

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, April 06, 2015 2:09 PM
To: PUBCOMMENT-OCC2
Subject: CORRECTION Public comment on Permit Number WQ0010539001

*MWD
087424*

RFR

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Steven Baxter

E-MAIL: swbaxtergroup@sbcglobal.net

COMPANY:

ADDRESS: 2002 FAIRWIND DR
HOUSTON TX 77062-4514

PHONE: 2814805469

FAX:

COMMENTS: Our building codes and/or adopted ordinances here in the Houston, Tx. and surrounding areas require HVAC condensate to be directed directly into the sanitary sewer system. It is my understanding through the years that Legionella is a bacteria which is difficult to remove from the sanitary sewer waste water treatment process. I am also familiar with the processes at the Savely waste water treatment facility that CLCWA utilizes and am concerned about the fact that this effluent could now be released in the middle of a highly populated area which is accessible to the general public. Additionally it has been brought to my attention that the CLCWA has been cited by TCEQ for improper documentation on water treatment. The current existing 001 outfall is not accessible to the general public and outfalls into a large body of water that has tidal influence. The proposed 002 and 003 outfalls would be accessible and directly adjacent to residential property owners that are known to have immune deficiencies. I believe that issues of public health/safety, property use, and

SW

economic/environmental impact have not been sufficiently considered. Therefore, I request that the Executive Director of the TCEQ reconsider and/or amend Permit WQ0010539001 to require that proposed outfalls 002 and 003 be tested for Legionella to ensure the levels are no greater than what currently exist in the natural surrounding environment. Testing for Legionella is well established and should not pose a significant or undue burden on the applicant. In addition, I request that this aforesaid permit be additionally amended such that proposed outfalls 002 and 003 be treated the same as existing outfall 001 relative to public access and discharge limitations and/or bacteria counts. Our household/family is personally affected by Permit WQ0010539001 given our property is in the CLCWA district and abuts the proposed detention where the effluent water will be pumped. Our property line is less than 100 feet from where the effluent water ditch and wetlands will be created according to the applicant's proposal. Our backyard has a nice patio deck area that we have enjoyed over the 19 plus years here. Because Legionella is treatment resistant and will not be tested for, we will be unable to continue to enjoy our extended living room for fear of health risk due to the fog that will rise over the applicant's proposed pond and flow directly into our backyard. This will affect our family, our extended family, and some of our good friends that we will no longer be able to entertain. As an Architect, I did extensive research prior to purchasing this home for my wife and I to start our family together. It is located on the higher elevations of the surrounding area. We have never had, nor been required, to carry flood insurance because of this. The FEMA maps are updated periodically to adjust existing conditions for those at risk which ultimately affects home owners and/or flood insurance. We have had the same home owners insurance company/agent in the 19 plus years we have resided here, and after some discussion with them, our insurance requirements/rates would be affected if the proposed plan is implemented. We have several children's future to plan for and should not have to take on the burden of more costly home owners and/or flood insurance, especially given the fact I did my due diligence up front for this very reason. Therefore, I request that Permit WQ0010539001 be amended to provide compensation for any and all additional financial burdens we may incur due to implementation of this project.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, April 06, 2015 8:26 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

MWD
4/5/15
97424

From: swbaxtergroup@sbcglobal.net [mailto:swbaxtergroup@sbcglobal.net]
Sent: Sunday, April 05, 2015 4:48 PM
To: DoNot Reply
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Steven Baxter

E-MAIL: swbaxtergroup@sbcglobal.net

COMPANY:

ADDRESS: 2002 FAIRWIND DR
HOUSTON TX 77062-4514

PHONE: 2814805469

FAX:

COMMENTS: Our building codes and/or adopted ordinances here in the Houston, Tx. and surrounding areas require HVAC condensate to be directed directly into the sanitary sewer system. It is my understanding through the years that Legionella is a bacteria which is difficult to remove from the sanitary sewer waste water treatment process. I am also familiar with the processes at the Savely waste water treatment facility that CLCWA utilizes and am concerned about the fact that this effluent could now be released in the middle of a highly populated

area which is accessible to the general public. Additionally it has been brought to my attention that the CLCWA has been cited by TCEQ for improper documentation on water treatment. The current existing 001 outfall is not accessible to the general public and outfalls into a large body of water that has tidal influence. The proposed 002 and 003 outfalls would be accessible and directly adjacent to residential property owners that are known to have immune deficiencies. I believe that issues of public health/safety, property use, and economic/environmental impact have not been sufficiently considered. Therefore, I request that the Executive Director of the TCEQ reconsider and/or amend Permit WQ0010539001 to require that proposed outfalls 002 and 003 be tested for Legionella to ensure the levels are no greater than what currently exist in the natural surrounding environment. Testing for Legionella is well established and should not pose a significant or undue burden on the applicant. In addition, I request that this aforesaid permit be additionally amended such that proposed outfalls 002 and 003 be treated the same as existing outfall 001 relative to public access and discharge limitations and/or bacteria counts. Our household/family is personally affected by Permit WQ0010539001 given our property is in the CLCWA district and abuts the proposed detention where the effluent water will be pumped. Our property line is less than 100 feet from where the effluent water ditch and wetlands will be created according to the applicant's proposal. Our backyard has a nice patio deck area that we have enjoyed over the 19 plus years here. Because Legionella is treatment resistant and will not be tested for, we will be unable to continue to enjoy our extended living room for fear of health risk due to the fog that will rise over the applicant's proposed pond and flow directly into our backyard. This will affect our family, our extended family, and some of our good friends that we will no longer be able to entertain. As an Architect, I did extensive research prior to purchasing this home for my wife and I to start our family together. It is located on the higher elevations of the surrounding area. We have never had, nor been required, to carry flood insurance because of this. The FEMA maps are updated periodically to adjust existing conditions for those at risk which ultimately affects home owners and/or flood insurance. We have had the same home owners insurance company/agent in the 19 plus years we have resided here, and after some discussion with them, our insurance requirements/rates would be affected if the proposed plan is implemented. We have several children's future to plan for and should not have to take on the burden of more costly home owners and/or flood insurance, especially given the fact I did my due diligence up front for this very reason. Therefore, I request that Permit WQ0010539001 be amended to provide compensation for any and all additional financial burdens we may incur due to implementation of this project.

Melissa Schmidt

From: PUBCOMMENT-OCC
Sent: Monday, June 24, 2013 10:14 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

H

MWD
87424

From: swbaxtergroup@sbcglobal.net [<mailto:swbaxtergroup@sbcglobal.net>]
Sent: Sunday, June 23, 2013 12:19 PM
To: donotReply@tceq.state.tx.us
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Steven Baxter

E-MAIL: swbaxtergroup@sbcglobal.net

COMPANY:

ADDRESS: 2002 FAIRWIND DR
HOUSTON TX 77062-4514

PHONE: 8327151805

FAX:

COMMENTS: I see from my second comments for requests that only the public meeting was show as requested. So I am commenting again and requesting a contested public hearing.

MS

TCEQ Public Meeting Form
May 29, 2014

14

Clear Lake City Water Authority
Water Quality TPDES
Permit No. WQ0010539001

RECEIVED

MAY 29 2014

PLEASE PRINT

Name: STEVE BAXTER

AT PUBLIC MEETING

Mailing Address: 2002 FAIRWIND

Physical Address (if different): _____

City/State: HOUSTON, TX.

Zip: 77062

This information is subject to public disclosure under the Texas Public Information Act

Email: _____

Phone Number: (281) 480-5469

- Are you here today representing a municipality, legislator, agency, or group? Yes No

If yes, which one? _____

Please add me to the mailing list. ✓

I wish to provide formal *ORAL COMMENTS* at tonight's public meeting. ✓

I wish to provide formal *WRITTEN COMMENTS* at tonight's public meeting. ✓

(Written comments may be submitted at any time during the meeting)

Please give this form to the person at the information table. Thank you.

ms

Clear Lake City Water Authority TPDES permit no. WQ0010539001

May 29, 2014

Statement *Opposing* Effluent Water

TCEQ has the obligation to not harm human health, safety, and/or the environment. It is impossible to analytically predict the combined or synergistic effect upon aquatic life of the myriad of chemicals present in effluent. After extensive research I have yet to find another project of this scope which places this many millions of gallons of effluent in a slow moving surface drained situation directly adjacent to single family residences. There is a difference between irrigating with it as it has a chance to percolate down through the earth and get filtered of all the nasty stuff still within the effluent versus putting it in a clay lined bathtub.

Currently the CLCWA utilizes the Indirect non-potable reuse process at the sanitary sewer plant which is reclaimed water for non-potable purposes by discharging to a water body being Horsepen Bayou. This allows the tidal effects to have a washing machine effect to disburse the foul effluent. The proposed permit is asking for a Direct non-potable reuse process in which reclaimed water is piped directly from the waste water sanitary sewer plant uphill into a very large 6' deep slow surface drainage retention scenario that exits directly into the backyards of 400 homes, drains around both sides of another large subdivision, and also directly behind several local schools, as 100% effluent. After this, the 100% effluent can finally outfall into the upper portions of Horsepen Bayou and mix with the brackish water but still directly behind two subdivisions of homes and the local high school. Note, the current indirect non-potable reuse process at the sanitary sewer plant is not being dumped around any adjacent homes or schools. There is another local elementary school that will be surrounded on three sides by this effluent ditch. To have type II reclaimed water in the aforesaid stated scenario without any protection, especially to the very young, makes no common sense.

Another bothersome item is this effluent water ditch will be dug down to elevations from 16' to 21', and our water table here in this area is between 18' and 20'. So to intermix this effluent with the natural water table is just absurd.

Is there an alternative to this mess; possibly. I always look at the different

alternative solutions to a given problem. So with that being said, I say:

1.) Develop a direct potable reuse source of reclaimed water given this is much safer for human safety and the environment. I realize that the TCEQ has not yet developed a rule for this implementation but given we are being the guinea pigs here, much like the local Brio Site and Forrest of Friendswood disasters I believe it is a viable request.

2.) Request for an indirect potable reuse method of the type I reclaimed water use which is water to augment drinking water supplies by discharging to a water body that is subsequently treated for potable consumption and safe for human contact.

Thank you,

Steve Baxter, Oakbrook Resident of 18 years

2002 FAIRWIND HOUSTON, TX - 77062

RECEIVED

MAY 29 2014

AT PUBLIC MEETING

Marisa Weber

From: PUBCOMMENT
Sent: Wednesday, June 19, 2013 2:42 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

PM

From: PUBCOMMENT-OCC
Sent: Wednesday, June 19, 2013 10:35 AM
To: PUBCOMMENT
Subject: FW: Public comment on Permit Number WQ0010539001

*MWD
7/4/13*

From: swbaxtergroup@sbcglobal.net [mailto:swbaxtergroup@sbcglobal.net]
Sent: Wednesday, June 19, 2013 10:13 AM
To: doNotReply@tceq.state.tx.us
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Steven Baxter

E-MAIL: swbaxtergroup@sbcglobal.net

COMPANY:

ADDRESS: 2002 FAIRWIND DR
HOUSTON TX 77062-4514

PHONE: 8327151805

FAX:

MWD

COMMENTS: I made some comments yesterday evening and there were issues with the website that would not allow me to request a public meeting. Because of my profession I have several technical questions and/or concerns that I have been following up with the permit reviewer. Realizing there is a time limit and given there has been very little public awareness of this project, I am formally requesting a public meeting in addition to a case hearing. My residence is directly adjacent to said property, they share a common property line.

Marisa Weber

From: PUBCOMMENT
Sent: Wednesday, June 19, 2013 2:42 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

*mw
87424*

From: PUBCOMMENT-OCC
Sent: Wednesday, June 19, 2013 7:14 AM
To: PUBCOMMENT
Subject: FW: Public comment on Permit Number WQ0010539001

From: swbaxtergroup@sbcglobal.net [mailto:swbaxtergroup@sbcglobal.net]
Sent: Tuesday, June 18, 2013 7:16 PM
To: donotReply@tceq.state.tx.us
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Steven Baxter

E-MAIL: swbaxtergroup@sbcglobal.net

COMPANY:

ADDRESS: 2002 FAIRWIND DR
HOUSTON TX 77062-4514

PHONE: 8327151805

FAX:

mw

COMMENTS: I live directly adjacent to the property where this sanitary sewage waste water is proposed to be pumped and released. I have little kids and there are retired elderly people around us and understand that the water can never be made clean enough not to prevent disease. What the Clear Lake City Water Authority is proposing and now voted to adopt with no public input is not what was promised in the beginning and just plain outrageous. The location where the treated sewage waste water is currently released at the aforesaid waste water facility is subject to tidal events, which in essence act like a washing machine to disperse the water into the bay system. If this effluent waste water is allowed to be released as proposed it is a continual flow with nothing to wash it out. This creates all kinds of issues with a wet detention or retention situation like what the Clear Lake City Water Authority is proposing. The retention bottoms have to be drained and cleaned periodically to remove all the oil, fertilizer, etc. from the area that settles out over time. They are proposing a 6' to 7' ditch where the effluent waste water will flow and another very wide area of wetlands to each side which will be stagnant water. I asked the director of utilities for Clear Lake City Water Authority my concerns about the smell of the water given alot of folks utilize their backyards and we have a constant southerly breeze (most of the old golf course orients north to south). His response was if we get enough complaints about the issue then we will treat the water further. There is also a concern of alligators (we pulled a 12' male from the Harris County Flood Control District easement behind our house) and the comment was the same being if we get complaints we will look into it...my comment back was such that the first time might be fatal. I realize the alligator issue has little to do with TCEQ but it is the attitude that scares most folks. They only have monies to dig this detention facility and are not worried or will patch issues that arrise later. This is not how a project like this should be set up. Steven Baxter, Architect

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, April 06, 2015 8:25 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

RFR
HR

*MWD
87424*

From: ajcooper@cybergal.com [mailto:ajcooper@cybergal.com]
Sent: Sunday, April 05, 2015 5:58 PM
To: DoNot Reply
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: MRS Anita Cooper

E-MAIL: ajcooper@cybergal.com

COMPANY:

ADDRESS: 15803 DIANA LN
HOUSTON TX 77062-4433

PHONE: 2812864433

FAX:

COMMENTS: I am requesting that the Executive Director of the TCEQ reconsider and amend his decision relative to TPDES Permit WQ0010539001. I believe that issues of public health have not been sufficiently considered. I am requesting a contested case hearing. I am also requesting that the TCEQ Commissioners conduct a contested review of TPDES Permit WQ0010539001. I am submitting these requests via this e-

