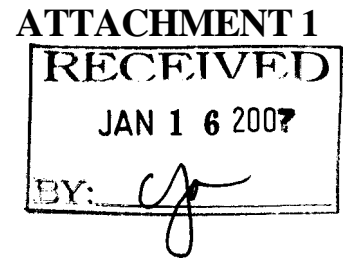




③

ORANGE WATER & SEWER AUTHORITY

Quality Service Since 1977



January 16, 2007

Mr. Roger Stancil, Town Manager
Town of Chapel Hill
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514-5705

SUBJECT: ODOR ELIMINATION FOR THE MASON FARM WASTEWATER TREATMENT PLANT (WWTP)

Dear Mr. Stancil:

As requested in the Council meeting on December 4, 2006, OWASA will return to the Town Council on January 22, 2007, to advise the Council on the status of OWASA's compliance with the March 1, 2004 Special Use Permit Modification Stipulations related to odor elimination. Mac Clarke, OWASA Board Chair, will make a presentation to the Council covering the following key points:

1. OWASA remains committed to taking the necessary engineering, capital improvement and operating measures necessary to achieve the odor elimination goal.
2. Since 2000, OWASA has completed \$4 million of capital improvements at the WWTP to eliminate odor (Attachment #1).
3. Additional odor elimination improvements which have been approved and funded by the OWASA Board and are currently under construction or planned for the WWTP will have an estimated cost of \$2.9 million. These improvements are expected to provide substantial odor elimination improvements based on information available to date from the current WWTP odor study. The \$2.9 million of improvements includes:
 - ✓ The new covered headworks facility, which is expected to be completed by July 31, 2007; and
 - ✓ Covering of other odor sources (splitter boxes for primary clarifiers, internal pump station wet wells, and influent channel for aeration basins), which are expected to be completed by December 31, 2007.
4. OWASA will also complete odor modeling work by April 30, 2007 to help determine whether additional capital improvements, such as covering aeration basins and/or primary clarifiers, are justified to meet the odor elimination goal.

5. OWASA will continue to work expeditiously to achieve full compliance with the odor elimination goal and to honor our commitments to our neighbors and the Town Council.

At their January 11, 2007 meeting, the OWASA Board had a productive discussion with representatives of our WWTP neighbors (Gary Richman, Barnes Bierck and Jim Ward) regarding a definition for odor elimination. After the January 11th meeting, OWASA staff worked further with Mr. Richman and Mr. Ward to develop an acceptable definition for odor elimination. As a result of these discussions, we have developed a proposed definition for odor elimination (Attachment #2) which we believe our WWTP neighbors would agree to be within the general framework agreed upon on January 11".

In accord with Mr. Ward's comments, I am providing a copy of the "Best-In-Class" wastewater plant survey information (Attachment #3) from our odor consultant. The Council may also find it useful to have the information which we provided for the December 4, 2006 Public Forum in their agenda package for their January 22, 2007 meeting.

We appreciate the opportunity to provide additional information to the Council and community regarding our odor elimination work.

Very truly yours,



Ed Kerwin
Executive Director

c: OWASA Board of Directors (w/attachments)

Attachments:

1. Odor Elimination Program Costs at Mason Farm WWTP
2. Definition of Odor Elimination - Mason Farm WWTP
3. Mason Farm WWTP Odor Study - Plant Survey Summary

Odor Elimination Program Costs at the Mason Farm Wastewater Treatment Plant

IMPROVEMENTS COMPLETED AT THE WWTP AS OF SEPTEMBER, 2006	YEAR COMPLETED	APPROXIMATE COST
Construction of a biofilter to treat foul air from the solids handling facility	2000	\$350,00
Abandonment of "trickling filter" (open air facility) treatment process.	2002	--
Covering biosolids storage tanks and installing an odor scrubber to treat foul air from them	2004	\$666,000
Hazen & Sawyer odor study	2004	\$78,000
Installation of natural gas pilot light to ensure more reliable burning of gas from digester	2004	\$4,000
Improvements in fermentation and gravity belt thickener operation to reduce the quantity of odorous solids returned to the aeration basins	2005	\$500,000
Establishment of an in-house odor monitoring program	2005	\$20,000
Replacement of one digester cover	2005	\$578,000
Installation of fixed cover structures on solids digesters	2005	\$1,600,000
Purchase of "OdaLog" odor monitoring equipment and odor sampling at various locations around the WWTP	2006	\$9,000
Replacement of underground digester gas piping with new aboveground pipes	2006	<u>\$214,000</u>
<i>Total costs for completed improvements</i>		<i>\$4,019,000</i>

