

2016 ANNUAL REPORT





## A Message from the Executive Director

Welcome to our 2016 annual reporting of activities. We try to emphasize those items of most interest to you, our ratepayers, who own property in neighborhoods, commercial districts, and business parks. We hope you enjoy these highlights of the Southeast Metro Stormwater Authority (SEMSWA) services.

SEMSWA's mission begins with protection of our streams and storm drain systems, which requires us to preserve their functionality and enhance our natural resources. For the several complementary program areas established to accomplish this mission, flood control is a primary component and guides our efforts. Certainly, water quality, capital construction, and maintenance are also critical program areas to manage stormwater, but preserving and maintaining the flood flow capacity of our natural and built systems is the essential end result we are looking for. One way our water quality goal is met is during capital construction projects that stabilize the stream corridors, which at the same time provides for efficient flood conveyance. Routine maintenance of natural areas and the built infrastructure enhances the water quality of receiving streams and also prepares the systems to handle flood flows.

One 2016 project that epitomizes the integration of our program areas to ensure adequate flood control is the vegetation management of Unnamed Creek between Eaglecrest High School and Antelope Elementary School in east Centennial. A request by the Arapahoe County Sheriff's Office to provide a 'clear' zone of sight along the creek trail that connects the two schools reinforces the importance of routine maintenance. The removal of dense and

unsuitable vegetation resulted in increased flood flow conveyance and will eventually enhance water quality.

Also in 2016, SEMSWA saw the benefits of a capital construction program that was nimble enough to adjust priorities and meet the demands of escalating development. Increasing base flows from upstream development and the potential for reduced flood flow capacity within Piney Creek prompted SEMSWA to construct the remaining capital projects in a shorter time frame - three years rather than a more typical 10 years. Additionally, new development pressures in the Happy Canyon watershed guided the design of a new Regional facility sooner rather than later, in order to facilitate cost-effective development, capture flood flows, and improve water quality. This flexible approach will allow for more well-timed projects in order to protect, preserve and enhance systems in your neighborhood.

### John A. McCarty, PE, PWLF

*The SEMSWA Mission: Provide stormwater management services essential to the protection, preservation, and enhancement of our neighborhoods, community, and natural resources through flood control, water quality, construction, maintenance, and education.*



Tunneling equipment used for Little Dry Creek project to install a Yosemite Street culvert.



BEFORE



AFTER

Comprehensive vegetation removal along Unnamed Creek trail in northeast Centennial.



Award-winning runoff design for an outfall to Willow Creek, downstream of Englewood Dam.



## Maintenance and Inspections Division

While sediment removal from our regional ponds and pipe outfalls is a large part of the day-to-day activities of the Maintenance and Inspections Division (see below and page 10), the routine repair and replacement of inlets, grates, pipe and outfalls are integral to the efficiency and effectiveness of the stormwater system. Crews also provide a valuable service by video-taping the system in the vicinity of a proposed capital project to identify and implement the maintenance needed to augment the capital program construction effort.

During 2016, the maintenance crews replaced and/or repaired numerous stormwater conveyance structures in

several City or unincorporated County neighborhoods. Typically, roadway or trail pipes and culverts may become clogged with sediment and debris, trapping stagnant water that corrodes the pipe; outfall and pipe flared end sections become dislodged or damaged; and inlets and grates are compromised by settling streets or concrete collars. Depending on the severity, fixes may take less than a day to more than a week, and may require detailed environmental permitting if the structure is in or near a drainageway or other natural resource area. This work may be considered 'routine', but it is critical to the safe and efficient working of the stormwater system that conveys storm and flood flows to our drainageways and creeks.

This trail culvert that conveys storm and flood flows to the nearest drainageway was damaged and required replacement, with the addition of a flared end section that provides a preferred path for the runoff to travel.



## Piney Creek Hollow Park Pond



One of the larger Maintenance and Inspections Division projects in 2016 was the sediment removal operations at Arapahoe Park and Recreation District's Piney Creek Hollow Park detention pond. This pond was constructed to detain storm flows in the Piney Creek watershed. Over the years it filled with sediment from upstream development constructed in the late 1990's, a period when there was no enforcement in place to control sediment releases during construction. Almost 1,000 cubic yards of sediment was removed. Several low water trail crossings were uncovered, and a low flow trickle channel discovered. The facility is now ready to provide storage for flood flows from upstream, providing protection for downstream properties.