MWD

Comments system in response to the TCEQ Chief Clerk's letter dated 3-6-15 that addresses TPDES Permit WQ0010395001. I am personally affected by this application. My property is in the CLCWA District and abuts the golf course property where the effluent water will be pumped. My property line is less than 100 feet from where the effluent water ditch, ponds and wetlands will be created according to the applicant's proposal. My property is approximately 0.1 miles from the outfalls 002 and 003. I recommend this application be amended. Below are requested amendments. 1) I request that the applicant should be required to treat all outfalls equally and treatment requirements and bacteria count limits of 001 be extended to 002 and 003. The residents adjacent to outfalls 002 and 003 should not be put at a greater bacteria levels than those residents living adjacent to outfall 001. All regulations that apply to 001 are to be applied to outfalls 002 and 003. Therefore I request that the discharge limits for outfall 002 and 003 be amended to 35 daily average and 104 daily maximum, the current requirements for outfall 001. Since outfall 001 is inaccessible to the public, I request that outfalls 002 and 003 be made inaccessible in a similar way. 2) I request that this application be amended to require the applicant to test for Legionella and Legionella pneumophila at the outfalls, 002 and 003, and allow no more than exists in the natural environment (where no waste water treatment plant effluent is present). I further request that the applicant be required to adjust his treatment process in order to assure that the bacteria levels of Legionella at outfalls 002 and 003 are at or below the established natural environment baseline. Because of my husband's advanced age of 82, colitis and diminished immune system and motor system deterioration due to Parkinson's disease, I feel he is particularly vulnerable to the potential fatal disease, Legionnaire's Disease, caused by this bacteria. Because this bacteria is inhaled from water aerosol (mist/fog/steam) evaporating from a contaminated water source, my proximity to this treated effluent places him at a high risk. The levels of Legionella will likely be high in the effluent exiting the Savely Waste Treatment plant due to City of Houston regulations and common building and treatment practice. The City of Houston requires that all air conditioner drain water, a source of Legionella, be piped into the sanitary drain lines. The moist, warm environment inside the drain lines are ideal for Legionella growth. Recent articles have shown Legionella related cases are increasing and one study showed that over 50% of the treatment plants tested had high levels of Legionella. Legionella pneumophila is resistant to most common wastewater treatment processes especially chlorine which the applicant intends to use periodically. During periods of high air conditioner use and warm temperatures, the treated waste water at outfall 002 and 003 will likely contain high levels of treatment resistant Legionella pneumophila. Under the current proposal, outfalls 002 and 003 will create a "water aerosol" at the exit pipe that as a fine mist can travel several miles and linger in the air. In addition because Legionella is treatment resistant, the mist/fog that will rise over the applicant's proposed ponds and streams and flow as fog into my yard (adjacent resident) will most likely contain high levels of Legionella. Proximity legionellosis is noted in the literature. Biofilm growth of Legionella in stagnant warm water(applicant's ponds) is also noted in the literature. With an OSHA estimated 25,000 cases and 4,000 deaths each year, this bacteria attacks elderly and weakened people like my husband and I don't want this threat in my backyard. I believe you are required by Implementation Procedures, 30 TAC Chapter 307 to protect public health. My husband's health will be at high risk whenever that fog is present and I will be afraid that we may contract Legionnaires disease from inhaled effluent mist. The applicant's method of testing for E.coli provides no protection to public health from this aerosol transmitted disease. Testing for Legionella is well established and should not pose a significant or undue burden on the applicant. 3) I request that this application be amended to provide financial compensations for changes in my homeowner insurance costs due to this project. Currently, there is no existing ditch or stream in my section, southeast of El Dorado. My current insurance is based on that fact. This outfall would create a stream and water body behind my house. My flood insurance(FEMA) will increase significantly as it is reclassified as close proximity to a water body. In addition, my property will be reclassified by my homeowners insurance company. Because my property description will significantly change due to the outfall and new water body, I believe that I risk losing my homeowner's insurance or paying substantially more for coverage based on reclassification. This represents direct financial harm to me and I request the application be amended to provide financial compensation should this project occur. I request that the application be amended in the following ways prior to possible approval. I request that the application be amended in the following ways prior to possible approval. We request that the discharge limits for outfall 002 and 003 be amended to the levels for outfall 001 and outfalls 002 and 003 be made

inaccessible to the public in a similar way to outfall 001. I request that this application be amended to require the applicant to test for Legionella and allow no more Legionella at outfalls 002 and 003 than exists in the natural environment. I request that this application be amended to provide financial compensations for changes in my homeowner insurance costs due to this project. I request the Executive Director reconsider and amend his decision relative to TPDES Permit WQ0010539001. I request this for myself and also as a member of Friends of the Old Golf Course.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, June 30, 2014 12:55 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

Handwritten:
TCEQ
Cimera

From: coolgranmal@yahoo.com [<mailto:coolgranmal@yahoo.com>]
Sent: Monday, June 30, 2014 7:48 AM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: MS Anita J Cooper

E-MAIL: coolgranmal@yahoo.com

COMPANY:

ADDRESS: 15803 DIANA LN
HOUSTON TX 77062-4433

PHONE: 2812864433

FAX:

COMMENTS: TCEQ must be responsible for protecting us from not only water quality but the plans to get there. Please consider these comments and questions in your decision. The CLCWA has violated people's trust. They first announced that this project would be a series of ponds. Now it is a very deep and wide ditch along the whole old golf course. Digging will start 10' from my property line. This is unnecessarily close. We bought this property because of the open space behind this house. Now, it will be a huge ditch that we will not want to get

Handwritten:
MWA

close to because of the enormity of the effluent water that will be caught in the 'wetlands' surrounding the ditch. How will this ditch be maintained with wetlands surrounding it? Flooding is not a valid reason for applying for this permit. This area around the old golf course has never flooded. Now, it probably will flood our homes. When my flood insurance goes up astronomically, who will be held responsible? When my house is flooded with effluent water, who will be responsible? The CLCWA should be held accountable. I am commenting on the following because these items were brought up at the hearing. Most of the people who spoke in favor of this do not live anywhere near this site on the old golf course. A lot of talk was about Exploration Green. They have nothing to do with the effluent water quality nor the ditch clean-up. They have no money so how are they going to do all this improvement? Trees have been donated of which half will be lucky to survive after they have been planted and will take 30 years to mature. Two awards were given to the CLCWA and EG for things they have not even started doing. What's the value in that?

TCEQ Public Meeting Form
May 29, 2014

4

Clear Lake City Water Authority
Water Quality TPDES
Permit No. WQ0010539001

RECEIVED
MAY 29 2014

PLEASE PRINT

Name: ANITA COOPER

AT PUBLIC MEETING

Mailing Address: 15803 DIANA LN.

Physical Address (if different): _____

City/State: HOUSTON TX Zip: 77062-4433

****This information is subject to public disclosure under the Texas Public Information Act****

Email: ajcooper@cybergal.com

Phone Number: 281-286-4433

• Are you here today representing a municipality, legislator, agency, or group? Yes No
If yes, which one? _____

Please add me to the mailing list.

I wish to provide formal *ORAL COMMENTS* at tonight's public meeting. ✓

I wish to provide formal *WRITTEN COMMENTS* at tonight's public meeting.

(Written comments may be submitted at any time during the meeting)

Please give this form to the person at the information table. Thank you.

mm

Comments to TCEQ

Permit # WQ0010539001, Clear Lake City Water Authority

Property values of homes on the Clear Lake City old golf course will decrease during the many years of constructing this site. If we need to sell during this construction, we will have to take a loss on our homes. Who would buy a house with a monstrous unlandscaped ditch in the back yard?

My husband is 81 years old and has Parkinson's Disease. This permit would put him at risk of being exposed to the numerous diseases that could be caused by effluent sewer water standing in the 'wetlands' that will border the entire big ditch of the OGC.

One WA board member said "if we get complaints, we'll clean it better". That is a very poor outlook for us. Will we have to get sick and possibly die before the WA will 'clean it better'?

State laws for the effluent water from the sewer treatment plant are not strong enough to protect us at this close proximity, nor are they stringent enough to remove all the disease pathogens.

Statutory and Regulatory requirements do not take into consideration this effluent being in our back yard surrounded by a 'wetlands' that is protected. This ditch cannot be maintained if they can't get to it. All other effluent is diluted by mixing with natural running streams.

Please do NOT issue this permit to the CLCWA. Too much is at stake for us: our health and protection of our property values.

✓ ✓
Anita Cooper and Charles Sterling
Residents on Section 2 of the Old Golf Course
15803 Diana Lane
Houston, TX 77062-4433
281-286-4433
ajcooper@cybergal.com

RECEIVED
MAY 29 2014
AT PUBLIC MEETING

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, July 08, 2013 8:34 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

PM

From: txanita@swbell.net [mailto:txanita@swbell.net]
Sent: Thursday, July 04, 2013 3:39 PM
To: donotReply@tceq.state.tx.us
Subject: Public comment on Permit Number WQ0010539001

*mmw
07424*

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: MS Anita J Cooper

E-MAIL: txanita@swbell.net

COMPANY:

ADDRESS: 15803 DIANA LN
HOUSTON TX 77062-4433

PHONE: 2812864433

FAX:

COMMENTS: I respectfully request a public meeting be held on this pending permit ammendment. The public that live around the 'old golf course' need to know what may be going on in their back yards!

mmw

Marisa Weber

From: PUBCOMMENT
Sent: Thursday, May 16, 2013 10:17 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

From: PUBCOMMENT-OCC
Sent: Thursday, May 16, 2013 7:22 AM
To: PUBCOMMENT
Subject: FW: Public comment on Permit Number WQ0010539001

MWD
HEFF
007400

From: ajcooper@cybergal.com [mailto:ajcooper@cybergal.com]
Sent: Wednesday, May 15, 2013 9:29 PM
To: donotReply@tceq.state.tx.us
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Anita Cooper

E-MAIL: ajcooper@cybergal.com

COMPANY:

ADDRESS: 15803 DIANA LN
HOUSTON TX 77062-4433

PHONE: 2812864433

FAX:

Mu

COMMENTS: The permit reqt by CLCWA will be dumping water at back door. This 'reclaimed sewer water' will be less than 60 feet from my back door. This will put us at risk of being exposed to numerous bacteria and other unhealthy items in our back yard. My husband is 80 years old and has Parkinson's Disease. This puts him at risk of being exposed to all manner of communicable diseases. I am very much opposed to this plan of the CLCWA. The only reason they are doing this is to accommodate a builder's wish to build out the few remaining acres in this area without worrying about water detention. This is not a reason to expose us to untold dangers at our back door. This water will be a potential flooding hazard to us. As I understand, this house has never flooded. If sewer water is pumped into the big ditch (see CLCWA website for their 'plan') and a storm hits with lots of rain, the bayous will fill and back up into the old golf course causing all the standing sewer water to overflow into our house. Please understand that the CLCWA does plan to build a 15' deep ditch the entire length of the 178 acre golf course. This is totally unnecessary except to hold their sewer water to attract a developer. There is definitely something going on underfoot than meets the eye.

Mr. Richard A. Hyde, P.E. Executive Director,
Texas Commission on Environmental Quality
P. O. Box 13087
Austin, TX 78711-3087

RECEIVED
MAR 23 2015
EXECUTIVE DIRECTOR

March 15, 2015

MWD
87424

REVIEWED

MAR 24 2015 H

Dear Mr. Hyde:

By _____ *[Signature]*

I am requesting the TCEQ to conduct a contested case hearing of the CLCWA proposed amendment of TPDES Permit No. WQ0010539001. I recommend disapproval. My name is Thomas Dorsch, 16112 Seahorse Drive, Houston, TX 77062. Phone: 281-488-8742, info@tdorsch.com

I am an "Affected Person". TCEQ approval of this amendment & CLCWA implementation of it will have a detrimental effect on me & my family in the following areas:

1. Health

My property abuts the old golf course where currently nonexistent massive ditches will be excavated and where 1,080,000 gallons per day of partially treated effluent water will slowly flow & pool in acres of man-made swampy wetlands & new retention ditches. This new effluent water hazard will be within 100 feet of my property line. I have a weakened immune system due to mosquito bite allergy. **I have a serious reactions like blistering lesions and larger hives accompanied by fever and joint swelling I consulted with allergy/immunology specialists. This doctors advised me to avoid standing near calm, shaded, humid areas and avoid pools of standing water.**

Historically the TCEQ allows effluent water to be added to existing, flowing bodies of water. This massive effluent water project adds effluent water to a (currently) non-existent dry detention ditch. A project this massive has never been added to a fully occupied residential area and TCEQ permitted in Texas. Therefore the biological & health impacts are currently not quantifiable. The TCEQ can not guarantee that the proposed quantity of partially treated effluent water will be safe for someone with my health conditions. It is my position that my health & possibly even life are endangered by the bacteria, germs, & hordes of **mosquitoes** that will appear if this permit is approved.

2. Finances

My FEMA flood insurance category will change to a more hazardous flood zone because of my properties new proximity to the effluent water. As a result, my annual costs rate will increase by 30%.

Per general discussions with local realtors, my property value will decrease by as much as 15% (estimated @ \$20,000 to \$30,000) during the CLCWA planned 15 year development period [excavation & construction] of this project.

My CLCWA District taxes will increase as the board issues new bonds to pay for this currently unfunded \$50 million project.

Please disapprove the amendment to Permit WQ0010539001.

Sincerely,

Dr. Thomas Dorsch

[Handwritten Signature]

OFFICE

53

[Handwritten Signature]

Thomas G. Roesch, Ph.D.
16112 Seahorse Drive
Houston, TX 77062

RECEIVED
MAR 23 2015
TCEQ MAIL CENTER
CJ

NORTH HOUSTON TX 77060
12 MAR 2015 15:11



Mr. Richard A. Hyde, P.E.
Executive Director, Environmental
TX Commission on
Quality
P.O. Box 13087
Austin, TX 78711-3087

75711308767

REVIEWED

MAR 24 2015 H

Mr. Richard A. Hyde, P.E. Executive Director,
Texas Commission on Environmental Quality

P. O. Box 13087
Austin, TX 78711-3087

March 15, 2015

Dear Mr. Hyde:

MWD
87424
TCH
8

RECEIVED
MAR 23 2015
EXECUT. DIRECTOR

RECEIVED
MAR 23 2015
EXECUTIVE DIRECTOR

I am requesting the TCEQ to conduct a contested case hearing of the CLCWA proposed amendment of TPDES Permit No. WQ0010539001. I recommend disapproval.