(51)

IMPROVEMENTS TO BE COMPLETED BY SUMMER, 2007; CURRENT ODOR STUDY	ESTIMATED COMPLETION	ESTIMATED COST
Construction of new, covered "headworks" where wastewater enters the plant (captured foul air to be treated in the odor scrubber)	July 31, 2007	\$2,200,000
Covering "splitter boxes" that carry wastewater to and from "primary clarifiers" (settling tanks for removal of wastewater solids); captured foul air to be treated in carbon filters	December 31, 2007	\$300,000
Improved foam removal at aeration basins (tanks where biological treatment occurs)	July 31, 2007	\$196,000
Tie-in of exhaust air pipe from the new Morgan Creek Pump Station to the odor scrubber	July 31, 2007	\$50,000
Septage receiving station improvements (improved washdown area and odor containment)	July 31, 2007	\$30,000
Treat foul air from the biosolids dewatering equipment to be installed in 2007	October 31, 2007	\$50,000
Black & Veatch odor study (costs to date)	Spring 2007	\$73,000
<i>Total costs for improvements underway and pending</i>		<i>\$2,899,000</i>
<i>Overall costs of completed and committed work</i>		<i>\$6,918,000</i>

Definition of Odor Elimination
Mason Farm Wastewater Treatment Plant (WWTP)

Why We Need Operating Measures and Performance Standards

We are proposing a set of standards and measures for two reasons:

- 1) To give WWTP operators a set of alerts to monitor normal operating parameters, identify out of standard conditions in real time and enable corrective action to eliminate or mitigate off-site odor.
- 2) To determine whether the physical changes made to the plant structures and processes – given increased and projected increases in volume – are adequate to eliminate off-site odor. Or whether additional potential improvements which have been identified (covering the primary clarifiers and/or covering some or all of the aeration basins), but not yet scheduled, should be made. Also, the goal is to expedite the measuring/decision process so that the decisions on additional changes – if needed – can be made as quickly as possible, no later than June 30,2007.

Impact Performance Standard:

The goal of odor elimination is fully embraced by OWASA. Ultimately the measure of success of odor elimination is the absence of odor from the experience of OWASA neighbors. OWASA's goal is zero off-site odor so that the quality of life for those living in close proximity to the WWTP is not adversely impacted.

Like OWASA's goal of zero wastewater spills/overflows, there may be occasions when, despite OWASA's best efforts to prevent or minimize the duration and intensity of any odor releases, there may be occasional odor releases during scheduled (preventive maintenance) and unscheduled (failure of equipment) maintenance events at the WWTP.

Therefore, the Performance Standard proposed by OWASA for verified odor events experienced by WWTP neighbors is three (3) or less per year.

OWASA will undertake operating, engineering, structural and funding measures necessary to minimize the frequency, duration and intensity of odor releases associated with instances of scheduled and unscheduled maintenance events. OWASA will provide WWTP neighbors timely notice in advance of scheduled events and as soon as possible for unscheduled off-site odor events.

Monitoring Standards for Odor Elimination

- 1) The "rotten egg" smell associated with hydrogen sulfide is generally accepted as the primary cause of WWTP odors. Hydrogen sulfide is relatively easy to measure and an industry accepted compound for monitoring odor. OWASA will continuously measure

hydrogen sulfide at or near the WWTP property boundary at a minimum of three locations.

Standard: hydrogen sulfide measured at or near the WWTP property boundary shall be 0.0 parts per million.

