

MEMBERS OF THE WPCA THAT ARE UNABLE TO ATTEND THIS MEETING, PLEASE CALL
ETHER DIAZ, (860) 644-2511, EXT. 2243, ON OR BEFORE 4:30 P.M. ON THE DAY OF THE
MEETING

**WATER POLLUTION CONTROL AUTHORITY
TOWN OF SOUTH WINDSOR**

**REGULAR MEETING
SOUTH WINDSOR TOWN HALL
COUNCIL CHAMBERS**

AGENDA

**TUESDAY, JUNE 7, 2022
7:00 P.M.**

REGULAR MEETING

A. Roll Call

B. Acceptance of Minutes of Previous Meetings

1. May 3, 2022 Public Hearing & Regular Meeting

C. New Business

1. 46 Schwier Road - Powder Hollow Brewery (Approval to Discharge)
2. Revisions to Section 16 of the WPCA Rules and Regulations (Decision)
3. Fiscal Year 2022/2023 Budget, Sewer User Fees and Qualified Income Discount Program (Decision)

D. Communications and Reports

1. Wastewater Treatment Plant Odor Control Study Presentation and Discussion (Tighe & Bond to Present)
2. Superintendent Report
3. DEEP Clean Water Fund Resolution Process

E. Public Participation (Items not on the agenda)

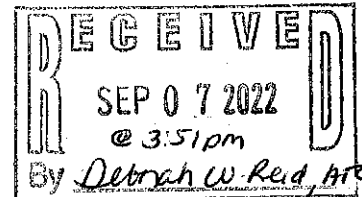
F. Bills, Change Orders, Disbursements

G. Unfinished Business

H. Executive Session

I. Adjournment

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Vice-Chairman Joseph Botti, called the Regular Meeting to order at 7:00 p.m. The following actions were taken during the June 7, 2022 Regular Meeting.

A. Roll Call

Members Present: Joseph Botti, Carol Fletterick, Toby Lewis, Michael Lyon, James Murray, and Bala Ramasamy

Members Absent: Stephen Wagner

Alternates Present: David Basile

Alternates Absent: Vicki Paliulis

Staff Present: Ether Diaz, Recording Secretary
Tony Manfre, Superintendent of Pollution Control

Others Present: Michael McManus, Founder and CEO of Powder Hollow Brewery
Zhijiaz (Jason) Tang, Principal Engineer, Tighe & Bond
Floyd Baranello resident of 763 Main Street
Jean Howat resident of 763 Main Street
Judith Straayer resident of 567 Main Street
Janet Wade Utay resident of 482 Main Street
Christopher Wilkos resident of 756 Main Street
James Dina resident of 789 Main Street
Arthur Utay resident of 482 Main Street
Douglas Gugino resident of 55 Chapel Road
Tom Delnicki resident of 130 Felt Road

B. Acceptance of Minutes of Previous Meetings

1. May 3, 2022, Public Hearing and Regular Meeting

Motion to accept the minutes of the May 3, 2022 Public Hearing and Regular Meeting as presented.

Motion was made by Mr. Michael Lyon and seconded by Ms. Carol Fletterick. Mr. Toby Lewis abstained. The motion carried unanimously.

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C. New Business

1. 46 Schwier Road, Powder Hollow Brewery (Approval to Discharge)

Mr. Michael McManus, Founder and CEO of Powder Hollow Brewery was in attendance requesting approval to change the nature of the waste water discharge and approval to install a private deduction meter which may be used to measure the amount of water that is not discharged to the sewer. Included with the Agenda packet was a Narrative Report for this project (see Exhibit A).

Mr. Tony Manfre explained that the building is currently connected to the town's sanitary sewer system. This application is for a change in wastewater characteristics and to install a deduction meter. They are proposing a pretreatment system to meet discharge requirements. The applicant will need to submit MIU Notification if flow is above 1,000 gpd. Previously this location was used as a workshop, forklift maintenance/storage, and one office.

Motion to approve the discharge of brewery wastewater from 46 Schweir Road under the following conditions:

- a. Discharged wastewater meets the WPCA's regulated limits. If limits cannot be attained a more effective pretreatment system shall be required;
- b. A Capacity Charge shall be due if the size of domestic water meter is increased;
- c. Applicant shall comply with all Miscellaneous Industrial User permit and notification requirements; and
- d. The applicant may have a licensed plumber install a deduction meter to meter water that does not enter the sewer. The meter installation shall be to the satisfaction of the Superintendent of Pollution Control.

Motion was made by Mr. Toby Lewis and seconded by Mr. Michael Lyon.
The motion carried unanimously.

2. Revisions to Section 16 of the WPCA Rules and Regulations (Decision)

Mr. Tony Manfre explained that a Public Hearing was held May 3, 2022 to present proposed revisions made to Section 16 of the WPCA Rules and Regulations so as to modify the existing language for the billing of rental apartment developments (see Exhibit B).

Motion to adopt the revisions to Section 16 "Sewer Use Charges and the Collection Thereof" into the South Windsor WPCA Rules and Regulations.

Motion was made by Mr. Michael Lyon and seconded by Toby Lewis.
The motion carried unanimously.

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3. Fiscal Year 2022/2023 Budget, Sewer User Fees and Qualified Income Discount Program (Decision)

Mr. Tony Manfre explained that a Public Hearing was held on May 3, 2022 to present the proposed FY 2022/2023 Budget, Sewer User Fees and Qualified Income Discount Program (see Exhibit C and Exhibit D). There was no comments from the public.

Motion to adopt the fiscal year 2022/2023 Operating Budget, Sewer User Fees, and Qualified Income Discount Program as presented.

Motion was made by Mr. Toby Lewis and seconded by Ms. Carol Fletterick.
The motion carried unanimously.

D. Communications and Reports

1. Wastewater Treatment Plant Odor Control Study Presentation and Discussion (Tighe & Bond to Present)

Mr. Manfre explained that the Town's Engineering Consultant, Tighe & Bond, did the Odor Control Study of the South Windsor Water Pollution Control Facility (WPCF). Included with the Agenda was a copy of the Odor Control Study report (see Exhibit E). This study was done in response to odor complaints received from the neighborhood. The report is also available on the town's website at www.southwindsor-ct.gov.

Mr. Zhijiaz (Jason) Tang, Wastewater Engineer from Tighe & Bond presented a Powerpoint presentation (see Exhibit F). Mr. Tang also stated that he is a resident of the Town of South Windsor. Mr. Tang explained that the study was done last year and the report was finalized earlier this year. The Scope of the Work was to identify potential odor sources at the WPCF and surrounding area, to evaluate the performance of the existing Odor Control System at the facility and to develop recommendations for odor control.

This study included two sets of Data Collection. The first one is the Odor Emission Samples at the WPCF. This collection was done by a handheld meter which can measure the Hydrogen Sulfide (H₂S) and the odorous air flow. The reason why the H₂S was measured is because it is the number one pollutant in wastewater odor. Typically that comes from the decomposition of organic matter, said Mr. Tang.

The other data collection was to do odor surveys in the surrounding area around the WPCF; approximately a 1 mile radius from the facility. The inspection was done by driving and walking around the area to identify any potential odor sources and to obtain odor characteristics such as odor smell like sewage, smell like H₂S, odor like "swampy", or burned rubber smell from a tire. The odor intensity is measured by an odor intensity scale. Also, odor samples were collected to determine the concentration

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of odorants that can be smelled. The odor detection threshold is the lowest concentration of odorants that can be smelled by a typical person, said Mr. Tang.

An odor emissions test sampling at the WPCF was done on June 29, 2021. The samples were taken from the sludge holding tank air collection. The sampling port location number 5 "Sludge Holding Tank" identified that the H₂S Concentration was high; the measured concentration exceeded 100 parts per million (ppm); the upper limit of the meter. The 100 ppm was used to calculate the odor load.

The sampling port location number 10 "Odor Control Duct" is the place where all odor air flows are combined and before entering the existing biofilter. The measured concentration was 25.1 ppm which is kind of high too, said Mr. Tang. He also mentioned that these samplings were done on a humid, sunny day; the temperature was 93 degrees.

A month later, on July 28, 2021, a second odor emissions test sampling was done at the WPCF. This day was partly cloudy; the temperature was 68 degrees and there was a significant rainfall before the date. The sampling port location number 5 "Sludge Holding Tank" still had the highest concentration for H₂S but much lower (20 ppm). Also, the sampling port location number 10 "Odor Control Duct", the measure concentration was 2.3 ppm this time.

A total of six surveys were performed. However, Mr. Tang only presented four of them because they identified that there's potential odor issues that might be coming from the WPCF. The other two did not present any samples related to the WPCF. The intensity 0.5-1 was identified for most of them. This means that the odor is very faint and this odor could be detected by an experienced inspector or someone who's sensitive could smell that. An intensity odor of 1-2 is weak and the average person might detect it if his/her attentions are called to it, but that would not otherwise attract his attention.

The conclusions drawn from this study is that the existing biofilter is not performing well. Also, there's variable odor loads at the WPCF ranging from 25 ppm H₂S to 2 ppm H₂S at the biofilter. That's a significant concentration, said Mr. Tang. Based on the odor survey that was performed in the surrounding area it was determined that the off-site "sewage" characteristics odors detected around Main Street and Vibert Road by the WPCA entrance. Other off-site odors detected with "manure", "swampy", "sour", and "earthy" characteristics.

The first recommendation will be to rehabilitate the existing biofilter media. Consider inorganic media with longer life cycle and greater treatment capacity such as Biosorbens by Biorem. Replacing the biofilter media is relatively low cost compared to new odor control treatment technologies. The estimated cost for this project is \$460,000.

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The second recommendation will be to replace the existing biofilters with activated carbon filters if not interested in rehabilitating the existing biofilter. Carbon filters are very reliable and can provide more consistent odor removal by adsorption. However, this will require to be replaced every 5 years. The estimated cost for this project is roughly \$1,200,000. Mr. Tang explained that the estimated cost for the biofilter was done last year; however, this cost is expected to be higher due to inflation.

The third option will be to consider satellite odor treatment system that could be provided at strongest odor sources such as Sludge Holding Tanks. The estimated cost for this project is \$380,000.

The last recommendation will be to cover and collect odors from the primary clarifier influent and effluent channels. Currently the influent and effluent channels are uncovered and they exhibit moderate levels of odor, H₂S and D/T values.

Comments were received from the following residents of the Town of South Windsor.

Floyd Baranello of 763 Main Street, South Windsor, CT approached the Authority and explained that the surveys were done within a one mile radius of the WPCF. In looking at the data, Mr. Baranello explained that he counted 22 sites that were sampled. There are seven people that live within 1,000 feet from the WPCF. He lives 524 feet from the sewer Sludge Holding Tank. However, not one sample was taken at anywhere near their homes. Mr. Tang responded that the inspector was driving and walking around and wherever he smelled some sense he stopped to take a sample. I understand, responded Mr. Baranello and expressed that the inspector went around to find a "rubber weed treating facility", a "restaurant", "farmers' fields", however, he did not come to any of the homes that have had experienced the odor for years.

In reference to the Results slide for the "Odor Emissions at WPCA – June 20, 2021", Mr. Baranello stated that Mr. Tang pointed out that at the Sampling Port Location Number 10 "Odor Control Duct" the H₂S Concentration is 25.1 ppm whereby the measured concentration exceeded 100 ppm. He asked if it exceeds the ability for their device to measure. Yes, responded Mr. Tang; however, those samples were taken from the Odor Control Duct, therefore, that's not a concentration in the atmosphere. Mr. Baranello asked if the Sludge Holding Tank is opened. No, it's covered, responded Mr. Tang. Mr. Manfre responded that it is a negative pressure tank, so the tanks are covered and that's where the Odor Control Duct draws air from that tank which ends up at the biofilter. The people here can smell it, said Mr. Baranello. He also explained that the sampling sites did not account for the people that smell it. This is a smell greater than what the average person might detect it if his/her attentions are called to it. This is a smell whereby they need to shut down their parties, shut down their barbecues and they get no sleep at night because of the smell. This smell is not faint or negligible, this smell is much higher than what's been indicated, said Mr. Baranello. He also expressed that samples taken within one mile of the WPCF is meaningless. Mr. Tony Manfre responded that there were samples taken outside at the entrance of the facility; at the intersection of Main Street and Vibert Road. Mr.

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Baranello expressed that this is a smell that they need to live with virtually every week. This is not a new problem, this problem has existed for years and years. The last upgrade to the treatment facility was in 2012. They were told that the odor situation would be mitigated shortly, however, 10 years later and they still have the same problem. Mr. Baranello also expressed that he doesn't think that Mr. Tang has indicated how strong the odor really is. He asked the Authority what they are going to do on this matter. The first recommendation is to replenish the existing biofilter material; this was done two years ago and the biofilter material lasted approximately a year and a half. After that was put in the Authority decided to do this study because it wasn't working. In reference to the study report, page 8, Mr. Baranello quoted the following "The main disadvantage of rehabilitating and reusing the existing biofilter is its inability to handle peak odor loads from the WPCF." The solution of replacing it with what it doesn't work seems like a waste of tax payer's money, said Mr. Baranello. He hope that the Authority consider taking one big step forward and decide for the engineered biofilter media. Although this is a high cost, funds are allocated in the budget.

For point of clarification, Mr. Tang explained that the media they are recommending is different from what was used before. Also, most of the samples were taken around the intersection of Vibert Road and Main Street.

Mr. Toby Lewis apologized for not having a chance to read the report beforehand. However, it seems that based on the recommendations being made is a project that can be completed in phases. He asked Mr. Tang based on his experience is that the case. Mr. Tang explained that other water pollution control facilities have replaced the media and the odor was controlled. That's why in this case they recommend organic media biofilters; the warranty is about 10 years but typically last beyond 20 years. If the Town does a phased approach, the first step will be to replace the existing organic media in the filter which consists of degraded wood chips. If they still get complaints then they'll look for the other recommendation.

What are the known effects of odor; are there any health hazards, asked Mr. Toby Lewis. Mr. Tang responded that the high concentration can damage our health but that's only if it is higher than what's been discussed in the report. In this case it is just a bad smell. The odors in the neighborhood are very low. It does not smell good but it won't damage or impact our health.

Jean Howat of 763 Main Street, wife of Mr. Baranello, read from the report that "Ultimately, the WPCF may decide to move away from biofilters for odor control". Also, "The main disadvantage of rehabilitating and reusing the existing biofilter is its inability to handle peak odor loads from the WPCF"; "This will likely continue to be a problem even if the existing biofilter is rehabilitated." She asked Mr. Tank why he didn't say in his presentation that it won't work. Mr. Tang responded that what he has said is that rehabilitating the existing biofilter will mitigate the odor. Ms. Howat stated that it will mitigate the issue except for peak odor loads. Mr. Tang explained

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that he showed that there's peak loads from the sludge holding tank and that's why they are recommending the satellite system.

Mr. Manfre pointed out to the Authority and residents that in the past month they started taking daily readings on the H₂S levels around the WPCF in an effort to obtain a better understanding of the cause and effect of H₂S levels. They also have been trying to reduce the load put into the biofilter. Their focus and attention has been on the sludge storage tanks which was pointed out to be over 100 ppm H₂S. Some adjustments were made such as increasing the trucking frequency to keep the tanks down. They also started a chemical addition which helps oxidize odors or the H₂S to bring that level down. They are trying to manage the mixers differently; they've essentially turned the mixers off and the average H₂S reading the sludge storage tanks have dropped from 112 ppm to 18 ppm. They've seen significant decrease in H₂S in that regards.

Judith Straayer of 567 Main Street said that this is a problem that the Town has been trying to fix for the past forty years and it hasn't changed. Although she doesn't have any odor from the facility at her house, she stopped walking down Main Street because "it is so stinky, it is horrible". She expressed that the Wood Memorial Library and the Nowashe Village are impacted by this smell. People come from all over Connecticut to visit the Wood Memorial Library and the Nowashe Village and constant ask "What is going on with South Windsor; what is that smell". The people who live next door to the facility sometimes have to close the windows, shut down their parties because of the odor. Eighteen residents attended the meeting and agreed with Ms. Straayer that this is a nauseating and horrible odor. This is a problem that needs to be fixed; if we know what the fix is, a million two, a million five is a lot of money, but it's nothing compared to the reputation of our Town, said Ms. Straayer.

Janet Wade Utay of 482 Main Street said that she's been living on Main Street only for twenty-three years and the odor problems has always been there. Ms. Utay expressed concern about the peak load and the odd alternatives mentioned. The Town of South Windsor is growing in population. Was this growth factored into the study, she asked. Mr. Tang responded that growth would not impact the odor. The South Windsor WPCF is able to handle higher flows. Ms. Wade Utay stated that H₂S is an EPA pollutant and is regulated in some industries. What's the allowable H₂S discharge by the EPA in CT, she asked. Mr. Tang responded that H₂S is an OSHA requirement and the normally regulated Perceived Emission Level (PEL) in all walking places is 10 ppm for eight hours PEL. Ms. Wade Utay expressed that for neighbors that live around the facility, the odor has lasted more than 24 hours. So based on the 8 hours PEL, there could be a potential to have health effects. Yes, hydrogen sulfite at the highest concentrations can cause health effects. However, the current concentration of the odor smelled is .01 ppm. Mr. Wade Utay asked what's included in the cost estimates in the future to monitor the odor. Mr. Manfre responded that the Town does want to mitigate any odors that are coming from the treatment facility. They've been monitoring the sampling collection points in the treatment plant from the study to obtain a better understanding of the matter. Ms. Wade Utay

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recommended doing some community monitoring at the corner of Vibert Road and Main Street rather than just at the facility and there may be additional correlations that can help to understand what's causing the problem.

Christopher Wilkos of 756 Main Street expressed that residents of Main Street know the difference between the smell of "manure", "swampy smell" and the smell of sewage because they all live near farmfields. In response to the question does this smell have a health effect, Mr. Wilkos stated that this smell is an annoyance but again is both from the quality of life stand point and from the quality of the town stand point; personal to the residents because as expressed is obnoxious and it effects their life. It drives outdoor gatherings indoor. In the summer time when the windows are opened they have to be closed. He also explained that he and his wife are hosting a baby shower in a couple of weeks whereby they can control the menu, the setting, and who they invite; however, they can't control the weather but they will get a tent. The one thing they are most worried about is that they can't control a bad windy sewage treatment plant day. This has been an existing issue. They have addressed the Town Council on this matter and this goes beyond the local residents within a half mile of the treatment plant. The Wood Memorial Library is a centrally located popular attraction of South Windsor, CT drawing thousands of visitors throughout the year from around the State as well as town residents. The Hartford Marathon is held one day in October and there's between 5,000 to 10,000 runners. And now the Nowashe Village which is a Native American Village that was built behind the wood proximity to the sewer treatment plant. There are busloads of students that come from elementary schools both from in Town and around the State visiting this site. The Nowashe Village have been written about in magazines, featured in articles and TV shows; this will continue to be a very popular destination for people. However, the odor impacts home owners within a certain area of the treatment plant and visitors. But it also looks poorly on the reputation of the Town. Mr. Wilkos expressed that there's been some solution proposed, however, they would like to see this issue go away. He's spoken to people in other towns. For example, Glastonbury plant is next to a field where kids participate in sports constantly and they don't have this issue. There're other plants in different towns where they don't have this issue. All we are asking again is a viable long term solution to the problem, said Mr. Wilkos.

James Dina of 789 Main Street expressed that he lives midway between the Wood Memorial Library and the treatment facility. He's been living on Main Street for the last 48 years; for many years they have had intense odor situations and so many times it was quite defeating. In 2008, residents of Main Street received a letter from Mr. Fred Shaw, Former Superintendent of Pollution Control. This letter was regarding the upgrade to the facility that took three years to complete (2009-2012). They received another dated March 28, 2012 from Mr. Shaw informing the residents that "the Town is now near completion of the upgrade". However, Mr. Dina was puzzled at first by the following language "a major project of this type... that more effort seems to be necessary to complete the final 2% of the project than what was required up to that point". Mr. Dina quoted Mr. Fred Shaw "the new odor control systems one of these processes requiring fine tuning for proper operation. The Town, together with its

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consultant are working diligently to correct this system and bring it back into proper operation". Mr. Dina asked if the Town is still diligently working to solve this problem. Now that the Town knows where the sewage odors are coming from and the best way to correct the problem. He would not support to put another bandage on the problem; he asked the Authority to provide a real solution to the problem.

Arthur Utay of 482 Main Street addressed the Authority. There is a problem and it is imperative and it needs to be fixed, said Mr. Utay. He would expect for the experts on this matter to be in contact and in discussion with other municipalities that already had similar systems and have addressed their problems to obtain an understanding why it works for them and not working in South Windsor. As far as the town's growth, he recommended obtaining an understanding from the experts as to how much capacity is in the system currently. The town's growth and the system capacity needs to be addressed now as part of an overall solution. Also, the cost estimates for the proposed recommendations were done over a year ago. However, the cost of living has increased; everything is going up in cost. Therefore, the \$1.2 million estimate that was done over a year ago will be higher.

Douglas Gugino of 55 Chapel Road made reference to the Capital Improvement Projects included in the budget. He explained that \$200,000 has been allocated for the Odor Control System. The replacement of the biofilter media doesn't seem to be included in the budget, however, the budget has been approved this evening. Mr. Gugino asked if the funds allocated for the upgrade of the Clark Street pump station is due to the increase in flow received at that pump station. Mr. Manfre explained that typically treatment plants and pump stations are designed to last twenty years; therefore, this is an upgrade to the pump station. Mr. Manfre also explained that the plan of the \$200,000 in the budget allocated for the Odor Control System is to purchase synthetic material, do the engineering and then in the following year do the construction of the biofilter. Mr. Gugino asked the Authority if they are taking steps towards the recommendations of the replacement of the media. He also asked if the \$3.5 million is a grant or a loan. Mr. Manfre responded that they are applying for Clean Water loans. This will be a 20 year loan with 2% interest. Mr. Manfre explained that the plan is to follow the recommendations; to rehabilitate the biofilter with the engineered media, take readings, and if the H₂S readings are high then they'll go with the satellite system or start considering a full carbon upgrade.

Mr. Gugino asked if there is a ten year forecast of operating costs and what would that look like. He explained that the recommendations of upgrading the existing biofilter by replacing the filter material would cost \$460,000. If that does not improve the odor situation, switching to a more effective carbon filter would cost \$1.2 million, as the entire system would be replaced. Also, the proposed satellite treatment system to address odor issues at specific sources in the waste plant would cost \$380,000.

Ms. Jean Howat and Mr. Floyd Baranello of 763 Main Street approached the podium again. Their property value has decreased due the odor situation and asked the members of the Authority what they would do if they had to live with the odor

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problem. Vice-Chairman Botti responded that it is helpful to hear it directly from the residents and the plan is to address the matter. Mr. Toby Lewis responded that this is not acceptable in any parts of the Town, and assured them that the Authority is going to come up with a solution. If funding is an issue, it could be brought to a referendum.

Rep. Tom Delnicki, R-South Windsor, recommended looking at how other towns with wastewater treatment facilities are handling the odor situation and obtain an economical suggestion as to how they go about it. And also to find out how the residents reacted to the solutions.

Mr. Manfre, responded that they have toured and are planning to tour nearby facilities, including Glastonbury, Mattabassett, and Vernon, to see their solutions. Currently they are using the carbon filter and wet scrubber systems.

There was no further discussion on this matter.

2. Superintendent Report

Included with the Agenda was a report from Mr. Tony Manfre, Superintendent of Pollution Control (see Exhibit G). Mr. Manfre briefly discussed each item on his report. He also added that the Collector of Revenue reported that twenty eight Demand/Intent to Lien Notices were mailed to delinquent commercial sewer accounts; they must be complied with by June 30, 2022. Liens will be placed on or about July 1, 2022. Alias Tax Warrants will be issued shortly thereafter for accounts that remain delinquent. The Delinquent Balance including the 2022 Grant List for the Commercial accounts is \$87,498 and the residential accounts is \$162,296. The current collection rate for the 2022 Grand List for the commercial accounts is 94.30% and 97.67% for the residential accounts.

