Town of Ridgefield, Connecticut
Phase 2 Wastewater Facilities Plan

Draft Inflow Control Plan

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Prepared By

AECOM

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SECTION 1. INTRODUCTION

As noted in the Phase 1 Wastewater Facilities Plan, significant inflow and infiltration (I/I) is present in the Sewer District 1 collection system and is the largest factor in influencing the peak flow at the South Street Wastewater Treatment Facility (WWTF). During wet periods of the year when the groundwater level is elevated and large storm events occur, influent flows at the South Street WWTF increase significantly. These periods typically occur in the spring, and to a lesser extent, in the fall. The flow increase is a result of both increased infiltration of groundwater into the collection system, and more significantly, an increase in inflow of surface water and stormwater into the sanitary collection system.

As part of the Phase 1 Wastewater Facilities Plan, the future year 2035 estimated average flow and estimated peak flow to the South Street WWTF from Sewer District 1were projected. These flows in gallons per day (gpd), presented by flow component are summarized below.

TABLE 1. SOUTH STREET WWTF YEAR 2035 PROJECTED AVERAGE FLOW AND PEAK FLOW

Flow Component	Estimated Average Daily Flow (gpd)	Estimated Peak Flow (gpd)
Current (2010-2013) Wastewater	592,000	1,658,000
Current (2010-2013) Infiltration	201,000	363,000
Current (2010-2013) Inflow	57,000	3,859,000
Projected Wastewater	111,100	311,000
Projected Infiltration	39,300	71,000
Total	**1,000,400**	**6,262,000**

Of the 6.26 million gallons per day (mgd) projected future peak flow, approximately 0.7 mgd is the estimated peak infiltration and 3.9 mgd is the estimated peak inflow.

An alternative to accommodating the future flows includes implementation of an I/I reduction program. Reducing I/I not only will reduce the peak flow in the collection system and WWTF, but will reduce operational costs as the I/I flows are no longer pumped and treated. I/I reduction “frees up” capacity in the collection and treatment system. A secondary benefit of I/I removal is that the efficiency of the biological treatment process will be improved as the process performs better at consistent flows and loads. This I/I reduction will decrease the large flow increases currently experienced at the WWTF during and after storm events.

Due to the nature of I/I, it is not possible to predict the exact amount of I/I that can be removed by an I/I reduction program. However, a reasonable target for the I/I reduction program to achieve is to be able to identify and remove about 25% of the peak inflow, representing 1.0 mgd of inflow. As a result, the projected year 2035 peak flow in Sewer District 1 is anticipated to be reduced by the same 1.0 mgd, from 6.3 mgd to 5.3 mgd.

Based on field work conducted under the Phase 1 and Phase 2 Wastewater Facilities Plan and review of past studies and field work, the WPCA working together with Suez and AECOM has developed the following inflow reduction plan to systematically repair inflow sources and identify any further defects remaining within the system.

SECTION 2. BACKGROUND

Much of the Sewer District 1 collection system, constructed to service the "village" or central section of Town, dates from 1902. As infrastructure ages, it becomes more susceptible to deterioration, and infiltration and inflow also typically become progressively worse, contributing to hydraulic overload. Due to the age of the Sewer District 1 collection system, Infiltration/Inflow (I/I) has been an issue that the Town has been addressing. I/I is extraneous groundwater and surface water that enters the sewer system, occupying capacity and potentially overloading the collection system. Periodically, the Town has undertaken efforts to locate and remove I/I sources. These efforts have included the following:

2.1 1960's

An initial effort was undertaken in the 1960s with smoke testing and subsequent grouting of leaking manholes and sewer pipe joints. The approximately 50 inflow sources identified by smoke testing in the 1960s were reportedly not removed, but the grouting program was found to be effective in reducing I/I.

2.2 1980's

In the mid-1980s, a television inspection program was undertaken on a portion of the system, and certain badly damaged sewer manhole to manhole reaches were replaced or lined. House-to-house inspections to locate sump pumps illegally connected to the sewer system were conducted in 1984 that identified 50 sump pumps connected to the sewer, and 20 had been confirmed to be removed. In the late 1980s, a number of leaking sewer mains in Sewer District 1 were lined using either a cured-in-place liner or a fold and form PVC liner. Manholes were also sealed and repaired to eliminate leakage.

2.3 Early 1990's

As part of the last major upgrade of the South Street plant in the early 1990s, the Town again addressed I/I and undertook a major sewer rehabilitation program to address I/I in public portion of the the collection system. This program consisted of lining mainline sewers using the cured-in-place lining process, as well as sealing of leaking manholes.

2.4 2005

Recognizing the ongoing impacts of I/I on the collection system flows, the Town continued efforts to locate and ultimately correct, leakage into the gravity sewer system. As part of the scope of services under the Town's contract for wastewater operational services with Aquarion Operating Services (now Suez), cleaning and television inspection of the collection system was conducted. As part of a 5 year cycle, approximately 20 percent of the collection system was flushed, cleaned, and televised per year to locate leakage as well as structural defects in the system.

2.5 2007-2008

In March 2007, the Town continued to address I/I and prepared an infiltration/inflow (I/I) analysis of Sewer Districts 1 and 2. The purpose of this investigation was to estimate the amount of I/I entering the sanitary sewer system and develop a prioritized program of additional investigations to identify sources of I/I for subsequent rehabilitation.

In order to assess the distribution of flows within the sanitary sewer systems, flow in the systems were monitored at 7 locations for seven weeks in March, April and May of 2007. Rainfall was also monitored during this period to correlate with the flow monitoring data.

TV inspection videos and reports of approximately 34,000 linear feet of sanitary sewers, conducted by National Water Main Cleaning Co., under contract to Aquarion Operating Services conducted between October 2005 and October 2007 were reviewed. Recommendations for rehabilitation were made. This information was then used to update the Town's existing sewer system map to better define the system.

Based on the investigations performed during the 2007-2008 study, a recommended program to reduce I/I and improve system operation was developed. The program was presented in a report in February 2008 which recommended a program of sewer rehabilitation and further investigations.

2.6 2009-2010

Based on the recommendations in the February 2008 report the Town initiated the design and construction of a sewer rehabilitation project to address the identified defects. As the initial step in the design, AECOM reviewed approximately 4,000 linear feet of additional internal television data collected in 2008 as well as the logs of 70 manhole inspections collected in 2009. The findings of these field investigations were summarized in a report which recommended a program for the rehabilitation of the I/I sources and defects identified.

Based on the 2008 and 2009 reports bid documents for sewer rehabilitation were prepared for the Infiltration/Inflow Rehabilitation, Contract 09-1. This project was constructed in 2010 by National Water Main Cleaning Co.

2.7 2013-2015

Under the Phase I Wastewater Facilities Plan AECOM conducted a number tasks to further identify I/I sources in Sewer District 1. Each task culminated in a technical memorandum which were subsequently summarized and included in the Facilities Plan report. The work included:

- Smoke Testing – approximately 96,000 liner feet (100% of system)
- Manhole inspections (Subarea 1) – 54 manholes (approximately 10% of system)
- Collection System Bottleneck Evaluations which consisted of:
    - Field survey of manholes along selected sewer routes which exhibited flow restrictions.
    - Flow monitoring (with rain gaging) @ 9 locations for 12 weeks.

2.8 2015-2016

Under the Phase 2 Wastewater Facilities Plan AECOM conducted a number of tasks to further identify I/I sources in Sewer District 1. Each task was summarized in a technical memorandum, which will be included in the Facilities Plan report. The work included:

- Dyed water testing – 160 suspect inflow sources (Technical Memorandum No. 1 dated October 27, 2016)
- Dyed water tracing – 20 identified inflow sources (Technical Memorandum No. 1 dated October 27, 2016)
- Manhole inspections – 470 manholes (approximately 80% of system) (Technical Memorandum No. 3 dated December 21, 2016)
- CCTV of selected mainline and lateral sewers – approximately 3,000 lf of mainline sewer and 10 laterals (Technical Memorandum No. 2 dated November 17, 2016)
- House to house inspections – completed approximately1,000 out of 1,200 attempted (83% of buildings in Sewer District 1) (Technical Memorandum No. 4 dated December 21, 2016)

SECTION 3. PROGRAM FOR SEWER SYSTEM REHABILITATION AND INVESTIGATION

A program has been developed to further identify and remove I/I sources from its sanitary sewer system. The program consists of two major components; sewer system rehabilitation and further investigation of the system. The sewer system rehabilitation program addresses the repair of I/I defects that have been confirmed through field investigations. The program for further investigation addresses specific tasks for investigating and evaluating the sewer system to identify additional inflow sources in the future.

3.1 Sewer System Rehabilitation Program

Some of the I/I sources and defects summarized in this section were located as part of previous investigation efforts. In the preparation of this report, AECOM reviewed and updated the summary lists of known I/I sources and defects in the system. However, the rehabilitation of I/I sources have been prioritized to focus on reducing peak inflow to the collection system. The types and locations of I/I sources and defects are discussed below.

3.1.1 Public and Private Inflow Sources

Inflow is defined as water, other than sanitary flow, that enters a sewer system and is distinguished from infiltration. Inflow is generally divided into two components: direct inflow and indirect inflow. Direct inflow represents the short-term response to rainfall that is due to direct stormwater runoff connections to the sanitary sewer. Possible sources of direct inflow are roof leaders (sometimes called downspouts), yard and area drains, basement drains, manhole covers and cross-connections from storm drains and catchbasins. Indirect inflow represents the prolonged response to rainfall for a period of 24 to 72 hours after a storm event. Higher flow during this period generally indicates the presence of sump pump connections to the sanitary sewer system. Public inflow sources are distinguished from private inflow sources in that the inflow source emanates from public property and discharges to the public sewer. Private inflow sources, on the other hand, emanate from private property and discharge to the public sewer.

Through recent field investigations, the Town has identified numerous public and private sources of inflow to its sanitary sewer system. Based on comparison of the summary listings provided in previous technical memoranda and reports, 43 direct and 6 indirect inflow sources have yet to be removed. It is recommended that the Town take the necessary steps to eliminate these inflow sources. Tables 2 and 3 provide a summary listing of the private and public inflow sources for removal.

As indicated, the majority of the inflow sources identified for removal are private sources as they are located on private property. The WPCA has determined that costs to rehabilitate private inflow sources will be borne by the owner of the private property as these are illegal connections to the sanitary sewer system. This approach is also consistent with the past policy of the WPCA. To eliminate these sources, the Town should work with property owners to remove the inflow source from the sanitary sewer system. This approach would be similar to the approach recently used by the Town to remove downspouts from the sanitary sewer system. It is anticipated that this removal work will be an ongoing task, and Town personnel should monitor the progress and evaluate the effectiveness of this approach.

It is also recommended that the Town remove the 4 public inflow sources (2 direct, 2 indirect). Removal of the indirect inflow sources are discussed under section 3.1.4 Pipeline Rehabilitation.

TABLE 2. SUMMARY LIST OF PRIVATE INFLOW SOURCES FOR REMOVAL

Subarea	From MH #	To MH #	Inflow Source Identified	Estimated Peak Inflow Rate (gpd)	Inflow Point of Entry to Sanitary System	Locations (2)
Direct Inflow Sources						
1	67	67A	Cleanout	100	Open Cleanout Front Yard	25 Rowland Lane (Source 1)
1	75	74B	Cleanout	50	Open Cleanout Back Yard	84 Governor Street (Source 3)
1	75	74B	Cleanout	50	Open Cleanout Back Yard	84 Governor Street (Source 4)
1	74B	74	Cleanout	50	Open Cleanout Back Yard	58 Prospect Ridge Street (Source 6)
1	-	79	Cleanout	520	Open Cleanout Front Yard	29 Branchville Road (Source 7)
1	68	67	Cleanout	4,540	Open Cleanout Back Yard	250 Main Street (Source 8)
1	110	109	Sewer Manhole	30	Unsealed Cover Front Yard	45 West Lane (Source 10)
1	-	110	Cleanout	(1)	Open Cleanout Front Yard	58 West Lane (Source 11)
1	0	109	Cleanout	30	Open Cleanout Front Yard	55 High Ridge Ave (Source 12)
1	109	108	Cleanout	30	Open Cleanout Front Yard	3 Parley Lane (Source 14)
2	205	204A	Sewer Structure	1,360	Unsealed Cover Driveway	149 Main Street (Source 20)
2	202	189	Downspout Connection	13,620	Back Yard	21 King Lane (Source 21)
2	202	189	Downspout Connection	13,620	Back Yard	21 King Lane (Source 22)
2	203	202B	Cleanout	3,030	Open Cleanout Back Yard	74 High Ridge Road (Source 26)
2	203	202B	Cleanout	3,030	Open Cleanout Back Yard	74 High Ridge Road (Source 27)
2	203	202B	Cleanout	3,030	Open Cleanout Back Yard	74 High Ridge Road (Source 28)
1	71.3	71	Cleanout	50	Open Cleanout Front Yard	58 Branchville Road (Source 34)
1	71.3	71	Downspout	13,620	Front Yard	64 Branchville Road (Source 35)
2	184	178	Cleanout	100	Open Cleanout Front Yard	2 Peaceable Street (Source 37)
2	180	179	Cleanout	50	Open Cleanout Front Yard	129 High Ridge Road (Source 38)
2	180	179	Sewer Structure	1,360	Unsealed Cover Driveway	145 High Ridge Road (Source 39)
4	24	23	Cleanout	(1)	Open Cleanout Back Yard	490 Main Street (Source 41)

TABLE 2. SUMMARY LIST OF PRIVATE INFLOW SOURCES FOR REMOVAL (CONT.)

Subarea	From MH #	To MH #	Inflow Source Identified	Estimated Peak Inflow Rate (gpd)	Inflow Point of Entry to Sanitary System	Locations (2)
4	24	23	Cleanout	(1)	Open Cleanout Back Yard	490 Main Street (Source 42)
4	17	16	Downspout	11,580	Side Yard	54 Prospect Street (Source 43)
4	17	16	Sewer Manhole	6,810	Unsealed Cover Driveway	54 Prospect Street (Source 44)
2	172	170	Sewer Manhole	550	Unsealed Cover Paved Asphalt.	421 Main Street (Source 45)
2	185A	185	Cleanout	50	Open Cleanout Back Yard	325 Main Street (Source 48)
4	38	37	Cleanout	100	Open Cleanout Front Yard	24 Bailey Avenue (Source 52)
4	13B	13A	Cleanout	60	Open Cleanout Side Yard	4 Sunset Lane (Source 54)
4	-	SS2.1	Cleanout	60	Open Cleanout Side Yard	47 Sunset Lane (Source 55)
3	136B	136C	Cleanout	5	Paved Conc.	25 Abbott Avenue (Source 57)
3	149C	149.1	Cleanout	5	Open Cleanout Front Yard	14 Mulvaney Court (Source 58)
3	163A	163	Cleanout	30	Open Cleanout Front Yard	21 Bryon Ave (Source 61)
3	163A	163	Cleanout	30	Open Cleanout Front Yard	19 Bryon Ave (Source 62)
3	163A	163	Cleanout	30	Open Cleanout Front Yard	19 Bryon Ave (Source 63)
3	O9	O8	Cleanout	60	Open Cleanout Front Yard	20 Overlook Drive (Source 64)
3	AH1	AH2	Cleanout	10	Open Cleanout Side Yard	10 Arrow Head Pl (Source 65)
3	R26	R27	Cleanout	60	Open Cleanout Front Yard	102 Ramapoo Road (Source 70)
3	R23	RH1	Cleanout	100	Open Cleanout Front Yard	4 Ramapoo Hill Road (Source 71)
3	R22	R23	Cleanout	50	Open Cleanout Front Yard	131 Ramapoo Road (Source 72)
3	M2A	M2	Cleanout	50	Open Cleanout Side Yard	20 Mulberry Street (Source 73)
4	14	13	Cleanout	2,000	Hole in Cleanout Paved Conc.	9 Grove Street (3)
5	622	621	Car Wash Holding Tank	5,000	Open Cover Side Yard	6 Farmingville Road
2	185	173	Downspout	57,900	Side Yard	353 Main St. Church (4)
2	185	173	Downspout	8,200	Back Yard	353 Main St. Rectory (4)
2	185	173	Downspout	39,300	Side Yard	353 Main St. Rectory (4)

TABLE 2. SUMMARY LIST OF PRIVATE INFLOW SOURCES FOR REMOVAL (CONT.)

Subarea	From MH #	To MH #	Inflow Source Identified	Estimated Peak Inflow Rate (gpd)	Inflow Point of Entry to Sanitary System	Locations (2)
Indirect Inflow Sources						
1	75	74B	Service Connection	100	Dye in SMH 74B	84 Governor Street (Source 5)
2	202	-	Service Connection	2,800	Dyed water entering SMH 202 through 207 Main St. service connection.	207 Main Street (Source 24 & 25)
1	103	103A	Service Connection	103	Dyed water entering sewer through leaking service connection at 57 Main Street, 135 ft. upstream of SMH-102.	57 Main Street (Source 67)
3	R27	R26	Service Connection	(1)	Defective above grade flexible connection on service connection.	99 Ramapoo Road (Source 69)
Total Estimated Inflow				**193,310**		

Notes:

1. *Possible inflow source above ground surface. No inflow rate estimate for source.*
2. *Smoke testing inflow source number noted in parenthesis, if applicable.*
3. *Identified during house-to-house inspections.*
4. *Identified during dyed water testing.*

TABLE 3. SUMMARY LIST OF PUBLIC INFLOW SOURCES FOR REMOVAL

Subarea	From MH #	To MH #	Inflow Source Identified	Estimated Peak Inflow Rate (gpd)	Inflow Point of Entry to Sanitary System	Locations (1)
Direct Inflow Sources						
1	64.1	64	Cleanout	100	Open Cleanout Back of Building	Behind 316 Main St. (Veterans Park School) (Source 18A) (2)
1	66A	65	Cleanout	50	Open Cleanout Front of Building	316 Main St. (Veterans Park School) (Source 19)
3	133B	133	Cleanout	40	Open Cleanout Side of Building	25 Gilbert – Housing Authority Recreational Building (Source 56)
Indirect Inflow Sources						
1	63	62	Pipeline Defect	34,100	Dyed water entering sewer through offset joint and capped service connection	SMH 63 to SMH 62 (Source 16 & 17)
3	160	159	Pipeline Defect	35,400	Longitudinal fracture observed at 12 o'clock	10 Greenfield Ave (CB) (Source 59 & 60)
Total Estimated Inflow				**69,690**		

Notes:

1. *Smoke testing inflow source number noted in parenthesis, if applicable.*
2. *2 sources identified at source 18, therefore broke out into 18A and 18B.*

3.1.2 Sump Pumps

Through smoke testing and house to house inspections, a total of 105 sump pumps connected to the sanitary sewer have been identified for removal. Table 4 summarizes the sump pumps to be removed, including the location and subarea. Sump pumps can have a wide range of pumping capacities depending on the size of the unit installed. In addition to the capacity of the unit, the flow from a sump pump discharged into the collection system is also a function of the number of hours each day that the sump pump is in operation. Based on an average flow per pump of 20 gallons per minute (gpm) that runs for 8 hours during a storm event, the total contribution of 105 sump pumps discharging to the sanitary sewer system is estimated at approximately 1,008,000 gpd during peak flow conditions. As noted previously, the WPCA has determined that the costs to rehabilitate private inflow sources will be borne by the owner of the private property. This approach would extend to the removal of sump pumps as well. The implementation, inspection, and tracking of sump pump removal would be an ongoing task, and Town personnel should monitor the progress and effectiveness of this approach by using and updating a database of the identified sump pumps. In addition to the inflow sources identified for removal above, 254 buildings were identified for follow-up inspections to verify that there are no sources of inflow at these locations. These buildings, as identified in Attachment A, include:

- 203 buildings where contact/access was not gained after 3 attempts
- 3 buildings where property owners refused access
- 38 buildings with 41 sump pumps whose discharge location cannot be determined (Due to piping in finished walls)
- 10 buildings which have floor drains whose discharge location cannot be determined, and have reported experiencing flooding or backups

Building inspections could be accomplished by Town staff prior to a real estate transaction. Or, building inspections may be performed by the building inspector whenever he or she needs to visit a building for issuance of a building permit. Identifying the discharge location of the sump pumps and floor drains may be accomplished by the inspector by dyed water testing. The Town's Sewer Ordinance provides the authority to conduct these inspections. With this approach, building inspections may be performed on an ongoing basis without a formal house to house inspection program. The WPCA and the Building Department will need to collaborate to implement and administer this inspection program. Documentation of the removal process is a key to success of the program.

3.1.3 Manhole Rehabilitation

As noted previously, manhole inspections were conducted in Sewer District 1 in 2008, 2013, and 2016. Figure 1, attached, highlights all of the manholes that have been inspected to date. Based on the results of these inspections, a total of 385 manholes were identified with defects requiring rehabilitation. However, since the focus of this program is the reduction of inflow, only manholes which meet the following criteria have been recommended for rehabilitation:

- Manholes identified as being in areas which may be subject to flooding, or
- Manholes which were identified as inflow sources during smoke testing

A total of 32 manholes meet these criteria. Table 5 summarizes the locations of these 32 manholes by subarea and manhole number, including the manhole depth, recommended repairs, and estimated rehabilitation cost which includes an allowance for engineering and contingency.

TABLE 4. SUMP PUMPS IDENTIFIED FOR REMOVAL

Sub-area	Address (1)		No. of Sump Pumps
1	50	Branchville Road	1
1	10	Governor St Veterans Park School	1
1	59	Main Street	1
2	35	Catoonah Street	2
2	6	Catoonah Street	1
2	27	Catoonah Street	2
2	29	Catoonah Street	1
2	31A	Catoonah Street	1
2	29	Gilbert Street (source 46)	1
2	108	High Ridge Avenue	1
2	63	High Ridge Avenue (Source 29)	
2	74	High Ridge Avenue	1
2	77	High Ridge Road	2
2	21	King Lane (Source 23)	1
2	127	Main Street	1
2	409	Main Street	1
2	451	Main Street	1
2	467	Main Street	1
2	509	Main Street	1
2	19	Peaceable Street	1
2	46	Peaceable Street	1
2	22	West Lane Cottage Units 401 to 406	3
3	17	Abbott Avenue	1
3	25	Abbott Avenue	1
3	7	Bryon Avenue	1
3	12	Bryon Avenue	2
3	20	Bryon Avenue	1
3	26	Farm Hill Road	1
3	40	Gilbert Street	1
3	86	Ramapoo Road	1
4	30	Bailey Avenue	1
4	106	East Ridge Street	1
4	30	Grove Street	1
4	374	Main Street	1
4	51	Prospect Ridge Road	1
4	55	Prospect Street	1
4	57	Prospect Street	1
4	16	Prospect Street	1
4	15	Sunset Lane	1
4	18	Sunset Lane	2
5	23	Danbury Rd	1
5	Building 1	Fox Hill - 1,2,3,4 Nettle Lane, Units 1,2,3,4,5 Meadow Lane	2

TABLE 4. SUMP PUMPS IDENTIFIED FOR REMOVAL (CONT.)

Sub-area	Address (1)		No. of Sump Pumps
5	Building 21	Fox Hill - Orange Lane Units 4-8, Quince Court Units 8-10	3
5	Building 36	Fox Hill - Units 1,3,5,7 Edelweiss Lane, Units 1,2,3,4 Forest Lane	4
5	Building 37	Fox Hill - Units 1-4 Daisy Lane, Units 2,4,6,8 Edelweiss Lane	1
5	Building 6	Fox Hill - Units 1-4 Frog Hollow, Units 2,3,6,7 Grape Lane	1
5	Building 35	Fox Hill - Units 1-4 Greenbrier, Units 3,5 Honeysuckle Lane	2
5	Building 19	Fox Hill - Units 1-4 Sandalwood La, Units 1,4,5,7 Outpost Lane	3
5	Building 20	Fox Hill - Units 1-5 Raspberry Lane, Units 3-5 Quince Court	2
5	Building 5	Fox Hill - Units 2,4,5,8 Grape Lane, Units 1,3,5,7 Hollyberry Lane	1
5	Building 17	Fox Hill - Units 9,10 Outpost Lane, Units 1-3 Teaberry Lane, Units 1-3 Winterberry Lane	3
5	10	Hillsdale Avenue	2
5	6	Juneberry Lane	1
6	Building 2	Casagmo - Cook Close	1
6	Building 3	Casagmo - Cook Close	1
6	Building 6	Casagmo - Keeler Close	1
6	Building 15	Casagmo - Lawson Lane	2
6	Building 17	Casagmo - Lawson Lane	3
6	Building 18	Casagmo - Lawson Lane	1
6	Building 10	Casagmo - Olcott Way	2
6	Building 22	Casagmo - Olcott Way	2
6	Building 23	Casagmo - Olcott Way	1
6	Building 24	Casagmo - Olcott Way	2
6	Building 25	Casagmo - Olcott Way	1
6	Building 8	Casagmo - Olcott Way	1
6	Building 11	Casagmo - Olcott Way	2
6	Building 9	Casagmo - Olcott Way	1
6	Building 19	Casagmo - Quincy Close	1
6	Building 20	Casagmo - Quincy Close	3
6	Building 13	Casagmo - Unit 11 Lawson Lane	1
6	Building 5	Casagmo - Unit 12 Keeler Close	1
6	12	Danbury Road - Ridgefield Power Equipment	1
6	10	Lawson Lane	1
6	24	Lawson Lane	1
6	547	Main Street	1
6	621	Main Street	1
		Total	**105**

Notes:

1. *Smoke testing inflow source number noted in parenthesis, if applicable.*

TABLE 5. MANHOLES TO BE REHABILITATED

Sub-area	MH No.	Location	MH Depth	MH Type	MH Cleaning	Repair Defective Chimney	Wrap Chimney	Reset F & C	Raise F & C	Replace Defective F & C	Install Manhole Insert	Chemical Sealing	Interior Coating	Repair Bench	Rebuild Bench & Invert	Chemical Sealing Connection
1	67	Rowland Lane Easement	64.75"	Brick					X		X	X	X			X
1	68	Branchville Road Easement	92.5"	Block					X		X	X	X			X
1	71.2	54 Branchville Rd.	3'6"	Precast					X		X				X	X
1	71.3	Branchville Road Easement	101"	Precast	X			X			X					
1	72	Prospect Ridge Easement	81"	Brick						X		X	X			
1	73	Prospect Ridge Easement	67"	Brick			X				X	X	X			X
1	74	Prospect Ridge Easement	67.5"	Brick			X		X	X	X					
1	75	Governor Street	93.5"	Block						X	X					
1	85	Kent Lane	90"	Brick							X	X	X		X	
1	113	High Ridge Avenue	93"	Brick	X			X				X	X			
1	62a	Market Street Easement	65.75"	Block		X	X		X		X	X				
1	67A	Rowland Lane	68.5"	Block								X	X			
1	67B	Aldrich Museum Easement	51"	Precast		X		X			X					
1	73a	Prospect Ridge Easement	79"	Brick			X				X					X
1	74b	Prospect Ridge Easement	63.5"	Brick							X					
1	98a	Ascot Way	70"	Block				X								
2	185	351 Main St.	6'1"	Parged	X	X		X			X	X	X			
2	185A	323 Main St.	4'11"	Block						X	X					X
3	149B	12 Barry Ave.	4'5"	Precast				X			X					X
3	R10	34 Ramapoo Rd.	8'	Precast				X				X				
4	9	520 Main St. Near brook	5'9"	Brick			X	X				X	X			
4	21	520 Main St. Near brook	4'1"	Brick	X		X					X	X	X		
4	22	500 Main St.	8'3"	Parged			X				X					X
4	22.1	500 Main St.	4'	Precast			X		X		X					
4	22.2	500 Main St	6'1"	Precast			X		X		X					
4	24	25 Prospect St.	9'7"	Brick			X		X			X	X			
4	47	32 Prospect St.	9'	Brick		X	X	X	X		X	X	X			
4	48	41 Governor St.	3'9"	Brick	X	X	X	X	X		X	X	X			
4	12D	520 Main St. Near brook	6'6"	Brick	X	X		X			X	X	X			
6	116	80 Grove St.	8'3"	Brick		X		X			X					
6	8D	7-10 Cook Close	6'8"	Precast							X					
6	8E	12-15 Carpenter Close	5'6"	Precast							X					
				Total =	6	7	12	12	10	4	24	16	14	1	2	8
				Unit Cost =	$800	$1,100	$2,700	$1,100	$1,300	$1,600	$500	$1,600	$3,200	$900	$1,600	$1,100
				Subtotal Cost =	$4,800	$7,700	$32,400	$13,200	$13,000	$6,400	$12,000	$25,600	$44,800	$900	$3,200	$8,800
				Total Cost =												**$172,800**

In addition to the manholes identified for rehabilitation above, the field crews were unable to inspect a total of 84 manholes during the manhole inspection programs. These manholes were reported as being buried, paved over, or unable to be located. In order to fully complete the manhole inspection investigation, the Town should take steps to locate and inspect the manholes identified in Attachment B. The investigation of these sources has been incorporated into the program for further investigation of the system discussed later in this plan. Figure 2, attached, indicates the location of manholes which are recommended to be rehabilitated as well as those manholes which have not been inspected.

3.1.4 Pipeline Rehabilitation

As noted earlier, the Town has performed TV Inspection of sewer pipelines throughout Sewer District 1 as part of a 5 year inspection cycle. Based on review of the TV inspection logs and videos, the Town previously completed the design and construction of the 2010 sewer rehabilitation project, entitled "Infiltration/Inflow Rehabilitation, Contract 09-1". At this time, all of the recommended sewer rehabilitation work identified in the TV inspections conducted through to 2010 has been completed.

In 2016, the Town performed TV inspection of selected mainline sewers and lateral service connections to identify infiltration sources and to potentially detect the presence of sump pumps. The criteria for selecting locations of the TV inspections included low-lying areas which may be subject to flooding and those which have unusually long service connections. Infiltration was observed, and rehabilitation alternatives for both mainline and lateral service connections were identified, however the estimated infiltration observed is relatively small compared to the direct inflow sources that have been identified. Therefore, the Town should consider rehabilitation of these infiltration sources to be a low priority.

As previously noted and indicated in Table 3, 2 indirect public inflow sources were identified with an estimated peak inflow rate of 69,700 gpd. These sources consist of pipeline defects and are recommended for rehabilitation. Table 6 provides a summary list of the sewer pipeline rehabilitation work to be completed by subarea and manhole to manhole reach of pipe, and estimated rehabilitation cost, including an allowance for engineering and contingency.

TABLE 6. SEWER PIPELINE REHABILITATION RECOMMENDATIONS

Sub-area	From MH	To MH	Street Name	Pipe Dia (in)	Pipe Length (ft)	Sewer Pipeline Rehabilitation		
						Clean (ft)	Joint T&S (ft)	Lineal Spot Repair (ft)
3	159	160	Greenfield Avenue	8	330			5
1	63	62	Market Street	8	175	175	175	5
					Total =	175	175	10
					Unit Cost =	$6	$15	$1,850
					Sub-Total Cost =	$1,050	$2,625	$18,500
					Total Cost =			**$22,175**

The sewer repairs are recommended to be conducted using trenchless sewer rehabilitation methods. Trenchless technologies generally include cleaning, chemical treatment for root control, joint testing and chemical sealing, spot repairs of structural defects, and relining sewer pipelines. Figure 2 attached, has been highlighted to show those sewers which are recommended to be rehabilitated.

3.2 Program for Further Investigation

The Town has conducted system wide I/I investigations in Sewer District 1, including flow monitoring, smoke testing, TV inspections of sewer pipelines, house to house inspections, and manhole inspections. Additionally, dyed water testing and tracing have been conducted in numerous areas of Sewer District 1. Past studies and reports were reviewed and areas in need of further investigation have been updated.

3.2.1 House to House Inspection

As noted previously in Section 3.1.2 Sump Pumps, the Town conducted a system wide house to house inspection program in Sewer District 1. The success rate of accessing buildings was approximately 83%. The inspections identified 102 sump pumps connected to the sewer system (3 more sump pumps were identified during smoke testing). A total of 254 buildings were identified for follow-up inspections to verify that there are no sources of inflow at these locations. A list of the buildings identified for follow-up inspection is included in Attachment A. These building inspections could be conducted by Town staff.

The Connecticut Department of Transportation (DOT) is planning reconstruction of Main Street within the next few years which is to include drainage, sidewalks, catchbasins, repavement, and improving traffic flow. The proposed roadway and drainage construction in this area gives the Town a unique opportunity to address inflow sources identified in the heavily developed Village area. The downtown area is one of the oldest parts of town and is densely populated with a mixture of uses including local businesses, civic buildings, and public spaces, making it one of the most difficult areas to address inflow problems. Given that the State is in the design phase of planning improvements in this area, it is recommended that any follow-up inspections in the Main Street area, as identified in Attachment A, be conducted first, and any redirection of inflow sources be incorporated into the Main Street reconstruction project. It is anticipated that these follow-up inspections would also be conducted with existing Town staffing.

3.2.2 Dyed Water Testing and Tracing

Dyed water testing and tracing was conducted in Sewer District 1 to identify or confirm sources of inflow into the sewer system. As noted in Section 3.1.2 Sump Pumps, there are 38 buildings with 41 sump pumps whose discharge location cannot be determined. There are also 10 buildings which have floor drains whose discharge location cannot be determined, and have reported experiencing flooding or backups. Identifying the discharge location of the sump pumps and floor drains may be accomplished by dyed water testing during follow-up building inspections.

During the dyed water tracing conducted in 2016, tracing was attempted at the location of inflow Source No. 40, between MH 179 and MH 180. The drainage structures in the vicinity of inflow Source No. 40 were plugged and flooded with dyed water to simulate surcharge conditions and the sewer system was monitored for the observance of the dyed water. However, the drainage system failed to surcharge. It was observed that portions of the corrugated metal pipe (CMP) drain were corroded on the bottom, thereby allowing the water introduced into the system to leach out instead of surcharging the structures. Therefore, to confirm the source of the inflow and make recommendations for rehabilitation, it is recommended that the Town repair the drain line and repeat the dyed water tracing. The calculated peak inflow rate of inflow Source No. 40 is estimated to be 6,800 gpd. The Town should consider the further investigation of this inflow source a low priority.

3.2.3 TV Inspection of Service Connections

During the dyed water tracing conducted in 2016, five service connections were identified for TV inspection. They are Inflow Source Nos. 18, 24 & 25, 30 & 31, 68, and 67. TV inspection of the service connections was identified for the purpose of:

- Locating and confirming the location of the indirect source of inflow (Source Nos. 30 & 31, 67), and
- Determining the appropriate rehabilitation method (Source Nos. 18, 24 & 25, 67)

Inflow Source Nos. 24 & 25, and 67 are private sources which were confirmed to be indirect sources of inflow. Therefore the cost of any follow-up investigation and rehabilitation should be borne by the private property owner, and are listed in Table 2 for removal.

TV inspection of public Inflow Source No. 18 is recommended to determine the appropriate rehabilitation method. TV inspection of private Inflow Source Nos. 30 & 31, and 68 is recommended to locate, and confirm the location of the indirect source of inflow. Table 7 provides a summary list of the TV inspection of service connections to be completed by subarea and manhole to manhole reach of pipe, and estimates the investigation cost, including an allowance for engineering and contingency. The calculated peak inflow rate of inflow Source Nos. 18A, 30 & 31, and 68 is estimated to be 13,700 gpd. The Town should consider further investigation of these inflow sources a low priority.

TABLE 7. FURTHER INVESTIGATION – CLEAN AND TV INSPECT SERVICE CONNECTIONS

Sub-area	From MH	To MH	Address (1)	Source Description		Calculated Peak Inflow Rate (gpd)	Recommendation	Estimated Cost
				Sector	Type			
1	64.1	64	Behind 316 Main Street (Veterans Park School) (Source 18A) (2)	Public	Service Connection	100	Clean & TV SC to determine rehab	$1,250.00
2	195	194	87 High Ridge Road (Source 30 & 31)	Private	Service Connection	13,620	Clean & TV SC to determine rehab	$1,250.00
1	99	98	7 Main Street (Source 68)	Private	Service Connection	*(3)*	Clean & TV SC to determine rehab	$1,250.00
					Totals =	**13,720**		**$3,750**

Notes:

1. *Smoke testing inflow source number noted in parenthesis.*
2. *Cost of drain repair not included.*
3. *Further investigation necessary to estimate inflow rate. No inflow estimate has been made for indirect source number 68.*

3.2.4 Manhole Inspection

To further identify sources of leakage and to assess the physical condition of manholes in Sewer District 1, the 84 manholes as identified in Attachment B which were not inspected during prior investigations should be inspected. Each manhole should be inspected to inventory the condition and structural integrity of the manhole. It is recommended that Suez uncover and inspect these manholes over time in an effort to locate further inflow sources.

SECTION 4. PRIVATE INFLOW SOURCE REDUCTION PROGRAM

As indicated, the inflow sources remaining for removal have been identified as both public and private sources. The Town's sewer ordinance provides the WPCA with the authority to enforce the removal of illegal connections contributing extraneous flow to the system. The recommended inflow source reduction program will need to be an on-going program that will continue through the next several years for the removal of private source inflow, particularly sump pumps that may be connected to the sewer system.

4.1 Identification

The Town conducted a successful house to house building inspection program, where approximately 83% of the buildings connected to the sanitary sewer system in Sewer District 1 were inspected for illicit connections. A total of 102 sump pumps were identified by inspections. 3 more sump pumps were identified during smoke testing conducted in 2013.

At this time it is recommended that the Town continue to focus on the identification and removal of private inflow sources. The locations of additional private inflow sources (sump pumps or roof downspouts) would be identified through an educational public outreach program. The program would be initiated by the mailing of an educational brochure to all sewer users, residential and business, in Sewer District 1. The brochure will include a general description of I/I sources and requests residents to call the WPCA if an inflow source is known to exist on their property.

An example of the educational brochure is presented in Attachment C. It is recommended that the Town mail the brochure to all sewer users in Sewer District 1. In addition, the brochure could be distributed for posting in public places, and modified for publication in local newspapers and viewing on the Town's website. In a larger context, the program could be expanded to educate and garner public support for the pending infrastructure upgrades and costs associated with the wastewater collection and treatment system as a whole.

The Town should maintain a database of sump pumps identified through the public outreach program. The database would then be used to track the efforts to notify private property owners and the removal of sump pumps.

4.2 Educational Outreach Program

It is recommended that public outreach efforts be employed to encourage voluntary participation in the private inflow source removal program. The key to public support is to convince the sewer user that the redirection of illegal connections is in their best interest. Commonly cited benefits are reduced sewer fees, lessened likelihood of sewer backups, correction of an illegal connection that could allow sewer gas to enter the building, and reducing the size and cost of the needed wastewater treatment facility upgrade. Various methods and media are used for public education. Print ads in local newspapers, local access cable television programming, and public meetings are common approaches. Dedicated links to an I/I reduction page on the WPCA's website may be another approach to use.

As noted previously, it is recommended that the Town mail an educational brochure to all sewer users in Sewer District 1. The brochure, presented in Attachment C, includes a general description of many different types of I/I sources and describes the Town's efforts in identifying and removing illegal inflow connections, particularly private inflow connections.

4.3 Additional Basement Inspections

As part of the continued sump pump identification and removal process, once a new sump pump is identified through the educational public outreach program, a limited basement inspection is recommended. As noted in Section 3.2.1 House to House Inspection, the Town conducted a system wide house to house inspection program in Sewer District 1, where approximately 83% of the buildings in Sewer District 1 were inspected, and 254 buildings were identified for follow-up inspections. Until such time that the 254 follow-up building inspections have been conducted, it is likely that, through the educational public outreach program, a property owner identifies that they have a sump pump connected to the sanitary sewer system and notifies the WPCA. The frequency of these types or notifications is likely to be sporadic. When such a notification does occur, conducting a limited basement inspection would allow the Town to confirm the current discharge location of the sump pump, and provide input to an acceptable redirect. When a new sump pump has been identified in this manor, an inspector should perform a follow-up visit to the house to verify the illegal connection. The inspector should perform the following:

- Take photographs of the sump pump and its discharge location and related internal plumbing.
- Complete a basement inspection form as presented in Attachment D. During the basement inspection, the inspector should also inspect the general premises to determine a proposed sump pump discharge location.
- If the sump pump discharge location is not obvious, a possible option to confirm the discharge location may be to introduce dyed water into the sump pump system and then observe the public sewer through the first downstream sanitary sewer manhole for evidence of dyed water.
- After the owner completes the sump pump redirection, perform a follow-up inspection of the premises to confirm that the proposed redirection work was performed in accordance with the approved plan.

Once an illegal connection has been identified and confirmed, the WPCA should issue a letter to the property owner requesting the disconnection of the illegal connection. The letter should inform the property owner of the illegal connection, request its disconnection, cite the authority under which they are acting, and provide a timeline to remove the illegal connection. If the illegal connection is not removed within the allowed time period, the Town may want to consider assessing a penalty, to be added to the sewer bill, until the disconnection has been made.

4.4 Removal

The WPCA has determined that costs to rehabilitate private inflow sources will be borne by the owner of the private property as these are illegal connections to the sanitary sewer system. There are three typical options for redirecting the flow from sump pumps:

- Redirect flow to a drywell.
- Redirect flow to an outlet at existing ground level (overland flow).
- Redirect flow to connect to an existing drainage system.

For general guidance, typical details showing various sump pump redirection alternatives are included in Attachment E. Each sump pump redirection requires an individual evaluation to identify a recommended redirection method. Some sump pumps may be easily disconnected from the sanitary sewer and the discharge of the clean water redirected onto the ground surface in the yard. When determining if this is a viable option, it is important that there is adequate surface area in the yard to permit discharge without creating drainage problems on the owner's property or adjacent properties.

SECTION 5. SUMMARY AND RECOMMENDATIONS

A work plan has been developed to assist the Town with the implementation of the program for sewer system rehabilitation and further investigations outlined above. The priority of work should take into consideration any capital improvement projects the Town is contemplating. As noted previously, the DOT is planning reconstruction of Main Street which is to include drainage, sidewalks, catchbasins, repavement and improving traffic flow. As part of the reconstruction, dedicated storm drain connections for sump pumps, roof downspouts, and other illegal connections should be provided in the storm drain system to allow these inflow sources to be redirected from the sanitary sewer. With the exception of the aforementioned Main Street reconstruction, the current work plan is driven by the needs of the sewer system. The work plan should be updated regularly to incorporate capital improvement projects related to infrastructure projects as they become available.

5.1 Implementation of Plan for Rehabilitation and Further Investigation

The focus of this program is the reduction of inflow with the intent of removing at least 25% of the existing peak inflow, representing 1.0 mgd of inflow. Accordingly, the recommended rehabilitation and further investigation of inflow sources are prioritized as follows:

Priority 1A. Redirect the 105 sump pumps identified in Table 4. The cost of removing the private inflow sources is to be borne by the owner of the private property, therefore no cost has been estimated for this work.

Priority 1B. Conduct building inspections on Main Street within the limits of the DOT Main Street Reconstruction project.

Priority 1C. Contact DOT to open a dialogue on integrating sump pump drainage connections into the DOT Main Street Reconstruction project.

Priority 2. Eliminate the 44 private and 5 public inflow sources identified in Tables 2 and 3. This includes the 2 indirect public inflow sources identified in Table 6. The cost of removing the private inflow sources is to be borne by the owner of the private property. The total estimated cost to remove the 3 direct public inflow sources (Table 3) and the 2 indirect public inflow sources (Table 6), including engineering and contingencies, is approximately $2,100, and $22,000 respectively.

Priority 3. Conduct the remaining portion of the 254 follow-up building inspections identified in Attachment A, after Priority 1B is completed, to verify that there are no sources of inflow at these locations. It is anticipated that the follow-up building inspections would be conducted by Town staff, therefore no cost has been estimated for this work. Implement sump pump removal actions for any sump pumps found connected to the sewer system.

Priority 4. Locate and inspect the 84 manholes, as identified in Attachment B, which were not inspected during prior investigations to further identify sources of leakage and to assess the physical condition of manholes in Sewer District 1. It is anticipated that the Suez would uncover and inspect these manholes over time as part of system maintenance efforts, therefore no cost has been estimated for this work.

Priority 5. Initiate the design and construction of the rehabilitation of 32 manholes as identified in Table 5. The total cost of manhole rehabilitation, including engineering and contingencies, is approximately $175,000.

It is anticipated that completing the Priority 1A, 1B, 1C, 2, and 3 actions will reduce inflow by the target level of 1.0 mgd. However it is recommended that Priority 4 and 5 should also be implemented whether the 1.0 mgd reduction is or is not achieved by the higher priority actions.

The recommended inflow source reduction plan should also include, as an integral part, an educational public outreach program and additional basement inspections. The educational public outreach program would consist of mailings and otherwise public posting of the educational brochure as presented in Attachment C as well as press releases. It is anticipated that the educational public outreach program, including mailings and postings, would be conducted with existing Town staffing. Additional basement inspections should be initiated as soon as private inflow sources are identified through the educational public outreach. Given the fact that the DOT is planning reconstruction of Main Street, it is recommended that any follow-up building inspections in the Main Street area, as identified in Attachment A, be conducted first, and any redirection of inflow sources be incorporated into the Main Street reconstruction project. It is anticipated that the basement inspections would also be conducted with existing Town staffing. Inspections of buildings that could not be entered and inspection of sump pump removals are expected to be an on-going program that would continue through the next several years for the removal of private inflow sources.

5.2 Tracking and Documenting I/I Removal Work

It is recommended that the Town track the removal of I/I from its system on a subarea by subarea basis. To facilitate this process, a computer spreadsheet or database should be developed to track steps taken to contact owners of sump pumps or other illegal inflow source required to be removed, and to keep a running total of the I/I sources removed.