- 2) Compounds other than hydrogen sulfide can produce odor at the WWTP, but are more difficult to measure. To determine the overall odor level, an air sample is collected in a bag and sent to a specialized laboratory which performs sensory analysis (nose testing) using a dilution apparatus known as a dynamic olfactometer. The dynamic olfactometer delivers odorous air in a range of dilutions to trained panelists who then determine the Dilution-to-Threshold ratio (D/T). The D/T is a measure of the number of dilutions needed to make the odorous ambient air non-detectable.

Performance Standard: D/T measured at or near the WWTP property boundary shall be 5 or less (this D/T value is tentative subject to additional modeling work that will be completed by April 30,2007).

The aforementioned D/T testing procedure can not be practically used for "real time" odor measurement because air samples have to be collected and sent to a specialized lab for testing, which can take weeks to complete.

A portable olfactometer for field use has been developed; however, the results are less reliable. OWASA will evaluate the potential benefit of using a portable olfactometer to measure odor "real time" in the field. OWASA will complete this evaluation by April 30,2007 and will forward their findings to the WWTP neighbors and the Town Council.

Current Work in Progress

OWASA expects to complete the new covered headworks facility by July 31, 2007. The covering of other odor sources (splitter boxes for primary clarifiers, internal pump station wet wells, and influent channel for aeration basins) is expected to be complete by December 31, 2007. Upon completion of these capital improvements, OWASA may be in compliance with the performance standards for odor elimination. If not, additional capital improvements will be made.

Next Steps

- 1) OWASA will complete additional odor modeling work (using previous data) for the WWTP by April 30, 2007, to help determine whether additional odor improvements (other than those already completed or currently planned) are justified to reasonably ensure that the odor elimination goal is met. If additional odor improvements are needed (such as covering the primary clarifiers and/or covering some or all of the aeration basins), such improvements will require approximately 18-24 months to complete, once the OWASA Board directs staff to proceed.

- 2) If the performance standard for odor elimination is exceeded, OWASA will immediately investigate the cause and take remedial action for each occurrence which may include additional structural improvements at the WWTP.
- 3) OWASA will regularly report to the WWTP neighbors and to the Chapel Hill Town Council regarding compliance with the WWTP odor elimination performance standards.

The performance standards herein may be refined over time as new experience and knowledge is gained. OWASA will continue to keep the WWTP neighbors informed and involved in this odor elimination program

Mason Farm Wastewater Treatment Plant Odor Study
Plant Survey Summary

No.	Facility Name	Location	Complaints/Year	State, Local, or Agency Regulation	Self-imposed Standards or Goals
1	Central San WWTP	CA			
2	Corona WWTP #1/#2	CA	~1-2	<ul style="list-style-type: none"> AQMD (Air Quality Management District) 	<ul style="list-style-type: none"> Measure success by conducting daily tests and meeting permit requirements
3	El Toro Water Recycling Plant	CA	0 (but some complaints in the collection system)	<ul style="list-style-type: none"> Need to measure H₂S for their permit, always have readings of 0 	
4	Elsinore Regional WRF	CA			
5	Encina WPCF	CA			
6	Goleta WWTP	CA	0		<ul style="list-style-type: none"> Measure success by public comment Don't feel like they need a formal odor control program
7	Hale Ave. Resource Recovery Facility	CA			
8	Joint WPCP	CA			
9	Meadowlark WRP	CA	~2	<ul style="list-style-type: none"> No limits or rules imposed by local government 	<ul style="list-style-type: none"> Want to be "good neighbors" No measure of "success", but goal is 0 odor events
10	Moreno Valley WRF	CA			
11	Orange Co. San District - Plant	CA			
12	Oso Creek WRP	CA			
13	Oxnard WWTP	CA	Occasional; can't think of last one	Imposed by State <ul style="list-style-type: none"> APCD (Air Pollution Control District) H₂S must be less than 5 ppm Only violate standard when odor control equipment is down 	<ul style="list-style-type: none"> Odor control response protocol Plant measures its success by making their customers happy
14	San Luis Obispo WRF	CA			
15	Ina Road Plant	AZ	NA	NA	NA
16	Kyrene WRP	AZ	0 (have proven that odor complaints are in collection system, not the plant)	<ul style="list-style-type: none"> Must follow state air pollution regulations for generators and scrubbers 	<ul style="list-style-type: none"> Don't have a written definition of success, but success would probably no more than 2 complaints per year
17	Mesa Northwest WRP	AZ	None (over the past 3 years)	Imposed by County (Maricopa) <ul style="list-style-type: none"> < 0.03 ppm H₂S at the fence line 	<ul style="list-style-type: none"> Zero odor complaints pH and ORP are kept at about 9 and 800 mV for packed tower scrubbers To meet County requirements at all times
18	Scottsdale Water Campus	AZ	≤ 1 (on average)	Imposed by County (Maricopa) <ul style="list-style-type: none"> < 0.03 ppm H₂S at the fence line Monitoring records maintained on site O&M plan on site for odor control system 	<ul style="list-style-type: none"> Zero odor complaints 99% H₂S removal efficiency for the wet scrubber
19	Wildcat Hill WWTP	AZ	None	A.A.C. R18-2-730.H <ul style="list-style-type: none"> The permittee shall not allow H₂S to be emitted from any location in such a manner and amount that the concentration of such 	<ul style="list-style-type: none"> Zero odor complaints Replace activated carbon media when H₂S breakthrough occurs at 75% of the carbon bed