3. DEEP Clean Water Fund Resolution Process

Mr. Tony Manfre explained that the Department of Energy and Environmental Protection (DEEP) requested a Resolution from the Town Council for the Clean Water Fund loan of the Pump Stations upgrades. The Director of Finance is working with the Town's Bonding Counsel to draft a resolution for the project. Once the WPCA approves the project and paying the loan with Sewer User Fees through a Resolution that is then approved by the Town Council. The Resolution will authorize the Town Manager to enter into the agreement with DEEP. At this time we are waiting for an updated cost estimate of the upgrades and a completion date. The resolution should be prepared for the September meeting.

E. Public Participation (Items not on the agenda)

None

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F. Bills, Change Orders, Disbursements

None

G. Unfinished Business

None

H. Executive Session

None

I. Adjournment

Motion to adjourn at 8:50 p.m.

The motion was made by Mr. Toby Lewis and seconded by Mr. Michael Lyon.
The motion carried unanimously.

Respectfully Submitted,

Ether Diaz, Recording Secretary

Narrative
46 Schwier Rd, South Windsor CT 06074

PH Production CT LLC

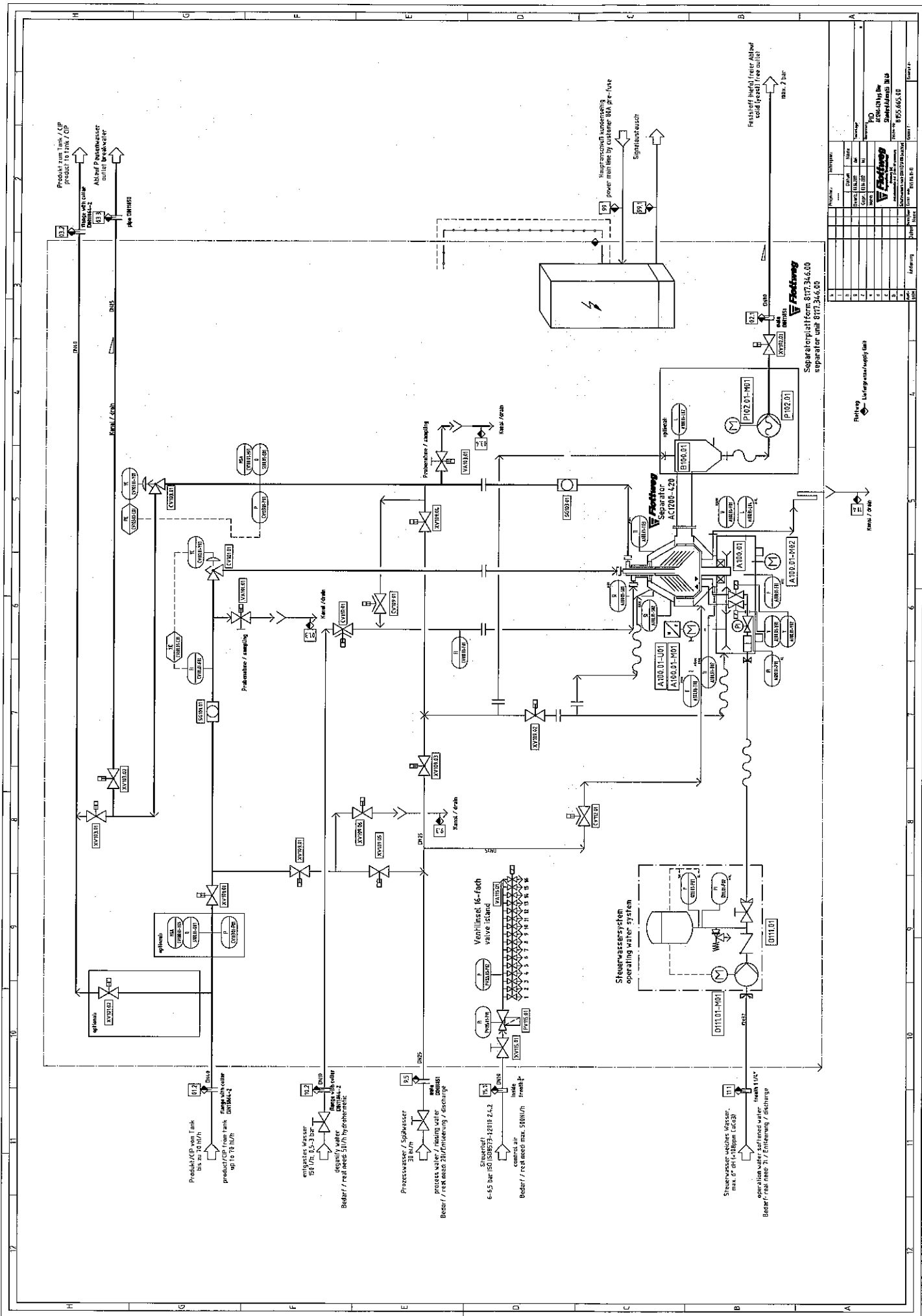
To Whom it may concern,

We are seeking approval to relocate our existing business from our Enfield location to the building located at 46 Schwier Road, South Windsor CT. PH Production CT LLC is the company that makes beer for Powder Hollow Brewery. We have been in business for over 7 years. In this building we would like to create and package beverages we sell at our taprooms and to our local restaurants/retailers.

We appreciate your review of this project. COVID 19 has impacted our business harshly. We are fortunate to be expanding currently, we know our expansion is due from the support of our loyal customer base that has helped us grow since we first started. We are happy to meet and discuss this project further if you are willing to work with us.

Thank you again for your time!

PH Production CT LLC
Powder Hollow Brewery
Founder and CEO
Michael McManus
860-205-0942
Michael.mcmanus@powderhollowbrewery.com



Item	Part No.	Quantity	Unit	Remarks
1	8773.346.00	1	Separator	Separator
2	8773.346.00	1	Separator	Separator
3	8773.346.00	1	Separator	Separator
4	8773.346.00	1	Separator	Separator
5	8773.346.00	1	Separator	Separator
6	8773.346.00	1	Separator	Separator
7	8773.346.00	1	Separator	Separator
8	8773.346.00	1	Separator	Separator
9	8773.346.00	1	Separator	Separator
10	8773.346.00	1	Separator	Separator
11	8773.346.00	1	Separator	Separator
12	8773.346.00	1	Separator	Separator

Item	Part No.	Quantity	Unit	Remarks
1	8773.346.00	1	Separator	Separator
2	8773.346.00	1	Separator	Separator
3	8773.346.00	1	Separator	Separator
4	8773.346.00	1	Separator	Separator
5	8773.346.00	1	Separator	Separator
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9	8773.346.00	1	Separator	Separator
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Item	Part No.	Quantity	Unit	Remarks
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9	8773.346.00	1	Separator	Separator
10	8773.346.00	1	Separator	Separator
11	8773.346.00	1	Separator	Separator
12	8773.346.00	1	Separator	Separator

46 SCHWEIR ROAD
SOUTH WINDSOR, CONNECTICUT

EXISTING BUILDING FLOOR PLAN

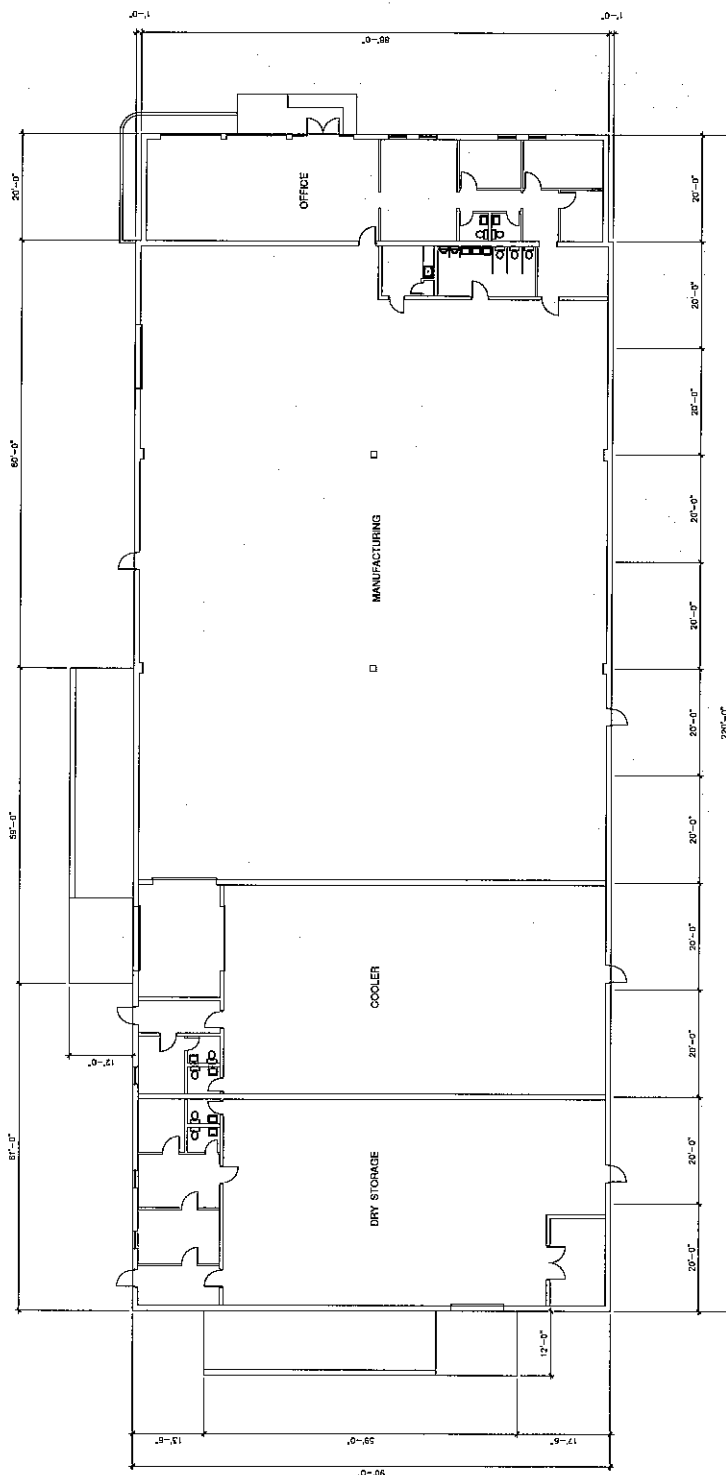
CONSULTANTS:



**PDS ENGINEERING &
CONSTRUCTION, INC.**

167 Old Windsor Road
Boonville, Connecticut 06032
Telephone: (800) 242-0226
FAX (800) 242-0347

DATE	ISSUE
5-5-2022	PROGRESS DRAWING



EXISTING BUILDING FLOOR PLAN
3/32"=1'-0"

SECTION 16

SEWER USE CHARGES AND

THE COLLECTION THEREOF

16.1 Purpose. The purpose of this Regulation is to establish fair and reasonable charges for use of the South Windsor sewerage system and in connection therewith giving consideration to appropriate factors relating to the kind, quality, or extent of use of any property connected to or to be connected to the sewage system. This Regulation is further intended to establish an equitable basis of cost recovery of the industrial share of the local capital and debt service charges.

16.2 An annual sewer use charge shall be imposed on each residential, commercial and industrial building connected into the sewer system and discharging sewerage of any quality, character or quantity into the sewer system. The following methods for calculating rates are hereby prescribed:

- A. Sewer use charges, together with other sources of revenues, shall fund 100 percent of the costs for Pollution Control operation and maintenance (O & M) debt service, capital improvements and operating and replacement reserves, and shall be prorated among the several user categories (residential, commercial, small industrial and major industrial) based upon the quantity of equivalent sanitary wastewater discharged. A user charge shall be computed according to the following general formula:

$$\text{User Charge} = \frac{(C_t - (C_R + R_o)) \times Q_o}{Q_t}$$

Where:

C_t = Total annual cost for operation, debt service, capital projects, contributions to reserves.

C_R = Surcharges for removal of excess Total Suspended Solids (T.S.S.) and Biochemical Oxygen Demand (B.O.D.).

R_o = Other Sources of Revenue

- Septic Dumping Fees
- Permit Fees
- Assessments

- Interest & Lien Fees
- Connection Charges
- Grants/loans
- Transfers from Operating and Replacement Reserves
- Internal Services Transfers
- Investment Interest Earnings

Q_0 = Annual individual user discharge (gallons). Assumed discharge for uniform rate users; measured or minimum discharge for other users.

Q_t = Total annual industrial/commercial and residential discharge (gallons). Sum of Q_0 for all users.

B. Residential User Charges

1. There shall be a uniform rate for each dwelling unit in single and multifamily residential buildings, and residential condominiums based on a uniform assumed discharge. If an accessory apartment is present, the main dwelling and the accessory apartment are charged as separate dwelling units. Group homes are charged as single family dwellings. In-law apartments within a dwelling are not considered separate dwelling units.
2. A resident subject to a sewer user charge and found to be eligible by the Town of South Windsor Human Services Department for property tax relief under the State of Connecticut Qualifying Income for the Elderly and Totally Disabled Tax Relief Program shall have said user charge reduced by a percentage corresponding to the percentages and income levels for married and unmarried owners as described in the aforesaid Qualifying Income for the Elderly and Totally Disabled Tax Relief Program. The difference between the revenue received from sewer user charges paid by all Qualified Users and such revenue as would have otherwise been received had the full residential rate been applied shall be absorbed by all other sewer user classes, which shall be adjusted accordingly.

C. Commercial/Industrial User Charges

1. Discharge into the sewer system is calculated on water usage from January 1 through December 31 billed by the facility's water company-the previous year.

2. The owner may seek approval to install and maintain, at their own expense, a meter measuring sewerage outflow. Said meter shall be installed in a place easily accessible to the Authority or its duly authorized agent for recording purposes. The owner is required to provide to the Town in January of each year a written report of the meter readings for the preceding calendar year; said report must be provided no later than the final business day in January to have the meter's readings used in arriving at the sewer user charge.
3. In the case where the owner is approved to install and maintain, at their own expense, a meter used for the purpose of measuring water not discharged to the sewer system, the owner is required to provide to the Town in January of each year a written report of the meter readings for the preceding calendar year; said report must be provided no later than the final business day in January to receive credit in arriving at the sewer user charge.
4. **Rental apartment developments:** User charges are calculated based on measured water consumption or outflow subject to a minimum per apartment unit. Common areas such as club houses and offices, if present, are charged as a single unit in calculating the minimum.
5. **Institutional residence facilities such as independent living facilities, assisted living facilities and nursing homes:** User charges are calculated based on facility measured water consumption subject to a minimum similar to other commercial/industrial facilities.
6. **All other commercial and industrial users:** User charges are calculated based on measured water consumption or discharge subject to a minimum consumption or discharge.

D. Industrial Surcharges

Industries shall be assessed a surcharge when suspended solids (s.s.) and biochemical oxygen demand (B.O.D.) concentrations exceed 238 mg/1 and 212 mg/1, respectively. A separate surcharge shall be computed for both suspended solids and B.O.D. In the computation

of suspended and B.O.D. surcharge rates, the annual allocated cost for suspended solids and B.O.D. removal shall be divided by the annual quantity of each parameter removed in the treatment process.

$$\text{Cost per pound s.s. removed} = \frac{\text{Annual Costs for s.s. Removed}}{\text{Pounds of s.s. Removed}}$$

$$\text{Cost per pound B.O.D. removed} = \frac{\text{Annual Costs of B.O.D. Removed}}{\text{Pounds of B.O.D. Removed Annually}}$$

Treatment costs shall be allocated according to flow (Q), B.O.D. and s.s. in the following proportions:

<u>Activity Unit</u>	<u>Allocation %</u>		
	<u>Q</u>	<u>s.s.</u>	<u>B.O.D.</u>
Pretreatment	100	---	---
Primary Treatment	20	25	55
Secondary Treatment	10	60	30
Effluent Disinfection	90	10	---
Sludge Thickening	---	40	60
Sludge Dewatering	---	40	60
Sludge Disposal	---	40	60
Laboratory	10	60	30

16.3 Small Industries

- A. The owner is required to submit a sworn statement of water use or discharge into the sewer system from January 1 through December 31; such statement to be supported by any available records or evidence of water use or discharge to which applicable rate shall be applied; or
- B. In the case of disagreement, the owner is required to install and maintain, at his own expense, a meter measuring sewerage outflow. Such measurements to be used in arriving at sewer use charge. Said meter to be installed in a place easily accessible to the Authority or its duly authorized agent for recording purposes.
- C. In the case where the owner is required to install and maintain, at his own expense, a meter used for the purpose of measuring water not discharged to the sewer system, the owner is required to provide to the Town in January of each year a written report on company letterhead of the meter readings for the

preceding calendar year; said report must be provided no later than the final business day in January to receive credit in arriving at the sewer user charge.

16.4 Major Industries

- A. The owner shall install and maintain, at his own expense, a meter measuring waste outflow; such measurements to be used in arriving at sewer use charge. Said meter to be installed in a place easily accessible to the Authority or its duly authorized agent for recording purposes.
- B. A suitable sampling manhole shall be provided at the owner's expense in a place easily accessible to the Authority or its duly authorized agent for monitoring B.O.D. and solids. Location of flow measuring equipment and sampling manhole may be combined upon approval of the Authority.
- C. In the case where the owner is required to install and maintain, at his own expense, a meter used for the purpose of measuring water not discharged to the sewer system, the owner is required to provide to the Town in January of each year a written report on company letterhead of the meter readings for the preceding calendar year; said report must be provided no later than the final business day in January to receive credit in arriving at the sewer use charge.

16.5 Billing Cycle

- A. Residential and Qualified Residential Users – the user fee per fiscal year (July 1st through June 30th) (annual charge) for each single-family living quarters, due and payable on October 1st.
- B. Prorate Charges – a residential user charge shall be paid by the property owner to the Town at the time of connection to the sanitary sewer system. The prorate charge shall be the annual minimum (flat rate) charge prorated for the balance of the fiscal year pursuant to the schedule of prorated charges in effect at the time. The effective date for determination of the prorated charge shall be thirty (30) calendar days from the date of drain layer's permit issuance.

If, at the end of a fiscal year within which a prorated user charge had been collected, the residential unit remains unconnected to a potable water supply, and therefore, unable to use the sanitary sewer system, the property owner may request a refund of said charge. The property owner must provide evidence by means of arranging for an onsite inspection by a Town official. In the event that a prorated user charge is refunded, the property shall continue to be listed on the Account Master Maintenance

File for the purposes of billing in subsequent years. Future requests for refunds may be granted by the Authority at the end of each fiscal year based upon Town

inspections. In order to be eligible for a refund, the user charge must be paid at the time of billing.

During any fiscal year, refunds of a portion of a paid sewer user charge may be granted by the Authority based upon written evidence provided by the property owner that the residential unit had been connected to a potable water supply.

- C. Commercial and Industrial – user fee per fiscal year (annual charge) for each building connected into the sewer system, due and payable on April 1st.

16.6 The Water Pollution Control Authority shall establish special charges when water use is not related to sewer use, or when water is obtained from an unmetered source.

16.7 Reserve Fund Policy

Purpose: The purpose of this Policy is to ensure the proper functioning and continuous operation of South Windsor's sanitary sewage system is essential for public health and safety, economic development, environmental protection, and the quality of life for those living and working in our town. The Water Pollution Control Authority (WPCA) is responsible for this system, and as such must establish prudent fiscal policies to ensure adequate funding for proper maintenance, repair and replacement of the system's many components. Planning for the future needs of this complex and widespread system entails a degree of unavoidable uncertainty, including, among other things, exposure to unforeseen natural events, accidents, revenue fluctuation, and unplanned facility repair, maintenance and improvement needs.

The purpose of the Reserve Fund Policy is to mitigate the economic consequences of current and future risks, to ensure sound fiscal management and stabilization of annual sewer user rates, and to allow for greater flexibility with long term planning.

1. The Reserve Fund shall be made up of restricted funds for specific purposes and shall include the following:
 - a. An Operating Reserve equal to a three (3) month (25%) reserve of the operating budget (Operation & Maintenance and Debt Service) to maintain sufficient cash reserves to offset variations in revenue and expenditures using a three year trend to project the actual amount, and
 - b. A Replacement Reserve equal to two (2) percent of the Pollution Abatement Facility Asset Value , adjusted to reflect replacement costs based upon an industry construction cost index, and

2. The WPCA intends to fully fund the Reserve Fund over a Five Year period for the Operating Reserve and over a Ten Year period for the Replacement Reserve beginning with the adoption of this policy. It is understood, however, that these goals may require modification depending on the actual use of such Reserve Funds, and will be subject to regular review pursuant to Paragraph 5, *infra*.

Procedure

1. Until the Restricted Fund targets are met, the WPCA will transfer into the Reserve Fund all revenues exceeding expenditures after payment of debt service and on-going equipment replacement costs.
2. Reserve Fund balances will be maintained pursuant to the standards and procedures found in the Generally Accepted Accounting Principles (GAAP) and the Governmental Accounting Standards Board (GASB).
3. Unrestricted fund balances that are the result of revenues exceeding expenditures in any given fiscal year shall be utilize at the discretion of the WPCA for purposes consistent with the Reserve Fund Policy.
4. For the purpose of rate stabilization, Funds shall be transferred from the Reserve Fund on an "as needed basis" to compensate for unusual operating or other expenses, as, for example, when a future replacement project is expected to significantly increase rates. Such rate stabilization funds will be utilized in conjunction with the distribution of any necessary rate increase over a period of years, in order to avoid an excessive rate increase in any one given year. The amount of rate stabilization funds used and the distribution of rate increases shall be at the discretion of the WPCA.
5. The Reserve Fund Policy may be reviewed and revised at any time by the WPCA upon motion by its members, but will, in any case, be subject to annual review at budget and rate-setting meetings. Such policy review may include, but is not limited to, consideration of changes in reserve fund target balances, the time period for achieving full funding, and the use of reserve funds to offset sewer use rate increases. Such policy review will include due consideration of current sewer system conditions, future needs, current reserve fund balances, and the Town's economic circumstances. The South Windsor Town Council and Town Manager will be advised of such a review to allow for input from these parties.