5.3 Short- and Long-Term Monitoring

Depending on the nature and extent of I/I removal work, it may be warranted to conduct post-construction flow monitoring as a means of documenting the I/I quantity removed from the system. However, the scope of and need for a monitoring program should be determined by the WPCA on a case by case basis. The South Street WWTF flows should continue to be monitored as the WPCA currently does to assess changes in flows resulting from I/I reduction, and confirm the 1 mgd inflow removal target has been achieved. If the target inflow reduction is not achieved, the need for further I/I removal, or the implementation of flow equalization should be reassessed.

Respectfully Submitted,

AECOM, INC.

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Force Main from Middle School PS

Recreation Center Pump Station

Fox Hill Pump Station

Copps Hill Pump Station

Pump Station

South Street WWTF

Ramapoo Road Pump Station

Quail Ridge Pump Station

2.5" Force Main

2" Force Main

SubArea 1

SubArea 2

SubArea 3

SubArea 4

SubArea 5

SubArea 6

ROBERTS POND

TITICUS POND

Great Swamp

AECOM

Drawn: BC 1/24/2017

Approved: AA 1/24/2017

Map Location

Legend

- Inspected Manhole
- Manhole Not Inspected
- Pump Station
- Force Main
- Municipal Sewer
- Private Sewer
- Streams
- Road Edge
- Waterbodies
- Swamps

SubAreas

- Subarea 1
- Subarea 2
- Subarea 3
- Subarea 4
- Subarea 5
- Subarea 6

N

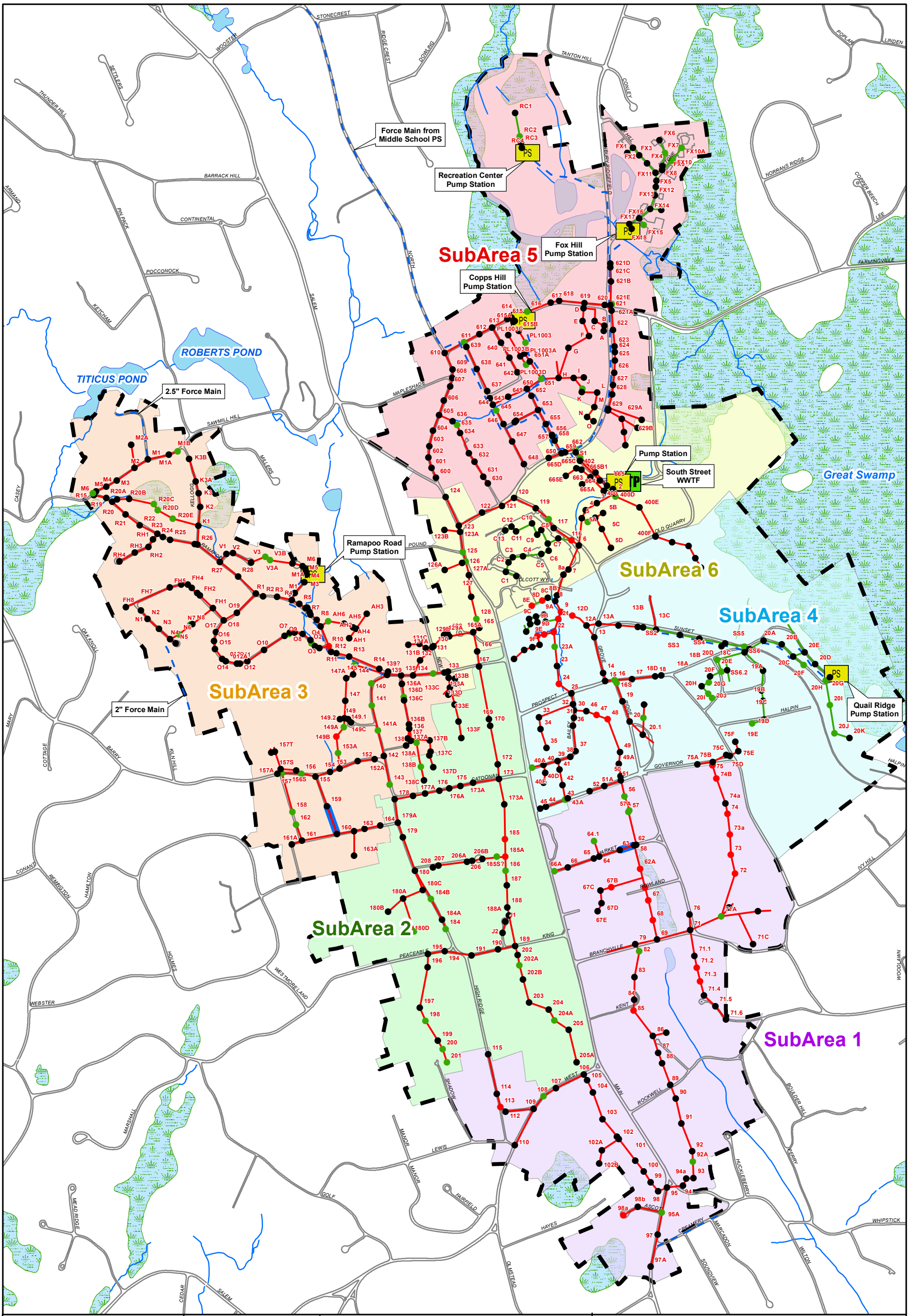
0 200 400 800 Feet

FIGURE 1

MANHOLES INSPECTED

PHASE 2 WASTEWATER FACILITIES PLAN
RIDGEFIELD, CT

G:\Projects\MUNI\60299267RID\Maps\Facilities Flow Report\Figure 1 - Manholes Inspected.mxd



AECOM

Drawn:	BC	1/24/2017
Approved:	AA	1/24/2017

FIGURE 2

SEWERS AND MANHOLES WITH DEFECTS RECOMMENDED FOR REPAIR

PHASE 2 WASTEWATER FACILITIES PLAN
RIDGEFIELD, CT

G:\Projects\MUNI\60299267RID\Maps\Facilities Flow Report\Figure 2 Sewers and Manholes Repair.mxd

Attachment A - Summary List of Buildings for Follow-Up Inspection

Attachment A
Properties Which Did Not Respond After Third Attempt to Conduct Inspection

Subarea	Address
1	19 Ascot Way
1	9 Branchville Rd
1	19 Creamery Ln
1	29 East Ridge Rd
1	56 East Ridge Rd
1	2 Main St
1	8 Main St
1	55 Main St
1	156 Main St
1	200 Main St
1	236 Main St
1	250 Main St
1	43 Rockwell Rd
1	59 Rockwell Rd
1	61 Rockwell Rd
1	16 Rowland Ln
1	19 Rowland Ln
1	25 Rowland Ln
1	26 Rowland Ln
1	349 Wilton Rd East
2	22 Catoonah Street
2	25 Catoonah Street
2	47 Catoonah Street
2	51 Catoonah Street
2	33B Catoonah Street
2	34B Catoonah Street
2	37R Catoonah Street
2	39A Catoonah Street
2	44B Catoonah Street
2	36 Catoonah Street Unit 16
2	36 Catoonah Street Unit B10
2	36 Catoonah Street Unit B7
2	8 Griffith Ln
2	16 Griffith Ln
2	30 Griffith Ln
2	36 Griffith Ln
2	37 Griffith Ln
2	111 High Ridge Ave
2	123 High Ridge Ave
2	125 High Ridge Ave
2	143 High Ridge Ave
2	146 High Ridge Ave
2	148 High Ridge Ave
2	154 High Ridge Ave
2	159 High Ridge Ave
2	63 High Ridge Avenue

Attachment A
Properties Which Did Not Respond After Third Attempt to Conduct Inspection

Subarea	Address
2	44 King Lane
2	21 King Ln
2	139 Main St
2	145 Main St
2	267 Main St
2	305 Main St
2	321 Main St
2	323 Main St
2	325 Main St
2	2 Peaceable St
2	38 Peaceable St
2	42 Peaceable St
2	56 Shadow Ln
2	61 Shadow Ln
3	2 Abbott Ave
3	3 Abbott Ave
3	13 Abbott Ave
3	21 Abbott Ave
3	27 Abbott Ave
3	31 Abbott Ave
3	29 A Abbott Ave
3	29B Abbott Ave
3	8 Barry Ave
3	14 Barry Ave
3	23 Barry Ave
3	25 Barry Ave
3	32 Barry Ave
3	33 Barry Ave
3	34 Barry Ave
3	41 Barry Ave
3	46 Barry Ave
3	6 Berry Ave
3	21 Bryon Ave
3	22 Bryon Ave
3	26 Bryon Ave
3	30 Bryon Ave
3	7 Fairview Ave
3	32 Fairview Ave
3	36 Fairview Ave
3	27 Gilbert Street
3	32 Gilbert Street
3	43 Gilbert Street
3	55 Gilbert Street
3	14 Greenfield Ave
3	15 Greenfield Ave
3	190 High Ridge Ave

Attachment A
Properties Which Did Not Respond After Third Attempt to Conduct Inspection

Subarea	Address
3	192 High Ridge Ave
3	201 High Ridge Ave
3	218 High Ridge Ave
3	25 Kellogg Street
3	5 Mulberry Street
3	7 Mulberry Street
3	14 Mulberry Street
3	28 Mulberry Street
3	8 Nutmeg Court
3	16 Nutmeg Court
3	19 Nutmeg Court
3	20 Overlook Drive
3	7 Ramapoo Hill Road
3	6 Ramapoo Road
3	21 Ramapoo Road
3	34 Ramapoo Road
3	91 Ramapoo Road
3	99 Ramapoo Road
3	7 Victor Drive
4	33 Bailey Ave
4	107 East Ridge St
4	109 East Ridge St
4	500 Main St
4	520 Main St Unit 18
4	520 Main Street Unit 12
4	520 Main Street Unit 6
4	12 Prospect Ridge Unit 12
4	19 Prospect Ridge Unit 2
4	19 Prospect Ridge Unit 20
4	19 Prospect Ridge Unit 23
4	19 Prospect Ridge Unit 3
4	19 Prospect Ridge Unit 32
4	19 Prospect Ridge Unit 4
4	19 Prospect Ridge Unit 43
4	19 Prospect Ridge Unit 45
4	19 Prospect Ridge Unit 51
4	19 Prospect Ridge Unit 52
4	19 Prospect Ridge Unit 6
4	19 Prospect Ridge Unit 63
4	19 Prospect Ridge Unit 7
4	28 Prospect St
4	58 Prospect St
4	120 Prospect St Unit 15
4	120 Prospect St Unit 21
4	120 Prospect St Unit 22
4	120 Prospect St Unit 36

Attachment A
Properties Which Did Not Respond After Third Attempt to Conduct Inspection

Subarea	Address
4	120 Prospect St Unit 4
4	120 Prospect St Unit 5
4	120 Prospect St Unit 50
4	120 Prospect St Unit 51
4	120 Prospect St Unit 53
4	120 Prospect St Unit 54
4	120 Prospect St Unit 58
4	120 Prospect St Unit 6
4	120 Prospect St Unit 60
4	120 Prospect St Unit 61
4	85 Prospect St Unit B
4	59 Prospect St Unit C
4	85 Prospect St Unit C
4	85 Prospect St Unit D
4	85 Prospect St Unit E
4	59 Prospect St Unit J
4	120 Prospect St Until 30
4	13 Sunset Ln
4	17 Sunset Ln
4	19 Sunset Ln
4	23 Sunset Ln
4	47 Sunset Ln
5	2 Cops Hill Rd
5	159 Danbury Road
5	Building 14 Fox Hill - Blackberry Lane 1-4, 6-8 Cottonwood Lane
5	4 Island Hill Ave
5	4 Lafayette Ave
5	6 Lafayette Ave
5	7 Lafayette Ave
5	14 Lafayette Ave
5	16 Lafayette Ave
5	8 Mountain Ave
5	12 Mountain View Ave
5	16 Mountain View Ave
5	5 North Salem Rd
5	17 North Salem Rd
5	24 North St
5	32 North St
5	40 North St
5	42 North St
5	48 North St
5	59 North St
5	10 Roberts Lane
5	16 Roberts Lane
5	3 Rochambeau Ave
5	14 Rochambeau Ave

Attachment A

Properties Which Did Not Respond After Third Attempt to Conduct Inspection

Subarea	Address
5	18 Rochambeau Ave
6	55 Danbury Rd
6	75 Danbury Rd Building A
6	75 Danbury Rd Building B
6	57 Danbury Rd Building C
6	6 Danbury Road
6	66 Grove St Unit 3
6	66 Grove St Unit 4
6	66 Grove St Unit 9
6	66 Grove St Until 11
6	66 Grove St Until 20
6	6 Island Hill Ave
6	13 Lawson Lane
6	14 Lawson Lane
6	19 Lawson Lane
6	607 Main St
6	616 Main St
6	115 Olcott Way
6	2 Silver Birch Lane

Attachment A
House to House Inspection Refusals

Subarea	Address
2	87 High Ridge Road
4	120 Prospect St Unit 11
6	1 Island Hill Avenue

Attachment A
Sump Pumps with Discharge Location not Determined

Subarea	Address	No. of Sump Pumps to Unknown Discharge Location
1	23 High Ridge Avenue	1
1	32 Main Street	1
1	85 Main Street	1
1	120 prospect Ridge Rd	1
1	371 Wilton Road West	1
1	378 Wilton Road West	1
2	27 Catoonah Street	1
2	33 Catoonah Street	1
2	41 Catoonah Street	1
2	36 Catoonah Street Unit 12	1
2	15 Griffith Lane	1
2	34 Griffith Ln	2
2	74 High Ridge Avenue	1
2	55 High Ridge Avenue Guest house	1
2	77 High Ridge Road	1
2	106 High Ridge Road	2
2	139 High Ridge Road	2
2	77 High Ridge Road Pool House	1
2	455 Main	1
2	453 Main Street	1
2	207 Main Street main Church building	1
3	30 Barry Ave	1
3	32 Overlook Dr	1
3	40 Ramapoo Rd	1

Attachment A
Sump Pumps with Discharge Location not Determined

Subarea	Address	No. of Sump Pumps to Unknown Discharge Location
3	15 Ramapoo Road	1
4	16 Bailey Ave	1
4	12 Grove St apartment front	1
4	14 Grove Street	1
4	400 Main Street	1
4	54 Prospect Street	1
4	60 Prospect Street	1
4	4 Sunset Lane	1
5	Building 22 Fox Hill - 1,2,3 Orange Lane, 1,2,6,7,11 Quince Court	1
5	Building 7 Fox Hill - Units 5-8 Island Path, Units 9-12 Elderberry Lane Ridgefield CT	1
5	11 Lafayette Avenue	1
5	27 Roberts Lane	1
6	Building 24 Casagmo - Olcott Way	1
6	613 Main Street	1
Totals		**41**

Attachment A
Buildings with Floor Drains that Experience Flooding or Backups
Whose Discharge Locations Could Not Be Determined

Subarea	Address
1	30 Main Street
2	127 Main Street
4	38 Prospect St
4	490 Main Street
4	120 Prospect St Unit 67
5	13 Rochambeau Ave
6	86 Danbury Rd
N/A	700 North Salem Road
5	125 Danbury Road unit 6
5	130 Danbury Road

Attachment B - Manholes Not Inspected

ATTACHMENT B
MANHOLES NOT INSPECTED

Sewer Subarea	MH No.	Location	Reason
1	56	Veterans Park Field	Not Found
1	57	Veterans Park Field	Not Found
1	82	Branchville Road Easement	Not Found
1	105	Main Street Easement	Could not locate
1	108	29 West Ln.	Not Found
1	57A	Veterans Park Field	Not Found
1	66A	Market St. near Main St.	Not Found
1	71A	East Ridge Middle School	Not Found
1	74A	Between 62 and 74 Prospect Ridge	Not Found
1	92A	Main Street Easement	Not Found
1	95A	398 Main St.	Not Found
2	184	South of 106 High Ridge Ave.	Not Found
2	186	305B Main St.	Not Found
2	198	63 High Ridge Ave.	Not Found
2	200	59 High Ridge Ave.	Not Found
2	201	56 Shadow Ln.	Not Found
2	138B	52 Catoonah St.	Not Found
2	180D	113 High Ridge Ave.	Not Found
2	184B	112 High Ridge Ave.	Not Found
2	185S	36 Griffith Ln.	Not Found
2	202A	207 Main St.	Not Found
2	204A	155 Main St.	Not Found
3	134.1	32 Gilbert St.	Not Opened/Paved over
3	140	223 High Ridge Ave.	Not Found
3	143	173 High Ridge Ave.	Not Found
3	144	21 Ramapoo St	Not Found
3	158	20 Fairview Ave.	Not Found
3	162	15 Fairview Ave.	Not Found
3	136D	8 Abbott Ave	Not Found
3	138A	29 Abbott Ave.	Not Found
3	141A	201 High Ridge Ave.	Not Found
3	149A	15 Mulvaney Ct.	Not Found
3	153A	14 Barry Ave.	Not Found
3	156S	33 Barry Ave.	Not Found
3	157S	Barry Ave/Fairview Ave.	Not Found
3	AH6	40 Ramapoo Rd.	Not Found
3	M1B	1 Mulberry St.	Not Opened
3	M6	Mulberry St./Ramapoo Rd.	Not Opened
3	N6	23 Nutmeg Ct.	Not Found
3	N7	13 Farm Hill Rd.	Not Found
3	O8	20 Overlook Dr.	Not Found
3	R20C	130 Ramapoo Rd.	Not Found
3	R20D	126 Ramapoo Rd.	Not Found
3	R20E	116 Ramapoo Rd.	Not Found
3	V3A	17 Victor Dr.	Not Found

ATTACHMENT B
MANHOLES NOT INSPECTED

Sewer Subarea	MH No.	Location	Reason
3	V3B	70 Ramapoo Rd.	Not Found
4	16	East Ridge/Prospect St.	Not Opened/Paved over
4	20.2	66 Prospect St.	Not Found
4	43	8 Governor St.	Not Found
4	16S	Prospect St./East Ridge	Not Found
4	19E	Ridgefield Housing Authority on Halpin Ln.	Not Found
4	20D	120 Prospect St. Unit 25	Not Found
4	20D.1	19 Prospect Ridge unit 25	Not Found
4	20E.1	19 Prospect Ridge unit 26	Not Found
4	20G.1	19 Prospect Ridge unit 18 rear	Not Found
4	20H	120 Prospect St. Units 41-32 Rear	Not Found
4	20I	120 Prospect St. Units 41-32 Rear	Not Found
4	20I.1	19 Prospect Ridge unit 6	Not Found
4	20J	120 Prospect St. Units 41-32 rear	Not Found
4	20J.1	19 Prospect Ridge unit 4	Not Found
4	40A	Bailey Ave./Main St.	Not Found
4	SS5	Sunset Ln/Prospect St.	Not Found
5	611	Rochambeau Ave./Copps Hill Rd.	Not Opened/Paved over
5	616	Copps Hill Rd.	Not Found
5	645	Mountain View Ave.	Not Found
5	621E	Danbury Rd/Farmingville Rd.	Not Found
5	FX 7	Stone Dr.	Not Found
5	FX10	Stone Dr.	Not Found
5	FX10A	Stone Dr.	Not Found
5	FX15	Fox Hill Dr.	Not Found
5	FX9	Stone Dr.	Not Found
5	J	103 Danbury Rd.	Not Found
5	PL1003	125 Danbury Rd. Behind Stop & Shop	Not Found
5	PL1003D	13 Lafayette	Not Found
5	RC2	193 Danbury Rd.	Not Opened/Cannot open
6	125	Main St./Pound St.	Not Found
6	126	599 Main St.	Not Found
6	128	533 Main St.	Not Found
6	400.1	Back side of Wastewater Treatment Plant	Not Found
6	651	125 Danbury Rd.	Not Found
6	662	65 Danbury Rd.	Not Found
6	663	South St.	Not Found
6	400D	Behind Wastewater Treatment Plant	Not Found
6	5A	66 Grove St. Unit 1	Not Opened/Cannot open

Attachment C – Draft Suggested Educational Brochure

Wastewater Update

The Ridgefield Water Pollution Control Authority (WPCA) continually works to maintain and improve the efficiency of the Town's sanitary sewer collection system and treatment plants and to prevent sewer overflow and backups. As part of the planning process for the Town's wastewater collection and treatment system, the Ridgefield WPCA is undertaking efforts to identify and eliminate sources of Infiltration and Inflow (I/I) to reduce sanitary sewer overflows and sewer back-ups.

Due to the age of the collection system, Infiltration/Inflow (I/I) has historically been an issue at the South Street WWTF since the 1960's. Over the years, the Town has taken proactive steps to address inflow & infiltration (I/I) within its wastewater collection system. Investigations utilizing TV inspections, smoke and dye testing, manhole inspections, flow monitoring and rainfall gauging have been made to identify sources of infiltration and inflow. This data was then used to rehabilitate portions of the wastewater collection system utilizing both traditional (dig and replacement) and trenchless technology methods of construction which have resulted in a reduction in peak wet weather flows. Recent evaluations however, have indicated the presence of high rates of I/I and the need to address it by locating and removing the sources.

Wastewater Update (Continued)

The focus of continued field investigations is to locate sources of I/I that can be removed to reduce the high flows in the wastewater collection system that occur during storms. Removal of these sources will reduce the cost to the sewer users for the needed upgrades to the Town's wastewater collection and treatment facilities.

South Street Wastewater Treatment Facility

For more information
Contact the Ridgefield
Water Pollution Control Authority
at
431-2734
or
Visit our website at
www.ridgefieldct.org

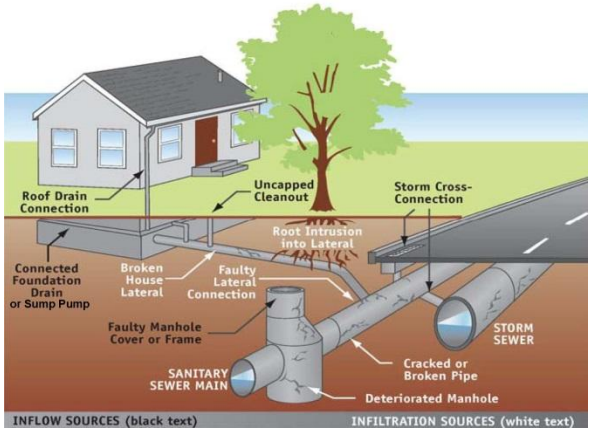
Town of Ridgefield, Connecticut

Inflow & Infiltration (I/I) Removal Program

What is Inflow and Infiltration (I/I)?

Inflow and Infiltration (I/I) are terms used to describe clean water that enters the sewer system. All of this water is called clean water, although it may be dirty, to distinguish it form sanitary sewage.

Typical sources of infiltration and inflow are shown in the figure below.



Improper and damaged connections allow rainwater to bypass the storm system and overwhelm the sanitary sewer system.

Inflow: Inflow is water that is discharged into the sewer system through improper connections, such as downspouts and sump pumps. Most inflow comes from stormwater.

Infiltration: Infiltration is groundwater that enters the sewer system through cracked pipes, leaky manholes, or improperly connected storm drains. Most infiltration comes from groundwater.

Why is this water a problem?

Sanitary sewer systems are designed to carry wastewater away from toilets, dishwashers, sinks, or showers.

Stormwater systems are designed to carry rainwater away, and are normally much larger than sanitary sewer systems. When clean water enters sanitary sewer system, it is transported and treated like sanitary wastewater.

Wet weather magnifies existing inflow and infiltration sources. As a rain event begins, the inflow and infiltration sources start filling the sanitary sewer systems with clean water.

Once the sanitary sewer system has reached capacity or becomes overloaded, wastewater backups may occur, flooding basements and releasing wastewater onto the street.

An overwhelmed sanitary sewer system can result in overflows as shown above.

How can I be sure my property drainage connections are properly connected?

Sump Pumps: If you have a sump pump that is connected to the sanitary sewer system, it should be redirected to the storm system, your property landscape, or a dry well.

Roof Drain Downspouts: If your roof drain downspouts are connected to the sanitary sewer system, they should be redirected onto the ground or to a dry well. Another alternative is to utilize rain barrels to collect roof drain stormwater for use on lawns or gardens.

Sewer Service Connections: Broken or damaged sewer service connections including missing or broken clean out caps, also contribute to groundwater and stormwater entering the sanitary sewer system. These types of defects should be repaired.

Area Drains: Area drains located in driveways, basements, or lawns that drain to the sanitary sewer system should be redirected to the storm drain systems or dry well.

State and local regulations prohibit the discharge of clean water into a sanitary sewer line. If you suspect you have one or more of the connections shown above, please contact the Ridgefield WPCA at 431-2734.

Attachment D - Inflow Survey Form/Basement Inspection Form

INFLOW SURVEY FORM / BASEMENT INSPECTION FORM

General Information

House No. and Street Name:_____ Name of Inspector:_____

Owner Name: _____ Date of Inspection:_____

Owner Address: _____

_____

Telephone: _____

Basement Inspection

Sump Pump: Yes: _____ No: _____ Capacity (gpm, if known):_____

If yes, describe discharge location: _____

Basement Drain: Yes: _____ No: _____

If yes, describe discharge location: _____

Cleanout: Location: Floor / Wall / Other: _____

Condition: Closed / Open / Evidence of Previously Opened?

Outside Inspection:

Roof Leaders: Yes: _____ No: _____

If yes, describe discharge location:

Into ground and connected to sewer: _____

Into ground and connected to drain: _____

Into foundation with discharge location unknown: _____

On top of ground: _____

Other: _____

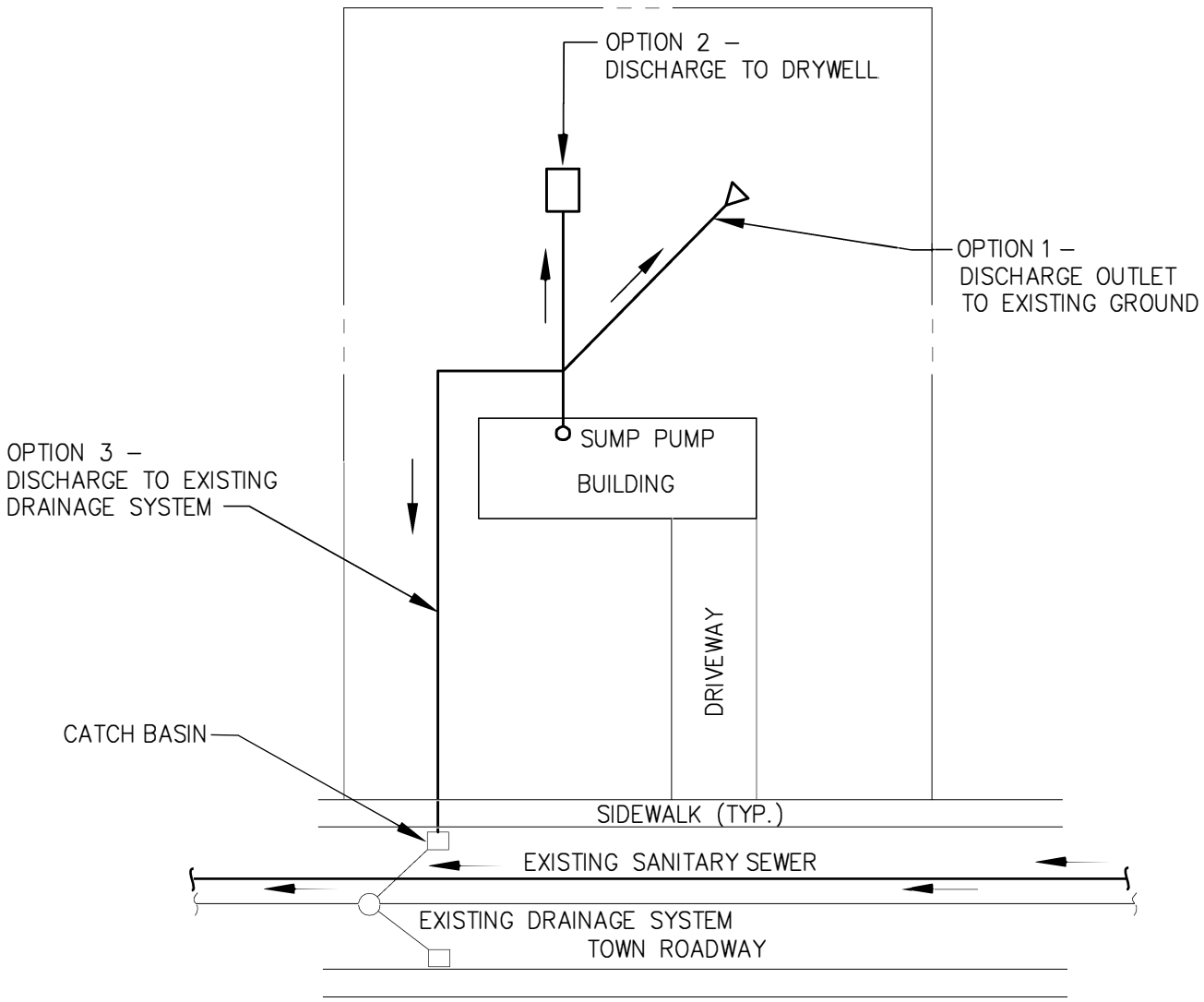
Area Drains: Yes: _____ No: _____

If yes, describe type: Yard / Driveway / Patio / Stairwell / Other: _____

Discharge location: _____

Use the space below to show basement or site diagram, sketch or comments:

Attachment E - Typical Sump Pump Redirect Options



NOTES:

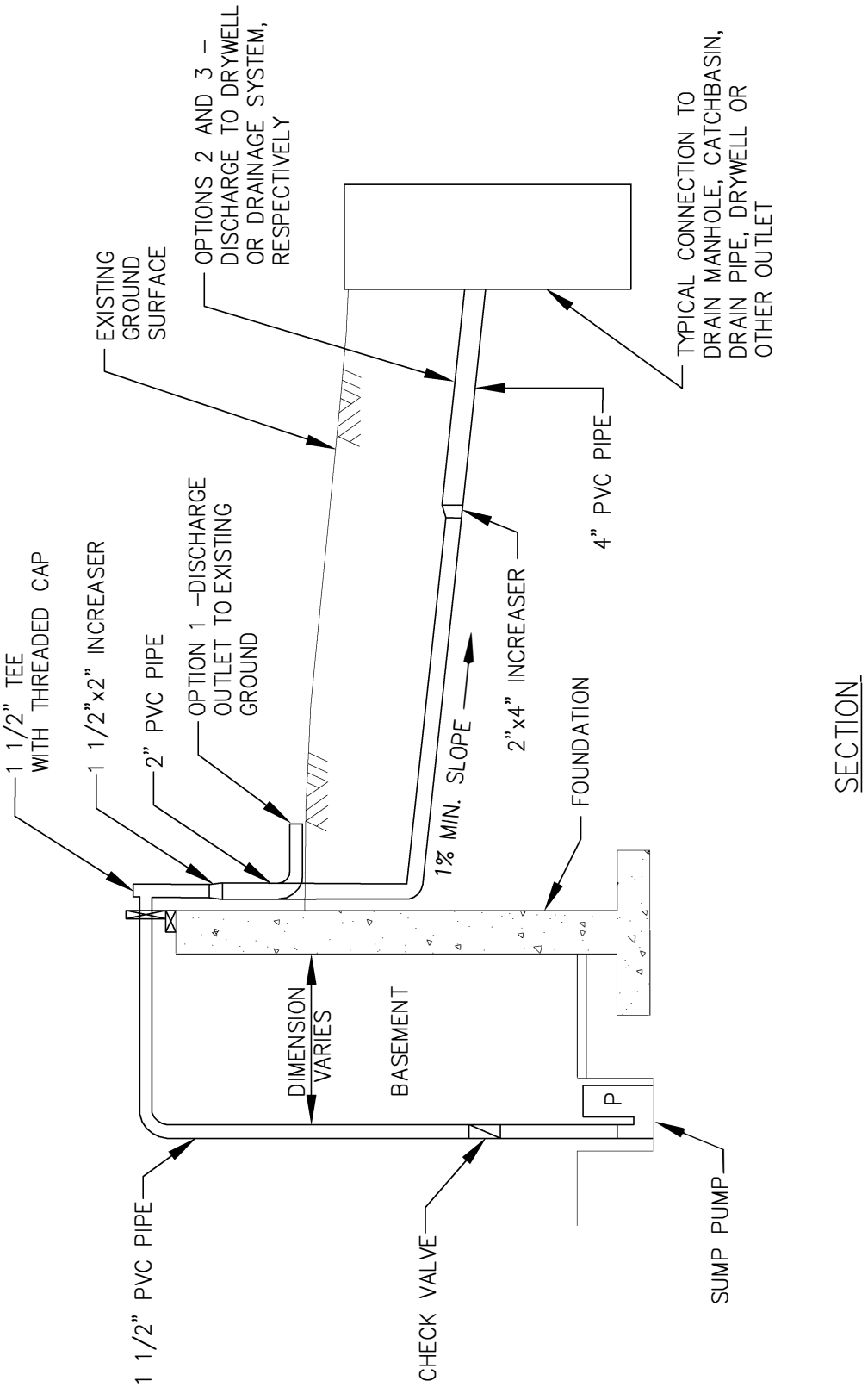
1. DETAIL SHOWS TYPICAL OPTIONS FOR REDIRECTION OF SUMP PUMP AFTER DISCONNECTING FROM SANITARY SEWER. OTHER OPTIONS, NOT SHOWN, MAY ALSO BE CONSIDERED.
2. ENSURE REDIRECTION IS PERFORMED WITHOUT CREATING DRAINAGE PROBLEMS ON OWNER'S PROPERTY OR ADJACENT PROPERTIES.

TOWN OF RIDGEFIELD, CONNECTICUT

PHASE 2 WASTEWATER FACILITIES PLAN
TYPICAL DETAILS FOR
SUMP PUMP REMOVAL

TYPICAL PLAN OF SUMP PUMP
REDIRECTION OPTIONS

SCALE: NTS | DATE: 11/28/16 | AECOM



SECTION

NOTE:

PIPE DIMENSIONS SHOWN MAY VARY.

TOWN OF RIDGEFIELD, CONNECTICUT

PHASE 2 WASTEWATER FACILITIES PLAN
TYPICAL DETAILS FOR
SUMP PUMP REMOVAL

TYPICAL SECTION OF SUMP PUMP REDIRECTION OPTIONS

SCALE: NTS | DATE: 11/28/16 | AECOM

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity

MUNICIPAL NPDES PERMIT

issued to

Permittee:
Town of Ridgefield
400 Main Street, Ridgefield,
Ridgefield, Connecticut 06877

Location Address:
Town of Ridgefield
9101 Ethan Allen Highway (Rte. 7)
Ridgefield, Connecticut 06877

Facility ID: 118-002 **Permit ID:** CT0101451 **Permit Expires:** September 17, 2019

Receiving Stream: Norwalk River **Design Flow Rate:** 0.12 MGD

SECTION 1: GENERAL PROVISIONS

(A) This permit is reissued in accordance with Section 22a-430 of Chapter 446k, Connecticut General Statutes ("CGS"), and Regulations of Connecticut State Agencies ("RCSA") adopted thereunder, as amended, and Section 402(b) of the Clean Water Act, as amended, 33 USC 1251, et. seq., and pursuant to an approval dated September 26, 1973, by the Administrator of the United States Environmental Protection Agency for the State of Connecticut to administer a N.P.D.E.S. permit program.

(B) The Town of Ridgefield ("permittee"), shall comply with all conditions of this permit including the following sections of the RCSA which have been adopted pursuant to Section 22a-430 of the CGS and are hereby incorporated into this permit. **Your attention is especially drawn to the notification requirements of subsection (i)(2), (i)(3), (j)(1), (j)(6), (j)(8), (j)(9)(C), (j)(10)(C), (j)(11)(C), (D), (E), and (F), (k)(3) and (4) and (1)(2) of Section 22a-430-3.** To the extent this permit imposes conditions more stringent than those found in the regulations, this permit shall apply.

Section 22a-430-3 General Conditions

- **(a)** Definitions
- **(b)** General
- **(c)** Inspection and Entry
- **(d)** Effect of a Permit
- **(e)** Duty to Comply
- **(f)** Proper Operation and Maintenance
- **(g)** Sludge Disposal
- **(h)** Duty to Mitigate
- **(i)** Facility Modifications; Notification
- **(j)** Monitoring, Records and Reporting Requirements
- **(k)** Bypass
- **(l)** Conditions Applicable to POTWs
- **(m)** Effluent Limitation Violations
- **(n)** Enforcement
- **(o)** Resource Conservation
- **(p)** Spill Prevention and Control
- **(q)** Instrumentation, Alarms, Flow Recorders
- **(r)** Equalization

Section 22a-430-4 Procedures and Criteria

- **(a)** Duty to Apply
- **(b)** Duty to Reapply
- **(c)** Application Requirements
- **(d)** Preliminary Review
- **(e)** Tentative Determination
- **(f)** Draft Permits, Fact Sheets
- **(g)** Public Notice, Notice of Hearing

(h) Public Comments
(i) Final Determination
(j) Public Hearings
(k) Submission of Plans and Specifications. Approval.
(l) Establishing Effluent Limitations and Conditions
(m) Case-by-Case Determinations
(n) Permit Issuance or Renewal
(o) Permit or Application Transfer
(p) Permit Revocation, Denial or Modification
(q) Variances
(r) Secondary Treatment Requirements
(s) Treatment Requirements
(t) Discharges to POTWs - Prohibitions

(C) Violations of any of the terms, conditions, or limitations contained in this permit may subject the permittee to enforcement action including, but not limited to, seeking penalties, injunctions and/or forfeitures pursuant to applicable sections of the CGS and RCSA.

(D) Any false statement in any information submitted pursuant to this Section of the permit may be punishable as a criminal offense under Section 22a-438 or 22a-131a of the CGS or in accordance with Section 22a-6, under Section 53a-157b of the CGS.

(E) The permittee shall comply with Section 22a-416-1 through Section 22a-416-10 of the RCSA concerning operator certification.

(F) No provision of this permit and no action or inaction by the Commissioner shall be construed to constitute an assurance by the Commissioner that the actions taken by the permittee pursuant to this permit will result in compliance or prevent or abate pollution.

(G) Nothing in this permit shall relieve the permittee of other obligations under applicable federal, state and local law.

(H) An annual fee shall be paid for each year this permit is in effect as set forth in Section 22a-430-7 of the RCSA. As of October 1, 2009 the annual fee is $ 1722.50.

SECTION 2: DEFINITIONS

(A) The definitions of the terms used in this permit shall be the same as the definitions contained in Section 22a-423 of the CGS and Section 22a-430-3(a) and 22a-430-6 of the RCSA, except for "Composite" and "No Observable Acute Effect Level (NOAEL)" which are redefined below.

(B) In addition to the above, the following definitions shall apply to this permit:

"------" in the limits column on the monitoring tables in Attachment 1 means a limit is not specified but a value must be reported on the DMR, MOR, and/or the ATMR.

"Annual" in the context of any sampling frequency, shall mean the sample must be collected in the month of February.

"Average Monthly Limit" means the maximum allowable "Average Monthly Concentration" as defined in Section 22a-430-3(a) of the RCSA when expressed as a concentration (e.g. mg/l); otherwise, it means "Average Monthly Discharge Limitation" as defined in Section 22a-430-3(a) of the RCSA.

"Bi-Weekly" in the context of any sampling frequency, shall mean once every two weeks.

"Composite" or **"(C)"** means a sample consisting of a minimum of eight aliquot samples collected at equal intervals of no less than 30 minutes and no more than 60 minutes and combined proportionally to flow over the sampling period provided that during the sampling period the peak hourly flow is experienced.

"Critical Test Concentration" or **"(CTC)"** means the specified effluent dilution at which the permittee is to conduct a single-concentration Aquatic Toxicity Test.

"Daily Composite" or **"(DC)"** means a composite sample taken over a full operating day consisting of grab samples collected at equal intervals of no more than sixty (60) minutes and combined proportionally to flow; or, a composite sample continuously collected over a full operating day proportionally to flow.

"Daily Concentration" means the concentration of a substance as measured in a daily composite sample, or, arithmetic average of all grab

sample results defining a grab sample average.

"Daily Quantity" means the quantity of waste discharged during an operating day.

"Geometric Mean" is the "n"th root of the product of "n" observations.

"Infiltration" means water other than wastewater that enters a sewer system (including sewer system and foundation drains) from the ground through such means as defective pipes, pipe joints, connections, or manholes. Infiltration does not include, and is distinguished from, inflow.

"Inflow" means water other than wastewater that enters a sewer system (including sewer service connections) from sources such as, but not limited to, roof leaders, cellar drains, yard drains, area drains, drains from springs and swampy areas, cross connections between storm sewers and sanitary sewers, catch basins, cooling towers, storm waters, surface runoff, street wash waters, or drainage. Inflow does not include, and is distinguished from, infiltration.

"Instantaneous Limit" means the highest allowable concentration of a substance as measured by a grab sample, or the highest allowable measurement of a parameter as obtained through instantaneous monitoring.

"In-stream Waste Concentration" or **"(IWC)"** means the concentration of a discharge in the receiving water after mixing has occurred in the allocated zone of influence.

"MGD" means million gallons per day.

"Maximum Daily Limit" means the maximum allowable "Daily Concentration" (defined above) when expressed as a concentration (e.g. mg/l), otherwise, it means the maximum allowable "Daily Quantity" as defined above, unless it is expressed as a flow quantity. If expressed as a flow quantity it means "Maximum Daily Flow" as defined in Section 22a-430-3(a) of the RCSA.

"Monthly Minimum Removal Efficiency" means the minimum reduction in the pollutant parameter specified when the effluent average monthly concentration for that parameter is compared to the influent average monthly concentration.

"NA" as a Monitoring Table abbreviation means "not applicable".

"NR" as a Monitoring Table abbreviation means "not required".

"No Observable Acute Effect Level" or **"(NOAEL)"** means any concentration equal to or less than the critical test concentration in a single concentration (pass/fail) toxicity test, conducted pursuant to Section 22a-430-3(j)(7)(A)(i) of the RCSA, demonstrating 90% or greater survival of test organisms at the CTC.

"Quarterly" in the context of any sampling frequency, shall mean sampling is required in the months of February, May, August and November.

"Range During Sampling" or **"(RDS)"** as a sample type means the maximum and minimum of all values recorded as a result of analyzing each grab sample of; 1) a Composite Sample, or, 2) a Grab Sample Average. For those permittees with pH meters that provide continuous monitoring and recording, Range During Sampling means the maximum and minimum readings recorded with the continuous monitoring device during the Composite or Grab Sample Average sample collection.

"Range During Month" or **"(RDM)"** as a sample type means the lowest and the highest values of all of the monitoring data for the reporting month.

"Sanitary Sewage" means wastewaters from residential, commercial and industrial sources introduced by direct connection to the sewerage collection system tributary to the treatment works including non-excessive inflow/infiltration sources.

"Twice per Month" in the context of any sampling frequency, mean two samples per calendar month collected no less than 12 days apart.

"ug/l" means micrograms per liter.

"Work Day" in the context of a sampling frequency means, Monday through Friday excluding holidays.

SECTION 3: COMMISSIONER'S DECISION

(A) The Commissioner of Energy and Environmental Protection ("Commissioner") has issued a final decision and found continuance of the existing system to treat the discharge will protect the waters of the state from pollution. The Commissioner's decision is based on application

#200900547 for permit reissuance received on February 24, 2009 and the administrative record established in the processing of that application.

(B) The Commissioner hereby authorizes the Permittee to discharge in accordance with the provisions of this permit, the above referenced application, and all approvals issued by the Commissioner or his authorized agent for the discharges and/or activities authorized by, or associated with, this permit.

(C) The Commissioner reserves the right to make appropriate revisions to the permit, if required after Public Notice, in order to establish any appropriate effluent limitations, schedules of compliance, or other provisions which may be authorized under the Federal Clean Water Act or the CGS or regulations adopted thereunder, as amended. The permit as modified or renewed under this paragraph may also contain any other requirements of the Federal Clean Water Act or CGS or regulations adopted thereunder which are then applicable.

SECTION 4: GENERAL LIMITATIONS AND OTHER CONDITIONS

(A) The Permittee shall not accept any new sources of non-domestic wastewater conveyed to its POTW through its sanitary sewerage system or by any means other than its sanitary sewage system unless the generator of such wastewater; (a) is authorized by a permit issued by the Commissioner under Section 22a-430 CGS (individual permit), or, (b) is authorized under Section 22a-430b (general permit), or, (c) has been issued an emergency or temporary authorization by the Commissioner under Section 22a-6k. All such non-domestic wastewaters shall be processed by the POTW via receiving facilities at a location and in a manner prescribed by the permittee which are designed to contain and control any unplanned releases.

(B) No new discharge of domestic sewage from a single source to the POTW in excess of 6,000 gallons per day shall be allowed by the permittee until the permittee has notified in writing the Municipal Facilities Section of said new discharge.

(C) The permittee shall maintain a system of user charges based on actual use sufficient to operate and maintain the POTW (including the collection system) and replace critical components.

(D) The permittee shall maintain a sewer use ordinance that is consistent with the Model Sewer Ordinance for Connecticut Municipalities prepared by the Department of Energy and Environmental Protection. The Commissioner of Energy and Environmental Protection alone may authorize certain discharges which may not conform to the Model Sewer Ordinance.

(E) No discharge shall contain or cause in the receiving stream a visible oil sheen, floating solids, visible discoloration, or foaming.

