Preserving the Health and Safety of the Greater Richmond Community and its Environment

WET WEATHER STORAGE PUMP STATION

In Service January 2016

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ANNUAL OPERATING REPORT
2016

RICHMOND WASTEWATER TREATMENT PLANT -

SANITARY AND STORM WATER COLLECTION SYSTEMS

CITY OF RICHMOND, CALIFORNIA

RICHMOND, CA WASTEWATER TREATMENT PLANT

ANNUAL OPERATIONS REPORT
January 1, to December 31, 2016

Prepared by

Veolia North America

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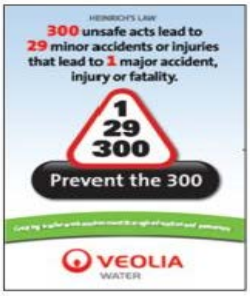
SAFETY PROGRAM STATUS/REVIEW:

It's a Culture, Not a Campaign



Safety Achievements

- Veolia Richmond has had no lost time safety incidents since October 7, of 2008. There were no OSHA recordable safety incidents in 2016 and in fact there has not been a recordable safety incident at the project since November of 2014.
- Plant staff conducted all of the required Veolia Water monthly safety training as well as specialized safety training from outside providers. Additionally staff held frequent internal departmental safety tailgate meetings.
- Completed all required monthly internal safety inspections and also were audited by Veolia's Regional Safety staff.
- Plant staff participated in the Great California Shakeout earthquake preparation drill on October 20, 2016. The drill was coordinated by Veolia regional safety management staff with many of the company's West Region sites participating.

WASTEWATER TREATMENT PLANT PERFORMANCE STATUS/REVIEW

2016 Operational Status and Statistics:

- 2.431 billion gallons of wastewater was treated through the Richmond WPCP and discharged into San Francisco Bay in 2016. Total volume discharged in 2015 was 1.817 billion gallons. The increase in discharge volume in 2016 (34% increase) was the result of high, rain induced plant flows measured especially in January and March. 2015 was a very dry year with only about 9.6 inches of total rainfall measured; rainfall in 2016 was about 28.7 inches where the average is 26 inches. Average plant flow was 4.98 million gallons per day (MGD) in 2015 and

6.66 MGD in 2016. Year to date 2017 has been extremely wet with 1.391 billion gallons treated (15.28 MGD) through April. That represents 77% of the total volume treated in all of 2015. Through the first four months of 2017 rainfall at the Richmond treatment plant rain gauge was 29.11 inches.

- **92.2**% of biochemical oxygen demand (BOD) was removed
- **94.4**% of total suspended solids (TSS) were removed

Operational Improvements Implemented and Noteworthy Activities Included:

- The most significant operational upgrade in 2016 was bringing the Wet Weather Storage Facility (WWSF) project on-line and into operation. This facility not only provided wet weather storage but also added operational flexibility to the treatment plant for maintenance related shut downs. A bypass line and valve were designed into the system to allow using the WWSF pump station if the existing influent pump station malfunctioned or needed service.
- In the first quarter of 2016, Veolia's CPM (Capital Projects) group and plant operations along with Central Sierra Electric began a complete replacement of the plant's electrical infrastructure. The replacement project includes primary and secondary electrical systems and is expected to conclude in May or June of 2017.
- Substantially rebuilt plant 3-water pump system and installed new filter for the system
- Completed (Carollo Engineers) 90% design of critical treatment plant improvements and also completed update of Facility Plan which will guide improvements to the treatment plan in the coming years.

Operational Challenges Included:

- Continuing to operate facility lacking functional grit removal system
- Significant failure of the DAFT skimmer/collector drive. It has been repaired and returned to service though the repair is considered temporary. The DAFT process is used to remove solids from the secondary system and there is no redundancy for the unit. The system needs and is scheduled for replacement in the coming year. The project involves converting to a new technology known as Rotary Drum Thickeners.
- Foaming in the secondary system, and especially secondary clarifiers. Can contribute to odors and settling problems in secondary the system.
- Maintenance needs of the automatic bar screen. Currently there is no redundancy for this piece of equipment though that will change with construction of the new plant headworks.
- Difficulty with the automated dechlorination system (process that removes chlorine from

effluent prior to discharge). The SBS (used for dechlorination) storage and feed system is scheduled for rehabilitation in the next 6 months to a year time frame and is a priority project.