Proposed

Exhibit C

TOWN OF SOUTH WINDSOR

Sewer User Rates, Surcharge Rates, Sewer Assessment Schedule, and Septic Disposal Fees

July 1, 2022 to June 30, 2023

Sewer User Rates

Residential, Single Family/Condominium Unit	\$425.00 per Unit
Apartment, non-restricted (Measured water use or per unit rate, whichever is greater)	\$212.50 per Unit
Commercial/Industrial, Business/Condominium Unit	\$425.00 per 74,000 gallons

Sewer Assessments

Account	Base	Frontage	Lateral	Connection Charge
Residential, School	\$2,854	\$47 /foot	\$1,272 /lateral	\$1,322 /unit
Comm./Industrial	\$2,854	\$88 /foot	\$1,272 /lateral	\$4,233 /acre

Residential Pro-rated Sewer User Adjustment

Date of Permit	Fee	Date of Permit	Fee
July 1st - July 31st	\$425.00	January 1st - January 31st	\$212.50
August 1st - August 31st	\$389.58	February 1st - February 29th	\$177.08
September 1st - September 30th	\$354.17	March 1st - March 31st	\$141.67
October 1st - October 31st	\$318.75	April 1st - April 30th	\$106.25
November 1st - November 30th	\$283.33	May 1st - May 31st	\$70.83
December 1st - December 31st	\$247.92	June 1st - June 30th	\$35.42

Residential Qualified Income Sewer User Charge Discount

Income Level			Married		Unmarried	
			Discount	Charge	Discount	Charge
\$0.00	to	\$19,100.00	50%	\$ 212.50	40%	\$255.00
\$19,100.00	to	\$25,600.00	40%	\$ 255.00	30%	\$297.50
\$25,600.00	to	\$31,900.00	30%	\$ 297.50	20%	\$340.00
\$31,900.00	to	\$38,100.00	20%	\$ 340.00	10%	\$382.50
\$38,100.00	to	\$46,400.00	10%	\$ 382.50	0%	\$425.00

Equivalent Dwelling Unit (EDU) Table

Residential		Comm/Ind.	
Bedroom	EDU	Water Meter	EDU
2 OR LESS	0.75	<1"	1
3	1	1"	2
4	1.25	1.5"	3
5	1.5	2"	4
6	2	3"	6
7-9	3	4"	8
10-12	4	6"	12
13-15	5	8"	16
16-18	6	10"	20
19-21	7	12"	24
22-24	8		
25-27	9		
28-30	10*		

* EDU will be applied for every 3 bedrooms over 30 bedrooms

Surcharge Rates

Biochemical Oxygen Demand
\$0.51 /lbs.over 212 mg/L
Total Suspended Solids
\$0.75 /lbs.over 238 mg/L

Septic Disposal Rate

\$155.00 /1500 gallons

MIU Notification Rates

\$100.00	Application
\$100.00	Renewal

PUBLIC WORKS
POLLUTION CONTROL

FISCAL YEAR
2022/2023

ACCOUNT NO.
3252

	FY2021 APPROVED	FY21/22 Approved	FY 22/23 Proposed	DELTA FROM LAST YEAR	% CHANGE
100 Salary & Benefits					
110 Full-time Salaries	\$ 1,081,700	\$ 1,097,110	\$ 1,120,080	\$ 22,969	2.1%
111 Overtime	\$ 114,472	\$ 117,542	\$ 121,533	\$ 3,991	3.3%
112 Longevity	\$ 700	\$ 700	\$ 700	\$ -	0.0%
113 Part-time Salaries	\$ -	\$ -	\$ -	\$ -	0.0%
130 Employee Benefits	\$ 522,872	\$ 538,558	\$ 560,200	\$ 21,642	3.9%
Subtotal:	\$ 1,719,744	\$ 1,753,910	\$ 1,802,513	\$ 48,603	2.7%
200 Materials & Expenses					
210 Office Supplies	\$ 2,000	\$ 2,000	\$ 2,000	\$ -	0.0%
221 Operating Materials	\$ 118,950	\$ 138,950	\$ 149,950	\$ 11,000	7.3%
222 Motor Vehicle Supplies	\$ 24,100	\$ 25,213	\$ 27,838	\$ 2,625	9.4%
223 Uniforms & Clothing	\$ 15,750	\$ 15,750	\$ 15,750	\$ -	0.0%
232 Equipment Repair	\$ 115,000	\$ 115,000	\$ 125,000	\$ 10,000	8.0%
Subtotal:	\$ 275,800	\$ 296,913	\$ 320,538	\$ 23,625	7.4%
300 Contractual Services					
310 Advertising	\$ -	\$ -	\$ -	\$ -	0.0%
320 Professional	\$ 160,100	\$ 164,100	\$ 173,000	\$ 8,900	5.1%
330 Rentals & Leases	\$ 33,400	\$ 33,400	\$ 33,400	\$ -	0.0%
360 Utilities	\$ 456,000	\$ 486,000	\$ 501,000	\$ 15,000	3.0%
371 Maintenance Contracts	\$ 674,300	\$ 673,300	\$ 931,200	\$ 257,900	27.7%
373 Repair Maintenance Equip.	\$ 32,300	\$ 32,300	\$ 34,300	\$ 2,000	5.8%
374 Fees & Memberships	\$ 1,900	\$ 2,150	\$ 2,150	\$ -	0.0%
375 Recruitment & Training	\$ 23,750	\$ 23,750	\$ 23,400	\$ (350)	-1.5%
390 Other Purchase Services	\$ 326,000	\$ 326,000	\$ 358,000	\$ 32,000	8.9%
393 Internal Service Charge	\$ 45,000	\$ 45,000	\$ 47,500	\$ 2,500	5.3%
Subtotal:	\$ 1,752,750	\$ 1,786,000	\$ 2,103,950	\$ 317,950	15.1%
400 Capital Outlay					
430 Capital Projects	\$ 168,000	\$ 47,300	\$ 75,000	\$ 27,700	36.9%
441 Office Equipment	\$ -	\$ -	\$ -	\$ -	0.0%
442 Department Equipment	\$ 76,500	\$ 245,000	\$ 595,000	\$ 350,000	58.8%
Subtotal:	\$ 244,500	\$ 292,300	\$ 670,000	\$ 377,700	56.4%
Department Total:	\$ 3,992,794	\$ 4,129,123	\$ 4,897,001	\$ 767,878	15.7%

**PUBLIC WORKS
POLLUTION CONTROL**

FISCAL YEAR 2022/2023

**ACCOUNT NO.
3252**

CODE NO. & DESCRIPTION	PROGRAM	COST
100 PERSONNEL SERVICES		\$ 1,802,513
110 FULL TIME SALARIES		ANNUAL
	SUPERINTENDENT*	\$ 95,951
	PLANT SUPERVISOR	\$ 104,020
*SALARY IS 80% FUNDED BY WPCA	LEAD OPERATOR W/CERT	\$ 88,211
**SALARY IS 25% FUNDED BY WPCA	LEAD OPERATOR W/O CERT	\$ 87,350
	LEAD OPERATOR W/O CERT	\$ 87,350
	OPERATOR 3 STEP 3	\$ 80,896
	OPERATOR 3 STEP 3	\$ 80,896
CONTRACTUAL	OPERATOR 3 STEP 3	\$ 80,896
SALARY INCREASES:	OPERATOR 3 STEP 3	\$ 80,896
CSEA UNION 2.00%	OPERATOR 3 STEP 2	\$ 80,103
AFSME UNION 2.00%	OPERATOR 3 STEP 2	\$ 80,103
MANAGEMENT 2.25%	OPERATOR 3 STEP 1	\$ 79,302
	LABORTORY ANALYST	\$ 80,896
	ADMINISTRATIVE SECRETARY**	\$ 13,208
	Salary Total	1,120,080
111 OVERTIME		
SCHEDULED OVERTIME:		
SATURDAYS (52 DAYS)		
# OF HRS # OF STAFF WAGE x 1.5		
2 2 \$ 62.99	SATURDAY OVERTIME	\$ 13,103
	SUNDAY OVERTIME	\$ 17,470
SUNDAYS (52) AND HOLIDAYS (13)	HOLIDAY OVERTIME	\$ 4,368
# OF HRS # OF STAFF WAGE x 2	SCHEDULED OT TOTAL	\$ 34,940
2 2 \$ 83.99		
UNSCHEDULED OVERTIME:		
ALARMS/YR 100	ALARMS	\$ 58,793
LINE BLOCKAGES/YR 2	LINE BLOCKAGES	\$ 1,176
PLANT/PS REPAIR (HRS.) 75	REPAIRS	\$ 11,024
# OF HRS # OF STAFF WAGE x 1.75	UNSCHEDULED OT TOTAL	\$ 70,993
4 2 \$ 73.49		
STAND BY COMP:	STAND BY COMPENSATION	\$ 15,600
WKS/YR COST/WK.	TOTAL	\$ 15,600
52 \$ 300		
112 LONGEVITY		
	LONGEVITY PAYMENT	700
May 3, 2022 Draft	TOTAL	700

PUBLIC WORKS
POLLUTION CONTROL

FISCAL YEAR 2022/2023

ACCOUNT NO.
3252

CODE NO. & DESCRIPTION	PROGRAM	COST
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114 TEMPORY HELP

TEMPORARY/SEASONAL HELP	\$	-
TOTAL		\$

130 EMPLOYEE BENEFITS

FICA	\$	94,659
BC/BS	\$	230,981
DEARBORN LIFE	\$	8,483
LTD	\$	1,574
STD	\$	221
W/C	\$	36,648
ICMA	\$	58,795
LAB CERTIFICATION	\$	1,600
AETNA PENSION	\$	118,587
CDL LICENSE	\$	2,652
STATE LICENSES	\$	6,000
TOTAL		\$ 560,200

**PUBLIC WORKS
POLLUTION CONTROL**

**FICAL YEAR
2022/2023**

**ACCOUNT NO.
3252**

CODE NO. & DESCRIPTION	PROGRAM	COST
200 MATERIALS AND SUPPLIES		\$ 320,538

210 OFFICE SUPPLIES

*PAPER, PENS, FAX, AND PRINTER
CARTRIDGES*

SUPPLIES	\$ 2,000
TOTAL \$ 2,000	

221 OPERATING SUPPLIES

221.1 PLANT SUPPLIES	\$ 1,500
221.2 PUBLICATIONS	\$ 1,500
221.3 SHOP SUPPLIES	\$ 6,000
221.4 SIGNS	\$ 1,200
221.5 EMERGENCY	\$ 1,500
221.6 CUSTODIAL SUPPLIES	\$ 3,500
221.7 LINE CLEANING SUPPLIES	\$ 17,000
221.8 SAFETY SUPPLIES	\$ 4,000
221.9 CHEMICALS	\$ 24,000
221.10 BUILDING SUPPLIES	\$ 1,750
221.11 PLUMBING SUPPLIES	\$ 2,000
221.12 LABORATORY SUPPLIES	\$ 20,500
221.13 HARDWARE SUPPLIES	\$ 3,500
221.14 SLUDGE DISPOSAL	\$ 2,500
221.15 LUBRICANTS	\$ 2,500
221.16 ELECTRICAL SUPPLIES	\$ 5,000
221.17 MECHANICAL SUPPLIES	\$ 52,000
TOTAL \$ 149,950	

222 MOTOR VEHICLE SUPPLIES

ASSUMPTIONS:

GASOLINE \$ 3.00
DIESEL \$ 3.50

	USE (GAL.)	
FUEL: Diesel Generators - Pump Stations	600	\$ 2,100
80SW - 2009 Ford Explorer	350	\$ 1,050
81SW - 2017 Ford F-250	350	\$ 1,050
82SW - 2014 Ford E-350 Cam. Tr.	500	\$ 1,500
83SW - 2019 F550 Utility Truck	775	\$ 2,325
84SW - 1995 Ford LN9000 Vac Tr.	775	\$ 2,713
86SW - 2008 Combination Truck	1500	\$ 5,250
87SW - 2014 Ford F-350 Utility Tr.	300	\$ 900
Pumps/Misc Equipment	100	\$ 300
TOTAL \$ 17,138		

REPAIR PARTS: Portable Equipment	\$ 1,200
1995 - 84SW Ford LN9000 Vacuum Truck	\$ 1,500
2008 - 86SW Combination Truck	\$ 4,500
2009 - 80SW Ford Explorer	\$ 1,200
2014 - 82SW Ford E-350 Camera Truck	\$ 750
2014 - 87SW Ford F-350 Utility Truck	\$ 500
2017 - 81SW Ford F-250	\$ 500
2019 - 83SW F450 Utility Truck	\$ 500

TOTAL \$ 10,650

May 3, 2022 Draft

PUBLIC WORKS
POLLUTION CONTROL

FICAL YEAR
2022/2023

ACCOUNT NO.
3252

CODE NO. & DESCRIPTION	PROGRAM	COST
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223 UNIFORMS

UNIFORM RENTAL	\$	7,500
SAFETY SHOES	\$	3,250
REPLACEMENT CLOTHING	\$	5,000

TOTAL		\$ 15,750
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232 EQUIPMENT REPAIR

PLANT EQUIPMENT	\$	80,000
PUMP STATION EQUIPMENT	\$	45,000

TOTAL		\$ 125,000
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PUBLIC WORKS
POLLUTION CONTROL

FISCAL YEAR
2022/2023

ACCOUNT NO.
3252

CODE NO. & DESCRIPTION	PROGRAM	COST
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300 - CONTRACTUAL SERVICES		\$ 2,103,950
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310 ADVERTISING/PRINTING

ADVERTISING	\$ -
TOTAL	\$ -

320 PROFESSIONAL

320.1 JobCal Support	\$ 500
320.2 Rockwell Support	\$ 1,000
320.3 Debt Mgt.	\$ 2,500
320.4 Water Consumption Reports	\$ 1,200
320.5 Insurance Premiums	\$ 150,000
320.6 NPDES Compliance Testing	\$ 16,000
320.7 NPDES PERMIT	\$ 300
320.8 Drug Testing and Innoculations	\$ 1,500
TOTAL	\$ 173,000

330 RENTAL & LEASES

330.1 Communications	\$ 22,000
330.2 2 Way Radio	\$ 2,000
330.3 GPS Rental	\$ 2,100
330.4 SCADA Line Equipment Rental	\$ 3,300
330.5 Security System	\$ 2,000
330.6 Copier	\$ 2,000
TOTAL	\$ 33,400

360 UTILITIES

360.1 ELECTRICAL USE:	
TREATMENT PLANT	\$ 350,000
PUMP STATIONS:	
Avery	\$ 3,000
Barrington	\$ 2,500
Benedict	\$ 22,000
Clark	\$ 35,000
Ellington	\$ 2,900
Pleasant Valley	\$ 8,500
Quarry Brook	\$ 3,100
Route 5	\$ 2,600
Rye	\$ 3,000
Scantic I	\$ 1,700
Scantic II	\$ 3,100

HEATING FUEL COST
\$3.50

360.2 HEATING FUEL 15,000/YR	\$ 52,500
360.3 TELEPHONE LAND LINES	\$ 3,000
360.4 WATER SERVICE:	
TREATMENT PLANT	\$ 7,500
CLARK ST PS	\$ 600

TOTAL	\$ 501,000
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**PUBLIC WORKS
POLLUTION CONTROL**

**FISCAL YEAR
2022/2023**

**ACCOUNT NO.
3252**

CODE NO. & DESCRIPTION	PROGRAM	COST
371 MAINTENANCE CONTRACTS		
371.1 Treatment Plant Pest Control		\$ 7,000
371.2 Container Rental Grit/Trash Collection		\$ 30,000
371.3 Sludge Transportation and Disposal		\$ 600,000
371.4 Custodial Building Maintenance		\$ 19,000
371.5 Grounds Maintenance		\$ 17,000
371.6 Stormwater Inspection and Testing		\$ 3,000
371.7 Power Center and ATS Service Contract		\$ 6,000
371.8 Plant/PS Generator Load Test/Adjustment		\$ 6,000
371.9 SCADA Maintenance		\$ 20,000
371.10 Fire Alarm System Maintenance		\$ 8,000
372.11 HACH Analyzer Maintenance		\$ 7,000
372.12 HVAC Control System Service Contract		\$ 3,200
372.13 HVAC Mechanical System Maintenance		\$ 45,000
372.14 Controls/PLC Service Contract		\$ 5,000
372.15 Easement Vegetation Management		\$ 55,000
372.16 Sewer Line & Grease Trap Inspection		\$ 100,000
TOTAL		\$ 931,200
373 REPAIR MAINTENANCE EQUIP.		
Service calls		\$ 6,000
Hoist Certification		\$ 4,000
Fire Extinguisher Testing		\$ 1,200
Fall Protection Certification		\$ 2,800
Backflow Preventer Certifications		\$ 800
Boiler Certifications		\$ 3,000
Machining		\$ 12,000
Flow Meter Calibrations		\$ 1,500
Equipment Calibrations/Certifications		\$ 3,000
TOTAL		\$ 34,300
374 FEES & MEMBERSHIPS		
NEWEA		\$ 1,650
CTWEA		\$ 500
TOTAL		\$ 2,150
375 RECRUITMENT & TRAINING		
Training materials and conferences		\$ 18,000
DEEP Licensing Exams		\$ 400
NASSCO		\$ 2,500
Safety and Compliance Training		\$ 2,500
TOTAL		\$ 23,400

PUBLIC WORKS
POLLUTION CONTROL

FISCAL YEAR
2022/2023

ACCOUNT NO.
3252

CODE NO. & DESCRIPTION	PROGRAM	COST
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390 OTHER PURCHASE SERVICES

<i>ANITARY SEWER SERVICES:</i> Vernon (489 Units)	\$ 280,000
MDC	\$ 16,000
Manchester (85 units)	\$ 62,000

TOTAL \$ 358,000

393 INTERNAL SERVICE CHARGE

ENGINEERING/COLLECTOR OF REV.	\$ 47,500
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TOTAL \$ 47,500

PUBLIC WORKS
POLLUTION CONTROL

FISCAL YEAR
2022/2023

ACCOUNT NO.
3252

CODE NO. & DESCRIPTION	PROGRAM	COST
400 CAPITAL OUTLAY		\$ 670,000
430 CAPITAL PROJECTS		
	EV Power Station	\$ 20,000
	PS Fire Alarm Panel	\$ 50,000
	Sludge Storage Floor Repair	\$ 5,000
	TOTAL \$ 75,000	
441 OFFICE EQUIPMENT		\$ -
	TOTAL \$ -	
442 DEPARTMENT EQUIPMENT		
	Electric Vehicle (Truck 80 Replacement)	\$ 60,000
	Truck 86 Replacement	\$ 500,000
	NH4_NO3 Probes	\$ 35,000
	TOTAL \$ 595,000	

DEBT SERVICE/CIP/RESERVE TOTAL \$ 4,270,301

DEBT SERVICE - PRINCIPAL AND INTEREST

PROJECT NAME	COST
1 TOWN OF VERNON UPGRADE	\$ 93,771
SUBTOTAL	\$ 93,771
2 PLEASANT VALLEY PS UPGRADE (FINAL PAY. 2026)	
PRINCIPAL	\$ 22,604
INTEREST	\$ 1,617
SUBTOTAL	\$ 24,221
3 SUBMERSIBLE PS UPGRADE (FINAL PAY. 2027)	
PRINCIPAL	\$ 84,279
INTEREST	\$ 10,025
SUBTOTAL	\$ 94,304
4 DRY PIT PS UPGRADE (FINAL PAY. 2028)	
PRINCIPAL	\$ 97,000
INTEREST	\$ 36,005
SUBTOTAL	\$ 133,005
TOTAL DEBT SERVICE	\$ 345,301

CAPITAL IMPROVEMENT PROJECTS

PROJECT LOCATION	PROJECT NAME	COST
TREATMENT PLANT	Aeration Tank Slide Gates	\$ 50,000
	Odor Control System	\$ 200,000
	Var. Freq. Drive Replacement	\$ 25,000
COLLECTION SYSTEM	Clark St. Pump Station Upgrade	\$ 3,500,000
	I/I REMOVAL AND MH REHAB.	\$ 50,000
	CIP TOTAL	\$ 3,825,000

RESERVE FUND CONTRIBUTION

FUND NAME	COST
OPERATING RESERVE (FUND BALANCE)	\$ -
REPLACEMENT RESERVE (CAPITAL PROJECTS)	\$ 100,000
RESERVE TOTAL	\$ 100,000

FUNCTION
Water Pollution
Control Authority

TOWN OF SOUTH WINDSOR
WATER POLLUTION CONTROL AUTHORITY
BOARDS AND COMMISSIONS

ACCOUNT NO.
1129

EXPENDITURE CLASSIFICATION	FY1819 ACTUAL	FY1920 ACTUAL	FY2021 ACTUAL	FY2122 PROJECTED	FY2223 PROPOSED
PERSONAL SERVICES					
110 FULL TIME SALARIES	\$ -	\$ -	\$ -	\$ -	\$ -
SUBTOTAL:	\$ -	\$ -	\$ -	\$ -	\$ -
MATERIALS & EXPENSES					
210 OFFICE SUPPLIES	\$ 54	\$ 155	\$ 200	\$ 200	\$ 200
SUBTOTAL:	\$ 54	\$ 155	\$ 200	\$ 200	\$ 200
CONTRACTUAL SERVICES					
310 ADVERTISING	\$ 1,160	\$ 2,157	\$ 252	1600	\$ 2,000
320 PROFESSIONAL	\$ -	\$ 112	\$ -	1800	\$ 1,000
350 PRINTING	\$ -	\$ -	\$ -	0	\$ -
374 FEES AND MEMBERSHIPS	\$ -	\$ -	\$ -	0	\$ -
SUBTOTAL:	\$ 1,160	\$ 2,269	\$ 252	\$ 3,400	\$ 3,000
CAPITAL OUTLAY					
430 Capital Projects	\$ -	\$ -	\$ -	\$ -	\$ -
441 Office Equipment	\$ -	\$ -	\$ -	\$ -	\$ -
SUBTOTAL	\$ -	\$ -	\$ -	\$ -	\$ -
DEPARTMENT TOTAL	\$ 1,214	\$ 2,424	\$ 452	\$ 3,600	\$ 3,200

**PUBLIC WORKS
POLLUTION CONTROL**

**USER FEE CALCULATION
FY 2022/2023**

**ACCOUNT NO.
3252**

DEFINITIONS

Ct = Total annual cost for operation, debt service, capital projects, contributions to reserves

Cr = Surcharges for removal of excess TSS/BOD

Ro = Other sources of revenue: dumping fees, permit fees, assessments, interest, liens, connection charges, grants, transfers from reserves, internal services transfers, and investment earnings

Qo = Annual individual user discharge (74,000 gallons)

Qt = total annual indust/comm and residential discharge

$$\text{USER CHARGE} = \frac{(\text{Ct} - (\text{Cr} + \text{Ro})) \times \text{Qo}}{\text{Qt}}$$

ASSUMPTIONS

Ct= OPERATIONS	\$ 4,897,001
DEBT SERVICE	\$ 345,301
*REPLACE. RESERVE	\$ 100,000
OPERATING RESERVE	\$ -
CAP. IMPROVEMENT	\$ 3,825,000
WPCA	\$ 3,200
TOTAL EXPENDITURES	\$ 9,170,502

Cr= SURCHARGES	\$ 25,000
Ro= OTHER SOURCES OF REVENUE	\$ 3,904,050
Qt= RESIDENTIAL FLOW	672,586,000
COM/IND FLOW	260,000,000
TOTAL FLOW	932,586,000
Qo= USER DISCHARGE FLOW	74,000 GAL