(F) No discharge shall cause acute or chronic toxicity in the receiving water body beyond any Zone Of Influence (ZOI) specifically allocated to that discharge in this permit.

(G) The permittee shall maintain an alternate power source adequate to provide full operation of all pump stations in the sewerage collection system and to provide a minimum of primary treatment and disinfection at the water pollution control facility to insure that no discharge of untreated wastewater will occur during a failure of a primary power source.

(H) The average monthly effluent concentration shall not exceed 10% of the average monthly influent concentration for BOD_5 and Total Suspended Solids for all daily composite samples taken in any calendar month.

(I) Any new or increased amount of sanitary sewage discharge to the sewer system is prohibited where it will cause a dry weather overflow or exacerbate an existing dry weather overflow.

(J) Sludge Conditions

(1) The permittee shall comply with all existing federal and state laws and regulations that apply to sewage sludge use and disposal practices, including but not limited to 40 CFR Part 503.

(2) If an applicable management practice or numerical limitation for pollutants in sewage sludge more stringent than existing federal and state regulations is promulgated under Section 405(d) of the Clean Water Act (CWA), this permit shall be modified or revoked and reissued to conform to the promulgated regulations.

(3) The permittee shall give prior notice to the Commissioner of any change(s) planned in the permittees' sludge use or disposal practice. A change in the permittees' sludge use or disposal practice may be a cause for modification of the permit.

(4) Testing for inorganic pollutants shall follow "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846 as updated and/or revised.

(K) This permit becomes effective on the 1st day of the month following the date of signature.

(L) When the arithmetic mean of the average daily flow from the POTW for the previous 180 days exceeds 90% of the design flow rate, the permittee shall develop and submit within one year, for the review and approval of the Commissioner, a plan to accommodate future increases in flow to the plant. This plan shall include a schedule for completing any recommended improvements and a plan for financing the improvements.

(M) When the arithmetic mean of the average daily BOD_5 or TSS loading into the POTW for the previous 180 days exceeds 90% of the design load rate, the permittee shall develop and submit for the review of the Commissioner within one year, a plan to accommodate future increases in load to the plant. This plan shall include a schedule for completing any recommended improvements and a plan for financing the improvements.

(N) On or before July 31st of each calendar year the main flow meter shall be calibrated by an independent contractor in accordance with the manufacturer's specifications. The actual record of the calibration shall be retained onsite and, upon request, the permittee shall submit to the Commissioner a copy of that record.

(O) The permittee shall operate and maintain all processes as installed in accordance with the approved plans and specifications and as outlined in the associated operation and maintenance manual. This includes but is not limited to all preliminary treatment processes, primary treatment processes, recycle pumping processes, anaerobic treatment processes, anoxic treatment processes, aerobic treatment processes, flocculation processes, effluent filtration processes or any other processes necessary for the optimal removal of pollutants. The permittee shall not bypass or fail to operate any of the aforementioned processes without the written approval of the Commissioner.

(P) The temperature of any discharge shall not increase the temperature of the receiving stream above 85°F, or, in any case, raise the normal temperature of the receiving stream more than 4°F.

SECTION 5: SPECIFIC EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

(A) The discharge(s) shall not exceed and shall otherwise conform to the specific terms and conditions listed in this permit. The discharge is restricted by, and shall be monitored in accordance with Tables **A** through **F** incorporated in this permit as Attachment 1.

(B) The Permittee shall monitor the performance of the treatment process in accordance with the Monthly Operating Report (MOR) incorporated in this permit as Attachment 2.

SECTION 6: SAMPLE COLLECTION, HANDLING and ANALYTICAL TECHNIQUES

(A) Chemical Analysis

(1) Chemical analyses to determine compliance with effluent limits and conditions established in this permit shall be performed using the methods approved pursuant to the Code of Federal Regulations, Part 136 of Title 40 (40 CFR 136) unless an alternative method has been approved in writing pursuant to 40 CFR 136.4 or as provided in Section 22a-430-3-(j)(7) of the RCSA. Chemicals which do not have methods of analysis defined in 40 CFR 136 or the RCSA shall be analyzed in accordance with methods specified in this permit.

(2) All metals analyses identified in this permit shall refer to analyses for Total Recoverable Metal, as defined in 40 CFR 136 unless otherwise specified.

(3) Grab samples shall be taken during the period of the day when the peak hourly flow is normally experienced.

(4) Samples collected for bacteriological examination shall be collected between the hours of 11 a.m. and 3 p.m. or at that time of day when the peak hourly flow is normally experienced.

(5) The Minimum Levels specified below represent the concentrations at which quantification must be achieved and verified during the chemical analyses for the parameters identified in Attachment 1, Tables A and C. Analyses for these parameters must include check standards within ten percent of the specified Minimum Level or calibration points equal to or less than the specified Minimum Level.

Parameter	Minimum Level
Aluminum	0.050 mg/l
Ammonia Nitrogen	0.010 mg/l
Arsenic, Total	0.005 mg/l
Beryllium, Total	0.001 mg/l
Cadmium, Total	0.0005 mg/l
Chlorine, Total Residual	0.050 mg/l

Chromium, Total	0.005 mg/l
Chromium, Total Hexavalent	0.010 mg/l
Copper, Total	0.005 mg/l
Cyanide, Total	0.010 mg/l
Iron, Total	0.040 mg/l
Lead, Total	0.005 mg/l
Mercury, Total	0.0002 mg/l
Nickel, Total	0.005 mg/l
Phosphorus, Total	0.10 mg/l
Selenium, Total	0.005 mg/l
Silver, Total	0.002 mg/l
Thallium, Total	0.005 mg/l
Zinc, Total	0.020 mg/l

(6) The value of each parameter for which monitoring is required under this permit shall be reported to the maximum level of accuracy and precision possible consistent with the requirements of this Section of the permit.

(7) Effluent analyses for which quantification was verified during the analysis at or below the minimum levels specified in this Section and which indicate that a parameter was not detected shall be reported as "less than x" where 'x' is the numerical value equivalent to the analytical method detection limit for that analysis.

(8) Results of effluent analyses which indicate that a parameter was not present at a concentration greater than or equal to the Minimum Level specified for that analysis shall be considered equivalent to zero (0.0) for purposes of determining compliance with effluent limitations or conditions specified in this permit.

(B) Acute Aquatic Toxicity Test

(1) Samples for monitoring of Acute Aquatic Toxicity shall be collected and handled as prescribed in "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" (EPA-821-R-02-012).

(a) Composite samples shall be chilled as they are collected. Grab samples shall be chilled immediately following collection. Samples shall be held at 0 - 6°C until Acute Aquatic Toxicity testing is initiated.

(b) Effluent samples shall not be dechlorinated, filtered, or, modified in any way, prior to testing for Acute Aquatic Toxicity unless specifically approved in writing by the Commissioner for monitoring at this facility. Facilities with effluent dechlorination and/or filtration designed as part of the treatment process are not required to obtain approval from the Commissioner.

(c) Samples shall be taken at the final effluent for Acute Aquatic Toxicity unless otherwise approved in writing by the Commissioner for monitoring at this facility.

(d) Chemical analyses of the parameters identified in Attachment 1, Table C shall be conducted on an aliquot of the same sample tested for Acute Aquatic Toxicity.

(i) At a minimum, pH, specific conductance, total alkalinity, total hardness, and total residual chlorine shall be measured in the effluent sample and, during Acute Aquatic Toxicity tests, in the highest concentration of the test and in the dilution (control) water at the beginning of the test and at test termination. If total residual chlorine is not detected at test initiation, it does not need to be measured at test termination. Dissolved oxygen, pH, and temperature shall be measured in the control and all test concentrations at the beginning of the test, daily thereafter, and at test termination.

(e) Tests for Acute Aquatic Toxicity shall be initiated within 36 hours of sample collection.

(2) Monitoring for Acute Aquatic Toxicity to determine compliance with the permit limit on Acute Aquatic Toxicity (invertebrate) shall be conducted for 48 hours utilizing neonatal (less than 24 hours old) *Daphnia pulex*.

(3) Monitoring for Acute Aquatic Toxicity to determine compliance with the permit limit on Acute Aquatic Toxicity (vertebrate) shall be conducted for 48 hours utilizing larval (1 to 14-day old with no more than 24 hours range in age) *Pimephales promelas*.

(4) Tests for Acute Aquatic Toxicity shall be conducted as prescribed for static non-renewal acute tests in "Methods for measuring the Acute Aquatic Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" (EPA/821-R-02-012), except as specified below.

(a) For Acute Aquatic Toxicity limits, and for monitoring only conditions, expressed as a NOAEL value, Pass/Fail (single concentration) tests shall be conducted at a specified Critical Test Concentration (CTC) equal to the Aquatic Toxicity limit, (100% in the case of monitoring only conditions), as prescribed in Section 22a-430-3(j)(7)(A)(i) of the RCSA.

(b) Organisms shall not be fed during the tests.

(c) Synthetic freshwater prepared with deionized water adjusted to a hardness of 50±5 mg/L as $CaCO_3$ shall be used as dilution water in the tests.

(d) Copper nitrate shall be used as the reference toxicant.

(5) For limits expressed as NOAEL = 100%, compliance shall be demonstrated when the results of a valid pass/fail Acute Aquatic Toxicity Test indicate 90% or greater survival in the effluent sample at the CTC (100%).

(C) Chronic Aquatic Toxicity Test for Freshwater Discharges

(1) Chronic Aquatic Toxicity testing of the discharge shall be conducted annually during July, August, or September of each year.

(2) Chronic Aquatic Toxicity testing shall be performed on the discharge in accordance with the test methodology established in "Short-Term Methods for Estimating The Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms" (EPA-821-R-02-013) as referenced in 40 CFR 136 for *Ceriodaphnia* survival and reproduction and Fathead minnow larval survival and growth.

(a) Chronic Aquatic Toxicity tests shall utilize a minimum of five effluent dilutions prepared using a dilution factor of 0.5 (100% effluent, 50% effluent, 25% effluent, 12.5% effluent, 6.25% effluent).

(b) Norwalk River water collected immediately upstream of the area influenced by the discharge shall be used as control (0% effluent) and dilution water in the toxicity tests.

(c) A laboratory water control consisting of synthetic freshwater prepared in accordance with EPA-821-R-02-013 at a hardness of 50±5 mg/l shall be used as an additional control (0% effluent) in the toxicity tests.

(d) Daily composite samples of the discharge (final effluent following disinfection) and grab samples of the Norwalk River, for use as site water control and dilution water, shall be collected on day 0 for test solution renewal on day 1 and day 2 of the test; day 2, for test solution renewal on day 3 and day 4 of the test; and day 4, for test solution renewal for the remainder of the test. Samples shall not be pH or hardness adjusted, or chemically altered in any way.

(3) All samples of the discharge and Norwalk River water used in the Chronic Aquatic Toxicity test shall, at a minimum, be analyzed and results reported in accordance with the provisions listed in Section 6(A) of this permit for the parameters listed in Attachment 1, Table C included herein, excluding Acute Aquatic Toxicity organism testing.

SECTION 7: RECORDING AND REPORTING REQUIREMENTS

(A) The results of chemical analyses and any aquatic toxicity test required above in Section 5 and the referenced Attachment 1 shall be entered on the Discharge Monitoring Report (DMR) and reported to the Bureau of Water Protection and Land Reuse. The report shall also include a detailed explanation of any violations of the limitations specified. The DMR must be received at the following address by the 15th day of the month following the month in which samples are collected.

ATTN: Municipal Wastewater Monitoring Coordinator
Connecticut Department of Energy and Environmental Protection
Bureau of Water Protection and Land Reuse, Planning and Standards Division
79 Elm Street
Hartford, Connecticut 06106-5127

(1) For composite samples, from other than automatic samplers, the instantaneous flow and the time of each aliquot sample collection shall be recorded and maintained at the POTW.

(B) Complete and accurate test data, including percent survival of test organisms in each replicate test chamber, LC_{50} values and 95% confidence intervals for definitive test protocols, and all supporting chemical/physical measurements performed in association with any aquatic toxicity test, shall be entered on the Aquatic Toxicity Monitoring Report form (ATMR) and sent to the Bureau of Water Protection and Land Reuse at the address specified above in Section 7 (A) of this permit by the 15th day of the month following the month in which samples are collected.

(C) The results of the process monitoring required above in Section 5 shall be entered on the Monthly Operating Report (MOR) form, included herein as Attachment 2, and reported to the Bureau of Water Protection and Land Reuse. The MOR report shall also be accompanied by a detailed explanation of any violations of the limitations specified. The MOR, must be received at the address specified above in Section 7 (A) of this permit by the 15th day of the month following the month in which the data and samples are collected.

(D) A complete and thorough report of the results of the chronic toxicity monitoring outlined in Section 6(C) shall be prepared as outlined in Section 10 of EPA-821-R-02-013 and submitted to the Department for review on or before December 31 of each calendar year to the address specified above in Section 7 (A) of this permit.

(E) NetDMR Reporting Requirements

(1) Unless otherwise approved in writing by the Commissioner, no later than one-hundred and twenty (120) days after the issuance of this permit, the Permittee shall begin reporting to the Department electronically using NetDMR, a web-based tool that allows Permittees to electronically submit discharge monitoring reports (DMRs) and other required reports through a secure internet connection. Specific requirements regarding subscription to NetDMR and submittal of data and reports in hard copy form and for submittal using NetDMR are described below:

(a) NetDMR Subscriber Agreement

On or before fifteen (15) days after the issuance of this permit, the Permittee and/or the person authorized to sign the Permittee's discharge monitoring reports ("Signatory Authority") as described in RCSA Section 22a-430-3(b)(2) shall contact the Department and initiate the subscription process for electronic submission of Discharge Monitoring Report (DMR) information. On or before ninety (90) days after issuance of this permit the Permittee shall submit a signed and notarized copy of the *Connecticut DEP NetDMR Subscriber Agreement* to the Department.

(b) Submittal of Reports Using NetDMR

Unless otherwise approved by the Commissioner, on or before one-hundred and twenty (120) days after issuance of this permit, the Permittee and/or the Signatory Authority shall electronically submit DMRs and reports required under this permit to the Department using NetDMR in satisfaction of the DMR submission requirement of this permit. DMRs shall be submitted electronically to the Department no later than the 15th day of the month following the completed reporting period.

(c) Submittal of NetDMR Opt-Out Requests

If the Permittee is able to demonstrate a reasonable basis, such as technical or administrative infeasibility, that precludes the use of NetDMR for electronically submitting DMRs and reports, the Commissioner may approve the submission of DMRs and other required reports in hard copy form ("opt-out request"). Opt-out requests must be submitted in writing to the Department for written approval on or before fifteen (15) days prior to the date a Permittee would be required under this permit to begin filing DMRs and other reports using NetDMR. This demonstration shall be valid for twelve (12) months from the date of the Department's approval and shall thereupon expire. At such time, DMRs and reports shall be submitted electronically to the Department using NetDMR unless the Permittee submits a renewed opt-out request and such request is approved by the Department.

All opt-out requests and requests for the NetDMR subscriber form should be sent to the following address:

Attn: NetDMR Coordinator
Connecticut Department of Energy and Environmental Protection
Water Permitting and Enforcement Division – 2nd Floor
79 Elm Street
Hartford, CT 06106-5127

SECTION 8: RECORDING AND REPORTING OF VIOLATIONS, ADDITIONAL TESTING REQUIREMENTS, BYPASSES, MECHANICAL FAILURES, AND MONITORING EQUIPMENT FAILURES

(A) If any Acute Aquatic Toxicity sample analysis indicates toxicity, or that the test was invalid, an additional sample of the effluent shall be collected and tested for Acute Aquatic Toxicity and associated chemical parameters, as described above in Section 5 and Section 6, and the results reported to the Bureau of Water Protection and Land Reuse (Attn: Aquatic Toxicity) via the ATMR form (see Section 7 (B)) within 30 days of the previous test. These test results shall also be reported on the next month's DMR report pursuant to Section 7 (A). The results of all toxicity tests and associated chemical parameters, valid and invalid, shall be reported.

(B) If any two consecutive Acute Aquatic Toxicity test results or any three Acute Aquatic Toxicity test results in a twelve month period indicates toxicity, the permittee shall immediately take all reasonable steps to eliminate toxicity wherever possible and shall submit a report, to the

Bureau of Water Protection and Land Reuse (Attn: Aquatic Toxicity), for the review and written approval of the Commissioner in accordance with Section 22a-430-3(j)(10)(c) of the RCSA describing proposed steps to eliminate the toxic impact of the discharge on the receiving water body. Such a report shall include a proposed time schedule to accomplish toxicity reduction and the permittee shall comply with any schedule approved by the Commissioner.

(C) Section 22a-430-3(k) of the RCSA shall apply in all instances of bypass including a bypass of the treatment plant or a component of the sewage collection system planned during required maintenance. The Department of Energy and Environmental Protection, Bureau of Water Protection and Land Reuse, Planning and Standards Division, Municipal Facilities Section (860) 424-3704, the Department of Public Health, Water Supply Section (860) 509-7333 and Recreation Section (860) 509-7297, and the local Director of Health shall be notified within 2 hours of the permittee learning of the event by telephone during normal business hours. If the discharge or bypass occurs outside normal working hours (8:30 a.m. to 4:30 p.m. Monday through Friday), notification shall be made within 2 hours of the permittee learning of the event to the Emergency Response Unit at (860) 424-3338 and the Department of Public Health at (860) 509-8000. A written report shall be submitted to the Department of Energy and Environmental Protection, Bureau of Water Protection and Land Reuse, Planning and Standards Division, Municipal Facilities Section within five days of the permittee learning of each occurrence, or potential occurrence, of a discharge or bypass of untreated or partially treated sewage.

The written report shall contain:

(i) The nature and cause of the bypass, permit violation, treatment component failure, and/or equipment failure,

(ii) the time the incident occurred and the anticipated time which it is expected to continue or, if the condition has been corrected, the duration,

(iii) the estimated volume of the bypass or discharge of partially treated or raw sewage,

(iv) the steps being taken to reduce or minimize the effect on the receiving waters, and

(v) the steps that will be taken to prevent reoccurrence of the condition in the future.

(D) Section 22a-430-3(j) 11 (D) of the RCSA shall apply in the event of any noncompliance with a maximum daily limit and/or any noncompliance that is greater than two times any permit limit. The permittee shall notify in the same manner as in paragraph C of this Section, the Department of Energy and Environmental Protection, Bureau of Water Protection and Land Reuse Planning and Standards Division, Municipal Facilities Section except, if the noncompliance occurs outside normal working hours (8:30 a.m. to 4:30 p.m. Monday through Friday) the permittee may wait to make the verbal report until 10:30 am of the next business day after learning of the noncompliance.

(E) Section 22a-430-3(j) 8 of the RCSA shall apply in all instances of monitoring equipment failures that prevent meeting the requirements in this permit. In the event of any such failure of the monitoring equipment including, but not limited to, loss of refrigeration for an auto-sampler or lab refrigerator or loss of flow proportion sampling ability, the permittee shall notify in the same manner as in paragraph C of this Section, the Department of Energy and Environmental Protection, Bureau of Water Protection and Land Reuse, Planning and Standards Division, Municipal Facilities Section except, if the failure occurs outside normal working hours (8:30 a.m. to 4:30 p.m. Monday through Friday) the permittee may wait to make the verbal report until 10:30 am of the next business day after learning of the failure.

(F) In addition to the reporting requirements contained in Section 22a-430-3(i), (j), and (k) of the Regulations of Connecticut State Agencies, the permittee shall notify in the same manner as in paragraph C of this Section, the Department of Energy and Environmental Protection, Bureau of Water Protection and Land Reuse, Planning and Standards Division, Municipal Facilities Section concerning the failure of any major component of the treatment facilities which the permittee may have reason to believe would result in an effluent violation.

SECTION 9: COMPLIANCE SCHEDULES

(A) The permittee shall achieve the final water quality-based effluent limits for **phosphorus** for DSN 001-1 established in Section 5 of this permit, in accordance with the following:

(1) The permittee has retained AECOM Technical Services, Inc., to prepare the documents and implement or oversee the actions required by this permit. The permittee shall retain one or more qualified consultant(s) acceptable to the Commissioner until this permit is fully complied with, and, within ten days after retaining any consultant other than the one originally identified under this paragraph, the permittee shall notify the Commissioner in writing of the identity of such other consultant. The consultant(s) retained shall be a qualified professional engineer licensed to practice in Connecticut. The permittee shall submit to the Commissioner a description of a consultant's education, experience and training which is relevant to the work required by this permit within ten days after a request for such a description. Nothing in this paragraph shall preclude the Commissioner from finding a previously acceptable consultant unacceptable.

(2) On or before 240 days after the date of issuance of this permit, the permittee shall submit for the Commissioner's review and written approval a comprehensive and thorough engineering report which describes and evaluates alternative actions as outlined below which may be taken by permittee to achieve compliance with the Phosphorus limitations in Section 5 of this permit. Such report shall contain at a minimum:

(a) A summary of existing facilities, service areas, and conditions in Sewer District 1 and 2;

(b) The findings of the in-plant sampling efforts;

(c) An evaluation of existing flows and loadings, including an assessment of the magnitude of Inflow & Infiltration in Sewer Districts 1 and 2;

(d) A summary of findings of the smoke testing and recommendations for subsequent dye testing and due water flooding;

(e) Identification of areas where extension of the collection system is recommended;

(f) An updated review of the Route 7 WWTF Influent Pump Station and Quail Ridge Pump Station condition and summary of their needs;

(g) A summary of the evaluation of the Sewer District 1 collection system bottlenecks and recommendations;

(h) A projection of anticipated future flows and loadings in Sewer District 1 and Sewer District 2;

(i) An assessment of the two (South Street and Route 7) WWTFs capacities, identification of the treatment processes limiting the capacities, consideration of modifications to remove the capacity limitations, and an assessment of the potential to rerate the WWTFs capacity to a higher level;

(j) An assessment of the feasibility of land application of a portion of the effluent from the South Street WWTF; and,

(k) A Phase 2 Scope of Work will be prepared and submitted to include the items listed below in Section 9 (A) (3).

(3) On or before 730 days after the date of issuance of this permit, the permittee shall submit for the Commissioner's review and written approval a comprehensive and thorough engineering report which describes and evaluates alternative actions which may be taken by permittee to achieve compliance with the Phosphorus limitations in Section 5 of this permit. Such report shall:

(a) List all permits and approvals required for each alternative, including but not limited to any permits required under Sections 22a-32, 22a-42a, 22a-342, 22a-361, 22a-368 or 22a-430 of the CGS,

(b) Propose a preferred alternative or combination of alternatives with supporting justification therefore,

(c) State in detail the most expeditious schedule for performing each alternative, and

(l) Propose a detailed program and schedule to perform all actions required to implement the preferred alternative, including but not limited to a schedule for submission of engineering plans and specifications for any new equipment, the start and completion of any construction activities and applying for and obtaining all permits and approvals required for such actions.

(4) Unless another deadline is specified in writing by the Commissioner, on or before 180 days after approval of the engineering report in Section 9(A)(3), the permittee shall (1) submit for the Commissioner's review and written approval, contract plans and specifications for the approved remedial actions, a revised list of all permits and approvals required for such actions and a revised schedule for applying for and obtaining such permits and approvals; and (2) submit applications for all permits and approvals required under Sections 22a-430 and 22a-416 of the CGS. The permittee shall obtain all required permits and approvals.

(5) In accordance with the schedule approved in writing by the Commissioner, but in no event later than 1,800 days after the issuance of this permit, the permittee shall complete the actions approved in writing by the Commissioner necessary to comply with the requirements for phosphorus in Table A of this permit. Within fifteen days after completing such actions, the permittee shall certify to the Commissioner in writing that such actions, as required by this paragraph, have been completed.

(B) The permittee shall achieve the final water quality-based effluent limits for **Escherichia coli** for DSN 001-1 established in Section 5 of this permit, in accordance with the following:

(1) On or before 300 days after the date of issuance of this permit, the permittee shall submit for the Commissioner's review and written

approval a comprehensive and thorough report which describes the actions to be taken by the permittee necessary to achieve compliance with the requirements in Table A of this permit for Escherichia coli. Such report shall include a schedule for implementation of such actions not to exceed 730 days after the date of issuance of this permit.

(2) In accordance with the schedule approved in writing by the Commissioner, but in no event later than 730 days after the date of issuance of this permit, the permittee shall perform the actions approved in writing by the Commissioner necessary to comply with the requirements in Table A of this permit for Escherichia coli. Within fifteen days after completing such actions, the permittee shall certify to the Commissioner in writing that the actions have been completed as approved by the Commissioner.

(C) The permittee shall submit to the Commissioner semi-annual status reports beginning sixty days after the date of approval of the either report referenced in paragraphs 9(A) and 9(B) of this Section. Status reports shall include, but not be limited to, a detailed description of progress made by the permittee in performing actions required by this Section of the permit in accordance with the approved schedule including, but not limited to, development of engineering plans and specifications, construction activity, contract bidding, operational changes, preparation and submittal of permit applications, and any other required under paragraph(s) 9(A) and 9(B) of this Section.

(D) The permittee shall use best efforts to submit to the Commissioner all documents required by this Section of the permit in a complete and approvable form. If the Commissioner notified the permittee that any document or other action is deficient, and does not approve it with conditions or modifications, it is deemed disapproved, and the permittee shall correct the deficiencies and resubmit it within the time specified by the Commissioner or, if no time is specified by the Commissioner, within thirty days of the Commissioner's notice of deficiencies. In approving any document or other action under this Compliance Schedule, the Commissioner may approve the document or other action as submitted or performed or with such conditions or modifications as the Commissioner deems necessary to carry out the purposes of this Section of the permit. Nothing in this paragraph shall excuse noncompliance or delay.

(E) Dates. The date of submission to the Commissioner of any document required by this section of the permit shall be the date such document is received by the Commissioner. The date of any notice by the Commissioner under this section of the permit, including but not limited to notice of approval or disapproval of any document or other action, shall be the date such notice is personally delivered or the date three days after it is mailed by the Commissioner, whichever is earlier. Except as otherwise specified in this permit, the word "day" as used in this Section of the permit means calendar day. Any document or action which is required by this Section only of the permit, to be submitted, or performed, by a date which falls on, Saturday, Sunday, or, a Connecticut or federal holiday, shall be submitted or performed on or before the next day which is not a Saturday, Sunday, or Connecticut or federal holiday.

(F) Notification of noncompliance. In the event that the permittee becomes aware that it did not or may not comply, or did not or may not comply on time, with any requirement of this Section of the permit or of any document required hereunder, the permittee shall immediately notify the Commissioner and shall take all reasonable steps to ensure that any noncompliance or delay is avoided or, if unavoidable, is minimized to the greatest extent possible. In so notifying the Commissioner, the permittee shall state in writing the reasons for the noncompliance or delay and propose, for the review and written approval of the Commissioner, dates by which compliance will be achieved, and the permittee shall comply with any dates which may be approved in writing by the Commissioner. Notification by the permittee shall not excuse noncompliance or delay, and the Commissioner's approval of any compliance dates proposed shall not excuse noncompliance or delay unless specifically so stated by the Commissioner in writing.

(G) Notice to Commissioner of changes. Within fifteen days of the date the permittee becomes aware of a change in any information submitted to the Commissioner under this Section of the permit, or that any such information was inaccurate or misleading or that any relevant information was omitted, the permittee shall submit the correct or omitted information to the Commissioner.

(H) Submission of documents. Any document, other than a DMR, ATMR or MOR required to be submitted to the Commissioner under this Section of the permit shall, unless otherwise specified in writing by the Commissioner, be directed to:

Carlos Esguerra, Sanitary Engineer 2
Department of Energy and Environmental Protection
Bureau of Water Protection and Land Reuse, Planning and Standards Division
79 Elm Street
Hartford, Connecticut 06106-5127

This permit is hereby issued on September 18, 2014.

Betsey Wingfield
Bureau Chief
Bureau of Water Protection and Land Reuse

ATTACHMENT 1

Tables A through F

TABLE A

Discharge Serial Number (DSN): **001-1**	Monitoring Location: **1**
Wastewater Description: **Sanitary Sewage**	
Monitoring Location Description: **Final Effluent**	
Allocated Zone of Influence (ZOI): **0.70 cfs**	In-stream Waste Concentration (IWC): **20.97 %**

PARAMETER	Units	FLOW/TIME BASED MONITORING				INSTANTANEOUS MONITORING			REPORT FORM	Minimum Level Analysis See Section 6
		Average Monthly Limit	Maximum Daily Limit	Sample Freq.	Sample type	Instantaneous Limit or Required Range [3]	Sample Freq.	Sample Type		
Alkalinity	mg/l	NA	NA	NR	NA	------	Monthly	Grab	MOR	
Biochemical Oxygen Demand (5 day) [1] See remark (E) below	mg/l	20	40	Weekly	Daily Composite	NA	NR	NA	DMR/MOR	
Fecal coliform May 1st through September 30th [4]	Colonies per100 ml	NA	NA	NR	NA	see remarks (B) and (C) below	Weekly	Grab	DMR/MOR	
Escherichia coli May 1st through September 30th [5] See remark (D) below.	Colonies per100 ml	NA	NA	NR	NA	410	Weekly	Grab	DMR/MOR	
Flow	MGD	------	------	Continuous[2]	Average Daily Flow	NA	NR	NA	DMR/MOR	
Nitrogen, Ammonia (total as N):										
June	mg/l	6.7	------	Weekly	Daily Composite	NA	NR	NA	DMR/MOR	
July, August and September		2.5	------	Weekly						
October		4.4	------	Weekly						
November through May		------	------	Monthly						
Nitrogen, Nitrate (total as N)	mg/l	NA	------	Monthly	Daily Composite	NA	NR	NA	MOR	
Nitrogen, Nitrite (total as N)	mg/l	NA	------	Monthly	Daily Composite	NA	NR	NA	MOR	
Nitrogen, Total Kjeldahl	mg/l	NA	------	Monthly	Daily Composite	NA	NR	NA	MOR	
Nitrogen, Total	mg/l	NA	------	Monthly	Daily Composite	NA	NR	NA	MOR	
Nitrogen, Total	lbs/day	NA	------	Monthly	Daily Composite	NA	NR	NA	MOR	
Oxygen, Dissolved	mg/l	NA	NA	NR	NA	------	Work Day	Grab	MOR	
pH	S.U.	NA	NA	NR	NA	6 - 9	Weekly	Grab	DMR/MOR	
Phosphate, Ortho	mg/l	NA	------	Monthly	Daily Composite	NA	NR	NA	MOR	

Phosphorus, Total. April 1st through October 31st [6] April 1st through October 31st November 1st through March 30th	mg/l	1.55 NA	3.11 ------	Weekly Monthly	Daily Composite	NA	NR	NA	DMR/MOR	*
Phosphorus, Total April 1st through October 31st	lbs/day	------	------	Weekly	Daily Composite	NA	NA	NA	MOR	
Phosphorus, Total (Average Seasonal Load Cap)[7] October	lbs/day	------	NA	Weekly	Calculated	NA	NA	NA	DMR/MOR	
Solids, Settleable	ml/l	NA	NA	NR	NA	------	Work Day	Grab	MOR	
Solids, Total Suspended[1] See remark (E) below	mg/l	20	40	Weekly	Daily Composite	NA	NA	NA	DMR/MOR	
Temperature	°F	NA	NA	NR	NA	------	Work Day	Grab	MOR	
Turbidity	NTU	NA	NA	NR	NA	------	Work Day	Grab	MOR	
UV Intensity May 1st through September 30th. See remark A	mW/cm^2	NA	NA	NR	NA	------	2/Work Day	Grab	DMR/MOR	

TABLE A – CONDITIONS

Footnotes:

[1] The discharge shall not exceed an average monthly 20 mg/l or a maximum daily 40 mg/l.

[2] The permittee shall record and report on the monthly operating report the minimum, maximum and total flow for each day of discharge and the average daily flow for each sampling month. The permittee shall report, on the discharge monitoring report, the average daily flow and maximum daily flow for each sampling month.

[3] The instantaneous limits in this column are maximum limits.

[4] During the period beginning at the date of issuance of this permit and lasting until the implementation of Escherichia coli monitoring at the Water Pollution Control Facility, the discharge shall not exceed and shall otherwise conform to specific terms and conditions listed.

[5] During the period beginning after the implementation of Escherichia coli monitoring, but no later than **730 days** after permit issuance, lasting until expiration, the discharge shall also not exceed and shall otherwise conform to the specific terms and conditions listed.

[6] During the period beginning after the implementation of phosphorus removal but no later than **1,800 days** after permit issuance, lasting until expiration, the discharge shall also not exceed and shall otherwise conform to the specific terms and conditions listed.

[7] During the period beginning after the implementation of phosphorus removal but no later than **1,800 days** after permit issuance, lasting until expiration, the discharge shall not exceed the total phosphorus Average Seasonal Load of 1.0 lb/day. Calculate the Average Seasonal Load by adding all sample results during each April 1st through October 31st season in pounds per day and dividing by the total number of those samples in that season.

Remarks:

(A) Ultraviolet disinfection shall be utilized from May 1st through September 30th.

(B) The geometric mean of the Fecal coliform bacteria values for the effluent samples collected in a period of a calendar month during the period from May 1st through September 30th shall not exceed 200 per 100 milliliters.

Remarks. (Continued)

(C) The geometric mean of the Fecal coliform bacteria values for the effluent samples collected in a period of a calendar week during the period from May 1st through September 30th shall not exceed 400 per 100 milliliters.

(D) The geometric mean of the Escherichia coli bacteria values for the effluent samples collected in a period of a calendar month during the period from May 1st through September 30th shall not exceed 126 per 100 milliliters.

(E) The Average Weekly discharge Limitation for BOD_5 and Total Suspended Solids shall be 1.5 times the Average Monthly Limit listed above.

TABLE B

Discharge Serial Number (DSN): **001-1**		Monitoring Location: **K**			
Wastewater Description: **Sanitary Sewage**					
Monitoring Location Description: **Final Effluent**					
Allocated Zone of Influence (ZOI): **0.70 cfs**		In-stream Waste Concentration (IWC): **20.97 %**			
PARAMETER	**Units**	**FLOW/TIME BASED MONITORING**			**REPORT FORM**
		Average Monthly Minimum	**Sample Freq.**	**Sample type**	
Biochemical Oxygen Demand (5 day) Percent Removal [1]	% of Influent	90	Weekly	Calculated[2]	DMR/MOR
Solids, Total Suspended Percent Removal [1]	% of Influent	90	Weekly	Calculated[2]	DMR/MOR

TABLE B – CONDITIONS

Footnotes:

[1] The discharge shall be less than or equal to 10% of the average monthly influent BOD_5 and total suspended solids (Table E, Monitoring Location G).

[2] Calculated based on the average monthly results described in Table A. Removal efficiency $= \frac{\text{Inf.BOD or TSS} - \text{Effluent BOD or TSS}}{\text{Inf.BOD or TSS}} \times 100$

TABLE C

Discharge Serial Number (DSN): **001-1**					Monitoring Location: **T**	
Wastewater Description: **Sanitary Sewage**						
Monitoring Location Description: **Final Effluent (after completion of UV disinfection)**						
Allocated Zone of Influence (ZOI): **0.70 cfs**			In-stream Waste Concentration (IWC): **20.97 %**			
PARAMETER	**Units**	**Maximum Daily Limit**	**Sampling Frequency**	**Sample Type**	**Reporting form**	**Minimum Level Analysis See Section 6**
Aluminum, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
Antimony, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
NOAEL Static 48Hr Acute D. Pulex[1]	% survival	≥90%	Semi-annually	Daily Composite	ATMR/DMR	
NOAEL Static 48Hr Acute Pimephales[1]	% survival	≥90%	Semi-annually	Daily Composite	ATMR/DMR	
Arsenic, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
Beryllium, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
BOD_5	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	
Cadmium, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
Chromium, Hexavalent	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
Chromium, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
Chlorine, Total Residual	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
Copper, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
Cyanide, Amenable	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	
Cyanide, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
Iron, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
Lead, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
Mercury, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
Nickel, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
Nitrogen, Ammonia (total as N)	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	
Nitrogen, Nitrate, (total as N)	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	
Nitrogen, Nitrite, (total as N)	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	
Phosphorus, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
Phenols, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	
Selenium, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
Silver, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
Suspended Solids, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	
Thallium, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*
Zinc, Total	mg/l	------	Semi-annually	Daily Composite	ATMR/DMR	*

TABLE C - CONDITIONS

Remarks: [1]The results of the Toxicity Tests are recorded in % survival. The permittee shall report % survival on the DMR based on criteria in Section 6(B) of this permit.

ATMR – Aquatic Toxicity Monitoring Report

TABLE D

Discharge Serial Number: **001-I**			Monitoring Location: **G**				
Wastewater Description: **Sanitary Sewage**							
Monitoring Location Description: **Influent**							
PARAMETER	**Units**	**DMR REPORTING FORMAT**	**FLOW/TIME BASED MONITORING**		**INSTANTANEOUS MONITORING**		**REPORTING FORM**
			Sample Frequency	**Sample Type**	**Sample Frequency**	**Sample Type**	
Biochemical Oxygen Demand (5 day)	mg/l	Monthly average	Weekly	Daily Composite	NA	NA	DMR/MOR
Nitrogen, Ammonia (total as N)	mg/l		Monthly	Daily Composite	NA	NA	MOR
Nitrogen, Nitrate (total as N)	mg/l		Monthly	Daily Composite	NA	NA	MOR
Nitrogen, Nitrite (total as N)	mg/l		Monthly	Daily Composite	NA	NA	MOR
Nitrogen, Total Kjeldahl	mg/l		Monthly	Daily Composite	NA	NA	MOR
Nitrogen, Total	mg/l		Monthly	Daily Composite	NA	NA	MOR
Phosphate, Ortho	mg/l		Monthly	Daily Composite	NA	NA	MOR
Phosphorus, Total	mg/l		Monthly	Daily Composite	NA	NA	MOR
pH	S.U.		NA	NA	Work Day	Grab	MOR
Solids, Total Suspended	mg/l	Monthly average	Weekly	Daily Composite	NA	NA	DMR/MOR
Temperature	°F		NA	NA	Work Day	Grab	MOR

TABLE E

Discharge Serial Number: **001-1**	Monitoring Location: **P**
Wastewater Description: **Primary Effluent**	
Monitoring Location Description: **Primary Sedimentation Basin Effluent**	

PARAMETER	Units	REPORTING FORMAT	TIME/FLOW BASED MONITORING		INSTANTANEOUS MONITORING		REPORTING FORM
			Sample Frequency	Sample Type	Sample Frequency	Sample type	
Alkalinity, Total	mg/l		NA	NA	Monthly	Grab	MOR
Biochemical Oxygen Demand (5 day)	mg/l	Monthly average	Weekly	Composite	NA	NA	MOR
Nitrogen, Ammonia (total as N)	mg/l		Monthly	Composite	NA	NA	MOR
Nitrogen, Nitrate (total as N)	mg/l		Monthly	Composite	NA	NA	MOR
Nitrogen, Nitrite (total as N)	mg/l		Monthly	Composite	NA	NA	MOR
Nitrogen, Total Kjeldahl	mg/l		Monthly	Composite	NA	NA	MOR
Nitrogen, Total	mg/l		Monthly	Composite	NA	NA	MOR
pH	S.U.		NA	NA	Monthly	Grab	MOR
Solids, Total Suspended	mg/l	Monthly average	Weekly	Composite	NA	NA	MOR

TABLE F

Discharge Serial Number: **001-1**	Monitoring Location: **SL**		
Wastewater Description: **Thickened Sludge**			
Monitoring Location Description: **Thickened Sludge**			
PARAMETER	**INSTANTANEOUS MONITORING**		**REPORTING FORM**
	Units	**Grab Sample Freq.**	
Arsenic, Total	mg/kg	Annual	DMR
Beryllium, Total	mg/kg	Annual	DMR
Cadmium, Total	mg/kg	Annual	DMR
Chromium, Total	mg/kg	Annual	DMR
Copper, Total	mg/kg	Annual	DMR
Lead, Total	mg/kg	Annual	DMR
Mercury, Total	mg/kg	Annual	DMR
Nickel, Total	mg/kg	Annual	DMR
Nitrogen, Ammonia *	mg/kg	Annual	DMR*
Nitrogen, Nitrate (total as N) *	mg/kg	Annual	DMR*
Nitrogen, Organic *	mg/kg	Annual	DMR*
Nitrogen, Nitrite (total as N) *	mg/kg	Annual	DMR*
Nitrogen, Total *	mg/kg	Annual	DMR*
pH *	S.U.	Annual	DMR*
Polychlorinated Biphenyls	mg/kg	Annual	DMR
Solids, Fixed	%	Annual	DMR
Solids, Total	%	Annual	DMR
Solids, Volatile	%	Annual	DMR
Zinc, Total	mg/kg	Annual	DMR

(*) required for composting or land application only

Testing for inorganic pollutants shall follow "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846 as updated and/or revised.

ATTACHMENT 2

MONTHLY OPERATING REPORT FORM

Ridgefield Route 7 WPCF Permit No. CT0101451

Sample month/year:

	Daily Flow			Primary Sludge			Waste sludge	BOD (5-day)			Suspended Solids			Settleable Solids	Turbidity	UV Intensity		Fecal Coliform	E. Coli	Ammonia			Nitrite			Nitrate		
	Max.	Min.	Total	Vol.	% solids	wt.		Inf.	Prim. Eff.	Final Eff.	Inf.	Prim. Eff.	Final Eff.	Eff.	Eff.	1	2			Inf.	Prim. Eff.	Final Eff.	Inf.	Prim. Eff.	Final Eff.	Inf.	Prim. Eff.	Final Eff.
Units	mgd			gal		lbs.	lbs	mg/l			mg/l			ml/l	NTU	mW/cm2		#/100 ml	#/100 ml	mg/l			mg/l			mg/l		
Freq	daily			work day			work day	Weekly			Weekly			work day	work day	4/work day		Weekly	Weekly	Monthly			Monthly			Monthly		
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Total																												
Ave																												
Limit																												

TKN			Total N			Total N	Lowest	pH		Total P			Total P	Ortho P			Temp.		Alkalinity	
Inf.	Prim. Eff.	Final Eff.	Inf.	Prim. Eff.	Final Eff.	Eff.	D.O. Eff.	Inf.	Eff.	Inf.	Prim. Eff.	Final Eff.	Eff.	Inf.	Prim. Eff.	Final Eff.	Inf.	Eff.	Prim. Eff.	Eff.
mg/l			mg/l			lb/d	mg/l	S.U.		mg/l			lb/d	mg/l			°F			
Monthly			Monthly			monthly	4 per workday	work day		Monthly			April - October	Monthly			work day		Monthly	

Sludge Disposal Location:

Please return forms to:
DEEP - Water Bureau
ATTN: Municipal Wastewater Monitoring Coordinator
Municipal Facilities
79 Elm Street
Hartford, CT 06106-5127

Statement of Acknowledgement

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations.

Authorized Official:

Title:

Signature: ____________________

Date: __________

DATA TRACKING AND TECHNICAL FACT SHEET

Permittee: Town of Ridgefield

PERMIT, ADDRESS, AND FACILITY DATA

PERMIT #: CT0101451 **APPLICATION #:** 200900547 **FACILITY ID.** 118-002

Mailing Address:	Location Address:
Street: 66 Prospect Street	Street: 9101 Ethan Allen Hwy (Route 7)
City: Ridgefield ST: CT Zip: 06877	City: Ridgefield ST: CT Zip: 06877
Contact Name: Amy Seibert	Contact Name: Jorge Pereira, United Water
Phone No.: 203-431-2734	Phone No.: 203-438-8615
E-mail:	DMR Contact email address: Jorge.pereira@unitedwater.com

PERMIT INFORMATION

DURATION 5 YEAR _X_ 10 YEAR ___ 30 YEAR ____

TYPE New _ Reissuance X Modification ___

CATEGORIZATION POINT (X) NON-POINT ( ) GIS #

NPDES (X) PRETREAT () GROUND WATER(UIC) ( ) GROUND WATER (OTHER) ( )

NPDES MAJOR(**MA**) ___
NPDES SIGNIFICANT MINOR or PRETREAT SIU (**SI**) _X
NPDES or PRETREATMENT MINOR (**MI**) ____

COMPLIANCE SCHEDULE YES X NO___
POLLUTION PREVENTION ___ TREATMENT REQUIREMENT___
WATER QUALITY REQUIREMENT **X** OTHER ____

OWNERSHIP CODE
Private ___ Federal ___ State ___ Municipal (town only) X_ Other public___

DEP STAFF ENGINEER Carlos Esguerra **DATE DRAFTED:** 4/23/2014

PERMIT FEES

Discharge Code	DSN Number	Annual Fee
111000c	00-1	1,722.50

FOR NPDES DISCHARGES
Water Quality Classification Goal: B
Segment: Norwalk River - 7300

NATURE OF BUSINESS GENERATING DISCHARGE
Municipal Sanitary Sewage Treatment

PROCESS AND TREATMENT DESCRIPTION (by DSN)
Secondary Municipal wastewater treatment plant with nitrification/denitrification and seasonal UV disinfection.

