

# Union County Government

EST. 1842



## Union County, NC Department of Public Works Wastewater System Performance Summary Fiscal Year 2016-2017

### Wastewater Plants

Twelve Mile Creek WRF - NC0085359  
Crooked Creek WRF - NC0069841  
Olde Sycamore WRF – WQ0011928  
Tallwood WWTP – NC0069523  
Grassy Branch WWTP – NC0085812  
Hunley WWTP – NC0072508

### Collection System

WQCS00054

### BioSolids - Land Application

WQ0007486 - NCDEQ  
ND0089004 - SCDHEC



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## Dear Customer,

We are proud to share this year's Annual Wastewater System Performance Summary with you. This report outlines last year's wastewater treatment efforts. Included are details about your treatment facilities, collection system performance, and how it compares to standards set by regulatory agencies.

Wastewater is all the water that leaves the inside of your home or business through sinks, toilets, washing machines, etc. and enters Union County's wastewater (sewage) collection system. Wastewater then flows through pipes into the County's regional sewage system, where it is treated to meet federal and state water quality standards.

We have a responsibility to manage our water resources in a sustainable manner to ensure there is sufficient water and its quality is protected. While we are committed to conserving resources and protecting the environment through wastewater treatment, this can only occur if it is done in a safe manner. Protection of public health and safety is, and must remain, our first priority. We are proud of our achievements to date, but we aim to constantly improve the way we manage the wastewater generated by our residents.

If you have any questions about this report or concerning your water, please contact me at 704-296-4215. If you want additional information, please visit our website at [www.co.union.nc.us](http://www.co.union.nc.us).

Sincerely,  
Andrew Neff, P.E.  
Water & Wastewater Division Director  
Union County Public Works  
500 North Main Street  
Monroe, NC 28112



### ***Public Works' Vision Statement:***

We are recognized for providing exemplary service through the engagement of our employees in the efficient and effective management of our assets and resources.

## **1.0 INTRODUCTION**

House Bill 1160, the Clean Water Act of 1999, was ratified by the North Carolina General Assembly on July 20, 1999 and signed into law by the Governor on July 21, 1999. This legislation placed significant reporting requirements on entities that own or operate wastewater systems. This Performance Summary is intended to establish compliance with this rule.

Union County Public Works (UCPW) is charged with the management, operation and maintenance of the County's sanitary sewer system. During the 2016-17 fiscal year the wastewater system was comprised of 5 active wastewater treatment plants (WWTP), 70 wastewater pumping stations, and over 650 miles of pipe with 35,070 connections. In addition to the 5 WWTPs which have a combined rated treatment capacity of 8.15 million gallons per day (MGD), the County, through contractual agreement, has 2.65 MGD and 3.0 MGD of purchased capacity at the City of Monroe WWTP and Charlotte's McAlpine Creek WWTP respectively.



## **2.0 DEFINITIONS**

For the purposes of this Performance Report the following definitions apply:

- **Aerobic** – A condition in which atmospheric or dissolved molecular oxygen is present in the aquatic environment.
- **Automatic Telephone Dialer or ATD** – A device connected to the telephone system that will call programmed telephone numbers to alert people of equipment status.
- **Biological Nutrient removal** – The process of removing nitrogen and phosphorus from wastewater using biological processes as opposed to chemical means.
- **Biosolids** – A primarily organic solid product, produced by wastewater treatment processes that can be beneficially recycled. The word *biosolids* replaces the word *sludge*.
- **BOD – Biochemical Oxygen Demand** – The rate at which organisms use the oxygen in water or wastewater while stabilizing decomposable organic matter under aerobic conditions. The BOD Test is a procedure that measures the rate of oxygen use under controlled conditions of time and temperature. BOD is typically used to express the “strength” of wastewater.
- **CL<sub>2</sub> – Chlorine Residual** – The amount of chlorine present in the final effluent after disinfection. Typically measured in micrograms per liter or milligrams per liter.
- **D.O. – Dissolved Oxygen** – Molecular (atmospheric) oxygen dissolved in a liquid.
- **Effluent** – Treated wastewater flowing from the treatment system.
- **Extended Aeration** – A type of wastewater treatment facility in which the wastewater is retained and treated for a minimum of 24 hours at design flow before discharge occurs.
- **Impeller** - A rotating set of vanes in a pump designed to pump or lift water.
- **Inflow and Infiltration (I&I)** - Extraneous water that enters the sanitary sewer system through openings and/or defects in the collection system.
- **Fecal Coliform** – The coliform (bacteria) found in the feces of warm blooded animals. The presence of coliform-group bacteria is an indication of possible pathogenic bacterial contamination.
- **MGD – Million Gallons per Day** – Volumetric measurement of flow converted to millions. Example 150,000 gallons per day (gpd) / 1,000,000 = 0.150 MGD.
- **NH<sub>3</sub> – Nitrogen as Ammonia** – A compound found naturally in wastewater. The compound is produced by the deamination of organic nitrogen containing compounds
- **NPDES Permit – National Pollutant Discharge Elimination System - Permits**, required by the Federal Water Pollution Control Act Amendments of 1972, which regulate discharges to surface waters.
- **pH** – The expression of the intensity of the basic or acidic condition of a liquid.
- **Pump Station** – A holding tank with pumps that forces wastewater uphill when flow by gravity is not possible.
- **Reclaimed Water** – Highly treated wastewater that has undergone advanced treatment processes to remove solids, organics, and pathogens meeting the State’s Health and Safety Standards for Beneficial Re-use.
- **SCADA** – Acronym for “*supervisory control and data acquisition*”, a computer system for gathering and analyzing real-time data.
- **SBR – Sequencing Batch Reactor** – A type of wastewater treatment facility that treats and discharges water in batches as opposed to continuous flow.
- **SSO** – Acronym for “**sanitary sewer overflow**”
- **Telemetry** – A system by which information pertaining to remote equipment status is transmitted via radio waves to a central location.
- **TSS – Total Suspended Solids** – Particles suspended in a liquid.
- **Turbidity** – The measurement of the clearness or cloudiness of a liquid.