USER CHARGE = \$ 415.91

ALLOWABLE FOR
UNCOLLECTABLES 2% \$ 8.32

USER CHARGE	\$ 424.22
FINAL USER CHARGE	\$ 425

May 3, 2022 Draft

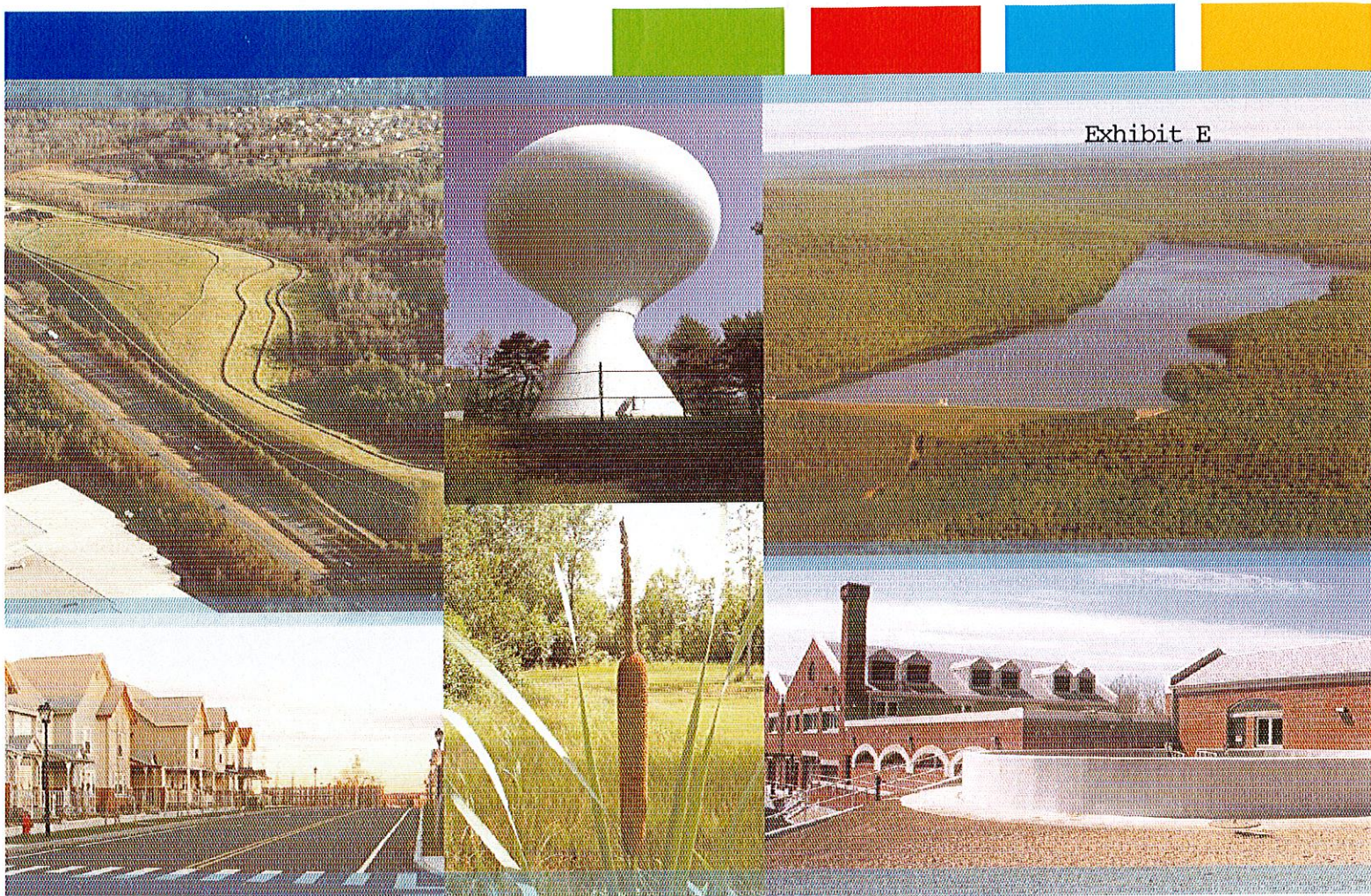
**PUBLIC WORKS
POLLUTION CONTROL**

**FISCAL YEAR
2022/2023**

**ACCOUNT NO.
3252**

REVENUES

Sources of Revenue	ACTUAL FY1819	ACTUAL FY1920	ACTUAL FY2021	PROJECTED FY2122	ESTIMATED FY2223
Sewer User Charges	\$ 4,986,299	\$ 4,745,397	\$ 5,310,339	\$ 5,200,000	\$ 5,279,568
Industrial Surcharges	\$ 112,044	\$ 71,287	\$ 14,625	\$ 25,000	\$ 25,000
Septic Dumping Fees	\$ 26,392	\$ 19,893	\$ 34,703	\$ 20,000	\$ 20,000
Grant Reimbursement/Loan	\$ -	\$ -	\$ -	\$ -	\$ 3,500,000
Interest Income	\$ 68,073	\$ 67,336	\$ 113,402	\$ 65,000	\$ 65,000
Lien Fees	\$ 18,487	\$ 16,712	\$ 21,845	\$ 15,000	\$ 17,000
Gen. Gov. Sundry	\$ 2,873	\$ 7,601	\$ 5,815	\$ 8,500	\$ 6,000
Permit Fees	\$ 7,840	\$ 4,160	\$ 4,800	\$ 18,000	\$ 6,000
Assessments	\$ 14,898	\$ 32,561	\$ 47,568	\$ 45,000	\$ 40,000
Connection Charges	\$ 129,559	\$ 335,699	\$ 196,833	\$ 150,000	\$ 175,000
Capacity Charge	\$ 50,439	\$ 67,869	\$ 33,300	\$ 20,000	\$ 30,000
Investment Interest Earnings	\$ 449	\$ 251	\$ 48	\$ 28	\$ 50
Cancel Pr. Year Encumbrances	\$ 10,918	\$ 119,824	\$ 20,106	\$ 10,000	\$ -
Internal Services	\$ 25,800	\$ 13,695	\$ 25,005	\$ 25,000	\$ 25,000
Fund Balance Appropriations	\$ -	\$ -	\$ -	\$ -	\$ -
Energy Rebate	\$ -	\$ -	\$ 1,591	\$ 20,000	\$ 20,000
	\$ 5,454,071	\$ 5,502,285	\$ 5,829,980	\$ 5,621,528	\$ 9,208,618



South Windsor Water Pollution Control Facility
1 Vibert Road, South Windsor, CT

ODOR CONTROL STUDY

Town of South Windsor

March 4, 2022

Tighe&Bond

www.tighebond.com

Tighe&Bond

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Tighe&Bond

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Appendix A: Odor Science & Engineering Report

Appendix B: Odor Emissions Sampling Locations

Appendix C: BIOREM® Biofilter Media Cut Sheet

Appendix D: Vapex™ System Cut Sheets

Appendix E: Conceptual Layout of Carbon Filter System

Town of South Windsor WPCF Odor Control Study

TO: Town of South Windsor: Jeff LeMay
FROM: Tighe & Bond: Alan J. Wells, P.E.
COPY: Tighe & Bond: Ryan Palzere, Zhijian (Jason) Tang
DATE: March 4, 2022

Tighe & Bond is pleased to submit this Technical Memorandum summarizing the results of an Odor Control Study we conducted for the Town of South Windsor Water Pollution Control Facility (WPCF). Tighe & Bond was retained by the Town to conduct this Odor Control Study to identify potential odors and sources at the WPCF and surrounding areas, evaluate the performance of the WPCF's existing odor control system, and develop recommendations for odor control measures. The details of the findings and recommendations are summarized in this Technical Memorandum.

Tighe & Bond, along with our subconsultant Odor Science & Engineering (OS&E) of Bloomfield, CT, provided the following Scope of Services as part of this Odor Control Study:

1. Scope of Services

1. Kick-off Meeting – Tighe & Bond and OS&E attended a kick-off meeting on May 26th, 2021 with the Town of South Windsor at the WPCF for the purpose of reviewing the scope of services and schedule, and coordinating the data collection effort. Odor sampling dates and locations were identified at the kick-off meeting.
2. Data Collection – Tighe & Bond and OS&E collected data relative to odors. Two types of odor data collection were conducted, **odor emissions** and **odor surveys**. **Odor emissions** sampling consisted of hydrogen sulfide and air flow measurements of odor sources at the WPCF (including those sources currently connected to the existing odorous air collection system and other suspect sources such as the primary effluent channel). Measurements were made with portable hand-held meters by Tighe & Bond personnel. Additionally, OS&E collected a total of sixteen (16) samples at the WPCF for off-site qualitative analysis by an odor panel including odor intensity, concentration, and character. **Odor emissions** data collection occurred on June 29th, 2021 and July 28th, 2021.

Additionally, six (6) off-site **odor surveys** were conducted by OS&E. The off-site odor surveys were conducted in the vicinity of the WPCF (within an approximate 1-mile radius) by slowly driving and/or walking in the areas surrounding the WPCF. The locations of any odors observed during the surveys were recorded on a map of the area. Odor intensity, concentration, character, and the likely source of the odors were recorded. **Odor surveys** data collection occurred on June 29th, July 28th, August 20th, and August 25th, 2021.

3. Summary of Results and Development of Alternatives – A summary of the **odor emission** sampling results from the WPCF campus and ranking of the odor sources was provided based on their odor emission rates (odor concentration x flow rate). In addition, a summary of the off-site **odor surveys** was provided showing the extent of any WPCF related odor impacts as well as the impact from any other sources detected in the study area. Based on these results, odor control alternatives were developed. Odor Control

alternatives include modifications to the existing odorous air collection system, collection of odors from sources not currently being collected (such as the primary effluent channel), alternative odor treatment technologies (in lieu of the existing biofilter) with a specific focus on carbon media systems. Alternatives were not developed for odor sources identified outside and/or unrelated to the WPCF campus.

4. Evaluation of Alternatives – Alternatives were screened based on criteria including estimated effectiveness, estimated opinions of life cycle costs, and operation and maintenance considerations.
5. Recommendations – For those alternative(s) considered to be most viable, recommendations were developed including descriptions, conceptual sketches, estimated capital costs, estimated operation and maintenance costs, and an implementation schedule. Recommendations were documented in a technical memorandum. A draft of the technical memorandum was provided to the Town for review and comment on November 16th, 2021. A virtual review meeting was conducted on January 21st, 2022. Tighe & Bond addressed the review comments from the Town and prepared the final technical memorandum.

2. Meetings and Deliverables

1. One (1) on-site Kick-off Meeting – completed May 26th, 2021.
2. Two (2) on-site odor emission data collection days – completed June 29th, 2021 and July 28th, 2021.
3. Three (3) off-site odor survey data collection days – completed June 29th, July 28th, August 20th, and August 25th, 2021.
4. One (1) Draft and one (1) Final Technical Memorandum.
5. One (1) on-site or virtual review meeting, to discuss the findings and recommendations contained in the Technical Memorandum – completed January 21st, 2022.

3. Introduction

The Town of South Windsor WPCF is located at 1 Vibert Road in South Windsor, CT. On May 4th, 2021, Tighe & Bond submitted a proposal to the Town of South Windsor WPCF to provide engineering services in support of an Odor Control Study for the WPCF. The objective of this Study was to identify potential odors and sources at the WPCF and surrounding areas, evaluate the performance of the WPCF's existing odor control system and develop recommendations for odor control measures.

Prior to the current Tighe & Bond Odor Control Study, the Town retained OS&E and CDM Smith of East Hartford, CT to conduct biofilter performance sampling and odor panel analyses for the WPCF, and the results were documented in a report dated June 17th, 2013. In that study, a total of eight (8) odor emission samples were analyzed for hydrogen sulfide, dimethyl sulfide, and mercaptans. These samples were also returned to OS&E's olfactory laboratory for same-day analysis by eight (8) trained odor panelists. OS&E concluded that odor removal efficiencies for the north and south sides of the biofilter were 99.9% and 99.7%, respectively. Hydrogen sulfide removal efficiencies were determined to be 100% for both the north and south sides, while the dimethyl sulfide and mercaptan concentrations for all samples were below the detection limit.

Since the 2013 study, it is our understanding that the biofilter media was changed by the Town, but the media specifications were thought to be different from the original media. Furthermore, the Town suspects the biofilter media is no longer performing effectively and odorous air may be short circuiting through the media untreated. In addition, the Town has received odor complaints from residents abutting the WPCF, from Main Street and east of the WPCF. For these reasons, the Town retained Tighe & Bond to perform the current Odor Control Study.

4. Data Collection

As part of the current Odor Control Study, a sampling plan was developed to collect data from the WPCF over two (2) non-consecutive days. Tighe & Bond and OS&E staff mobilized onsite to perform sampling activities on June 29th, 2021 and July 28th, 2021. The methods of data collection are described in Section 1. Data are presented in Tables 4-1 through 4-3 included at the end of this section. Figures 1 through 8 and Tables 1 and 2 of the OS&E Report included in Appendix A also present the data collected from this study. A summary of results is provided in Section 5 of this report.

4.1 Odor Emissions

Odor emissions sampling consisted of hydrogen sulfide and air flow measurements from the existing odor control duct for odor sources at the WPCF. A diagram noting the locations of where these measurements were taken is included in Appendix B. Measurements were made with portable hand-held meters by Tighe & Bond personnel. The results of this odor emissions sampling are summarized in Tables 4-1 and 4-2.

Additionally, OS&E collected a total of sixteen (16) samples at the WPCF for off-site qualitative analysis by an odor panel including odor intensity, concentration, and character. The results of this analysis are included in Table 1 and Table 2 in the OS&E report in Appendix A.

4.2 Odor Surveys

OS&E performed a total of six (6) odor surveys in the areas surrounding the WPCF. Two (2) odor surveys took place on June 29th, 2021: one in the morning and one in the afternoon. Similarly, two (2) odor surveys took place on July 28th, 2021: one in the morning and one in the afternoon. The remaining odor surveys occurred on August 20th, 2021, and August 25th, 2021.

The goal of these surveys was to identify the extent and character of any odors off-site from WPCF emission sources. Additionally, these surveys were used to identify other odor emission sources that may be causing complaints from residents. A summary of the off-site odor surveys that resulted in potentially WPCF-sourced odor emissions is presented in Table 4-3.

The odor surveys also found several extraneous odors that weren't believed to have originated from the WPCF. Nearby farmer's barns and fields produced "swampy", "muddy", "earthy", "manure", and "wet vegetation" odors. Other odors that were recorded were that of "stagnant water" due to flooded lawns, "musty/mulch/wood chips" due to home landscaping, "burnt rubber" due to a tire retreading business, and "food cooking" from a local restaurant.

TABLE 4-1
Data Collected from Sampling Event on June 29th, 2021

Sampling Port Location Number (see Appendix B)	Sampling Location Description	Velocity (ft/min)	Pipe Diameter (ft)	Theoretical Flow Rate (CFM)	H ₂ S Concentration (ppm)	Odor Load (CFM x ppm, rounded to nearest 100)
1	Headworks Building	900	2	2,827	0	0
2	Influent Pump Wet Well/GBT	900	2	2,827	0	0
3	Gravity Thickener	1,100	0.5	216	6.3	1,400
4	Gravity Thickener	1,450	0.5	285	0	0
5	Sludge Holding Tank ¹	1,200	0.83	655	> 100	65,500
6	Influent Pump Wet Well/GBT	1,800	2	5,655	1.6	9,000
7	Odor Control Duct	1,800	2	5,655	24.3	137,400
8	Odor Control Duct (Fan # 1) ²	210	2	660	13.5	8,900
9	Odor Control Duct (Fan #1) ²	200	2	628	20	12,600
10	Odor Control Duct	2,000	2	6,283	25.1	157,700

Note:

1. Measured concentration exceeded 100 ppm (the upper limit of the meter). 100 ppm was used to calculate the odor load.
2. Fan #1 was off in first sampling event on June 29th, 2021.

TABLE 4-2Data Collected from Sampling Event on July 28th, 2021

Sampling Port Location Number (see Appendix B)	Sampling Location Description	Velocity (ft/min)	Pipe Diameter (ft)	Theoretical Flow Rate (CFM)	H ₂ S Concentration (ppm)	Odor Load (CFM x ppm, rounded to nearest 100)
1	Headworks Building	850	2	2,670	0	0
2	Influent Pump Wet Well/GBT	800	2	2,513	0	0
3	Gravity Thickener	1,300	0.5	255	15.5	4,000
4	Gravity Thickener	1,400	0.5	275	0.8	200
5	Sludge Holding Tank	1,200	0.83	655	20	13,100
6	Influent Pump Wet Well/GBT	1,600	2	5,027	0	0
7	Odor Control Duct	1,800	2	5,655	1.9	10,700
8	Odor Control Duct	2,000	2	6,283	1.8	11,300
9	Odor Control Duct	2,000	2	6,283	2.2	13,800
10	Odor Control Duct	2,000	2	6,283	2.3	14,500

TABLE 4-3

Summary of OS&E Odor Surveys that Resulted in Odors Potentially Sourced from the WPCF

Date	Sampling Location Number ¹	Sampling Location Description	Character of Odor	Intensity
June 29 th , 2021 (morning)	1	Entrance to the WPCF	Sewage/H ₂ S	0.5 - 1.0
June 29 th , 2021 (afternoon)	1	Entrance to the WPCF	Sewage/H ₂ S	0.5 - 1.0
June 29 th , 2021 (afternoon)	2	Main Street	Sewage/H ₂ S	0.5
June 29 th , 2021 (afternoon)	5	Entrance to the WPCF	Sewage	0.5 - 1.0
August 20 th , 2021	3	Entrance to the WPCF	Sewage/H ₂ S	1.0 – 2.5
August 20 th , 2021	7	Intersection of Vibert Road & Main Street	Sewage (puffy)	0.5
August 25 th , 2021	7	Vibert Road	Sour Sewage	0.5 – 1.5

Note:

1. Location numbers based off corresponding location numbers in Figure 3 through Figure 8 of the OS&E Report included in Appendix A.

5. Summary of Results

Tables 4-1 and 4-2 contain the data collected from the sampling events on June 29th, 2021 and July 28th, 2021, respectively. Table 4-3 presents a summary of OS&E's odor survey data that resulted in WPCF-sourced odors. Appendix A includes the report prepared by OS&E that summarizes the results of the odor data analysis.

The first sampling event occurred on June 29th, 2021. Weather conditions were clear and humid with an approximate temperature of 93°F. The WPCF reported flows of 2.3 MGD. Sampling began at approximately 11:15 AM. The most significant concentration of hydrogen sulfide was recorded at the sludge holding tank, which exceeded the upper detection limits (100 ppm) of the measuring device. The sludge holding tank is located on the eastern side of the WPCF and is the closest structure in the WPCF to Main Street, where the odor complaints are originating from. Sludge is typically transported off-site of the WPCF by means of a 6,000-gallon tanker truck. Other significant concentrations of hydrogen sulfide were recorded at four (4) points in the duct that combines all flows leading to the biofilter. Minimal hydrogen sulfide concentrations were recorded at gravity thickener #1 and the influent pump wet well duct that combines the air flow. Hydrogen sulfide concentrations were not detected at the headworks building, influent pump wet well, or gravity thickener #2 (which was not in use at the time of sampling).

The second sampling event occurred on July 28th, 2021. Weather conditions were partly cloudy with an approximate temperature of 68°F. The WPCF reported flows of 3.7 MGD. Due to significant rainfall between the two sampling events, the wastewater entering the plant was likely diluted by stormwater, leading to decreased overall odor levels. Sampling began at approximately 9:25 AM. Like the first sampling event, the most significant concentration of hydrogen sulfide was recorded at the sludge holding tank. The level in the tank was approximately 3-feet. Other significant concentrations of hydrogen sulfide were recorded at gravity thickener #1. Minimal hydrogen sulfide concentrations were recorded at gravity thickener #2 and the four (4) points in the duct that combines all flows leading to the biofilter. Hydrogen sulfide concentrations were not detected at the headworks building, influent pump wet well, or combined duct from the influent pump wet well.

The OS&E report included in Appendix A summarizes the data collected from these sampling events as well, in addition to the six off-site odor surveys that OS&E performed. As indicated in the OS&E report, elevated odor levels and higher flow rates were recorded at different locations in the biofilter, suggesting an uneven distribution of air flowing through the biofilter and a reduction in its overall performance. During the June 29th, 2021 data collection, samples were collected at both the inlet to the biofilter and the outlet (the surface of the biofilter). With an inlet odor level of 8,282 dilutions to threshold (D/T), the outlet samples ranged from 23 D/T to 8,313 D/T, indicating a significant yet uneven degradation of the biofilter's performance. Moreover, as seen on Figure 1 of the OS&E report, the air velocities measured on the surface of the biofilter were uneven, ranging from 455 ft/min to 192 ft/min, indicating that the biofilter is short circuiting.

Between the June 29th, 2021 and July 28th, 2021 data collection events, a significant amount of rainfall had been received that diluted flows entering the WPCF, with temperature also dropping considerably from 93°F to 68°F. It is believed that these two factors lowered odor levels in general. The two samples that were collected from the surface of the biofilter on July 28th were 69 D/T and 82 D/T, while the results were previously up to 8,313 D/T on June 29th. Primary clarifier #2 showed an odor level of 35 D/T, while the primary effluent channel showed an odor level of 163 D/T. The 6,000-gallon tanker truck that hauls sludge off-site from the sludge holding tank was found to be an insignificant source of odor emissions.

Additionally, of the six (6) community odor surveys that OS&E performed, four (4) resulted in odors that could potentially be traced to the WPCF. These results are summarized in Table 4-3 of this report. In these four (4) surveys, odors that can be characterized as "sewage" or "hydrogen sulfide" smelling were noted at locations along Vibert Road and at the intersection with Main Street. As determined in the report, however, the intensity of the WPCF-related odors that were noted were not high enough to typically be the cause of odor complaints.

6. Development and Evaluation of Alternatives

Based on the results of the odor emissions and odor surveys, the biofilter is experiencing a significant reduction in its capacity to treat odors collected from the WPCF. The biofilter is short circuiting, resulting in odorous air flowing unevenly through the media and not being effectively treated. Furthermore, it appears the media itself has a reduced ability to treat odors. With the biofilter's treatment capacity reduced and short-circuiting, odors are effectively leaving the WPCF untreated or inadequately treated.

Additionally, the primary tank influent and effluent channels were found to be untreated sources of odor that could also be causing complaints. As noted in Table 2 of the OS&E report, these areas have shown significant D/T values (ranging from 38 D/T to 163 D/T). Since the primary tank influent and effluent channels are uncovered, any odors that are present can freely escape the WPCF.

Tighe & Bond has developed the following alternatives to improve the odor control system at the WPCF. Table 6-1 at the end of this Section 6 summarizes the advantages and disadvantages of each of these alternatives for several different categories, including operation and maintenance (O&M), required infrastructure, capital cost, key equipment, safety, and effectiveness of odor removal. A discussion of each alternative is presented below.

6.1 Rehabilitation and Reuse of Existing Biofilter

One alternative to address the WPCF odor control system would be to rehabilitate the existing biofilter. This option would allow for a rather simple transition for WPCF staff, as the current odor control system would remain relatively unchanged. The existing organic media in the biofilter, which consists of degraded wood chips, mulch, and compost, would be replaced with engineered biofilter media to revitalize the system's odor removal effectiveness. Engineered biofilter media is mineral-based and designed to optimize and sustain surface area for bacteria growth, resulting in a high-performing, energy-efficient biofilter system with a lower residence time than organic media biofilters. The existing biofilter's layout would mostly stay the same with some piping changes likely needed to ensure proper air distribution, hydration, and drainage of the new engineered media. This is a relatively low-cost method that would not require any significant additional land and minimize impacts to WPCF operations.

The main disadvantage of rehabilitating and reusing the existing biofilter is its inability to handle peak odor loads from the WPCF. As seen in Tables 4-1 and 4-2, hydrogen sulfide concentrations are everchanging in terms of location and time of year and vary with weather conditions and the wastewater load at the WPCF. Biofilters depend on odor reducing bacteria which work most effectively with steady conditions in terms of hydrogen sulfide, temperature, and moisture. Based on the data, these conditions at the WPCF are significantly variable, and as a result, the biofilter may not effectively treat the full range of odors. This will likely continue to be a problem even if the existing biofilter is rehabilitated.

6.2 Installation of Chemical Scrubber

A second alternative is to utilize the technology of a chemical wet scrubber, which has proved effective in odor control and removal systems. Chemical scrubbers work by absorbing the targeted pollutant into the scrubbing liquid. Design considerations depend upon the targeted pollutant, ideal removal efficiency, and process conditions including the flow rate, temperature, and concentration. A typical chemical scrubber setup includes a scrubbing vessel, fan, recycle pump, instrumentation and controls, mist eliminator, exhaust stack, ductwork, chemical feed pumps, and chemical storage tanks.

While a chemical scrubber application would achieve a high level of continuous odor removal efficiency and be able to handle peak flows, significant costs, both direct and indirect, would be incurred by the WPCF. Capital cost will include chemical scrubber equipment and accessory systems, as well as a building to host the equipment and store chemicals. Significant O&M costs are required, including manpower to run the system, chemical use, and waste disposal. Additionally, the use of chemicals would require health and safety measures and proper chemical storage and containment.

6.3 Installation of Activated Carbon Filter

The third alternative is the installation of activated carbon filters. Carbon filters work through the process of adsorption, where odorous molecules attach to the active surface areas of carbon media. The greater the surface area of the adsorbent, the greater the removal efficiency. A typical carbon filter setup includes two vessels, fans, fan sound enclosure, exhaust stack, prefilter, ductwork, and carbon media. The service life of the carbon media is typically five (5) years, although this depends on the system's flow rate and concentration.

Similar to a chemical scrubber, carbon filters provide a high level of continuous odor removal efficiency and can handle peak flows experienced by the WPCF. However, unlike a chemical scrubber, carbon filters pose much less of safety risk and require a smaller upfront capital cost. Additionally, the infrastructure and equipment required by carbon filters is less than that of a chemical scrubber; but greater than a biofilter. The maintenance of carbon filters is low, generally consisting of changing air pre-filters, maintaining fans and motors, and changing the carbon media approximately every five (5) years. These maintenance requirements are similar to what the WPCF has been doing for the existing biofilter and odor control fan/duct.