My name is Victoria Dorsch, 16112 Seahorse Drive, Houston, TX 77062.
Phone: 281-488-8742, peremoga2001@yahoo.com ✓

TEXAS
COMMISSION ON
ENVIRONMENTAL
QUALITY
CHIEF CLERK'S
OFFICE
2015 MAR 04 PM 09:53

I am an "Affected Person". TCEQ approval of this amendment & CLCWA implementation of it will have a detrimental effect on me & my family in the following areas:

1. Health

My property abuts the old golf course where currently nonexistent massive ditches will be excavated and where 1,080,000 gallons per day of partially treated effluent water will slowly flow & pool in acres of man-made swampy wetlands & new retention ditches. This new effluent water hazard will be within 100 feet of my property line. I am 54 years of age and have a weakened immune system due to mosquito bite allergy. **I have a serious reactions like blistering lesions and larger hives accompanied by fever and joint swelling. In 2014 I was in emergency room, because of a mosquito bite, which caused anaphylaxis (an-a-fi-LAK-sis), a life-threatening condition. This condition characterized by throat swelling, generalized hives, and faintness. I have experienced anaphylaxis! I consulted with allergy/immunology specialists. This doctors advised me to avoid standing near calm, shaded, humid areas and avoid pools of standing water. These are popular places for mosquitoes to hang out.**

Historically the TCEQ allows effluent water to be added to existing, flowing bodies of water. This massive effluent water project adds effluent water to a (currently) non-existent dry detention ditch. A project this massive has never been added to a fully occupied residential area and TCEQ permitted in Texas. Therefore the biological & health impacts are currently not quantifiable. The TCEQ can not guarantee that the proposed quantity of partially treated effluent water will be safe for someone with my health conditions. It is my position that my health & possibly even life are endangered by the bacteria, germs, & hordes of **mosquitoes** that will appear if this permit is approved.

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Per general discussions with local realtors, my property value will decrease by as much as 15%

Handwritten signature/initials

(estimated @ \$20,000 to \$30,000) during the CLCWA planned 15 year development period [excavation & construction] of this project.

My CLCWA District taxes will increase as the board issues new bonds to pay for this currently unfunded \$50 million project.

Please disapprove the amendment to Permit WQ0010539001.

Thank you

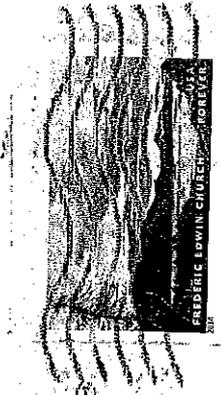
Signature Victoria Dorsch

Date 3/15/2015

Victoria Dorsch
16112 Seahorse Drive
Houston, TX 77062

HOUSTON TX 77062

15 MAR 2015 PM 11



109

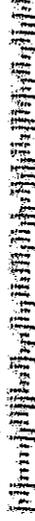
RECEIVED

MAR 23 2015

TCEQ MAIL CENTER
CS

Mr. Richard A. Hyde, P.E. Executive
Director,
Texas Commission on Environmental
Quality
P.O. Box 13087
Austin, TX 78711-3087

78711308787



TCEQ Public Meeting Form
May 29, 2014

20

Clear Lake City Water Authority
Water Quality TPDES
Permit No. WQ0010539001

RECEIVED
MAY 29 2014
AT PUBLIC MEETING

PLEASE PRINT

Name: Victoria Zorsch

Mailing Address: 16112 Seahorse Dr

Physical Address (if different): 16112 Seahorse Drive

City/State: Houston Zip: TX 77062

****This information is subject to public disclosure under the Texas Public Information Act****

Email: peremoga2001@yahoo.com ✓

Phone Number: 281-488-8742

• Are you here today representing a municipality, legislator, agency, or group? Yes No

If yes, which one? _____

Please add me to the mailing list. ✓

I wish to provide formal *ORAL COMMENTS* at tonight's public meeting. ✓

I wish to provide formal *WRITTEN COMMENTS* at tonight's public meeting. ✓

(Written comments may be submitted at any time during the meeting)

Please give this form to the person at the information table. Thank you.

mw

Victoria Dorsch
16112 seahorse Drive.
Houston, TX 77062
Phone 281-488-8742

RECEIVED

MAY 29 2014

AT PUBLIC MEETING

May29,2014.

To: Texas Commission on Environmental Quality (TCEQ)
meeting on Thursday, May 29, 2014, 7 pm.

Dear Sir and Madam:

I would like to present my COMMENTS bout having effluent sewer water pumped into the OGC, our back yards!

This effluent will be pumped uphill from the Savely Waste Water Treatment Plant located at 14210 Middlebrook Drive, Houston, in Harris County, Texas 77058.

An annual average flow not to exceed 1,080,000 gallons per day of effluent sewer water is planned to be pumped into the entire 178 acres of the old golf course. This is in many residents' back yards. It is also mere feet away from planned walking and bike paths.

Treated sewer water contains 50 to 1,000 pathogenic bacteria in each gallon. We all are affected, not just the people who live on the golf course. Users of the planned walking and riding paths will be exposed to the smells, viruses, mosquitoes and germs that the sewer water brings to our neighborhoods.

Most effluent sewer water is used watering golf courses and open areas through sprinklers. This method allows the treated water to dissipate in the air, with very little amounts being absorbed. In other areas, effluent is released into a flowing stream, thereby diluting the effluent significantly. The water that will be pumped into the OGC will be retained in the 'wetlands' along the entire perimiter. Dangers to children will abound. Senior citizens who live on the OGC, will also be affected as will many others who have a weakened immune system.

Thank you for your attention.

Sincerely,
Dorsch family



Marisa Weber

From: PUBCOMMENT
Sent: Wednesday, May 15, 2013 8:25 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

PM

From: PUBCOMMENT-OCC
Sent: Wednesday, May 15, 2013 7:48 AM
To: PUBCOMMENT
Subject: FW: Public comment on Permit Number WQ0010539001

*MWD
07424*

From: peremoga2001@yahoo.com [<mailto:peremoga2001@yahoo.com>]
Sent: Tuesday, May 14, 2013 11:24 PM
To: donotReply@tceq.state.tx.us
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: DR. Victoria Dorsch

E-MAIL: peremoga2001@yahoo.com

COMPANY:

ADDRESS: 16112 SEAHORSE DR
HOUSTON TX 77062-6219

PHONE: 2814888742

FAX:

MWD

COMMENTS: The Clear lake C Water Authority a permit request to T Q to amend their current waste water disposal permit -application number WQ0010539001. The amendment would allow the CLCWA to dump up to 10 million gallons per day of treated waste water effluent into/onto the Old Golf Course on Bay Area blvd.. Treated waste water doesn't belong in our neighbourhood! We protesting this assault on our community, property and nature! We Requesting a public meeting to protest the dumping of waste water effluent into our community. Water Authority has revealed their real purpose for ruining our beautiful golf course/park. They plan to fill it with treated toilet water. They have applied to the Environmental Quality board to modify their existing permit to allow them to dump up to 10 million gallons of treated sewage waste water each day into our back yards. Waste water from the sewage treatment plant is currently dumped into Horse Pen Bayou. They intend to establish pipes and pumping systems at taxpayer (our) expense to pump it uphill into the Big Ditch. This could help alleviate the requirement of developers to provide their own detention. This could mean big profits for developers while flushing our property values down the toilet. The motives of the Water Authority are unclear. It is clear that we do not have flooding problems and we do not want our existing park with its ponds and forests destroyed. Developers should provide their own detention. Are they getting a free ride at our expense?

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, June 30, 2014 12:57 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

MWD
Henry
67424

H
From: rjhalyard@academicplanet.com [<mailto:rjhalyard@academicplanet.com>]
Sent: Saturday, June 28, 2014 5:14 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Raymond Halyard

E-MAIL: rjhalyard@academicplanet.com

COMPANY:

ADDRESS: 16204 DIANA LN 318a
HOUSTON TX 77062-5300

PHONE: 2814862050

FAX:

COMMENTS: The draft permit states that the treated wastewater from Outfall 003 will pass through future ponds located on each side of El Dorado Blvd (obviously referring to land owned by the CLCWA in the old golf course); the CLCWA Master Plan states that these ponds will cover 38 acres to a permanent depth of six feet - this corresponds to ten million cubic feet of dirt that must be excavated to create the ponds. This will take an extended period of time to accomplish and much dust will be in the air during dry weather. The standard

MWD

dump truck load is about five cubic yards (or 135 cubic feet). This will require about 74,000 loads or about one hundred and fifty thousand trips (coming and going) through CLC streets to remove; this in turn will result in more dust in the air, dirt on the streets and damage to the streets; Published criteria on wet detention ponds and constructed wetlands discourages their construction in dense urban areas, Therefore the passage of this permit as drafted will cause a health hazard (dust) and a public nuisance for CLC residents. I live across the street from the old golf course and will be adversely affected by the excavation project; I therefore request a contested case hearing! RJH

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Tuesday, June 17, 2014 11:26 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

H

From: rjhalyard@academicplanet.com [<mailto:rjhalyard@academicplanet.com>]
Sent: Tuesday, June 17, 2014 11:24 AM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

*MWD
07424
HCLC*

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Raymond Halyard

E-MAIL: rjhalyard@academicplanet.com

COMPANY:

ADDRESS: 16204 DIANA LN 318a
HOUSTON TX 77062-5300

PHONE: 2814862050

FAX:

COMMENTS: The future ponds that will receive the treated wastewater from Outfall 003 are located in the 'old CLC golf course' now owned by the CLCWA; these ponds and their associated constructed wetlands will perform storm water and 'de facto' wastewater treatment functions as a combined wet detention pond and constructed wetlands facility as described in the CLC Master Plan. Current BMP literature (e.g., The EPA Storm Water Wet Pond and Wetland Management Guidebook, EPA No. 833B09001) cautions that the use of

RM

wet detention ponds and constructed wetlands can result in mosquito infestation, noxious odors and water quality degradation if proper design and maintenance criteria are not used; this is especially critical in urban areas. Based only on preliminary review, the current draft permit states that no significant water quality degradation is expected and therefore does not specify specific design and maintenance criteria; this is overly optimistic and therefore SPECIFIC design and maintenance criteria for the future CLCWA Detention Facility should be added to the permit! I live across the street from the old golf course and will be subject to mosquitos and odors; I therefore request a contested case hearing on the permit.

TCEQ Public Meeting Form
May 29, 2014

(H)

Clear Lake City Water Authority
Water Quality TPDES
Permit No. WQ0010539001

RECEIVED

MAY 29 2014

AT PUBLIC MEETING

PLEASE PRINT

Name: Raymond Halyard

Mailing Address: 16204 Diana Ln #318A

Physical Address (if different): Houston TX 7

City/State: Houston Zip: 77062

This information is subject to public disclosure under the Texas Public Information Act

Email: rjhalyard@academicplanet.com

Phone Number: 281 486 2050

• Are you here today representing a municipality, legislator, agency, or group? Yes No

If yes, which one? _____

Please add me to the mailing list.

I wish to provide formal *ORAL COMMENTS* at tonight's public meeting.

I wish to provide formal *WRITTEN COMMENTS* at tonight's public meeting.

(Written comments may be submitted at any time during the meeting)

Please give this form to the person at the information table. Thank you.

MW

TCEQ PERMIT NO. WQ0010539001

CLCWA DETENTION FACILITY ON 'OLD GOLF COURSE'

(#)

① The Detention Facility water flowrate, is from Outfall 003 1,080,000 gallons per day. Since there are 86,400 seconds per day and 7.5 gallons per cubic foot, this flowrate corresponds to 1.67 cubic feet per second. Spread over the width of the ponds, this will result in an EXTREMELY low water flow velocity that can cause areas of stagnation, mosquito infestation, algal blooms and noxious odors. Impaired water quality would make ^{the} draft permit too optimistic. I live across the street from the old golf course and will be subject to mosquitos and odors. I request a contested case hearing.

RJ Holyard 5/29/2014

Raymond J. Holyard 281 466 2050

✓ rjholyard@academicplanet.com

16204 #318A, Houston, TX 77062

RECEIVED

MAY 29 2014

AT PUBLIC MEETING

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Tuesday, May 27, 2014 9:58 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

H

From: rjhalyard@academicplanet.com [<mailto:rjhalyard@academicplanet.com>]
Sent: Saturday, May 24, 2014 5:32 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

MWD
87424

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Raymond Halyard

E-MAIL: rjhalyard@academicplanet.com

COMPANY:

ADDRESS: 16204 DIANA LN 318a
HOUSTON TX 77062-5300

PHONE: 2814862050

FAX:

COMMENTS: The treated waste water annual average flow rate of 1,080,000 or less per day into the detention facility corresponds to about 1.67 cubic feet or less per second. This flow rate will result in EXTREMELY low flow velocities in the facility's ponds where the flow cross-sectional area will be a few hundred square feet, and may result in stagnation causing mosquito infestation and algal growth. The live algae can cause low dissolved oxygen and the dead algae can cause increased biological oxygen demand (BOD) and noxious odors. A new

MWD

treatment plant may be needed at the facility's exit to return the BOD to the proper level. I live across the street from the former entrance to the old golf course and a few hundred feet from the last proposed pond and may be exposed to mosquitoes and noxious odors. I recommend that a more precise analytical study of possible mosquito and odor problems be performed and I request a contested case hearing.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Thursday, May 29, 2014 10:47 AM
To: PUBCOMMENT-OCC2
Subject: CORRECTION Public comment on Permit Number WQ0010539001

H

From: PUBCOMMENT-OCC
Sent: Tuesday, May 27, 2014 9:58 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

Handwritten: MW 07424

From: rjhalyard@academicplanet.com [<mailto:rjhalyard@academicplanet.com>]
Sent: Saturday, May 24, 2014 5:30 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Raymond Halyard

E-MAIL: rjhalyard@academicplanet.com

COMPANY:

ADDRESS: 16204 DIANA LN 318a
HOUSTON TX 77062-5300

PHONE: 2814862050

FAX:

Handwritten: MW

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Marisa Weber

From: PUBCOMMENT-OCC
Sent: Tuesday, May 27, 2014 9:58 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

From: rjhalyard@academicplanet.com [<mailto:rjhalyard@academicplanet.com>]
Sent: Saturday, May 24, 2014 5:30 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

*MWD
07424*

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Raymond Halyard

E-MAIL: rjhalyard@academicplanet.com

COMPANY:

ADDRESS: 16204 DIANA LN 318a
HOUSTON TX 77062-5300

PHONE: 2814862050

FAX:

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MWD

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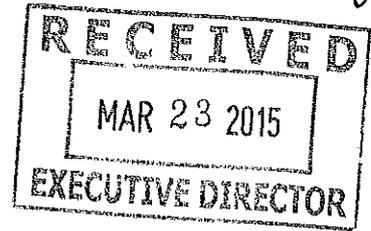
TEXAS
COMMISSION
ON ENVIRONMENTAL
QUALITY

Chief
Clerk
Office

Mr. Richard A. Hyde, P.E., Executive Director,
Texas Commission on Environmental Quality
P. O. Box 13087
Austin, TX 78711-3087

2015 MAR 24 PM 2:34

CHIEF CLERKS OFFICE



MWD
87424

Dear Mr. Hyde,

I am requesting the TCEQ to conduct a contested case hearing of the CLCWA proposed amendment of TPDES Permit No. WQ0010539001. I recommend disapproval.