### **3.0 SYNOPSIS OF WASTEWATER TREATMENT FACILITIES (Fiscal Year 2016-2017)**

During the 2016-17 fiscal year the Department of Public Works operated and maintained a total of five (5) active wastewater treatment facilities and maintained one (1) inactive facility. Although each Permit requires facility visitation daily, excluding weekends and holidays, Public Works' wastewater treatment facilities are checked 7 days per week, 365 days per year. All treatment facilities are equipped with emergency back-up power generators. In addition to SCADA, each facility has both audible and visual trouble alarms. Wastewater treatment plant staff rotate "call duty" for after hour situations that may arise.

A brief overview of each facility and a performance summary table for each facility is provided herein.

#### **3.1 Twelve Mile Creek Water Reclamation Facility**

Permit No. NC0085359. Twelve Mile Creek WRF is an extended aeration facility utilizing biological nutrient removal and tertiary filtration. Disinfection is accomplished via UV (ultraviolet light). Twelve Mile effluent is discharged into Twelve Mile Creek, which is part of the Catawba River Basin. The facility is permitted to discharge up to 6.0 MGD of treated wastewater. Twelve Mile Creek WWTP is located at 8299 Kensington Drive and serves Waxhaw as well as portions of Indian Trail, Stallings and Weddington. Please refer to Table 3-1.

#### **3.2 Crooked Creek Water Reclamation Facility**

Permit No. NC0069841. Crooked Creek WRF is an extended aeration facility utilizing tertiary filtration. Disinfection is accomplished via UV (ultraviolet light). Crooked Creek effluent is pumped over 17,000 feet to discharge into the North Fork Crooked Creek which lies in the Yadkin Pee Dee River Basin. This facility is permitted to discharge up to 1.9 MGD of treated wastewater. Crooked Creek is located at 4015 Sardis Church Road and serves the Indian Trail, Lake Park and Stallings areas. Please refer to Table 3-2.

#### **3.3 Hunley Creek Wastewater Treatment Plant**

Permit No. NC0072508. The facility was taken out of service May 10, 2006, via a flow diversion project and remains inactive. Hunley Creek is located at 6913 Stevens Mill Road. Due to "Inactive Status" of the Hunley Creek WWTP, there was no data to report to Table 3-3 for fiscal year 2016-2017.

#### **3.4 Olde Sycamore Water Reclamation Facility**

Permit No. WQ0011928. Olde Sycamore is an extended aeration facility with tertiary filtration. Disinfection is accomplished via UV (ultraviolet light). This facility is permitted to discharge up to 0.150 MGD (150,000 per gallons per day) of treated wastewater. Olde Sycamore was "up-fitted" in early 2012 to improve operating efficiency (reduced electrical consumption) by implementing usage of fine-bubble diffused aeration versus the former "coarse-bubble" aeration. Olde Sycamore serves the Olde Sycamore Golf Community located off Highway 218 and Rock Hill Church Road. Olde Sycamore effluent is discharged to a man-made impoundment from which it is then pumped onto the Olde Sycamore Golf Course as a source of irrigation. Please refer to Table 3-4.