6.4 Installation of Satellite Treatment System at the Sludge Holding Tank

Because the sludge holding tank is the largest contributor of odors at the WPCF, as well as being one of the closer odor sources to abutters residing on Main Street, the installation of a satellite odor treatment system at the tank might be effective in reducing odors. This alternative would best be applied in conjunction with one of the alternatives outlined above. The satellite system would treat odorous air associated with the sludge holding tank, significantly reducing the odor load directed to the centralized odor treatment system and thereby improving its performance and longevity, especially for a biofilter system.

Like the technology described in Section 6.3, smaller carbon filters exist in canister/drum form that are designed to treat odors at the source, as opposed to larger carbon filter that treats odorous air collected from across the entire WPCF. However, because of the high concentrations experienced at the sludge holding tank, carbon filter canisters would not be the appropriate technology for this application. The carbon media has a greater likelihood of being overwhelmed at the sludge holding tank, resulting in a greater frequency of changing out the filter media and/or inadequate treatment of odor.

Instead of carbon filter cannisters, the sludge holding tank may benefit from the installation of a Vapex™ odor control system. The technology combines ozone, water, and air to create hydroxyl radicals that can oxidize odor compounds. The system has a small footprint, requires no chemicals or biosolutions, and can be tailored to meet the WPCF's needs. In addition to odor control, Vapex™ units are capable of remediating fats, oils, and grease, as well as decreasing rates of corrosion.

The disadvantage of satellite system is that it only treats odor locally, and the other odor sources in the WPCF will remain untreated by the system. However, the satellite system can reduce odor load to the centralized odor treatment system, attenuate peak concentration, and consequently improve the performance of the centralized system.

TABLE 6-1
Evaluation of Odor Treatment Alternatives

	Rehabilitation and Reuse of Existing Biofilter	Installation of Chemical Scrubber	Installation of Activated Carbon Filter	Installation of Satellite Vapex™ System at Sludge Holding Tank
O&M	Low	High	Moderate	Low
Required Infrastructure	Low	High	Moderate	Low
Capital Cost	Low	High	Moderate	Low
Key Equipment	Low	High	Moderate	Low
Safety Risk	Low	High	Low	Low
Effectiveness of Odor Removal	Moderate	High	High	Moderate

7. Recommendations

Based on the evaluation of these alternatives and discussions with the WPCF staff, Tighe & Bond recommends a phased approach for improving odor control at the WPCF. Initially, it is recommended that the WPCF rehabilitate their existing organic media biofilter utilizing engineered biofilter media.

Rehabilitating the existing biofilter with permanent engineered media would provide a higher efficiency for odor removal than the existing organic media and be able to handle the average odor concentrations experienced at the WPCF. The capital cost and required infrastructure necessitated by the rehabilitation of the biofilter is less than that of constructing either a chemical scrubber or activated carbon filter. The application of engineered biofilter media at the WPCF is the least costly alternative that will improve the effectiveness of the current odor control system.

For reference, Table 7-1 lists BIOREM® engineered biofilter installations in the region. Of note is the Westerly, RI Wastewater Treatment Facility (WWTF), where the existing organic media biofilter was rehabilitated with Biosorbens® engineered media. A technical cut sheet of the media can be found in Appendix C.

Table 7-2 presents an Opinion of Probable Construction Cost (OPCC) for the rehabilitation of the existing biofilter. Upon removal of the existing organic media, piping within the biofilter

may need to be modified to ensure proper air distribution, hydration, and drainage of the engineered biofilter media. It should be noted that the engineered biofilter media does not require as long of a contact time as organic media does, so the biofilter volume can be reduced. The total construction and engineering cost is estimated to be approximately \$460,000.

TABLE 7-1

Regional Installations of BIOREM® Engineered Biofilter Media

Location	Description
Westerly, RI WWTF	Rehabilitated existing organic media biofilter with 5600 ft ³ Biosorbens® engineered media
New Milford, CT WPCF	Systemwide, large in-ground Biofiltair™ Biofilter
Newport, RI WWTF	Systemwide, large Biofiltair™ Biofilter
Rumford, RI	Two above-ground, two-stage, Basys™ Biofilters
East Providence, RI WTF & Pump Station	Mytilus® Biotrickling Filter installed at both the influent building and at a pump station

TABLE 7-2

Biofilter Rehabilitation OPCC and Engineering Estimate

Demolition and Modification of Existing Biofilter ¹	\$50,000
Supply and Delivery of Engineered Biofilter Media ²	\$126,500
Installation of Engineered Biofilter Media	\$60,000
Subtotal Construction	\$236,500
Construction Contingency @20%	\$47,300
Total Estimated Construction	\$283,800
Contractor OH&P @40%	\$113,520
Estimated Engineering @20%	\$56,760
Total Estimated Construction and Engineering	\$454,080
Rounded³	\$460,000

1. One of the existing biofilter cells to be demolished and backfilled, the other is to be rehabilitated.

2. Price includes SCH 80 PVC manifold, Engineering Submittal packages, O&M manuals, and field services.

3. Cost estimate is a rough order of magnitude, estimated prior to any design efforts.

As part of the biofilter rehabilitation, the WPCF should consider installation of a satellite odor treatment technology at the sludge holding tank. The sludge holding tank is the largest source of odor loads at the WPCF. Treating this odor source separately will lessen the load on the biofilter, reducing its size and likely improving its performance and longevity. As discussed in Section 6.4, a Vapex™ unit may prove effective in reducing odors at the sludge holding tank, ultimately reducing downstream concentrations to lessen the load on the biofilter. Appendix D contains the cut sheets of a Vapex™ system. Recently, a Vapex™ system was installed at the Southington, CT WPCF for odor control of the sludge holding tank and the system is capable of treating peak H₂S concentrations greater than 1,000 ppm.

Table 7-3 presents an OPCC for the installation of a Vapex™ treatment system at the sludge holding tank. With no treatment chemicals needed, the system can begin treating odors at the sludge holding tank once the proper water and electrical connections are made. One unit

equipped with four nozzles should be sufficient to treat odorous compounds within the sludge holding tank. It should be noted that adding a satellite treatment system to the sludge holding tank will lessen the load on the biofilter, allowing the biofilter to potentially decrease in physical size and thus making it less expensive. The total construction and engineering cost is estimated to be approximately \$380,000.

TABLE 7-3

Sludge Holding Tank Satellite Treatment OPCC and Engineering Estimate

Supply and Delivery of Vapex System ¹	\$137,713
Installation of Vapex System	\$60,000
Subtotal Construction	\$197,713
Construction Contingency @20%	\$39,543
Total Estimated Construction	\$237,255
Contractor OH&P @40%	\$94,902
Estimated Engineering @20%	\$47,451
Total Estimated Construction and Engineering	\$379,608
Rounded²	\$380,000

1. Price includes Engineering Submittal packages, O&M manuals, spare parts, field services, and training.

2. Cost estimate is a rough order of magnitude, estimated prior to any design efforts.

As part of the WPCF odor control system upgrade, Tighe & Bond also recommends covering the primary tank influent and effluent channels. As noted in Table 2 of the OS&E report, these areas have shown significant D/T values that could be contributing to odor complaints. Covering the primary tank influent and effluent channels will help contain odors at the WPCF and ensure that they are properly routed to the WPCF's odor control system. During the design phase, it should be confirmed that the rehabilitated biofilter is properly sized for the additional air flow from these areas. Table 7-4 includes an Engineering Cost Estimate for covering the primary tank influent and effluent channels as well as the installation of any required air ducts.

Ultimately, the WPCF may decide to move away from biofilters for odor control. The biological processes within a biofilter can be challenging for reliable odor control, especially with variable factors such as odor loads, temperature, and moisture. Many wastewater facilities find carbon filters to be the easiest and most effective means of treating odors. The activated carbon media can also be engineered to have an affinity for a specific compound, such as hydrogen sulfide. While they have higher upfront capital costs as compared to biofilters, Tighe & Bond believes they provide the best reliability and ease of operation in the long term for controlling odors. For this reason, we recommend the installation of carbon filters for a long-term odor control solution at the WPCF.

Table 7-4 presents an OPCC and Engineering Cost estimate for the installation of an activated carbon filter odor control system. Appendix E contains a conceptual design layout for the proposed carbon filter odor control system. In the concept, we propose installing the carbon filters in the same location as the existing biofilter. It is presumed that the existing biofilters would be demolished. A carbon filter package for the odor control system at the WPCF would include two insulated fiber-reinforced plastic (FRP) vessels, exhaust stacks, new fans with sound enclosure, prefilter differential pressure gauges, carbon media, and a simple control panel with motor starter. The OPCC also includes work for covering the primary tank influent and effluent channels as well as all associated ductwork needed to fully integrate the carbon

filter. The total construction and engineering cost is estimated to be approximately \$1,200,000.

TABLE 7-4
Carbon Filter OPCC and Engineering Estimate

Demolition of Existing Biofilter	\$50,000
Backfill and Filter Pad	\$50,000
Carbon Filter & Installation	\$600,000
Electrical Works	\$70,000
Cover Primary Tank Influent/Effluent Channels/Air Ducts	\$50,000
Subtotal Construction	\$820,000
Construction Contingency @20%	\$164,000
Total OPCC	\$984,000
Total Estimated Engineering @20%	\$196,800
Total Estimated Construction and Engineering	\$1,180,800
Rounded	\$1,200,000

1. Cost estimate is a rough order of magnitude, estimated prior to any design efforts.
2. Assumed the existing biofilters will be demolished and backfilled, and new carbon filter will be installed at the same location.
3. Assumed two units at 6,000 cfm/unit. One duty unit and one standby unit.

A large, solid blue curved shape that starts wide on the left and tapers towards the right, framing the Tighe & Bond logo.

Tighe&Bond

APPENDIX A



Odor Science & Engineering, Inc.

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(860) 243-9380 Fax: (860) 243-9431

September 1, 2021

Alan Wells
Sr. Project Manager
Tighe & Bond
213 Court Street
Middletown, CT 06457

RE: Assessment of odors associated with the South Windsor Water Pollution Control Facility
OS&E Project No. 2252-M-00

Dear Alan:

This letter report summarizes the results of Odor Science & Engineering, Inc. (OS&E's) tasks associated with Tighe & Bond (T&B's) Odor Control Study at the South Windsor Water Pollution Control Facility (WPCF). The facility is located at 1 Vibert Road in South Windsor, CT. The objective of the T&B Odor Control Study was to address the potential source(s) of odor causing complaints from a few residents located nearby Main Street. OS&E's tasks consisted of the following:

- Participation in the project's Kick-off meeting,
- Collection and analysis of odor emission samples from plant sources and
- Conducting ambient odor surveys in the areas surrounding the WPCF

The project kick-off meeting was held at the WPCF on May 26th, 2021. Following the meeting, OS&E together with T&B conducted a plant walk through to identify potential sources of odor emission. A sampling plan was developed which involved collecting a total of 16 samples from plant sources over 2 non-consecutive days. The first round of sampling was conducted on June 29th followed by a second round of sampling on July 28th, 2021. Each day the samples were returned to OS&E's Olfactory Laboratory in Bloomfield, CT for quantification and characterization within 24 hours.

Odor Sample Analysis

The samples were analyzed by dynamic dilution olfactometry using a trained and screened odor panel. The odor panelists are chosen from OS&E's pool of panelists from the Greater Hartford area who actively participate in ongoing olfactory research and represent an average to above average sensitivity when compared to a large population. The samples were quantified in terms of dilution-to-threshold (D/T) ratio in accordance with ASTM Method E-679-04. The odor panelists were also asked to describe the odor character of the samples at varying dilution levels. The sampling and odor measurement methodology is further described in Attachment A.

The odor panel results are summarized in Tables 1 and 2. Table 1 summarizes the results for the samples collected on June 29th, 2021. Emissions from several of the facility's strongest odor sources are collected and ducted to the biofilter for odor control. Samples were collected at the inlet to the biofilter and the outlet (surface) of the biofilter at 4 locations. With an inlet odor level of 8,282 D/T, the outlet samples ranged from 23 D/T to 8,313 D/T. Elevated odor levels at outlet locations 1 and 2 indicate short circuiting and uneven distribution of the air going into the biofilter. The biofilter sampling locations are shown in Figure 1. The flow rate was measured from a stack on the sampling hood during sample collection with an anemometer recording the velocity in feet/minute (fpm). Higher flow rates were measured at locations 1 and 2 (averaging 400 fpm) compared to locations 3 and 4 (averaging 221 fpm).

Three samples were also collected from aeration basin #2. The odor level of the sample collected 2" above the turbulent water surface at the influent channel was 75 D/T. The odor level collected from the quiescent surface at the center of the tank using a floating sampling hood was 19 D/T while the odor level of the sample collected 2" above the water at the effluent channel was 15 D/T.

Table 2 summarizes the results for the samples collected on July 28th, 2021. A significant amount of rain had been received between the June and July sampling events. With a much higher flow rate into the plant diluted by stormwater, odor levels in general were lower. A sample was collected from the water surface of the SW aeration anoxic zone tank using a floating sampling hood. The odor level was found to be 38 D/T. Two samples were again collected from the surface of the biofilter. The odor levels were considerably lower (69 D/T and 82 D/T) than those collected in June. The biofilter sampling locations are shown in Figure 2. H₂S measurements made by T&B at the inlet to the biofilter recorded ~20 ppm in June and ~1.6 ppm during the July sampling. The remaining samples were collected from the primary tanks. Odor levels ranged from 35 D/T from the quiescent surface of primary tank No.2 to 163 D/T in the primary effluent weir channel. OS&E also observed the sludge unloading operation that took place on July 28th and found it to be insignificant in terms of odor emissions. It is essentially a closed loop system with a direct attachment from the sludge tank into a 6000 gallon tanker truck that hauls off site. The sludge transfer area was found to be kept very clean.

Ambient Odor Monitoring

In conjunction with the June and July emission sampling events and on two additional days in August 2021, OS&E conducted a total of 6 individual odor surveys in the areas surrounding the WPCF. The odor surveys were conducted to document the extent and character of any off-site impact from WPCF emission sources as well as the impact from other odor sources in the area which could potentially cause odor complaints from nearby residents.

Community surveillance was accomplished by slowly driving or walking downwind of the WPCF. Each survey included the areas of concern along Main Street where odor complaints have been received from. The odor monitoring was conducted specifically looking for WPCF-related odors and, if found, to document the extent of their impact. Odors from odor sources in the area were also noted. When an odor was perceived, the location, aerial extent, weather, time, wind speed, wind direction, temperature, odor character, odor concentration (D/T ratio) and odor intensity were recorded.

Odor concentration was measured using a Scentometer. Odor intensity was measured using the 8-point butanol odor intensity scale. These ambient odor measurement methods are further described in Attachment B.

The individual surveys are shown in Figures 3 through 8. The shaded area on each figure represents the boundary of the areas investigated during the survey. The locations of the individual zones of odors detected are shown in red, numbered in the order in which the observations were made. Any WPCF-

related odor observations are highlighted in yellow. The numbers correspond to the entries in the table on each figure which provide the details of each odor observance. The tabular inserts in Figures 3 through 8 show the intensity of the odors on the n-butanol scale, odor concentration (in terms of “dilutions to threshold”, D/T), the character and the likely source of the odor.

Summary of off-site Surveys

Survey No. 1 began early on the morning of June 29th, 2021. Winds were from the S-SW at 2-4 mph, gusting to 6 mph. Skies were mostly sunny with an ambient temperature of 85°F. The only WPCF-related odors detected were at the entrance to rear gate. The “sewage/H₂S” was very light (odor intensity 0.5-1.0). Other odors detected during this survey included a “swampy/muddy” odor (intensity 1.0) coming from the wet marshy area just after the WPCF on Vibert Rd, Further down on Vibert Rd. an “earthy/dirt” odor (intensity 0.5) was noted coming from the open fields. Heading north on Main Street a “manure/barnyard” odor (intensity 0.5) was detected coming from a local home with a small farm on the property. On Strong Rd. and again on Pleasant Valley Rd. an “earthy/dirt/vegetation” odor was observed (intensity 0.5) coming from the open fields.

Survey No. 2 was conducted following sample collection on the afternoon of June 29th, 2021. Winds were west to W-SW shifting to W-NW by the end of the survey. Skies were sunny with an ambient temperature of 97°F. WPCF-related odors were detected at the plant entrance (intensity 0.5-1.0, locations 1 and 5) and again immediately northeast of the plant entrance on Main Street (location 2). Other odors detected during this survey were “food cooking” odors (intensity 1.0-1.5) from a local restaurant on Route 5 and “sour vegetation” odor (intensity 0.5-1.0) on Chapel Rd.

Survey No. 3 was conducted during the early morning on Wednesday, July 28th, 2021. Skies were mostly cloudy, with winds from the N shifting toward S at 1-5 mph with gusts up to 8 mph. The ambient temperature was 68°F. No WPCF odors were detected during this survey. “Wet grass” odors (intensity 1.0-2.0) were detected along Brook Street from a localized small flooded area of wet grass. Just south of the Bissell Bridge “earthy/dirt/manure” odors (intensity 1.0-1.5) were found to be coming from a local farm. A light “manure” odor (intensity 1.0) coming from another small local farm was detected along Newberry Road.

A fourth survey was conducted later that afternoon, Winds were from the N-NNE blowing at 2-4 mph gusting to 6 mph. Skies were mostly sunny with an ambient temperature of 81°F. Again, no wastewater treatment plant odors were detected during this survey. The only odor detected during this survey was a “stagnant/muddy water” odor (intensity 1.0-1.5) found west of the treatment plant on Vibert Rd. coming from wet areas on the access road.

Survey No. 5 was conducted on Friday morning, August 20, 2021. The temperature was 73°F with a very light S-SW-W at 0-1 mph and mostly cloudy skies. WPCF-related odors were again only found in close proximity to the plant. “Sewage/H₂S” odors (intensity 1.0-2.0) were detected at the entrance to the plant on Vibert Rd and light puffs of “sewage” (intensity 0.5) were detectable at the intersection of Vibert Rd & Main St. Other odors detected were attributable to local vegetation as well as a “burnt rubber” odor (intensity 1.0-2.0) at the intersection of Route 5 and Governors Hwy from a local tire company.

The final survey was conducted on the evening of August 25th, 2021. Winds were calm with an ambient temperature of 82°F. The only WPCF-related odor detected during this survey was a “sour sewage” odor (intensity 0.5-1.5) located immediately north of the plant on Vibert Rd. (location 7). All other odors

detected were related to local farms/fields, woodburning and a sewer drain located near the intersection of Route 5 and Glendale Rd.

Summary June/July/August Odor Surveys

In summary, when specifically looking to detect SWWPCF-related odors, light "sewage" odors were sometimes detected, but were found to be localized to the immediate area around the plant on Vibert Rd. and at the intersection of Vibert Rd. and Main St. The intensity of plant-related odors ranged from 0.5 to a maximum of 2.0.

Odors at these intensity levels would be characterized as:

n-butanol intensity level (0-8) ASTM E544-18	description of perceived odor
0.5 – 1	Very Faint: An odor that would ordinarily not be noticed by the average person and but could be detected by the experienced inspector or a hypersensitive individual.
1-2	Faint: An odor so weak that the average person might detect if his attentions are called to it, but that would not otherwise attract his attention.

Odors of such intensity level would not typically be the cause of odor complaints. Odor complaints are usually initiated at an odor intensity value of 3.0 or greater on the 8-point n-butanol intensity scale. This has been verified in many of our field studies across the country for a wide variety of industries and their neighboring communities. Only when a community has become "sensitized" (developed a disproportionate lack of tolerance for certain odors) is the objectionability level significantly below 3.0.

We appreciate the opportunity to work with T&B on this project. Please feel free to call me if you have any comments or questions concerning this report.

Sincerely,
ODOR SCIENCE & ENGINEERING, INC.



Martha O'Brien
Principal

**Table 1. Results of dynamic dilution olfactometry analysis – June 30th, 2021
Tighe & Bond - South Windsor WPCF Source Sampling Test Results
OS&E Project No. 2252-M-00**

Sample			Odor Conc. D/T ⁽¹⁾	Stevens' Law Constants ⁽²⁾		Odor Character ⁽³⁾
Date	Time	Location		a	b	
06/29/21	10:38	Biofilter Inlet	8,282	.60	.75	sour, H ₂ S, sewage, rotten eggs, sulfur, rotten meat/feces
06/29/21	10:10	Biofilter Outlet Loc. #1	4,071	.55	.91	sour, sewage, H ₂ S, rotten eggs, rotten sulfur, rotten meat, feces
06/29/21	10:28	Biofilter Outlet Loc. #2	8,313	.52	.91	sour, sewage, H ₂ S, rotten eggs, sulfur, rotten, feces, garbage
06/29/21	10:49	Biofilter Outlet Loc. #3	539	.64	.80	sour, sewage, H ₂ S, rotten eggs, sulfur, feces
06/29/21	11:09	Biofilter Outlet Loc. #4	23	.68	.73	sour, earthy, musty, wood chips, sewage, mercaptan, feces, plastic
06/29/21	11:44	Aeration Tank #2 Influent Channel Box	75	.59	.82	sour, sewage, rotten sludge, rotten meat, putrid, garbage, sulfur, H ₂ S, rotten potatoes, rotten onions, rotten cabbage
06/29/21	11:57	Aeration Tank #2 Effluent Channel Box	15	.54	.95	sour, sewage, sulfur, dirty water, rubber, plastic, exhaust
06/29/21	12:18	Aeration Tank #2 - Center of Tank	19	.64	.79	sour, dirty water, musty, earthy, sewage, mercaptan, onions, plastic, exhaust

1. D/T = dilutions-to-threshold
2. Stevens' Law correlates odor concentration (C) and odor intensity (I): $I = aC^b$. The constants a and b were determined by regression analysis based on the intensity ratings of the odor panel at varying dilution levels. I = 0-8 (based on the n-butanol intensity scale), C = odor concentration (D/T) typical of ambient odor levels.
3. Summary of all odor character descriptors used by the odor panelists at varying dilution levels.