- Process anomaly that began in late February of 2016 and lasted through late March of 2016. It is important to note there were no signs of problems with the processes during these events. In fact, the plant's process appeared very good during the period with low levels of turbidity and solids in the plant effluent. The event resulted in seven violations of the NPDES permit governing the treatment plant. The incident was thoroughly investigated internally and by external consultants and the cause linked to partial nitrification in the secondary treatment process. Additional discussion is provided below under Compliance Summary.
- Multiple aeration mixer failures and replacements during the year

COMPLIANCE SUMMARY STATUS / REVIEW:

NPDES

There were eight total instances of non-compliance with the WCA/Richmond NPDES permit during 2016. Those incidents, described as follows, were specific to the Richmond plant effluent.

February

- February 21-27 Weekly Average BOD Concentration; 46.4 mg/L - Limit < 45.0 mg/L
- Monthly Average BOD Concentration; 30.4 mg/L - Limit < 30.0 mg/L

March

- On March 2, 2016 an electrician was pulling wires in the chemical feed room. While pulling a wire through a switch panel the wire caught on the breaker switch for the SBS pump and turned it off without anyone noticing. For eight minutes, from 10:16 until 10:24, chlorine was measured in the effluent, peaking at 2.78 mg/l. The effluent limit for chlorine is 0.0.
- March 6-12 exceeded weekly average TSS concentration; value was 50.5 mg/L where the limit is < 45.0 mg/L (During this week, plant influent flow averaged 19.9 million gallons per day. Prior to that rainy stretch, daily plant flows averaged just over 5 MGD. Three very high daily TSS values (64, 110 and 76 mg/l) were recorded during the period and pushed the weekly average over the limit).
- March 6-12 exceeded weekly average BOD concentration; value was 49.3 mg/l where the limit is < 45.0 mg/L.

- February 28 - March 5; exceeded weekly average BOD concentration; value was 47.6 mg/L where the limit is < 45.0 mg/L
- Exceeded the March monthly average BOD concentration; value was 40.3 mg/L where the limit < 30.0 mg/L
- Did not meet monthly necessary minimum BOD Removal for March; value was 82% where the permit requirement is > 85%.

These BOD violations were investigated thoroughly with a preliminary report submitted to the State on June 26, 2016 and final report submitted on September 12, 2016. The report concluded the exceedences appeared to an extent related to the occurrence of nitrification, or partial nitrification during the effluent BOD test (carryover of nitrifying bacteria into the sample bottles with ammonia present).

During the investigation, as it became evident (April to May time frame) that nitrification may be a contributing factor, RWPCP staff/management reduced the solids inventory (indicated by MLSS) and solids retention time (as indicated by MCRT) targets with the expectation of inhibiting the nitrification process. During the first half of 2016 the monthly average MLSS under aeration was about 2400 mg/L and MCRT generally ranged from 5 to 9 days. The second half of 2016 saw a monthly average MLSS of 1500 mg/L and MCRT ranging from 3 to 6 days. It is important to note that after the BOD violations experienced in March, there were no effluent limit compliance issues for the remainder of the year. By those measures, the reduction of solids inventory targets did resolve the elevated effluent BOD issue.

During the period of elevated effluent BOD, laboratory staff began monitoring carbonaceous BOD (or cBOD) in addition to total BOD on the RWPCP effluent. This was done in an effort to establish baseline levels of cBOD with the expectation that if the issue returns in the future, a measureable difference would be observed in the total BOD versus cBOD. That delta would indicate and potentially confirm the suspected nitrification issue.

Richmond WPCP 2016 Blending Summary

As a result of rain and high treatment plant flows, there were eight blending events during 2016 as noted in the Table 1.0 below (blending is the modified treatment plant process mode whereby more wastewater comes into the plant than can be treated by the biological process). Primary treated flow is diverted around the biological processes then disinfected and blended with fully treated plant effluent. There are requirements in the NPDES permit regulating the Richmond WPCP for implementing measures and activities to reduce blending events at the treatment plant. Generally speaking, about 40 million gallons per day (MGD) can be pumped into the treatment plant but only about half that volume (20 MGD) can receive full secondary treatment.