Daryl Hampton
826 Lochnell
Houston, Tx 77062

I am an "Affected Person". TCEQ approval of this amendment & CLCWA implementation of it will have a detrimental effect on me & my family in the following areas:

1. Health

My property abuts the old golf course where currently nonexistent massive ditches will be excavated and where 1,080,000 gallons per day of partially treated effluent water will slowly flow & pool in acres of man-made swampy wetlands & new retention ditches. This new effluent water hazard will be within 1000 feet of my property line. I am 53 years of age and have a weakened immune system. Historically the TCEQ allows effluent water to be added to existing, flowing bodies of water. This massive effluent water project adds effluent water to a (currently) non-existent dry detention ditch. A project this massive has never been added to a fully occupied residential area and TCEQ permitted in Texas. Therefore the biological & health impacts are currently not quantifiable. The TCEQ cannot guarantee that the proposed quantity of partially treated effluent water will be safe for someone with my health conditions. It is my position that my health & possibly even life are endangered by the bacteria, germs, & hordes of mosquitoes that will appear if this permit is approved.

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Per general discussions with local realtors, my property value will decrease by as much as 15% (estimated @ \$20,000 to \$30,000) during the CLCWA planned 15 year development period of this project.

My CLCWA District taxes will increase as the board issues new bonds to pay for this currently unfunded \$50 million project.

Please disapprove the amendment to Permit WQ0010539001. Thank you.

Daryl Hampton

REVIEWED

MAR 24 2015

By

H
mu



NORTH HOUSTON TX 773

20 MAR 2015 PM 5 L

TEXAS
COMMISSION
ON ENVIRONMENTAL
QUALITY

2015 MAR 24 PM 2:34

CHIEF CLERKS OFFICE

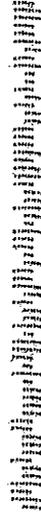
1915

Mr. Richard Hyde

TCEQ

P.O. Box 13087

Austin, TX 78711-3087



78711308787

Faint, illegible text, possibly a list or schedule of events.


Daryl Hampton
826 Lochnell Dr.
Houston, TX 77062-2615

RECEIVED
MAR 23 2015
TCEQ MAIL CENTER

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Thursday, April 02, 2015 12:48 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

HR
RFR

From: dancercit@sbcglobal.net [mailto:dancercit@sbcglobal.net]
Sent: Thursday, April 02, 2015 11:52 AM
To: DoNot Reply
Subject: Public comment on Permit Number WQ0010539001

MWD
87424

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Carole L Henning

E-MAIL: dancercit@sbcglobal.net

COMPANY:

ADDRESS: 15718 TORRY PINES RD
HOUSTON TX 77062-4512

PHONE: 8322263526

FAX:

COMMENTS: Friends of the Old Golf Course are requesting that the Executive Director of the TCEQ reconsider and amend his decision relative to TPDES Permit WQ0010539001. We believe that issues of public health have not been sufficiently considered. We are requesting a contested case hearing. Several of our members live within 0.2 mile from the proposed outfalls 002 and 003 and directly adjacent to the proposed

MWD

ponds. Several of our members have submitted request to reconsider. They include Charles Howard, Kenneth Proctor and Anita Cooper. Others feel that their health will be negatively impacted and believe they meet the requirements of Rule 55.256, Title 30 of the Texas Administrative Code and wish their concerns to be expressed by the Friends of the Old Golf Course. 1) We request that the applicant be required to treat all outfalls equally and treatment requirements and bacteria count limits of outfall 001 be extended to 002 and 003. We feel residents adjacent to outfalls 002 and 003 should face no greater bacteria levels than those residents living adjacent to outfall 001. All regulations that apply to 001 are to be applied to outfalls 002 and 003. We request that the discharge limits for outfall 002 and 003 be amended to 35 daily average and 104 daily maximum, the current requirements for outfall 001. Since outfall 001 is inaccessible to the public, we request that outfalls 002 and 003 be made inaccessible in a similar way. 2) We request that this application be amended to require the applicant to test for Legionella and Legionella pneumophila at the outfalls, 002 and 003, and allow no more than exists in the natural environment (where no waste water treatment plant effluent is present). We further request that the applicant be required to adjust his treatment process in order to assure that the bacteria levels of Legionella at outfalls 002 and 003 are at or below the established natural environment baseline. Many of our members are elderly and have diminished immune system due to cancer, radiation treatments and a wide variety of chronic health conditions. The elderly and immune challenged are particularly vulnerable to the potential fatal disease, Legionnaire's Disease, caused by this bacteria. Because this bacteria is inhaled from mist/fog/steam (water aerosol) evaporating from a contaminated water source, our members proximity to this treated effluent places them at a high risk. The levels of Legionella will be high in the in the effluent exiting the Savely Waste Treatment plant due to City of Houston regulations and common building and treatment practices. The City of Houston requires that all air conditioner drain water, a source of Legionella, be piped into the sanitary drain lines. Legionella pneumophila is resistant to most common wastewater treatment processes especially chlorine which the applicant intends to use periodically. During periods of high air conditioner use and warm temperatures, the treated waste water at outfall 002 and 003 will likely contain high levels of treatment resistant Legionella pneumophila. Under the current proposal, outfalls 002 and 003 will create a "water aerosol" that as a fine mist can travel a great distance and linger in the air. In addition because Legionella is treatment resistant, the mist/fog that will rise over the applicant's proposed ponds and streams and flow as fog into adjacent resident's yards will most likely contain high levels of Legionella. Proximity legionellosis is noted in the literature. Biofilm growth of Legionella in stagnant warm water (applicant's ponds) is also noted in the literature. This biofilm accumulation of Legionella may threaten human health as described by Implementation Procedures, 30 TAC Chapter 307. As a result, public health will be at risk whenever the fog is present and people will be at increased risk of contracting this disease from inhaled effluent mist. The applicant's method of testing for E.coli provides no protection to public health from this aerosol transmitted disease. Testing for Legionella is well established and should not pose a significant or undue burden on the applicant. To summarize: We request that the application be amended in the following ways prior to possible approval. We request that the discharge limits for outfall 002 and 003 be amended to the levels for outfall 001 and outfalls 002 and 003 be made inaccessible to the public in a similar way to outfall 001. We request that this application be amended to require the applicant to test for Legionella and allow no more Legionella at outfalls 002 and 003 than exists in the natural environment. We request the Executive Director reconsider and amend his decision relative to TPDES Permit WQ0010539001. We request this on behalf of the members of Friends of the Old Golf Course.

Marisa Weber

From: PUBCOMMENT
Sent: Wednesday, May 15, 2013 11:35 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

PM
H

mwd
07424

From: PUBCOMMENT-OCC
Sent: Wednesday, May 15, 2013 11:16 AM
To: PUBCOMMENT
Subject: FW: Public comment on Permit Number WQ0010539001

From: handymess79@gmail.com [<mailto:handymess79@gmail.com>]
Sent: Wednesday, May 15, 2013 11:14 AM
To: donotReply@tceq.state.tx.us
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Mandy Hess

E-MAIL: handymess79@gmail.com

COMPANY:

ADDRESS: 1638 BEACHCOMBER LN
HOUSTON TX 77062-5409

PHONE: 2816601039

MW

FAX:

COMMENTS: I would like to request a public meeting about this permit request. I would also like to request a contested case hearing regarding permit amendment application number WQ0010539001, I live directly across the street, or 100 feet from the facility in question and would be adversely affected by the facility due to much lowered standards of living and lowered property values. I'm also concerned about the safety of such an operation.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, June 02, 2014 9:06 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

From: handymess79@gmail.com [<mailto:handymess79@gmail.com>]
Sent: Thursday, May 29, 2014 6:39 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

*MWD
857424*

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Mandy Hess

E-MAIL: handymess79@gmail.com

COMPANY:

ADDRESS: 1638 BEACHCOMBER LN
HOUSTON TX 77062-5409

PHONE: 2816601039

FAX:

COMMENTS: I don't want effluent waste water ponds and lakes in my backyard. It will just be stagnating and I don't want the smell or germs in my neighborhood, especially since it is completely unnecessary.

MWD

Bridget C. Bohac, Chief Clerk
TCEQ, MC-105

REVIEWED

MAR 27 2015

By

[Signature]

H

mw
87424

CHIEF CLERK OFFICE

MAR 26 AM 9:10

STATE OF TEXAS
COMMISSION ON
ADMINISTRATIVE
SUPPORT

Attached are copies of 3 letters that I previously submitted to TCEQ via your e-comments system. They are my response to your 3-6-15 letter entitled--Decisions of the Executive Director. Please include them as my requests for a decision reversal & a contested case hearing.

After I submitted the originals electronically I discovered minor typos which I have corrected in this data package. I am not enough of a computer whiz to know how to correct typos electronically after the inputs have been submitted. Is it possible? Thanks for your support in this matter.

Charles E. Howard

Charles E. Howard

3-24-15

mw

1

From: donotreply@tceq.texas.gov
Subject: TCEQ Confirmation: Your public comment on Permit Number WQ0010539001 was received.
Date: March 18, 2015 at 11:14 AM
To: Chuck Howard 8180fritz@gmail.com

**REGULATED ENTITY NAME ROBERT T
SAVELY WATER RECLAMATION FACILITY**

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

**PRINCIPAL NAME: CLEAR LAKE CITY
WATER AUTHORITY**

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: I am requesting that the Technical Director of the TCEQ reconsider his decision relative to TPDES Permit WQ0010539001. I am also requesting that the TCEQ Commissioners conduct a contested ^{case hearing} ~~review~~ of TPDES Permit

WQ0010539001. I am submitting both these requests via this e-Comments system in response to the TCEQ Chief Clerk's letter dated 3-6-15 that addresses TPDES Permit WQ0010395001. I highly recommend disapproval of this permit because of the detrimental affect it will have on me and my family's health & finances. The Permit per se contains a detailed data package that describes the construction & operation of two new outfalls & a pipeline system (required to move effluent water 14,000 feet from the Waste Water Treatment Facility to 2 locations in the middle of my fully populated residential area). If the TCEQ approves this Permit, they will also be

approving the construction & operation of these facilities. Approval & implemental will directly impact my health & finances as described below: Health----My property is in the CLCWA District and abuts the golf course property where the effluent water will be pumped. My property line is less than 100 feet from where the effluent water will flow & pool in a combined man-made retention ditch/wetlands swamp facility. My property is also within the prescribed quarter mile radius of both new outflows (which by TCEQ's definition, makes me an affected person). I am 76 years of age and have a severly deminished immune system due to: 1. Open Heart Bypass Surgery 2.

Cancer hormone & radiation treatment (on going) 3. Normal Age immunity degeneration. Historically, the TCEQ has allowed effluent water to be added to existing flowing bodies of water @ less than 30% of the total combined volume. If this permit is approved, the TCEQ will be permitting the CLCWA to put 2,160,000 gallons per day (100% effluent i.e. not a mixture) into a currently dry area in a populated community. This has never been allowed before in Texas. The super bacteria, germs, levels of mosquito infestation that this will bring so close to where I live will be a danger to my health & possibly even my life. This 100% effluent man-made body of water can not at this

time be guaranteed by the TCEQ or the CLCWA, ^{to} not ~~to~~ be a hazard to my health & well being. Finances----My FEMA flood insurance zone will change because of my closer proximity to the effluent water ditch. As a result my cost of flood insurance will increase by 30% per year. My property value will decrease as the CLCWA excavates 3 million cubic yards of soil to create the planned ditches. Because of the noise, dust & street mud from several thousand dump trucks, property values will decrease by 15% (\$20,000 TO \$30,000 per home). Since this entire \$50 million CLCWA project is currently unfunded, the board must issue a new bond and my taxes will go up accordingly.

Finally, the TCEQ should disapprove this permit or hold it on abeyance for ^{at least} 5 years until the CLCWA has created the first of 5 ditches that will contain the effluent water (i.e. permit is premature).

Based on TCEQ rule Section 1.10(h), the TCEQ General Counsel has waived the filing requirements of Section 1.10(c) to allow the filing of comments, requests, or withdrawals using this online system. The

General Counsel also has waived the requirements of Section 1.10(e) so that the time of filing your electronic comments or requests is the time this online system receives your comments or requests.

Comments or requests are considered

2

From: donotreply@tceq.texas.gov
Subject: TCEQ Confirmation: Your public comment on Permit Number WQ0010539001 was received.
Date: ~~March 21, 2015 at 1:50 PM~~
To: Chuck Howard 8180fritz@gmail.com

**REGULATED ENTITY NAME ROBERT T
SAVELY WATER RECLAMATION FACILITY**

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

**PRINCIPAL NAME: CLEAR LAKE CITY
WATER AUTHORITY**

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: I am requestion that the Executive Director reconsider his decision to approve TPDES Permit WQ0010539001 and also that the TCEQ Comissioners conduct a contesred case hearing of the permit. The permit should be disapproved

for the following reasons: (Reference 3-6-15 TCEQ letter entitled--Decision of the Executive Director--signed by Bridget C. Bohac ---Response to Public Comment)

1. Response 5: page 15 states "An antidegradation review of the receiving water was conducted and determined that existing recreational uses will be maintained". This is not true and did not happen. The data package portion of this permit makes it very clear that the receiving water will flow into "Future Ponds (or ditches)", therefore there is no current receiving water to analyze. Furthermore there are no existing recreational uses since the appropriate future ponds will not be excavated for 10

to ¹⁵~~12~~ years. If the TCEQ examination team had a clearer understanding of the details of the permit data package, they would realize that the future receiving water will not flow for at least 10 years ; it can not be analyzed until then; and future years maintenance of the future ponds & receiving waters will have been transferred to the Exploration Green Conservancy [EGC]. The EGC has no taxing power or secure source of income, therefore you can not make a firm judgement that the recreational "uses" will be maintained. Please disapprove this Permit.