RESOURCES USED TO DRAFT PERMIT

___ *Federal Effluent Limitation Guideline 40CFR 133 Secondary Treatment Category*

___ *Performance Standards*

__ *Federal Development Document*
name of category

_X_ *Department File Information*

_X_ *Connecticut Water Quality Standards*

_X_ *Anti-degradation Policy*

__ *Coastal Management Consistency Review Form*

_X_ *Other – Explain: Interim Phosphorus Management Strategy*

BASIS FOR LIMITATIONS, STANDARDS OR CONDITIONS

_X_ *Secondary Treatment (Section 22a-430-4(r) of the Regulations of Connecticut State Agencies)*

__ *Case-by-Case Determination (See Other Comments)*

_X_ *In order to meet in-stream water quality (See General Comments)*

__ *Anti-degradation policy*

GENERAL COMMENTS

The Town of Ridgefield ("Ridgefield") operates a municipal water pollution control facility ("the facility") located at 9101 Ethan Allen Highway (Route 7) in Ridgefield, CT. The facility is designed to treat and discharge up to 0.12 million gallons a day of effluent into Norwalk River. The facility currently uses secondary treatment with seasonal UV disinfection to treat effluent before being discharged. Pursuant to Conn. Gen. Stat. § 22a-430, the Department of Energy and Environmental Protection has issued Ridgefield a permit for the discharge from this facility. Ridgefield has submitted an application to renew its permit. The Department has made a tentative determination to approve Ridgefield's application and has prepared a draft permit consistent with that determination.

The most significant changes from the current permit are the inclusion of phosphorus limits, revised bacteria monitoring requirements (e. coli), Aluminum monitoring to be consistent with the most recent CT Water Quality Standards and Iron monitoring to be consistent with EPA's National Recommended Water Quality Criteria.

SPECIFIC REQUIREMENTS OR REVISIONS

The Department reviewed the application for consistency with Connecticut's Water Quality Standards and determined that with the limits in the draft permit, including those discussed below, that the draft permit is consistent with maintenance and protection of water quality in accordance with the Tier I Anti-degradation Evaluation and Implementation Review provisions of such Standards.

The need for inclusion of water quality based discharge limitations in this permit was evaluated consistent with Connecticut Water Quality Standards and criteria, pursuant to 40 CFR 122.44(d). Discharge monitoring data was evaluated for consistency with the available aquatic life criteria (acute and chronic) and human health (fish consumption only) criteria, considering the zone of influence allocated to the facility where appropriate. In addition to this review, the statistical procedures outlined in the EPA Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001) were employed to calculate the need for such limits. Comparison of the attached monitoring data and its inherent variability with the calculated water quality based limits indicates a low statistical probability of exceeding such limits. Therefore, no water quality based limits were included in the permit at this time.

A compliance schedule is included for the reduction of phosphorus in the effluent. The town has retained the services of AECOM Technical Services, Inc., to conduct a facilities planning evaluation of the two wastewater treatment facilities in Ridgefield. This evaluation is being conducted in two phases: the phase I evaluation is currently underway with a report completion date targeted for the end of 2014; and initiation of the phase II study is expected to start in the second quarter of 2015. The town, as part of the phase II assessment, will look into the possibility of decommissioning the Route 7 plant with conveyance of flows to the main Ridgefield plant. For this

reason, the draft permit includes an extended compliance timeframe (of up to 1,800 days) for the implementation of phosphorus monitoring which will allow the town to complete the above-referenced studies and adopt a plan to address the new monitoring requirements.

Phosphorus Permitting Approach
Phosphorus is a naturally occurring element that is essential to support plant growth. When present in excessive amounts, phosphorus can impair both aquatic life and recreational use of Connecticut's water resources. Excess nutrient enrichment is a serious threat to water quality in Connecticut. Excessive loading of phosphorus to surface waters as a result of discharges from wastewater treatment plants or non point sources such as runoff from urban and agricultural lands, can lead to algal blooms, including blooms of noxious blue green algae, reduction in water clarity, and in extreme cases depletion of oxygen, fish kills, and other impairments to aquatic life. Currently, 21 water body segments have been identified on Connecticut's List of Waters Not Meeting Water Quality Standards where nutrient enrichment is a contributing cause of the impairment.

The Connecticut Water Quality Standards (WQS) do not include numeric criteria for nutrients but rather incorporate narrative standards and criteria for nutrients. These narrative policy statements direct the Connecticut Department of Environmental Protection to impose discharge limitations or other reasonable controls on point and non point sources to support maintenance or attainment of designated uses. In the absence of numeric criteria for phosphorus, the Department has developed an interim nutrient management strategy for freshwater non-tidal streams based on the narrative policy statements in the WQS to meet the pressing need to issue NPDES permits and be protective of the environment. The strategy includes methods that focus on phosphorus because it is the primary limiting nutrient in freshwater systems. These methods were approved by the United States Environmental Protection (EPA) in their letter dated October 26, 2010 as an interim strategy to establish water quality based phosphorus limits in non-tidal freshwater for industrial and municipal water pollution control facilities (WPCFs) national pollutant discharge elimination system (NPDES) permits.

The method in the interim strategy uses best available science to identify phosphorus enrichment levels in waste receiving rivers and streams that adequately support aquatic life uses. The methodology focuses on algal communities as the key aquatic life nutrient response variable and phosphorus enrichment factors that represent significant changes in communities based on data collected statewide. Ongoing work is currently being conducted to refine the approach through additional data collection and by expanding the methodology to include non-waste receiving streams. It is expected that the ongoing work will lead to numeric nutrient criteria for all freshwater rivers and streams in the next WQS review cycle. The current approach provides for a major statewide advancement in the level of phosphorus control that is expected to meet all freshwater designated uses. The adaptive nature of Connecticut's strategy allows for revisions to permit limits in future permit cycles without delaying action that we know needs to be taken today.

The current approach follows a watershed based framework incorporating many of the elements from the U.S. EPA Watershed –Based National Pollutant Discharge Elimination System (NPDES) Permitting Technical Guidance (2007). Consistent with the 2007 Guidance, the approach "explicitly considers the impact of multiple pollutant sources and stressors, including nonpoint source contributions, when developing point source permits". Expected current conditions are based on the probability of excess phosphorus export from land cover and municipal and industrial facilities in the upstream drainage basin. Connecticut's policy for phosphorus management is translated into a numeric expression through geo-spatial and statistical analyses that determines the maximum acceptable seasonal phosphorus mass load per unit area of watershed contributing flow to the point of assessment.

The goal of the interim strategy is to achieve or maintain an enrichment factor (EF) of 8.4 or below throughout a watershed. An EF is representative of the amount of anthropogenic phosphorus loading to river and streams. It is calculated by dividing the current total seasonal phosphorus load by a modeled total phosphorus load under complete forested conditions at a particular point along the river. An enrichment factor is representative of the amount of anthropogenic phosphorus loading to rivers and streams. The goal of an 8.4 enrichment factor represents a threshold at which a significant change is seen in the algal communities indicating highly enriched conditions and impacts to aquatic life uses.

The analysis was conducted using benthic algae collected in rivers and streams throughout CT under varying enrichment conditions. The approach targets the critical 'growing' season (April through October) when phosphorus is more likely to be taken up by sediment and biomass because of low flow and warmer conditions. During winter months aquatic plants are dormant and flows are higher providing constant flushing of phosphorus

through aquatic systems with a less likely chance that it will settle out into the sediment. Limiting the phosphorus export from industrial and municipal facilities offers a targeted management strategy for achieving aquatic life designated uses within a waterbody. The export of some phosphorus from facilities and other land sources is considered normal use of the land recognizing that humans are part of the environment.

A seasonal load was established by the Department for each facility discharging to non-tidal waters based on the current degree of enrichment of the receiving water body at the point of discharge and the facilities contribution to the total watershed enrichment at the point of discharge.

Town of Ridgefield (Rte. 7) Permit Requirements
A nutrient watershed analysis was conducted for the Norwalk River watershed below facilities discharging phosphorus into the river. The facilities discharging to this river include: Ridgefield (Rte. 7) WPCF, Ridgefield (Main) WPCF and Georgetown (Redding) WPCF. The seasonal (April 1st through October 31st) nutrient loading from each facility discharging to the watershed was reduced to achieve an enrichment factor of 8.4 or lower throughout the river.

The current enrichment factor at the Town of Ridgefield (Rte. 7) discharge is 24.2. The final proposed seasonal load allocation for Town of Ridgefield (Rte. 7) POTW is 1 lbs/day. This load equates to a proposed treatment performance limit of 1 mg/L multiplied by the current seasonal average flow of 0.12 MGD. When this strategy is fully implemented by combining reductions at all facilities located in the same watershed, it is expected that an enrichment factor below 8.4 will be achieved in the Naugatuck River.

Federal regulations at 40 CFR 122.44(d) indicate that permit issuers are required to determine whether a given point source discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative or numeric criteria within a State water quality standard after consideration of existing controls on point and non-point sources of pollution. If a discharge is found to cause an excursion of a numeric or narrative state water quality criterion, NPDES regulations implementing section 301(b)(1)(C) of the Clean Water Act provide that a permit must contain effluent limits as necessary to achieve state water quality standards. The limit in the permit and the strategy are consistent with the narrative policy statements in the CT WQS and are expected to result in the attainment and maintenance of all designated uses for the water body when the strategy is fully implemented. If the Department develops numeric criteria in the future, or it is found that the current limit under the strategy is not sufficient to achieve designated uses, the goal will be modified and the WPCF will be expected to meet the more stringent water quality goal.

Translating the average performance level of 1 lb/day into enforceable permit limits requires consideration of effluent variability and frequency of monitoring in order to comply with federal permitting regulations. The procedure used is as follows:

1. Consider the permit performance level 1.0 mg/L to be equivalent to the Long Term Average (LTA)

2. Calculate the Maximum Daily Limit by multiplying the LTA by the 99th percentile LTA Multiplier appearing in Table 5-2 of the Technical Support Document (page 103 of EPA/505/2-90-001) corresponding to a CV of 0.6% to account for effluent variability:

*Maximum Daily Limit: 1 mg/L * 3.11 = 3.11 mg/L*

3. Calculate the Average Monthly Limit by multiplying the LTA by the 95th percentile LTA Multiplier appearing in Table 5-2 of the Technical Support Document corresponding to a CV of 0.6% to account for effluent variability and either n=4 samples/month or n=10 samples/month as appropriate for the facility to account for the precision of estimating the true monthly average based on an average for the days the effluent was sampled:

Average Monthly Limit= 1 mg/l X 1.55 = 1.55 mg/l

Summary of Limits for Ridgefield (Rte. 7) POTW:
Average Daily Load = 1 lb/day
Total Seasonal Load = 1 lbs/day * 214 Days/Season = 214 lbs/season
Maximum Daily Limit = 3.11 mg/L

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

MUNICIPAL NPDES PERMIT

Issued to

Permittee:
Town of Ridgefield
400 Main Street
Ridgefield, Connecticut 06877

Location Address:
Town of Ridgefield WPCF (Main)
22 South Street
Ridgefield, Connecticut 06877

Facility ID: 118-001 **Permit ID:** CT0100854

Permit Expires: **September 29, 2020**

Receiving Stream: Great Swamp

Design Flow Rate: 1.0 MGD

SECTION 1: GENERAL PROVISIONS

(A) This permit is reissued in accordance with Section 22a-430 of Chapter 446k, Connecticut General Statutes ("CGS"), and Regulations of Connecticut State Agencies ("RCSA") adopted thereunder, as amended, and Section 402(b) of the Clean Water Act, as amended, 33 USC 1251, et. seq., and pursuant to an approval dated September 26, 1973, by the Administrator of the United States Environmental Protection Agency for the State of Connecticut to administer a N.P.D.E.S. permit program.

(B) The Town of Ridgefield, ("permittee"), shall comply with all conditions of this permit including the following sections of the RCSA which have been adopted pursuant to Section 22a-430 of the CGS and are hereby incorporated into this permit. **Your attention is especially drawn to the notification requirements of subsection (i)(2), (i)(3), (j)(1), (j)(6), (j)(8), (j)(9)(C), (j)(10)(C), (j)(11)(C), (D), (E), and (F), (k)(3) and (4) and (l)(2) of Section 22a-430-3.** To the extent this permit imposes conditions more stringent than those found in the regulations, this permit shall apply.

Section 22a-430-3 General Conditions

- **(a)** Definitions
- **(b)** General
- **(c)** Inspection and Entry
- **(d)** Effect of a Permit
- **(e)** Duty to Comply
- **(f)** Proper Operation and Maintenance
- **(g)** Sludge Disposal
- **(h)** Duty to Mitigate
- **(i)** Facility Modifications; Notification
- **(j)** Monitoring, Records and Reporting Requirements
- **(k)** Bypass
- **(l)** Conditions Applicable to POTWs
- **(m)** Effluent Limitation Violations
- **(n)** Enforcement
- **(o)** Resource Conservation
- **(p)** Spill Prevention and Control
- **(q)** Instrumentation, Alarms, Flow Recorders
- **(r)** Equalization

Section 22a-430-4 Procedures and Criteria

- **(a)** Duty to Apply
- **(b)** Duty to Reapply
- **(c)** Application Requirements

(d) Preliminary Review
(e) Tentative Determination
(f) Draft Permits, Fact Sheets
(g) Public Notice, Notice of Hearing
(h) Public Comments
(i) Final Determination
(j) Public Hearings
(k) Submission of Plans and Specifications. Approval.
(l) Establishing Effluent Limitations and Conditions
(m) Case-by-Case Determinations
(n) Permit Issuance or Renewal
(o) Permit or Application Transfer
(p) Permit Revocation, Denial or Modification
(q) Variances
(r) Secondary Treatment Requirements
(s) Treatment Requirements
(t) Discharges to POTWs - Prohibitions

(C) Violations of any of the terms, conditions, or limitations contained in this permit may subject the permittee to enforcement action including, but not limited to, seeking penalties, injunctions and/or forfeitures pursuant to applicable sections of the CGS and RCSA.

(D) Any false statement in any information submitted pursuant to this Section of the permit may be punishable as a criminal offense under Section 22a-438 or 22a-131a of the CGS or in accordance with Section 22a-6, under Section 53a-157b of the CGS.

(E) The permittee shall comply with Section 22a-416-1 through Section 22a-416-10 of the RCSA concerning operator certification.

(F) No provision of this permit and no action or inaction by the Commissioner shall be construed to constitute an assurance by the Commissioner that the actions taken by the permittee pursuant to this permit will result in compliance or prevent or abate pollution.

(G) Nothing in this permit shall relieve the permittee of other obligations under applicable federal, state and local law.

(H) An annual fee shall be paid for each year this permit is in effect as set forth in Section 22a-430-7 of the RCSA. As of October 1, 2009 the annual fee is $ 2367.50.

SECTION 2: DEFINITIONS

(A) The definitions of the terms used in this permit shall be the same as the definitions contained in Section 22a-423 of the CGS and Section 22a-430-3(a) and 22a-430-6 of the RCSA, except for "Composite" and "No Observable Acute Effect Level (NOAEL)" which are redefined below.

(B) In addition to the above, the following definitions shall apply to this permit:

"------" in the limits column on the monitoring tables in Attachment 1 means a limit is not specified but a value must be reported on the DMR, MOR, and/or the ATMR.

"Annual" in the context of any sampling frequency, shall mean the sample must be collected in the months of July, August or September.

"Average Monthly Limit" means the maximum allowable "Average Monthly Concentration" as defined in Section 22a-430-3(a) of the RCSA when expressed as a concentration (e.g. mg/l); otherwise, it means "Average Monthly Discharge Limitation" as defined in Section 22a-430-3(a) of the RCSA.

"Bi-Weekly" in the context of any sampling frequency, shall mean once every two weeks.

"Composite" or **"(C)"** means a sample consisting of a minimum of eight aliquot samples collected at equal intervals of no less than 30 minutes and no more than 60 minutes and combined proportionally to flow over the sampling period provided that during the sampling period the peak hourly flow is experienced.

"Critical Test Concentration" or **"(CTC)"** means the specified effluent dilution at which the permittee is to conduct a single-concentration Aquatic Toxicity Test.

"Daily Composite" or **"(DC)"** means a composite sample taken over a full operating day consisting of grab samples collected at equal intervals of no more than sixty (60) minutes and combined proportionally to flow; or, a composite sample continuously collected over a full operating day proportionally to flow.

"Daily Concentration" means the concentration of a substance as measured in a daily composite sample, or, arithmetic average of all grab sample results defining a grab sample average.

"Daily Quantity" means the quantity of waste discharged during an operating day.

"Geometric Mean" is the "n"th root of the product of "n" observations.

"Infiltration" means water other than wastewater that enters a sewer system (including sewer system and foundation drains) from the ground through such means as defective pipes, pipe joints, connections, or manholes. Infiltration does not include, and is distinguished from, inflow.

"Inflow" means water other than wastewater that enters a sewer system (including sewer service connections) from sources such as, but not limited to, roof leaders, cellar drains, yard drains, area drains, drains from springs and swampy areas, cross connections between storm sewers and sanitary sewers, catch basins, cooling towers, storm waters, surface runoff, street wash waters, or drainage. Inflow does not include, and is distinguished from, infiltration.

"Instantaneous Limit" means the highest allowable concentration of a substance as measured by a grab sample, or the highest allowable measurement of a parameter as obtained through instantaneous monitoring.

"In-stream Waste Concentration" or **"(IWC)"** means the concentration of a discharge in the receiving water after mixing has occurred in the allocated zone of influence.

"MGD" means million gallons per day.

"Maximum Daily Limit" means the maximum allowable "Daily Concentration" (defined above) when expressed as a concentration (e.g. mg/l), otherwise, it means the maximum allowable "Daily Quantity" as defined above, unless it is expressed as a flow quantity. If expressed as a flow quantity it means "Maximum Daily Flow" as defined in Section 22a-430-3(a) of the RCSA.

"Monthly Minimum Removal Efficiency" means the minimum reduction in the pollutant parameter specified when the effluent average monthly concentration for that parameter is compared to the influent average monthly concentration.

"NA" as a Monitoring Table abbreviation means "not applicable".

"NR" as a Monitoring Table abbreviation means "not required".

"No Observable Acute Effect Level" or **"(NOAEL)"** means any concentration equal to or less than the critical test concentration in a single concentration (pass/fail) toxicity test, conducted pursuant to Section 22a-430-3(j)(7)(A)(i) of the RCSA, demonstrating greater than 50% survival of test organisms in 100% (undiluted) effluent and 90% or greater survival of test organisms at the CTC.

"Quarterly" in the context of any sampling frequency, shall mean sampling is required in the months of March, June, September and December.

"Range During Sampling" or **"(RDS)"** as a sample type means the maximum and minimum of all values recorded as a result of analyzing each grab sample of; 1) a Composite Sample, or, 2) a Grab Sample Average. For those permittees with pH meters that provide continuous monitoring and recording, Range During Sampling means the maximum and minimum readings recorded with the continuous monitoring device during the Composite or Grab Sample Average sample collection.

"Range During Month" or **"(RDM)"** as a sample type means the lowest and the highest values of all of the monitoring data for the reporting month.

"Sanitary Sewage" means wastewaters from residential, commercial and industrial sources introduced by direct connection to the sewerage collection system tributary to the treatment works including non-excessive inflow/infiltration sources.

"Semi-Annual" in the context of any sampling frequency, shall mean the sample must be collected in the months of June and December.

"Twice per Month" in the context of any sampling frequency, mean two samples per calendar month collected no less than 12 days apart.

"ug/l" means micrograms per liter

"Work Day" in the context of a sampling frequency means, Monday through Friday excluding holidays.

SECTION 3: COMMISSIONER'S DECISION

(A) The Commissioner of Energy and Environmental Protection ("Commissioner") has issued a final decision and found continuance of the existing system to treat the discharge will protect the waters of the state from pollution. The Commissioner's decision is based on application #200900552 for permit reissuance received on February 24, 2009 and the administrative record established in the processing of that application.

(B) The Commissioner hereby authorizes the Permittee to discharge in accordance with the provisions of this permit, the above referenced application, and all approvals issued by the Commissioner or his authorized agent for the discharges and/or activities authorized by, or associated with, this permit.

(C) The Commissioner reserves the right to make appropriate revisions to the permit, if required after Public Notice, in order to establish any appropriate effluent limitations, schedules of compliance, or other provisions which may be authorized under the Federal Clean Water Act or the CGS or regulations adopted thereunder, as amended. The permit as modified or renewed under this paragraph may also contain any other requirements of the Federal Clean Water Act or CGS or regulations adopted thereunder which are then applicable.

SECTION 4: GENERAL LIMITATIONS AND OTHER CONDITIONS

(A) The Permittee shall not accept any new sources of non-domestic wastewater conveyed to its POTW through its sanitary sewerage system or by any means other than its sanitary sewage system unless the generator of such wastewater; (a) is authorized by a permit issued by the Commissioner under Section 22a-430 CGS (individual permit), or, (b) is authorized under Section 22a-430b (general permit), or, (c) has been issued an emergency or temporary authorization by the Commissioner under Section 22a-6k. All such non-domestic wastewaters shall be processed by the POTW via receiving facilities at a location and in a manner prescribed by the permittee which are designed to contain and control any unplanned releases.

(B) No new discharge of domestic sewage from a single source to the POTW in excess of 50,000 gallons per day shall be allowed by the permittee until the permittee has notified in writing the Municipal Facilities Section of said new discharge. New discharge notifications as described in this section shall be submitted to the staff identified in section 9(K) included herein.

(C) The permittee shall maintain a system of user charges based on actual use sufficient to operate and maintain the POTW (including the collection system) and replace critical components.

(D) The permittee shall maintain a sewer use ordinance that is consistent with the Model Sewer Ordinance for Connecticut Municipalities prepared by the Department of Energy and Environmental Protection. The Commissioner of Energy and Environmental Protection alone may authorize certain discharges which may not conform to the Model Sewer Ordinance.

(E) No discharge shall contain or cause in the receiving stream a visible oil sheen, floating solids, visible discoloration, or foaming.

(F) No discharge shall cause acute or chronic toxicity in the receiving water body beyond any Zone Of Influence (ZOI) specifically allocated to that discharge in this permit.

(G) The permittee shall maintain an alternate power source adequate to provide full operation of all pump stations in the sewerage collection system and to provide a minimum of primary treatment and disinfection at the water pollution control facility to insure that no discharge of untreated wastewater will occur during a failure of a primary power source.

(H) The average monthly effluent concentration shall not exceed 15% of the average monthly influent concentration for BOD_5 and Total Suspended Solids for all daily composite samples taken in any calendar month.

(I) Any new or increased amount of sanitary sewage discharge to the sewer system is prohibited where it will cause a dry weather overflow or exacerbate an existing dry weather overflow.

(J) Sludge Conditions

(1) The permittee shall comply with all existing federal and state laws and regulations that apply to sewage sludge use and disposal practices, including but not limited to 40 CFR Part 503.

(2) If an applicable management practice or numerical limitation for pollutants in sewage sludge more stringent than existing federal and state regulations is promulgated under Section 405(d) of the Clean Water Act (CWA), this permit shall be modified or revoked and reissued to conform to the promulgated regulations.

(3) The permittee shall give prior notice to the Commissioner of any change(s) planned in the permittees' sludge use or disposal practice. A change in the permittees' sludge use or disposal practice may be a cause for modification of the permit.

(4) Testing for inorganic pollutants shall follow "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846 as updated and/or revised.

(K) This permit becomes effective on the 1st day of the month following the date of signature.

(L) When the arithmetic mean of the average daily flow from the POTW for the previous 180 days exceeds 90% of the design flow rate, the permittee shall develop and submit within one year, for the review and approval of the Commissioner, a plan to accommodate future increases in flow to the plant. This plan shall include a schedule for completing any recommended improvements and a plan for financing the improvements.

(M) When the arithmetic mean of the average daily BOD_5 or TSS loading into the POTW for the previous 180 days exceeds 90% of the design load rate, the permittee shall develop and submit for the review of the Commissioner within one year, a plan to accommodate future increases in load to the plant. This plan shall include a schedule for completing any recommended improvements and a plan for financing the improvements.

(N) On or before July 31st of each calendar year the main flow meter shall be calibrated by an independent contractor in accordance with the manufacturer's specifications. The actual record of the calibration shall be retained onsite and, upon request, the permittee shall submit to the Commissioner a copy of that record.

(O) The permittee shall operate and maintain all processes as installed in accordance with the approved plans and specifications and as outlined in the associated operation and maintenance manual. This includes but is not limited to all preliminary treatment processes, primary treatment processes, recycle pumping processes, anaerobic treatment processes, anoxic treatment processes, aerobic treatment processes, flocculation processes, effluent filtration processes or any other processes necessary for the optimal removal of pollutants. The permittee shall not bypass or fail to operate any of the aforementioned processes without the written approval of the Commissioner.

(P) The permittee is hereby authorized to accept septage at the treatment facility; or other locations as approved by the Commissioner.

(Q) The temperature of any discharge shall not increase the temperature of the receiving stream above 85°F, or, in any case, raise the normal temperature of the receiving stream more than 4°F.

SECTION 5: SPECIFIC EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

(A) The discharge(s) shall not exceed and shall otherwise conform to the specific terms and conditions listed in this permit. The discharge is restricted by, and shall be monitored in accordance with Tables **A** through **F** incorporated in this permit as Attachment 1.

(B) The Permittee shall monitor the performance of the treatment process in accordance with the Monthly Operating Report (MOR) incorporated in this permit as Attachment 2.

SECTION 6: SAMPLE COLLECTION, HANDLING and ANALYTICAL TECHNIQUES

(A) Chemical Analysis

(1) Chemical analyses to determine compliance with effluent limits and conditions established in this permit shall be performed using the methods approved pursuant to the Code of Federal Regulations, Part 136 of Title 40 (40 CFR 136) unless an alternative method has been approved in writing pursuant to 40 CFR 136.4 or as provided in Section 22a-430-3-(j)(7) of the RCSA. Chemicals which do not have methods of analysis defined in 40 CFR 136 or the RCSA shall be analyzed in accordance with methods specified in this permit.

(2) All metals analyses identified in this permit shall refer to analyses for Total Recoverable Metal, as defined in 40 CFR 136 unless otherwise specified.

(3) Grab samples shall be taken during the period of the day when the peak hourly flow is normally experienced.

(4) Samples collected for bacteriological examination shall be collected between the hours of 11 a.m. and 3 p.m. or at that time of day

when the peak hourly flow is normally experienced.

(5) The Minimum Levels specified below represent the concentrations at which quantification must be achieved and verified during the chemical analyses for the parameters identified in Attachment 1, Tables A and C. Analyses for these parameters must include check standards within ten percent of the specified Minimum Level or calibration points equal to or less than the specified Minimum Level.

Parameter	Minimum Level
Aluminum	0.050 mg/l
Antimony, Total	0.010 mg/l
Arsenic, Total	0.005 mg/l
Beryllium, Total	0.001 mg/l
Cadmium, Total	0.0005 mg/l
Chlorine, Total Residual	0.050 mg/l
Chromium, Total	0.005 mg/l
Chromium, Total Hexavalent	0.010 mg/l
Copper, Total	0.005 mg/l
Cyanide, Total	0.010 mg/l
Iron, Total	0.040 mg/l
Lead, Total	0.005 mg/l
Mercury, Total	0.0002 mg/l
Nickel, Total	0.005 mg/l
Phosphorus, Total	0.050 mg/l
Selenium, Total	0.005 mg/l
Silver, Total	0.002 mg/l
Thallium, Total	0.005 mg/l
Zinc, Total	0.020 mg/l

(6) The value of each parameter for which monitoring is required under this permit shall be reported to the maximum level of accuracy and precision possible consistent with the requirements of this Section of the permit.

(7) Effluent analyses for which quantification was verified during the analysis at or below the minimum levels specified in this Section and which indicate that a parameter was not detected shall be reported as "less than x" where 'x' is the numerical value equivalent to the analytical method detection limit for that analysis.

(8) Results of effluent analyses which indicate that a parameter was not present at a concentration greater than or equal to the Minimum Level specified for that analysis shall be considered equivalent to zero (0.0) for purposes of determining compliance with effluent limitations or conditions specified in this permit.

(B) Acute Aquatic Toxicity Test

(1) Samples for monitoring of Acute Aquatic Toxicity shall be collected and handled as prescribed in "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" (EPA-821-R-02-012).

(a) Composite samples shall be chilled as they are collected. Grab samples shall be chilled immediately following collection. Samples shall be held at 0 - 6°C until Acute Aquatic Toxicity testing is initiated.

(b) Effluent samples shall not be dechlorinated, filtered, or, modified in any way, prior to testing for Acute Aquatic Toxicity unless specifically approved in writing by the Commissioner for monitoring at this facility. Facilities with effluent dechlorination and/or filtration designed as part of the treatment process are not required to obtain approval from the Commissioner.

(c) Samples shall be taken at the final effluent for Acute Aquatic Toxicity unless otherwise approved in writing by the Commissioner for monitoring at this facility.

(d) Chemical analyses of the parameters identified in Attachment 1, Table C shall be conducted on an aliquot of the same sample tested for Acute Aquatic Toxicity.

(i) At a minimum, pH, specific conductance, total alkalinity, total hardness, and total residual chlorine shall be measured in the effluent sample and, during Acute Aquatic Toxicity tests, in the highest concentration of the test and in the dilution (control) water at the beginning of the test and at test termination. If total residual chlorine is not detected at test initiation, it does not need to be measured at test termination. Dissolved oxygen, pH, and temperature shall be measured in the control and all test

concentrations at the beginning of the test, daily thereafter, and at test termination.

(e) Tests for Acute Aquatic Toxicity shall be initiated within 36 hours of sample collection.

(2) Monitoring for Acute Aquatic Toxicity to determine compliance with the permit limit on Acute Aquatic Toxicity (invertebrate) shall be conducted for 48 hours utilizing neonatal (less than 24 hours old) *Daphnia pulex.*

(3) Monitoring for Acute Aquatic Toxicity to determine compliance with the permit limit on Acute Aquatic Toxicity (vertebrate) shall be conducted for 48 hours utilizing larval (1 to 14-day old with no more than 24 hours range in age) *Pimephales promelas.*

(4) Tests for Acute Aquatic Toxicity shall be conducted as prescribed for static non-renewal acute tests in "Methods for measuring the Acute Aquatic Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" (EPA/821-R-02-012), except as specified below.

(a) For Acute Aquatic Toxicity limits, and for monitoring only conditions, expressed as a NOAEL value, Pass/Fail (single concentration) tests shall be conducted at a specified Critical Test Concentration (CTC) equal to the Aquatic Toxicity limit, (100% in the case of monitoring only conditions), as prescribed in Section 22a-430-3(j)(7)(A)(i) of the RCSA.

(b) Organisms shall not be fed during the tests.

(c) Synthetic freshwater prepared with deionized water adjusted to a hardness of 50±5 mg/L as $CaCO_3$ shall be used as dilution water in the tests.

(d) Copper nitrate shall be used as the reference toxicant.

(5) For limits expressed as NOAEL = 100%, compliance shall be demonstrated when the results of a valid pass/fail Acute Aquatic Toxicity Test indicate 90% or greater survival in the effluent sample at the CTC (100%).

(C) Chronic Aquatic Toxicity Test for Freshwater Discharges

(1) Chronic Aquatic Toxicity testing of the discharge shall be conducted annually during July, August, or September of each year.

(2) Chronic Aquatic Toxicity testing shall be performed on the discharge in accordance with the test methodology established in "Short-Term Methods for Estimating The Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms" (EPA-821-R-02-013) as referenced in 40 CFR 136 for *Ceriodaphnia* survival and reproduction and Fathead minnow larval survival and growth.

(a) Chronic Aquatic Toxicity tests shall utilize a minimum of five effluent dilutions prepared using a dilution factor of 0.5 (100% effluent, 75% effluent, 50% effluent, 25% effluent and 12.5% effluent,).

(b) Synthetic freshwater prepared in accordance with EPA-600-4-91-002 at a hardness of 50(+/-)5 mgl shall be used as control (0% effluent) and dilution water in the toxicity tests.

(c) Daily composite samples of the discharge (final effluent following disinfection) shall be collected on day 0, day 2 and day 4 of the test. Samples shall not be pH or hardness adjusted, or chemically altered in any way.

(d) Test solution shall be renewed on day 1 (test initiation), day 3, and day 5 of the test.

(3) All samples of the discharge shall, at a minimum, be analyzed and results reported in accordance with the provisions listed in Section 6(A) of this permit for the parameters listed in Attachment 1, Table C included herein, excluding Acute Aquatic Toxicity organism testing.

SECTION 7: RECORDING AND REPORTING REQUIREMENTS

(A) The results of chemical analyses and any aquatic toxicity test required above in Section 5 and the referenced Attachment 1 shall be entered on the Discharge Monitoring Report (DMR) and reported to the Bureau of Water Protection and Land Reuse. The report shall also include a detailed explanation of any violations of the limitations specified. The DMR must be received at the following address by the 15th day of the month following the month in which samples are collected.

ATTN: Municipal Wastewater Monitoring Coordinator
Connecticut Department of Energy and Environmental Protection

Bureau of Water Protection and Land Reuse, Planning and Standards Division
79 Elm Street
Hartford, Connecticut 06106-5127

(1) For composite samples, from other than automatic samplers, the instantaneous flow and the time of each aliquot sample collection shall be recorded and maintained at the POTW.

(B) Complete and accurate test data, including percent survival of test organisms in each replicate test chamber, LC_{50} values and 95% confidence intervals for definitive test protocols, and all supporting chemical/physical measurements performed in association with any aquatic toxicity test, shall be entered on the Aquatic Toxicity Monitoring Report form (ATMR) and sent to the Bureau of Water Protection and Land Reuse at the address specified above in Section 7 (A) of this permit by the 15th day of the month following the month in which samples are collected.

(C) The results of the process monitoring required above in Section 5 shall be entered on the Monthly Operating Report (MOR) form, included herein as Attachment 2, and reported to the Bureau of Water Protection and Land Reuse. The MOR report shall also be accompanied by a detailed explanation of any violations of the limitations specified. The MOR, must be received at the address specified above in Section 7 (A) of this permit by the 15th day of the month following the month in which the data and samples are collected.

(D) A complete and thorough report of the results of the chronic toxicity monitoring outlined in Section 6(C) shall be prepared as outlined in Section 10 of EPA-821-R-02-013 and submitted to the Department for review on or before December 31 of each calendar year to the address specified above in Section 7 (A) of this permit.

(E) NetDMR Reporting Requirements

(1) Unless otherwise approved in writing by the Commissioner, no later than one-hundred and twenty (120) days after the issuance of this permit, the Permittee shall begin reporting to the Department electronically using NetDMR, a web-based tool that allows Permittees to electronically submit discharge monitoring reports (DMRs) and other required reports through a secure internet connection. Specific requirements regarding subscription to NetDMR and submittal of data and reports in hard copy form and for submittal using NetDMR are described below:

(a) NetDMR Subscriber Agreement

On or before fifteen (15) days after the issuance of this permit, the Permittee and/or the person authorized to sign the Permittee's discharge monitoring reports ("Signatory Authority") as described in RCSA Section 22a-430-3(b)(2) shall contact the Department and initiate the subscription process for electronic submission of Discharge Monitoring Report (DMR) information. On or before ninety (90) days after issuance of this permit the Permittee shall submit a signed and notarized copy of the *Connecticut DEP NetDMR Subscriber Agreement* to the Department.

(b) Submittal of Reports Using NetDMR

Unless otherwise approved by the Commissioner, on or before one-hundred and twenty (120) days after issuance of this permit, the Permittee and/or the Signatory Authority shall electronically submit DMRs and reports required under this permit to the Department using NetDMR in satisfaction of the DMR submission requirement of this permit. DMRs shall be submitted electronically to the Department no later than the 15th day of the month following the completed reporting period.

(c) Submittal of NetDMR Opt-Out Requests

If the Permittee is able to demonstrate a reasonable basis, such as technical or administrative infeasibility, that precludes the use of NetDMR for electronically submitting DMRs and reports, the Commissioner may approve the submission of DMRs and other required reports in hard copy form ("opt-out request"). Opt-out requests must be submitted in writing to the Department for written approval on or before fifteen (15) days prior to the date a Permittee would be required under this permit to begin filing DMRs and other reports using NetDMR. This demonstration shall be valid for twelve (12) months from the date of the Department's approval and shall thereupon expire. At such time, DMRs and reports shall be submitted electronically to the Department using NetDMR unless the Permittee submits a renewed opt-out request and such request is approved by the Department.

All opt-out requests and requests for the NetDMR subscriber form should be sent to the following address:

Attn: NetDMR Coordinator
Connecticut Department of Energy and Environmental Protection
Water Permitting and Enforcement Division – 2nd Floor
79 Elm Street

Hartford, CT 06106-5127

SECTION 8: RECORDING AND REPORTING OF VIOLATIONS, ADDITIONAL TESTING REQUIREMENTS, BYPASSES, MECHANICAL FAILURES, AND MONITORING EQUIPMENT FAILURES

(A) If any Acute Aquatic Toxicity sample analysis indicates that an Aquatic toxicity effluent limitation has been exceeded, or that the test was invalid, an additional sample of the effluent shall be collected and tested for Acute Aquatic Toxicity and associated chemical parameters, as described above in Section 5 and Section 6, and the results reported to the Bureau of Water Protection and Land Reuse (Attn: Aquatic Toxicity) via the ATMR form (see Section 7 (B)) within 30 days of the previous test. These test results shall also be reported on the next month's DMR report pursuant to Section 7 (A). The results of all toxicity tests and associated chemical parameters, valid and invalid, shall be reported.

(B) If any two consecutive Acute Aquatic Toxicity test results or any three Acute Aquatic Toxicity test results in a twelve month period indicates that the Acute Aquatic Toxicity limit has been exceeded, the permittee shall immediately take all reasonable steps to eliminate toxicity wherever possible and shall submit a report, to the Bureau of Water Protection and Land Reuse (Attn: Aquatic Toxicity), for the review and written approval of the Commissioner in accordance with Section 22a-430-3(j)(10)(c) of the RCSA describing proposed steps to eliminate the toxic impact of the discharge on the receiving water body. Such a report shall include a proposed time schedule to accomplish toxicity reduction and the permittee shall comply with any schedule approved by the Commissioner.

(C) Section 22a-430-3(k) of the RCSA shall apply in all instances of bypass including a bypass of the treatment plant or a component of the sewage collection system planned during required maintenance. The Department of Energy and Environmental Protection, Bureau of Water Protection and Land Reuse, Planning and Standards Division, Municipal Facilities Section (860) 424-3704, the Department of Public Health, Water Supply Section (860) 509-7333 and Recreation Section (860) 509-7297, and the local Director of Health shall be notified within 2 hours of the permittee learning of the event by telephone during normal business hours. If the discharge or bypass occurs outside normal working hours (8:30 a.m. to 4:30 p.m. Monday through Friday), notification shall be made within 2 hours of the permittee learning of the event to the Emergency Response Unit at (860) 424-3338 and the Department of Public Health at (860) 509-8000. A written report shall be submitted to the Department of Energy and Environmental Protection, Bureau of Water Protection and Land Reuse, Planning and Standards Division, Municipal Facilities Section within five days of the permittee learning of each occurrence, or potential occurrence, of a discharge or bypass of untreated or partially treated sewage.

The written report shall contain:

(i) The nature and cause of the bypass, permit violation, treatment component failure, and/or equipment failure,

(ii) the time the incident occurred and the anticipated time which it is expected to continue or, if the condition has been corrected, the duration,

(iii) the estimated volume of the bypass or discharge of partially treated or raw sewage,

(iv) the steps being taken to reduce or minimize the effect on the receiving waters, and

(v) the steps that will be taken to prevent reoccurrence of the condition in the future.

(D) Section 22a-430-3(j) 11 (D) of the RCSA shall apply in the event of any noncompliance with a maximum daily limit and/or any noncompliance that is greater than two times any permit limit. The permittee shall notify in the same manner as in paragraph C of this Section, the Department of Energy and Environmental Protection, Bureau of Water Protection and Land Reuse Planning and Standards Division, Municipal Facilities Section except, if the noncompliance occurs outside normal working hours (8:30 a.m. to 4:30 p.m. Monday through Friday) the permittee may wait to make the verbal report until 10:30 am of the next business day after learning of the noncompliance.

(E) Section 22a-430-3(j) 8 of the RCSA shall apply in all instances of monitoring equipment failures that prevent meeting the requirements in this permit. In the event of any such failure of the monitoring equipment including, but not limited to, loss of refrigeration for an auto-sampler or lab refrigerator or loss of flow proportion sampling ability, the permittee shall notify in the same manner as in paragraph C of this Section, the Department of Energy and Environmental Protection, Bureau of Water Protection and Land Reuse, Planning and Standards Division, Municipal Facilities Section except, if the failure occurs outside normal working hours (8:30 a.m. to 4:30 p.m. Monday through Friday) the permittee may wait to make the verbal report until 10:30 am of the next business day after learning of the failure.

(F) In addition to the reporting requirements contained in Section 22a-430-3(i), (j), and (k) of the Regulations of Connecticut State Agencies, the permittee shall notify in the same manner as in paragraph C of this Section, the Department of Energy and Environmental Protection, Bureau of Water Protection and Land Reuse, Planning and Standards Division, Municipal Facilities Section concerning the failure of any major component of the treatment facilities which the permittee may have reason to believe would result in an effluent violation.

SECTION 9: COMPLIANCE SCHEDULES

(A) On or before **30 days** after the date of issuance of this permit, the permittee shall retain one or more qualified consultants acceptable to the Commissioner to prepare the documents and implement or oversee the actions required by this permit and shall, by that date, notify the Commissioner in writing of the identity of such consultants. The permittee has retained AECOM to prepare the documents and implement or oversee the actions required by this permit. The municipality shall retain one or more qualified consultants acceptable to the Commissioner until this permit is fully complied with, and, within ten days after retaining any consultant other than the one originally identified under this paragraph, the municipality shall notify the Commissioner in writing of the identity of such other consultant. The consultant(s) retained to perform the studies and oversee any remedial measures required herein shall be a qualified professional engineer licensed to practice in Connecticut. The permittee shall submit to the Commissioner a description of a consultant's education, experience and training which is relevant to the work required by this permit within ten days after a request for such a description. Nothing in this paragraph shall preclude the Commissioner from finding a previously acceptable consultant unacceptable.

(B) The permittee shall achieve the final water quality-based effluent limits for **Zinc** DSN 001-1 established in Section 5 of this permit, in accordance with the following:

(1) On or before **390 days** after the date of issuance of this permit, the permittee shall submit for the Commissioner's review and written approval a comprehensive and thorough engineering report which describes and evaluates alternative actions which may be taken by permitteee to achieve compliance with the Zinc limitations listed in Section 5 of this permit. Such report shall:

(a) List all permits and approvals required for each alternative, including but not limited to any permits required under Sections 22a-32, 22a-42a, 22a-342, 22a-361, 22a-368 or 22a-430 of the CGS,

(b) Propose a preferred alternative or combination of alternatives with supporting justification therefore,

(c) State in detail the most expeditious schedule for performing each alternative, and

(d) Propose a detailed program and schedule to perform all actions required to implement the preferred alternative, including but not limited to a schedule for submission of engineering plans and specifications for any new equipment, the start and completion of any construction activities and applying for and obtaining all permits and approvals required for such actions.

(2) Unless another deadline is specified in writing by the Commissioner, on or before **426 days** after approval of the engineering report mentioned in 9(B)(1) above, the permittee shall (1) submit for the Commissioner's review and written approval, contract plans and specifications for the approved remedial actions, a revised list of all permits and approvals required for such actions and a revised schedule for applying for and obtaining such permits and approvals; and (2) submit applications for all permits and approvals required under Sections 22a-430 and 22a-416 of the CGS. The permittee shall obtain all required permits and approvals.

(C) The permittee shall achieve the revised seasonal water quality-based effluent limits for **phosphorus** for DSN 001-1 established in Section 5 of this permit, in accordance with the following:

(1) On or before **390 days** after the date of issuance of this permit, the permittee shall submit for the Commissioner's review and written approval a comprehensive and thorough engineering report which describes and evaluates alternative actions which may be taken by permittee to achieve compliance with the Phosphorus limitations in Section 5 of this permit. Such report shall:

(a) List all permits and approvals required for each alternative, including but not limited to any permits required under Sections 22a-32, 22a-42a, 22a-342, 22a-361, 22a-368 or 22a-430 of the CGS,

(b) Propose a preferred alternative or combination of alternatives with supporting justification therefore,

(c) State in detail the most expeditious schedule for performing each alternative, and

(d) Propose a detailed program and schedule to perform all actions required to implement the preferred alternative, including but not limited to a schedule for submission of engineering plans and specifications for any new equipment, the start and completion of any construction activities and applying for and obtaining all permits and approvals required for such actions.

(2) Unless another deadline is specified in writing by the Commissioner, on or before **426 days** after approval of the engineering report mentioned in 9(C)(1) above, the permittee shall (1) submit for the Commissioner's review and written approval, contract plans and specifications for the approved remedial actions, a revised list of all permits and approvals required for such actions and a revised schedule for applying for and obtaining such permits and approvals; and (2) submit applications for all permits and approvals required under Sections 22a-430 and 22a-416 of the CGS. The permittee shall obtain all required permits and approvals.

(D) The permittee shall achieve the final water quality-based effluent limits for **Escherichia coli** for DSN 001-1 established in Section 5 of this permit, in accordance with the following:

(1) On or before **300 days** after the date of issuance of this permit, the permittee shall submit for the Commissioner's review and written approval a comprehensive and thorough report which describes the actions to be taken by the permittee necessary to achieve compliance with the requirements in Table A of this permit for **Escherichia coli**. Such report shall include a schedule for implementation of such actions not to exceed **730 days** after the date of issuance of this permit.

(2) In accordance with the schedule approved in writing by the Commissioner, but in no event later than **730 days** after the date of issuance of this permit, the permittee shall perform the actions approved in writing by the Commissioner necessary to comply with the requirements in Table A of this permit for **Escherichia coli**. Within fifteen days after completing such actions, the permittee shall certify to the Commissioner in writing that the actions have been completed as approved by the Commissioner.