9

Mason Farm Wastewater Treatment Plant Odor Study
Plant Survey Summary

				emissions into the ambient air at any occupied place beyond the premise on which the source is located exceeds 0.03 ppmv for any average period of 30 minutes or more	
20	Clark County WWTP	NV			
21	Las Vegas WPCF	NV	≤ 2	<ul style="list-style-type: none"> No numerical limit for H₂S at the fence line Air Quality Permit/Section 43 <ul style="list-style-type: none"> Facility shall be operated in a manner such that odors will not cause a nuisance On-site, ambient air monitoring is required. Nine years of monitoring data for H₂S and ammonia have been recorded at 0' from the fence line of this facility. In 2002, NDEEM and the City of Las Vegas agreed to discontinue the monitoring due to the low level of pollutant concentrations being detected after controls had been added to the facility. No further monitoring is required by this modification NPDES Permit <ul style="list-style-type: none"> There shall be no objectionable odors from collection system, treatment facility or disposal area, or biosolids treatment, use, storage, or disposal area that the Permittee owns or operates 	<ul style="list-style-type: none"> Zero odor complaints Have a policy in place to do an immediate check of the plant and report back to the person that called; explain if a problem is found and what have been done to correct the problem ORP is set at 2,000 mV and pH at 7.2 for packed tower chemical scrubbers
22	Mandarin WRF	FL	NA	<ul style="list-style-type: none"> No limits but rules imposed by local government Rules: <ul style="list-style-type: none"> 5 complaints within 90 days about a facility will initiate a cease and desist order with potential fines The complaints must be validated by City staff with a "sniff" test. The same person can call 5 times in one day about an incident and an order will be issued 	<ul style="list-style-type: none"> 0 ppm H₂S at the fenceline 98% removal efficiency for H₂S with no secondary treatment 95% H₂S removal efficiency for H₂S with secondary treatment and secondary phase polishing systems
23	St. Pete's Southwest WRF	FL			
24	Southwest WWTP	FL	NA	<ul style="list-style-type: none"> No limits but rules imposed by local government Rules: <ul style="list-style-type: none"> 5 complaints within 90 days about a facility will initiate a cease and desist order with potential fines The complaints must be validated by City staff with a "sniff" test. The same person can call 5 times in one day about an incident and an order will be issued 	<ul style="list-style-type: none"> 0 ppm H₂S at the fenceline 98% removal efficiency for H₂S with no secondary treatment 95% H₂S removal efficiency for H₂S with secondary treatment and secondary phase polishing systems