Based on TCEQ rule Section 1.10(h), the TCEQ General Counsel has waived the filing requirements of Section 1.10(c) to

From: donotreply@tceq.texas.gov
Subject: TCEQ Confirmation: Your public comment on Permit Number WQ0010539001 was received.
Date: March 23, 2015 at 11:36 AM
To: Chuck Howard 8180fritz@gmail.com

**REGULATED ENTITY NAME ROBERT T
SAVELY WATER RECLAMATION FACILITY**

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

**PRINCIPAL NAME: CLEAR LAKE CITY
WATER AUTHORITY**

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: I am requesting that the TCEQ Executive Director reconsider his decision to approve TPDES Permit WQ0010539001 because it is based on incomplete data & approval will create health & safety hazards for myself & other

CLCWA district members. I am also requesting that the Commissioners conduct a contested case ^{hearing} ~~review~~ of this permit for the same reasons. On 3-6-15, I received a letter from the TCEQ Chief Clerk entitled "Decision of the Executive Director". Among other things it contained 45 pages under the title "Executive Director's Responses to Public Comment" and addressed why he will approve WQ0010539001. It is my belief that many of these responses are based on incomplete or misunderstood data as reviewed ~~by~~ the TCEQ. An example follows: (Reference the last paragraph of Page 5--Description of the Facility) It states --effluent discharge would be via

outfall 002 to a "pond"-----and later states
--effluent would be discharged from outfall
003 to a "series of ponds"----. Both of these
are incorrect and should have the word
FUTURE inserted before ponds. Why
would this change the Director's decision?
Apparently the TCEQ evaluators did not
understand or take into consideration the
current or future status of property where
the two outfalls will be located. If outfall
002 was functional today it ^{would} flow effluent
water into a normally dry, shallow HCFCD
ditch that does not belong to the
CLCWA. The 1,080,000 gallons per day of
flowing effluent would inundate this flood
control ditch and exacerbate normal
flood control during rain events. The

CLCWA hopes to acquire the HCFCD ditches and modify them via ^{deeper} excavation per the CLCWA Master Plan.

Unfortunately, the planned start of this excavation is (not before) 2026. Is it not true that all ^{TCEQ} permits expire after 5 years & must be renewed? If so this requested permit will expire 6 years before it has a future ditch (or pond) to contain flow from outfall 002. The last sentence in this paragraph on page 5 identifies "receiving water uses" in the proposed outfall 002 area as being safe for intermediate aquatic life use. The TCEQ evaluators apparently analyzed the run-off water that sometimes exists in the HCFCD ditches presently in order to make this statement. This is

irrelevant and therefore misleading. They did not & can not analyze the future water that will only exist sometime after 2026. It is my belief that this future effluent water will normally consist of 90% effluent water plus 10% rain water run-off. The TCEQ cannot conclude at this point in time that these future receiving waters are safe for intermediate aquatic life use as stated on page 5. Acres of this mixture within 125 feet of my property will endanger my health, my families, and my elderly neighbors. Everything I have discussed above also applies to page 5 statements about discharge from outfall 003 with the following exceptions. The area nearest outfall 003 is currently high & dry (zero

ditches) and planned excavation will start in 2023. I fear the Executive Director has made his decision based on incomplete data & a lack of understanding of the timing of the CLCWA Master Plan for excavation of future ponds. I highly recommend disapproval of WQ0010539001, but as a fall-back position, the TCEQ ^{sh} could delay it's approval for five years without any significant impact (i.e. this currently unfunded plan may never happen).

Based on TCEQ rule Section 1.10(h), the TCEQ General Counsel has waived the filing requirements of Section 1.10(c) to allow the filing of comments, requests, or



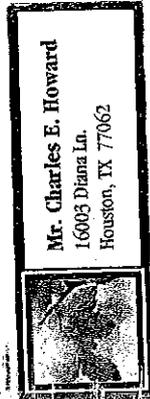
TEXAS
COMMISSION ON
ENVIRONMENTAL
QUALITY

MAR 26 AM 9:41



CHIEF CLERK'S OFFICE

Bridget C. Bohac, Chief Clerk
TCEQ MC-105
P.O. Box 13087
Austin, Texas 78711-3087



Mr. Charles E. Howard
16003 Diana Ln.
Houston, TX 77062



787133087

TCEQ Chief Clerk

FYI --the attached has your copy of my response to your 3-6-15 letter to me. I mailed the original by registered mail to Mr. Hyde. Thank you.

Chuck Howard

*MWD
DMW
HCH
8/7/15*



REVIEWED

MAR 24 2015

By

B

*H
RFR*

CHIEF CLERK'S OFFICE

MAR 24 2015 11 23 56

TCEQ
COMMISSION
ON ENVIRONMENTAL
QUALITY

MW

TCEQ Ex. Dir. Letter

Mr. Richard A. Hyde, P.E.
Executive Director, TCEQ

Handwritten:
10/1/15
10/1/15

Sir,

I am requesting that you reconsider your decision to approve TPDES Permit WQ0010539001 as referenced in a 3-6-15 TCEQ letter from your Chief of Staff addressed to me, Charles E. Howard, and several hundred of my Clear Lake City Water Authority (CLCWA) district neighbors. I highly recommend disapproval of Permit WQ0010539001 because of the detrimental impact it will have on me and my family's health and finances. The entire Permit, as submitted to the TCEQ for review & approval, consist of a formal approval form & a detailed data package. The data package portion describes in detail the construction & operation

of two new outfalls plus 14,000+ feet of new pipeline (12 inch diameter) that will move partially treated effluent water close to my property. The water will originate at the existing Waste Water Treatment Facility (WWTF-elevation @7 feet ASL) and is pumped uphill 2.7 miles to 2 new outfalls (@21 feet ASL) located in the middle of my fully occupied, dry residential area. Currently there are no lakes or constantly flowing bodies of water in the targeted golf course residential area. The CLCWA is clearly asking the TCEQ to approve two things, (1.) the quality of the proposed effluent water and (2.) to also approve the construction and operation of these (data package described) facilities to relocate the water into my neighborhood. TCEQ approval of WQ0010539001 will permit the CLCWA district to construct & operate these new questionable facilities. This will severely impact my health and finances as described below:

Health:

My property is in the CLCWA district and abuts the golf course property where the ditches will eventually (10 to 15 years) be excavated and the effluent water will flow from the proposed 2 new outfalls. My property line is less than 125 feet from where the effluent water will flow & pool in a combined man-made swamp (new wetlands) & excavated retention ditch. My property is also within the TCEQ prescribed quarter mile radius of both new outfalls. By TCEQ definition, this makes me an affected person.

Furthermore, I am 76 years of age and have a severely diminished immune system due to: 1. Open heart bypass surgery 2. Cancer Radiation treatment (on going) 3. normal aging immunity degeneration.

Historically, the TCEQ has only allowed effluent water to be added to existing or flowing bodies of water @ less than 30% of the total combined volume of that body of water. If TCEQ approves this permit, TCEQ will be permitting the CLCWA to excavate a series of

ditches & then fill them with 90% effluent water and 10% occasional run-off water. The 2 outflows will bring a volume of 2,160,000 gallons per day to the new ditches & wetland swamps at 90% (not 30%) by volume. This has never been done before in Texas and creates an unacceptable health hazard for me & my family and other older neighbors. The CLCWA suggests that the effluent water is safe and pathogen free due to the use of UV radiation. However, when the water becomes turbid due to rain or other environmental situations, they rely on chlorine treatment. This may control some pathogens, but several classes of harmful bacteria are unaffected by their current level of chlorine treatment. If they add more chlorine it will kill all the plant life they will have purposely added to the new wetlands.

Superbugs--a new family of antibiotic resistant bacteria--know as CRE --can cause infections that defy even drugs of the last resort & destroy human life. The CLCWA proposed UV and Chlorine treatments will have no impact on

superbugs & other bacteria that will be present in the effluent water system. On multiple rainy days, harmful bacteria and germs will pour from the new outflows and form layers of pathogen rich mud in the wetlands swamp & ditch behind my house (less than 125 feet). To further exacerbate this situation, the CLCWA will pump this effluent water through the new outflows into newly excavated ditches that are below the area water table. This will promote intermingling of effluent with underground water. 30% of the CLCWA provided drinking water comes from underground water, therefore the water supply could become contaminated and infect all users.

The superbugs, bacteria, germs, water contamination and hordes of germ laden mosquitoes that TCEQ approval of this Permit will endanger my health and possibly could end my life. Can the TCEQ and the CLCWA guarantee in writing that my health will not be endangered by approval & implementation of

this Permit?

Finances:

My FEMA flood insurance zone will change because of my closer proximity to water (effluent water ditch). As a result, my cost for flood insurance will increase by 30%. My property value will decrease as the CLCWA excavates 3 million cubic yards of soil to create these ditches. The accompanying noise, dust and street mud from several thousand dump trucks removing soil will make my neighborhood into an undesirable real estate area. Property values will decrease by 15% (\$20,000 to \$30,000 per home). My CLCWA taxes will increase significantly because the Board must issue \$50 million in bonds to pay for this unfunded project. The proposed excavated ditches will not be available to accept the flow of effluent water for 10 years for outflow 002 and for 15 years for outflow 003. Therefore consideration and approval of this Permit by TCEQ is premature &

unnecessary. The Permit could be held by TCEQ in abeyance & set aside for 5 years. I, however, am recommending disapproval & I also request a contested case hearing by the TCEQ Commissioners.

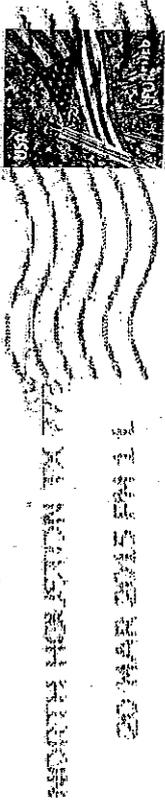
Thank you

Charles E. Howard Charles E. Howard 3-19-15

*Charles E. Howard
Executive Director
TCEQ*

cc: Denis Paul Texas State Representative
Larry Taylor Texas State Senator
Bridget C. Bohac TCEQ Chief Clerk

Mr. Charles E. Howard
16003 Diana Ln.
Houston, TX 77062



HOUSTON TX 77062

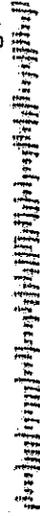
20 MAR 2015 PM 11

Bridget C. Bohac, Chief Clerk
TCEQ, MC-105
P.O. Box 13087
Austin, Texas 78711-3087

RECEIVED
MAR 23 2015
TCEQ MAIL CENTER
CJ

TEXAS
COMMISSION
ON ENVIRONMENTAL
QUALITY

2015
MAR 23 2:56
CLERKS OFFICE



Marisa Weber

From: PUBCOMMENT-OCC
Sent: Tuesday, March 24, 2015 10:40 AM
To: PUBCOMMENT-OCC2
Subject: CORRECTION Public comment on Permit Number WQ0010539001

RFR
H

Handwritten:
Down
7424

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Monday, March 23, 2015 11:37 AM
To: DoNot Reply
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: I am requesting that the TCEQ Executive Director reconsider his decision to approve TPDES Permit WQ0010539001 because it is based on incomplete data & approval will create health & safety hazards for myself & other CLCWA district members. I am also requesting that the Commissioners conduct a contested case review of this permit for the same reasons. On 3-6-15, I received a letter from the TCEQ Chief Clerk

Handwritten:
mu

entitled "Decision of the Executive Director". Among other things it contained 45 pages under the title "Executive Director's Responses to Public Comment" and addressed why he will approve WQ0010539001. It is my belief that many of these responses are based on incomplete or misunderstood data reviewed by the TCEQ. An example follows: (Reference the last paragraph of Page 5--Description of the Facility) It states --effluent discharge would be via outfall 002 to a "pond"-----and later states --effluent would be discharged from outfall 003 to a series of ponds----. Both of these are incorrect and should have the word FUTURE inserted before ponds. Why would this change the Director's decision? Apparently the TCEQ evaluators did not understand or take into consideration the current or future status of property where the two outfalls will be located. If outfall 002 was functional today it flow effluent water into a normally dry shallow HCFCD ditch that does not belong to the CLCWA. The 1,080,000 gallons per day of flowing effluent would inundate this flood control ditch and exasperbate normal flood control during rain events. The CLCWA hopes to acquire the HCFCD ditches and modify them via excavation per the CLCWA Master Plan. Unfortunately, the planned start of this excavation is (not before) 2026. Is it not true that all permits expire after 5 years & must be renewed? If so this requested permit will expire 6 years before it has a future ditch (or pond) to contain flow from outfall 002. The last sentence in this paragraph on page 5 identifies "receiving water uses" in the proposed outfall 002 area as being safe for intermediate aquatic life use. The TCEQ evaluators apparently analyzed the run-off water that sometimes exists in the HCFCD ditches presently in order to make this statement. This is irrelevant and therefore misleading. They did not & can not analyze the future water that will only exist sometime after 2026. It is my belief that this future effluent water will normally consist of 90% effluent water plus 10% rain water run-off. The TCEQ cannot conclude at this point in time that these future receiving waters are safe for intermediate aquatic life use as stated on page 5. Acres of this mixture within 125 feet of my property wiii endanger my health, my families, and my elderly neighbors. Everything I have discussed above also applys to page 5 statements about discharge from outfall 003 with the following exceptions. The area nearest outfall 003 is currently high & dry (zero ditches) and planned excavation will start in 2023. I fear the Executive Director has made his decision based on incomplete data & a lack of understanding of the timing of the CLCWA Master Plan for excavation of future ponds. I highly recommend disapproval of WQ0010539001, but as a fall-back position, the TCEQ could delay it's approval for five years without any significant impact (i.e. this currently unfunded plan may never happen).