Table 1.0

2016 Blending Events		
Date	Blending Duration	Blending Volume; Million Gallons
January 6	9 hours, 20 minutes	3.07
January 18	17 hours, 18 minutes	6.93
January 19	9 hours, 30 minutes	7.37
March 5	18 hours	11.09

March 6	12 hours	5.48
March 10	31 hours, 36 minutes	17.68
March 12	34 hours, 36 minutes	15.17
December 15	19 hours, 16 minutes	11.66
Totals	**151.6 Hours**	**78.45**

2016 Goals and Process Improvement Recommendations

- Evaluate the prospect of converting from the Rockwell RS View platform to an Ignition or Wonderware operating system as the plant and collections (lift stations) SCADA operating platform (***currently on hold***)
- Upgrade treatment plant electrical infrastructure. (***project is nearing completion***)
- Upgrade aeration system by converting to fine bubble diffused air or similar system (**90% designed; awaiting funding with construction expected to begin in 2018**)
- Replacement/rehabilitation of the SBS (sodium bisulfite; removes chlorine prior to discharge) storage, distribution and feed system (**in design**)
- Upgrade grit removal facilities (**90% designed; awaiting funding with construction expected to begin in 2018*)***
- Secondary clarifier rehabilitation (**90% designed; project expected to commence by mid-2017)**
- Rehabilitation of 3 water distribution system (**currently on hold**)
- Upgrade plant street lighting and process area lighting (**has been added to the plant electrical project with completion expected by mid-2017)**
- Upgrade of plant security camera system (**has been added to the plant electrical project with completion expected by mid-2017)**
- Engineering evaluation of treatment plant site and grounds to eliminate storm water runoff (actually run on) from adjacent hillsides and properties (**project is underway with the objective of minimizing storm water flow to the treatment plant headworks which increases flow through the plant during heavy or prolonged rain events**)

Odors and H2S Alerts

Table 2.0 below shows the year over number of telephoned odor complaints to the treatment plant and call center from 2014 through 2016. Telephoned odor complaints have averaged about 20 over the past 4 years. That number includes 36 calls last year, nearly 60% percent where the cause was linked to nearby odor sources.

Table 2.0 **Richmond, CA WPCP**

Year	Number of Phoned in Odor Complaints
2016	36*, **
2015	12
2014	12

* 4 calls in March were related to a flaring event at a refinery

** 9 calls in September and 8 of 12 calls in October were associated with activities at the West County Landfill

Table 3.0 shows the total tabulated H2S alerts measured at the treatment plant North, South and Brickyard Cove H2S monitors from 2014 through 2016. H2S alerts increased at the South Fence in 2015 due largely to an active January attributable to a late start to the rainy season and minimum flushing of the sewers. The North and South Fence monitors were out of service for substantial portions of 2015 and early 2016. The Brickyard monitor was inoperable for much of 2016. These facts are due to aging of the equipment which was installed beginning in late 2011 to early 2012. City staff is moving toward contracting with an alternative vendor for this equipment and service. Hadronex, the current and past vendor for H2S monitoring is moving away from providing this type of service.

Table 3.0

H2S Alerts

	2016			2015			2014		
	North	South	Brickyard	North	South	Brickyard	North	South	Brickyard
December	0	0	0**	0**	OOS	OOS	0	1	OOS
November	1	3	OOS	OOS	OOS	OOS	5	7	0
October	1	0	OOS	OOS	OOS	0	0	2	OOS
September	2	1	0**	OOS	OOS	0	1	0	0
August	0	0	OOS	OOS	1**	0	1	1	0
July	0	0	0**	OOS	0	0	0	0	OOS
June	0	0	0	0**	0	0**	0	0	OOS
May	0	0	0	0**	1	0	0	1	OOS
April	1	OOS	0	0**	1	0	0	0	OOS
March	0	0**	OOS	OOS	3	0	0	0	OOS
February	OOS	0**	OOS	0	3	0	0	0	0
January	0	0	OOS	1	8	0	0	1	0
Total	**5**	**4**	**0**	**1**	**17**	**0**	**7**	**13**	**0**

OOS = meter out of service **** = 50% or less meter uptime for the month**

Only H2S alerts above the regulatory response threshold (30 ppb) are included

MAINTENANCE STATUS / REVIEW:

A tabulated work order summary for 2016 is provided below based on the preventative and corrective maintenance performed at the facilities by area.