Odor Science & Engineering, Inc. 105 Filley Street, Bloomfield, CT 06002
Phone (860) 243-9380 Fax (860) 243-9431 www.odorscience.com

Odor Sampling of SWWPCF Biofilter

Date 06/29/2021

Time: 10:10-11:10

Temp. 91⁰F Barometric Pressure 29.98 Wind Speed 2-4 Dir. S-SSW

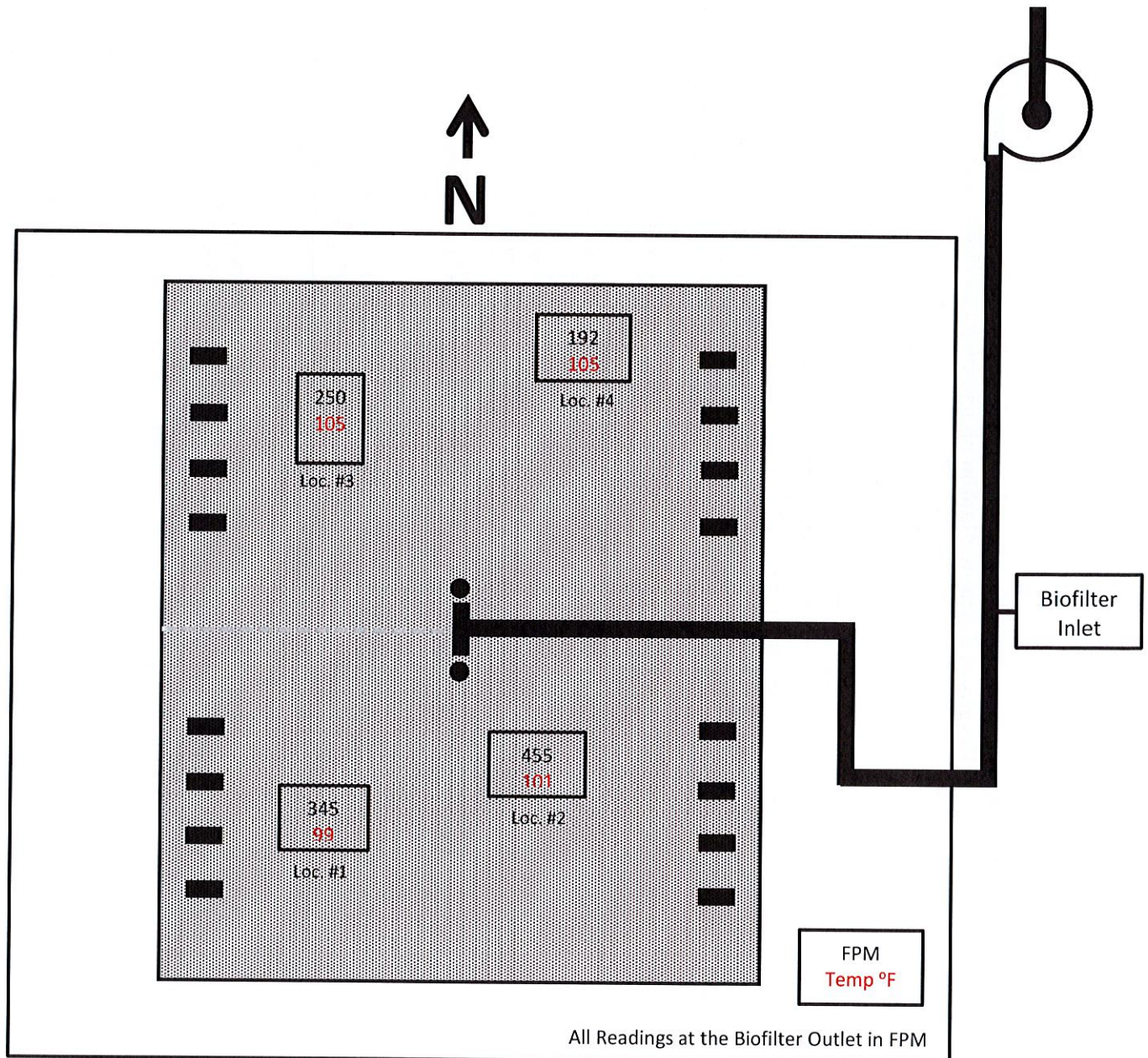


Figure 1. Air flow and Temperature Measurements During Sample Collection

Table 2. Results of dynamic dilution olfactometry analysis – July 29th, 2021
Tighe & Bond - South Windsor WPCF Source Sampling Test Results
OS&E Project No. 2252-M-00

Sample			Odor Conc. D/T ⁽¹⁾	Stevens' Law Constants ⁽²⁾		Odor Character ⁽³⁾
Date	Time	Location		a	b	
07/28/21	10:42	Biofilter Outlet South Center of Bed	69	.52	.71	sour, rotten sewage, H ₂ S, rotten cabbage, earthy, wet dirt, rotten composted leaves
07/28/21	11:03	Biofilter Outlet North Center of Bed	82	.66	.76	sour, rotten sewage, rotten cabbage/vegetables, sulfur, swampy, urine, outhouse
07/28/21	11:34	Primary Influent Channel Splitter Box	38	.56	.79	sour, sewage, rotten cabbage, urine, garbage
07/28/21	11:52	Primary Clarifier No. 2 Quiescent	35	.58	.74	sour, sewage, sulfur, urine, burnt, smoky, plastic, exhaust
07/28/21	12:08	Primary Clarifier No. 2 Weir	89	.56	.72	sour, sewage, sulfur, H ₂ S, rotten eggs, rotten greens
07/28/21	12:23	Primary Clarifier No. 2 Effluent Weir Channel	163	.59	.72	sour, sewage, sulfur, H ₂ S, rotten eggs, feces
07/28/21	12:55	Primary Effluent Channel Box	49	.66	.72	sour, sewage, sulfur, swampy, rotten cabbage/vegetation, musty
07/28/21	13:17	Anoxic Zone SW Tank Center of Tank	38	.45	.74	sewage, earthy, dirt, musty cellar, stagnant water, swampy

1. D/T = dilutions-to-threshold
2. Stevens' Law correlates odor concentration (C) and odor intensity (I): $I = aC^b$. The constants a and b were determined by regression analysis based on the intensity ratings of the odor panel at varying dilution levels. I = 0-8 (based on the n-butanol intensity scale), C = odor concentration (D/T) typical of ambient odor levels.
3. Summary of all odor character descriptors used by the odor panelists at varying dilution levels.

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Odor Sampling of SWWPCF Biofilter

Date 07/28/2021

Time: 10:30-11:03

Temp. 67°F Barometric Pressure 30.01 Wind Speed 2-8 mph Dir. North

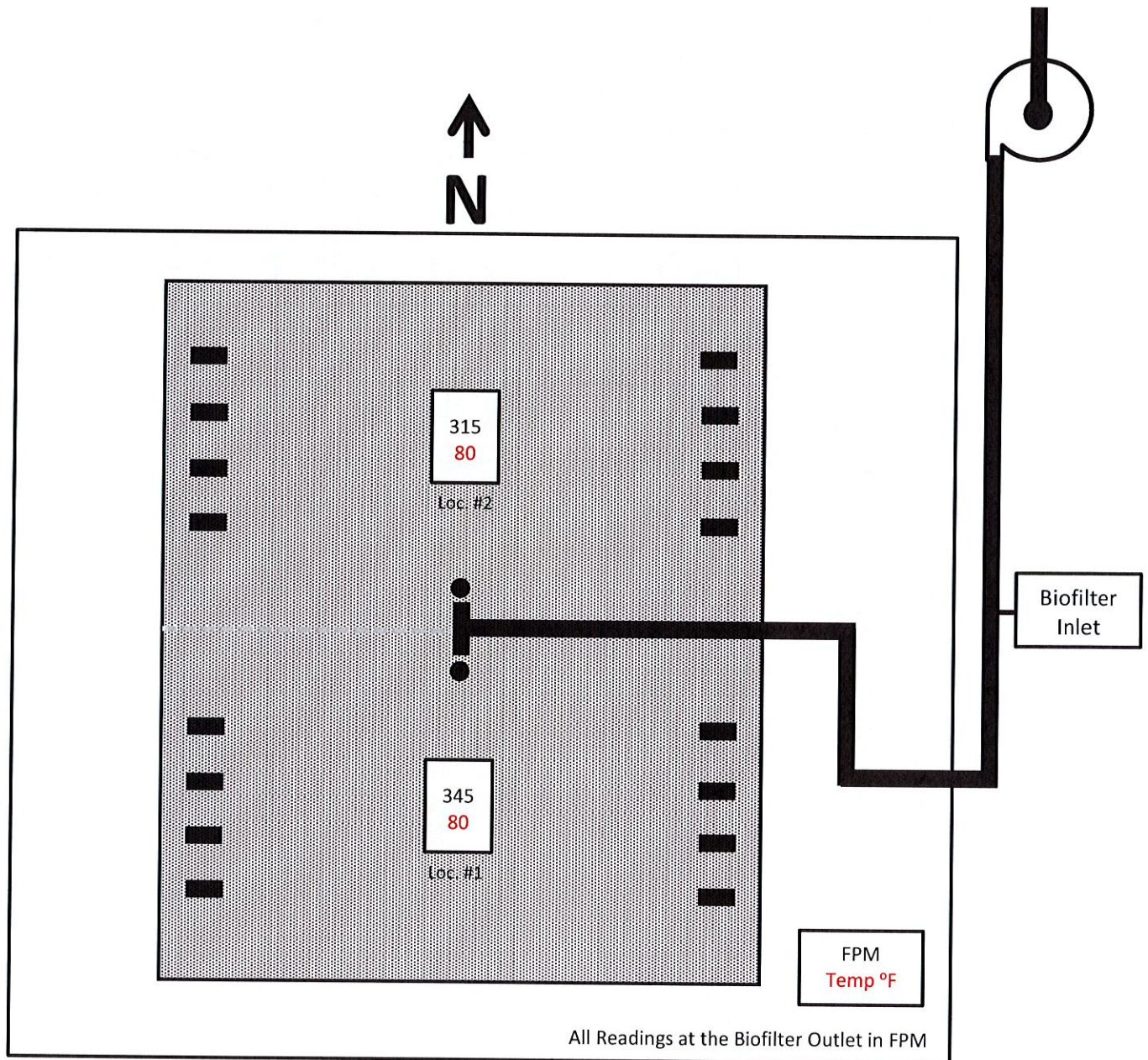
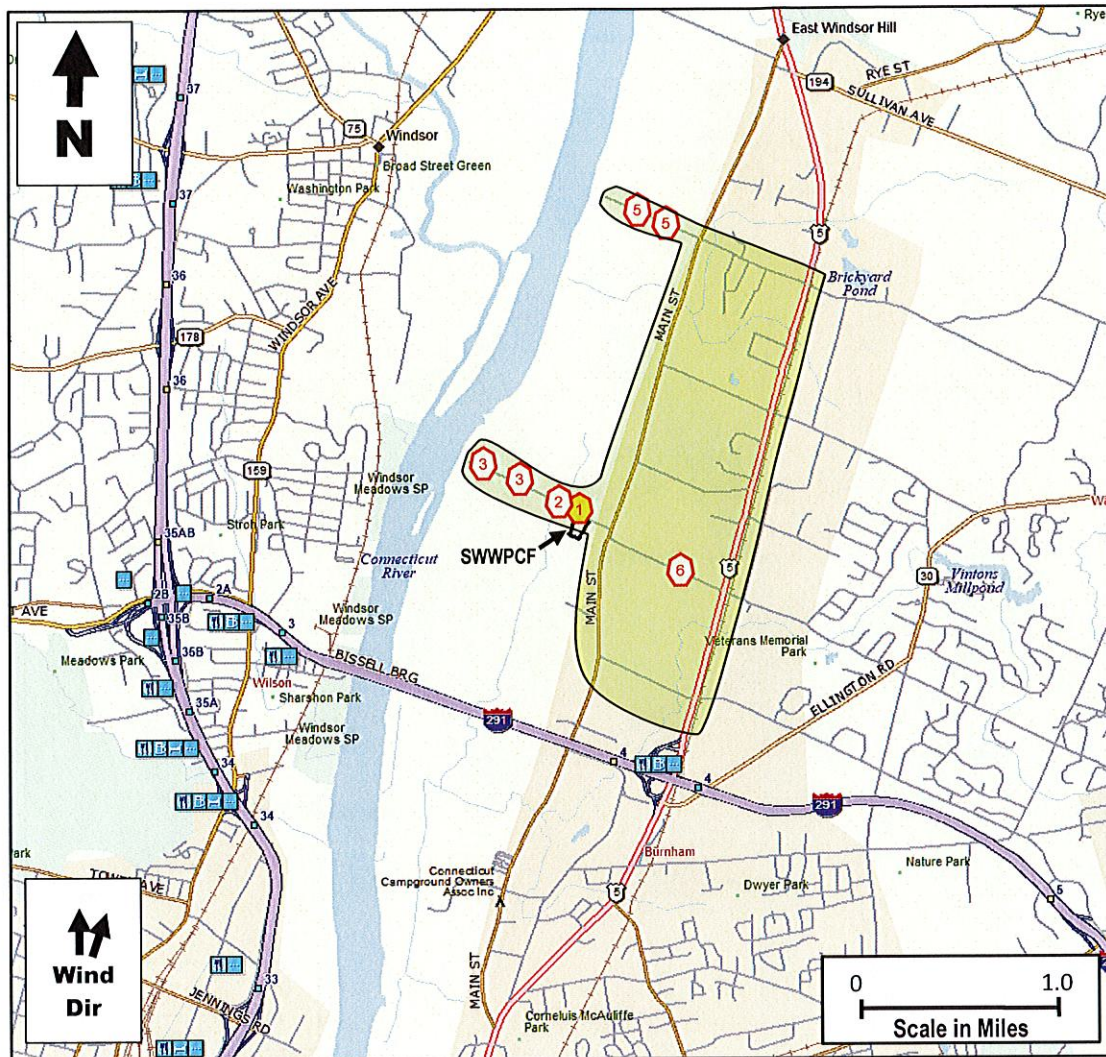


Figure 2. Air flow and Temperature Measurements During Sample Collection



loc. #	int.	D/T	character	potential source
1	0.5-1.0	0.5	sewage/H ₂ S	SWWPCF
2	1.0	0.5	swampy, muddy	roadside ditch
3	0.5	0.5	earthy/dirt	farmer's fields
4	0.5	0.5	manure/barnyard	local farmer's barn
5	0.5	0.5	earthy/dirt/vegetation	farmer's fields
6	0.5	0.5	earthy/dirt/vegetation	farmer's fields
meteorological conditions: wind: S-SSW, 2-4 mph, gusts to 6 mph, 85°F, sunny, 10% cloud cover				

Figure 3. Community Odor Survey No. 1 (06/29/2021 08:00-09:20)



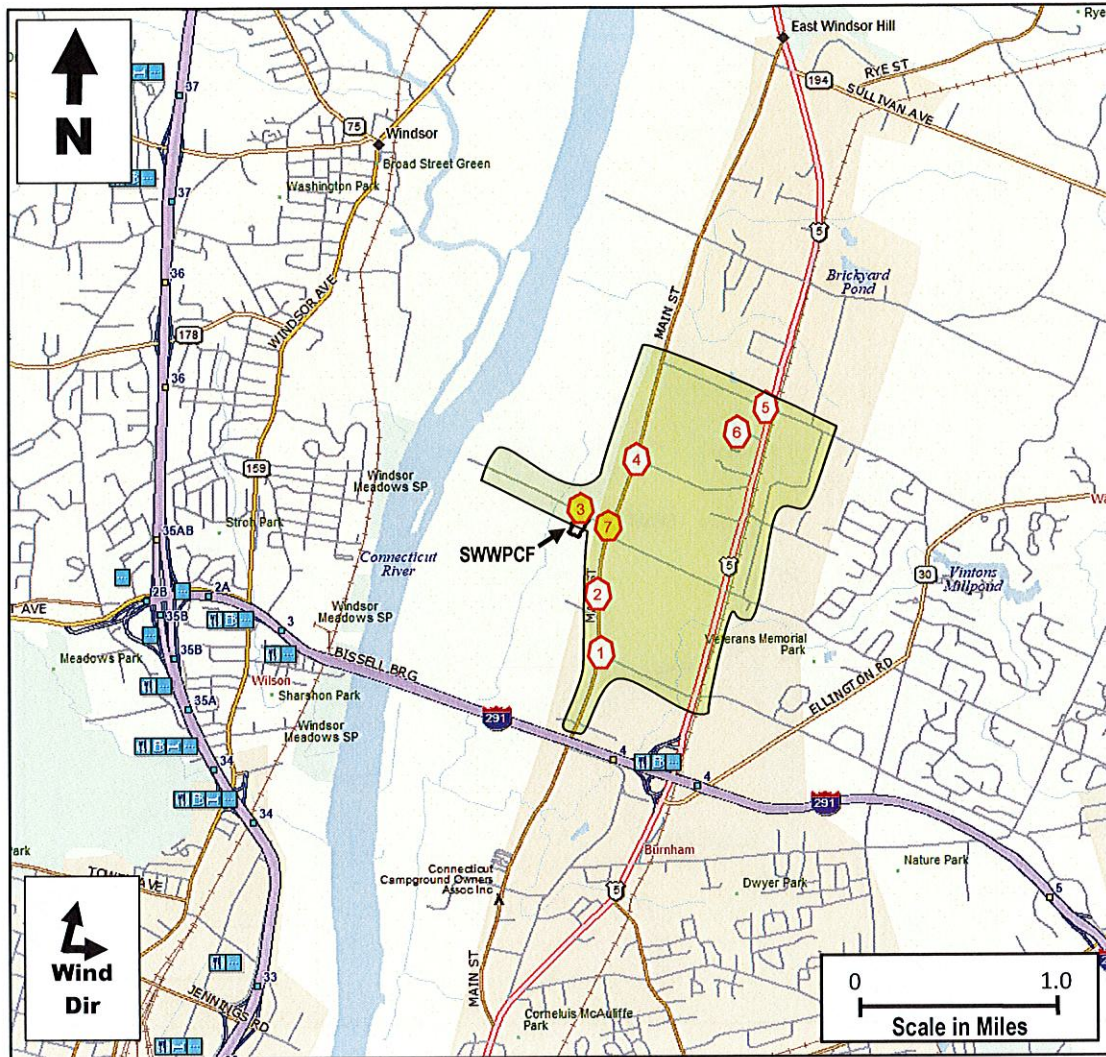
loc. #	int.	D/T	Character	potential source
1	0.5-1.0	<2	sewage, H ₂ S	SWWPCF
2	0.5	<2	sewage, H ₂ S	SWWPCF
3	1.0-1.5	<2-2	food cooking	local restaurant
4	0.5-1.0	<2	sour vegetation	local home yards
5	0.5-1.0	<2	Sewage	SWWPCF
meteorological conditions: wind: WSW-WNW, 1-4 mph, gusts to 6 mph, 97°F, mostly sunny, 25% cloud cover				

Figure 4. Community Odor Survey No. 2 (06/29/2021 12:55-13:55)



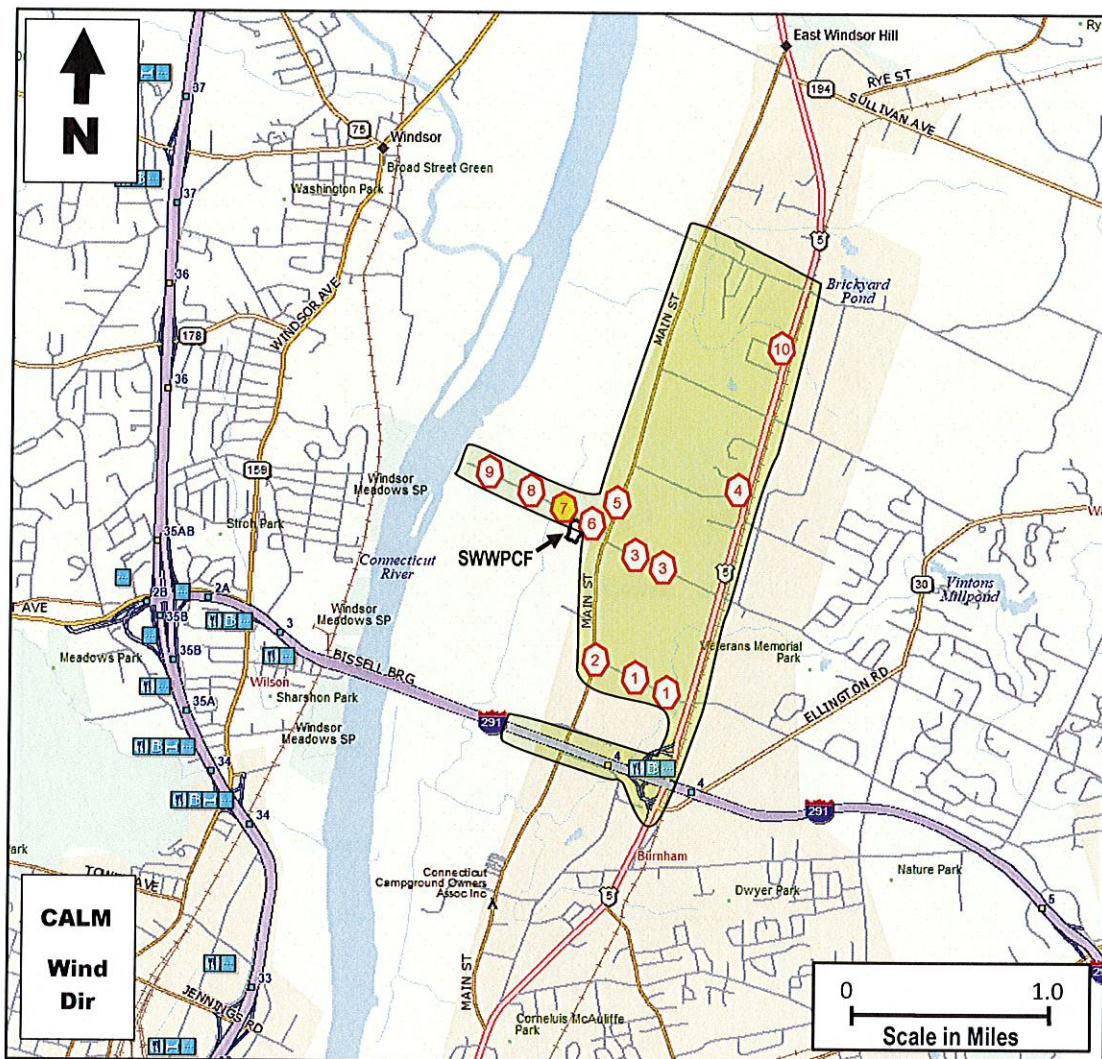
loc. #	int.	D/T	Character	potential source
1	1.0-1.5	<2	stagnant, muddy water	roadside ditch
meteorological conditions: wind: N-NNE, 2-4 mph, gusts to 6 mph, 81°F, mostly sunny, 40% cloud cover				

Figure 6. Community Odor Survey No. 4 (07/28/2021 13:40-14:50)



loc. #	int.	D/T	Character	potential source
1	0.5-1.0	<2	stagnant water	flooded lawns
2	1.0-1.5	<2-2	musty/mulch/wood chips	local home landscaping
3	1.0-2.5	2-7	sewage/H ₂ S	SWWPCF
4	1.0-1.5	<2-2	manure/mulch	local home/farm
5	1.0-2.0	2-7	burnt rubber	Commercial Tire retreading
6	1.0-1.5	<2-2	sour garbage	?
7	0.5	<2	sewage (puffy)	SWWPCF
meteorological conditions: wind: SSW-W, 0-1 mph, 85°F, mostly cloudy, 90% cloud cover				

Figure 7. Community Odor Survey No. 5 (08/20/2021 06:39-08:15)



loc. #	int.	D/T	Character	potential source
1	0.5-1.0	<2	wet dirt/vegetation	wet farmland
2	1.0-1.5	<2-2	Woodsmoke	local home
3	0.5-1.0	<2	wet green vegetation/crops	wet fields
4	1.0-1.5	<2-2	food cooking	local restaurant
5	1.0-2.0	2-7	manure/barnyard	local farm
6	0.5-1.0	<2	fresh cut grass/weeds	side road ditches
7	0.5-1.5	<2-2	sour sewage	SWWPCF
8	1.5-3.0	2-15	swampy/stagnant water	swamp lands
9	0.5-1.0	<2	sour corn/vegetation	corn fields
10	0.5-1.5	<2-2	manure-like/rotten sewage	sewer drain/swampy area
meteorological conditions: wind: CALM 0 mph, 82°F, partly cloudy, 45% cloud cover				

Figure 8. Community Odor Survey No. 6 (08/25/2021 19:05-20:30)

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Tighe&Bond

APPENDIX B

WATER POLLUTION CONTROL FACILITY SOUTH WINDSOR, CT ODOR EMISSIONS SAMPLING LOCATIONS

V = on vertical duct
H = on horizontal duct

Legend

1 Vibert Rd

Port 1 (V)

Port 2 (V)

Port 3 (V)

Port 4 (V)

1 Vibert Rd

Port 5 (V)

Port 6 (V)

Port 7 (V)

Port 9 (H)

Port 8 (H)

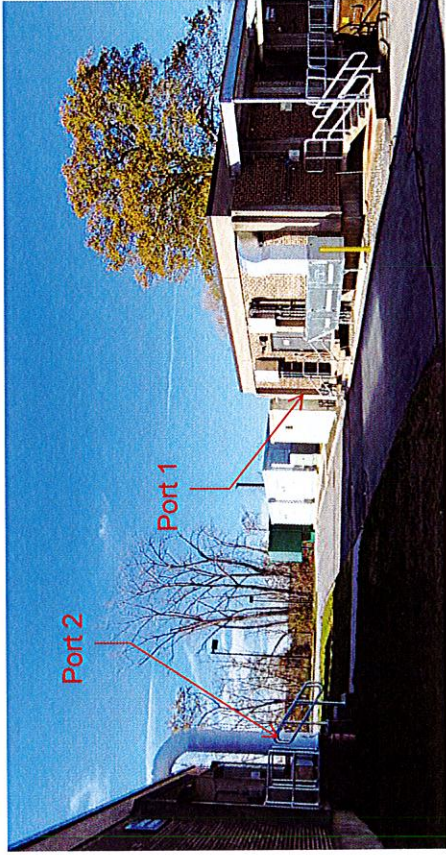
Port 10 (H) No drill
needed

Google Earth

© 2021 Google

90 ft

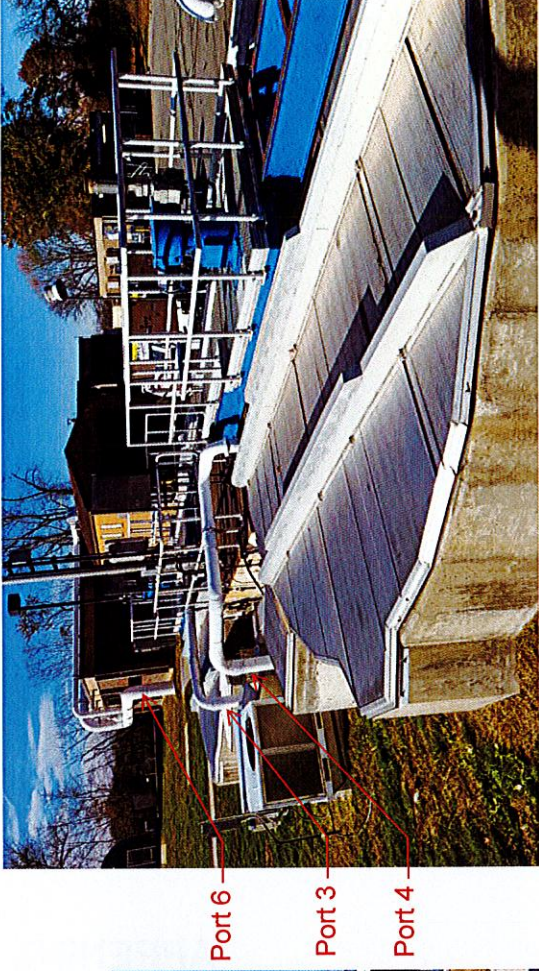




Headworks Bldg. and Influent Pump Wetwell/GBT Bldg



Sludge Holding Tank



Gravity Thickeners and Influent Pump Wetwell/GBT Bldg



Odor Control Exhaust Fans and Duct

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Tighe&Bond

APPENDIX C



BIOSORBENS®

BIOSORBENS® is a top performing, engineered inorganic permanent biofilter media which delivers consistent performance over the life of the media. BIOSORBENS® is ideal for applications where total odor removal is required. It is guaranteed to perform and carries a 10 year warranty.