BEFORE



AFTER

# Engineering & Construction Division



Redefinition of the Piney Creek channel through the Ranches development results in a stable channel and bank with a decrease in sediment transport downstream.

## Capital Improvement Program (CIP)

SEMSWA continued to make progress in 2016 to reclaim Piney Creek, with two projects completed and two in the construction phase. The completed Piney Creek at Tower Road - Reach 5 project removed over 40,000 tons of sand/sediment, redefined the channel through The Farm subdivision, and re-established access to the trail. The completed Piney Creek Ranches Phase 1 - Reach 6 project stabilized and revegetated the channel within the Ranches development, greatly reducing the sediment load downstream. The Piney Creek at Liverpool - Reach 7 and Piney Creek Upstream of Caley - Phase 2 projects are underway and will address bank erosion and mitigate a major source of sediment using the same channel redefinition and bank stabilization methods. Planned Piney Creek projects will be completed in 2018, with an estimated \$15 million investment to reclaim five miles of unstable creek.



Residents enjoying the stabilized horse crossing feature.

### Little Dry Creek @ Yosemite

Flowing through South Suburban Parks & Recreation District's Walnut Hills Park in Centennial, this reach of the creek required improvements to undersized Yosemite St. and Xanthia St. culvert crossings as well as channel/bank stabilization. Overflows from an undersized upstream detention pond at Yosemite and Alton Ave. caused flooding in nearby Davies Ave. and damaging spills onto private properties. Upsizing the pond's outlet pipe/culvert was accomplished by tunneling under Yosemite to install a larger culvert to convey flood flows to Little Dry Creek. The successful tunneling method was a first for SEMSWA.



Advancing the tunneling equipment under Yosemite. Completed Xanthia Street culvert for Little Dry Creek flows.

### CIP Projects Completed:

- Littles Creek:** Broadway Storm Sewer Improvements
- Little Dry Creek:** Yosemite to Xanthia Channel Improvements
- Cottonwood Creek:** Inverness Regional Pond
- Cottonwood Creek:** Caley West Regional Pond
- Piney Creek:** Tower - Reach 5 Channel Improvements
- Piney Creek:** Ranches - Reach 6 Channel Improvements

### CIP Projects In Progress:

- Piney Creek:** Upstream of Caley Channel Improvements
- Piney Creek:** Liverpool - Reach 7 Channel Improvements
- Unnamed Creek Tributary:** Mesa HOA Tract C Improvements
- 2016/2017:** Cured-in-Place Pipe (CIPP) Program

## Land Development Program

Land Development Program staff were busy in 2016 responding to 130 new applications for development in Centennial and urban unincorporated Arapahoe County. A sign of continued growth is the record number of pre-submittal meetings staff prepared for and attended: 164 pre-submittal meetings in 2016, up from 151 in 2015, and 136 in 2014. Project submittals from an applicant typically include drainage reports, construction documents, and various permit applications reviewed for adherence to criteria. Staff also review SEMSWA capital construction projects as well as City and County Public Works projects for adherence to standards, as part of the goal of ensuring responsible and resilient construction of public infrastructure. Staff coordinate their reviews with Floodplain Management and Water Quality program staff to identify permitting requirements and discuss the technical merit of any variance to the standards. This coordination provides the

Applicant the smoothest path through the development process.

In 2016, the Land Development staff coordinated the final approvals for several new commercial development projects of note. These include Mikron in the developing Dove Valley area, and Camp Bow Wow and Innova I, both located just north of the Inverness Business Park area. This developing south-metro area, within both City of Centennial and Arapahoe County jurisdictions, is continuing to see an influx of significant developments that make this a vibrant destination for both homes, offices, and businesses. The SEMSWA-constructed Regional stormwater system in these areas encourages the maximum developable footprint for these owner/developers.