Mason Farm Wastewater Treatment Plant Odor Study
Plant Survey Summary

25	Arlington East WWTP	FL	NA	<ul style="list-style-type: none"> No limits but rules imposed by local government Rules: <ul style="list-style-type: none"> 5 complaints within 90 days about a facility will initiate a cease and desist order with potential fines The complaints must be validated by City staff with a "sniff" test. The same person can call 5 times in one day about an incident and an order will be issued 	<ul style="list-style-type: none"> 0 ppm H₂S at the fence line 98% removal efficiency for H₂S with no secondary treatment 95% H₂S removal efficiency for H₂S with secondary treatment and secondary phase polishing systems
26	Indian Creek Middle Basin WWTP	KS	4 in year 2005	No	
27	Springfield Southwest WWTP	MO	2 to 3 per year	<ul style="list-style-type: none"> No limits but rules imposed by local government 	Maintain "good neighbors" status
28	Rowlett Creek WWTP	TX	3 to 4 per year	<ul style="list-style-type: none"> 0.3 ppm at the fence line 	Try to keep discharge from scrubbers below 0.1 ppm
29	Wilson Creek WWTP	TX	3 to 4 per year	<ul style="list-style-type: none"> 0.3 ppm at the fence line 	Try to keep discharge from scrubbers below 0.1 ppm
30	Broomfield WWTP	CO		<ul style="list-style-type: none"> Colorado Air Quality Control Regulation 2 limits the D/T at the property to 7 for municipal WWTPs adjacent to residential or commercial property The allowable D/T is 15 if the adjacent land is zoned for non-commercial and non-residential uses 	
31	Reading WWTP	PA	1 to 2 per year	<ul style="list-style-type: none"> State Department of Environmental Protection requires monitoring and reporting of wet scrubber performance Two-stage Primary Scrubber System – 99% H₂S removal for inlet H₂S >20 ppm Max outlet H₂S 0.2 ppm for inlet H₂S <20 ppm Single-stage Solids Scrubber System – 90% H₂S removal for inlet H₂S >10 ppm Max outlet H₂S 1 ppm for inlet H₂S <10 ppm 	Measure success by conducting daily tests and meeting permit requirements
32	Santa Cruz WPCF ¹	CA	< 5	No	No
33	Conway WWTP ²	SC	2	No	No
34	Myrtle Beach WWTP ³	SC	Couple	No	<ul style="list-style-type: none"> Respond to all complaints by investigating the surrounding area and equipment to possibly identify the source and make any corrections or changes to minimize odor Try to maintain the pH @ 10 or more for the wet scrubbers Goal is to maintain ≤ 1.0 ppm dissolved sulfides in incoming wastewater with Biocide addition at major pump stations

Abbreviations:

A.A.C = Arizona Administrative Code
DAQEM = Department of Air Quality and Environment Management

Footnotes:

¹ A 17 MGD plant with a buffer distance of 200 ft. Neighborhood consists of parks and residential area. The secondary treatment process includes trickling filters with solids

Mason Farm Wastewater Treatment Plant Odor Study
Plant Survey Summary

NA = Not Available
WRF = Water Reclamation Facility
WRP = Water Reclamation Plant
WPCP = Water Pollution Control Plant
WWTP = Wastewater Treatment Plant

contact. Anaerobic digesters and centrifuges are used for solids processing. The plant currently covered all processes except for secondary clarifiers. The plant completed an odor control project about two years back and is currently using vapex hydroxyl fog odor control system and ORT with bleach followed by carbon filters.

² A 4 MGD plant with a buffer distance of 800 ft. Residential neighborhood. The plant currently does not have any odor control nor covered processes. Planning to cover headworks in the future.

³ A 17 MGD plant with a buffer distance of 200 to 500 ft. Neighborhood includes residential, commercial, and some undeveloped area. It is an activated sludge plant with extended aeration, rotating biological contactors, and aerated lagoon. Solids handling processes consist of aerobic holding tanks, dissolved air floatation, belt filter presses, and composting facilities (to compost belt press cake). The plant currently covers headworks, grit tanks, and splitter boxes. Wet scrubbers are used for the covered areas and a masking agent is used for the uncovered areas. Peroxide is injected into the incoming waste stream at a couple of major pump stations to minimize amount of H₂S released.