#### **3.5 Tallwood Estates Wastewater Treatment Plant**

Permit No. NC0069523. Tallwood is an extended aeration facility with tertiary filtration. Disinfection is accomplished via UV (ultraviolet light). This facility is permitted to discharge up to 0.05 MGD (50,000 gallons per day) of treated wastewater. Tallwood plant was replaced in 2013 with a new facility. Tallwood is located within and serves the Tallwood Subdivision off Brief Road and Belk Boy Scout Camp. Tallwood effluent is discharged to Clear Creek, which lies in the Yadkin Pee Dee River Basin. Please refer to Table 3-5.

#### **3.6 Grassy Branch Wastewater Treatment Plant**

Permit No. NC0085812. Grassy Branch is an extended aeration facility with tertiary filtration. Disinfection is accomplished via UV (ultraviolet light). This facility is permitted to discharge up to .05 MGD (50,000 gallons per day) of treated wastewater. Grassy Branch is located at 1629 Old Fish Road and currently serves the Unionville Elementary, Piedmont Middle and Piedmont High School as well as one individual residence, Loxdale Farms Subdivision, and Smith Field Subdivision. Grassy Branch effluent is discharged to Crooked Creek which lies in the Yadkin Pee Dee River Basin. Please refer to Table 3-6.





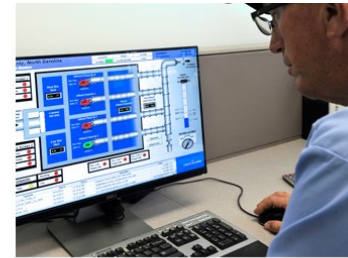
**TABLE 3-1**

**Twelve Mile Creek Water Reclamation Facility  
NPDES Permit #: NC0085359  
Fiscal Year: 2016-2017 Effluent Limits and Performance**

PARAMETER	LIMIT	JUL '16	AUG '16	SEP '16	OCT '16	NOV '16	DEC '16	JAN '17	FEB '17	MAR '17	APR '17	MAY '17	JUN '17
<b>FLOW</b>	<b>6.0 MGD</b>	3.74	3.85	3.91	4.01	3.67	3.18	4.32	3.56	3.66	4.02	3.95	4.18
<b>pH</b>	<b>6-9 SU</b>	7-7.8	7.2-7.5	7.2-7.6	6.6-7.5	6.8-7.3	6.8-7.4	6.7-7.1	6.7-7.3	6.8-7.4	6.8-7.4	6.7-7.6	6.7-7.6
<b>BOD<sub>5</sub></b>	<b>5 mg/l</b>	0.98	0	0.11	0	-	-	-	-	2.04	2.33	1.02	0.35
<b>SUMMER (APR.1 - OCT.31)</b>													
<b>WINTER (NOV.1 - MAR.31)</b>	<b>10 mg/l</b>	-	-	-	-	0.16	0.53	0.94	1.71	-	-	-	-
<b>AMMONIA NITROGEN</b>	<b>1 mg/l</b>	0.04	0.07	0.23	0.09	-	-	-	-	0.087	0.268	0.031	0.495
<b>SUMMER</b>													
<b>WINTER</b>	<b>2 mg/l</b>	-	-	-	-	0.27	0.24	0.60	0.45	-	-	-	-
<b>TOTAL SUSPENDED RESIDUE</b>	<b>30 mg/l</b>	0.54	0	0	0.14	0	.046	0.70	0.66	0.32	0.83	0	0.13
<b>FECAL COLIFORM</b>	<b>200/100 ml</b>	15.6	6.8	28.6	11.7	11.8	17.1	7.0	1.8	13.6	7.9	2.1	3.7
<b>DISSOLVED OXYGEN</b>	<b>≥ 6 mg/l</b>	8.11	8.02	8.11	8.59	8.87	9.33	9.42	9.37	9.41	8.95	8.73	8.36
<b>TOTAL PHOSPHOROUS - Maximum Month</b>	<b>41.7 #/day</b>	9.01	4.18	0.81	2.28	4.05	2.51	4.24	3.30	4.75	6.04	0.61	1.67
<b>TOTAL PHOSPHORUS – 12 Month Rolling Average</b>	<b>20.85 #/day</b>	12.58	10.89	10.24	9.58	8.27	7.54	5.45	4.47	3.80	4.04	3.96	3.62

**Permit Violations:**

There were no permit limit violations at this facility in FY17



**TABLE 3-2**

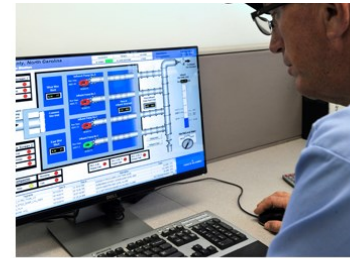
**Crooked Creek Water Reclamation Facility  
NPDES Permit #: NC0069841  
Fiscal Year: 2016-2017 Effluent Limits and Performance**