Development projects of note in the City and County completed in 2016, including Mikron (top), Camp Bow Wow (middle), and Innova I (bottom).

## Master Planning Program



Master Plans, completed in partnership with Urban Drainage & Flood Control District (UDFCD), are used to guide responsible development by planning for adequate storm drainage infrastructure, and to identify future capital construction projects. Master planning may include the delineation of flood hazard areas, identification of regional drainage and stormwater quality improvement opportunities, and recommendations for prioritizing capital construction and maintenance efforts. Master planning for a basin takes various forms, including major drainageway planning, outfall systems planning, alternative analysis, administrative updates, and/or a flood hazard study. Since several of these components may be undertaken for a basin, it may take up to three years to fully complete the planning effort. During 2016, six basins, including Lee Gulch, Sand Creek, Harvard Gulch, Big Dry Creek, First Creek, and the South Platte River, were studied. The following documents were completed in 2016:

- Lee Gulch, Upstream End, Alternatives Analysis
- Sand Creek, Right Bank Tributaries, Master Drainageway Plan (MDP)
- Harvard Gulch, MDP and Flood Hazard Area Delineation (FHAD) study

Also during 2016, master planning efforts commenced or were continued for the following components in the studied basins:

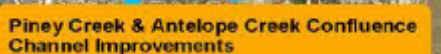
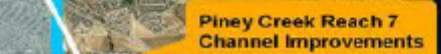
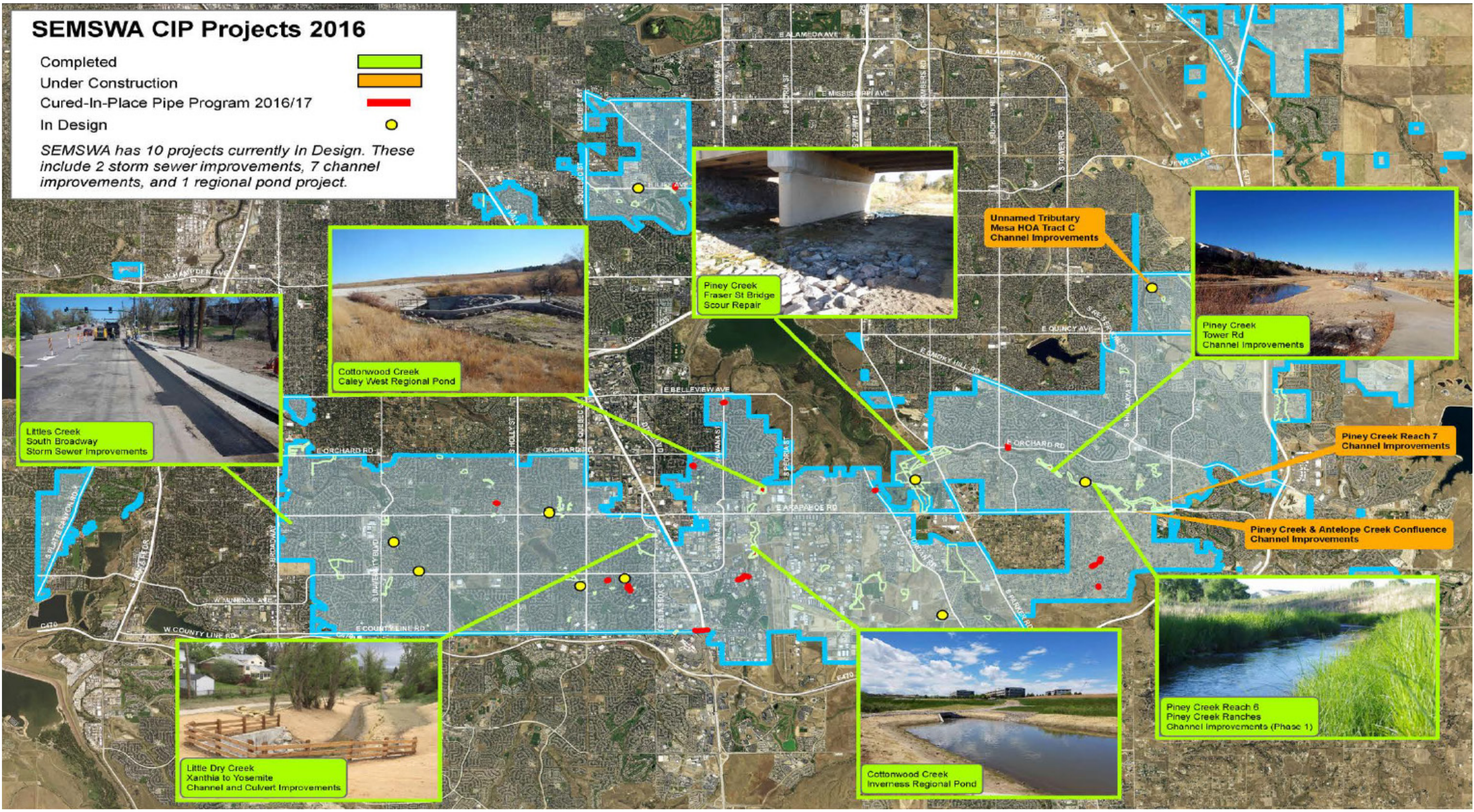
- Big Dry Creek, FHAD
- First Creek, Outfall Systems Plan (OSP)
- South Platte River, FHAD