Table 4.0 **Work Order Summary**

	Preventative Maintenance		Corrective Maintenance		Total	
	2016	**2015**	**2016**	**2015**	**2016**	**2015**
Storm Lift Stations	747	732	2	2	749	734
Sanitary Lift Stations	1155	1149	2	11	1157	1160
WWTP	958	983	33	82	991	1065
Total	**2860**	**2864**	**37**	**95**	**2897**	**2959**

Below in Table 6.0 are major maintenance expenditures made during 2016. The costs do not account for all maintenance expenditures; they are representative of major equipment replacement, maintenance or substantial overhaul. Veolia's contractual requirement for major maintenance expenditure is $60,000 annually.

Table 5.0 **2016 Richmond WPCP Major Maintenance and Projects**

Process Area	Project Description	Project Cost (Rounded)
VEOLIA FUNDED TREATMENT PLANT RELATED		
Chemical Feed	(3) New feed pumps	$25,000
Boiler System	Annual maintenance service and emissions testing	$5,000
Bar Screen	Purchase new brake assemblies for drive motor	$5,500
Influent Pump System	Purchase and install new VFD (variable speed drive)	$18,000
Primary Clarifier System	Repair chains and flights for # 2	$10,000
Primary Clarifier System	Purchase and install new helical skimmer	$10,000
Aeration Basin	Purchase of two new aerator fan blades	$25,000
Secondary System	Rebuild of one RAS pump and one TWAS pump	$15,000
Solids Handling	Rebuild kits for 2 transport pumps	$20,000
Digester Heating System	Rebuild heat exchanger	$5,000
Digester Gas System	Purchase and install new gas flow meter	$10,000

Dystor System	Rebuild air side pressure relief valves (PRVs)	$21,000
Dystor System	Semiannual cover Inspections (2X)	$25,000
General Plant	Replaced heater and ventilation in chemical feed	$10,000
General Plant	Facility painting	$8,000
General Plant	Connected 2 (potable) water and installed backflow preventer to feed digester boilers	$5,000
VEOLIA FUNDED COLLECTIONS SYSTEM RELATED		
Annex Lift Station	New PanelView HMI	$5,000
Lift Stations	Annual Emergency Generator Maintenance	$25,000
Fleet	Replace CCTV truck generator	$10,000
CITY FUNDED		
General Plant	Collections and operations staff room remodels	$75,000
Aeration Basin	Purchase and installation of 2 new gear boxes and drive shafts	$50,000
Headworks	Bar screen and compactor control upgrade	$25,000
Lift Station	Replacement pumps for Ferry Point	$43,000
Headworks and Grit Area	Wetwell, grit tank and storm basin cleaning	$100,000
	City Funded	**$293,000**
	Veolia Funded	**$257,500**
	Total	**$550,500**

Table 6.0 **2017 Preliminary Planned Procurement and Maintenance Projects**

2016 Planned Projects	
Complete rebuild of bar screen	Annual lift station pump inspections
Replace all failed plant doors and frames	Digester gas flow meter installation
Scum auger rebuild and motor/gear drive replacement	Replace Marina Bay lift station pumps with non-clogging type pumps
Primary clarifier chain/flight drive replacement	Replace plant security camera system
Annual plant (2) and lift station (18) emergency generator maintenance	Purchase Dystor critical spares
Primary sludge pumps rebuild	1 scum pump replacement (w/new)
RAS pump rebuild	PVRB rebuild
Lift station communications upgrades	Ferry Point L/S pump installation
Annual boiler maintenance service/emissions testing	Lift station communications upgrades
Install new air relief valve at Southwest Annex P/S	