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, March 23, 2015 12:09 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

H

From: 8180fritz@gmail.com [mailto:8180fritz@gmail.com]
Sent: Monday, March 23, 2015 11:37 AM
To: DoNot Reply
Subject: Public comment on Permit Number WQ0010539001

Handwritten: MWD / 87424 / h-eh-f

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: I am requesting that the TCEQ Executive Director reconsider his decision to approve TPDES Permit WQ0010539001 because it is based on incomplete data & approval will create health & safety hazards for myself & other CLCWA district members. I am also requesting that the Commissioners conduct a contested case review of this permit for the same reasons. On 3-6-15, I received a letter from the TCEQ Chief Clerk entitled "Decision of the Executive Director". Among other things it contained 45 pages under the title

Handwritten: MW

"Executive Director's Responses to Public Comment" and addressed why he will approve WQ0010539001. It is my belief that many of these responses are based on incomplete or misunderstood data reviewed by the TCEQ. An example follows: (Reference the last paragraph of Page 5--Description of the Facility) It states --effluent discharge would be via outfall 002 to a "pond"-----and later states --effluent would be discharged from outfall 003 to a series of ponds----. Both of these are incorrect and should have the word FUTURE inserted before ponds. Why would this change the Director's decision? Apparently the TCEQ evaluators did not understand or take into consideration the current or future status of property where the two outfalls will be located. If outfall 002 was functional today it flow effluent water into a normally dry shallow HCFCD ditch that does not belong to the CLCWA. The 1,080,000 gallons per day of flowing effluent would inundate this flood control ditch and exasperbate normal flood control during rain events. The CLCWA hopes to acquire the HCFCD ditches and modify them via excavation per the CLCWA Master Plan. Unfortunately, the planned start of this excavation is (not before) 2026. Is it not true that all permits expire after 5 years & must be renewed? If so this requested permit will expire 6 years before it has a future ditch (or pond) to contain flow from outfall 002. The last sentence in this paragraph on page 5 identifies "receiving water uses" in the proposed outfall 002 area as being safe for intermediate aquatic life use. The TCEQ evaluators apparently analyzed the run-off water that sometimes exists in the HCFCD ditches presently in order to make this statement. This is irrelevant and therefore misleading. They did not & can not analyze the future water that will only exist sometime after 2026. It is my belief that this future effluent water will normally consist of 90% effluent water plus 10% rain water run-off. The TCEQ cannot conclude at this point in time that these future receiving waters are safe for intermediate aquatic life use as stated on page 5. Acres of this mixture within 125 feet of my property wiii endanger my health, my families, and my elderly neighbors. Everything I have discussed above also applys to page 5 statements about discharge from outfall 003 with the following exceptions. The area nearest outfall 003 is currently high & dry (zero ditches) and planned excavation will start in 2023. I fear the Executive Director has made his decision based on incomplete data & a lack of understanding of the timing of the CLCWA Master Plan for excavation of future ponds. I highly recommend disapproval of WQ0010539001, but as a fall-back position, the TCEQ could delay it's approval for five years without any significant impact (i.e. this currently unfunded plan may never happen).

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Tuesday, March 24, 2015 10:41 AM
To: PUBCOMMENT-OCC2
Subject: CORRECTION Public comment on Permit Number WQ0010539001

RFR
H

*MWD
87424*

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Saturday, March 21, 2015 1:51 PM
To: DoNot Reply
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: I am requestion that the Executive Director reconsider his decision to approve TPDES Permit WQ0010539001 and also that the TCEQ Comissioners conduct a contesred case hearing of the permit. The permit should be disapproved for the following reasons: (Reference 3-6-15 TCEQ letter entitled--Decision of the Executive Director--signed by Bridget C. Bohac ---Response to Public Comment) 1. Response 5: page 15

MW

states "An antidegradation review of the receiving water was conducted and determined that existing recreational uses will be maintained". This is not true and did not happen. The data package portion of this permit makes it very clear that the receiving water will flow into "Future Ponds (or ditches)", therefore there is no current receiving water to analyze. Furthermore there are no existing recreational uses since the appropriate future ponds will not be excavated for 10 to 12 years. If the TCEQ examination team had a clearer understanding of the details of the permit data package, they would realize that the future receiving water will not flow for at least 10 years ; it can not be analyzed until then; and future years maintenance of the future ponds & receiving waters will have been transferred to the Exploration Green Conservancy [EGC]. The EGC has no taxing power or secure source of income, therefore you can not make a firm judgement that the recreational "uses" will be maintained. Please disapprove this Permit.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, March 23, 2015 7:38 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

H

From: 8180fritz@gmail.com [mailto:8180fritz@gmail.com]
Sent: Saturday, March 21, 2015 1:51 PM
To: DoNot Reply
Subject: Public comment on Permit Number WQ0010539001

*MWD
87424*

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: I am requestion that the Executive Director reconsider his decision to approve TPDES Permit WQ0010539001 and also that the TCEQ Comissioners conduct a contesred case hearing of the permit. The permit should be disapproved for the following reasons: (Reference 3-6-15 TCEQ letter entitled--Decision of the Executive Director--signed by Bridget C. Bohac ---Response to Public Comment) 1. Response 5: page 15 states "An antidegradation review of the receiving water was conducted and determined that existing

mw

recreational uses will be maintained". This is not true and did not happen. The data package portion of this permit makes it very clear that the receiving water will flow into "Future Ponds (or ditches)", therefore there is no current receiving water to analyze. Furthermore there are no existing recreational uses since the appropriate future ponds will not be excavated for 10 to 12 years. If the TCEQ examination team had a clearer understanding of the details of the permit data package, they would realize that the future receiving water will not flow for at least 10 years ; it can not be analyzed until then; and future years maintenance of the future ponds & receiving waters will have been transferred to the Exploration Green Conservancy [EGC]. The EGC has no taxing power or secure source of income, therefore you can not make a firm judgement that the recreational "uses" will be maintained. Please disapprove this Permit.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Tuesday, March 24, 2015 10:38 AM
To: PUBCOMMENT-OCC2
Subject: CORRECTION Public comment on Permit Number WQ0010539001

RFR
H

From: 8180fritz@gmail.com [mailto:8180fritz@gmail.com]
Sent: Wednesday, March 18, 2015 11:15 AM
To: DoNot Reply
Subject: Public comment on Permit Number WQ0010539001

*MWD
7424*

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: I am requesting that the Technical Director of the TCEQ reconsider his decision relative to TPDES Permit WQ0010539001. I am also requesting that the TCEQ Commissioners conduct a contested review of TPDES Permit WQ0010539001. I am submitting both these requests via this e-Comments system in response to the TCEQ Chief Clerk's letter dated 3-6-15 that addresses TPDES Permit WQ0010395001. I highly

MWD

recommend disapproval of this permit because of the detrimental affect it will have on me and my family's health & finances. The Permit per se contains a detailed data package that describes the construction & operation of two new outfalls & a pipeline system (required to move effluent water 14,000 feet from the Waste Water Treatment Facility to 2 locations in the middle of my fully populated residential area). If the TCEQ approves this Permit, they will also be approving the construction & operation of these facilities. Approval & implemental will directly impact my health & finances as described below: Health----My property is in the CLCWA District and abuts the golf course property where the effluent water will be pumped. My property line is less than 100 feet from where the effluent water will flow & pool in a combined man-made retention ditch/wetlands swamp facility. My property is also within the prescribed quarter mile radius of both new outflows (which by TCEQ's definition, makes me an affected person). I am 76 years of age and have a severely deminished immune system due to: 1. Open Heart Bypass Surgery 2. Cancer hormone & radiation treatment (on going) 3. Normal Age immunity degeneration Historically, the TCEQ has allowed effluent water to be added to existing flowing bodies of water @ less than 30% of the total combined volume. If this permit is approved, the TCEQ will be permitting the CLCWA to put 2,160,000 gallons per day (100% effluent i.e. not a mixture) into a currently dry area in a populated community. This has never been allowed before in Texas. The super bacteria, germs, levels of mosquito infestation that this will bring so close to where I live will be a danger to my health & possibly even my life. This 100% effluent man-made body of water can not at this time be guaranteed by the TCEQ or the CLCWA, not to be a hazard to my health & well being. Finances----My FEMA flood insurance zone will change because of my closer proximity to the effluent water ditch. As a result my cost of flood insurance will increase by 30% per year. My property value will decrease as the CLCWA excavates 3 million cubic yards of soil to create the planned ditches. Because of the noise, dust & street mud from several thousand dump trucks, property values will decrease by 15% (\$20,000 TO \$30,000 per home). Since this entire \$50 million CLCWA project is currently unfunded, the board must issue a new bond and my taxes will go up accordingly. Finally, the TCEQ should disapprove this permit or hold it on abyance for 5 years until the CLCWA has created the first of 5 ditches that will contain the effluent water (i.e. permit is premature).

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Wednesday, March 18, 2015 2:03 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

H

From: 8180fritz@gmail.com [mailto:8180fritz@gmail.com]
Sent: Wednesday, March 18, 2015 11:15 AM
To: DoNot Reply
Subject: Public comment on Permit Number WQ0010539001

*MWD
DHW
3/18/15*

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: I am requesting that the Technical Director of the TCEQ reconsider his decision relative to TPDES Permit WQ0010539001. I am also requesting that the TCEQ Commissioners conduct a contested review of TPDES Permit WQ0010539001. I am submitting both these requests via this e-Comments system in response to the TCEQ Chief Clerk's letter dated 3-6-15 that addresses TPDES Permit WQ0010395001. I highly recommend disapproval of this permit because of the detrimental affect it will have on me and my family's

MWD

health & finances. The Permit per se contains a detailed data package that describes the construction & operation of two new outfalls & a pipeline system (required to move effluent water 14,000 feet from the Waste Water Treatment Facility to 2 locations in the middle of my fully populated residential area). If the TCEQ approves this Permit, they will also be approving the construction & operation of these facilities. Approval & implemental will directly impact my health & finances as described below: Health---My property is in the CLCWA District and abuts the golf course property where the effluent water will be pumped. My property line is less than 100 feet from where the effluent water will flow & pool in a combined man-made retention ditch/wetlands swamp facility. My property is also within the prescribed quarter mile radius of both new outflows (which by TCEQ's definition, makes me an affected person). I am 76 years of age and have a severely deminished immune system due to: 1. Open Heart Bypass Surgery 2. Cancer hormone & radiation treatment (on going) 3. Normal Age immunity degeneration Historically, the TCEQ has allowed effluent water to be added to existing flowing bodies of water @ less than 30% of the total combined volume. If this permit is approved, the TCEQ will be permitting the CLCWA to put 2,160,000 gallons per day (100% effluent i.e. not a mixture) into a currently dry area in a populated community. This has never been allowed before in Texas. The super bacteria, germs, levels of mosquito infestation that this will bring so close to where I live will be a danger to my health & possibly even my life. This 100% effluent man-made body of water can not at this time be guaranteed by the TCEQ or the CLCWA, not to be a hazard to my health & well being. Finances---My FEMA flood insurance zone will change because of my closer proximity to the effluent water ditch. As a result my cost of flood insurance will increase by 30% per year. My property value will decrease as the CLCWA excavates 3 million cubic yards of soil to create the planned ditches. Because of the noise, dust & street mud from several thousand dump trucks, property values will decrease by 15% (\$20,000 TO \$30,000 per home). Since this entire \$50 million CLCWA project is currently unfunded, the board must issue a new bond and my taxes will go up accordingly. Finally, the TCEQ should disapprove this permit or hold it on abeyance for 5 years until the CLCWA has created the first of 5 ditches that will contain the effluent water (i.e. permit is premature).

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Wednesday, September 24, 2014 3:01 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

H

From: 8180fritz@gmail.com [mailto:8180fritz@gmail.com]
Sent: Wednesday, September 24, 2014 2:54 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

*MWD
007424*

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: I am requesting a contested case hearing for WQ0010539001. This request concerns the potential for spilling millions of gallons of effluent water into Clear lake High School and into hundreds of homes in the event of a large rain event or storm event if this permit is approved by TCEQ & implemented by CLCWA. It is my contention that the CLCWA & TCEQ would be equally liable in a class action suit under civil law if this permit is approved and implemented. The current CLCWA plan is to pump 2,160,000 gallons

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of effluent water per day uphill & away from the Waste Water Treatment Facility (WWTF); through a series of excavated detention/retention ditches that were a dry golf course in a highly populated part of Houston. This effluent water will then flow back to Horsepen Bayou through 2 separate dry Harris County Flood Control District (HCFCD) ditches [B104-03-00 & B104-02-00] . Both ditches enter Horsepen Bayou well above the WWTF effluent water source. This will raise the "normal " level of Horsepen Bayou in the populated areas above the WWTF & increase the potential for flooding and overflowing the banks of the HCFCD ditches. Proximity of these ditches to existing homes & Clear Lake High School; physical limitations on increasing the size of these HCFCD ditches; and no funds or preparations by CLCWA or HCFCD to modify them; are a disaster waiting to happen in the event of a major storm event (rain and/or surge). It is my opinion that TCEQ will be complicit in causing homes & school to have pooling depths of water inside them (composed of run-off and effluent water) that could remain for days. The CLCWA is currently having difficulty regulating the amount of additional run-off that a new developer (Trendmaker) will add to upper Horsepen Bayou. This is in addition to the problem I just described because of a dispute over the amount of detention (ponds) Trendmaker must provide. Trendmaker is asking for relief from an already undersized amount. New development in the CLCWA district is on the NE side of Horsepen Bayou. The to be excavated golf course is on the SW side of Horsepen Bayou. On paper, new development detention requirements can be mitigated by the golf course detention. Physically, run-off from NE will never be mitigated by detention in the SW--not possible. My point is: Horsepen Bayou's "normal" level will rise due to new development & a permit that allows millions of gallons of effluent water to be pumped into it. Add a storm event to this mix and you can have a disaster with hundreds of millions in damages. I believe the TCEQ's responsibility goes beyond the chemical makeup of the effluent water of the permit. I strongly request WQ0010539001 be cancelled by the Executive Director of the TCEQ or the entire Commission.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, June 30, 2014 12:57 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

H

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Sunday, June 29, 2014 2:28 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

mw
6/29/14

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: Notice to the TCEQ Executive Director, I am requesting a Contested Case Hearing for WQ0010539001. This application should be disapproved. I am contesting the following major categories: 1. The omission of written justification for this Application. 2. The Application is very premature. Concerning justification; A. The Application as written contains no valid justification for creating 2 new outfalls to dump effluent water in a higher elevation fully populated community that surrounds a golf course. B. The CLCWA