PARAMETER	LIMIT	JUL '16	AUG '16	SEP '16	OCT '16	NOV '16	DEC '16	JAN '17	FEB '17	MAR '17	APR '17	MAY '17	JUN '17
<b>FLOW</b>	<b>1.900 MGD</b>	0.869	0.826	0.875	0.930	0.780	0.836	1.304	0.789	0.850	1.015	0.981	1.177
<b>pH</b>	<b>6-9 SU</b>	7-7.9	6.7-7.6	6.4-7.6	7.1-8.1	7.1-7.8	6.99-7.5	7.1-7.7	7-7.6	7-7.4	6.7-7.4	6.6-7.2	6.6-7.5
<b>BOD<sub>5</sub></b>													
<b>SUMMER (APR.1 - OCT.31)</b>	<b>5 mg/l</b>	10.17	0.30	1.45	0.14	-	-	-	-	-	2.66	0.39	0.15
<b>WINTER (NOV.1 - MAR.31)</b>	<b>10 mg/l</b>	-	-	-	-	0	10.36	0.62	05.1	0.78	-	-	-
<b>AMMONIA NITROGEN</b>													
<b>SUMMER</b>	<b>2 mg/l</b>	0.51	0.92	0.013	0.012	-	-	-	-	-	0.036	0.024	0.011
<b>WINTER</b>	<b>4 mg/l</b>	-	-	-	-	0.014	0.16	0.68	0	0	-	-	-
<b>TOTAL SUSPENDED RESIDUE (TSS)</b>	<b>30 mg/l</b>	33.2	0.50	4.12	0.39	0	21.7	1.68	0.52	0	4.89	1.64	0.63
<b>FECAL COLIFORM</b>	<b>200/100 ml</b>	6.2	2.9	9.6	1.6	2.8	2.6	3.8	5.3	5.1	14.6	7.7	25.1
<b>DISSOLVED OXYGEN</b>	<b>≥ 6 mg/l</b>	7.72	7.6	7.99	8.72	9.14	9.67	10.01	9.67	9.73	9.12	8.68	8.33

Permit Violations:

In July there is a weekly average limit violation for both BOD and TSS. This has resulted in a monthly average violation of the BOD limit in July also.

In December there are weekly average violations for both BOD and TSS. This resulted in a monthly average violation for BOD. The TSS average for the month was in compliance.



**TABLE 3-3**

**Hunley Creek Wastewater Treatment Plant  
NPDES Permit #: NC0072508  
Fiscal Year: 2016-2017 Effluent Limits and Performance**

PARAMETER	LIMIT	JUL '16	AUG '16	SEP '16	OCT '16	NOV '16	DEC '16	JAN '17	FEB '17	MAR '17	APR '17	MAY '17	JUN '17
FLOW	0.231 MGD	<p><b>Hunley Creek WWTP is currently not in service. This facility was listed as inactive as of May 2006; therefore, there is no data reported for this fiscal year</b></p>											
pH	6-9 SU												
Cl <sub>2</sub>	20 ug/l												
BOD <sub>5</sub>	5 mg/l												
SUMMER (APR.1 - OCT.31)	5 mg/l												
WINTER (NOV.1 - MAR.31)	10 mg/l												
AMMONIA NITROGEN	2 mg/l												
SUMMER	2 mg/l												
WINTER	4 mg/l												
TOTAL SUSPENDED RESIDUE	30 mg/l												
FECAL COLIFORM	200/100 ml												
DISSOLVED OXYGEN	≥ 5 mg/l												
No violations for fiscal year													





**TABLE 3-4**

**Olde Sycamore Water Reclamation Facility  
NPDES Permit #: WQ0011928  
Fiscal Year: 2016-2017 Effluent Limits and Performance**

PARAMETER	LIMIT	JUL '16	AUG '16	SEP '16	OCT '16	NOV '16	DEC '16	JAN '17	FEB '17	MAR '17	APR '17	MAY '17	JUN '17
<b>FLOW</b>	<b>0.150 MGD</b>	0.042	0.040	0.038	0.040	0.050	0.055	0.053	0.044	0.045	0.040	0.049	0.049
<b>pH</b>	<b>6-9 SU</b>	6.7-7.5	6.6-7.3	6.6-7.3	6.7-7.4	6.8-7.2	6.7-7.4	6.7-7.2	6.5-7.2	6.5-7.3	6.2-7.0	6.3-7.4	6.7-7.3
<b>BOD<sub>5</sub></b>	<b>10 mg/l</b>	0	0.0	0	0	0	0	1.6	5.4	0	0	1.5	0
<b>AMMONIA NITROGEN</b>	<b>4 mg/l</b>	0	0.00	0	0.07	0.90	0	0.11	0.40	0	0.12	0	0
<b>TOTAL SUSPENDED RESIDUE</b>	<b>5 mg/l</b>	0	1.6	0	0	0	0	0	0	0	0	0	0
<b>FECAL COLIFORM</b>	<b>14/100 ml</b>	1	1	1	1	1	1	1	1	1	1	1	1
<b>TURBIDITY</b>	<b>≤ 10 NTU</b>	0.3	0.3	0.6	0.4	0.7	1.9	3.8	2.8	0.9	1.9	3.0	0.3