(E) The permittee shall submit to the Commissioner **semi-annual** status reports beginning sixty days after the date of approval of the report referenced in paragraph(s) B, C and D of this Section. Status reports shall include, but not be limited to, a detailed description of progress made by the permittee in performing actions required by this Section of the permit in accordance with the approved schedule including, but not limited to, development of engineering plans and specifications, construction activity, contract bidding, operational changes, preparation and submittal of permit applications, and any other required under paragraph(s) B, C, and D of this Section.

(F) The permittee shall perform the approved actions in accordance with the approved schedule(s), but in no event shall the approved actions be completed later than: **1820 days** after the date of issuance of this permit for compliance with the **Zinc and Phosphorus** limits; and **730 days** for compliance with the **Escherichia coli** limits listed herein. Within fifteen days after completing such actions, the permittee shall certify to the Commissioner in writing that the actions have been completed as approved.

(G) The permittee shall use best efforts to submit to the Commissioner all documents required by this Section of the permit in a complete and approvable form. If the Commissioner notified the permittee that any document or other action is deficient, and does not approve it with conditions or modifications, it is deemed disapproved, and the permittee shall correct the deficiencies and resubmit it within the time specified by the Commissioner or, if no time is specified by the Commissioner, within thirty days of the Commissioner's notice of deficiencies. In approving any document or other action under this Compliance Schedule, the Commissioner may approve the document or other action as submitted or performed or with such conditions or modifications as the Commissioner deems necessary to carry out the purposes of this Section of the permit. Nothing in this paragraph shall excuse noncompliance or delay.

(H) Dates. The date of submission to the Commissioner of any document required by this section of the permit shall be the date such document is received by the Commissioner. The date of any notice by the Commissioner under this section of the permit, including but not limited to notice of approval or disapproval of any document or other action, shall be the date such notice is personally delivered or the date three days after it is mailed by the Commissioner, whichever is earlier. Except as otherwise specified in this permit, the word "day" as used in this Section of the permit means calendar day. Any document or action which is required by this Section only of the permit, to be submitted, or performed, by a date which falls on, Saturday, Sunday, or, a Connecticut or federal holiday, shall be submitted or performed on or before the next day which is not a Saturday, Sunday, or Connecticut or federal holiday.

(I) Notification of noncompliance. In the event that the permittee becomes aware that it did not or may not comply, or did not or may not comply on time, with any requirement of this Section of the permit or of any document required hereunder, the permittee shall immediately notify the Commissioner and shall take all reasonable steps to ensure that any noncompliance or delay is avoided or, if unavoidable, is minimized to the greatest extent possible. In so notifying the Commissioner, the permittee shall state in writing the reasons for the noncompliance or delay and propose, for the review and written approval of the Commissioner, dates by which compliance will be achieved, and the permittee shall comply with any dates which may be approved in writing by the Commissioner. Notification by the permittee shall not excuse noncompliance or delay, and the Commissioner's approval of any compliance dates proposed shall not excuse noncompliance or delay unless specifically so stated by the Commissioner in writing.

(J) Notice to Commissioner of changes. Within fifteen days of the date the permittee becomes aware of a change in any information submitted to the Commissioner under this Section of the permit, or that any such information was inaccurate or misleading or that any relevant information was omitted, the permittee shall submit the correct or omitted information to the Commissioner.

(K) Submission of documents. Any document, other than a DMR, ATMR or MOR required to be submitted to the Commissioner under this Section of the permit shall, unless otherwise specified in writing by the Commissioner, be directed to:

Carlos A. Esguerra
Department of Energy and Environmental Protection
Bureau of Water Protection and Land Reuse, Planning and Standards Division
79 Elm Street
Hartford, Connecticut 06106-5127

This permit is hereby issued on September 30, 2015.

Betsey Wingfield
Bureau Chief
Bureau of Water Protection and Land Reuse

ATTACHMENT 1

Tables A through F

TABLE A

Discharge Serial Number (DSN): **001-1** | Monitoring Location: **1**

Wastewater Description: **Sanitary Sewage**

Monitoring Location Description: **Final Effluent**

Allocated Zone of Influence (ZOI): **0.50 cfs** | In-stream Waste Concentration (IWC): **75.59%**

PARAMETER	Units	FLOW/TIME BASED MONITORING				INSTANTANEOUS MONITORING			REPORT FORM	Minimum Level Analysis See Section 6
		Average Monthly Limit	Maximum Daily Limit	Sample Freq.	Sample type	Instantaneous Limit or Required Range [3]	Sample Freq.	Sample Type		
Alkalinity	mg/l	NA	NA	NR	NA	------	Monthly	Grab	MOR	
Biochemical Oxygen Demand (5 day) [1] November 1st through March 31st.	mg/l	20	40	Weekly	Daily Composite	NA	NR	NA	DMR/MOR	
Biochemical Oxygen Demand (5 day) [1] April 1st through October 31st.	mg/l	10	20	Weekly	Daily Composite	NA	NR	NA	DMR/MOR	
Fecal coliform [4] May 1st through September 30th	Colonies per100 ml	NA	NA	NR	NA	see remarks (B) and (C) below	Weekly	Grab	DMR/MOR	
Escherichia coli [5] May 1st through September 30th. See remark (D) below	Colonies per100 ml	NA	NA	NR	NA	410	Weekly	Grab	DMR/MOR	
Flow	MGD	------	------	Continuous [2]	Average Daily Flow	NA	NR	NA	DMR/MOR	
Nitrogen, Ammonia (total as N). April May June July through September October November through March	mg/l	7.3 4.9 2.3 1.6 2.7 ------	------ ------ ------ ------ ------ ------	2/week 2/week 2/week 2/week 2/week Monthly	Daily Composite	NA	NR	NA	DMR/MOR DMR/MOR DMR/MOR DMR/MOR DMR/MOR MOR	
Nitrogen, Nitrate (total as N)	mg/l	NA	------	Monthly	Daily Composite	NA	NR	NA	MOR	
Nitrogen, Nitrite (total as N)	mg/l	NA	------	Monthly	Daily Composite	NA	NR	NA	MOR	
Nitrogen, Total Kjeldahl	mg/l	NA	------	Monthly	Daily Composite	NA	NR	NA	MOR	
Nitrogen, Total	mg/l	NA	------	Monthly	Daily Composite	NA	NR	NA	MOR	

Nitrogen, Total	lbs/day	NA	------	Monthly	Daily Composite	NA	NR	NA	MOR	
Oxygen, Dissolved. May 1st through September 30th	mg/l	NA	NA	NR	NA	≥ 6.0	Work Day	Grab	DMR/MOR	
Oxygen, Dissolved. October 1st through April 30th	mg/l	NA	NA	NR	NA	NA	Work Day	Grab	DMR/MOR	
pH	S.U.	NA	NA	NR	NA	6 - 9	Work Day	Grab	DMR/MOR	
Phosphate, Ortho. [6] May 1st through September 30th October 1st through April 30th	mg/l	NA	------ ------	Weekly Monthly	Daily Composite	NA	NR	NA	MOR	
Phosphorus, Total [6] May 1st through September 30th October 1st through April 30th	mg/l	1.0 ------	2.0 ------	Weekly Monthly	Daily Composite	NA	NR	NA	DMR/MOR MOR	*
Phosphate, Ortho. [7] November 1st through March 31st April 1st through October 31st	mg/l	NA	------ ------	Monthly Weekly	Daily Composite	NA	NR	NA	MOR	
Phosphorus, Total [7] November 1st through March 31st April 1st through October 31st	mg/l	NA 0.16	------ 0.31	Monthly Weekly	Daily Composite	NA	NR	NA	DMR/MOR	*
Phosphorus, Total April 1st through October 31st	lbs/day	------	------	Weekly	Daily Composite	NA	NA	NA	MOR	
Phosphorus, Total [8] (Average Seasonal Load Cap) October	lbs/day	------	NA	Weekly	Calculated	NA	NA	NA	DMR/MOR	
Solids, Settleable	ml/l	NA	NA	NR	NA	------	Work Day	Grab	MOR	
Solids, Total Suspended[1] November 1st through March 31st	mg/l	20	40	Weekly	Daily Composite	NA	NA	NA	DMR/MOR	
Solids, Total Suspended[1], April 1st through October 31st	mg/l	10	20	Weekly	Daily Composite	NA	NA	NA	DMR/MOR	
Temperature	°F	NA	NA	NR	NA	------	Work Day	Grab	MOR	
Turbidity	NTU	NA	NA	NR	NA	------	Work Day	Grab	MOR	
UV Intensity May 1st through September 30th See remark A	mW/cm^2	NA	NA	NR	NA	------	4/Work Day	Grab	MOR	
Zinc, Total	kg/d	0.25	0.33	Weekly	Daily Composite	NA	NA	NA	DMR/MOR	*
Zinc, Total	mg/l	------	------	Weekly	Daily Composite	NA	NA	NA	MOR	*

TABLE A – CONDITIONS

Footnotes:

[1] The discharge shall not exceed an average monthly 20 mg/l (November 1st through March 31st) and 10 mg/l (April 1st through October31st) or a maximum daily 40 mg/l (November 1st through March 31st) and 20 mg/l (April 1st through October 31st).

Footnotes (Continued)

[2] The permittee shall record and report on the monthly operating report the minimum, maximum and total flow for each day of discharge and the average daily flow for each sampling month. The permittee shall report, on the discharge monitoring report, the average daily flow and maximum daily flow for each sampling month.

[3] The instantaneous limits in this column are maximum limits except for Dissolved Oxygen is a minimum limit.

[4] During the period beginning at the date of issuance of this permit and lasting until the implementation of Escherichia coli monitoring at the Water Pollution Control Facility, the discharge shall not exceed and shall otherwise conform to specific terms and conditions listed.

[5] During the period beginning after the implementation of Escherichia coli monitoring, but no later than **730 days** after permit issuance, lasting until expiration, the discharge shall also not exceed and shall otherwise conform to the specific terms and conditions listed.

[6] During the period beginning at the date of issuance of this permit and lasting until the implementation of revised phosphorus effluent limits at the Water Pollution Control Facility, the discharge shall not exceed and shall otherwise conform to specific terms and conditions listed.

[7] During the period beginning after the implementation of revised phosphorus effluent limits but no later than **1820 days** after permit issuance, lasting until expiration, the discharge shall also not exceed and shall otherwise conform to the specific terms and conditions listed.

[8] During the period beginning after the implementation of phosphorus removal but no later than **1820 days** after permit issuance, lasting until expiration, the discharge shall not exceed the total phosphorus Average Seasonal Load of 0.52 lbs/day as follows: Calculate the Average Seasonal Load by adding all sample results during each April 1st through October 31st season in pounds per day and dividing by the total number of those samples in that season.

Remarks:

(A) Ultraviolet disinfection shall be utilized from May 1st through September 30th.

(B) The geometric mean of the Fecal coliform bacteria values for the effluent samples collected in a period of a calendar month during the period from May 1st through September 30th shall not exceed 200 per 100 milliliters.

(C) The geometric mean of the Fecal coliform bacteria values for the effluent samples collected in a period of a calendar week during the period from May 1st through September 30th shall not exceed 400 per 100 milliliters.

(D) The geometric mean of the Escherichia coli bacteria values for the effluent samples collected in a period of a calendar month during the period from May 1st through September 30th shall not exceed 126 per 100 milliliters.

TABLE B

Discharge Serial Number (DSN): **001-1**		Monitoring Location: **K**			
Wastewater Description: **Sanitary Sewage**					
Monitoring Location Description: **Final Effluent**					
Allocated Zone of Influence (ZOI): **0.5 cfs**		In-stream Waste Concentration (IWC): **75.59 %**			
PARAMETER	**Units**	**FLOW/TIME BASED MONITORING**			**REPORT FORM**
		Average Monthly Minimum	**Sample Freq.**	**Sample type**	
Biochemical Oxygen Demand (5 day) Percent Removal[1]	% of Influent	85	Weekly	Calculated[2]	DMR/MOR
Solids, Total Suspended Percent Removal[1]	% of Influent	85	Weekly	Calculated[2]	DMR/MOR

TABLE B – CONDITIONS

Footnotes:

[1] The discharge shall be less than or equal to 15% of the average monthly influent BOD_5 and total suspended solids (Table E, Monitoring Location G).

[2] Calculated based on the average monthly results described in Table A. Removal efficiency $= \frac{\text{Inf.BOD or TSS} - \text{Effluent BOD or TSS}}{\text{Inf.BOD or TSS}} \times 100$

TABLE C

Discharge Serial Number (DSN): **001-1**					Monitoring Location: **T**	
Wastewater Description: **Sanitary Sewage**						
Monitoring Location Description: **Final Effluent**						
Allocated Zone of Influence (ZOI): **0.5 cfs**			In-stream Waste Concentration (IWC): **75.59 %**			
PARAMETER	**Units**	**Maximum Daily Limit**	**Sampling Frequency**	**Sample Type**	**Reporting form**	**Minimum Level Analysis See Section 6**
Aluminum, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
Antimony, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
NOAEL Static 48Hr Acute D. Pulex[1]	% survival	NOAEL=100%	Quarterly	Daily Composite	ATMR/DMR	
NOAEL Static 48Hr Acute Pimephales[1]	% survival	NOAEL=100%	Quarterly	Daily Composite	ATMR/DMR	
Arsenic, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
Beryllium, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
BOD_5	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	
Cadmium, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
Chromium, Hexavalent	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
Chromium, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
Chlorine, Total Residual	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
Copper, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
Cyanide, Amenable	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	
Cyanide, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
Iron, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
Lead, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
Mercury, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
Nickel, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
Nitrogen, Ammonia (total as N)	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	
Nitrogen, Nitrate, (total as N)	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	
Nitrogen, Nitrite, (total as N)	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	
Phosphorus, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
Phenols, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	
Selenium, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
Silver, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
Suspended Solids, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	
Thallium, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*
Zinc, Total	mg/l	------	Quarterly	Daily Composite	ATMR/DMR	*

TABLE C - CONDITIONS

Remarks: [1]The results of the Toxicity Tests are recorded in % survival. The permittee shall report % survival on the DMR based on criteria in Section 6(B) of this permit.

ATMR – Aquatic Toxicity Monitoring Report

TABLE D

Discharge Serial Number: **001-1**	Monitoring Location: **N**			
Wastewater Description: **Activated Sludge**				
Monitoring Location Description: **Each Aeration Unit**				
PARAMETER	**REPORTING FORMAT**	**INSTANTANEOUS MONITORING**		**REPORTING FORM**
		Sample Frequency	Sample Type	
Oxygen, Dissolved	High & low for each WorkDay	4/WorkDay	Grab	MOR
Sludge Volume Index	WorkDay	WorkDay	Grab	MOR
Mixed Liquor Suspended Solids	WorkDay	WorkDay	Grab	MOR

TABLE E

Discharge Serial Number: **001-1**			Monitoring Location: **G**				
Wastewater Description: **Sanitary Sewage**							
Monitoring Location Description: **Influent**							
PARAMETER	**Units**	**DMR REPORTING FORMAT**	**FLOW/TIME BASED MONITORING**		**INSTANTANEOUS MONITORING**		**REPORTING FORM**
			Sample Frequency	**Sample Type**	**Sample Frequency**	**Sample Type**	
Alkalinity, Total	mg/l		NA	NA	Monthly	Grab	MOR
Biochemical Oxygen Demand (5 day)	mg/l	Monthly average	Weekly	Daily Composite	NA	NA	DMR/MOR
Nitrogen, Ammonia (total as N)	mg/l		Monthly	Daily Composite	NA	NA	MOR
Nitrogen, Nitrate (total as N)	mg/l		Monthly	Daily Composite	NA	NA	MOR
Nitrogen, Nitrite (total as N)	mg/l		Monthly	Daily Composite	NA	NA	MOR
Nitrogen, Total Kjeldahl	mg/l		Monthly	Daily Composite	NA	NA	MOR
Nitrogen, Total	mg/l		Monthly	Daily Composite	NA	NA	MOR
Phosphate, Ortho	mg/l		Monthly	Daily Composite	NA	NA	MOR
Phosphorus, Total (November 1st through March 31st)	mg/l		Monthly	Daily Composite	NA	NA	MOR
Phosphorus, Total (April 1st through October 31st)	mg/l		Weekly	Daily Composite	NA	NA	MOR
pH	S.U.		NA	NA	Work Day	Grab	MOR
Solids, Total Suspended	mg/l	Monthly average	Weekly	Daily Composite	NA	NA	DMR/MOR
Temperature	°F		NA	NA	Work Day	Grab	MOR

TABLE F

Discharge Serial Number: **001-1**	Monitoring Location: **SL**		
Wastewater Description: **Dewatered sludge**			
Monitoring Location Description: **Dewatered sludge**			
PARAMETER	**INSTANTANEOUS MONITORING**		**REPORTING FORM**
	Units	**Grab Sample Freq.**	
Arsenic, Total	mg/kg	Semi-annually	DMR
Beryllium, Total	mg/kg	Semi-annually	DMR
Cadmium, Total	mg/kg	Semi-annually	DMR
Chromium, Total	mg/kg	Semi-annually	DMR
Copper, Total	mg/kg	Semi-annually	DMR
Lead, Total	mg/kg	Semi-annually	DMR
Mercury, Total	mg/kg	Semi-annually	DMR
Nickel, Total	mg/kg	Semi-annually	DMR
Nitrogen, Ammonia *	mg/kg	Semi-annually	DMR*
Nitrogen, Nitrate (total as N) *	mg/kg	Semi-annually	DMR*
Nitrogen, Organic *	mg/kg	Semi-annually	DMR*
Nitrogen, Nitrite (total as N) *	mg/kg	Semi-annually	DMR*
Nitrogen, Total *	mg/kg	Semi-annually	DMR*
pH *	S.U.	Semi-annually	DMR*
Polychlorinated Biphenyls	mg/kg	Semi-annually	DMR
Solids, Fixed	%	Semi-annually	DMR
Solids, Total	%	Semi-annually	DMR
Solids, Volatile	%	Semi-annually	DMR
Zinc, Total	mg/kg	Semi-annually	DMR
(*) required for composting or land application only Testing for inorganic pollutants shall follow "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846 as updated and/or revised.			

ATTACHMENT 2

MONTHLY OPERATING REPORT FORM

Monthly Operating Report

Facility: South Street WPCF
Town: Ridgefield
Sample Month:
Permit # CT0100854

Chief Plant Opreator: Jorge Pereira
Facility ID: 118-001

Please return forms to: DEEP-Water Bureau
Municipal Facilities Section
79 Elm Street
Hartford, CT 06106-5127

Parameter	Units	Freq	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	AVG
Flow																																		
Max. Day	Mgd	daily																																
Min. Day	Mgd	daily																																
Total Day	Mgd	daily																																
Influent																																		
PH	S.U.	WorkDay																																
Temp	F	WorkDay																																
BOD (5 day)	mg/l	weekly																																
Solids, Susp.	mg/l	weekly																																
Ammonia	mg/l	Monthly																																
Nitrate	mg/l	Monthly																																
Nitrite	mg/l	Monthly																																
Total Nitrogen	mg/l	Monthly																																
TKN	mg/l	Monthly																																
Total Phosphorous	mg/l	See permit																																
Orthophosphate	mg/l	See permit																																
Alkalinity	mg/l	Monthly																																
Aeration Tanks																																		
Tank 3A - MLSS	mg/l	WorkDay																																
Tank 3A - SVI	ml/g	WorkDay																																
Tank 3A - DO Hi	mg/l	WorkDay																																
Tank 3A - DO Lo	mg/l	WorkDay																																
Tank 3B - MLSS	mg/l	WorkDay																																
Tank 3B - SVI	ml/g	WorkDay																																
Tank 3B - DO Hi	mg/l	WorkDay																																
Tank 3B - DO Lo	mg/l	WorkDay																																
Tank 4A - MLSS	mg/l	WorkDay																																
Tank 4A - SVI	ml/g	WorkDay																																
Tank 4A - DO Hi	mg/l	WorkDay																																
Tank 4A - DO Lo	mg/l	WorkDay																																
Tank 4B - MLSS	mg/l	WorkDay																																
Tank 4B - SVI	ml/g	WorkDay																																
Tank 4B - DO Hi	mg/l	WorkDay																																
Tank 4B - DO Lo	mg/l	WorkDay																																

Monthly Operating Report

Facility: South Street WPCF
Town: Ridgefield
Sample Month:
Permit # CT0100854

Parameter	Units	Freq	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	AVG
Effluent																																		
PH	S.U.	WorkDay																																
Temp	F	WorkDay																																
Dissolved Oxygen	mg/l	WorkDay																																
Solids, Sett.	ml/l	WorkDay																																
Turbidity	NTU	WorkDay																																
BOD (5 day)	mg/l	weekly																																
Solids, Susp.	mg/l	weekly																																
Ammonia	mg/l	See permit																																
Nitrate	mg/l	weekly																																
Nitrite	mg/l	weekly																																
Total Nitrogen	mg/l	weekly																																
TKN	mg/l	weekly																																
Total Phosphorous	mg/l	See permit																																
Orthophosphate	mg/l	See permit																																
Phos, Total (April-Oct)	lbs/day	weekly																																
Escherichia Coli	Col/100	See permit																																
Fecal Coliform (Interim)	Col/100	Weekly																																
Alkalinity	mg/l	Monthly																																
Zinc	kg/d	weekly																																
Zinc	mg/l	weekly																																
UV Intensity																																		
Bank #1 -1 st Reading	mW/cm2	WorkDay																																
Bank #1 - 2 nd Reading	mW/cm2	WorkDay																																
Bank #1 - 3 th Reading	mW/cm2	WorkDay																																
Bank #1 - 4 th Reading	mW/cm2	WorkDay																																
Bank #2 -1st Reading	mW/cm2	WorkDay																																
Bank #2 - 2 nd Reading	mW/cm2	WorkDay																																
Bank #2 - 3 th Reading	mW/cm2	WorkDay																																
Bank #2 - 4 th Reading	mW/cm2	WorkDay																																

Monthly Operating Report

Facility: South Street WPCF
Town: Ridgefield
Sample Month:
Permit # CT0100854

Parameter	Units	Freq	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	AVG
Activated Sludge																																		
Return Sludge Flow	Mgd	NA																																
Return Sludge Solids	mg/l	NA																																
Waste Sludge																																		
WAS Flow	gals	NA																																
Sludge Disp. Loc.	Mattabassett District - Cromwell, CT																																	
Sludge Shipped	gals	NA																																
Waste Accepted																																		
Septage Received	gals	NA																																

Statement of Acknowledgement

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations.

Authorized Official

Signature:

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

DATA TRACKING AND TECHNICAL FACT SHEET

Permittee: Town of Ridgefield

PERMIT, ADDRESS, AND FACILITY DATA

PERMIT #: CT0100854 **APPLICATION #:** 200900552 **FACILITY ID.** 118-001

Mailing Address:	Location Address:
Street: 66 Prospect Street	Street: Town of Ridgefield (Main POTW)
City: Ridgefield ST: CT Zip: 06877	Town: Ridgefield ST: CT Zip: 06877
Contact Name: Amy Seibert	Contact Name: Jorge Pereira (United Water)
Phone No.: 203-431-2734	Phone No.: 203-438-8615
	DMR Contact email address: Jorge.pereira@unitedwater.com

PERMIT INFORMATION

DURATION 5 YEAR _X_ 10 YEAR ___ 30 YEAR ___

TYPE New _ Reissuance **X** Modification ___

CATEGORIZATION POINT **(X)** NON-POINT ( ) GIS #

NPDES (X) PRETREAT () GROUND WATER(UIC) ( ) GROUND WATER (OTHER) ( )

NPDES MAJOR**(MA) X**_
NPDES SIGNIFICANT MINOR or PRETREAT SIU **(SI)** ___
NPDES or PRETREATMENT MINOR **(MI)** ___

COMPLIANCE SCHEDULE YES **X** NO___
POLLUTION PREVENTION ___ TREATMENT REQUIREMENT__
WATER QUALITY REQUIREMENT **X** OTHER ___

OWNERSHIP CODE
Private __ Federal __ State __ Municipal (town only) **X** Other public___

DEP STAFF ENGINEER Carlos Esguerra **DATE DRAFTED:** March 2, 2015

PERMIT FEES

Discharge Code	DSN Number	Annual Fee
111000d	001	$2,367.50

FOR NPDES DISCHARGES
Drainage Basin Code: 4952 Water Quality Classification Goal: B
Segment: Norwalk River 7300-02-1-L(2) (Great Swamp)

NATURE OF BUSINESS GENERATING DISCHARGE
Municipal Sanitary Sewage Treatment

PROCESS AND TREATMENT DESCRIPTION (by DSN)
Secondary wastewater treatment with (seasonal) phosphorus removal, sand filtration and seasonal UV disinfection.

RESOURCES USED TO DRAFT PERMIT

X Federal Effluent Limitation Guideline 40CFR 133 Secondary Treatment Category

__ Performance Standards

__ Federal Development Document
name of category

X Department File Information

X Connecticut Water Quality Standards

X Anti-degradation Policy

__ Coastal Management Consistency Review Form

__ Other - Explain

BASIS FOR LIMITATIONS, STANDARDS OR CONDITIONS

X Secondary Treatment (Section 22a-430-4(r) of the Regulations of Connecticut State Agencies)

__ Case-by-Case Determination (See Other Comments)

__ In order to meet in-stream water quality (See General Comments)

__ Anti-degradation policy

GENERAL COMMENTS

The Town of Ridgefield operates a municipal water pollution control facility ("the facility") located at 22 South Street. The facility is designed to treat and discharge up to 1.0 million gallons a day of effluent into ***Great Swamp*** *which is part of the Norwalk River basin. The facility currently uses secondary treatment with denitrification and seasonal UV disinfection to treat effluent before being discharged. Pursuant to Conn. Gen. Stat. § 22a-430, the Department of Energy and Environmental Protection has issued Ridgefield a permit for the discharge from this facility. Ridgefield has submitted an application to renew its permit. The Department has made a tentative determination to approve Ridgefield's application and has prepared a draft permit consistent with that determination.*

The most significant changes from the current permit are the inclusion of revised phosphorus effluent limits and zinc; revised bacteria monitoring requirements (e.g. e. coli); Aluminum monitoring to be consistent with the most recent CT Water Quality Standards and Iron monitoring to be consistent with EPA's National Recommended Water Quality Criteria.

SPECIFIC REQUIREMENTS OR REVISIONS

The Department reviewed the application for consistency with Connecticut's Water Quality Standards and determined that with the limits in the draft permit, including those discussed below, that the draft permit is consistent with maintenance and protection of water quality in accordance with the Tier I Anti-degradation Evaluation and Implementation Review provisions of such Standards.

The need for inclusion of water quality based discharge limitations in this permit was evaluated consistent with Connecticut Water Quality Standards and criteria, pursuant to 40 CFR 122.44(d). Discharge monitoring data was evaluated for consistency with the available aquatic life criteria (acute and chronic) and human health (fish consumption only) criteria, considering the zone of influence allocated to the facility where appropriate. In addition to this review, the statistical procedures outlined in the EPA Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001) were employed to calculate the need for such limits. Comparison of the attached monitoring data and its inherent variability with the calculated water quality based limits indicates a statistical probability of exceeding such limits. Therefore, water quality based limits zinc were included in the permit at this time.

From January 2007 through April 2008, Ridgefield (Main) POTW continuously exceeded its zinc loading limit listed in its discharge permit. These exceedances resulted in EPA order No. 08-022 issued on September 26, 2008 requiring Ridgefield to implement corrective measures to meet required zinc limits. Ridgefield coordinated with the water company (Aquarion Water Co.) to implement changes in the products added to the water supply distribution system for corrosion control. As a result, Aquarion Water Co., has reportedly modified its zinc orthophosphate ratio from 1:3 commonly used in 2002 to a 1:10 ratio implemented since 2012. A graph created using EPA-ICIS zinc effluent loading data since January 2005 (see attachment) shows a downward trend on effluent loadings from the subject facility. Zinc exceedances have become significantly less prevalent in recent years. As noted in the preceding paragraph, the current permit includes revised zinc limits which must be met by Ridgefield no later than 1,460 days after permit issuance.

A compliance schedule is included for the implementation of revised phosphorus limits in the effluent:

Phosphorus Permitting Approach
Phosphorus is a naturally occurring element that is essential to support plant growth. When present in excessive amounts, phosphorus can impair both aquatic life and recreational use of Connecticut's water resources. Excess nutrient enrichment is a serious threat to water quality in Connecticut. Excessive loading of phosphorus to surface waters as a result of discharges from wastewater treatment plants or non point sources such as runoff from urban and agricultural lands, can lead to algal blooms, including blooms of noxious blue green algae, reduction in water clarity, and in extreme cases depletion of oxygen, fish kills, and other impairments to aquatic life. Currently, 21 water body segments have been identified on Connecticut's List of Waters Not Meeting Water Quality Standards where nutrient enrichment is a contributing cause of the impairment.

The Connecticut Water Quality Standards (WQS) do not include numeric criteria for nutrients but rather incorporate narrative standards and criteria for nutrients. These narrative policy statements direct the Connecticut Department of Environmental Protection to impose discharge limitations or other reasonable controls on point and non point sources to support maintenance or attainment of designated uses. In the absence of numeric criteria for phosphorus, the Department has developed an interim nutrient management strategy for freshwater non-tidal streams based on the narrative policy statements in the WQS to meet the pressing need to issue NPDES permits and be protective of the environment. The strategy includes methods that focus on phosphorus because it is the primary limiting nutrient in freshwater systems. These methods were approved by the United States Environmental Protection (EPA) in their letter dated October 26, 2010 as an interim strategy to establish water quality based phosphorus limits in non-tidal freshwater for industrial and municipal water pollution control facilities (WPCFs) national pollutant discharge elimination system (NPDES) permits.

The method in the interim strategy uses best available science to identify phosphorus enrichment levels in waste receiving rivers and streams that adequately support aquatic life uses. The methodology focuses on algal communities as the key aquatic life nutrient response variable and phosphorus enrichment factors that represent significant changes in communities based on data collected statewide. Ongoing work is currently being conducted to refine the approach through additional data collection and by expanding the methodology to include non-waste receiving streams. It is expected that the ongoing work will lead to numeric nutrient criteria for all freshwater rivers and streams in the next WQS review cycle. The current approach provides for a major statewide advancement in the level of phosphorus control that is expected to meet all freshwater designated uses. The adaptive nature of Connecticut's strategy allows for revisions to permit limits in future permit cycles without delaying action that we know needs to be taken today.

The current approach follows a watershed based framework incorporating many of the elements from the U.S. EPA Watershed –Based National Pollutant Discharge Elimination System (NPDES) Permitting Technical Guidance (2007). Consistent with the 2007 Guidance, the approach "explicitly considers the impact of multiple pollutant sources and stressors, including nonpoint source contributions, when developing point source permits". Expected current conditions are based on the probability of excess phosphorus export from land cover and municipal and industrial facilities in the upstream drainage basin. Connecticut's policy for phosphorus management is translated into a numeric expression through geo-spatial and statistical analyses that determines the maximum acceptable seasonal phosphorus mass load per unit area of watershed contributing flow to the point of assessment.

The goal of the interim strategy is to achieve or maintain an enrichment factor (EF) of 8.4 or below throughout a

watershed. An EF is representative of the amount of anthropogenic phosphorus loading to river and streams. It is calculated by dividing the current total seasonal phosphorus load by a modeled total phosphorus load under complete forested conditions at a particular point along the river. An enrichment factor is representative of the amount of anthropogenic phosphorus loading to rivers and streams. The goal of an 8.4 enrichment factor represents a threshold at which a significant change is seen in the algal communities indicating highly enriched conditions and impacts to aquatic life uses.

The analysis was conducted using benthic algae collected in rivers and streams throughout CT under varying enrichment conditions. The approach targets the critical 'growing' season (April through October) when phosphorus is more likely to be taken up by sediment and biomass because of low flow and warmer conditions. During winter months aquatic plants are dormant and flows are higher providing constant flushing of phosphorus through aquatic systems with a less likely chance that it will settle out into the sediment. Limiting the phosphorus export from industrial and municipal facilities offers a targeted management strategy for achieving aquatic life designated uses within a waterbody. The export of some phosphorus from facilities and other land sources is considered normal use of the land recognizing that humans are part of the environment.

A seasonal load was established by the Department for each facility discharging to non-tidal waters based on the current degree of enrichment of the receiving water body at the point of discharge and the facilities contribution to the total watershed enrichment at the point of discharge.

Ridgefield (Main POTW) Permit Requirements
A nutrient watershed analysis was conducted for the Norwalk River watershed below facilities discharging phosphorus into the river. The facilities discharging to the river include: Ridgefield (rt 7) WPCF, Ridgefield (Main)WPCF, Georgetown (Redding)WPCF. The seasonal (April 1st through October 31st) nutrient loading from each facility discharging to the watershed was reduced to achieve an enrichment factor of 8.4 or lower throughout the river.

The current enrichment factor at Ridgefield (Main) WPCF discharge is 137.9. The final proposed seasonal load allocation for the subject WPCF is 0.52 lbs/day. This load equates to a proposed treatment performance limit of 0.1 mg/L multiplied by the current seasonal average flow of 0.62 MGD.

Federal regulations at 40 CFR 122.44(d) indicate that permit issuers are required to determine whether a given point source discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative or numeric criteria within a State water quality standard after consideration of existing controls on point and non-point sources of pollution. If a discharge is found to cause an excursion of a numeric or narrative state water quality criterion, NPDES regulations implementing section 301(b)(1)(C) of the Clean Water Act provide that a permit must contain effluent limits as necessary to achieve state water quality standards. The limit in the permit and the strategy are consistent with the narrative policy statements in the CT WQS and are expected to result in the attainment and maintenance of all designated uses for the water body when the strategy is fully implemented. If the Department develops numeric criteria in the future, or it is found that the current limit under the strategy is not sufficient to achieve designated uses, the goal will be modified and the WPCF will be expected to meet the more stringent water quality goal.

Translating the average performance level of 0.52 lbs/day into enforceable permit limits requires consideration of effluent variability and frequency of monitoring in order to comply with federal permitting regulations. The procedure used is as follows:

1. Consider the permit performance level of 0.1 mg/L to be equivalent to the Long Term Average (LTA)

2. Calculate the Maximum Daily Limit by multiplying the LTA by the 99th percentile LTA Multiplier appearing in Table 5-2 of the Technical Support Document (page 103 of EPA/505/2-90-001) corresponding to a CV of 0.6% to account for effluent variability:

*Maximum Daily Limit: 0.1 mg/L * 3.11 = 0.31 mg/L*

3. Calculate the Average Monthly Limit by multiplying the LTA by the 95th percentile LTA Multiplier appearing in

Table 5-2 of the Technical Support Document corresponding to a CV of 0.6% to account for effluent variability and either n=4 samples/month or n=10 samples/month as appropriate for the facility to account for the precision of estimating the true monthly average based on an average for the days the effluent was sampled:

Average Monthly Limit= 0.1 mg/l X 1.55 = 0.16 mg/l

Summary of Limits for Ridgefield (Main) POTW:
Average Daily Load = 0.52 lbs/day
Total Seasonal Load = (0.52 lbs/day * 214 Days/Season) = 111.28 lbs/season
Maximum Daily Limit = 0.31 mg/L
Average Monthly Limit = 0.16 mg/L

With respect to the foregoing summary of limits, it should be noted that compliance with the Maximum Daily Limit or the Average Monthly Limit during the time the seasonal load limit is calculated will not ensure compliance with the Total Seasonal Load limit. For example, if the Permittee discharged phosphorus at the maximum permitted by either the Maximum Daily Limit or the Average Monthly Limit throughout the time that the seasonal load is calculated, the Permittee would exceed the Total Seasonal Load limit. For this reason, the Permittee must monitor compliance with the Total Seasonal Load limit independent of its compliance with the Maximum Daily Limit and the Average Monthly Limit.

WATER QUALITY LIMIT CALCULATIONS
See attached

Effluent Chemistry: RIDGEFIELD SOUTH ST. WPC

as of Monday, March 02, 2015 | Design Flow 1 MGD | Avg. Monthly Flow '11: 1.03 MGD | Max. Monthly Flow '11: 1.73 MGD

Receiving Waterbody: Norwalk River
Allocated ZOI: 0.5 cfs
Database IWC: 75.6% Site Specific

Date	BOD	TSS	NH3	NO2	NO3	CNt	CNa	Be	As	Cd	Cr6	Cr3	Cu	Pb	Th	Ni	Ag	Zn	Sb	Se	Phen	Hg
3/10/2010	1.00	< 1.00	0.15	< 0.050	4.19	< 10.0	< 10.0	< 10.0	< 5.0	< 0.5	< 10.0	< 5.0	6.0	< 5.0	< 10.0	< 5.0	< 2.0	51.0	< 5.0	< 5.0	< 50.0	< 0.2
6/9/2010	1.00	7.00	< 0.05	< 0.050	4.41	< 10.0	< 10.0	< 10.0	< 5.0	< 0.5	< 10.0	6.0	< 5.0	< 5.0	< 10.0	< 5.0	< 2.0	51.0	< 5.0	< 5.0	< 50.0	< 0.2
9/14/2010	1.00	1.00	< 0.05	< 0.050	4.68	< 10.0	< 10.0	< 10.0	< 5.0	< 0.5	< 10.0	< 5.0	< 5.0	< 3.0	< 10.0	< 5.0	< 2.0	69.0	< 5.0	< 5.0	< 50.0	< 0.2
12/7/2010	5.00	< 1.00	< 0.05	0.089	4.87	< 10.0	< 10.0	< 10.0	< 5.0	< 0.5	< 10.0	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	< 2.0	51.0	< 5.0	< 5.0	< 50.0	< 0.2
3/22/2011	1.00	< 1.00	< 0.05	< 0.050	4.02	< 10.0	< 10.0	< 10.0	< 1.0	< 0.5	< 10.0	< 5.0	< 5.0	< 3.0	< 10.0	< 5.0	< 2.0	45.0	< 5.0	< 1.0	< 50.0	< 0.2
6/14/2011	6.00	3.00	0.45	0.050	5.03	< 10.0	< 10.0	< 10.0	< 1.0	< 0.5	< 10.0	< 5.0	< 5.0	< 3.0	< 10.0	< 5.0	< 5.0	32.0	< 5.0	< 1.0	< 50.0	< 0.2
9/14/2011	1.00	< 1.00	< 0.05	< 0.050	3.36	< 10.0	< 10.0	< 10.0	< 1.0	< 0.5	< 10.0	< 5.0	< 5.0	< 3.0	< 10.0	< 5.0	< 2.0	31.0	< 5.0	< 1.0	< 50.0	< 0.2
12/6/2011	2.00	3.00	< 0.05	< 0.050	4.35	< 10.0	< 10.0	< 10.0	< 1.0	< 0.5	< 10.0	< 5.0	< 5.0	< 3.0	< 10.0	< 5.0	< 2.0	52.3	< 5.0	< 1.0	< 50.0	< 0.2
3/13/2012	1.00	3.00	< 0.05	0.321	4.67	< 10.0	< 10.0	< 10.0	< 0.2	< 0.0	< 10.0	< 0.9	< 1.6	< 1.2	< 1.5	< 0.8	< 1.2	60.2	< 1.6	< 0.4	< 50.0	0.0
6/12/2012	1.00	1.00	0.12	0.300	5.15	10.0	10.0	10.0	0.1	0.5	10.0	5.0	5.0	3.0	1.0	5.0	1.0	48.5	5.0	1.0	50.0	0.2
9/4/2012	1.00	1.00	0.05	< 0.050	5.38	< 10.0	< 10.0	< 10.0	< 0.5	< 0.5	< 10.0	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 2.0	62.1	< 5.0	< 5.0	< 50.0	< 0.2
12/11/2012	1.00	2.00	0.27	< 0.050	5.42	< 10.0	< 10.0	< 10.0	< 5.0	< 0.5	< 10.0	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	< 2.0	45.7	< 5.0	< 5.0	< 50.0	< 0.2
3/12/2013	6.50	< 2.00	< 0.05	< 0.050	4.08	< 10.0	< 10.0	< 10.0	< 5.0	< 0.5	<100.0	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	< 2.0	42.5	< 5.0	< 5.0	< 50.0	< 0.2
6/11/2013	1.00	2.40	< 0.05	< 0.050	2.71	< 10.0	< 10.0	< 10.0	< 5.0	< 0.5	< 10.0	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	< 2.0	31.5	< 5.0	< 5.0	50.0	< 0.2
9/10/2013	1.00	< 1.00	< 0.05	0.501	< 4.66	< 10.0	< 10.0	< 10.0	< 5.0	< 0.5	< 10.0	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	< 2.0	58.2	< 10.0	< 1.0	80.0	0.2
12/3/2013	3.00	< 4.00	0.09	0.207	5.55	< 10.0	< 100.0	< 10.0	< 5.0	< 0.5	< 10.0	< 5.0	< 3.0	< 5.0	< 10.0	< 5.0	< 2.0	48.3	< 5.0	< 5.0	< 80.0	< 0.2
3/11/2014	7.00	< 4.00	0.06	< 0.050	7.50	< 10.0	< 10.0	< 1.0	< 5.0	< 5.0	< 10.0	< 5.0	7.4	< 5.0	< 10.0	< 5.0	< 2.0	58.8	< 5.0	< 5.0	< 50.0	< 0.2
6/10/2014	4.00	< 1.00	< 0.05	1.260	0.50	< 10.0	< 10.0	< 1.0	< 5.0	< 0.5	< 10.0	< 5.0	< 3.0	< 5.0	< 10.0	< 5.0	< 2.0	52.0	< 5.0	< 5.0	< 50.0	< 0.2
9/9/2014	2.00	< 5.00	0.07	< 0.050	4.78	< 10.0	< 10.0	< 1.0	< 5.0	< 0.5	< 10.0	< 5.0	< 3.0	< 5.0	< 10.0	< 5.0	< 2.0	50.0	< 5.0	< 5.0	< 50.0	< 0.2
	BOD	TSS	NH3	NO2	NO3	CNt	CNa	Be	As	Cd	Cr6	Cr3	Cu	Pb	Th	Ni	Ag	Zn	Sb	Se	Phen	Hg
Count	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
# Detected	8	9	8	7	18	1	1	1	1	1	1	2	3	1	1	1	1	19	1	1	3	3
Average	2.45	2.34	0.09	0.175	4.49	10.0	14.7	8.6	3.4	0.7	14.7	4.8	4.7	4.2	8.6	4.8	2.1	49.5	5.1	3.5	53.2	0.2
Maximum	7.00	7.00	0.45	1.260	7.50	10.0	100.0	10.0	5.0	5.0	100.0	6.0	7.4	5.0	10.0	5.0	5.0	69.0	10.0	5.0	80.0	0.2
CV	0.9	0.7	1.1	1.7	0.3	0.0	1.4	0.4	0.6	1.5	1.4	0.2	0.3	0.3	0.4	0.2	0.4	0.2	0.3	0.6	0.2	0.2

Bold => mg/L Normal => ug/L

WQB LIMITS:

Discharger: Ridgefield South St. WPCF — by: EsguerraC, 3/2/2015, 16:12

Receiving Water: Great Swamp

Design Flow: 1.000 MGD

Allocated ZOI: 0.50 CFS

Samples/Month: 4

CURRENT CONDITIONS

Avg. Flow: 1.030 MGD

Max. Flow: 1.730 MGD

IWC: 75.59 %

WQB Limits - **Site Specific**

Compound	C.V.	AML ug/l	MDL ug/l	AML kg/d	MDL kg/d	LIMIT? ML?
Aluminum	0.0	1.15E+02	1.15E+02	4.36E-01	4.36E-01	
Ammonia	1.0	1.37E+03	3.46E+03	5.20E+00	1.31E+01	
Antimony	0.3	2.27E+02	3.41E+02	8.60E-01	1.29E+00	
Arsenic	0.6	2.10E-02	4.21E-02	7.95E-05	1.60E-04	ML
Beryllium	0.2	4.45E+00	5.90E+00	1.69E-02	2.23E-02	ML
Cadmium	2.0	9.38E-02	2.88E-01	3.55E-04	1.09E-03	ML
Chlorine	0.6	1.19E+01	2.39E+01	4.51E-02	9.06E-02	
Chromium (hex)	1.4	7.47E+00	2.12E+01	2.83E-02	8.02E-02	ML
Chromium (tri)	0.2	5.19E+01	6.88E+01	1.97E-01	2.61E-01	
Copper	0.3	2.39E+01	3.59E+01	9.07E-02	1.36E-01	
Cyanide (amen)	1.4	4.48E+00	1.27E+01	1.70E-02	4.80E-02	ML
Lead	0.3	1.43E+00	2.15E+00	5.43E-03	8.15E-03	ML
Mercury	0.2	6.75E-02	8.95E-02	2.56E-04	3.39E-04	ML
Nickel	0.2	3.57E+01	4.74E+01	1.35E-01	1.79E-01	
Phenol	0.2	1.98E+02	2.62E+02	7.49E-01	9.93E-01	
Selenium	0.5	5.59E+00	1.03E+01	2.12E-02	3.91E-02	
Silver	1.4	4.77E-01	1.35E+00	1.81E-03	5.11E-03	ML
Thallium	0.4	6.35E-01	1.06E+00	2.41E-03	4.03E-03	ML
Zinc	0.2	6.49E+01	8.60E+01	2.46E-01	3.26E-01	LIMIT/ML

Current Conditions

Compound	# DETECTS	AMC ug/l	MMC ug/l	AMM kg/d	MMM kg/d
Aluminum	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ammonia	9	1.00E+02	4.50E+02	3.90E-01	2.95E+00
Antimony	1	4.70E+00	1.00E+01	1.83E-02	6.55E-02
Arsenic	1	3.60E+00	5.00E+00	1.40E-02	3.28E-02
Beryllium	1	9.60E+00	1.00E+01	3.75E-02	6.55E-02
Cadmium	2	1.10E+00	1.00E+01	4.29E-03	6.55E-02
Chlorine				0.00E+00	0.00E+00
Chromium (hex)	1	1.43E+01	1.00E+02	5.58E-02	6.55E-01
Chromium (tri)	2	4.90E+00	6.00E+00	1.91E-02	3.93E-02
Copper	6	5.20E+00	8.00E+00	2.03E-02	5.24E-02
Cyanide (amen)	1	1.43E+01	1.00E+02	5.58E-02	6.55E-01
Lead	1	4.20E+00	5.00E+00	1.64E-02	3.28E-02
Mercury	2	2.00E-01	2.00E-01	7.80E-04	1.31E-03
Nickel	1	4.80E+00	5.00E+00	1.87E-02	3.28E-02
Phenol	3	5.29E+01	8.00E+01	2.06E-01	5.24E-01
Selenium	1	3.60E+00	5.00E+00	1.40E-02	3.28E-02
Silver	2	2.90E+00	2.00E+01	1.13E-02	1.31E-01
Thallium	1	8.30E+00	1.00E+01	3.24E-02	6.55E-02
Zinc	21	5.04E+01	7.50E+01	1.97E-01	4.91E-01

Final WQB Limits

	AML (kg/d)	MDL (kg/d)
Zinc	0.246	0.326

Interim WQB Limits

	AML (kg/d)	MDL (kg/d)

Minimum Levels

Arsenic	0.005 mg/L
Beryllium	0.001 mg/L
Cadmium	0.0005 mg/L
Chromium (hex)	0.010 mg/L
Cyanide (amen)	0.010 mg/L
Lead	0.005 mg/L
Mercury	0.0002 mg/L
Silver	0.002 mg/L
Thallium	0.005 mg/L
Zinc	0.020 mg/L

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Memorandum

To	Ridgefield WPCA	Page	1
CC	C. Fisher, J. O'Brien, M. Burke, J. Pereira, J. Pennell		
Subject	Town of Ridgefield, CT Phase 2 Wastewater Facilities Plan – WWTF Condition Assessments		
From	Jon Pearson, P.E.		
Date	March 2, 2016		

INTRODUCTION

On October 6, 2015 a multi-discipline team of AECOM Water technical specialists visited the Route 7 and South Street wastewater treatment facilities (WWTF) to meet with the plant staff to discuss the conditions of the facilities, staff concerns, and upgrade needs.