LEFT: Big Dry Creek FHAD will delineate flood hazard areas.

# SEMSWA CIP Projects 2016

- Completed
- Under Construction
- Cured-In-Place Pipe Program 2016/17
- In Design

SEMSWA has 10 projects currently In Design. These include 2 storm sewer improvements, 7 channel improvements, and 1 regional pond project.



## Floodplain Management Program

Colorado's 2016 flood season, which is typically from May through October, included both snowmelt and thunderstorm flooding. Snowmelt floods resulted from the melting of the winter snowpack in the high mountain areas which became spring runoff. Thunderstorm floods were caused by intense rain over relatively small areas. Because there is little to no warning time, the term flash flood is often used to describe thunderstorm floods. Between 20 and 30 large floods occurred somewhere in Colorado in 2016 and Colorado experiences a major flood disaster roughly once every five years. Many people think that if they do not live near a stream or creek they are not in danger of flooding; this is not true. Flooding is the nation's number one natural disaster. Flash floods and seasonal storms flooded every region of the country in 2016. Flood maps don't show all areas at risk and flood risks can change over time. Flooding can occur outside of mapped floodplains and along smaller streams and creeks that are not shown on any flood maps. Flooding can also occur from inundated storm sewers, low-lying areas with poor drainage, or broken water mains. Much of the true risk of flooding is its unpredictability. And a person may not know that a home or business insurance policy does not cover flood damage; flood insurance is purchased separately. Transferring some of the financial risk from a flood event to an insurance policy is good policy! Fortunately, no significant flooding was reported during 2016 in the SEMSWA service area.



## Environmental Resources Division

### Tracking Substantial Improvements



Some of our established neighborhoods developed before flood maps and floodplain regulations, and as a result, there are existing structures in the floodplain. In some cases, flood risks have changed and structures are newly shown in the floodplain. SEMSWA staff works with City Building Department staff to review and permit improvements to existing structures in the floodplain for compliance with floodplain regulations. During 2016, SEMSWA worked with the City Building staff to begin tracking existing structures in the floodplain for home improvements. These existing structures are subject to additional Substantial Improvement

standards, which are intended to reduce flood damage and losses. Substantial improvements are equivalent to the cost of improvements or repair that equal or exceed 50% of the market value of the structure before the start of construction. The City's Substantial Improvement standard, as defined by the Land Development Code, is cumulative over 10 years. Each property and its flood risk are unique, so please contact SEMSWA for additional information about if and how these requirements apply to your project.