Permit Violations:

There were no permit limit violations at this facility in FY17



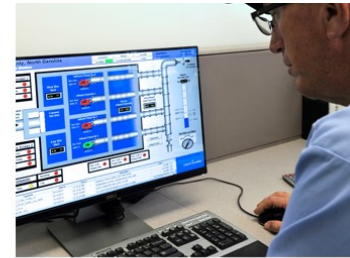
**TABLE 3-5**

**Tallwood Estates Wastewater Treatment Plant  
NPDES Permit #: NC0069523  
Fiscal Year: 2016-2017 Effluent Limits and Performance**

PARAMETER	LIMIT	JUL '16	AUG '16	SEP '16	OCT '16	NOV '16	DEC '16	JAN '17	FEB '17	MAR '17	APR '17	MAY '17	JUN '17
<b>FLOW</b>	<b>0.050 MGD</b>	0.022	0.019	0.020	0.025	0.016	0.015	0.033	0.017	0.010	0.030	0.026	0.026
<b>pH</b>	<b>6-9 SU</b>	6.8-7.6	7-7.6	6.86-7.72	7-7.6	7-7.58	7.03-7.8	6.8-7.69	6.71-7.74	7.2-7.6	7-7.6	7.1-7.7	7.1-7.6
<b>BOD<sub>5</sub></b>													
<b>SUMMER (APR 1-OCT 31)</b>	<b>5 mg/l</b>	1.3	0	0	0	0	-	-	-	-	0	0	0
<b>WINTER (NOV.1 - MAR.31)</b>	<b>10 mg/l</b>	-	-	-	-	-	1.88	0.70	4.4	1.8	-	-	-
<b>AMMONIA NITROGEN</b>													
<b>SUMMER</b>	<b>2 mg/l</b>	0	0	0.095	1.35	0.33	-	-	-	-	0	0	0
<b>WINTER</b>	<b>4 mg/l</b>	-	-	-	-	-	0.78	0	0.088	0	-	-	-
<b>TOTAL SUSPENDED RESIDUE</b>	<b>30 mg/l</b>	6.2	0	0	0	0	1.23	1.78	2.25	0	0	0.62	-
<b>FECAL COLIFORM</b>	<b>200/100 ml</b>	8.9	1.2	1	1	1	1	1	1.5	1	1.8	1.2	1
<b>DISSOLVED OXYGEN</b>	<b>≥ 6 mg/l</b>	6.87	6.97	7.30	7.92	7.88	7.52	8.35	8.00	8.31	8.20	7.73	7.93

Permit Violations:

There are no permit limit violations at this facility in FY17



**TABLE 3-6**

**Grassy Branch Wastewater Treatment Plant  
NPDES Permit #: NC0085812  
Fiscal Year: 2016-2017 Effluent Limits and Performance**

PARAMETER	LIMIT	JUL '16	AUG '16	SEP '16	OCT '16	NOV '16	DEC '16	JAN '17	FEB '17	MAR '17	APR '17	MAY '17	JUN '17
<b>FLOW</b>	<b>0.050 MGD</b>	0.019	0.030	0.037	0.040	0.026	0.034	0.073	0.038	0.039	0.045	0.052	0.047
<b>pH</b>	<b>6-9 SU</b>	7-8	6.56-7.82	6.3-7.75	6.6-7.8	6.5-7.62	6.67-7.85	6.51-8.23	6.68-7.75	6.75-7.91	6.2-8	6.6-8.8	6.6-7.7
<b>Cl<sub>2</sub></b>	<b>17 ug/l</b>	0	-	0	0	0	0	0	0	0	0	0	0
<b>BOD<sub>5</sub></b>	<b>5 mg/l</b>	0	1.3	0	0	-	-	-	-	-	1.45	3.06	2.06
<b>SUMMER (APR.1 - OCT.31)</b>													
<b>WINTER (NOV.1 - MAR.31)</b>	<b>10 mg/l</b>	-	-	-	-	0	0.56	3.27	4.62	1.94	-	-	-
<b>AMMONIA NITROGEN</b>	<b>2 mg/l</b>	0.068	0.60	0.22	0.075	-	-	-	-	-	0.84	0.814	1.488
<b>SUMMER</b>													
<b>WINTER</b>	<b>4 mg/l</b>	-	-	-	-	0.024	0	0.26	0.91	0.25	-	-	-
<b>TOTAL SUSPENDED RESIDUE</b>	<b>30 mg/l</b>	0.63	1.82	0	0	0	0.28	2.00	3.18	1.59	0	3.00	2.73
<b>FECAL COLIFORM</b>	<b>200/100 ml</b>	7.3	24.0	5.5	7.3	1.6	2.3	4.0	8.6	3.3	6.9	48.5	5.1
<b>DISSOLVED OXYGEN</b>	<b>≥ 6 mg/l</b>	7.76	7.70	7.64	8.32	8.64	8.90	9.44	9.01	8.85	8.80	8.16	7.92