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Master Plan (MP) also does not contain written justification for this activity. There are currently no officially (federal or state) designated wetlands on the golf course. The addition of effluent water via this application cannot be justified as required to support (nonexistent) wetlands. D. The application calls for the addition of 1,080,000 gallons per day of effluent water into 7 foot deep retention ditches on the golf course(future ditches). This water must then flow through 2 different HCFCD ditches to return to Horsepen Bayou. These smaller dry detention HCFCD ditches will not be modified and cannot accommodate this much effluent water and heavy natural run-off without flooding the surrounding homes. In other words, execution of this application will exacerbate flooding---not improve it. /// Concerning prematurity of this application for Outfall 002; A. The CLCWA does not currently own the dry detention ditch (B104-03-00)in the center of golf course section1. It is owned by HCFCD and they have not given the CLCWA permission to modify it or to dump any effluent water into their ditch. Even if this application is approved, the CLCWA cannot proceed with planned modifications of section 1. B. The HCFCD dry detention ditch B104-03-00 also extends beyond golf course section 1 to Horsepen Bayou. It is not designed to carry 1,080,000 gallons per day plus storm event run-off and will be subject to flooding. The HCFCD has no agreement or near term plans to modify this ditch. C. The CLCWA cannot ever excavate golf course section1 (planned for 2026AD) without HCFCD approval. Even with approval, Outfall 002 would sit idle from 2014 until 2026 when it would then have a ditch into which to dump water. Outfall 002 should be disapproved and this application can be resubmitted in 2026 (12 years) if excavation of section 1 ever becomes a reality. This would avoid lots of rust and deterioration. /// Concerning prematurity of this application for Outfall 003; A. Section 2 of the golf course currently has no drainage ditch and has no channel connecting it to golf course section 3. Section 2 is planned not to be excavated until 2024, therefore Outfall 003 would also sit idle ,rust,and deteriorate for 10 years. Outfall 003 should also be disapproved and this application can be resubmitted in 2024 if excavation of section 2 ever becomes a reality. B. For effluent water to flow from section 2 to sections 3,4, & 5 of the golf course, an elevated bridge must be built on Reseda Street between section 2 & section 3. A channel /ditch must also be made under it to allow the water to flow. The CLCWA is forbidden by law to use water district funds for this construction. The City of Houston ,which owns Reseda Street has not agreed to to build or fund such a bridge i.e. no water will flow and outfall 003 will be useless. C. The 12 inch diameter forced main of this application cannot be completed and buried until golf course sections 2,3,4,& 5 are completely excavated. This means that outfalls 002 & 003 cannot be connected until 2024 AD. No need to approve it until 2023AD. D. HCFCD ditch B104-02-00 thatbegins in section 3 and runs beyond the golf course section 5 to Horsepen Bayou is owned by the HCFCD and not the CLCWA. It is also not designed to carry 1,080,000 gallons per day plus run-off and will not be modified. Flooding will occur during storm events and of extra concern is the proximity of Clear Lake High School with 3000 students. The CLHS is less than 50 feet from the HCFCD ditch. This presents a health & safety hazard & the Clear Creek Independent School District was never notified about this Application. WQ0010539001 should definitely be disapproved.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, June 30, 2014 12:54 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

*MWD
Dover
Harris*

H

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Monday, June 30, 2014 10:08 AM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: I am requesting a contested case hearing of WQ0010539001. I would also like to set the record straight on a few items that have been misstated by others in their inputs to this e-comment system. 1. NASA astronauts on long term spaceflights do drink recycled urine water. Fecal matter is never mixed in or recycled with it. The proposed "reuse water" that will be dumped on the golf course is a combination of partially recycled urine, fecal matter, and anything else you flush down your sewer. It is not potable and to make it

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drinkable would require a separate purification plant next to the WWTF. This would be prohibitively expensive. The past use of reuse water to water the golf course was minuscule (2 million gallons per YEAR) when compared to what is proposed for the excavated golf course (1,080,000 Gallons per DAY from each new Outfall). 2. The golf course is mowed every month and the cart paths are still used daily by walkers, runners, bikers, and mothers pushing baby carriages. Using any available money to improve what we have without water would be money better spent. 3. The Water Authority has never put a price tag on their proposed excavation costs. Previously they declared the sale of the excavated soil would pay for it. Recently they admitted they can not sell the soil (80% clay) and taxpayers will have to pay. How much? \$50 million? Will it require a new bond? Why won't they address this publicly? How can they guarantee that what they start will ever be finished? 4. In 2013 the HCFCD was formally invited to "partner " with the Water Authority on this project. Their formal response was --we have no interest in being a part of this project. The Water Authority can not excavate without HCFCD's consent. This was not made public at the various Town halls conducted by the Water Authority. 5. It does not appear that the TCEQ engineers used my analysis (Part 1 & Part 2) in their evaluation of this Application. It is in the TCEQ database and points out many faults in the plans for this Project that will lead to abject failures if WQ0010539001 is approved.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, June 23, 2014 8:48 AM
To: PUBCOMMENT-ELD; PUBCOMMENT-WQ; PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

H

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Sunday, June 22, 2014 4:00 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

*MWD
87404*

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: Notice to the TCEQ Executive Director, I am requesting a contested case hearing on the amendment of WQ0010539001. I am contesting the following 5 items: [1.] Attachment 4B to the amendment contains an error that severely impacts the validity of the TCEQ's review & analysis and subsequent Preliminary approval. The attachment uses the term " Future Pond Area". The use of the term "pond" is a major error. The Wikipedia encyclopedia defines a pond as a body of standing water, either natural or man-made. Per

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the amendment data and the CLCWA Master Plan for this area, the outfalls (002 & 003) are to be created to provide a constant flow of effluent water through future (2024AD) excavated retention "ditches". Each outfall will provide constantly flowing effluent water @ 1,080,000 gallons per day to prevent stagnation. Upon reaching a steady state depth of 7 feet in the "future" areas, this constantly flowing ditch stream will then flow into a smaller Harris County Flood Control District (HCFCD) ditch and then into Horsepen Bayou. Mr. Director, this will be a stream and not a pond and should be re-evaluated as a future flowing stream. As a minimum, all landowners one full mile downstream of the point of discharge will be tidally influenced and should have been notified via the 4-29-2013 letter issued by the TCEQ. They should have also received the 4-3-14 TCEQ letter announcing Preliminary approval and a pending Public meeting scheduled for 5-29-14 to allow them to voice concerns. They have not been afforded the opportunity to participate in this review process. This should be corrected as soon as possible. An extension and another Public meeting are required. [2.] The method used by the TCEQ to determine the tidal-freshwater boundary for outfall 002 is faulty. The reviewer used current site-specific data to determine the boundary to be 0.62 miles downstream of the outfall 002 discharge point. The condition that exist now will not exist in the future when 1,080,000 gallons per day of effluent water are flowing over this "water quality monitoring station". The boundary will be pushed far beyond this point, therefore use of the current data is inapplicable to for what is requested in the Application. A better measure would have been to use the 5-foot contour line as was used for outfall 003. This would put the boundary approximately where the HCFCD ditch intersects Horespen bayou. This analysis should be revised and the landowners one full mole downstream of the outfall 002 discharge should be notified and allowed to participate in full.[3.] Both HCFCD ditches that receive flowing effluent water from outfalls 002 & 003 are designed to be dry detention ditches that handle only natural run-off water. With the addition of 1,080,000 gallons per day of effluent they will begin to erode rapidly. When a heavy rain event happens and adds significant run-off to the constantly flowing effluent water, flooding of the surrounding streets and homes will occur. This will relocate the effluent water from a ditch to peoples kitchen,etc. The fouled water may stand and stagnate for days. Does the TCEQ or CLCWA have a commitment from the HCFCD to modify their ditches? Surely the TCEQ does not deem this to be a healthy situation. [4.]Has the CLCWA completed an environmental impact assessment? I believe one is required in specified Corp. of Engineers format prior to TCEQ proceeding to approve this application. Clear Lake High School abuts HCFCD ditch B104-02-00 which will be filled with effluent water from outfall 003. [5.]Has anyone notified the CCISD that one of their properties is in danger of being inundated with effluent water in a rainstorm?They should also be notified by the TCEQ and allowed to input comments as part of this review process. This application to amend WQ0010539001 is a debacle and should be disapproved.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Wednesday, June 18, 2014 8:16 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

H

From: 8180fritz@gmail.com [mailto:8180fritz@gmail.com]
Sent: Tuesday, June 17, 2014 3:19 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

*MWD
6/17/14*

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: Notification to the Executive Director of the TCEQ , I am requesting a contested case hearing relative to WQ0010539001. I have determined that not all of the landowners within a half mile radius of outfall 002 and outfall 003 where notified by mail when the TCEQ letter "Notice of Receipt of Application and Intent to Obtain Quality Permit Amendment"--Permit WQ0010539001 was issued April 29,2013. The TCEQ notice rules require the Chief Clerk to provide mailed notice of this Application to the landowners displayed on the

MWD

applicant's map (attachment 4B of CLCWA's data package). The Applicant must also supply the Chief Clerk with mailing labels for these landowners. The map of attachment 4B submitted by the applicant, shows approximately 900 homes within a half mile radius of outfalls 002 & 003. At this point, I am asking the Chief Clerk to verify that approximately 900 copies of the April 29, 2013 were mailed to these landowners. I am also requesting that the Chief Clerk certify that the mailing list was provided by the Applicant (CLCWA) as part of the original data package. I have conducted a spot survey of landowners within the designated half mile radius of outfalls 002 & 003. Their locations vary from near the axis of this Half mile radius circle to mid-radius and near the outer limit. This approach gives me a reasonable statistical sense of how many landowners actually received notification by mail. In about 2 hours of door to door survey, 5 out of 5 landowners stated they did not receive the April 29, 2013 notice or the April 3, 2014, mailed notification of Preliminary decision and a Public meeting on WQ0010539001. As a minimum these landowners have been deprived of their right to participate in this process. It is my belief that the applicant supplied far less than 900 landowner names & mailing addresses to the TCEQ Chief Clerk. My intuitive judgement is that no more than 100 landowners were properly identified by the Applicant. If so, this is a violation of the TCEQ's notice rules and is reason enough to disapprove or even void this Permit. Please take this opportunity to protect the environment of all the citizens of the Clear Lake City/Houston area.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Friday, June 13, 2014 8:28 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

H

From: 8180fritz@gmail.com [mailto:8180fritz@gmail.com]
Sent: Thursday, June 12, 2014 9:37 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

*MWD
87424*

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: The 6-29-14 deadline for formal comments has been extended by the TCEQ Executive Director because it was determined the receiving water of outfall 001, Horsepen Bayou, is tidally influenced and an additional landowner had not received a mailed notice. It is my contention that the two HCFCD ditches (tributaries) that currently flow natural run-off water directly into Horsepen Bayou are also tidally influenced. If this permit is approved, new outfalls will be created, "future ditches" will be excavated [2024AD], & effluent

MWD

water mixed with run-off will flow through the Tidally influenced HCFCD ditches directly into Horsepen Bayou. The TCEQ Instructions for Completing Domestic Wastewater Permit Applications gives specific guidelines pertaining to landowners that must be identified and notified. It says the applicant must identify all points of discharge (present or future), as well as the discharge route for one mile downstream from the point of discharge. It says the applicant must also identify all property boundaries of all landowners surrounding the point of discharge and on both sides of the discharge route for one full stream mile downstream of the point of discharge. It is my contention & sincere belief that none of the landowners whose property abuts the two HCFCD ditches have been identified, received a mailed notice, or allowed to participate in a Public Meeting relative to WQ0010539001. This Permit should be disapproved and I am requesting a contested review.

Brad Patterson

From: Chuck Howard <8180fritz@gmail.com>
Sent: Wednesday, June 11, 2014 4:53 PM
To: Brad Patterson
Subject: TCEQ e-comment attachments
Attachments: 20140611_00002.pdf; ATT00001.txt

mwp
87424

Brad, one more favor, please. The 3 charts in this PDF clarify my verbiage in the e-comments that were received by the TCEQ system 6-10-14. Can you attach them to that input for me? Thanks a ton & I will try not to abuse you anymore. WQ0010539001 is very important to me. Thanks for your generous help.

Supplemental Attachments to WQ0010539001 comments sent 6-10-2014 via TCEQ e-comment system by Charles Howard.

REVI
JUN 11
By *[Signature]*

TEXAS
COMMISSION
ON ENVIRONMENTAL
QUALITY
2014 JUN 12 PM 1:43
CHIEF CLERKS OFFICE

[Handwritten Signature]

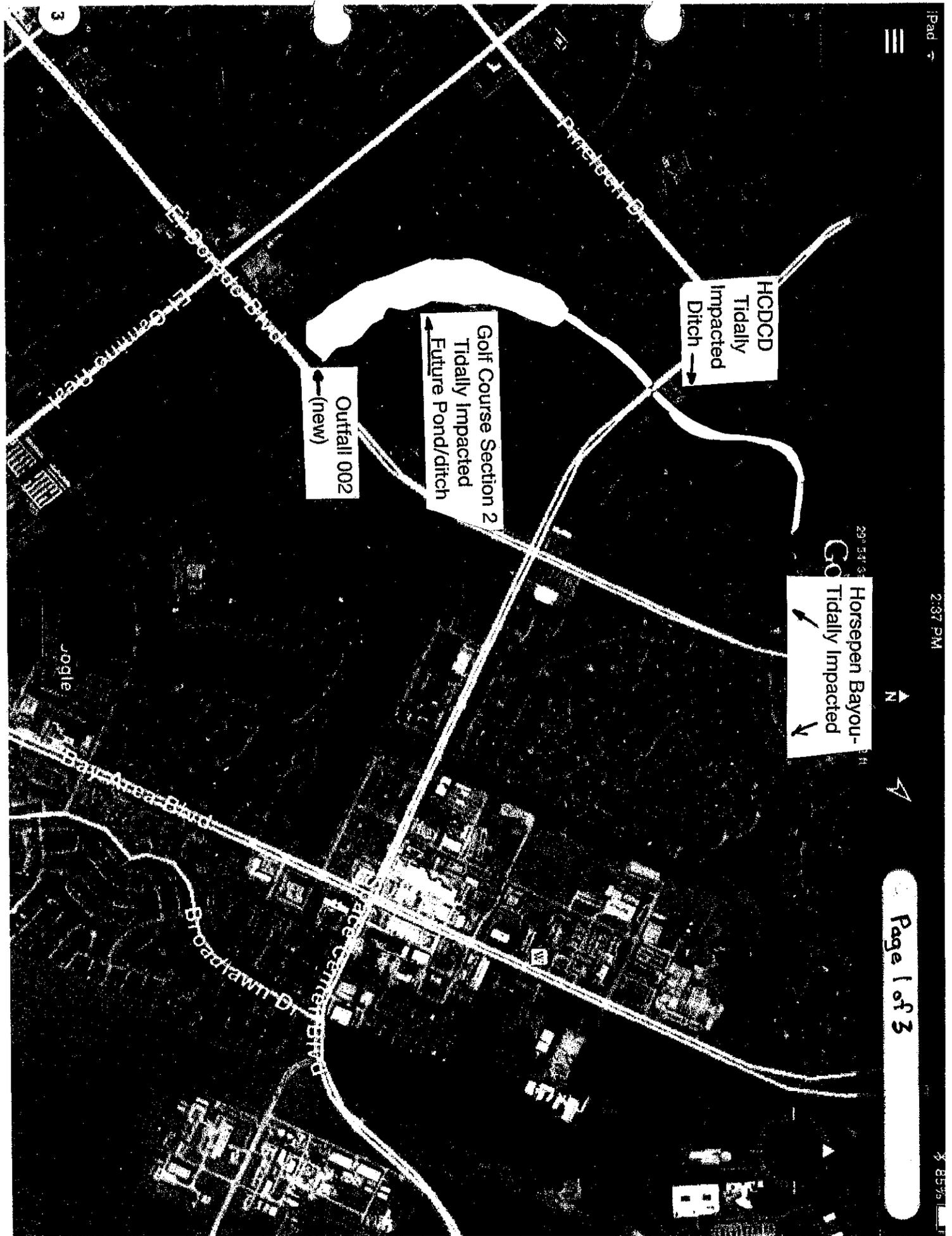


Horsepen Bayou -
Tidally Impacted

HCDCD
Tidally
Impacted
Ditch

Golf Course Section 2
Tidally Impacted
Future Pond/ditch

Outfall 002
(new)