The following is a summary of the condition of existing equipment, organized by facility and individual technical discipline, identified during discussions and the field assessment, as well as recommendations for evaluation during facilities planning efforts. More detailed summaries of the WWTF assessments also organized by individual technical discipline and site visit meeting minutes are appended to this memo.

General

The two Ridgefield WWTFs are the South Street WWTF and the Route 7 WWTF, with design average flow capacities of 1.0 MGD and 0.12 MGD, respectively. The facilities are contract operated by Suez (formerly United Water). The South Street WWTF was originally constructed in 1970 and was last upgraded in the early 1990s. The Route 7 WWTF has had only minor upgrades since its original construction in 1985.

ROUTE 7 WWTF

Architectural Plant Assessment

Several of the tanks including the grit chamber, primary settling tanks, equalization tank, and secondary settling tanks have spalling and/or cracked concrete in many locations at the guardrail bases. The guardrails, which are in good condition, have been modified with plastic netting covers in order to prevent leaves from accumulating in the tanks. The hatches to the primary and secondary sludge stations are in poor condition. The RBC covers are in good condition; however they have shifted from their base in some locations at their seams. The RBC drive motors are covered with temporary weather guards. The roof of the Control Building is deteriorating and at the end of its serviceable life.

The spalling and cracked concrete at the tanks should be repaired. Permanent and serviceable covers may be advisable for the tanks in order to prevent leaf accumulation, as well as to contain odors. It is recommended that the hatch to the primary and secondary sludge stations be repaired or replaced. The

RBC covers are original to the plant and should be more closely inspected during final design; with consideration given to replacing the covers. The roof of the Control Building should be considered for replacement.

Structural Plant Assessment

The exposed concrete on the majority of the process tanks are showing cracking, particularly around the guardrail posts. The Control Building does not appear to require structural repair.

Sealing of the guardrail posts and crack and surface repair of the tanks and slabs throughout the site should be considered.

Mechanical Process Plant Assessment

The majority of the equipment at the facility is approaching or has exceeded its expected service life. This includes the headworks equipment, primary and secondary sludge and scum pumps, drives and bearings on the RBCs, drives and scum skimmers on both the primary and secondary settling tanks, and the UV disinfection system. In addition, the influent channel is not configured to handle the flow capacity of the influent pumps, the equalization tank is not being used for equalization and operates in a flow through mode, the plant water system is non-functioning, and the supernatant pump at the sludge holding tanks is not adequate for the service it is currently providing.

Since the majority of the existing mechanical equipment is approaching or has exceeded its expected service life consideration should be given to replacing the equipment. Consideration should also be given to restoring the equalization tank functionality. A new plant water system should considered to replace the non-functioning system, as well as installation of a new city water line to deliver potable water as the onsite artesian well does not provide adequate water flow, and is heavily laden with iron. Consideration should also be given to replacing the supernatant pump at the sludge holding tanks and piping it to the headworks. The inclusion of an odorous air collection and treatment system(s) should be considered for odorous areas of the WWTF (headworks, primary settling tanks, sludge holding tanks). Consideration should also be given to improving the arrangement for sludge removal from the sludge holding tanks to eliminate the need for vactor type equipment to haul sludge from the site and the truck and plant operators needing to pull hose up on top of the tanks, such as placing a connection at grade level.

HVAC Plant Assessment

In general, the HVAC equipment and systems at the facility are in poor condition and much is past its expected service life. Most of the rooms have no ventilation and either corroded heaters or no heat. Temporary heaters, dehumidifiers and portable air conditioning units have been provided in some areas.

All of the HVAC equipment and ventilation in the various WWTF areas should be evaluated and considered for replacement.

Instrumentation and Control Systems Plant Assessment

The limited instrumentation at this facility is approaching the end of its expected service life and is not expected to provide reliable service in the future. There are no local or remote alarms, no automated data entry, and no automatic monitoring or controls of the systems at the WWTF.

The Route 7 WWTF should consider upgrading their instrumentation and control systems to provide a full SCADA system for monitoring, historical data tracking, and tie-in of alarms. Consideration should also be given to replacing and relocating the extisting WWTF ultrasonic level element and weir system flow meter to a location with improved maintenance access and to a more accurate technology such as a magnetic flow meter.

Electrical Plant Assessment

The WWTF main electrical distribution equipment was installed in the mid-1980s, and is currently obsolete and past its service life. As a result, newly produced spare parts are no longer readily available and there is limited manufacturer support for maintenance and repair. The WWTF main MDP is rated for 400 amps, 208 VAC and it may not have the capacity to support a facility upgrade.

Consideration should be given to removing and replacing the WWTF's electrical distribution system in its entirety and removing and replacing the existing utility transformer with a unit KVA rating that matches any future facility upgrade. Consideration should also be given to replacing the WWTF lighting systems with energy efficient type lighting. Also consideration should be given to providing the WWTF with the following new systems: fire alarm, emergency exit lights, lightning protection system, security system, and power monitoring system. Finally consideration should be given in providing an electrical short circuit and coordination studies and providing all new electrical equipment with arc flash labels in accordance with the requirement of the NEC, NFPA-70E, and IEE 1584.

SOUTH STREET WWTF

Architectural Plant Assessment

The architectural features of the buildings at the facility are in poor condition, including damaged building faces, doors and associated hardware, roof leaks, railing demise at the old aeration tanks, corrosion, and paint/coating peeling in process areas.

These architectural features should be considered for repair or replacement. Consideration should also be given to providing dedicated storage space at the facility for spare parts, lubricants, etc. Cosmetic upgrades to the administration and laboratory spaces should also be considered. Compliance with the Americans with Disabilities Act (ADA) for any improvements should also be considered for the various administration areas depending on the extent of the upgrade work in these areas.

Structural Plant Assessment

The original 1970s aeration tanks are unused and exhibit significant cracking and deterioration, and the operating aeration tanks show some wall cracking. The final settling tanks are mostly buried, but the exposed concrete appears to be in good condition. The roofs on both the Control Building and Operations Building show signs of cracking. The concrete located in the basement pump gallery does not appear to have any structural issues. Some water infiltration is coming from underground conduits that supply the wiring for the building.

Consideration should be given to repairing the cracks in the 1970s aeration tanks if they are to be used in the future. In addition consideration should be given to repairing or replacing the roofs of the Control Building and Operation Building as well as sealing the leaks in the Operations Building basement.

Mechanical Process Plant Assessment

Some of the process operations such as the headworks and dewatering are unable to keep up with the current and anticipated WWTF peak flows and loads. Most of the mechanical process equipment is near the end of its expected service life, including the mechanically cleaned influent screen, Pista grit system, septage pumps, surface aerators, final settling sludge and scum collection mechanisms and drive units, sand filter mechanical components, UV disinfection system, sludge pumps, belt filter press/thickener, recycle pumps, chemical pumps, and alum tanks and pumps. The existing comminutor is not operational, and a new channel grinder has recently been installed.

Some of the process operations should be evaluated to determine if more efficient equipment is available to replace the existing equipment. These systems include septage receiving, headworks equipment, aeration equipment, UV disinfection system and sludge handling equipment. The odor control and ventilation in the belt press room appears inadequate to handle the existing operation causing high corrosion rates and odor issues in that area. Consideration should be given to reworking or redesigning these areas as part of a WWTF upgrade.

HVAC Plant Assessment

In general, the HVAC equipment and systems are in fair to poor condition and are not expected to provide reliable service to the WWTF over the next 20 years. Much of the equipment is corroded, not functional, missing, or near the end of its service life.

All of the HVAC equipment and ventilation in the various WWTF areas should be evaluated and considered for replacement/upgrade.

Instrumentation and Control Systems Plant Assessment

The instrumentation at this facility is approaching the end of its expected service life and is not expected to provide reliable service in the future. There are no local or remote instrumentation control panels and no centralized automated data collection system.

The South Street WWTF should consider upgrading their instrumentation and control systems to provide a full SCADA system including a number of instrumentation and control panels for control monitoring, historical data tracking, and tie-in of alarms with an automated call out system should be considered. Automatic control of the aeration tank aeration system using measured dissolved oxygen should be considered due to the high potential of increase the energy efficiency of the system.

Electrical Plant Assessment

The WWTF main electrical distribution equipment was provided in the early 1990s, currently obsolete and past its service life. Newly produced spare parts are no longer readily available and there is limited manufacturer support for maintenance and repair. The WWTF facility main distribution panel (MDP) is rated for 800 amps and it may not have the capacity to support a facility upgrade.

Although the facility electrical distribution system appears to be in relatively good condition for its age, consideration should be given to removing and replacing the WWTF electrical distribution system in its entirety. The WWTF main electrical system is located on the second floor of the Operations Building and is not readily accessible which could be an issue to access during building fire condition. Consideration should be given to providing a new electrical system in a new electrical room located at grade with outside door access. With a new system the electrical equipment should be located in dedicated, air conditioned, environmentally controlled, electrical rooms away from process equipment.

The WWTF has limited standby power backup capacity and cannot support the WWTF's critical process loads. Consideration should be given to provide the WWTF with a new standby generator(s) in outdoor, weatherproof, sound attenuated enclosure(s). Replacement of the existing utility owned pad mounted transformer is also recommended. At the direction of the Town, consideration should be given to replacing the lighting systems with energy efficient type lighting (LED) and providing lighting occupancy sensors in finished building spaces. Consideration should also be given to replacement of the WWTF's existing fire alarm system, including providing fire alarm system for all buildings networked to a main panel located in readily accessible location at the WWTF. Finally consideration should be given to providing or updating the following systems:

- Emergency and exit lights.
- Lightning protection system.
- Paging and security systems.
- Power monitoring system.
- Perform an electrical short circuit and coordination studies and providing all new electrical equipment with arc flash labels in accordance with the requirement of the NEC, NFPA-70E and IEEE 1584.

APPENDIX A

OPERATIONS STAFF WORKSHOP MEETING MINUTES

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Meeting Minutes

Subject	A/E Facility Condition Assessments – Operations Staff Workshop
Date	October 6, 2015
Time	11:00 AM
Location	Town Hall Annex
AECOM Project No.	60299267
Project Name	Ridgefield, CT WWTF Phase 2 Facility Plan
Attendees:	Diana Van Ness – Ridgefield WPCA Jason O'Brien – United Water Mike Burke – United Water Jorge Pereira – United Water Jeff Pennell – United Water Charlie Fisher – Ridgefield Town Engineer Jon Pearson – AECOM Matt Formica – AECOM Matt Ribeiro – AECOM Chris Galligan – AECOM Jack Welch – AECOM Yasser Rizk – AECOM Ted Stillwell – AECOM Kevin Collins – AECOM Audrey Casavant - AECOM

A meeting was held with operations staff from Suez (formerly United Water), the WPCA Administrator, Town Engineer and AECOM Water project staff and engineering disciplines to discuss the current status of the existing facilities as well as develop ideas for potential upgrades and items that need to be addressed during plant upgrades. The following is a summary of those discussions.

Route 7 WWTF

Influent Pumping

- It was noted that the existing Route 7 Pump Station is in need of replacement.
- The potential for decommissioning of the Route 7 WWTF was discussed. In the event that the plant is decommissioned, the idea of relocating the Route 7 Pump Station to the WWTF site was discussed as limited land area is available at the existing site to construct a replacement. This would require installation of gravity sewer from the existing pump station to the site.
- Discussion included the potential to use existing tank volume for equalization or storage.
- The need to relocate the Route 7 Pump Station should the Route 7 WWTF remain in service should also be evaluated.

Preliminary Treatment

- The current configuration of the influent channel only allows for one pump to be operational. The influent channel overflows when the second pump is turned on.
- The comminutor was replaced with a Muffin Monster 2-3 years ago.
- The current screw operates on a timer. Little grit or solids are collected. Operations staff noted that they may only remove 1-2 barrels of grit per year and little grit is seen in the primary settling tanks.
- If a new headworks is being evaluated, consider the use of a Pista grit system as well as a fully enclosed headworks unit.
- Replacement of muffin monster with screening system should be evaluated.
- Covering influent channels and equipment for odor and leaf control shall also be considered.

Primary Treatment

- Chain and flights on existing sludge/scum collection equipment was replaced approximately five years ago. Primary settling tanks still have original drive units from the original plant construction in 1985; United Water suggested full replacement of the primary settling tank equipment including drives, flights, chains, weirs, launders, scum skimmers, etc.
- The option of covering the primary settling tanks was discussed as operations staff has difficulty keeping leaves and other debris from the channels.

Equalization Tank

- In the current configuration, the existing equalization tank provides little to no flow equalization. However some loading equalization is provided and the limited aeration may provide some benefit. The use of the tank is required by the CT DEEP as it was part of the original design. The flow control valve and lower tank discharge piping are not used. The flow exits the tank through the upper overflow piping. It was also discussed that the tank should likely be covered to provide leaf control and odor control should be considered. The aeration system blower, piping and diffusers should be replaced in their entirety with consideration of providing blower redundancy.
- United Water would like equalization functionality restored and suggested evaluating both pumped and control valve configurations.

Rotating Biological Contactors

- The existing media and shafts on the RBCs were replaced in 2000. It is believe that the drive units are original, but have been rebuilt. The fiberglass covers are original. Operations staff built enclosures around the drive units for winter months to prevent freezing and icing. New drive units, media shafts and covers that extend over the drive units should be provided.

Secondary Settling

- Chain and flights on existing sludge/scum collection equipment was replaced approximately five years ago.
- Secondary settling tanks still have original drive units from plant construction in 1985.

- United Water recommends a full upgrade to all settling tank equipment including drive units, flights, chains, scum skimmers, weirs, launders, etc.
- Discussed the option of covering tanks for leaf and algae control.

Disinfection

- Ultraviolet (UV) Room and the open channel configuration needs to be improved. The UV units should be replaced.
- Humidity and climate in UV Room needs to be improved as it becomes extremely uncomfortable in the summer months.
- Consider closed UV disinfection system as channel system has overflowed in past and would allow use of a plant water system.

Phosphorous Removal

- Chemical feed system for phosphorus removal will need to be fully enclosed and provided with spill containment and eyewash/shower. Will require the connection to and extension of Aquarion Water piping on Route 7 to service WWTF.

Outfall

- The outfall was not inspected as it is located behind dense brush. There have never been any issues or backups reported.

Primary/Secondary Sludge Pump Stations

- Both sludge pumping systems are old and should be replaced with provisions for redundancy. A hoisting system for removing the pumps from the vaults was also requested.
- Sludge wasting is currently performed manually. It was requested that the need to go into vault to waste sludge be evaluated for increased operator safety. United Water requested that gate operator extensions and pump control be installed at grade to allow switching between settling tank units for sludge and scum wasting. The addition of a redundant pump is recommended.
- Discussed the option of using telescoping valves versus pumping.
- An original spare pump is located in the Control Building with no ability to move to either location. Parts have been removed from the spare over the years to fix the existing pumps.

Sludge Storage

- Supernatant pump needs replacement at sludge holding tank. Redundancy for supernatant pump system should be considered. United Water staff prefers Penn Valley pumps, but indicated that plunger pumps would also be acceptable.
- Operations staff wastes sludge manually and automation is not desired in the future. Should chemical addition be required for phosphorous removal, the sludge storage volume should be evaluated as sludge production will increase.
- It is also recommended to consider automated wasting if the sludge volume grows considerably and facility will not be permanently staffed. Also need to install level control in sludge storage tank as there is only a local alarm that sounds and can be difficult to hear when inside the sludge pumping stations.

- Evaluate odor control for sludge storage tank. Typically the WWTF staff aerates the storage tanks one day before sludge is trucked offsite.
- Sludge is hauled offsite one or two times per month and thickening not required.
- Hauling currently requires the use of a vacuum truck with hose connecting to a fitting at the top of the tank. Consider the installation of a connection on the back of the tank at grade to facilitate easier connection.

Control Building (Arch, HVAC, Plumb, Elec)

- The existing roof needs replacement.
- Maintain lab space for daily testing; some space could be converted for storage.
- If upgrades require full time staffing at the facility, space requirements would need to be adjusted.
- Provide improved access to garage area; no access currently except across grass. Basement currently minimally used for storage.

I&C Systems

- Full upgrade of any existing control systems is required.
- Remote process operation is not required. Minimal process monitoring; critical levels, flows, etc. would be acceptable for this facility.
- Tie in alarms to SCADA system with automated call out (Win911).
- The flow meter is located in the former plant water wet well downstream of the UV chamber. It should be relocated to allow for easier maintenance.
- Radio communications are not recommended in this area due to hills and need for repeater installations throughout town.

Site Electrical

- United Water emphasized the desire to install new electrical panels with external resets to eliminate the need to open energized panels.
- Upgrade all site lighting to LED.
- Power operated entrance gate requested.
- Transformer pad is settling. Transformer could require upgrading if electrical loads are increased by the proposed upgrade modifications.
- The location of electrical equipment components remaining in the basement.

Other WWTF Systems (plant water, piping systems, air systems, gates/valves, phones/internet, fire alarm, etc.)

- No current plant water system. Installation of plant water system would be helpful for operation team. Existing yard hydrants would need to be replaced.
- No current working phone at site; consider bringing service to WWTF for SCADA purposes and phone.

Site Issues (parking, drainage, lighting, security, safety, fuel oil, etc.)

- Site needs full civil upgrade including pavement, curbing, and fencing.
- Potable water well does not function; heavily laden with iron and is not usable for sanitary purposes. It is recommended that site be connected to the Aquarion Water main located on Route 7.

- Potential for condo complex to be built at top of hill upstream of treatment plant. Odor control options, including a biofilter should be considered
    - Biofilter could be placed on open space where additional treatment trains were originally slated should they be required.

South Street WWTF

Influent/Conveyance

- Evaluate options to eliminate the current bypass pump setup.
- Headworks channels have difficulty passing peak flows; consider increasing depth and width to improve hydraulics.
- Consider upsizing and relocating the influent sewers if possible.

Septage Facility

- Consider fully enclosed packaged septage receiving facility with odor control.
- Operations indicated that flow meter would not be necessary, but would likely be integral with any package system.

Preliminary Treatment

- Headworks facility will require full upgrade. Consider eliminating the connection to original abandoned tanks.
- A new Muffin Monster is currently on order to replace the failing comminutor. Discussed replacement with mechanical screening system and using the muffin monster for redundancy only.
- United Water staff would prefer not to have a mechanically cleaned bar screen; but would prefer a channel (drum) screen and washpress.
- The existing pista grit system works well, but is in need of a full mechanical upgrade.

Aeration Tanks

- Replace mechanical surface aerators with diffused air. Generator should be upsized to provide for some aeration during loss of power.
- Refurbish and improve sludge wasting system.
- Evaluate process control using dissolved oxygen or ammonia.
- Upgrade post aeration blowers.
- Aeration tank distribution box has issues with flow and solids distribution as well as odors.
- Original aeration tanks are in poor condition. While their reuse is desired an evaluation is required to determine if the structural, mechanical and electrical components can be refurbished. It is also not clear if the valves, gates and other mechanical equipment is operational.
- Distribution isolation gates in and out of aeration tanks and around WWTF should be replaced.

Secondary Settling

- Final settling tanks need full mechanical upgrade and replacement.

Sand Filters

- Existing mechanical components are in need of replacement.
- Evaluate different technologies for filters.
- Operations staff indicate that they are difficult and dangerous to maintain when working beneath sand media.
- Evaluate humidity and HVAC issues in filter area. Humidity is believed to be causing issues with roofing system.

Disinfection

- Existing Trojan system requires full replacement as spare parts are being discontinued.
- Utilize SCADA to monitor UV intensity for DEEP reporting.
- The current system configuration makes it difficult to access UV the bulb racks. Operations staff must get down into channel past railings and manually lift the racks out for cleaning.
- Consider a second channel for redundancy.
- The existing post reaeration location is problematic for the UV system.

Outfall

- No issues reported.

Recycle System Wet Well

- The existing wet well has leaking and soil issues.
- Significant quantities of sand from filters ends up in the wet well and causes issues.

Sludge Pumping

- All sludge pumps are original equipment from plant upgrade and are in need of replacement.
- Evaluate valving for sludge lines. Current valves are located over head and are difficult to access and operate.
- United Water staff are amenable to pumps that require seal water or use mechanical seals. The use of packing seals should be avoided.

Sludge Storage

- Evaluate sludge storage volume and projected future sludge production based on chemical addition and the need for additional sludge storage.
- Under current loading they are constantly processing sludge constantly during normal weekday operations
- Consider reuse of sludge tanks with aeration and odor control.

Sludge Thickening/Dewatering

- United Water indicated that they prefer to dewater and haul cake versus thickening and hauling liquid. This would require using existing garage to house a sludge cake container or truck.
- Recommend evaluating different dewatering options including a screw press or Fournier press.

Headworks Building (Arch, HVAC, Plumb, Elec)

- Existing building needs full upgrade.

- HVAC system needs replacement.

Old Control Building (Arch, HVAC, Plumb, Elec)

- Original building to be evaluated for use as storage space or office space.
- In the event that storage is planned for basement, a lifting device would be required to move parts in and out of the basement.
- Hazardous waste evaluation on building should be performed.
- Current electrical service to influent building passes through this building.

Operations Building (Arch, HVAC, Plumb, Fire Protect. Elec)

- Air conditioning currently works only in the break room, lab, and office.
- Ventilation in belt filter press room needs full upgrade.
- Fire protection system in belt filter press room needs replacement.
- Current lab area suits needs of the operations staff but may need some cosmetic upgrades. Operations staff requested replacement of existing refrigerator in lab space.

Chemical Feed System

- Chemical storage tanks located in area with minimal head room and are difficult to access.
- All chemical/polymer feed systems are in need of full replacement.

I&C Systems

- There is no existing SCADA system but one is desired.
- Consider future buildout space in a new SCADA system to bring in additional pump stations or processes.
- Integrate alarms into SCADA system.
- Evaluate dissolved oxygen / ammonia control and process monitoring as a means for optimizing process while promoting energy efficiency.

Site Electrical

- Upgrade site lighting to LED.
- Consider overall energy efficiency of operations.
- Consider installation of motor operated entrance gate.
- Consider the installation of a lightning protection system.
- Backup generator currently does not have capacity for maintaining the current process at the facility. Backup generator is also currently hard wired into equipment and the available power can not be utilized at different locations throughout the plant as needed. Full replacement of the generator and its distribution systems are needed.
- Consider load sledding agreements with the utility.

Other WWTF Systems (plant water, air systems, piping systems, gates/valves, phones/internet, fire alarm, etc.)

- Plant water system needs full replacement as pump currently runs constantly. Consider the installation of a hydropneumatic system.
- No operable phone system in entire facility. Discussed alternatives including page party system as opposed to hand held systems. Operators preferred to not have to carry

additional unit with them. Various communication systems will be evaluated for implementation.

- Current fuel oil storage tank needs to be replaced. It was recommended that connection to the natural gas main be considered. It will be necessary to evaluate whether the gas main has ample capacity to fuel a standby generator.
- The roofs of all existing buildings at the facility are in need of replacement. See field report provided by roofing consultant inspection conducted in October 2014.
- All regular and roll-up doors should be replaced.

Site issues (parking, drainage, lighting, security, safety, fuel oil, etc.)

- The current configuration of the plant has minimal storage area. The garage currently serves as their main storage area.
- If the garage were converted back to be used for sludge processing and cake storage, it would be necessary to evaluate construction of a second garage.
- The second gate on back side of garage is rarely used. Should second garage be an alternative, this may be a suitable location.
- Operations staff are required to work on fleet vehicles at the facility. Installation of a vehicle lift would be helpful.
- Existing parking is ample for the current staffing at the facility.

Odors

- Odor control options should be evaluated as part of the plant upgrade, including at the headworks, septage receiving, aeration tank distribution box and any sludge storage locations.

APPENDIX B

ARCHITECTURAL

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Memorandum

To	Jon Pearson, P.E.	Page	1
CC	Matt Formica, P.E. , Matt Ribeiro, P.E.		
Subject	Ridgefield, CT, Phase 2 Wastewater Facilities Plan, Architectural Field Assessment		
From	Kevin Collins, AIA		
Date	October 29, 2015		

The following memo describes the Ridgefield CT. South St. and Route 7 WWTF's architectural condition field assessment conducted on October 6, 2015.

ROUTE 7 WWTF

Comminutor / Grit Chamber and Primary Settling Tanks

The existing comminutor / grit chamber is an open air facility comprised of concrete tanks and platforms with an open air grit screw. The primary settling tanks consist of rectangular settling tanks and a below grade confined space primary sludge station. The aluminum guardrails in this area are in good condition. Freezing and thawing cycles have caused spalling and/or cracked concrete in many locations at the guardrail bases. Settling tank guardrails have been modified with plastic netting covers to prevent leaves from accumulating in the tanks. A more permanent and serviceable cover should be considered. The hatch over the primary sludge station has bent guides, yet remains serviceable. It is recommended to consider upgrades to the hatches at this location. Access to the primary sludge station is via a single ships ladder leading to a below grade confined space vault. Area pole-lights are unprotected and broken bulbs are evident.

Equalization Tanks

The equalization tank is an above grade tank that is located between the primary settling tanks and RBCs. The aluminum guardrails in this area are in good condition. Freezing and thawing cycles have caused spalling and/or cracked concrete in many locations at the guardrail bases. The existing railings have been draped in netting to prevent leaves from blowing into the tanks. The addition of permanent tank covers should be considered at this location as part of any future facility upgrades.

Rotating Biological Contactors (RBCs)

The Rotating Biological Contactors are housed in their original PVC covers. While the covers are in good shape, they have shifted and lifted from their base in some locations at their seams and may require cleaning and repair to provide and maintain good seals and prevent deterioration. It is recommended that the covers be more closely inspected during final design and consideration be given to replacing the covers as part of any facility upgrade work. The RBC drive motors are covered by temporary weather guards fashioned out of T1-11 wood siding and asphalt shingled top and require two people to lift them out of the way in order to access the motors. It is recommended that enclosed drive units be provided should they be replaced during facility upgrade work.

Secondary Settling Tanks

The secondary settling tanks consist of rectangular settlings tanks and a below grade confined space secondary sludge station. The aluminum guardrails are in good condition. Freezing and thawing cycles has caused spalling and/or cracked concrete in many locations at the guardrail bases. Settling tank guardrails have been modified with plastic netting covers to prevent leaves from accumulating in the tanks. A more permanent and serviceable cover may be advisable. The hatch over the secondary sludge station is in disrepair and replacement should be considered. Access to the secondary sludge station is via a single ships ladder leading to a below grade confined space vault.

UV Disinfection System (Plant Water Station)

The UV system is housed in a below grade room at the end of the secondary settling tanks slightly below grade originally known as the plant water station. The UV disinfection system is reachable by a concrete stair that was originally open to the air. Plant operations staff have constructed a wood framed enclosure with T1-11 siding and an asphalt shingled roof to prevent the accumulation of snow and ice during winter months.

Control Building

The Control Building is a CMU block structure with a brick veneer. It has a walk-out basement level containing area for storage and electrical room. The upper level contains a laboratory and restroom. The building has a standing seam metal roof with a peak running from building corner to building corner and interior scuppers at each of the lower corners behind a short parapet. The roof is battered and worn with a substrate that is clearly deteriorating and is at the end of its serviceable life and should be considered for replacement. The metal coping at the top of the parapet has lost its coating, is rusted throughout and is bent at many locations along its length. Steel lintels at windows exhibit some rusting. The exterior brick and block wall appears to be in generally good shape with a small degree of effloresing corresponding to an interior rain leader and a small area of adjacent mortar cracking. The interior is missing many ceiling tiles and exhibit signs of roof leaks. Water infiltration from the roof appears evident at both of the rain leader locations. Other interior finishes (paint and floor tile) are in adequate condition. The metal laboratory furniture is rusted in some locations. Consideration should be given to replacing the roof and providing cosmetic upgrades to the interior spaces.

Sludge Storage Tanks

The sludge storage tanks area located adjacent to the Control Building. These tanks are raised above grade and are enclosed by a metal safety railing which is in fair condition.

SOUTH STREET WWTF

Influent Building

The Influent Building is a CMU block building with a stucco faced exterior foam insulation finish system (EIFS) exterior veneer. The face of the building exposed to and unprotected from traffic has been dented and damaged in several locations. The dark bronze anodized exterior doors and their hardware are in disrepair or have been damaged. In interior process room, the paint coating exhibits extensive peeling. Corrosion of all metal components in the room is evident. Leaking from the EPDM ballasted concrete plank roof is also evident. At the adjacent RAS tank plywood has been placed on grating to contain odors. A more permanent cover system should be considered as part of a facility upgrade.

Control/Maintenance Building

The Control/ Maintenance Building is a block and brick building with a flat ballasted EPDM concrete plank roof from the original plant construction. While the building was used for process purposes during the original plant operation, it is currently used for equipment storage and maintenance. At the adjoining tank, exterior guardrails are bent and broken at their bases, and are currently held loosely in place in a temporary manner that would not meet building code criteria. The single pane storefront glass is cracked in the area of the original headworks and grit classifier, and anodized exterior doors are damaged. A need for designated storage space is evident by the prevalence of all available space being used for storage. The interior of the upper level exhibits cracking and peeling paint. A plywood platform built for storage has been constructed over a portion of the stairwell limiting head space above the stairs. The ceiling of the grade level exhibits signs of roof leaks. The lower level is a windowless story with no fire protection and houses original equipment and piping that was abandoned in place during the previous upgrade. A ships ladder emergency stair is provided that exits through an exterior non-watertight hatch. Should this building be utilized in future upgrades, a proper exterior hatch should be provided.

Operations Building

The Operations Building is a CMU block building with a stucco faced foam exterior insulation finish system (EIFS) exterior veneer and concrete plank roof covered with a ballasted EPDM roofing system. The EIFS system has been damaged at locations along the south face of the building. The filter room is located at grade level and also contains the UV disinfection system. This room exhibits signs of roof leaks as stalactites of deposited material have formed and hang from the ceiling. Extensive paint and coatings peeling is evident in this room as the area has historically had a humidity control issue. The west stair has a low head clearance of 7’-2” in places, which has been enough of an issue that foam head protection has been provided on offending cross members. The basement level Pump Gallery is served by this single stair. The chemical storage area is enclosed by a 5 foot tall containment curb with no stair or ladder access. The grade level floor contains mechanical spaces and the original Sludge Loading Room that has been converted to a garage and workshop area by Operations staff. Access to this space is provided by a single door and two overhead coiling doors with emergency switches that are non-operational. The Office and Laboratory areas are on the upper floor served by two stairs and do not accommodate access to persons with disabilities. Doorways widths typically vary between 30 and 32 inches for single doors and do not meet the required 32 inches minimum as defined by accessibility guidelines. The Laboratory, Control Room and Break Room are well appointed with finishes in good repair. Adjacent to the Laboratory and Lunch Room is the belt press room where sludge thickening occurs. The coatings in this room are worn and peeling due to the service performed in the space.

Photos:

Photo 1: Route 7 - Clarifier post and screen

Photo 2: Route 7 - Rotating Biological Contactors cover seam

Photo 3: Route 7 - Rotating Biological Drive Enclosure

Photo 4: Route 7 - UV System Room stair enclosure

Photo 5: Route 7 - Control Building

Photo 6: Route 7 - Control Building ceiling

Photo 7: South Street - Influent Building Exterior

Photo 8: South Street - Influent Building Interior

Photo 9: South Street - Control Maintenance Building

Photo 10: South Street - Aeration Tank Distribution Tank Railings

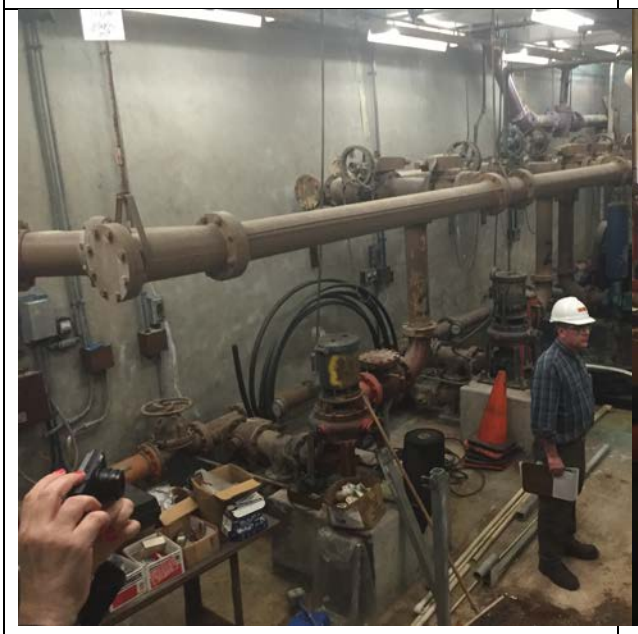


Photo 11: South Street - Control Building Lower Level

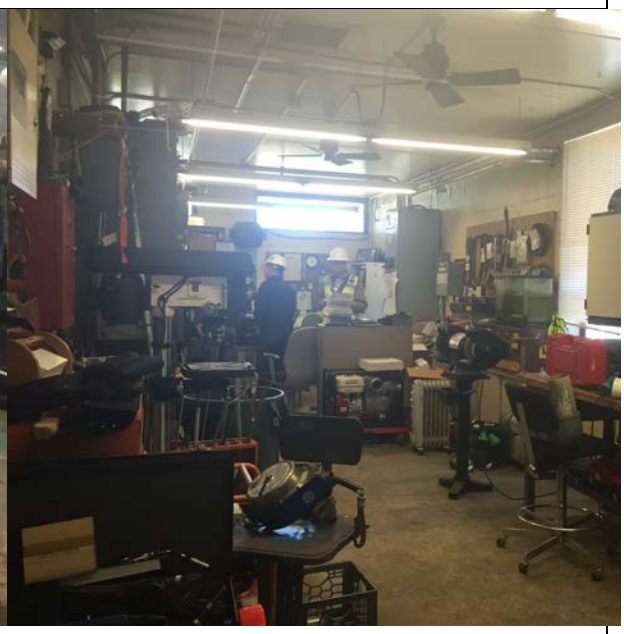


Photo 12: South Street - Control Building Upper Level

 **Photo 13: South Street - Operations Building EIFS damage**	

APPENDIX C

SOUTH STREET ROOF EVALUATION REPORT (OCTOBER 2014)

Herbert B. Fishman, B. C. E., M. Met. E.

H.B. FISHMAN & CO., INC.
300 Pleasant Valley Road, Suite C
South Windsor, CT 06074-3488
(860) 282-9036 / Fax (860) 282-7144
www.hbfishman.com

15 December 2014

Mr. Charles Fisher
Town Engineer
Town of Ridgefield
66 Prospect Street
Ridgefield, CT 06877

Re: Roof Evaluation Report
Town of Ridgefield – Wastewater Treatment Facility
22 South Street
Ridgefield, CT

Dear Mr. Fisher:

Per your request, on 2 December 2014, the writer conducted an inspection of the three buildings at the Wastewater Treatment Facility on South Street. Access to the building interiors was provided by Mr. Jeff Pennell of United Water.

1.0 BACKGROUND

* 1.1 The South Street facility was originally constructed in the 1970s and consisted of one building, now known as the Maintenance Building.

* 1.2 In 1991 – 1992, two other buildings were constructed and are known at the Operations Building and the Influent Building.

* 1.3 In 1991 – 1992, the roof on the Maintenance Building was replaced to match the new roofs on the two new buildings; the new roofs consisted of ballasted inverted roof membrane assemblies [IRMA] with Carlisle EPDM membranes. These roofs were installed by Barrett of Danbury and were warranted by the EPDM manufacturer, Carlisle, for ten (10) years [warranty expired 2002].

1.4 In late November 2014, the Town of Ridgefield requested that the roofs be inspected by H. B. Fishman & Co., Inc.

1.5 H. B. Fishman & Co., Inc. (HBF) is an independent roof consulting firm with offices located at 300 Pleasant Valley Road in South Windsor, CT.

* Information provided by others.

2.0 HBF INSPECTION OF 2 DECEMBER 2014

2.1 Our evaluation included visually inspecting each of the roof levels and the general interior conditions beneath same. Observed conditions were photo documented and roof sketches including roof measurements were prepared.

2.2 Specific observations are noted in the labeled photographs and on the roof plans attached to this report. The following summarizes our observations:

2.3 The three buildings have a total roof area of 8,133 square feet.

2.3.1 The Operations Building consisted of two roof levels totaling 5,330 square feet. The Influent Building had one roof level, covering 1,260 square feet. The Maintenance Building had one roof level covering 1,543 square feet.

2.3.2 Each of these buildings has a ballasted IRMA Carlisle EPDM roof system which has a slight slope from its roof perimeters to internal roof drains, generally located near the north-south center lines of the individual areas.

2.3.3 The roof cross sections include precast concrete plank decking, Carlisle .045" thick EPDM membranes [loose laid], 3.5" thick extruded polystyrene insulation [loose laid], a protection mat [loose laid] and stone ballast.

2.3.4 In general, the IRMA roofs were in fair condition with very small areas of ballast displacement and raised or floating insulation. Specific deficiencies which require maintenance are depicted in the labeled photographs attached to this report.

2.3.5 The majority of the outside perimeters consisted of 12" high parapets with EPDM base flashings and metal copings, all of which were generally in fair to good condition.

2.3.6 The outside perimeter on the Maintenance Building consisted of raised edge details; at some metal joint locations, the elastomeric stripping materials had cracked or split due to thermal movement of the metal edge.

2.3.7 Drain strainer baskets and screens were observed at each of the drain locations; leaves and some debris were noted at some drain locations which inhibit positive drainage.

2.3.8 No locations of active roof leaks were reported beneath the High Roof of the Operations Building or the Influent Building. Some possible leaks were observed beneath the Low Roof of the Operations Building (which may also be condensation related) and two leak areas were pointed out in the Maintenance Building.

2.3.9 The occupancy of the Operations Building High Roof and the Maintenance Building consisted of offices and testing laboratories with ceiling tile.

2.3.10 Open tanks with wastewater [sand filters] were observed beneath the Operations Building Low Roof [high humidity].

2.3.10.1 At many locations beneath the Low Roof, peeling interior paint on CMU walls was observed.

2.3.10.2 At many joints in the precast concrete plank decking, evidence of both active and inactive dripping water with white colored stalactites was observed. At some of these locations, water was actively dripping onto light fixtures and floor locations. Inactive drip evidence was observed on one of the electrical panels. United Water personnel indicated that at least one light fixture had been removed from the south end of this area due to water dripping onto same prior to our inspection.

2.3.10.3 At one precast plank location, deterioration of the underside of the plank and corrosion of embedded reinforcement bar was observed.

2.3.11 The occupancy beneath the Influent Building included treatment of wastewater which generates corrosive gasses.

2.3.11.1 Steel components within the building including angle clips, bolts, valves and roof hatch components were corroded. Corrosion of the roof hatch components has disabled the proper operation of the hatch cover.

2.3.12 Other observations included damaged and deteriorated exterior EIFS wall treatments on the Operations and Influent Buildings.

3.0 DISCUSSION

3.1 The ballasted IRMA EPDM roof systems are reaching the end of their useful lives. Typically, EPDM roof systems have an expected service life of 15 to 20 years; the subject roofs are 22 years old.

3.2 Any replacement roof system should include provisions for the high humidity and high temperatures experienced beneath the Operations Building Low Roof and the Influent Building Roof.

3.2.1 The new roof systems on these areas should include a vapor retarder or other method of controlling movement of interior moisture into the roof system.

3.2.2 A structural engineer should evaluate the observed degradation of the precast plank roof deck on the Operations Building Low Roof area and the corrosion of the structural components in the Influent Building.

3.2.3 Overflow roof drains or scuppers should be installed on the Operations and Influent Buildings.

3.3 We recommend that the Town consider this roof for removal and replacement within the next 1-2 years.

3.4 For budgetary purposes, we suggest that the Town consider reserving $25.00 per square foot, or $205,000.00 for the complete removal and replacement of the roof systems.

Respectfully submitted,

H. B. FISHMAN & CO., INC.

John R. Wooten, R.R.C., P.E.
President
Registered Roof Consultant, Professional Engineer

JRW/dal
CN 14127932.2
Attachments:

1. HBF Photographs #1 through 104 dated 2 December 2014
2. HBF Roof Plans
3. Carlisle IRMA Roof System Information, 1990

Town of Ridgefield – Wastewater Treatment Facility
Operations Building, Influent Building and Maintenance Building
22 South Street
Roof Inspection

2 December 2014

OPERATIONS BUILDING – ELEVATIONS

Photo 1:

General view of north elevation, Operations Building looking southwest. Note EIFS wall treatment.

Photo 2:

View of east elevation of High Roof and north and east elevations of Low Roof, Operations Building looking southwest.

Photo 3:

View of damaged EIFS corner, northeast corner of Operations Building.

Photo 4:

View of cracks in EIFS wall treatment, east elevation of Low Roof, typical.

Photo 5:

Close up view of cracks in EIFS wall treatment, east elevation of Low Roof, typical.

Photo 6:

Another close up view of cracks in EIFS wall treatment, east elevation of Low Roof, typical.

Photo 7:

View of damaged EIFS at ground level, south end of east elevation, Low Roof.

Photo 8:

View of damaged EIFS at southeast corner, Low Roof, Operations Building.

Photo 9:

General view of south elevations, Operations Building, looking northwest. Note concrete tank in foreground NIC.

Photo 10:

General view of the south elevations, Operations Building looking east.

Photo 11:

General view of the west elevation, High Roof, Operations Building looking northeast.

Photo 12:

General view of the west elevation, High Roof, Operations Building looking southeast.

OPERATIONS BUILDING – HIGH ROOF

Photo 13:

General view of ballasted IRMA Carlisle EPDM roof system, High Roof, Operations Building looking northwest from southeast corner. Note roof drains, roof hatch, exhaust units and vent pipe.

Photo 14:

General view of ballasted IRMA Carlisle EPDM roof system, High Roof, Operations Building looking southwest from northeast corner. Note roof drains, roof hatch, exhaust units and vent pipe.

Photo 15:

View of Carlisle batch # on flashing, east wall of High Roof, Operations Building. Note "01409AAIA0". 1991 material.

Photo 16:

View of typical extruded polystyrene thickness, 3-1/2" as measured at chimney, High Roof.

Photo 17:

View of a small area of exposed extruded polystyrene insulation adjacent to roof hatch, High Roof.

Photo 18:

View of typical ballast, High Roof, Operations Building. Note some of the ballast has separated into sharp shards.

Photo 19:

View of typical drain assembly with exposed extruded polystyrene insulation, High Roof, Operations Building. Note drain is single stage.

Photo 20:

View of the typical perimeter configuration, High Roof, Operations Building. Note metal coping with 12" high EPDM flashings.

Photo 21:

View of a metal collar installed with lag bolts at the northwest corner of the High Roof, Operations Building. Note fasteners may penetrate EPDM membrane.

Photo 22:

View of metal debris on High Roof, Operations Building. Also note low flashing height at vent pipe, typical.