Permit Violations:

January – Monthly Average Flow Violation due to heavy rain fall

May - Monthly Average Flow Violation due to Storm Surges

June – one weekly average ammonia violation due to intense flows to plant at the end of May





#### **4.0 BIOSOLIDS MANAGEMENT (Fiscal Year 2016-2017)**

Biosolids are managed and disposed of in accordance with Permit No's. WQ0007486 issued by the North Carolina Department of Environmental Quality and ND0089044 issued by South Carolina Department of Health and Environmental Control. Biosolids are treated and stored at both the Crooked Creek and Twelve Mile Creek WRFs. The solids are aerobically digested and then applied as "fertilizer" to permitted sites. The solids are considered stabilized and thus suitable for land application when the volatile solids content is reduced by 38%. If this 38% volatile solids reduction can not be achieved, then alkaline stabilization, injection or incorporation is employed to insure permit compliance. Union County Public Works, through its biosolids contractor, land applied approximately 5.97 million gallons of biosolids, which equates to 946 dry tons.

##### ***What Are Biosolids?***

Biosolids are the nutrient-rich, organic by-product of the wastewater treatment process. When treated and managed appropriately, they can be beneficially used for a number of purposes, such as a fertilizer to improve and maintain productive soils and stimulate plant growth. Biosolids are one of the most studied materials that have ever been regulated by the U.S. Environmental Protection Agency (USEPA).



#### **5.0 SYNOPSIS OF WASTEWATER COLLECTION SYSTEM (Fiscal Year 2016-2017)**

Permit No. WQCS00054. UCPW currently operates and maintains over 677 linear miles of sewer mains, including force mains, and 70 wastewater pumping stations providing service to population of approximately 110,403 customers. All pump stations are equipped with both audible and visual alarms as well as either automated telephone dialers (ATD) or telemetry which alert staff when alarm conditions are present. Inspections of all pump stations meet or exceed State requirements. Emergency auxiliary power is provided to all stations via portable or permanent mounted generators. Union County personnel are on call rotation and available 24 hours a day, 7 days a week, and 365 days a year.

Public Works is required by State permit to clean a minimum of 10% of the collection system annually to prevent and/or reduce backups and overflows. Staff has consistently surpassed that requirement, cleaning more than the required 10%. UCPW cleaned approximately 11.8% (70 miles of 610.5 total gravity miles) of the collection system last year. Staff also conducts inspections of the collection system with the utilization of underground closed-circuit television (CCTV) inspection equipment. These cleaning and inspection efforts allow staff to determine areas in the system that require repairs or increased maintenance to provide the proper service to our customers.

FOG (Fats, Oils, and Grease) program is aimed at reducing grease-related back-ups and overflows by educating the public of the hazards associated with the disposal of grease and grease related by-products into the wastewater system. Union County Public Works has also developed a comprehensive list of food service establishments (FSE) and commercial establishments. This effort has resulted in developing an important and successful grease trap inspection and enforcement program ensuring that restaurants and other food preparation facilities properly maintain grease traps and interceptors.



This fiscal year, approximately 220 FSEs have been inspected, including 34 Union County public school facilities.

LINE MAINTENANCE (min. 10%)	FEET	MILES
SEWER LINES CLEANED	370,246	70
CCTV MAIN LINE	28,195	5.33
SMOKE TESTING	6,766	1.28
EASEMENT MAINTENANCE	N/A	110

## Union County Adds New Valve Exerciser and Jet-Vac Combo Trucks to Lineup



Union County Public Works has two new tools in its arsenal. Its Operations team purchased a jet-vac combo truck and valve truck to help keep our water and wastewater system running smoothly.