#### Is my property in a regulated floodplain?

SEMSWA Floodplain program staff answered this question for City/County residents and businesses often in 2016. If you are not sure if your property is in a Federal Emergency Management Agency (FEMA) floodplain, you can visit the FEMA Flood Map Service Center, <https://msc.fema.gov> to verify your location relative to a mapped FEMA floodplain or view approved changes to a flood map. It is important to note that the FEMA flood maps do not show all flood hazard areas. So, in the SEMSWA service area, the Urban Drainage & Flood Control District produces locally-developed floodplain studies on our behalf that can be viewed at <https://udfcd.gisworkshop.com>. SEMSWA staff are available to help with these tools. If you find your property is in



a high-risk zone, note that the City and County have a Class 7 rating in FEMA's Community Rating System due to better-than-the-minimum floodplain regulations and actions. This Class 7 equated to a 15% discount in 2016 on flood insurance for structures in the high-risk flood zone.

#### Floodplain Program Statistics

In 2016, 27 floodplain permits were issued to work in a floodplain, 25 floodplain requests were assessed for impacts from proposed work, and 10 requests for modification of a floodplain were reviewed. SEMSWA also provides a map information service and responded to many inquiries requesting assistance in defining floodplain limits on a parcel and what that means to the property owner. Outreach efforts were targeted to inform property owners of changes to their flood risk through newsletter and newspaper articles, social media, open houses and direct mailings that cumulatively reached over 60,000 residents and businesses.

## Water Quality Program



In 2016, SEMSWA received authorization by the Colorado Department of Public Health and the Environment to discharge stormwater within the City of Centennial via renewal of their Cherry Creek Basin Regional General Permit, Stormwater Discharge for Municipal Separate Storm Sewer Systems (MS4 Permit). This permit became effective in July and will remain in effect until 2021, for a five-year permit term.

In 2016, SEMSWA met the MS4 permit requirements to reduce pollutants in stormwater runoff from residential, commercial, and industrial areas through permitting and inspecting sediment controls at over 210 job sites; ensuring the proper

*A Regional Detention and Water Quality Facility.*

construction of 7 water quality treatment facilities for new development; resolving 30 illicit discharge reports from the public; and sponsoring the safe disposal of 43,000 pounds of household hazardous waste collected via 425 curbside collections.

#### SPLASH Training Opportunities

The Stormwater Permittees for Local Awareness of Stream Health (SPLASH) group, consisting of Arapahoe County MS4 Permit holders, had an aggressive stormwater quality training schedule this year. Special training held at SEMSWA included **Revegetation Optimization at Disturbed Sites, CIP Construction and the MS4 Permit, and State Dewatering Permit Tips & Strategies**. Over 120 attendees took advantage of this free training.

### Public Outreach

In 2016, SEMSWA participated in or sponsored over 30 events that provided an opportunity for the public to learn about stormwater quality protection and what they could do to prevent negative impacts to our creeks and greenways. The goal of this outreach is to foster partnerships between

SEMSWA and residents/businesses through education and shared natural resource values. SEMSWA-sponsored outreach events reached thousands of citizens via a combination of public meetings, festivals, classroom & field projects, field tours/workshops, and volunteer events. SEMSWA

believes that these events strengthen the connection between people and their watershed, and reinforces that **everyone has a role in protecting a stream's water quality**. Also in 2016, over 60,000 residents received our annual summary flyer via utility or newsletter mailings.



*During 2016, SEMSWA sponsored and participated in Cherry Creek's Run for the Watershed Race, Littleton's Western Welcome Week, and Centennial's Public Works Week.*



### APWA Environmental Award

In 2016, SEMSWA received an award from the American Public Works Association (APWA) for the Willow Creek Upstream of Arapahoe Road Outfall project done with the Urban Drainage & Flood Control District. The award recognized the replacement of a low functioning riprap rundown with a vegetated structure that promotes stormwater quality infiltration and filtering before discharge to the creek.

*Riprap rundown from condominium complex parking lot replaced with attractive filtering vegetation.*



# Vegetation Management for Flood Control



LEFT: Unnamed Creek prior to vegetation removal. MIDDLE: Over 1 million pounds of vegetation recycled. RIGHT: The resulting 'clear zone' for Unnamed Creek.