Photo 23:

View of the disengaged west and north sides of the chimney cap from its hook strip, High Roof. Chimney cap is loose.

Photo 24:

Close up view of the disengaged west and north sides of the chimney cap from its hook strip, High Roof. Chimney cap is loose.

Photo 25:

View of failed sealant at bolt utilized to secure guard rail at roof hatch, High Roof.

Photo 26:

View of precast concrete plank deck as viewed in the Utility Closet, High Roof, Operations Building.

OPERATIONS BUILDING – LOW ROOF

Photo 27:

General view of the Low Roof, Operations Building looking northeast. Note ballasted IRMA Carlisle EPDM roof.

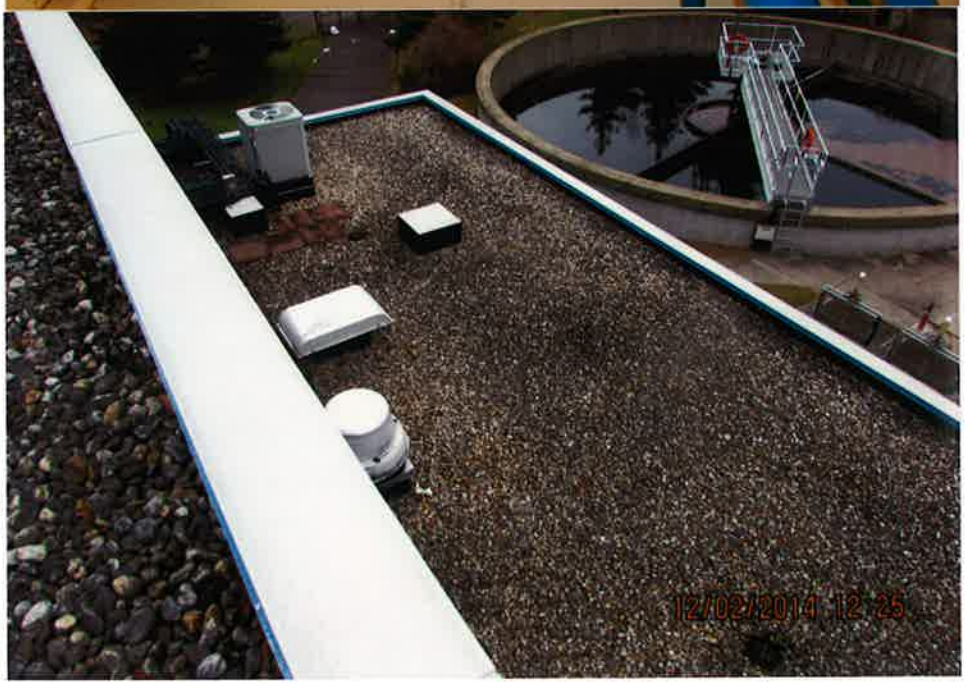


Photo 28:

General view of the Low Roof, Operations Building looking southeast. Note ballasted IRMA Carlisle EPDM roof.

Photo 29:

General view of the Low Roof, Operations Building looking northwest from southeast corner. Note roof drains, exhaust units, HVAC unit, multiple penetration and flashed sleepers for conduits.

Photo 30:

General view of the Low Roof, Operations Building looking southwest from northeast corner. Note roof drains and exhaust units.

Photo 31:

View of the south perimeter, Low Roof looking west. Note jog.

Photo 32:

View of Carlisle insignia on EPDM flashing, east perimeter of Low Roof, Operations Building. Note 04402AAIAD 045 EPDM. 1991 material.

Photo 33:

View of exposed and floating edge of extruded polystyrene, Low Roof adjacent to capped curb. Note styrene thickness 3-1/2".

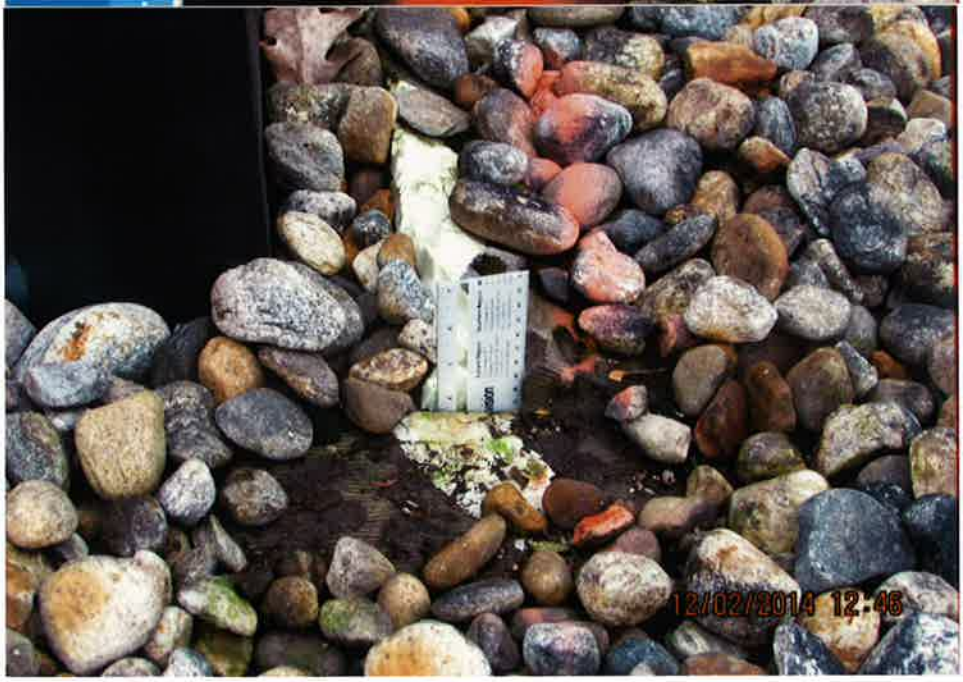


Photo 34:

View of another location of exposed, partially floating extruded polystyrene insulation, west side of Low Roof, Operations Building.

Photo 35:

View of typical outside perimeter, Low Roof, Operations Building. Note 12" flashing height with metal coping.

Photo 36:

View of typical drain and deteriorated concrete walkway pads, Low Roof, Operations Building.

Photo 37:

View of open corner of metal cap at flashed sleepers, northwest corner of Low Roof, Operations Building, typical.

Photo 38:

View of failed insulation at AC piping, north end of Low Roof, Operations Building.

Photo 39:

View of typical base flashing condition below EIFS wall treatment, west perimeter of Low Roof, Operations Building. Also note access doorway. Note typical flashing height of approximately 12".

Photo 40:

View of open edge of access doorway threshold, west perimeter, Low Roof, Operations Building.

Photo 41:

View of failed sealant where coping terminates, southwest corner of Low Roof, Operations Building.

Photo 42:

View of the water filled tanks directly beneath the Low Roof, Operations Building. This is the sand filter area.

Photo 43:

View of peeled coating on interior of CMU block wall, east perimeter of Low Roof, Operations Building.

Photo 44:

Close up view of peeled coating on interior of CMU block wall, east perimeter of Low Roof, Operations Building.

Photo 45:

View of peeled coating on interior of the south CMU wall, Low Roof, Operations Building.

Photo 46:

View of the underside of the south drain, Low Roof, Operations Building. Note precast concrete plank at this location. Also note peeling of coating.

Photo 47:

Close up view of the underside of the south drain, Low Roof, Operations Building. Note precast concrete plank at this location. Also note peeling of coating.

Photo 48:

View of drippage from joint in concrete plank, typical at south end of Low Roof.

Photo 49:

View of deteriorated concrete plank and corroded rebar at south end of Low Roof, Operations Building.

Photo 50:

Close up view of deteriorated concrete plank and corroded rebar at south end of Low Roof, Operations Building.

Photo 51:

View of drippage in the center of the south end, Low Roof, Operations Building.

Photo 52:

Views of additional drippage, south end of Operations Building. Note water is dripping onto light fixture today.

Photo 53:

View of accumulated drippage on metal walk grate, south end of Low Roof.

Photo 54:

View of underdeck condition at the north drain, Low Roof. Note drippage around this drain.

Photo 55:

View of drippage around the capped curb near the east perimeter of the Low Roof.

Photo 56:

Close up view of drippage around the cap curb near the east perimeter of the low roof.

Photo 57:

View of accumulated drippage onto one of the control panels beneath the Low Roof.

Photo 58:

General view of the poured concrete deck beneath the west side of the Low Roof, Operations Building.

INFLUENT BUILDING – ELEVATIONS

Photo 59:

View of east and south elevations of Influent Building looking northwest. Note EIFS wall treatment.

Photo 60:

View of a scrape mark in the EIFS wall treatment at the east elevation, Influent Building.

Photo 61:

View of damaged corner of EIFS, northeast corner, Influent Building.

Photo 62:

View of failed sealant between EIFS wall sections, typical, east elevation of Influent Building.

Photo 63:

View of the west elevation, Influent Building looking northeast.

Photo 64:

View of the north elevation, Influent Building looking southwest.

INFLUENT BUILDING – ROOF

Photo 65:

General view of Influent Building Roof looking northwest from southeast corner. Note roof drains, skylights, exhaust units and roof hatch. Note ballasted IRMA roof system with Carlisle EPDM membrane.

Photo 66:

General view of Influent Building Roof looking southwest from northeast corner. Note roof drains, skylights, exhaust units and roof hatch. Note ballasted IRMA roof system with Carlisle EPDM membrane.

Photo 67:

View of Carlisle insignia on flashing, west perimeter, Influent Building Roof. Note batch number only partially legible. 1991 material.

Photo 68:

View of floating insulation board adjacent to east exhaust unit, Influent Building Roof. Note extruded polystyrene insulation, 3-1/2" thick.

Photo 69:

Close up view of floating insulation board adjacent to east exhaust unit, Influent Building Roof. Note extruded polystyrene insulation, 3-1/2" thick.

Photo 70:

View of typical perimeter edge detail, Influent Building Roof. Note metal copings with 12" high base flashings.

Photo 71:

View of typical drain on Influent Building Roof. Note insulation has been shaved down as sump. Note leaves around drain.

Photo 72:

View of condensation on underside of skylight, typical, Influent Building.

Photo 73:

View of northeast exhaust unit, Influent Building. Note corrosion of steel components.

Photo 74:

View of roof hatch, south end of Influent Building. Note severe corrosion of steel components.

Photo 75:

Close up view of roof hatch, south end of Influent Building. Note severe corrosion of steel lock mechanism.

Photo 76:

Close up view of roof hatch, south end of Influent Building. Note severe corrosion of steel components.

Photo 77:

General view of underside of precast concrete plank deck in Influent Building looking north. Note corrosion of steel components.

Photo 78:

View of corrosion of steel components at north perimeter of Influent Building.

Photo 79:

View of corrosion of underside of north drain, Influent Building. Water was actively dripping from north drain during this inspection.

Photo 80:

View of corrosion of Ruffneck heating unit, north end of Influent Building.

Photo 81:

General view of underside concrete plank deck in Influent Building looking south. Note corrosion of steel components.

Photo 82:

View of corrosion of steel components at south perimeter of Influent Building.

Photo 83:

View of corrosion of Ruffneck heating unit, south end of Influent Building.

Photo 84:

View of corrosion of steel piping and valves at south end, Influent Building.

MAINTENANCE BUILDING – ELEVATIONS

Photo 85:

View of the Maintenance Building looking west. Note single story. Also note Influent Building in background.

Photo 86:

General view of Maintenance Building, west elevation, looking east. This building was originally constructed in 1974 and was reroofed in 1991-1992.

Photo 87:

General view of north and east elevations of Maintenance Building looking southwest. Note single story brick masonry structure with precast concrete plank deck.

Photo 88:

General view of west elevation, Maintenance Building looking southeast.

Photo 89:

General view of south elevations, Maintenance Building looking north.

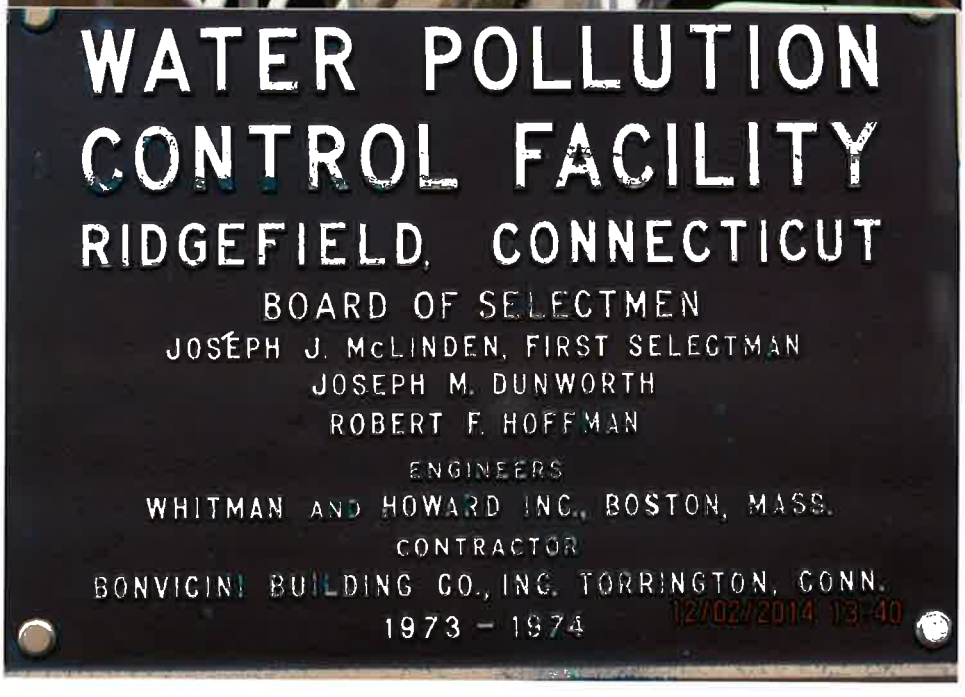


Photo 90:

Close up view of plaque on Maintenance Building. Note plaque indicating 1973-1974 construction.

MAINTENANCE BUILDING – ROOF

Photo 91:

General view of ballasted IRMA roof, Maintenance Building looking north. Note roof drains, chimney, exhaust units and vent pipes.

Photo 92:

General view of ballasted IRMA roof, Maintenance Building looking south. Note roof drains, chimney, exhaust units and vent pipes. Note extension at south perimeter.

Photo 93:

View of the typical metal edge detail around entire perimeter of Maintenance Building. Note raised gravel stop edge. Note that it does not cover vertically ribbed concrete wall.

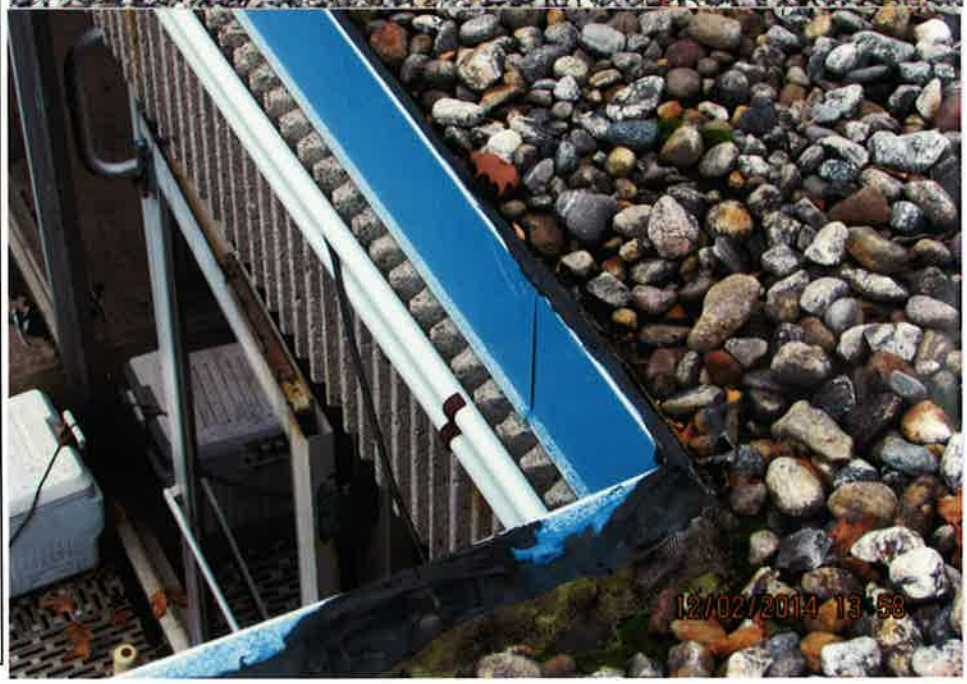


Photo 94:

Close up view of the typical metal edge detail around entire perimeter of Maintenance Building. Note raised gravel stop edge. Note that it does not cover vertically ribbed concrete wall.

Photo 95:

View of capped pipe near south end of Maintenance Building Roof.

Photo 96:

View of splits and cracks in stripping material at metal edge joints, typical around perimeter of Maintenance Building.

Photo 97:

View of a typical roof drain, Maintenance Building. Note screen around drain. Also note leaves.

Photo 98:

View of damaged exhaust cover, northwest corner of Maintenance Building Roof. Note roof leaks reported beneath this location. See Photos 101 and 102.

Photo 99:

View of the chimney condition along the west perimeter of the Maintenance Building Roof. Note cracks have been caulked.

Photo 100:

View of precast concrete plank deck, typical in Maintenance Building. Also note south roof drain.

Photo 101:

View of water stained opening beneath large northwest exhaust unit, Maintenance Building. Note active leaks reported during rain. See Photo 98.

Photo 102:

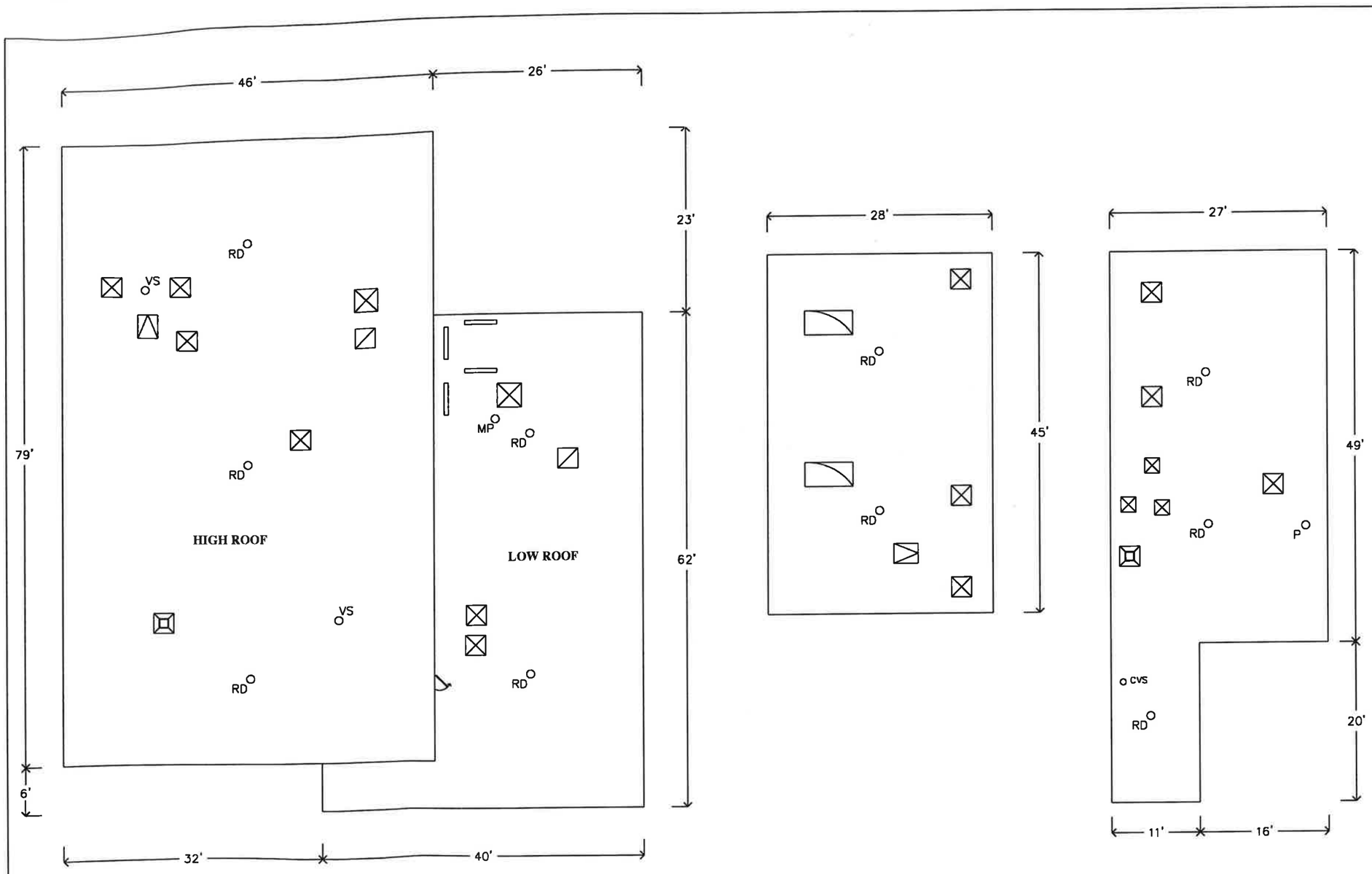
View of a bucket to catch the leak water, location described in Photos 98 and 101.

Photo 103:

View of a reported leak near the south end of the west perimeter, Maintenance Building in the Bathroom area. Note peeling paint and water stains.

Photo 104:

View of water damaged cardboard boxes beneath leak described in Photo 103.



OPERATIONS BUILDING

INFLUENT BUILDING

MAINTENANCE BUILDING

LEGEND OF SYMBOLS

O RD	ROOF DRAIN
O VS	VENT STACK
O MP	MULTI PIPE PENETRATION
	SLEEPER
	CURBED UNIT
	CAPPED CURB
	ROOF HATCH
	DOOR
	SKYLIGHT
O CVS	CAPPED VENT STACK
O P	PIPE PENETRATION
	MASONRY CHIMNEY

NOTATIONS

OPERATIONS BUILDING		
HIGH ROOF	= 3,634	SF
LOW ROOF	= 1,696	SF
INFLUENT BUILDING	= 1,260	SF
MAINTENANCE BUILDING	= 1,543	SF
TOTAL	= 8,133	SF

THE DIMENSIONS GIVEN ON THE DRAWINGS AND THE LOCATIONS OF ROOF PENETRATIONS ARE OFFERED ONLY FOR CONVENIENCE AND ARE NOT WARRANTED TO BE CORRECT. THE BIDDER SHALL MAKE HIS OWN MEASUREMENTS TO DETERMINE THE SIZE OF THE ROOF AND PENETRATION LOCATIONS.

DRAWN BY: KW CHECKED BY: JRW

H.B. FISHMAN & CO.,INC.
300 PLEASANT VALLEY RD.
SOUTH WINDSOR, CT.
(860)282-9036

SHEET TITLE:

SOUTH STREET BUILDINGS

RIDGEFIELD WASTEWATER TREATMENT FACILITY
22 SOOUTH STREET, RIDGEFIELD, CONNECTICUT

ROOF PLAN

PROJECT NUMBER: 0

SCALE: NOT TO SCALE

DATE: 12.3.2014

DRAWING NUMBER: **R1**

1990

Capabilities

QUALITY ROOFS BY DESIGN

CARLISLE

Need a strong, flexible watertight roof that will last? Carlisle makes it.

CARLISLE

Carlisle SynTec Systems

Ballasted Roofing Systems B and C

Compass Computer Services

Ballasted Roofing Systems — Designs "B" and "C"

Design "B" is Carlisle SynTec Systems most popular single-ply roofing system, developed to work on flat, or nearly flat roofs where the deck can carry the weight of the ballast. Insulation and membrane are loose-laid.

The membrane perimeter is secured and an even layer of ballast is added. Design "B" is ideal for dead-level roofs or slopes not exceeding two inches per horizontal foot.

This system is available in .045 in. thick Sure-Seal EPDM membrane.

Design "C", another ballasted system is a protected or inverted membrane assembly also designed for flat, or nearly flat, roofs where ballast load is not a problem. It uses .045 in. thick Sure-Seal EPDM membrane loose laid on the substrate. Insulation is installed above the membrane. The membrane perimeter is secured and an even layer of ballast is added.

"As One of the Pioneers of Single-Ply Roofing CARLISLE SYNTEC SYSTEMS Is in This Business To Stay."

Production, material expediting, research and development and administrative facilities are part of the "Miracle Mile" in Carlisle, Pennsylvania.

If you are looking for a strong, flexible, watertight roofing system that will last and a company that will back them up, look to Carlisle.

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Carlisle SynTec Systems — Quality Roofs by Design.

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Carlisle SynTec Systems
P. O. Box 7000
Carlisle, PA 17013

Call a Carlisle manufacturer's representative/distributor or call Carlisle toll free — 1-800-233-0551.
In Pennsylvania — 1-800-932-4626.
In Canada — 1-416-673-5557.

QUALITY ROOFS BY DESIGN

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CARLISLE
Carlisle SynTec Systems

APPENDIX D

STRUCTURAL

AECOM
250 Apollo Drive
Chelmsford, MA 01824
USA
www.aecom.com

978 905 2100 tel
978 905 2101 fax

Memorandum

To	Jon Pearson, P.E.	Page	1
CC	Matt Formica, P.E. , Matt Ribeiro, P.E., Michael Malenfant, P.E.		
Subject	Ridgefield, CT, Phase 2 Wastewater Facilities Plan, Structural Field Assessment		
From	John Welch		
Date	October 15, 2015		

The following memo describes the Ridgefield CT. South St. and Route 7 WWTF's structural condition assessment conducted on October 6, 2015.

Route 7 WWTF

The Route 7 WWTF services Sewer District 2 and is designed for an average daily flow of 0.12 MGD. The facility is in set into the side of a hill. The process tanks are at different elevations and are partially buried. All locations with top mounted guardrail posts are showing cracking due to freeze-thaw cycles. It appears that there is no barrier between the aluminum posts and the concrete. This has resulted in concrete blowouts on cantilevered slabs below the posts. Where posts are located on top of walls, there is concrete cracking in the top slab and/or top of wall, and the wall below (see photos 3,5 and 6. Sealing of these posts should be considered to prevent further deterioration. The concrete pad supporting the grit removal system shows some deterioration at the base (see photo 1). The four inch thick cantilevered slab at the northeast corner of the primary settling tanks is showing some cracking at the face of the wall. To avoid further damage due to freeze-thaw cycles, repair of this cracking should be considered (see photo 2).

The exposed exterior concrete surface of the primary settling tanks, equalization tanks, RBC tanks, and secondary settling tanks are showing signs of delamination due to age and weather exposure (see photos 3, 9, and 10). The top slabs of these tanks are also showing some cracking and scouring due to age and weathering. To avoid further damage due to weather cycles, repair of these surfaces should be considered. The sludge storage tanks are showing cracking and concrete damage due to the top mounted rails. Based on review of areas that could be accessed for visual inspection, the Control Building does not appear to require structural repair. All tanks were in use during the site visit, the concrete condition below the operating water level is unknown.

South Street WWTF

The South Street WWTF serves Sewer District 1 and is designed for an average daily flow of 1.0 MGD. The original 1970s vintage aeration tanks are unused and exhibit significant cracking and deterioration. The operating aeration tanks show some wall cracking (see photo 12). To avoid further deterioration due to weathering, repair of these cracks should be considered. The final settling tanks are mostly buried. The exposed concrete appears to be in good condition. At the north corner of the Control Building there is a visible crack in the bottom of the precast roof plank (see photo 11). The Filter Room in the Operations Building has stalactites hanging from the precast roof planks due to water infiltration through the concrete (see photo 13). The roof of this building should be considered for replacement. The water infiltration through the roofing is likely the cause of these buildups. The concrete located in the basement Pump Gallery appears to have no apparent structural issues. Water

infiltration is coming from underground conduits that supply the wiring for the building and sealing of these leaks should be considered.

Due to the operation of the facility, all tanks in the current treatment system were in use during the site visit, therefore, the concrete condition below the operating water level is unknown.

Photos:

Photo 1: Route 7 WWTF - Grit Removal System Concrete Pad

Photo 2: Route 7 WWTF – Primary Settling Tanks Cantilever Slab

Photo 3: Route 7 WWTF– Primary Settling Tanks Delamination

Photo 4: Route 7 WWTF – Primary Settling Tanks Concrete Delamination

Photo 5: Route 7 WWTF - Equalization Tank Concrete Cracking

Photo 6: Route 7 WWTF - Equalization Tank Cantilever Slab Concrete Blowout

Photo 7: Route 7 WWTF - Equalization Tank Cantilever and Wall Concrete Cracking

Photo 8: Route 7 WWTF - Equalization Tank Cantilever and Wall Concrete Cracking

Photo 9: Route 7 WWTF - RBC Tank Cracking and Delamination

Photo 10: Route 7 WWTF - RBC Tank Cantilever Slab Delamination

Photo 11: South Street WWTF - Control Building Roof Plank Crack

Photo 12: South Street WWTF - Aeration Tank Cracking

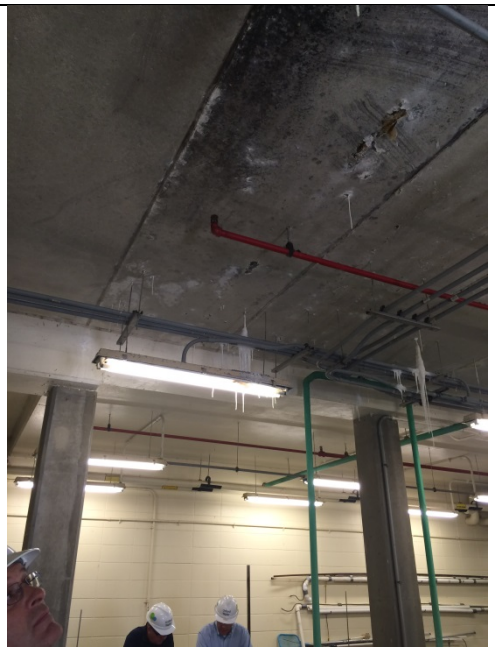

Photo 13: South Street WWTF - Filter Room Roof Planks

APPENDIX E

MECHANICAL PROCESS

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Memorandum

To	Matthew Ribeiro	Page	1
CC	Jon Pearson, Matt Formica		
Subject	Ridgefield, CT, Phase 2 Wastewater Facilities Plan, Mechanical Process Field Assessment		
From	Chris Galligan		
Date	October 16, 2015		

The following memo describes the Ridgefield CT. South St. and Route 7 WWTF's mechanical process conditions assessment conducted on October 6, 2015.

ROUTE 7 WWTF

Comminutor / Grit Chamber

The influent flow is pumped to the WWTF from an offsite pump station with two (2) five hundred gallon per minute pumps. The existing headwords system consists of a grit screw with aeration blower, comminutor, and a manual bar rack that feeds the channel to the primary settling tanks. It was reported that the influent pumps need to be controlled to prevent both pumps from running and overflowing at the headworks influent channel. A new equipment arrangement should be considered to handle the flow capacity of the influent pumps.

The headworks equipment was functioning with the exception of the comminutor, however due to the age of the equipment and the fact that it is located outside (no headworks building) all of the equipment is in need of replacement. United Water reported that the current headworks configuration works well for the influent flow at the plant as very little grit is removed using the grit screw, nor is excessive grit removed in the primary settling tanks indicating that a channel grinder could remain in place.

A building should be considered to house the replacement headworks equipment to protect it from the weather, as well as to help contain odors. The grit unit could be refurbished with a new blower and diffuser along with a new grit screw conveyor.

In addition to replacing the existing equipment, an odor control unit should serve the headworks area. It is recommended that covering the channels and equipment be covered as best as possible and drawing odor control air from under the covers as well as other areas of the WWTF with high odor potential such as the sludge tanks.

Primary Settling Tanks

Two primary clarifiers consist of rectangular settling tanks with slotted pipe scum removal and a single primary sludge & scum plunger pump serving both tanks. The chain and flights were replaced 5 years

ago; however the drives and scum skimmer pipes were not replaced. It is recommend that the drives and skimmer pipe be replaced and the flights be inspected when the tank is drained.

Primary Sludge Station

The sludge & scum plunger pump is well beyond its expected life and should be replaced with two pumps to provide redundancy. Because the pumps discharge to a tank at a lower elevation, they should be replaced with a positive displacement type that will prevent forward flow when the pumps are shut off (siphoning). A hose type pump would be recommended for this service. These pumps can be located in the existing below grade pump vault , or be located on the top slab due to the suction lift capability of the hose pump. If the pumps are located in the pump vault, consideration should be given to providing a way to hoist equipment out of the room.

The operators currently need to go below grade into the pump vault to operate the settling tank sludge valves (in blue along the wall). These valves should have operators that extend up to the top slab allowing valve operation without entering the confined space pump vault.

Equalization Tank

The tank's equalization/control valve system is not available and currently operates in a flow through mode as required by CT DEEP. The equalization function should be restored as part of any proposed WWTF upgrades. The existing flow control valves are not operational, and flow leaves the tank through two high overflow pipes at the top of the tank. Given the years of operation of the aeration system the aeration diffusers should be replaced. The aeration blowers are two positive displacement roots blowers that should be replaced in kind with blowers in weather proof sound enclosures.

Rotating Biological Contactors

The bearings and drives on RBC No. 1 were replaced recently, and RBC No. 2 is the original equipment. It is recommended that the drives and bearing on RBC No. 2 be replaced at a minimum, and that both units be inspected by the manufacturer to develop recommendations for refurbishing both units. The covers are original and should be replaced.

Secondary Settling Tanks

Two secondary settling tanks consist of rectangular clarifiers with slotted pipe scum removal and a single secondary sludge & scum plunger pump serving both tanks. It is recommended that the drives and skimmer pipe be replaced and the flights be inspected when the tank is drained.

Secondary Sludge Station

The sludge & scum plunger pump is well beyond its expected life and should be replaced with two pumps to provide redundancy. Because the pumps discharge to a tank at a lower elevation, they should be replaced with a positive displacement type that will prevent forward flow when the pumps are shut off (siphoning). A hose type pump would be recommended for this service. These pumps can be located in the existing below grade pump vault, or be located on the top slab due to the suction lift capability of the hose pump. If the pumps are located in the pump vault, consideration should be given to providing a way to hoist equipment out of the room.

The operators currently need to go below grade into the pump vault to operate the settling tank sludge valves (in blue along the wall). These valves should have operators that extend up to the top slab allowing valve operation without entering the confined space pump vault.

Plant Water System

The existing plant water system was removed and the operators use a local well to provide the non-potable water for the plant. The original plant water system was installed in a well adjacent to the UV disinfection room and was difficult to access and was not reliable. There is no potable water at the plant currently as the well is heavily laden with iron, and does not provide adequate pressure for use in the facility. A new plant water system should be added to replace the non-functioning system, and a new city water line should be run to the plant from the Route 7 service line. City water will be required for emergency showers and eye wash stations in the future as chemical addition will likely be implemented for phosphorous removal at the facility.

UV Disinfection System (Plant Water Station)

The existing UV disinfection system is not expected to provide reliable service for the next 20 years. The system also required manual cleaning which is labor intensive, requiring operators to pull the bulb racks out frequently and wipe them down with a harsh chemical cleaning solution. This system should be replaced with an automatically cleaned system (either in pipe or channel) for safety reasons as well

as reduced maintenance effort. There are currently no operating eyewash stations, and a station should be added in case of an incident with the bulb cleaning system.

Sludge Holding Tanks

The existing sludge holding tanks are aerated.. The operators only run the aeration system to mix the sludge one day prior to liquid sludge being removed from the tanks for offsite disposal. There is also a supernatant decant pump available to the operators to pump supernatant back to the head of the plant to allow thickening of the sludge. The existing supernatant pump is a hardware store purchased ¼ horsepower sump pump that is not adequate for the service it is currently used for. Replacement of the supernatant pump and piping to the headworks should be considered during upgrades. United Water also reported that a camlock hose connection at grade would be beneficial for sludge hauling as the truck driver and operators currently must climb the stairs and maneuver the hose to a connection at the top of the tank. It is also recommended to evaluate the addition of sludge pumping equipment as all sludge currently is vacuumed from the tank using a vactor type truck.

SOUTH STREET WWTF

The original South Street WWTF was constructed in 1970. The plant was upgraded in 1990, with the entire original treatment process tankage and equipment abandoned in place. The plant modification from the 1990's is in operating condition, but most of the equipment has reached the end of its useful life. The original plant and tankage takes up a large part of the property and is not used in the current treatment process.

Septage Receiving

The facility currently receives septage solely from the Town of Ridgefield. The system consists of a dumping area, storage and pumping facilities using chopper pumps at the back of the property with only manual screening. Consideration should be given to update the system to a packaged septage receiving station with a connection to odor control.

Influent Building

The existing headworks system consists of a mechanically cleaned bar screen with bypass rack, a comminutor, pista grit system and downstream hand raked fine screen. The screen system gets overloaded during high influent flows. These issues should be investigated and consideration given to add a new bypass and use the current bypass channel for an additional screen.

With proper initial screening, the existing comminutor and the downstream fine screen would no longer be needed and could be removed.

The Pista Grit system is functioning and replacement of the mechanical parts should be considered due to their age.

The aeration tank distribution box adjacent to the headworks building has plywood covers to contain odors and consideration should be given to replacing the covers with plate and providing a connection to odor control.

Aeration Tanks

The 1990s Aeration Tanks were in operation during the site visit. When possible, the tanks should be drained to allow for inspection of equipment located below the water surface. The surface aerators appeared in good working order, however they are inefficient and not expected that they will provide reliable service for the next 20 years, and therefore replacement should be considered as part of any facility upgrades. .

Final Settling Tanks

The existing final settling tanks were in operation during the site visit. When possible, the tanks should be drained to allow for inspection of equipment located below the water surface. Replacement of the settling tank drive units should be considered during facility upgrades due to their age. However, the weirs and baffles appeared to be in good working order

Operations Building

Pumping Systems

Due to the age of the sludge, recycle and chemical pumps, all pumps in the basement of the Operations Building should be considered for replacement. The plant water system currently has a single operational pump that continuously runs at a single speed and does not provide adequate service for the facility and replacement should be considered as part of facility upgrades.

Chemical System

The existing alum tanks are located in the basement of the Operations Building are at the end of their expected life. Due to their location it should be investigated whether a relocated new system that is more accessible or replacement of the tanks and system in their current location.

Sand Filtration

The existing sand filters are in poor condition due to their age and wear and service, the mechanical parts should be considered for replacement as sand is often found in the plant recycle system.

Sludge Handling

Sludge handling consists of a belt thickener/press operated in thickening mode with hauling of liquid thickened sludge. The sludge thickening room is suffering from corrosion due to thickening operations in and the small amount of ventilation provided. The belt thickeners/presses inherently have a large open sludge surface area which has led to a high level of odors and corrosion in the room. The equipment should be replaced and consideration should be given to thickening in an enclosed unit or dewatering in an enclosed unit with a connection to an odor control unit. The overall costs for hauling liquid sludge and the need to enclose the operation to reduce odors should be investigated.

UV Disinfection

The existing UV system is in operation; however it is a manual cleaning type system and the manufacturer, Trojan, is discontinuing the manufacture of spare parts. This system should be replaced with an automatically cleaned system to reduce the chemical handling the operators have to perform on the UV bulbs.

CONCLUSION

Route 7 WWTF

In general, the equipment at the Route 7 WWTF is still in operation but is past its expected service life. Since there is no expected increase in WWTF design flows, much of the equipment can be replaced in kind. However some improvements to incorporate current technology, such as changing the type of sludge pumps, enclosing the headworks area, and adding odor control should be considered as part of an overall upgrade.

South Street WWTF

Some of the process operations such as the headworks, septage receiving and dewatering are unable to keep up with the current and anticipated flow rates. Most of the existing equipment is near the end of its expected service life, and some of the process operations should be evaluated to determine if better equipment is now available to replace the existing equipment. These systems include septage receiving, headworks equipment, aeration equipment and sludge handling equipment. The odor control and ventilation in the belt press room appears inadequate to handle the existing operation causing high corrosion rates and odor issues in that area. Consideration should be given to reworking or redesigning these areas as part of a WWTF upgrade.

APPENDIX F

HVAC

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Memorandum

To	Jon Pearson, P.E.	Page	1
CC	Matt Formica, P.E., Matthew Ribeiro, P.E.		
Subject	Ridgefield, CT, Phase 2 Wastewater Facilities Plan, HVAC Field Assessment		
From	Audrey Casavant		
Date	October 16, 2015		

The following memo describes the Ridgefield CT. Route 7 WWTF and South Street WWTF HVAC condition assessment conducted on October 6, 2015.

ROUTE 7 WWTF

Primary Sludge Station

The WWTF staff and the signage on the access hatches indicted that the area is a confined space. The wall heater in this area is showing signs of corrosion. There is no forced ventilation in this space. Air enters through a wall damper near the top of the structure. The exterior screen on the damper is damaged. Consider upgrading the area to provide a heater with better corrosion resistance and forced ventilation of the space when occupied.

Secondary Sludge Station

The WWTF staff and the signage on the access hatches indicted that the area is a confined space. The wall heater internals have been removed and a temporary heater is in the space. There is no ventilation for this space the wall opening has been filled in. Consider upgrading the area to provide a heater with better corrosion resistance and forced ventilation of the space when occupied.

Plant Water Station/UV Disinfection Area

The wall heater in this area was severely corroded. There was no ventilation. The room was humid and a portable dehumidifier was in the space. Consider upgrading the area to provide a heater with better corrosion resistance and either passive or forced ventilation of the space when occupied. Consider the installation of a permanent dehumidifier system especially if and open channeled UV disinfection system is continued to be housed in the space.

Control Building

Laboratory. The HVAC system for the laboratory consists of two electric unit heaters and a spot cooler air conditioning unit. The heaters and spot cooler appear to be functioning properly. The spot cooler installed is typically used as a temporary system. The lab fume hood exhaust fan is wall mounted outside and is covered in vegetation. Consider upgrading all of the HVAC equipment in the

room to provide reliable service for the next 20 years. The need for a replacement laboratory hood should be determined with input from United Water and dependent upon the types of samples that will be prepared or analyzed at this WWTF.

Storage Room on Lower Level. An electric unit heater appears to be in good condition, no ventilation in the space was observed. Consider upgrading the HVAC equipment in the room and providing ventilation to provide reliable service for the next 20 years.

Electrical Room. A portable dehumidifier is installed in the area. No heat or ventilation in the space was observed. Consider the installation of a permanent dehumidifier in the room. Consider providing heat and/or ventilation in the room to provide reliable service for the next 20 years. This consideration should be discussed with United Water and is dependent upon use of the room in the future.

SOUTH STREET WWTF

Headworks Building

Headworks Area. The existing hydronic heating system in this building is not functional since the boiler in the Control Building is out of service. The existing unit heaters in the headworks area are severely corroded. The headworks portion of the building's ventilation system was not operating. The outside air inlet louver was boarded up and the ceiling inlet grille had appears to have fallen off. The condition of the roof exhaust fan (EX-1) condition could not be determined. Due to the age, condition, and difficult service in the room, consideration should be given to upgrading all of the HVAC systems with corrosion resistant components.

Electrical Room. The ventilation system consists of a roof exhaust fan and a roof outside air inlet hood. It could not be determined if the system was operational. Due to the age of this room consideration should be given to upgrading the HVAC systems.

Control Building

The boiler serving the Control Building and the Headworks Building was severely corroded and not functional. As a result hydronic heating is not available in these buildings.

The 1st Floor Maintenance Room. This room was in use and is served by two electric unit heaters, a through the wall air conditioning unit, and two ceiling destratification fans.

Generator Room. The Generator Room houses a fuel storage tank to supply the generator located outside on grade. There is no ventilation system serving the room. The room wall dampers were closed and roof intake hood dampers were open. These dampers, which previously served a generator, do not appear to function.

Chlorinator Room. The former Chlorinator (chemical) Room appears abandoned. The PVC ductwork is in good shape however the exhaust fan does not appear operational.

Lower Level (Old Pump Room). The lower level has been abandoned. The ventilation system was not operating and the roof outside air intake hood located on the roof above the East stair has been blocked off. The inline exhaust fan (F-3) was not running. The lower level was damp and musty.

Recommendations. Given the age and condition of the HVAC systems in the Control Building, consideration should be given to upgrading all of the HVAC systems. This consideration should be discussed with United Water and is dependent upon use of the building spaces in the future.

Operations Building

The Operations Building is heated by a hot water boiler system located on the first floor. The boiler and its appurtenances are still functional but near the end of their useful lives. There are two air handling units located in the mechanical room located on the first floor. Both air handling units are functional but near the end of their useful lives. Air handling unit (AHU-1) has a hot water heating coil and provides 100% outside air to the Pump Gallery, stair/corridors, Boiler Room, Mechanical Room, Polymer Mixing Room, the Control Room, and the MCC Room. Air conditioned air is provided by AHU-2 which has a hot water heating coil and a dx cooling coil. AHU-2 serves the Laboratory, Office and Lunch Room.

Pump Gallery. The ventilation system in this area appears to be functioning properly. The space is supplied by AHU-1 and exhausted by EX-7. Supplemental heat is provided by a hydronic unit heater.

Blower Room. The Blower Room is ventilated by F-1 which draws in outside air through the door louver and discharge is directed it to either the roof or the Filter Room by opening/ closing two motor operated dampers. The inlet grille to F-1 was very dirty. No heat is provided in this room.