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2017 Goals

- Continue to develop robust inventory of critical spares based on maintenance analysis supported by Veolia's West Region asset management group. Also develop accurate storeroom inventory tracked through CMMS.
- Train maintenance personnel to generate and close work orders in CMMS

VEOLIA CAPITAL PROJECTS MANAGEMENT (CPM):

Achievements in 2016

CPM is the construction arm of Veolia Water responsible mainly for capital projects and providing the construction management function for those improvements. Following are the improvements and projects status for 2016;

- Began construction of Treatment Plant Electrical Upgrade Project
- Completed 5 Year Treatment Facility Plan (CIP) and 90% design of critical treatment plant projects (Headworks Grit System replacement, Aeration Basin Rehabilitation and Conversion and Secondary Clarifier Rehabilitation)
- Mathieu Court Sewer Replacement Project – 610' of sewer pipeline was replaced along with 30 laterals
- Project staff and Veolia's CPM (Capital Projects Management) group using VW Housen & Associates developed list of 6 major sewer rehab projects consistent with guidelines in the Sanitary Sewer Master Plan. Focus is repairing/replacing old pipe and also to provide solutions to several areas with local capacity problems within the sewer network (and result in repeat sewer overflows during heavy rain events and high flow conditions). Design work included the following; 90% design of 13th Street Capacity Improvement Project; 90% design of 23rd Street Sewer Replacement Project and began design of Cutting, Carlson, and Hoffman Boulevard sewer projects.
- Completed National Court Storm Water Pipe Replacement Project
- Completed 35th and Bissell Urgent Repair; the pipe underneath the playing field next to the school at 35th and Bissell was in poor condition and needed rehabilitation
- Completed Port of Richmond and W. Nevin Force Main Emergency Repairs (Ghilotti Brothers)
- Completed 33rd and Leona Urgent Repair

LABORATORY STATUS / REVIEW:

Achievements in 2016

- Laboratory participated successfully in the State Proficiency Testing for Laboratory QA/QC.
- Veolia Richmond continues to upload both Self-Monitoring Reports and Discharge Monitoring Reports into the CIWQS database for electronic submittal to the State and to the Regional Water Quality Control Board.
- Laboratory data is managed through the Veolia Corporate standard Hach WIMS program.
- Utilizing the on-site and contract laboratories, staff completed all National Pollutant Discharge Elimination System (NPDES) permit required sampling and analyses.
- Laboratory continued to meet the recently imposed nutrient monitoring and reporting requirements
- Laboratory staff provided support to the operations group for continued process control, unscheduled high flow events and odor monitoring.
- Veolia Richmond project laboratory analyzed 1,668 compliance samples and 8,188 process control samples.
- Continued to meet requirements for Environmental Laboratory Accreditation Program certification for applicable analyses
- Laboratory staff continued to implement and comply with Veolia's corporate internal quality control/quality assurance program.

Goals for 2017

- New laboratory floor
- Preparation to meet new state environmental laboratory certification requirements
- Work with City's IPP (industrial pretreatment program) personnel to evaluate possible integration of staff to the treatment plant site
- Rotate and cross train select operations and lab staff between the two departments

SANITARY SEWER AND STORM WATER SYSTEM STATUS/REVIEW:

2016 Department Goals and Objectives

2016 marked the 13th year that Veolia Water operated and maintained the City of Richmond's 195 miles sanitary sewer collection system, lift stations and storm water assets. A significant organizational change was implemented to the collections staff in 2016. That change involved transitioning one of the collections maintenance technician positions into a 50/50% data analyst and working field position. This individual is responsible for assisting the (sewer) collections and

management teams with data validation, clean up and management. The work is focused on sewer CCTV and cleaning records. Additionally, the following primary goals continue to guide Veolia's efforts in the operation and management of the City of Richmond's sanitary and storm water collection systems and requires working closely with City staff:

- Minimize the number of non-capacity related sanitary sewer overflows (SSO's) by focused O&M efforts.
- Focus on continual improvement to customer satisfaction through quick response times, effective and regular face to face interactions, and prompt follow-up.
- Protect public and employee health, environmental quality and property from SSOs and related hazards
- Protect the City's sanitary sewer system assets by appropriate and effective maintenance and repair and replacement activities.
- Implement Sewer System Management Plan for sanitary collection system O&M
- Maintain well developed, effective and well defined cleaning/CCTV plans and schedules for sanitary and storm systems based on asset needs and equitable resource allocation.
- Continue to implement quality assurance processes to validate sewer cleaning methods
- Encourage and to incentivize staff to increase their CWEA certification levels and various other job skills

Sanitary System

Tables 7.0 and 8.0 below indicate the number and volume of overflows from the engineered overflow structures (weirs) at Harbor and Wright and Boat Ramp between 2015 and 2016. In late 2015 enhanced remote overflow monitoring instrumentation was installed at Harbor and Wright. The instruments indicated that sewage could flow out of the structure into the storm system and storm water could also flow back into the sanitary sewer under certain tidal conditions. As a result, inflatable bladders were installed in the structure to prevent the two types of water from flowing one way or the other.

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Table 7.0 **SSO from Engineered Overflow Structure**

2016 Harbor and Wright Overflow			
Date of Spill	**Gallons spilled**	**Start time**	**End time**
	0		
2015 Harbor and Wright Overflow			
Date of Spill	**Gallons spilled**	**Start time**	**End time**
	0		

2016 Boat Ramp Overflow			
Date of Spill	**Gallons spilled**	**Start time**	**End time**
	0		
2015 Boat Ramp Overflow			
Date of Spill	**Gallons spilled**	**Start time**	**End time**
	0		

Table 9.0 below shows SSO occurrences in 2015 and 2016. The Baykeeper Settlement of 2006 set SSO reduction goals and included a target SSO limit of 10 for the 2016 calendar year.

SSOs were skewed heavily during 2016 with 37 in the wet season and 9 in the dry season. A high percentage of SSO incidents (80%) occurred in the first and fourth quarter due to very heavy rains in January, March and again in December. Essentially all wet weather related SSOs occurred in a four day span. Wet weather/capacity related SSOs occur in areas of the system that have insufficient capacity to convey sewage when infiltration from extended or heavy rains increases the flow within the sewer pipes. Additionally, the high flows tend to mobilize solids (grease, rags, sediment etc.) in the sanitary sewers and those materials are redeposited in other areas when the flows subside. This action sometimes results in a higher frequency of SSOs following rainy periods (independent of capacity).

During dry weather, infrastructure issues (pipe failure due to age or pipe settling creates offsets in joints) or blockages (caused by grease build-up, rags, intruding lateral connections or tree roots, for example) predominate as the primary cause of SSOs.

Table 9.0

		Sanitary Sewer Overflow Statistics			
	Q1 (January – March)	Q2 (April – June)	Q3 (July - Sep)	Q4 – (October – November)	
2016	22	7	2	15	**46**
2015	4	3	8	6	**21**
Reduction/Increase	550%	233%	-75%	250%	**219%**
2016 Baykeeper Target	**2.5**	**2.5**	**2.5**	**2.5**	**10**
2015 Baykeeper Target	**4**	**4**	**4**	**4**	**16**
2016 SSO Percentage	Wet Season	80.4	Dry Season	19.6	
2015 SSO Percentage	Wet Season	48	Dry Season	52	
2016 SSO Type	**Number**	**Total Volume**	**% Volume to Surface Water**		
Capacity – Wet Weather	37	626,674	**100**		
SSOs - Other Causes	9	28,908	**93**		
Volume Reaching Surface Waters from Non Capacity/Wet Weather Causes			**26,877**		

Volumes Presented in Gallons
Wet Season = Q1 and Q4 **Dry Season = Q2 and Q3**

Program Metrics and Achievements

- Lead and supervisory members of the collections O&M staff maintained their PACP (Pipeline Assessment & Certification Program) certifications.
- Collections O&M staff and management participate in relevant California Water Environment Association (CWEA) and Bay Area Clean Water Agencies (BACWA) activities.
- Collection Technicians attend CWEA classes to prep for Grade 1, 2 & 3 certification tests. Three Technicians upgraded their certifications from Grade 1 to Grade 2 and two Technicians upgraded their certifications from Grade 2 to Grade 3 in 2016.
- Collections staff participated in daily morning safety meetings and review of daily accomplishments to share with management and the rest of the staff. This sharing of information develops growth in each individual and prevents redundancy in our tasks to improve group overall productivity.
- The collections department responded to 188 sanitary customer calls during 2016 as well as assisting with responses and requests from other City departments.