## Restorative Approach to Vegetation Management

SEMSWA Maintenance and Inspection Division crews began implementing a new vegetation management program in 2016 to both manage the native grass areas in our channels in a more restorative way, and to return our channels to conditions more reflective of the carrying capacities for flood flows when they were originally modeled to establish floodplain limits. This is important, as upstream development increases the runoff of storm flows during a rain event and the low height native grasses make ideal vegetation cover. When native grasses are dominant, they provide habitat, natural filtration, and un-impeded storm flow conveyance. In response to a

request from the Arapahoe County Sheriff's Office, SEMSWA conducted vegetation management operations along Unnamed Creek between Eaglecrest High and Antelope Ridge Elementary schools. Crews thinned trees and shrubs, cut low tree limbs to raise the canopy, and selectively mowed the native grass vegetation. Crews also removed the cut material from the area. The goal of this project was to establish a 'clear zone' of approximately one to eight-feet. This 'clear zone' opens up the creek's trail vista, limits the debris that can collect along the creek that can impede storm flows, and helps reduce flood risk. Continuing routine maintenance of the

creek will result in healthy native grass communities and improved water quality. In the bigger picture, native grasses will be encouraged to take over the channel bed and bank vegetation. Allowed to grow to their natural heights to propagate their own seed, native grasses choke out weeds, are self-perpetuating, do not need fertilizers, and regenerate independent plant communities naturally. Healthy native grass areas promote the return of native species that are slow growing and drought resistant, provide excellent vegetation cover, and enhance water quality in our greenways.

## Unnamed Creek Before and After Photos

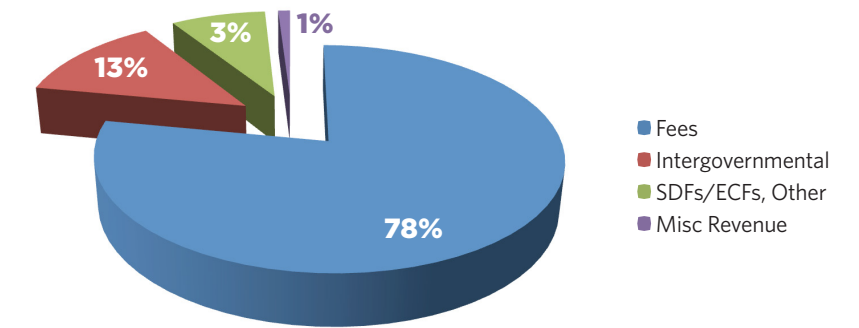


Dense and unfavorable vegetation along Unnamed Creek created unsafe zones for trail users and impeded storm runoff conveyance; removal improved channel conditions.

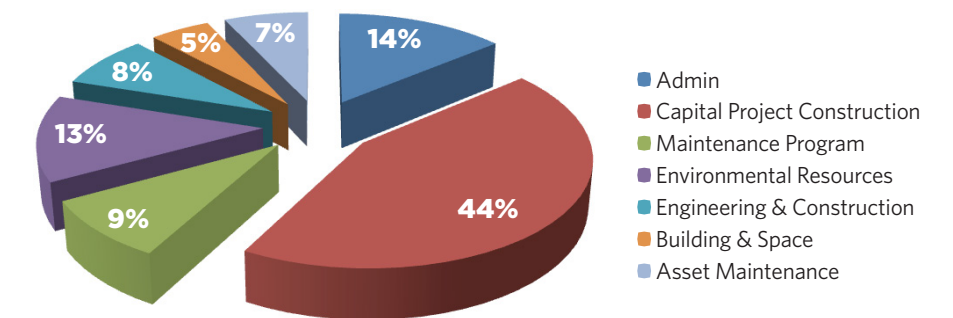
# SEMSWA Financials

SEMSWA is a political subdivision and a public corporation of the State, formed pursuant to Section 29-1-204.2 of the Colorado Revised Statutes. SEMSWA is an enterprise activity that is financed by fees based on the amount of runoff each property contributes to the storm sewer system, calculated from the amount of impervious area (e.g. roof, driveway, parking lot) and density. SEMSWA's purpose is to plan, fund, construct, and maintain drainage and flood control facilities within the service area. The SEMSWA Board has set fees to provide sufficient funds to properly manage stormwater runoff, convey flood flows, protect water quality, and meet State and Federal regulatory requirements. Property owners can find more information about the fee calculations at [www.semswa.org](http://www.semswa.org). The charts to the right show 2016 revenue and expenditure percentages. All program area expenses for 2016 were typical for any given year, with the exception of capital project construction, which can vary significantly from year to year depending on design, permitting, and construction schedules.

