are funded by City Departments and through City membership, sponsorship and contributions to agencies such as Tucson Clean and Beautiful, Pima Association of Governments, and the University of Arizona. The majority of funds expended on programs benefiting stormwater quality come from the City's General Fund. Two City Departments are enterprise funded and many of their costs are not reflected in the table below. It is recognized that a number of costs associated with stormwater protection are not readily available and staff are working toward identifying and developing a tracking mechanism to estimate the costs.

An estimate of annual expenditures for programs with direct stormwater quality benefit is provided in the Table 12.1 below:

Table 12.1

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY		2011-12	2012-13	2013-14	2014-15	2015-16
I	Public Awareness	\$4,794,132*	\$9,957	\$17,000		
II	Public Involvement	\$870,366	\$803,299	\$360,000		
III	IDDE	\$375,875	\$812,842	\$879,000		
IV	Municipal Facility Stormwater	\$1,065,122	\$1,424,474	\$2,461,000		
V	Industrial Stormwater	\$27,943	\$35,630	\$21,000		
VI	Construction Stormwater	\$270,573	\$448,406	\$321,000		
VII	Post-Construction Stormwater	VI above	VI above	VI above		
VIII	Stormwater Sampling	\$24,719	\$37,712	\$51,000		
	Program Administration & Management	\$95,024	\$274,259	\$120,000		
Total Stormwater Expenditures		\$7,523,754	\$3,846,579	\$4,230,000		

\*\$4,700,000 was from Tucson Water alone



## PART 13 ATTACHMENTS

- Laboratory reports (attached)
- Pima Association of Governments Outreach Activities (attached)
- Drainage System Maps will be included in or by 4<sup>th</sup> year annual report
- List of major outfalls will be included in or by 4<sup>th</sup> year annual report
- List of changes to the major outfall inventory included in or by 4<sup>th</sup> year annual report
- New or revised ordinances
  - “Green Streets Guidelines” (attached)
- New or revised public outreach documents (attached)