- The collections crew cleaned 90.4 miles of sewer pipeline as part of the underground preventative maintenance program during 2016.
- Televised (or CCTV) 20.6 miles of the sewer system during 2016.
- Completed 220 manhole inspections in 2016
- Completed 20 point repairs and 13 manhole repairs to the sanitary sewer collection system in 2016.
- In 2016 about $162,000.00 was spent on point repairs in the sanitary sewer system.
- Currently, nine Smart Cover monitors are installed in various locations within the City of Richmond sewer service area. The monitors allow for remote level monitoring of key locations known to have capacity or periodic blockage issues increasing the potential for SSOs.
- Veolia Collection System staff efficiently and effectively responded to 25 Wet and 21 Dry weather SSOs in 2016; thirty four (35) Category 1 and eleven (11) Category 3 events.
- Staff contracted root foaming on street and easement sewer lines totaling 42,220 ft. to reduce potential SSOs caused by roots. This is a 61% increase of lines treated over 2015.
- In 2016 staff made 10 sanitary sewer point repairs to eliminate sinkholes (caused by the defective underground pipes). Due to heavy rains starting in November 2016, staff has bundled 6 additional repairs to resolve sinkholes.
- Worked with City IPP staff to install 120 storm drain trash/litter screens in strategic locations in the City

Recommendations

- Continue developing and execute plan to resolve capacity related SSOs within two (2) years.
- Bundle and execute repairs to correct defects linked to past SSOs in the collection system whether it be sewer line replacement/lining, point repairs or manhole rehabilitation.
- Continue to resolve areas with maintenance access issues. No Change.

Storm Water System

The City of Richmond storm system includes various features provided in Table 9.0 below. The system is vast and the currently known list of assets and their scale are greater than understood when Veolia began work in Richmond in 2004. In recent years, the addition of duck bills, flap gates and trash capture devices has expanded the asset list. Portions of the City's storm water collection system are located in unincorporated parts of the area away from the City core serviced by the sanitary sewer. The storm water system is roughly constructed in many areas with easements and aspects that are much more loosely defined and less understood than the sanitary sewer system.

In 2016 one of the Collections Maintenance Technician positions was changed to a Lead Storm Water Maintenance Technician. An existing employee was promoted to fill this position. The objective of this change was to designate one person to focus and track all storm water related work in the system.

Table 9.0

Storm Mainlines	142 miles
Storm Manholes	1685
Pump Stations	8
Flap Gates/Duck Bills	12
Corrugated Metal Pipes	5 miles
Overflow Weirs	2
Catch Basins	1529
Ditches	7 miles
Concrete Swales	12 miles
Storm Edges	11 miles
Infiltration Basins	4
Storage vaults,	4
Drop Inlets	1175
Trash Inserts (small)	125
Trash Inserts (large) GZRD'S	2
Curb Inlets	1834
Pipe Culverts	2 miles
Retention Basins	0
Outfalls	127
End walls	12
Inlets	222
Sluice Gates	11
Detention Basins	18
Treatment Vault	1

Veolia's storm water O&M strategy, developed with City staff, is focused on maintaining the storm water drainage facilities based on available resources using a blended approach. The approach combines visual inspections and cleaning and televising programs utilizing performance measures (non-numerical, for example CCTV work for one week of every month) and metrics that can be evaluated based on targeted numeric values (for example number of inspections or total linear feet cleaned).

The operations and maintenance strategy is geared towards mitigating flooding issues, reducing storm water calls, reducing risk property damage from flooding and also protecting public health and safety. The objective for televising storm pipes is to investigate and understand connectivity issues and to determine how various pipe segments fit together and convey storm water.

Recommendations

Develop and formalize a plan for necessary inspection and maintenance activities related to storm drain outfalls, duckbills, and flap gates.