The combo truck is a specialized sewer-cleaning machine that utilizes jetting and vacuuming systems. Jetting is a process in which a high-pressure water hose with a sewer-jetting nozzle is pushed into the dirty pipeline. High-pressure water is released from the sewer jet truck to dislodge all of the dirt and flush it away into a manhole. As the dirt is removed, the nozzle continues to move deeper into the sewer.

All of the dirt is extracted with a vacuuming system from a downstream manhole. All the solids and water removed this way are then disposed into a sludge tank mounted on the truck. Jetting and vacuuming may also be performed simultaneously for more effective cleaning.

The truck releases around 75-80 gallons of water per minute into the sewer pipe using specially-designed nozzles. The water begins to flush out all the debris lodged in the pipe and/or along the pipe walls. Everything from stones and bottles to grease, sludge and grime get washed away. The air vacuuming system also comes into play at this point and sucks all the dislodged debris and forces it into the holding tank for later disposal.

With both of these systems working together on the jet-vac truck, cleaning of sewer lines is more efficient as compared to a single process.

A valve exerciser is a device that turns a valve repeatedly to try to stop the valve from becoming so stiff that it cannot be turned on or off. Regular turning is needed to ensure water valves can quickly shut off and stop the flow of water to main supply lines, if needed in emergency situations.

Exercising a water valve often requires opening and closing a valve five times or more. On a 6" valve this would equate to a total of 190 revolutions; which by hand would take forever. By using the valve exerciser truck, the job can be done in as little as five minutes. This means more productivity and less stress on the employee.

Additionally, it collects critical valve exercising information, and creates detailed reports to assist in maintaining your water distribution system. Both jet-vac combo truck and valve truck can be used to locate underground utilities, clean storm drains, and clean up spills.







Utility easements and right-of-ways are maintained by UCPW staff to ensure access for staff and equipment to conduct routine maintenance as well as respond to emergencies, such as sanitary sewer overflows. The easements require round-the-clock access and should not be impeded by structures such as pools (above or below ground), buildings, etc. as well as gardens, trees, shrubs, plantings, etc. Public Works staff inspects and conducts necessary maintenance, including mowing, to these easements and right-of-ways once a year, at a minimum.

An Easement Awareness, Education, and Enforcement Program has been established to improve accessibility to UCPW's sanitary sewer easements. This is accomplished by educating customers on the allowable uses of the easement and describing prohibitions, as well as procedures regarding enforcement when it is required for access.

High priority lines such as aerial creek crossings, lines subject to erosion and/or problematic areas are visually inspected at a minimum semi-annually. High priority lines are inspected more frequently after periods of heavy rain and flooding.

UCPW maintains emergency response equipment in a ready state at all times. This emergency equipment varies in nature from spare electrical parts and plumbing supplies, to vacuum trucks, pumps, and backhoes. Workers safety is of utmost importance. Safety equipment such as night lighting, gas monitors, trenching and shoring equipment, and reflective cones/signs are always readily available.

UCPW has Capital Improvement Projects (CIP) to identify and correct deficiencies associated within the wastewater collection system. Below is a sample of projects:

**Crooked Creek WRF Headworks Improvements** The project completed its design phase in January 2016. The construction contract was awarded in February 2016 with construction commencing in July 2016. The contract allows 425 days to attain completion and, with changes to date, is scheduled to be completed in November 2017. The project includes the construction of a new headworks facility, influent pump station, three million gallon flow equalization tank, and appurtenant yard piping, mechanical, and electrical system improvements. Construction of the flow equalization tank allows for greater operational control of the facility and offsets the need to expand treatment capacity to handle peak flows that occur on an irregular basis or for short time periods during any given day. Improvements to the headworks and influent pumping facilities ensure adequate capacity to convey incoming flows is available and reduces the risk of sanitary sewer overflows at the plant site and in the upstream collections system.



**12 Mile Creek WRF Filter Replacement** The project began construction in September 2015 and has been completed. This project replaced the existing effluent filter system with new cloth disk filters improving plant operational efficiency and enhancing effluent quality by increasing the removal of solids and nutrients. The filters are presently operational however, they do not meet the hydraulic loading criteria specified in the construction contract. Staff are working with the Engineer, the General Contractor, and the Manufacturer to resolve the filter performance issues.





**12 Mile Creek WRF Expansion** The project completed its design phase in April 2016 with construction commencing in September 2016. The contract allows 1,095 days to attain completion and is presently scheduled to be completed in September 2019. The project will expand the plant's treatment capacity from 6.0 MGD to 7.5 MGD to ensure demand will be met under projected growth scenarios. Improvements to the 12-Mile Creek WRF include upgrading the mechanical screens at the influent pump station; replacement of the headworks facility including new grit removal and odor control systems; conversion of the existing oxidation ditch treatment process to a diffused aeration system to provide for biological nutrient removal; replacement of the existing ultra-violet disinfection system for treated wastewater; construction of a new solids handling facility including gravity belt thickeners and belt filter press; and conversion of the existing aerobic digesters to utilizing a jet aeration system.