Filter Room. The Filter Room is ventilated by wall mounted outside air intake dampers and exhausted by roof exhaust fan EX-3. Additional ventilation is provided by a transfer air duct from the Blower Room exhaust fan (F-1) with motor operated dampers to direct the air up to the roof exhaust hood or to the Filter Room. The (F-1) system motor operated damper in the filter room does not appear functional. The room has evidence of excessive moisture with peeling paint on the walls which indicates the ventilation system may not be running properly. It was also observed that all three wall mounted outside air intake motor operated dampers were closed. Two hydronic unit heaters in the area appear to be in good condition.

The Polymer Mixing Room. The Polymer Mixing Room is served by a portable dehumidifier and ventilated by a duct from AHU-1 and exhausted by EX-5. This room does not appear to have enough ventilation and was slightly humid. Consideration should be given to increasing the ventilation rate and provide a dedicated exhaust for this space.

Sludge Loading Room (Truckway). This area is currently being used as a storage/ garage space. It is ventilated by two wall mounted outside air dampers and exhausted by roof mounted EX-4 which also exhausts air from the Belt Press Room on the second floor. The room is heated by a unit heater which appears to be in good condition. If the room is used for its original purpose consideration should be given to evaluating it for compliance with NFPA 820.

Belt Press Room. The Belt Press Room is ventilated with outside air through wall mounted motor operated dampers and a roof exhaust fan. The room was very humid with only one set of dampers open. Operation of the roof exhaust fan was not confirmed. NFPA 820 ventilation requirements and electrical area classification should be evaluated. Also if the floor opening to the Sludge Loading Room below is opened then that classification of that room should also be evaluated. The two rooms share the same exhaust system which may not satisfy NFPA 820 requirements. The Belt Press Room was designed to be heated by two hydronic unit heaters, one is currently installed, and the other has been removed.

Office, Lunch Room and Laboratory. These spaces are served by the air conditioning unit AHU-2. The system functions but it is at the end of its useful life. If the laboratory fume hood is to be replaced consideration the need to provide an exhaust stack should be investigated.

Men's Room, Women's Room, Janitor Closet, Electrical Room and the East Stairwell. These areas share the same (EX-5) exhaust system. The Electrical Room is served by EX-5 and in addition has its own outside air intake hood interlocked with roof exhaust fan EX-8. The Electrical Room was observed to be very warm and may require additional ventilation.

Recommendations. Given the age and condition of the HVAC systems in the Operations Building, consideration should be given to updating all of the HVAC systems. This consideration should be discussed with United Water and is dependent upon use of the building spaces in the future. An evaluation of the electrical rating of some of the building room's should be considered in any future upgrades to coordinate the areas' electrical ratings with their ventilation requirements.

CONCLUSION

Route 7 WWTF

In general, the HVAC equipment and systems at the Route 7 WWTF is in poor condition and much is past its expected service life. All of the HVAC equipment and ventilation in the various WWTF areas should be evaluated and consider for replacement.

South Street WWTF

In general, the HVAC equipment and systems at the South Street WWTF is in fair to poor condition and is not expected to provide reliable service to the WWTF over the next 20 years. As a result all of the HVAC equipment and ventilation in the various WWTF areas should be evaluated and consider for replacement.

APPENDIX G

INSTRUMENTATION AND CONTROL

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Memorandum

To	Jon Pearson, P.E.	Page	1
CC	Matt Formica, P.E., Matt Ribeiro, P.E.		
Subject	Ridgefield, CT, Phase 2 Wastewater Facilities Plan, Instrumentation and Control Systems Field Assessment		
From	Ted Stillwell		
Date	November 11, 2015		

The following memo describes the Ridgefield CT Route 7 WWTF and South Street WWTF instrumentation and controls assessment conducted on October 6, 2015.

BACKGROUND

The intent of the field assessment was to review the current condition of the facilities as it relates to instrumentation and control systems. This assessment was conducted with the Town and Suez (formerly United Water) staff to gain an understanding of the condition of the WWTFs as well as the Town and staff's concerns. Opinions on I&C systems conditions and need of improvements or repairs are offered which will form the basis for consideration of facility upgrades and modifications.

In addition to the summary provided in this memorandum, AECOM prepared a supervisory control and data acquisition (SCADA) system letter report in 2008 for the Town's wastewater treatment facilities and pump stations. Please note that the I&C industry changes at a rapid pace and some of the recommendations included in the letter report are dated from a technology platform and specific equipment stand point. As a result, this report has been included as an attachment to this memorandum as a reference and to facilitate further detailed discussions on system upgrade going further.

ROUTE 7 WWTF

The Route 7 WWTF is unstaffed and is periodically visited for routine operations. The Route 7 WWTF currently has no local or remote alarms. As part of the National Pollutant Discharge Elimination System (NPDES) permits for the WWTF, reports of plant operating data are required to be submitted to the CT DEEP. Currently, with no automated data collection system, those reports are generated manually.

Consideration should be given to providing monitoring as well as local and remote alarm capability for the Route 7 WWTF systems. Some systems that should be considered for monitoring include all mechanical equipment (for status and run time) tank levels (EQ, UV, sludge storage, fuel oil storage) power status (utility vs. standby generator) and Control Building temperature. Some systems that should be considered for local and remote alarms include critical (high) tank levels (EQ, sludge storage, UV), UV intensity, flow, and, main power failure status (utility vs. standby generator), low Control Building temperature.

The installation of a SCADA system for monitoring, historical data tracking and tie in of alarms with an automated call out system (such as WIN 911) should be considered. Remote process operation is not recommended for consideration due to the limited adjustable process variables at the WWTF. The use of radio communication for the WWTF should not be considered in this area due to hills and need for repeater installations throughout town.

The WWTF's single flow meter is an ultrasonic level element and weir system located in the effluent flushing water pump station and output a signal to the effluent chart recorder in the 1st floor of the Control Building. Consideration should be giving to replacing and relocating the WWTF flow meter to a location with improved maintenance access and to a more accurate technology such as a magnetic flow meter.

SOUTH STREET WWTF

The South Street WWTF is staffed Monday through Saturday from 7:00 a.m. to 3:00 p.m. and Sunday from 8:00 am to 10:00 am. In the event of trouble with the operation of the critical automatic equipment at the South Street WWTF, alarms are activated in a centralized panel at the facility. Trouble alarms for the South Street WWTF, including fire alarms, are conveyed using an autodialer via dial-up telephone lines to an offsite alarm monitoring service (Simplex). When an alarm condition is received, Simplex calls United Water staff. During staffed hours the call is received at the WWTF. During non-working hours the call goes out to a call list of cell phones for Suez on-call staff.

The South Street WWTF operates manually with some automated processes. The automated processes include the UV disinfection process which operates based on flow, the upflow sand filters which have manufacturer provided controls, and the belt filter press has a local control panel to control the press, sludge feed rate, and polymer addition. The WWTF has no local or remote instrumentation control panels (ICPs) or SCADA control. Equipment status is indicated locally, run-time meters are located at the Motor Control Center, and alarms are indicated on an alarm annunciator panel.

The South Street WWTF includes an alarm annunciator and circular flow recorders. The annunciator appears to operate and may continue to be used as long as parts remain available from Ametek. The existing Fisher & Porter chart recorder is no longer manufactured. The majority of the instruments at the WWTF including the flow meter, tank level elements and gas detectors are past their expected service lives.

As part of the National Pollutant Discharge Elimination System (NPDES) permits for the WWTF, reports of plant operating data are required to be submitted to the CT DEEP. There is currently no centralized automated data collection system. As a result those reports are generated manually.

The installation of a SCADA system including a number of instrumentation control panels for control monitoring, historical data tracking, and tie in of alarms with an automated call out system (such as WIN 911) should be considered. Remote process operation should also be considered if desired by the Town and United Water. The ability of the SCADA system to provide future buildout space for the remote pump stations and the Route 7 WWTF in the future should be considered. The interface to the SCADA system would be the instrumentation control panels as well as operator workstations (personal computers) in the administrative spaces (lab, offices) or other designated locations. In addition to monitoring, control, alarm and historian functionality, consideration should be given to providing, through various software applications, automatic lab report generation, state compliance reporting, maintenance management, and asset tracking and asset management.

With the SCADA system, consideration should be given to providing monitoring as well as local and remote alarm capability for the South Street WWTF systems. Some systems that should be considered for monitoring include all mechanical equipment (for status and run time), process flows (influent, RAS, WAS, etc.), tank levels (Operations Building wet well, Distribution Box No.1, chemical and fuel oil tanks, UV/post aeration channel, sludge storage, septage tanks, etc.) power status (utility vs. standby generator), gas detection, and building temperatures. Some systems that should be considered for local and remote alarms include critical (high) tank levels (EQ, sludge storage, UV, fuel oil storage tank), UV intensity, flow, and, main power failure status (utility vs. standby generator), low building temperatures.

With the SCADA system, consideration should be given to providing a real time process data historian. A data historian will collect (in a historical server) and display process information on a workstation terminal. The information maybe input into operators reports, reports to regulatory agencies and used to determine operating costs. The historian can also track equipment run time, flows, power and chemical usage if desired.

As noted previously, the majority of the instruments at the WWTF including the flow meters, tank level elements and gas detectors are past their expected service lives. Consideration should be given to replacing all of the instrumentation at the WWTF.

Finally, as area of the WWTF that could significantly benefit from the addition of a SCADA system for improved energy efficiency and process control is the aeration tanks. The dissolved oxygen in the aeration tanks is currently measured by hand and any speed adjustments to the two speed aerators are generally manual (with the exception of the 1st aeration tank which is operated cyclically for a few minutes an hour). Consideration should be given to the installation of an automatic aeration control system. The control of the tank aeration though the use of either dissolved oxygen or ammonia analyzers in conjunction with upgraded aeration equipment (surface aerators, diffused air systems) that can have their output varied should be considered to improve energy efficiency and process control.

CONCLUSION

Both the Route 7 WWTF and the South Street WWTF should consider upgrading their instrumentation and control systems to provide a full SCADA system. All of the instrumentation at both facilities is old, is not expected to provide reliable service into the future and should be considered for replacement. The use of a SCADA system will provide the following benefits:

- Improved process monitoring and alarm functionality.
- Improved process control
- Improved data collection for reporting requirements, process trending, and maintenance scheduling

APPENDIX H

SCADA CONCEPT DESIGN LETTER REPORT (JUNE 1, 2008)

Report

Submitted to: Water Pollution Control Authority

Town of Ridgefield, CT

SCADA Concept Design Letter Report

June, 2008

Submitted by:

60043171

June 18, 2008

Water Pollution Control Authority
66 Prospect Street
Ridgefield, CT 06877

Subject: SCADA Concept Design
Letter Report

Dear Authority Members:

In accordance with our Agreement Task Order, we are pleased to submit this letter report on developing a conceptual design for a supervisory control and data acquisition (SCADA) system for the Town's wastewater treatment facilities and pump stations.

INTRODUCTION

The Town of Ridgefield owns and operates two wastewater treatment facilities and seven pump stations. The facilities are operated under contract by United Water. The South Street Wastewater Treatment Facility (WWTF) is staffed Monday through Saturday from 7:00 a.m. to 3:00 p.m. and Sunday from 8:00 am to 10:00 am. The other facilities are unstaffed and are periodically visited for routine operations. Trouble alarms for the unstaffed facilities, and for the South Street WWTF during unstaffed hours, are conveyed using autodialers via dial-up telephone lines to an offsite alarm monitoring service (Simplex). When an alarm condition is received, simplex calls United Water staff. During staffed hours the call is received at the plant. During non-working hours the call goes out to a call list of cell phones for United Water on-call Staff. There is currently no centralized automated data collection system.

As part of the National Pollutant Discharge Elimination System (NPDES) permits for the Town's two wastewater facilities, a number of reports providing plant operating data are required to be submitted to the CT DEP. Currently, with no automated data collection system, those reports are generated by manual data entry.

The Town requested that Metcalf & Eddy, Inc. (M&E) prepare a conceptual design for a SCADA system that would improve the reliability and efficiency of the alarm telemetry system, and improve the accuracy and efficiency of the preparation of the required NPDES permit reports. This letter report outlines a conceptual design based on visits to the sites and direct input from United Water staff.

The key elements of this letter report include:

- A description of the Town's existing system
- A description of a SCADA system functional description
- A summary of SCADA remote monitoring
- A description of SCADA system security
- An overview of the communications options
- Proposed conceptual system architecture and Opinion of Probable Construction Cost

EXISTING SYSTEM

The Ridgefield Water Pollution Control Authority (WPCA) owns and operates two municipal wastewater treatment facilities; the South Street (Main) facility and the Route 7 facility. In the event of trouble with the

operation of the critical automatic equipment at the South Street WWTF alarms are activated at centralized a panel at the facility. Facility trouble alarms during unstaffed hours, including fire alarms, are also conveyed using autodialers via dial-up telephone lines to an offsite alarm monitoring service (Simplex). The Route 7 WWTF currently has no local or remote alarms.

Ridgefield's South Street and Route 7 wastewater system consists of approximately 520 sewer manholes, 93,000 linear feet of gravity sewer ranging in size from 6 to 18 inches in diameter, 9 pump stations, and 27,000 linear feet of force main. Of the 9 pump stations 7 are either owned or operated by the WPCA with the other 2 privately operated. The pump station trouble alarms are also conveyed using autodialers via dial-up telephone lines to an offsite alarm monitoring service (Simplex). The existing wastewater system is shown in Figure 1 (included at the end of this report).

The WPCA incurs a cost of approximately $500 per year per facility, excluding phone costs, or approximately $4,000 per year, for the current Simplex alarm monitoring service. This does not include charges for equipment repair and maintenance.

Table 1 summarizes the level of monitoring that the Ridgefield WPCA currently has at these facilities.

Table 1 - Existing Ridgefield Wastewater System Overview

Facility Type	Ridgefield Wastewater System Component	Current Monitoring
Wastewater Treatment Facility	South Street WWTF Route 7 WWTF	- Local panel Alarms (South Street WWTF only) - Local analog gauges - Chart recorders
Pump Station	South Street WWTF Influent Pump Station Quail Ridge Pump Station Ramapoo Road Pump Station Middle School Pump Station Copps Hill Pump Station Fox Hill Pump Station Route 7 Pump Station	- Station Power Failure - Communications Failure - High Water Level Alarm - Low Water Level Alarm - Pump On/Off - Pump Failure

SCADA Concept Workshop

On March 26, 2008, representatives of M&E met with United Water staff to conduct a workshop on the SCADA project. M&E raised a number of different questions regarding the purpose, structure, and functionality of the desired monitoring, control, and alarm system. It was concluded that the initial SCADA system implementation should be focused on providing a monitoring and alarm system, with capability provided for the future addition of supervisory control. In essence, the initial SCADA installation would provide data on equipment operation, but not allow remote operation of any equipment. Following the workshop, each wastewater facility was visited to collect information on existing equipment.

SCADA SYSTEM FUNCTIONAL DESCRIPTION

SCADA is an acronym that stands for Supervisory Control and Data Acquisition. A SCADA system can be thought of as a point for collection of real-time and historical information on a facility or group of facilities. A SCADA system includes; field instruments, remote stations, a communications network and central monitoring.

Three main elements of a SCADA system include various RTU's (Remote Terminal Units), communications, and an HMI (Human Machine Interface). Each RTU effectively collects information at a site, while communications bring that information from the various plants or RTU sites to a central location, and occasionally returns instructions to the RTU. The HMI displays this information in an easily understood graphical and tabular form, archives the data received, transmits alarms and permits operator control as required. The HMI is essentially a personal computer (PC) system running powerful graphic

and alarm software programs. Communication within the plant can be by data cable, wire or fiber-optic, or radio.

A SCADA system provides a window into multiple sites through monitoring center workstations. The monitoring center provides information and may allow supervisory control. Supervisory control would allow an operator to change set points, open or close a valve or start and stop a pump. Any access for control would be limited through password authorization and only allow control of processes that would not adversely affect a particular facility operation.

The SCADA system provides an opportunity to manage the wastewater system. A managed wastewater system can reduce operating labor costs, while at the same time improve plant or system performance and reliability. Information gathering would be automated, and correspondingly the frequency of field site inspections required may be reduced.

After-hours alarm call-outs may often be avoided since a SCADA system will indicate the nature and degree of a problem. SCADA based alarming is also very reliable since it is controlled and maintained in-house and tied directly to process control.

To manage a wastewater system both real-time and historical system information needs to be collected. A SCADA system will create a knowledge base to manage the system. The knowledge base will be created from the information collected and stored in a specialized database called an Historian. With this information and historical records future needs may be anticipated. The system can be operated in a proactive rather than a reactive mode. Proactive system operation can provide benefits including energy cost savings, and better control of chemical addition.

Another feature of a SCADA system is the trending of data. When graphically displayed, accumulated operating data often may indicate a developing problem, or an area for process improvement. Reports can easily be generated from this data utilizing common software programs such as OPS/SQL.

SCADA is based around a central monitoring center (SCADA Headquarters). The headquarters is connected to the wastewater system entities using phone, radio or dedicate wide area fiber network (WAN). The collected information will provide a management tool for; staffing, maintenance management, future system improvements and cost control.

RIDGEFIELD SCADA SYSTEM OBJECTIVE

The objective in developing a concept for the SCADA system is to provide monitoring and capability of future control of the wastewater system into a SCADA system centrally located at the South Street WWTF. The proposed SCADA system would consist of a main SCADA server node to be installed at the South Street WWTF. The SCADA node would consist of a PC based HMI system and a process controller which communicates with the RTUs. RTUs and panels would be installed at the wastewater pump stations.

The South Street WWTF currently has no local or remote RTUs or SCADA control. Equipment status is indicated locally, run-time meters are located at the Motor Control Center, and alarms are indicated on an alarm annunciator panel. Two HMI PCs and RTU would be installed in the Operations Building at the facility. The Route 7 WWTF and remote pump stations would communicate with the RTU at this location.

The signals currently generated at each of the facilities monitor the conditions identified in Table 1. The new SCADA system would maintain the capability to monitor these signals.

The following signals are suggested for the initial installation at the South Street WWTF:

- Influent Pump Wet Well Level (Continuous)
- Influent Pump Wet Well Level Alarm (High, Low)
- Influent Pumps (Status, Run Time, Failure)
- Mechanical Bar Screen (Status, Run Time)
- Grit Pumps (Status, Run Time)
- Comminutor (Status, Run Time)
- Mechanical Surface Aerators (Status, Run Time)

- Phosphorous Chemical Feed Pumps (Status, Run Time)
- Polymer Feed Pumps (Status, Run Time)
- Waste Sludge Storage Tanks Level (High)
- Sludge Mixing Blowers (Status, Run Time)
- Mechanical Mixers (Status, Run Time)
- Sludge Press/Thickener (Status, Run Time)
- UV Disinfection Lamp Banks (Status, Run Time, Intensity)
- Coarse Bubble Post Aeration Blowers (Status, Run Time)
- Return Sludge Pumps (Status, Run Time)
- Return Activated Sludge (Flow)
- Waste Sludge Pumps (Status, Run Time)
- Waste Activated Sludge (Flow)
- Scum Tank Level (High)
- Scum Pump (Status, Run Time)
- Truck Loading Pump (Status, Run Time)
- Operations Building Wet Well (High)
- Operations Building Wet Well Pumps (Status, Run Time)
- Post Aeration Tank Level (High)
- Post Aeration Blowers (Status, Run Time)
- Belt Filter Press Pump (Status, Run Time)
- Effluent Flow Meter (Flow Rate)
- Sodium Hydroxide Feed System Pumps (Status, Run Time)
- Sodium Hypochlorite Feed System Pumps (Status, Run Time)
- Thickened Sludge Storage Tanks Level (High)
- Septage Holding Tanks Level (High)
- Septage Pumps (Status, Run Time, Failure)
- Main Power Failure
- Alum Tank Level (Continuous)
- Generator (Status, Fault)
- Gas Detection System
- Influent Building (Low Temperature
- Distribution Box No. 1 Level (High)
- Influent Building (Low Temperature)
- Control Building (Low Temperature)
- Operations Building (Low Temperature)

The following signals are suggested for the initial installation at the Route 7 WWTF:

- Channel Grinder (Status, Run Time)
- Grit Collector (Status, Run Time)
- Grit Blower (Status, Run Time)
- Primary Settling Tank Drives (Status, Run Time)
- Primary Sludge Pump (Status, Run Time)
- Flow Equalization Tank Level (High)
- Equalization Blower (Status, Run Time)
- Rotating Biological Contactor Drives (Status, Run Time)
- Secondary Settling Tank Drives (Status, Run Time)
- Secondary Sludge Pump (Status, Run Time)
- Secondary Sludge Blowers (Status, Run Time)
- UV Disinfection (Status, Run Time, Intensity)
- Sludge Storage Tank Level (High)
- Supernatant Pumps (Status, Run Time)
- Control Building (Low Temperature)

- Magnetic Flow Meter (Flow Rate)
- Generator (Status, Fault)
- Main Power Failure
- Plant Water Pump (Status, Run Time)

The six remote pump stations also currently have no RTU. Only a few contact alarms are sent to the Simplex offsite alarm monitoring system via dial-up phone lines. Installation of the SCADA system would involve a NEMA 4X Stainless Steel exterior enclosure and a small footprint RTU installed at each station. The RTU at the main SCADA server room at the South Street WWTF would collect data from the pump stations to be used by the SCADA network.

The monitoring capabilities recommended for the remote pump stations are identified below:

- Pump Status (Each Pump)
- Wet Well Level (Continuous)
- Wet Well Level Alarm (High, Low)
- Pump Failure (Each Pump)
- Pump Status (Each Pump)
- RTU Communication Failure
- RTU Power Failure
- Uninterruptible Power Source (UPS) Status
- Generator Status
- Generator Fault
- Main Power Failure

To improve operator control, United Water requested that the SCADA system monitor and report additional parameters at the South Street WWTF and the Route 7 WWTF. To implement monitoring of these parameters will require some additional instrumentation. Table 2 summarizes the new equipment required to monitor and report the additional parameters requested.

Table 2 – Equipment Required to Monitor and Report Additional Parameters

Monitoring Parameter Description	Required Equipment	Quantity
South Street WWTF		
UV Intensity	Current to Current Relay	1
Scum Tank, High Level	Submersible Pressure Transmitter	1
Operations Building Wet Well, High Level	Float	1
Post Aeration Tank, High Level	Float	1
Alum Tank Level	Level Transmitter	1
Influent, Control & Operations Building Low Temperature Alarm	Building Temperature Alarm	3
Gas Detection Alarm	Gas Detection Sensor	1
Influent Bldg Dist. Box No. 1, High Level	Float	1
Waste Sludge Storage Tanks, High Level	Float	3
Septage Holding Tanks, High Level	Float	2
Route 7 WWTF		
Flow Equalization Tank, High Level	Ultrasonic Gap Switch	1
UV Intensity	Current to Current Relay	1
Sludge Storage Tanks, High Level	Float	2
Control Building Low Temp Alarm	Building Temperature Alarm	1

SCADA REMOTE MONITORING AND CONTROL

The monitoring and/or control of SCADA systems from a remote location is becoming more commonplace now that laptops, tablet PCs, and handheld devices can run more robust programs and contain more memory. United Water has expressed interest in being able to access key screens and alarms from remote locations such as an office or home. This capability could reduce overtime costs associated with alarm call outs by allowing United Water staff to determine the details of an alarm condition remotely.

Remote monitoring and/or control of HMI systems from a fixed location such as an office or at home is easily set up by connecting a laptop or PC running a client version of the HMI software to a local area network (office) or the internet (home). This setup is common and low cost. Since the operator is actually accessing a SCADA screen, supervisory control is still in effect. This means the operator still has to have the authorization to make any control changes. It is recommended that for security reasons only monitoring be allowed remotely.

SCADA SYSTEM SECURITY

With the growing concern of sabotage or malicious attacks of computer based control systems, system security has become a major issue. With remote locations communicating to a SCADA node using land lines, the SCADA system should include security measures. SCADA system security is mainly comprised of prohibiting outside sources from gaining access to your system. There are three main points of access which are the HMI PC, RTU, and communication network which include Ethernet equipment. Ethernet equipment is used to create a local area network (LAN) within the plant to allow communication between the SCADA system components.

SCADA PCs can be password protected at both the HMI and Windows level. All HMI software allows users to set up Operator and Supervisor accounts to allow appropriate access to plant operations. SCADA alarms can alert operators using lights, buzzers, beepers or cell phones. Firewalls can be installed to keep intruders from attacking at the network level. RTUs can also be password protected to keep unauthorized users from downloading or modifying configurations. The RTU should be kept in a locked enclosure to keep anyone from tinkering with the hardware.

Ethernet network equipment such as hubs, switches, and routers can also be set up with firewalls and filters to allow only the appropriate data into the network. It is recommended that remote access consist of monitoring only for security reasons.

COMMUNICATIONS

During preparation of this report, M&E contacted the Town's communication service provider, AT&T, to review existing town information systems. Local telephone lines and terrestrial radio alternative communication networks were considered to connect the various facility locations.

Leased Telephone Lines and Other Phone Line Options

Leased telephones lines are currently available from AT&T at all sites. Phone services that are available from AT&T include Digital Private Lines (T1) and Frame Relay. T1 Digital Private Lines are the highest capacity phone service available from AT&T and cost approximately $920 per month per site. The one time installation charge is approximately $4,700 per site. Frame Relay is of an efficient data transmitting technique used to send digital information quickly and inexpensively. It is a message forwarding system in which formatted packs of data, called frames, are passed from one point to another via a series of intermediate points. It produces a permanent virtual circuit which provides a continuous, dedicated connection at half the stated bandwidth. The cost for Frame Relay is approximately $1,300 per month per site. There is no installation charge for the Frame Relay.

Terrestrial Radio Service

Ridgefield's topography makes line of site radio transmission between the seven remote sites to the SCADA headquarters at the South Street WWTF impractical. Repeater sites, usually located at higher elevation locations such as water tanks, would need to be used to complete the path. Based on experience with previous projects, terrestrial radio service would be costly for this application and therefore not considered further.

Communication Systems Opinion of Probable Construction Cost

Table 3 provides the estimated initial capital cost, annual recurring expense, and five year initial capital and recurring cost for the types communication networks evaluated. A five year horizon has been used to illustrate the relationship between the initial capital costs and the recurring annual costs. These budgetary costs are based on information supplied by AT&T for service, installation and configuration. For comparison of communication options, these figures include costs only for the communication network. Hardware, programming, and installation costs for the RTUs and their panel enclosures are common to both options and are not included in these figures.

Costs provided do not represent full budget costs and are provided for comparison of communication systems purposes only.

Table 3 – Communication Systems Opinion of Probable Construction Cost per Site

Communication System	Initial Capital Cost	Annual Recurring Expense	Initial Capital + 5 Year Annual Cost
AT&T Digital Private Line (T1)	$4,700	$11,040	$59,900
AT&T Frame Relay System	$0	$15,600	$78,000

Alternative Comparison

A comparison of the various communications options including availability, initial and ongoing costs, reliability and security are shown in the following Table 4. The two feasible communication options evaluated in this report are the Digital Private Lines (T1) and Frame Relay.

The T1 AT&T Digital Private lines are a better upgrade to the current analog system and are a feasible alternative for the Ridgefield SCADA system because they provide greater flexibility and reliability. The AT&T Frame Relay system is also a cost effective option for systems similar to the Ridgefield SCADA system.

Table 4 – Comparison of Communication Alternatives

Communication Alternative	Availability of Service	Initial Cost	Annual Cost	Initial + 5 yr Annual Cost (Per Site)	Reliability	Security
AT&T Digital (T1) Private Lines	Available at all locations	Moderate	Moderate	$59,900	Reliable	Secure
AT&T Frame Relay System	Available at all locations	Low	Moderate	$78,000	Reliable	Secure

CONCLUSIONS & RECOMMENDATIONS

The communication systems opinion of probable construction cost presented in Table 2 indicates higher initial capital costs for the T1 option and higher recurring annual cost for the frame relay option. The higher initial capital costs for the T1 option is for installation of equipment necessary to provide the service. The initial installation costs for the T1 option are offset by its lower recurring annual cost. Annual costs may be further reduced by approximately $3,500 with the elimination of the use of the Simplex system for offsite alarm monitoring of the pump stations. However, the Fire Department requires that fire alarm monitoring be provided by a private service. Therefore, the Simplex system should be maintained for fire alarm monitoring at the South Street WWTF. Table 4 indicates that other variables including availability of service, reliability and security are essentially equivalent. Based on this evaluation, it is recommended that the Town implement a wastewater SCADA system using AT&T T1 communications link based on cost, availability, and reliability.

Recommended SCADA System Description

The recommended monitoring solution for the Ridgefield wastewater treatment plants and pump stations includes an RTU at each remote site communicating to the South Street WWTF. The communication to the plant would utilize T1 data quality phone lines.

Each remote site would include an RTU panel. The panel would include an RTU module with the capability of monitoring and control. The RTU module would be house in a NEMA 4X stainless steel enclosure. The enclosure would also include terminal strips and relays for all signals entering the panel, a panel power supply, an Uninterruptible Power Supply (UPS), and the telephone modem.

Each RTU panel should be identical in design as this will reduce the total cost of the RTUs. The RTUs should be designed with spare capacity. Because some pump stations do not have as many monitoring points, some RTUs will have more spare capacity then others. By using a common RTU panel one spare RTU can be purchased that may be used to replace a failed RTU panel. A proposed preliminary Pump Station SCADA system configuration is shown in Figure 2 (included at the end of this report).

It is recommended that the main SCADA server be installed at the South Street Wastewater Treatment Facility and would include:

- T1 phone connection to all remote locations
- Alarm dialer for notification of critical alarms when the plant is unmanned. When the plant is manned the alarm dialer may be disarmed. The alarm dialer should have the capability to be acknowledged remotely but must be cleared through the operator workstation
- Operator workstation PCs which allow automatic input for monitoring reports in the Office and Lab
- A color and black and white printer in the Office and Lab
- Laptop for RTU maintenance and remote monitoring
- Rack mounted server for SCADA monitoring, information archiving and reports

The rack mounted server would house the process controller and the Historian server. The process controller communicates with the RTUs and the Historian. The Historian server records and stores the historical data. The rack would also include phone and network switches, power supply and keyboard and monitor. The rack would be located in the office at the South Street WWTF. The South Street WWTF Inputs and Outputs (I/O) would be wired to an I/O marshalling panel similar to the remote RTUs. The marshalling panel would include terminal strips, relays, power supplies and a larger RTU module that will connect to the SCADA server using an Ethernet connection.

The marshalling panel and I/O module will provide for future expansion. The design should provide the ability of the South Street system to include process control for future plant expansion or process enhancements. Further if the Route 7 WWTF were expanded or required process enhancements the Route 7 facility could include expanded I/O and control capabilities similar to the South Street facility.

Operator workstations would also be located in the office and lab at the South Street WWTF. The existing reporting software (OPS) would be upgraded to OPS SQL. The upgraded reporting software would interface with the Historian to produce automated data entry and reporting required by the NPDES permits.

A proposed preliminary wastewater system SCADA architecture is shown in Figure 3 (included at the end of this report). This shows the South Street WWTF site as the central SCADA Headquarters. The seven pump stations and the Route 7 WWTF would communicate to the SCADA Headquarters directly via T1 phone lines.

Catalog cuts of recommended system components are included in Appendix A.

Recommended SCADA System Opinion of Probable Construction Cost

Planning level opinion of probable construction costs for the complete recommend SCADA system were developed. The SCADA costs are based on costs for similar projects in Connecticut and New England. The total opinion of probable construction costs for the recommended SCADA system includes an allowance of 40 percent for engineering and contingencies. The opinion of probable construction costs are presented in Table 5 below.

Table 5 – Recommended SCADA Systems Opinion of Probable Construction Cost

Site	Cost
Wastewater Treatment Facilities	
South Street WWTF	$ 254,000
Route 7 WWTF	$ 22,000
Pump Stations	
South Street WWTF Influent PS	$ 14,000
Quail Ridge PS	$ 19,000
Ramapoo Road PS	$ 19,000
Middle School PS	$ 19,000
Copps Hill PS	$ 14,000
Fox Hill PS	$ 19,000
Route 7 PS	$ 19,000
Subtotal Construction	$ 399,000
Engineering & Contingency (40%)	$ 159,600
Total Project Cost	$ 558,600

Should you have any questions, or require additional information, please do not hesitate to call me at (781) 224-6270.

Very truly yours,

Jon R. Pearson
Vice President
Metcalf & Eddy, Inc.

JRP/aa

cc: D. Van Ness, WPCA Administrator
C. Fisher, Town Engineer
J. O'Brien, United Water
J. Pereira, United Water
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APPENDIX I

ELECTRICAL

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Memorandum

To	Jon Pearson, P.E.	Page	1
CC	Matt Formica, P.E., Matt Ribeiro, P.E.		
Subject	Ridgefield, CT, Phase 2 Wastewater Facilities Plan, Electrical Systems Field Assessment		
From	Yasser Rizk		
Date	November 12, 2015		

The following memo describes the Ridgefield CT. Route 7 WWTF and South Street WWTF electrical systems assessment conducted on October 6, 2015.

ROUTE 7 WWTF

Electrical Distribution System

The Route 7 WWTF electrical distribution system includes a utility service routed underground to an oil filled pad mounted transformer stepping the service voltage down to 208 VAC, 3 phase, 4 wire, and 60 Hz. Refer to attached Photo No. 1.

The pad mounted transformer has no external nameplate and internal access was not available but it appears that the transformer is the original transformer installed when the plant was built in the mid-1980s. The transformer has a utility ID number 374 and was likely provided and owned by the electrical utility. The rating of the transformer was not available. It was observed that the transformer was not sitting correctly on its pad. Operations staff noted that it was likely hit by a snow plow but no damage was noted.

The utility meter is located at the back of the Control Building. The meter no. is 3127793. Refer to attached Photo No. 2.

The WWTFs electrical power consumption was not available on the day of the visit as the main electrical system is not equipped with power monitoring devices. The WWTFs maximum KW demand could be obtained from the electrical utility and it may be available on the monthly electrical utility bills. This information was requested from the plant staff at time of the site visit.

The WWTFs main electrical distribution is located at the lower level of the Control Building. The Main Motor Control Center (MCC) was manufactured by Cutler Hammer and is rated at 208 VAC, 600 amps, 25 KA short circuit symmetrical and is dated 3/1985. The MCC main circuit breaker is rated at 400 amps, 208 VAC, 3 phase, and 42 KA. The space inside the Electrical Room is very limited and access to the room may not be compliant with the current electrical codes. Refer to attached Photo No. 3.

The WWTF has a diesel standby generator and Automatic Transfer Switch (ATS). The ATS is rated at 208 VAC, 400 amps, 3 phase, and was manufactured by ASCO.

The Control Building Electrical Room is the only dedicated electrical space at the WWTF.

The majority of the electrical distribution equipment appears to be the original WWTF equipment provided during the mid-1980s construction.

Facility Standby Power

There is one standby diesel generator at the WWTF. The standby generator is diesel powered manufactured by Kohler model no. 100REOZJE rated for 100 KW, 125 KVA, 120/208 VAC, and 347 amps with a manufacture date of 08/2011. The generator is located outdoor in a non-walk-in enclosure next to the WWTF main entrance gate. The generator is provided with a 300 amp main breaker. Refer to attached Photo No. 4.

The facility is provided with a Convault, 500 gallon concrete diesel storage tank located next to the generator. Refer to attached Photo No. 5.

Electrical Systems

Support Electrical Systems. The following electrical systems were not observed at the WWTF:

- Fire Alarm
- Security
- Paging System
- Lightning Protection
- Gas Detection

Lighting. Fluorescent lights are provided at the Control Building. At time of visit the Electrical Room lights were not operational. No exit or no emergency lights were observed at the facility. Site lighting is provided with high pressure sodium type fixtures mounted on poles. The method of control of site lighting was not verified during the visit.

Client Meeting Notes

During the site visit, the AECOM team met with the Town and United Water Operations staff. The following are directions provided by the client meeting related to the WWTFs electrical systems:

- Provide a new electrical distribution system.
- Reuse existing phone line.
- Provide a new SCADA system.
- Provide a new motor operated entrance gate.
- Provide a lightning protection system.
- Provide LED based facility lighting system.
- Security and CCTV systems are not required.

Recommendations

As part of a WWTF upgrade consideration should be given to the following:

- Removing and replacing the facility electrical distribution system in its entirety.
    - The WWTF main electrical distribution equipment was provided in the mid 1980s, is obsolete, and is past its service life.
    - Newly produced spare parts are no longer readily available and there is limited manufacturer support for maintenance and repair.
    - The WWTF facility main MDP is rated for 400 amps, 208 VAC and it may not have the capacity to support a facility upgrade.
- Replacing the existing utility transformer with new transformer with rated KVA matching any future facility upgrade.

- Replacing the WWTF lighting systems with energy efficient type lighting (LED).
- Providing the WWTF with the following new systems:
    a. Fire alarm system.
    b. Emergency and exit lights.
    c. Lightning protection system.
    d. Security system.
    e. Power monitoring system.
- Performing electrical short circuit and coordination studies and providing all new electrical equipment with arc flash labels in accordance with the requirement of the NEC, NFPA-70E and IEEE 1584.

SOUTH STREET WWTF

Electrical Distribution System

The South Street WWTF electrical distribution system includes overhead 13.8 KV utility service installed at the facility along number of poles to an oil filled pad mounted transformer stepping the service voltage down to 480 VAC. Refer to attached Photo No. 6.

The pad mounted transformer had no external nameplate and internal access was not available but it appears that the transformer was installed when the plant was upgraded in the 1990s. According to the 1989 drawings, the transformer was provided and is owned by the electrical utility. The transformer is rated at 500 KVA and 13.8 KV-480/277 VAC. Refer to attached Photo No. 7.

The WWTF's electrical power consumption was not available on the day of the visit as the main electrical system is not equipped with power monitoring devices. The WWTF's maximum KW demand could be obtained from the electrical utility and it may be available on the monthly electrical utility bills. This information was requested from the plant staff at time of the site visit.

The WWTF's main electrical distribution is located in the Operations Building. The Main Switchboard (MDP) was manufactured by Cutler Hammer Model MP-200 Type KA410T and is rated at 480 VAC/277 VAC, 800 amps, 35 KA short circuit symmetrical. The MDP main breaker is set at 700 amps trip. The MDP is located in an Electrical Room on the second floor internal to the Operations Building and is provided with one egress door to a hallway. The space inside the electrical room is very limited and access to the room may not be compliant with the current electrical codes. Refer to attached Photo No. 8.

There are multiple Motor Control Centers (MCCs) in the Operations Building Electrical Room. All MCCs are Unitrol type as manufactured by Cutler Hammer. MCC-A is rated at 800 amps and is fed by a 300 amp circuit breaker in the MDP. MCC-B is rated at 800 amps and is fed by a 250 amp circuit breaker in the MDP. The MDP also feeds power to the old Control Building through a 250 amps circuit breaker. The MDP also has a 200 amp spare breaker and a 50 amp breaker feeding the air compressor. MCC-B has a split bus feeding into a 260 amp automatic transfer switch (ATS) feeding electrical loads on Emergency MCC (EMCC) backed up by a 50 KW standby generator.

The automatic transfer switch (ATS) is 480 VAC, 260 amps, and 3 phase manufactured by Zenith. Refer to attached Photo No. 9.

The Electrical Room in the Operations Building is the only dedicated electrical space in the building.

The majority of the electrical distribution equipment appears to be the equipment provided when the WWTF was upgraded in the early 1990s.

Facility Standby Power

There are two standby diesel generators on site as follows;

- The Operations Building standby generator diesel was manufactured by Cummins model no. DGHE-5672703. The generator is located outdoor in a non-walk-in enclosure next to the utility transformer and is rated for 50 KW, 62.5 KVA, and 75.2 amps. The generator feeds a limited number of loads including two lighting panels, the effluent sampling pump, Final Settling Tank No. 1 Drive, Final Settling Tank No. 2 Drive, Wet Well Drain Pump 1 and Wet Well Drain Pump no. 2. Refer to attached Photo No. 7.
- A standby diesel generator is located outdoor next to the old Control Building and is rated for 75 KW, 93.75 KVA, 112.5 amps, and 480 VAC. The generator was manufactured by Superior Model 75R61. The generator provides standby backup power to the Headworks Building EMCC and to the Sump Pumps Control Panel. Refer to attached Photo No. 10.

Headworks Building

The Headworks Building includes a process area with the electrical equipment installation rated for Class 1 Division 1 Hazardous Area and one electrical room. The Headworks building MCC is a Cutler Hammer Unitrol type and is rated for 800 amps, 42 KA, and is fed by 70 amps feed from the EMCC in the old Control Building. Refer to Photos No. 11 and No. 12.

Old Control Building

The old Control Building is mostly abandoned from a process perspective. It houses a Unitrol type MCC manufactured by Cutler Hammer rated at 600 amps and is fed by a 250 amp breaker from the Operations Building. This MCC is located in the first floor of the building and is mostly abandoned. Refer to attached Photo No. 13. The basement level of the building has mechanical equipment abandoned in place. The building also has a room that includes a 275 gallon diesel tank.

Operations Building

The Operations Building houses the main Electrical Room, Control Room, Laboratory, and multiple process areas. Refer to electrical distribution section of this report for electrical equipment in Operations Building.

Electrical Systems

Support Electrical Systems. The following electrical systems were either not observed at the WWTF or appear to be non-functional:

- Security. There was no security system observed at the WWTF.
- Paging System. There were scattered paging system devices throughout at the different areas of the WWTF. However, the existing system is not operational.
- Lightning Protection. There was no lightning protection system observed at the WWTF.
- Gas Detection. It appeared that there are no operational gas detection devices in the process area of the Headworks Building.

Fire Alarm. The following is a summary of the fire alarm systems observed at the WWTF:

- Operations Building: There is a fire alarm main panel in the Operations Building main electrical room. It was not clear how the fire alarm system communicates with other buildings on site and with the local fire department. Other parts of the Operations Building (ex. process areas) are not provided with fire alarm detection systems. The existing system may not provide code

compliant coverage of the entire building space. Examination of the code should be considered with any future upgrades.
- Headworks Building: Fire alarm detection devices were not observed in the process room. Fire alarm devices are located in the electrical room.
- Old Control Building: An operational fire alarm system was not observed in this building.

Lighting. Fluorescent lights and exit signs were observed at WWTF buildings with some exceptions as follows:

- Operations Building: No emergency lights were observed.
- Headworks Building: No emergency lights and no exit signs devices were observed in the process room.
- Old Control Building: No emergency lights and no exit signs devices were observed in the process room.

Client Meeting Notes

During the site visit, the AECOM team met with the Town and United Water operations staff. The following are directions provided by the client meeting related to the WWTF's electrical systems:

- Check fire alarm and sprinkler system code requirements.
- Provide new electrical distribution system.
- Consider providing a phone system as one does not currently exist.
- Provide new a paging system.
- Provide new a SCADA system.
- Provide new a fire alarm system.
- Provide a new motor operated gate.
- Look into solar panel system on roofs of buildings.
- Provide a lightning protection system.
- Provide a LED based facility lighting system.
- Security and CCTV systems are not required.

Recommendations

As part of a WWTF upgrade consideration should be given to the following:

- Although the facility electrical distribution system appears to in relatively operational condition relative to its age, consideration should be given to removing and replacing the WWTF electrical distribution system in its entirety.
    - The WWTF main electrical distribution equipment was provided in the early 1990s, currently obsolete and past its service life.
    - Newly produced spare parts are no longer readily available and there is limited manufacturer support for maintenance and repair.
    - The WWTF facility main MDP is rated for 800 amps and it may not have the capacity to support a facility upgrade.
- The WWTF main electrical system is located on the second floor of the Operations Building and is not readily accessible which could be an issue to access during building fire condition. Consideration should be given to providing a new electrical system in new electrical room located at grade with outside door access. With a new system the electrical equipment should be located in dedicated, air conditioned, environmentally controlled, electrical room(s) away from process equipment.
- The WWTF has limited standby power backup capacity and cannot support the WWTF's critical process loads including aeration and disinfection. Consideration should be given to providing the WWTF with new standby generator(s) in outdoor, weatherproof, sound attenuated enclosure(s).

- Replacing the existing utility transformer with new transformer with rated KVA matching the facility upgrade.
- Replacing the lighting systems with energy efficient type lighting (LED) and providing lighting occupancy sensors in finished building spaces.
- Replacing the WWTF's existing fire alarm system including providing fire alarm system for all buildings networked to a main panel located in readily accessible location at the WWTF.
- Provide the following new and replacement systems
    - Emergency and exit lights.
    - Lightning protection system.
    - Paging and security systems.
    - Power monitoring system.
    - Perform an electrical short circuit and coordination studies and providing all new electrical equipment with arc flash labels in accordance with the requirement of the NEC, NFPA-70E and IEEE 1584.

Photo 1: Route 7 WWTF Electrical Utility Transformer

Photo 2: Route 7 WWTF Utility Meter

Photo 3: Route 7 WWTF Main MCC

Photo 4: Route 7 WWTF Facility Standby Generator

Photo 5: Route 7 WWTF Diesel Storage Tank

Photo 6: South Street WWT Electrical Utility Service

Photo 7: South Street WWTF Main Utility Transformer and Standby Generator Located next to Operations Building

Photo 8: South Street WWTF Main MDP Located in Operation Building Electrical Room

Photo 9: South Street WWTF ATS Located in Operations Building

Photo 10: South Street WWTF Standby Generator next to Old Control Building

Photo 11: South Street WWTF Headworks Process Area

Photo 12: South Street WWTF Headworks Electrical Room

Photo 13: South Street WWTF Old Control Building MCC