2016 Accomplishments

- Cleaned 129 catch basins, culverts and ditches.
- 7 point repairs were made to the storm water collection system.
- Cleaned 3,859 ft. of storm conveyance system.
- Televised 13,868 ft. of storm pipeline.
- Responded to 96 storm related service calls.
- The Maintenance team completed 747 storm pump station PM activities and 2 corrective maintenance activities
- Inspected duckbills and flap gates (designed to prevent seawater from backing up into the storm or sanitary sewers).
- Inspected and cleaned the GSRDs (trash capture devices) 9 times in 2016.
- Staff continues to work on connectivity issues in order to further define the storm system.
- Staff is continuously working on completing tasks based storm water performance measures and other projects that arise.
- Due to a landslide at Rifle Range Road we slip lined the existing 15 inch corrugated metal pipe by replacing it with 100 feet of HDPE 12 inch pipe, and continued the pipeline for 460ft above ground to convey storm waters in rain events from Wildcat Canyon Rd to the East Bay Regional Parks emergency fire road daylighting into Wildcat Canyon Creek.
- Kinder Morgan located on Canal Blvd had an oil diesel spill from their above ground tanks that day lighted in a 30 inch storm outfall directly into the Bay. We sealed 60 storm joints to mitigate contaminated ground water leakage out to the Bay.
- Installed vented manholes at Boat Ramp off of Cutting Blvd to reduce flooding at the HWY 580 southbound off ramp at Canal Blvd.

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COMMUNITY:

- Member Richmond Council of Industries.
- Member East Bay Leadership Council
- Member Point Richmond Business Association
- Member of the Richmond Chamber of Commerce.
- Responded to odor complaint calls and treatment plant fence line monitor H2S alerts (and provided findings via letter or e-mail)
- Attended periodic Point Richmond Neighborhood Council.

SPONSOR/DONOR:

- YMCA of the East Bay
- Bay Area Clean Water Agencies (BACWA)
- Bay Area Consortium of Water and Wastewater Educators (BACWWE)

Continue paid OIT/Intern Program which employs two Richmond residents in rotating either wastewater operations or other relevant training for up to a year and a half. At the end of the training program the employees are expected to hire on to the Veolia Richmond project or, by virtue of experience and certification earned, be eligible for employment in the field of wastewater treatment operations with other agencies.

PROJECT SUPPORT STATUS / REVIEW:

Veolia Staff:

Sachin Chawla	Vice President of Operations, Northern California
Ed Dix	Process Control Management Plan
John O'Hare	Process Control, Laboratory and Regulatory Specialist
Jeremiah Danielson	Veolia Water West Operating Services, Inc. Environmental Health & Safety Manager
Dennis Flosi	Instrumentation, Controls and SCADA/PLC
Tanya Barber	Human Resources

OPERATOR CERTIFICATION STATUS / REVIEW:

Facility: Wastewater Treatment Plant Contract Operator – Registration Number CO - 0010

Staff

Aaron Winer – Project Manager
Grade V Wastewater Treatment Plant Operator Certificate # 9895
Grade I, Laboratory Analyst, Certificate, # - 00013118
Grade IV, Environmental Compliance Inspector, Certificate # - 050744001
Grade II Industrial Waste Treatment Plant Operator, Certificate # - 244

Russ Clifton – Assistant Project Manager; Chief Plant Operator
Grade lV Wastewater Treatment Plant Operator, Certificate # 4084
Grade lll Water Distribution Operator

Aloke Vaid – Operations Manager; Operator in Training

Reese P. Corcoran - Grade V Wastewater Treatment Plant Operator, Certificate # 8704

James M. York – Grade V Wastewater Treatment Plant Operator, Certificate # 8726

Zane Foy – Grade II Wastewater Treatment Plant Operator, Certificate # 9972
Grade T1 Water Treatment Operator, Operator # 30879
Grade II Industrial Waste Treatment Plant Operator, Certificate # 02078203

James Beirn – Grade II Wastewater Treatment Plant Operator, Certificate # 40050

Evelyn Christian – Grade II Wastewater Treatment Plant Operator, Certificate # 41813

Malcolm White – Operator in Training

Kevin Barricklow - Operator in Training