DRAFT

19

Table 5 – Plant Survey Summary

Number	Facility Name	Capacity mgd	Location	Receptor Data			Covered Processes					Odor Control					
				Buffer	Neighborhood	Complaints	H	P	A	F	S	H	P	A	F	S	
1	Central San WWTP	45	CA	M	I, H	Few	●		●			●	WS		NT		NT
2	Corona WWTP #1/#2	10	CA	W	I	0	●	●				●	BF	BF			WS
3	El Toro Water Recycling Plant	6	CA	M	P, H	Few	●	●					BF	BF			
4	Elsinore Regional WRF ¹	8	CA	M	I, R	0	●						WS				
5	Encina Water Pollution Control Facility	36	CA	N	R, H	2	●	●	●			●	BT, AC	BT, AC	WS		WS, AC
6	Goleta WWTP ²	6	CA	W	U	0	●						AC				
7	Hale Ave. Resource Recovery Facility	18	CA	N	R	0	●	●					WS	WS			
8	Joint Water Pollution Control Plant	350	CA	N	R, H, I	Few	●	●	● ³			●	WS, AC	WS, AC			AC, BF
9	Meadowlark Water Reclamation Plant	2	CA	N	R, I	Few	●				●		WS			WS	
10	Moreno Valley WRF	16	CA	W	U, I, A	0	●					●	WS				WS
11	Orange Co. San District - Plant ²	153	CA	N	R	0	●	●					WS	WS			
12	Oso Creek WRP	2	CA	N	R	0	●				na		WS				
13	Oxnard Wastewater Treatment Plant	32	CA	N	R, I, A	0	●					●	WS				WS
14	San Luis Obispo WRF	5	CA	N	R, I	Few											
15	Ina Road Plant	40	AZ	N	I, R, H	0	●	●				●	WS, AC	WS			AC
16	Kyrene Water Reclamation Plant	5	AZ	N	I	0	●						BF				
17	Mesa Northwest WRP	30	AZ	N	R	0	●	●	●			●	WS	WS	AC	AC	WS
18	Scottsdale Water Campus	12	AZ	N	R	0	●	●	●	●		●	WS	WS	AC	AC	
19	Wildcat Hill WWTP ²	8	AZ	W	I, U	Few	●	●					P ⁴	⁵			
20	Clark County WWTP	88	NV	N	R	0	●	●				●	BF	BF			WS
21	Las Vegas WPCF ²	71	NV	N	P	0	●					●	BF				WS
22	Mandarin Water Reclamation Facility	19	FL	N	R, H	24	●	na				●	BF				BF
23	St. Pete's Southwest WRF	14	FL	N	R, H, P	Few	●						WS, BF				
24	Southwest WWTP	10	FL	W	U, R	0	●						BF				
25	Arlington East WWTP	13	FL	M	R, I	Few	●	●				●	BT	BT			WS
26	Indian Creek Middle Basin	20	KS	N	R	Few	●	●	●			●	WS	WS	WS ⁶		WS
27	Springfield Southwest WWTP	10	MO	M	R, H	Few	●	●				●	WS	BT			BF
28	Rowlett Creek WWTP	15	TX	M	R, P	Few	●	●				●	WS	ASD			WS
29	Wilson Creek WWTP	34	TX	M	R	Few	●	●				●	ASD	ASD			WS
30	Broomfield WWTP	10	CO	M	R	Few	●	●				●	BF	BF			BF
31	Reading WWTP	27	PA	M	R	Few	●	●				●	WS	WS			WS

13

Footnotes:

- ¹ Ozidation Ditch
- ² Trickling Filter
- ³ Pure Oxygen Process
- ⁴ Airflow Vented to Primary Clarifier
- ⁵ Primary Vented to Atmosphere
- ⁶ Wet Scrubber provides no treatment

Buffer:

- N No Buffer
- M Moderate (<2,000 ft)
- W Wide (>2,000)

Complaints:

Annual basis

Neighborhood:

- A Agricultural
- H Highway
- I Industrial
- P Park/Golf Course
- R Residential
- U Undeveloped

Covered Processes:

- H Headworks
- P Primary Clarifiers
- A Aeration Basin
- F Final Clarifiers
- S Solids Processing

Odor Control:

- WS Wet Scrubber
- BF Biofilter
- AC Activated Carbon
- BT Biotrickling Filter
- ASD Activated Sludge Diffusion
- NT No Treatment