**Ongoing sanitary sewer evaluation studies (SSES)** throughout the collection system to identify problems, conduct flow monitoring, and need for rehabilitation.

Tallwood WRF basin – Flow study was conducted during the months of January 20-17- April 2017. The study provided details into specific areas of the basin requiring repairs. The repairs will be investigated further and scheduled as appropriate.

Eastside PS #3 (Eastside Regional System) – A flow monitor was installed at Eastside PS #3 to affirm flow readings from other locations in the associated collection system. Results confirmed accurate monitoring has taken place and will be used to determine any necessary improvements in the future.

Crooked Creek WRF Basin – A significant inflow and infiltration (I&I) project went underway in FY17. The project has identified areas of I&I entering the system, previously identified during flow studies in spring 2016. Once the areas are determined, UCPW will make the necessary repairs.

Grassy Brach WRF Basin – UCPW has worked extensively with UCPS staff to reduce SSO's in the basin. Efforts included flow monitoring, smoke testing, and point repairs, among others. Efforts are continuing into FY18 to continually reduce the impacts of I&I.

During the Fiscal Year 2016-2017, Union County's wastewater system collected and conveyed approximately 2.57 billion gallons of wastewater. There were seventeen (17) sanitary sewer overflows with a combined estimated volume of 82,504 gallons that occurred within the collection system. Union County Public Works conveyed 99.996% of the total volume of wastewater without incident.



DATE	MH ID#	ADDRESS	WATER BODY	VOUME DATA		TOTAL VOLUME (GALS)	PRIMARY CAUSE OF SSO	SECONDARY CAUSE OF SSO (IF ANY)	ADDITIONAL INFORMATION (IF ANY)
				GALLONS TO SURFACE WATERS	GALLONS ON GROUND				
07/07/16	6978	1723 Price Rd	Crooked Creek	0	200	200	Contractor hit line		
07/11/16	7089	634 Funderburk Rd	Richardson Creek	150	0	150	Severe Natural Conditions		
07/16/16	56	2312 Gallberry Ln	Little Twelvemile Creek	1,200	0	1,200	Debris		
09/28/16	2646	1405 Hwy 205	New Salem Branch	10,200		10,200	Pump Station Equipment Failure	I&I	
10/08/16		Funderburk Lift Station	Unnamed tributary to Rays Fork	1,200	0	1,200	Severe Natural Conditions		
10/08/16	5231	N/A	Crooked Creek	6,600	0	6,600	Severe Natural Conditions		
10/15/16	2472	415 Indian Trail Rd	South Fork Crooked Creek	9,000	0	9,000	Other	Debris	Third Party Damage - Contractor
12/14/16	5206	N/A	North Fork Crooked Creek	1,400	0	1,400	Pump Station Equipment Failure		CCWRF Influent PS
01/23/17	7214	N/A	Rone Branch	7,800	0	7,800	I&I	Severe Natural Condition	
01/23/17	5231	N/A	Crooked Creek	9,000	0	9,000	I&I	Severe Natural Condition	
03/28/17	7214 and 7456	Rone Branch LS (2125)	Rone Branch	6,000		6,000	Grease		Fish Kill - 50 +/-
04/24/17	2409	3005 Ashcroft Dr		6,115	0	6,115	Severe Natural Conditions		
04/24/17	5226 5231	Crooked Creek outfall	Crooked Creek	20,290	0	20,290	Severe Natural Conditions		
04/24/17	2729 2724	Grassy Branch Outfall	Grassy Branch	825	0	825	Severe Natural Conditions		
05/23/17	5231	Crooked Creek outfall	Crooked Creek	1,000	0	1,000	Severe Natural Conditions		
05/24/17	WETWELL	634 Funderburk Rd	Meadow Branch	324	0	324	Severe Natural Conditions		
06/18/17	FORCEMAIN	801 Marvin Rd	Six Mile Creek	1,200	0	1,200	pipe failure/break		
17	<b>TOTAL SPILLS</b>		<b>TOTAL ANNUAL VOLUMES</b>	<b>82,304</b>	<b>200</b>	<b>82,504</b>			
			<b>MILES OF PIPE IN SYSTEM</b>	<b>635.00</b>					
			<b>SSO's PER 100 MILES</b>	<b>2.68</b>					



For questions concerning this Wastewater System Performance Summary or additional information please contact UCPW:

(704) 296-4210

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Monroe, NC 28112-4730

This document can also be viewed at:

<http://www.co.union.nc.us/departments/public-works>