FEATURE

BENEFIT

Engineered

Our media is an engineered media manufactured to exacting specifications; this ensures predictable and consistent removal efficiency. No more guess work at EBRT's.

Low Pressure Drop

Maintains an even flow distribution throughout the biofilter media bed and minimizing power costs.

High Performance

Consistent and stable, readily achieving greater than 90% total odor removal and 99% H₂S removal.

Rigidity

Mineral structure provides rigid support to minimize the compaction and consolidation effects.

Hydrophilic

Greater water holding capacity provides superior elimination capacity while resisting degrading, decomposition and compaction of the media bed.

Mineral Structure

Immune to composting and does not react with acids, bases and solvents.

Low Residence Times

Empty bed residence times as low as 20 seconds.

Warranty

BIOSORBENS® is warranted for 10 years.



www.biorem.biz

BIOREM® is an environmental biotechnology company which manufactures a comprehensive line of high efficiency, biologically-based, air pollution control systems that are used to eliminate odors, H₂S, NH₃, TRS, VOCs and other hazardous air pollutants. With more than 500 installed systems worldwide, and over 15 years of experience, BIOREM® not only offers state-of-the-art technology based products but provides engineered solutions for total odor and VOC control.

CANADA

7496 Wellington Road 34, RR#3
Guelph, Ontario, Canada N1H 6H9
Toll Free: 1.800.353.2087 • Tel: 519.767.9100
Fax: 519.767.1824 • Email: info@biorem.biz

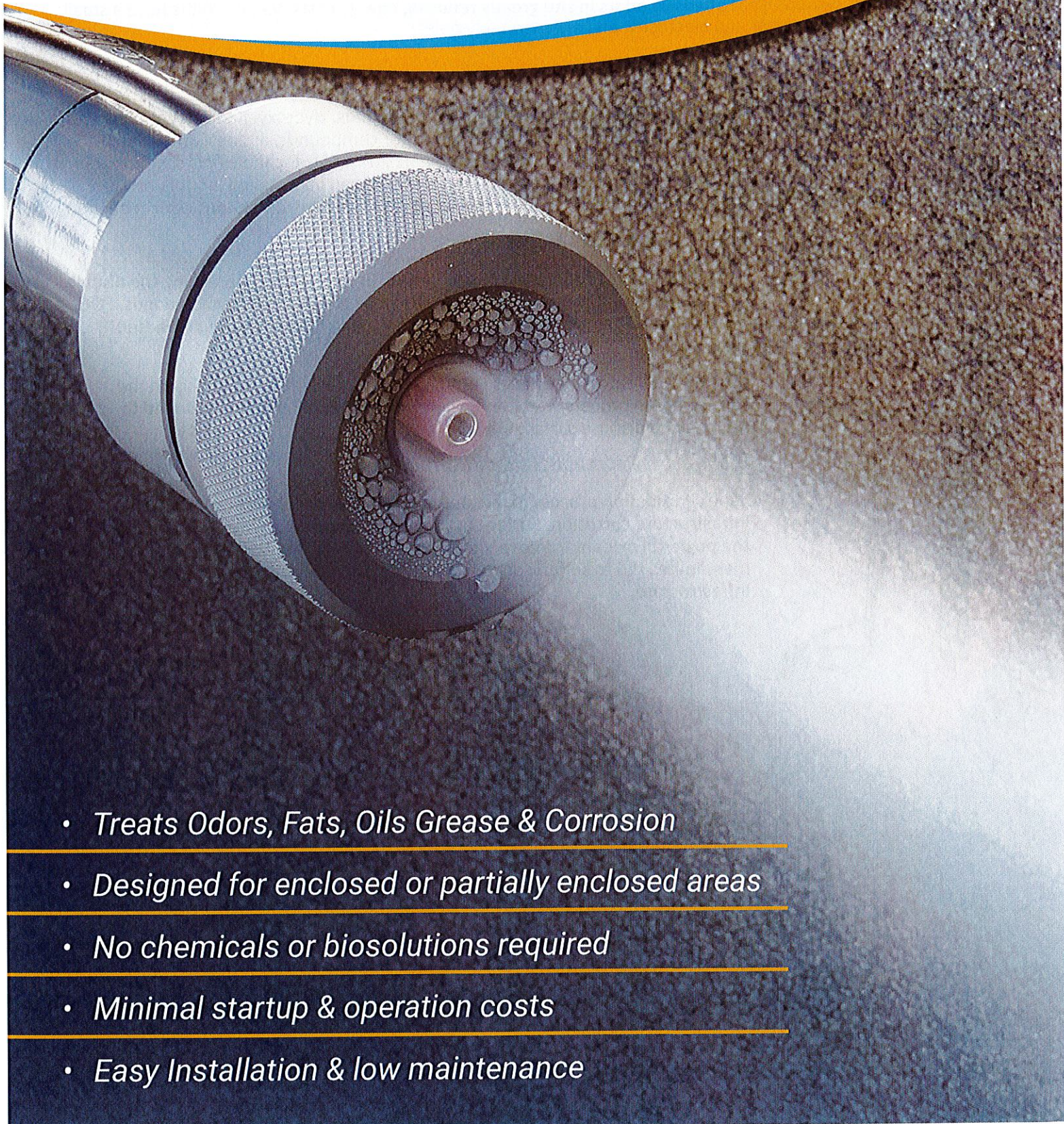
UNITED STATES

100 Rawson Road, STE 230
Victor, NY, 14564
Toll Free: 1.877.299.2108
Tel: 519.767.9100 • Fax: 519.767.1824

APPENDIX D



Radical Odor Control Technology **with Advanced Oxidation Process**



- *Treats Odors, Fats, Oils Grease & Corrosion*
- *Designed for enclosed or partially enclosed areas*
- *No chemicals or biosolutions required*
- *Minimal startup & operation costs*
- *Easy Installation & low maintenance*

Successfully Installed in Hundreds of Locations

The Vapex™ odor control system with its patented air atomizing three-fluid nozzles enhance the Advanced Oxidation Process by creating hydroxyl radicals ($\bullet\text{OH}$), the most potent oxidant used in odor treatment.

Vapex™ combines ozone, water and air to create hydroxyl radical fog that is efficiently dispersed throughout enclosed or partially enclosed spaces, such as lift stations, wet wells, holding tanks, diversion boxes, and headwork channels.

Vapex™ odor control systems treat offensive odors in situ greatly reducing energy costs. Vapex™ units have a small footprint, require minimal water and electricity, and are extremely quiet.

Eliminate Odors

Vapex™ technology oxidizes odorous compounds. Hydroxyl Radicals combine with odorous compounds such as reduced sulfur compounds, amines, and volatile fatty acids oxidizing them quickly and efficiently. This technology is customizable to meet varying installation requirements and can be installed indoors or outdoors. The hydroxyl radical fog results in almost instantaneous odor reduction.

Prevents Fats, Oils & Grease

Vapex™ technology remediates Fats, Oils, & Grease (FOG) by breaking the double carbon bonds that form the fatty acid chain. By breaking the carbon bonds, FOG does not reform downstream. Odors from volatile fatty acids are decreased significantly.

Continuous treatment reduces Fats, Oils, and Grease from collecting on the surface of the process water and walls, reducing or eliminating the need to remove and dispose surface FOG.

Disinfect & Decrease Rate of Corrosion

Vapex™ oxidation process eliminates biofilm on surfaces that lead to costly infrastructure corrosion. Surface pH in wet wells can be as low as 1, however, the powerful oxidant fog covers the entire surface killing the bacteria that metabolizes H_2S to sulfuric acid, raising the pH to above 6 and preserving the infrastructure.

Proven

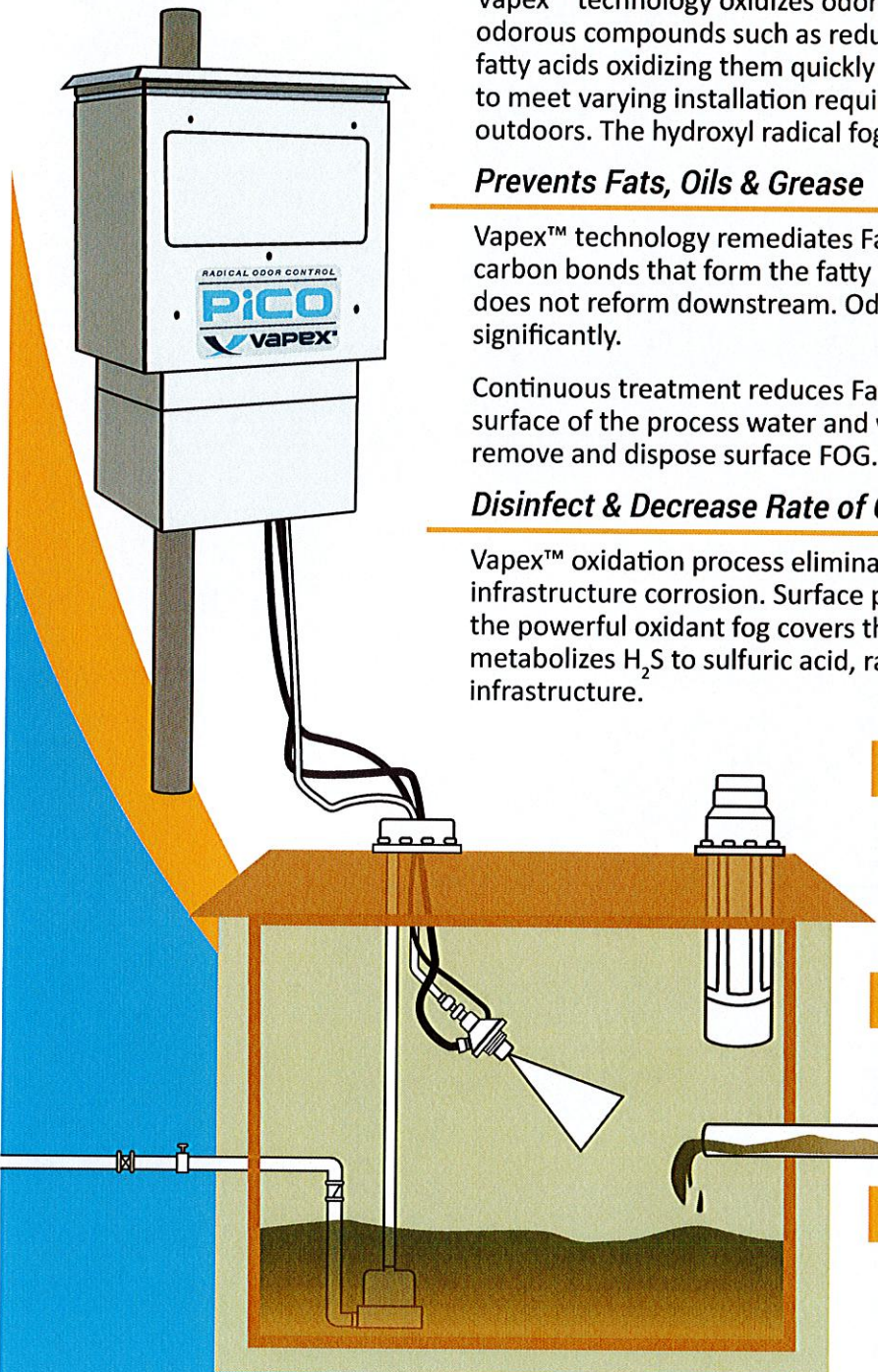
An independent university study found that hydroxyl radicals are being produced by combining micron-sized water particles and ozone using the patented nozzle from Vapex™.

Accepted

Major engineering firms and a state EPA determined the Vapex™ technology is effective in eliminating odors and remediating FOG.

Established

Over the past 10 years, major municipalities have standardized on Vapex™ technology.





LV NOZZLE



HV NOZZLE



RXN VENT

Base Model Features

- Powder Coated Aluminum Cabinet
- Insulated Cabinet
- Patented Nozzles
- HMI/PLC (excluding PICO model)
- Individual Oxidant Control for each nozzle
- SCADA Connection (excluding PICO model)
- Timer Based Oxidant Control
- Auto-Draining Moisture Removal System
- Pressure & Flow Based Oxidant Shut Off
- Small Footprint
- Low Power Usage
- 1- Year Mechanical Warranty
- Modem & Communication Services
- Ergonomically Designed Pedestal Mount

Benefits

- Treats High Concentrations of Hydrogen Sulfide, Mercaptans, and Amines
- Eliminates Odor Complaints
- Reduces Rate of Corrosion in the Infrastructure
- Remediates Fats, Oils, and Grease
- No Chemical Storage or Handling
- Quiet Operation
- Easy Installation
- Straightforward to Operate
- Environmentally Friendly
 - Reacted chemistry condenses safely back into influent stream
 - Small Carbon Footprint
- Low Installation, Maintenance, and Operational Costs

Applications

- Pump Stations/Wet Wells/ Lift Stations
- Junction Boxes & Siphons
- Interceptors
- Manholes
- Sludge Holding Tanks
- Grease and Scum Pits
- Grit Chambers
- Covered Primary Clarifiers
- Holding, Retention & Equalization Tanks
- Headworks Channels
- Rotary Screens

Options

- Extended Mechanical Warranty
- Quarterly Maintenance Program
- RXN Vent



Specifications

PICO

NANO

MICRO

MILLI

Maximum Treatment Volume, ft ³ (m ³)	750 (21)	10,000 (283)	26,000 (736)	42,000 (1,189)
Maximum Number of Nozzles	1	2	4	6
Oxidant Output, g/hr	≤ 10	≤ 20	≤ 50	≤ 60
Average H ₂ O Usage, gal/h/nozzle (l/h/nozzle)	1.5 (5.7)	8 (30.3)	8 (30.3)	8 (30.3)
Air Output, cfm/nozzle (m ³ /hr/nozzle)	1 (1.8)	20 (34)	20 (34)	20 (34)
Material of Construction*	TGIC polyester powder coated aluminum			
Noise Level, dB	< 65	< 70	< 70	< 70
Average System Weight, lbs (kg)	62 (28)	160 (73)	290 (132)	325 (147)
System Dimensions L in (cm) x W in (cm) x H in (cm)	L: 20 (51) W: 17 (43) H: 31 (79)	L: 41 (104) W: 17 (43) H: 47 (119)	L: 48 (122) W: 32 (81) H: 71 (180)	L: 48 (122) W: 32 (81) H: 71 (180)

Power Requirements

Volts, VAC	110	110 or 220	220	220
Average Current Draw, A, 50 Hz	3.5	10	18	20
Average Current Draw A, 60 Hz	6	17 or 11	19	23

Contact your Vapex™ Sales Representative or call 1-888-907-0004 to determine which Vapex™ unit is best suited to eliminate odors, remediate FOG, and decrease corrosion for your application.

MICRO

A#) 1' # 5";) ; A" ; 9 DA; 5'B; 5FD1; 9 B"

DESCRIPTION

The technology is specifically designed to treat H₂S, mercaptans, amines, and other odorous compounds in enclosed spaces. By combining ozone, water, and air using a patented 3-fluid nozzle to atomize the water molecules to create hydroxyl radicals. Hydroxyl radicals are highly reactive and can quickly and effectively oxidizes odorous compounds.

Additionally, the hydroxyl radical fog remediates most Fats, Oils and Grease by breaking them down into alcohols and acids and protects the infrastructure from microbial induced corrosion by destroying the bacteria causing the corrosion.

MAIN FEATURES

- Eliminates H₂S and other odorous compounds
- Reduce or eliminate some forms of Fats, Oils, and Grease (FOG)
- Reduce or eliminate biofilm or bacterial growth in the treatment area
- Reduce the rate of microbial induced corrosion

APPLICATIONS

- Lift Stations/Pump Stations
- Wet Wells
- Holding Tanks
- Headworks
- Covered Clarifiers
- Junction Boxes
- EQ Tanks
- Influent Channels
- Interceptors

SPECIFICATIONS

System

Oxidant Output: 50 grams per hour max
Number of Nozzles: 1 to 4
Treatment Volume: 26,000 ft³ max (estimate)

Nozzle Properties

HV Nozzle

Air output per nozzle: 20-30 CFM.
Water Usage per nozzle: 8 gal/hr.

LV Nozzle

Air output per nozzle: 1.5 CFM
Water Usage per nozzle: 1.5 gal/hr.

Max distance between nozzle & unit: 300 ft

Physical

Aluminum Powder Coated with TGIC polyester
Unit Dimensions: 53" L x 32" W x 72" H
Clearance Dimensions: 126" L x 107" W x 50" H
Installation Pad: 72" x 72" (Minimum)
Unit Weight 300-400 lbs.

Operating Temperature

20°F to 100°F

Power supply

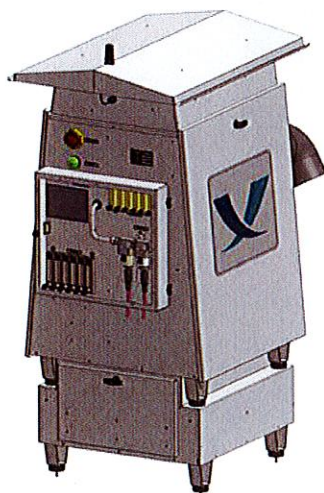
208-240 VAC, 30A, 60 Hz, Single Phase

Water supply

Water Quality: Potable Water
Minimum supply water: 10 gal/hr. per nozzle
Minimum water pressure: 25 psi
Maximum water pressure: 75 psi

CONTACT INFORMATION

- Contact your local Vapex rep
- Call Vapex - 407-977-7250
- Email Vapex - sales@vapex.com"



"
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*Picture may contain optional equipment – actual unit configuration may be different

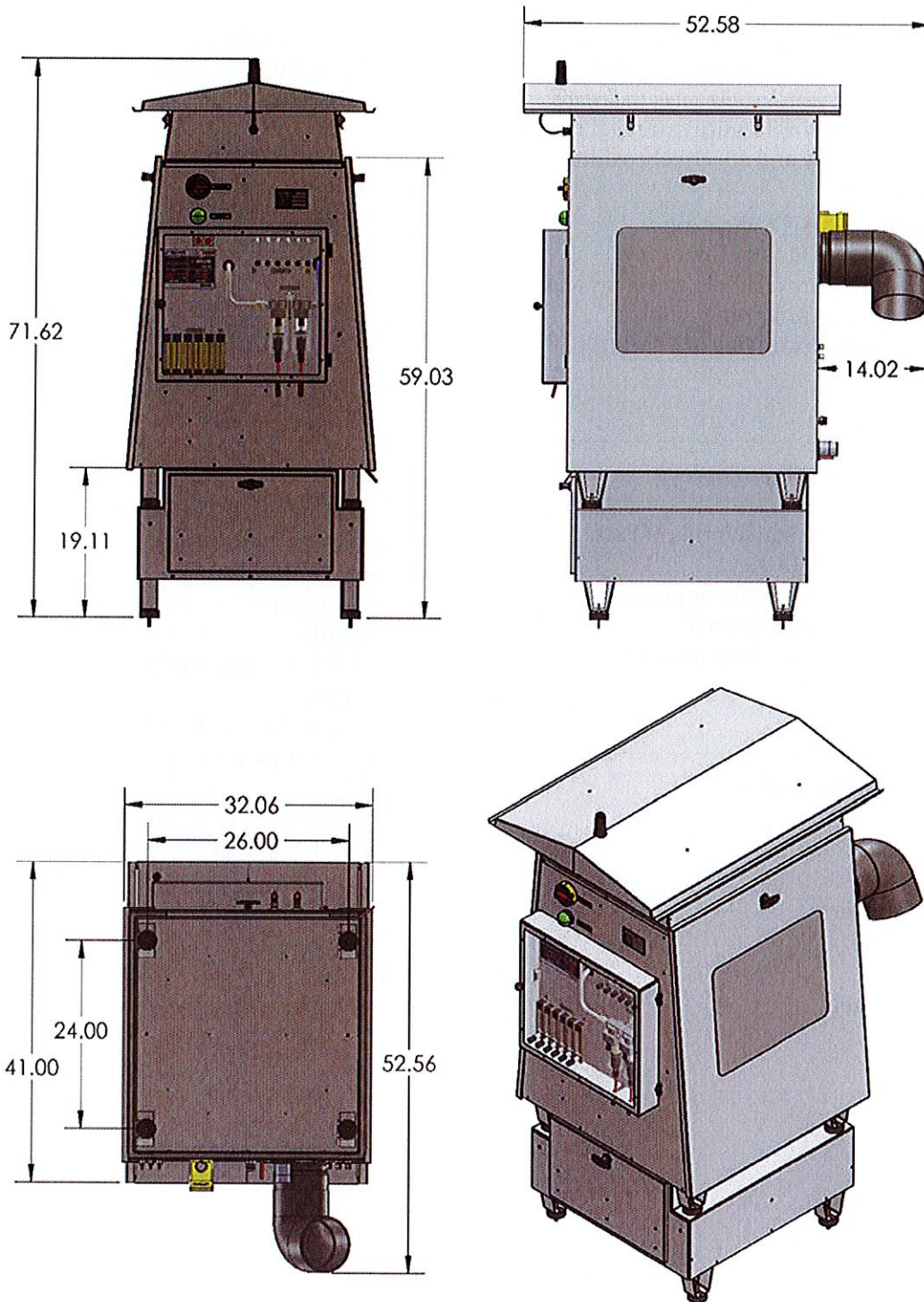
Vapex Environmental, LLC

Product Cut Sheet - 2020

www.vapex.com

MICRO

A#) 1' #5";) ; A" ; 9 DA ; 5'B; 5FD1; 9 B"



*Picture may contain optional equipment – actual unit configuration may be different

Vapex Environmental, LLC

Product Cut Sheet - 2020

www.vapex.com

Town of Southington, CT Water Pollution Control 999 Meriden Waterbury Turnpike, Plantsville, CT 06479

SUMMARY

- Southington WPC has four sludge retention tanks but only one was being used. The plant is relatively close to residential areas and the Odors emanating from the tank caused residents to complain. Peak hydrogen sulfide concentrations were greater than 1,000 ppm.