## 2016 Revenue (\$13,581,096)



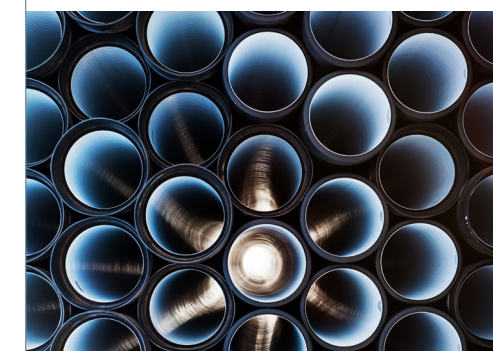
## 2016 Expenditures (\$10,328,602)



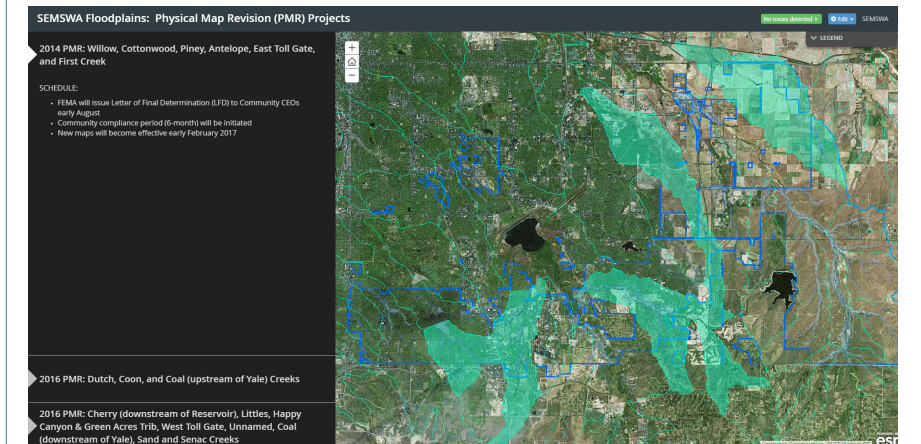
# GIS/IT Solutions

## Closed Circuit TV Software Implementation

During the last half of 2016, SEMSWA implemented a new Closed Circuit Television (CCTV) pipe video inspection system to complement existing work and asset management efforts. The new system integrates fully with GIS software and data, making CCTV inspections more visual and easily found. Routine database updates have been automated as well, which brings mobile inspections into the office for immediate use and keeps databases synchronized without extensive staff effort or time investment.



## Floodplain Web Mapping



Screenshot of Physical Map Revision (PMR) project basins in 2016.

In 2016, SEMSWA participated in several FEMA Physical Map Revision (PMR) projects. To assist with visualization and outreach, GIS staff created a web-based "story map" that outlines location and important project information. Also floodplain related, SEMSWA GIS began publishing current floodplain information directly to partner agencies via web services. The City of Centennial Building Department, for example, now utilizes this service to refer customers with properties potentially affected by floodplain limits to SEMSWA for floodplain permitting assistance.

# 2016 ANNUAL REPORT



Construction photos of Little Dry Creek channel improvements highlighting the tunneling process used to construct a conveyance culvert under Yosemite Street.

SEMSWA is a legal entity formed through an intergovernmental agreement between Arapahoe County, the City of Centennial, Arapahoe County Water and Wastewater Authority, East Cherry Creek Valley Water and Sanitation District, and the Inverness Water and Sanitation District. The boundaries of SEMSWA cover the City of Centennial and the developed areas of the unincorporated portions of the County. SEMSWA, which is an Enterprise, provides the resources and funding to protect people and property from flooding while also complying with water quality regulations.



## SEMSWA 2016 Board Members, Representation, and Contact Information

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*This annual report is an informal compilation of activities to provide a continuing history of our program area achievements.*