PROBLEM

- Odor

APPLICATION

Sludge Tank

- 37' diameter
- 23' deep

SOLUTION

- One (1) MILLI with 6 HV nozzles

INSTALL DATE

November 2016

CONTACT

Steve Gregory, Foreman

gregorvs@southington.org

(860) 628-8530

MANUFACTURER'S REPRESENTATIVE

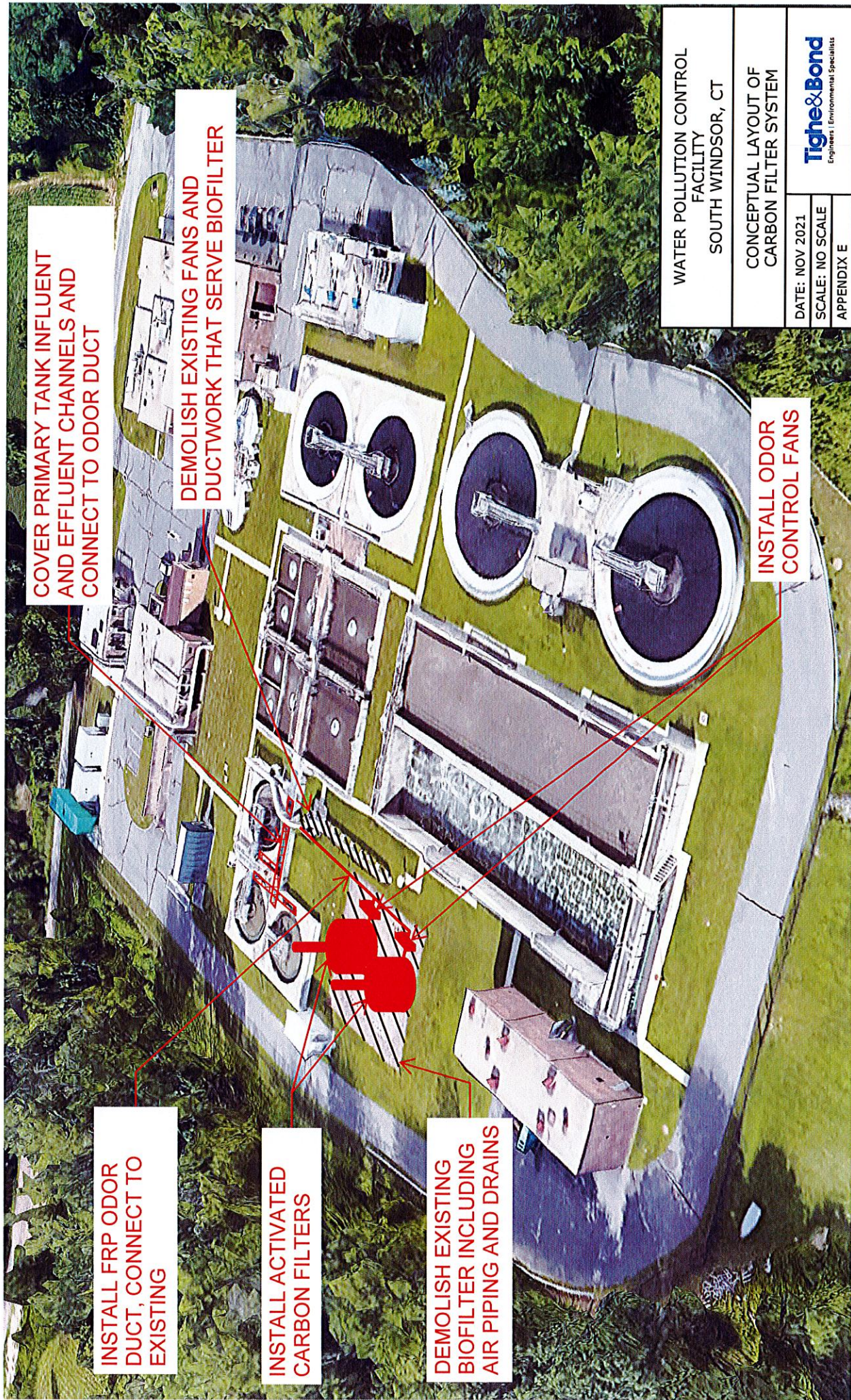
Maier Corporation - (781) 421-2600



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Tighe&Bond

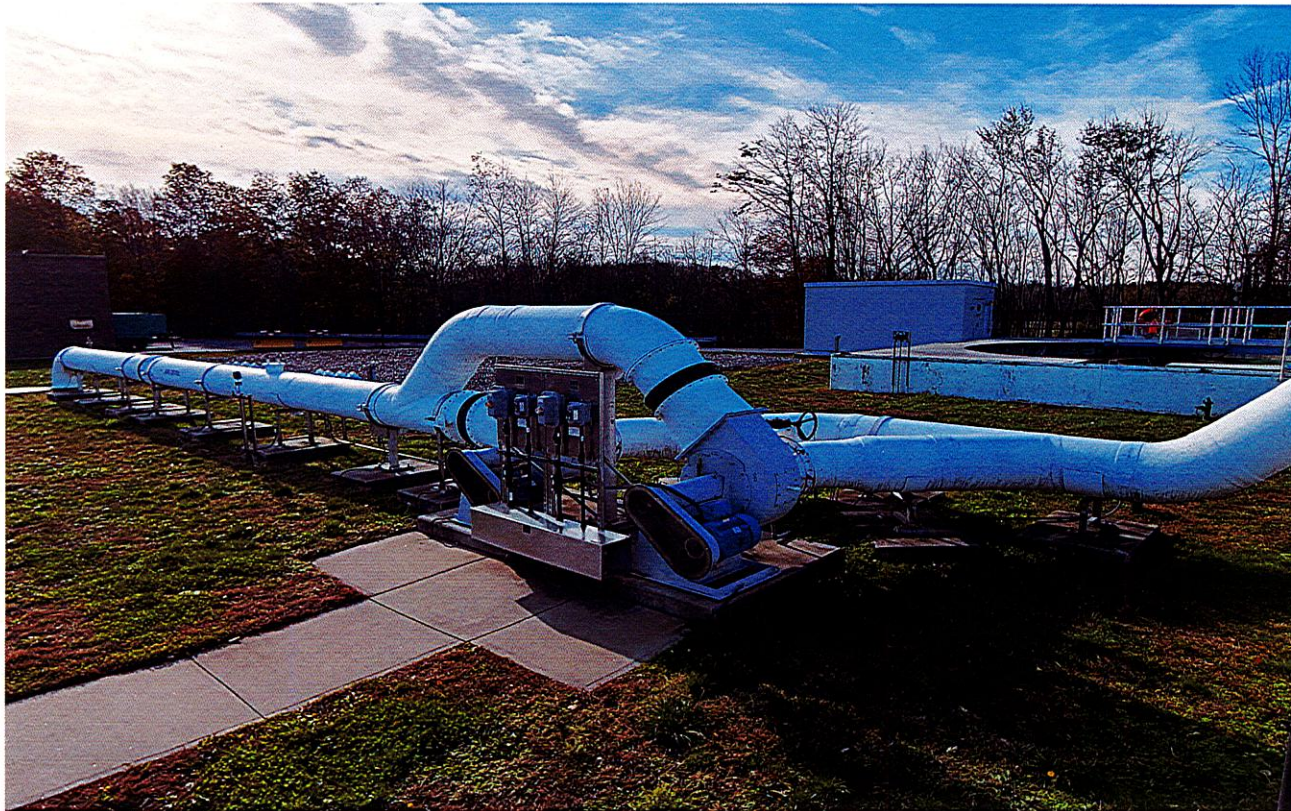
APPENDIX E



WATER POLLUTION CONTROL FACILITY SOUTH WINDSOR, CT		
CONCEPTUAL LAYOUT OF CARBON FILTER SYSTEM		
DATE: NOV 2021	SCALE: NO SCALE	APPENDIX E
Tighe&Bond Engineers Environmental Specialists		

ODOR CONTROL STUDY SOUTH WINDSOR, CT - WPCF

JUNE 7, 2022



Presented by:

Al Wells, PE - Project Manager

Zhijian (Jason) Tang, PE, PHD - Principal Engineer

AGENDA

- **Scope of Work**
- **Data Collection**
- **Results**
- **Conclusions**
- **Recommendations**
- **Questions**

SCOPE OF WORK

- **Identify potential Odor Sources at the WPCF and surrounding area**
- **Evaluate performance of existing Odor Control System at WPCF**
- **Develop Recommendations for Odor Control**

DATA COLLECTION

- **Odor Emission Samples at WPCF**
 - H₂S and Odorous Air Flow
- **Odor Surveys in surrounding area around WPCF**
 - 1 Mile radius approximately
 - Odor Characteristics
 - Odor Intensity
 - Odor D/T (Detection Threshold)

RESULTS

• Odor Emissions at WPCF – June 29, 2021

TABLE 4-1
Data Collected from Sampling Event on June 29th, 2021

Sampling Port Location Number (see Appendix B)	Sampling Location Description	Velocity (ft/min)	Pipe Diameter (ft)	Theoretical Flow Rate (CFM)	H ₂ S Concentration (ppm)	Odor Load (CFM x ppm, rounded to nearest 100)
1	Headworks Building	900	2	2,827	0	0
2	Influent Pump Wet Well/GBT	900	2	2,827	0	0
3	Gravity Thickener	1,100	0.5	216	6.3	1,400
4	Gravity Thickener	1,450	0.5	285	0	0
5	Sludge Holding Tank ¹	1,200	0.83	655	> 100	65,500
6	Influent Pump Wet Well/GBT	1,800	2	5,655	1.6	9,000
7	Odor Control Duct	1,800	2	5,655	24.3	137,400
8	Odor Control Duct (Fan # 1) ²	210	2	660	13.5	8,900
9	Odor Control Duct (Fan #1) ²	200	2	628	20	12,600
10	Odor Control Duct	2,000	2	6,283	25.1	157,700

Note:

1. Measured concentration exceeded 100 ppm (the upper limit of the meter). 100 ppm was used to calculate the odor load.
2. Fan #1 was off in first sampling event on June 29th, 2021.

RESULTS

- Odor Emissions at WPCF – July 28, 2021**

TABLE 4-2
Data Collected from Sampling Event on July 28th, 2021

Sampling Port Location Number (see Appendix B)	Sampling Location Description	Velocity (ft/min)	Pipe Diameter (ft)	Theoretical Flow Rate (CFM)	H ₂ S Concentration (ppm)	Odor Load (CFM x ppm, rounded to nearest 100)
1	Headworks Building	850	2	2,670	0	0
2	Influent Pump Wet Well/GBT	800	2	2,513	0	0
3	Gravity Thickener	1,300	0.5	255	15.5	4,000
4	Gravity Thickener	1,400	0.5	275	0.8	200
5	Sludge Holding Tank	1,200	0.83	655	20	13,100
6	Influent Pump Wet Well/GBT	1,600	2	5,027	0	0
7	Odor Control Duct	1,800	2	5,655	1.9	10,700
8	Odor Control Duct	2,000	2	6,283	1.8	11,300
9	Odor Control Duct	2,000	2	6,283	2.2	13,800
10	Odor Control Duct	2,000	2	6,283	2.3	14,500

RESULTS

- Odor Survey in surrounding area

TABLE 4-3

Summary of OS&E Odor Surveys that Resulted in Odors Potentially Sourced from the WPCF

Date	Sampling Location Number ¹	Sampling Location Description	Character of Odor	Intensity
June 29 th , 2021 (morning)	1	Entrance to the WPCF	Sewage/H ₂ S	0.5 - 1.0
June 29 th , 2021 (afternoon)	1	Entrance to the WPCF	Sewage/H ₂ S	0.5 - 1.0
June 29 th , 2021 (afternoon)	2	Main Street	Sewage/H ₂ S	0.5
June 29 th , 2021 (afternoon)	5	Entrance to the WPCF	Sewage	0.5 - 1.0
August 20 th , 2021	3	Entrance to the WPCF	Sewage/H ₂ S	1.0 – 2.5
August 20 th , 2021	7	Intersection of Vibert Road & Main Street	Sewage (puffy)	0.5
August 25 th , 2021	7	Vibert Road	Sour Sewage	0.5 – 1.5
Note: 1. Location numbers based off corresponding location numbers in Figure 3 through Figure 8 of the OS&E Report included in Appendix A.				

CONCLUSIONS

- **Odor Emissions at WPCF**

- Existing Biofilter not performing well
 - Areas of filter “breakout” with no odor treatment
- Variable Odor loads at WPCF
 - Ranging from **25 ppm** H₂S to **2 ppm** H₂S at biofilter
- Some additional odor sources at WPCF could be treated
 - Influent and Effluent channels at Primary Clarifiers

- **Odor Survey in surrounding area**

- Off-site “sewage” characteristic Odors detected around Main Street / Vibert Road by WPCF entrance
- Other off-site Odors detected with “manure”, “swampy”, “sour”, and “earthy” characteristics
- Odors are difficult to characterize because individuals have different sensitivities

RECOMMENDATIONS

- **Rehabilitate Existing Biofilter**

- Replace existing biofilter media
- Consider inorganic media with longer life cycle and greater treatment capacity such as Biosorbents by Biochem
- Biosorbents is performing well at Westerly, RI WWTP (3.2 MGD) located in neighborhood setting and along Pawcatuck River (highly recreational river with multiple marinas)
- Replacing biofilter media is relatively low cost compared to new odor control treatment technologies
- Biofilters utilize naturally occurring bacteria to treat odors
- Biofilter performance can be affected by changes in odor load and humidity

RECOMMENDATIONS

- **Replace Existing Biofilters with Activated Carbon Filters**
 - If not interested in rehabilitating existing biofilter
 - Carbon filters are very reliable
 - Provide more consistent odor removal by adsorption
 - Performance not affected by changes in odor loads or humidity (within design parameters)
 - Requires replacement carbon ~5 years
- **Consider satellite Odor treatment**
 - Smaller “satellite” odor treatment systems could be provided at strongest odor sources such as Sludge Holding Tanks
 - Smaller systems can treat the strong odors and lessen the large odor load “swings” to the biofilter
 - Activated Carbon Filters (adsorbs odors)
 - Vapex Treatment System (oxidizes odors)

RECOMMENDATIONS

- **Cover and collect odors from Primary Clarifier influent and effluent channels**
 - Influent and Effluent Channels are currently uncovered
 - Channels exhibit moderate levels of odor, H₂S and D/T values
 - Recommend covering channels and connecting to Odor Control Treatment system

OTHER INFORMATION

- **Biosorbents Installation at Westerly RI WWTP**



ESTIMATED COSTS - BIOFILTER

TABLE 7-2 Biofilter Rehabilitation OPCC and Engineering Estimate	
Demolition and Modification of Existing Biofilter ¹	\$50,000
Supply and Delivery of Engineered Biofilter Media ²	\$126,500
Installation of Engineered Biofilter Media	\$60,000
Subtotal Construction	\$236,500
Construction Contingency @20%	\$47,300
Total Estimated Construction	\$283,800
Contractor OH&P @40%	\$113,520
Estimated Engineering @20%	\$56,760
Total Estimated Construction and Engineering	\$454,080
	Rounded³ \$460,000
1. One of the existing biofilter cells to be demolished and backfilled, the other is to be rehabilitated.	
2. Price includes SCH 80 PVC manifold, Engineering Submittal packages, O&M manuals, and field services.	
3. Cost estimate is a rough order of magnitude, estimated prior to any design efforts.	

ESTIMATED COSTS – CARBON FILTER

TABLE 7-4 Carbon Filter OPCC and Engineering Estimate	
Demolition of Existing Biofilter	\$50,000
Backfill and Filter Pad	\$50,000
Carbon Filter & Installation	\$600,000
Electrical Works	\$70,000
Cover Primary Tank Influent/Effluent Channels/Air Ducts	\$50,000
Subtotal Construction	\$820,000
Construction Contingency @20%	\$164,000
Total OPCC	\$984,000
Total Estimated Engineering @20%	\$196,800
Total Estimated Construction and Engineering	\$1,180,800
Rounded	\$1,200,000
1. Cost estimate is a rough order of magnitude, estimated prior to any design efforts.	
1. Assumed the existing biofilters will be demolished and backfilled, and new carbon filter will be installed at the same location.	
1. Assumed two units at 6,000 cfm/unit. One duty unit and one standby unit.	

ESTIMATED COSTS – SATELLITE TREATMENT

TABLE 7-3

Sludge Holding Tank Satellite Treatment OPCC and Engineering Estimate

Supply and Delivery of Vapex System¹	\$137,713
Installation of Vapex System	\$60,000
Subtotal Construction	\$197,713
Construction Contingency @20%	\$39,543
Total Estimated Construction	\$237,255
Contractor OH&P @40%	\$94,902
Estimated Engineering @20%	\$47,451
Total Estimated Construction and Engineering	\$379,608
Rounded²	\$380,000
1. Price includes Engineering Submittal packages, O&M manuals, spare parts, field services, and training.	
2. Cost estimate is a rough order of magnitude, estimated prior to any design efforts.	

QUESTIONS?



WPCA COMMUNICATIONS AND REPORTS

June 7, 2022

The following is a monthly report from the Superintendent of Pollution Control as an appendix to the Water Pollution Control Authority meeting.

General Information

Public Works Week

National Public Works Week was celebrated May 15-21, 2022. This year's theme was "Ready & Resilient."

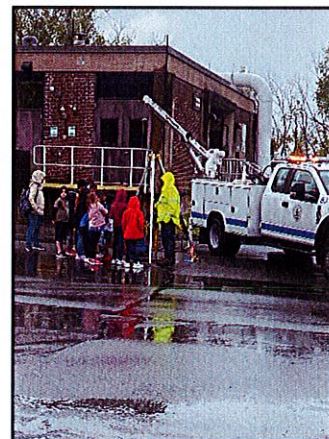
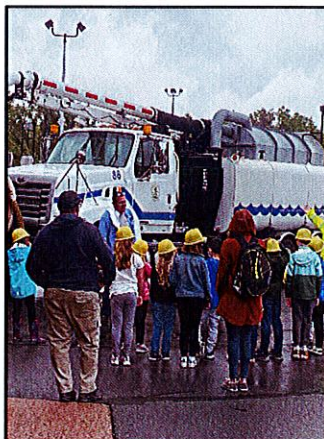
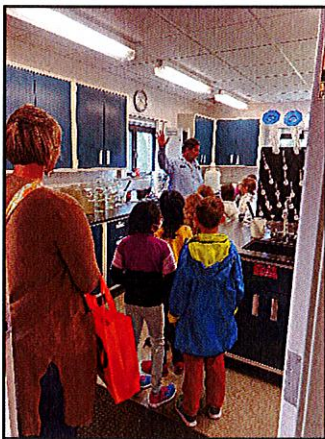


During the week South Windsor Public Works held several events to draw awareness to the importance of Public Works and to also recognize our employees, business partners, and citizens for their dedication to our community. This year's award recipients are:

Richard Boudreault Award:
Business Partnership Award:
Citizen/Civic Group Award:

Brian Sullivan, Parks Maintainer II
Connecticut Mulch Distributors
Steve Wagner, WPCA Chair, Planning & Zoning,
Energy Committee, Walking and Wheel Ways, Town Council (Former)

A field trip was also organized with Orchard Hill school that allowed over 100 2nd grade students, teachers, and chaperones to tour both the Town Garage and Treatment Plant. The students learned about sewer system, toured the facilities laboratory, and the staff demonstrated some of the equipment that we used everyday to provide sewer service to the community.



To round out the week a Fill-a-Truck Food Drive was hosted by Geissler's Supermarket. Public Works staff volunteered their time on a Saturday to collect food and monetary donations that benefitted the South Windsor Food & Fuel Bank.

Platt Hill Solar Farm Ribbon Cutting



The ceremonial ribbon cutting for the Platt Hill Solar Farm in Winchester was held on May 6th. The project was recently energized. One third of the solar power produced from this site will be for the Treatment Plant providing a significant cost savings on energy bills.

Treatment Plant and Collection Systems

Treatment Plant

Process

TREATMENT PLANT	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	AVERAGE
AVG FLOW (MGD)	2.57	2.55	4.67	3.57	4.15	2.93	2.67	2.51	2.63	3.10	3.30	3.12	3.15
BOD REMOVAL	98.6%	99.0%	97.4%	98.4%	98.5%	98.5%	98.5%	98.7%	95.7%	98.7%	98.6%	98.1%	98.2%
TSS REMOVAL	98.6%	98.9%	97.4%	98.3%	98.2%	98.9%	98.8%	99.0%	95.6%	99.0%	98.9%	97.9%	98.3%
NITROGEN LBS. (106 LBS. LIMIT)	96	87	142	102	115	97	97	88	95	88	97	98	100
NITROGEN mg/L	4.4	3.9	3.7	3.7	3.3	3.8	4.2	4.1	4.2	3.5	3.5	3.7	3.83

Maintenance

- Cleaned, inspected, and repaired equipment on Grit Chambers 1 and 2
- Replaced worn out gear box and coupling on Bar Screen Grinder
- Repaired faulty hydraulic fittings on UV Wiper system
- Replaced transition pipe segments on Sludge Transfer pumps
- Implemented changes to sludge storage operations in order to minimize H₂S loads into the biofilter for enhanced odor control
- Repaired immobile valves in GBT area

Collection System

COLLECTION SYSTEM	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	AVG FT
CCTV (FEET)	2,977	4,077	5,457	0	0	2,080	2,000	1,200	2,642	1,950	8,538	4,681	2,967
Contracted CCTV	18,569	10,254	0	0	9,693	12,783	0	0	0	0	0	0	4,275
CLEANING (FEET)	22,000	12,300	0	2,200	6,050	2,700	4,100	4,000	1,363	1,550	3,677	1,500	5,120

- Degreased Benedict Drive, Avery Street, Clark Street, Scantic 1, and Scantic 2 pump station wet wells
- Performed quarterly bypass valve exercises at all pump stations
- Worked with Green Mountain to assist on pre-cleaning and pre-CCTV footage for upcoming CIPP project

Capital Improvement Project Updates

Clark Street, Benedict Drive, Pleasant Valley Pump Station Upgrades

- 60% design is under staff review
- A pre-application meeting is being scheduled with DEEP
- Pre-permitting meeting with Town staff

Next Steps:

- *Engineer to perform Connecticut Environmental Policy Act (CEPA) Permit Review*
- *Project 90% design phase*
- *Submit design to DEEP for review and approval (min. 90-day review)*

Aeration Weir Gate Improvements

The WPCA approved transferring \$750,000 from FY21/22 CIP (Phase IV Part 1 Sewer System Improvements) to complete critical improvements to the aeration basin weir gates.

- An agreement with Woodard & Curran has been executed

American Rescue Plan Act (ARPA) Funded Projects

Phase IV Sewer System Improvements

This project has been approved utilizing American Rescue Plan Act funds. The budget for this project is \$1,100,000.

- Green Mountain Pipe continued Pre-Construction CCTV inspection and heavy pipe cleaning in preparation for the liners

UV Disinfection Upgrade

This project has been approved utilizing American Rescue Plan Act funds. The original budget for this project was \$1,300,000. In February 2022 the Authority approved transferring \$120,000 from this project to the Clark Street Bypass Valve project.

- Weston & Sampson are working on design plans

Clark Street Bypass Valve

This project has been approved utilizing American Rescue Plan Act funds. The original budget for this project was \$100,000. In February 2022 the Authority approved transferring \$120,000 from the UV Disinfection Upgrade project to the Clark Street Bypass Valve project.

- Nothing new to report this month

Collection of Sewer User Fees and Delinquent Accounts

Collector of Revenue Report

To be provided at the meeting.

Respectfully submitted by: Tony Manfre, Superintendent of Pollution Control