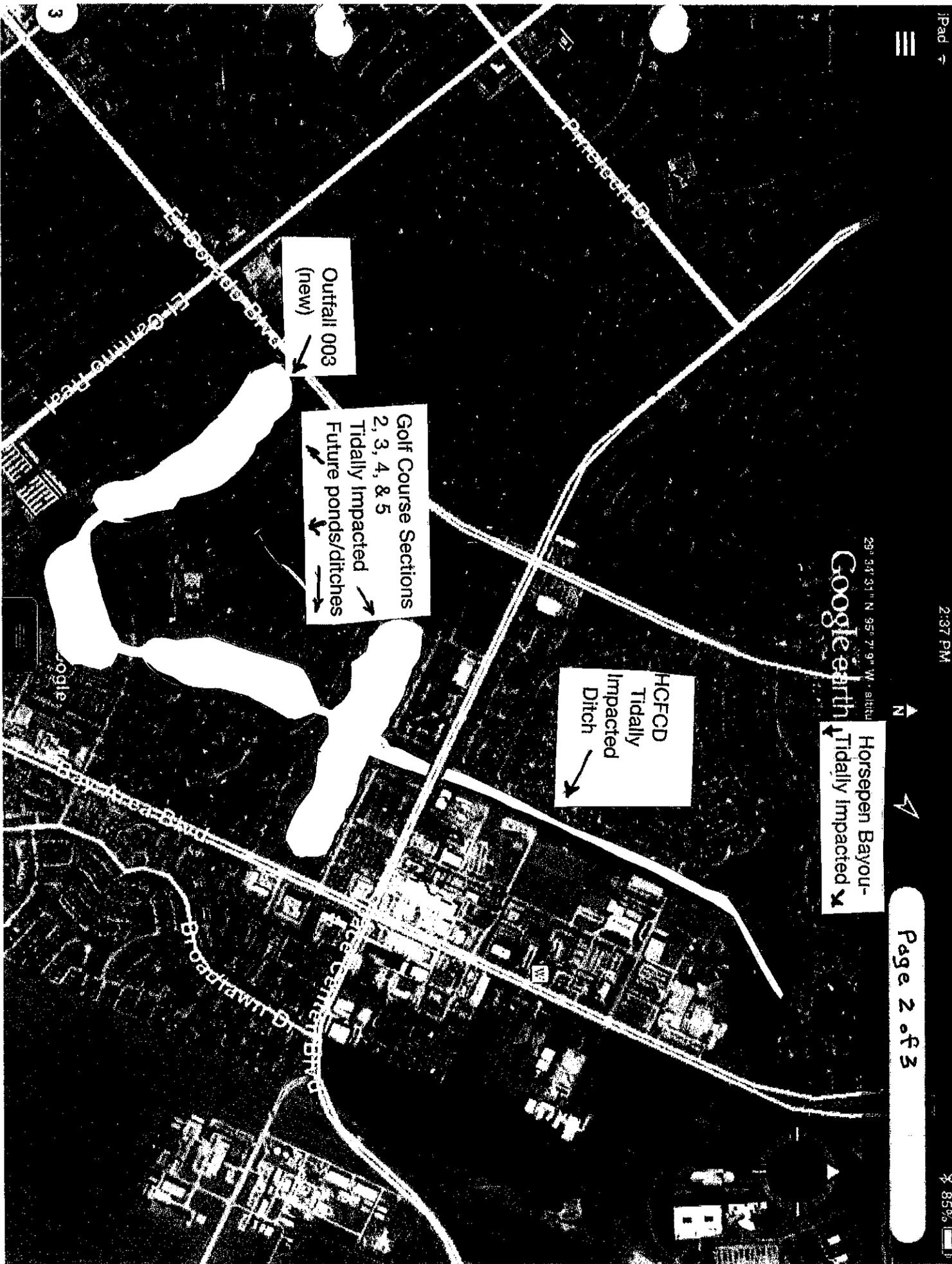
29° 34' 31" N 95° 7' 9" W · Atlanta
Google earth

Horsepen Bayou -
Tidally Impacted

HCFCD
Tidally
Impacted
Ditch

Golf Course Sections
2, 3, 4, & 5
Tidally Impacted
Future ponds/ditches

Outfall 003
(new)

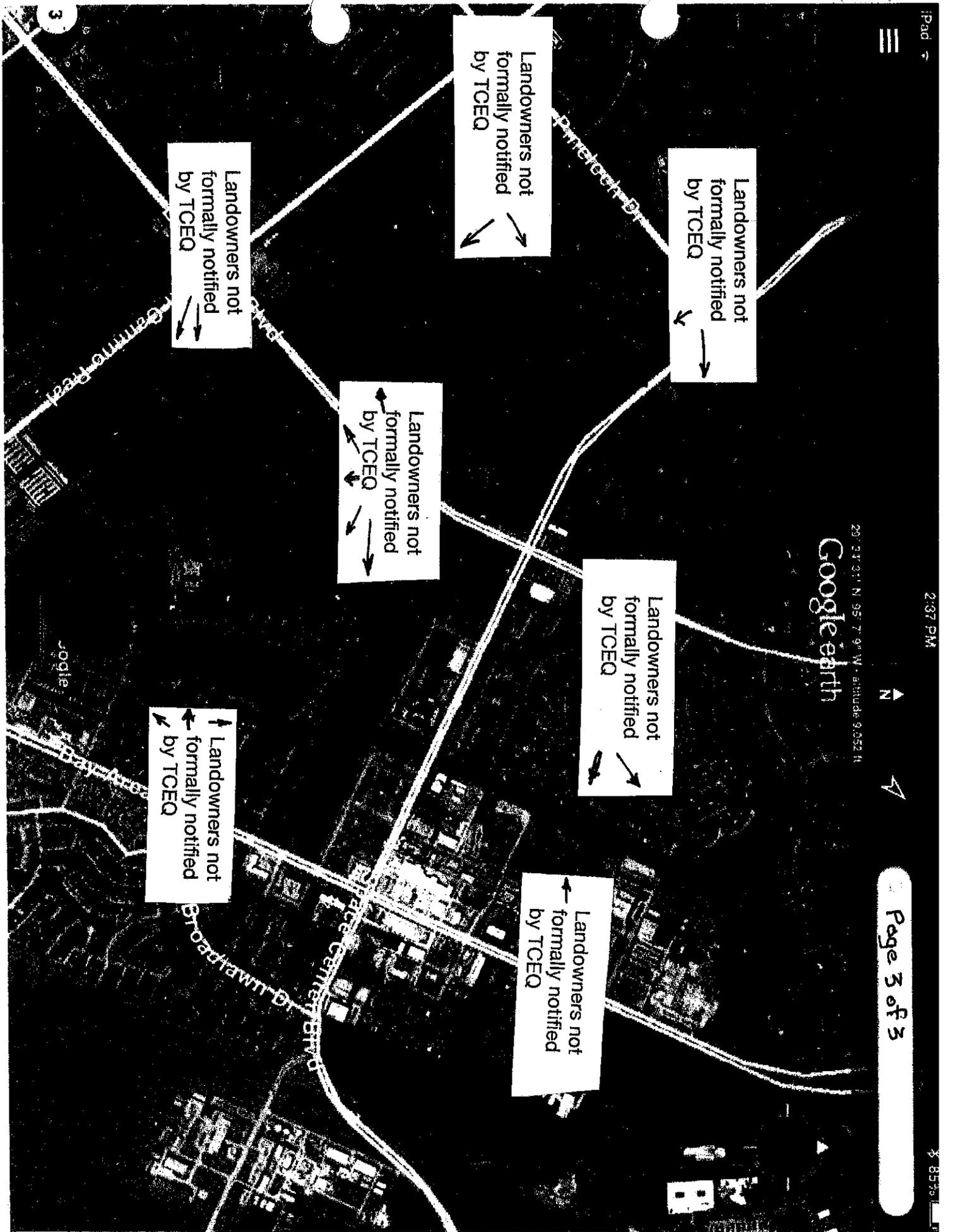




Google earth

28° 31' 31" N 95° 7' 9" W - Altitude: 9,052 ft

Landowners not formally notified by TCEQ



Marisa Weber

From: PUBCOMMENT-OCC
Sent: Tuesday, June 10, 2014 4:24 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Tuesday, June 10, 2014 3:47 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

MWD
87424

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2824888180

FAX:

COMMENTS: The Executive Director of the TCEQ is requested to grant another 30 day extention (i.e. 7-31-14)of the formal comment period for this permit. Approximately 500 homes are located less than 150 feet from the proposed flow path of the effluent water streams of this permit. They have not been notified by the TCEQ or allowed to submit comments. The receiving water for new Outfall 002 , Horsepen Bayou, is tidally influenced. Therefore, the upper bayou connected HCFCD ditch B104-03-00, and the connected "future ditch" of Section 1

MWD

of the golf course are also tidally influenced. Individual landowner property lines along this continuous route from Outfall 002 will be 50 feet to 160 feet from this flowing stream of effluent water & they will be impacted by this permit. In like manner, the receiving water for Outfall 003, Horsepen Bayou, is tidally influenced. Therefore, the middle bayou connected HCFCD ditch B104-02-00, and the connected "future ditches" of Sections 2, 3, 4, & 5 of the golf course are also tidally influenced. Individual landowner property lines along this continuous route from Outfall 003 to Horespen Bayou will also range for 50 to 160 feet from this flowing stream of effluent water & they will be impacted by this permit. A special concern along this route is the land owned by the CCISD where Clear Lake High School is located. This property is 50 feet from tidally influenced HCFCD ditch B104-02-00. This puts 3000 students every class day in close proximity to the effluent water that originates at Outfall 003. The CCISD Board of Directors should be officially notified by the TCEQ and allowed to evaluate/comment on the impact. Because the Board meets once per month, they may require more than a 30 day extension. None of these landowner's have been officially notified or give an opportunity to comment electronically or in a public meeting. This permit should be disapproved by the TCEQ.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, June 09, 2014 8:09 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

MW
87424

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Monday, June 09, 2014 4:46 AM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: My property abuts Section Two of the old golf course (OGC). I am 75 years old & have lived on the property since 1974. I had open-heart multiple grafts by-pass surgery 10 years ago because of heart disease complicated by pre-diabetic symptoms. As a result my immune system is weaker than is desirable. Approval of this permit will endanger my life by directly exposing my weakened immune system to the highly concentrated germ laden effluent water this permit will place very near my property. New outfall 003 will

MW

bring to OGC Section Two an effluent water flow of 1,080,000 gallons per day to fill a "future" retention ditch that is 7 feet deep X 348 feet wide X 3168 feet long. According to the CLCWA plan, this massive body of effluent water will be 106 feet from my property line or 166 feet from my patio where I sit every day. This large quantity of effluent very close to my retirement home will expose me 24/7 to noxious odors, concentrated germs (an possibly superbug germs) , tons of mosquitoes and elevated humidity levels that are currently not present. All of my golf course neighbors (regardless of the status of their immune systems) will be exposed 24/7 to this new danger. Approval of this permit can be life threatening for me and as a minimum will degrade the quality of life for me and my OGC neighbors. Please disapprove permit WQ0010539001. The people whose property abuts: OGC Sections 1.3.4.& 5 ; HCFCD ditches B104-02-00 & B104-03-00 ; and parts of upper Horsepen Bayou ,will now be impacted in similar fashion as described above for OGC Section 2. Have they been notified by mail and given adequate time to officially comment? Of great concern is the impact on CL High School (3000 students 10 hours per day). Even if this permit meets some minimum standards , the TCEQ must consider the role this permit plays in the flawed CLCWA plan if the TCEQ desires to protect the citizens. If you will search this permit & the CLCWA master plan, you will not find a written justification for pumping effluent water to the High & Dry OGC. Why would the TCEQ approve a permit that will ultimately endanger the health of thousands of area citizens? Please disapprove this Permit.

Brad Patterson

TEXAS
COMMISSION
ON ENVIRONMENTAL
QUALITY

From: Chuck Howard <8180fritz@gmail.com>
Sent: Monday, June 09, 2014 3:02 PM
To: Brad Patterson
Subject: E-comment attachment
Attachments: 20140609_00001.pdf; ATT00001.txt

2014 JUN -9 PM 3: 07

CHIEF CLERKS OFFICE

Thank you Brad for agreeing to formally put this attachment data (PDF) into the official TCEQ comments for WQ0010539001 since the normal e-comment would not accept it from my Ipad. Please also include the following words with this attachment. Thanks

The ambiguous language and errors in the TCEQ letter "Application and Preliminary Decision" dated 3-3-14 is a subject I have addressed in previous e-comments on WQ0010539001. I am still convinced that the TCEQ team does not fully appreciate that this permit modification is an integral part (first step) in the CLCWA's Master Plan. Also the TCEQ must evaluate both to fully understand the negative impact this permit will have on the health of all the citizens whose property abuts the areas where this effluent water will flow. I am including a flow plan for the effluent water that is based on CLCWA data. It clearly reveals that large volumes of E water will flow & pool in close proximity [less than 200 feet-24/7] to homes & schools on the golf course; the HCFC Ditches (2); and upper Horsepen Bayou. I seriously doubt that you have identified or notified all of them or given them an opportunity to comment on the permit. Please study the flow plan, look at the Master Plan & disapprove WQ0010539001.

MWD
87424

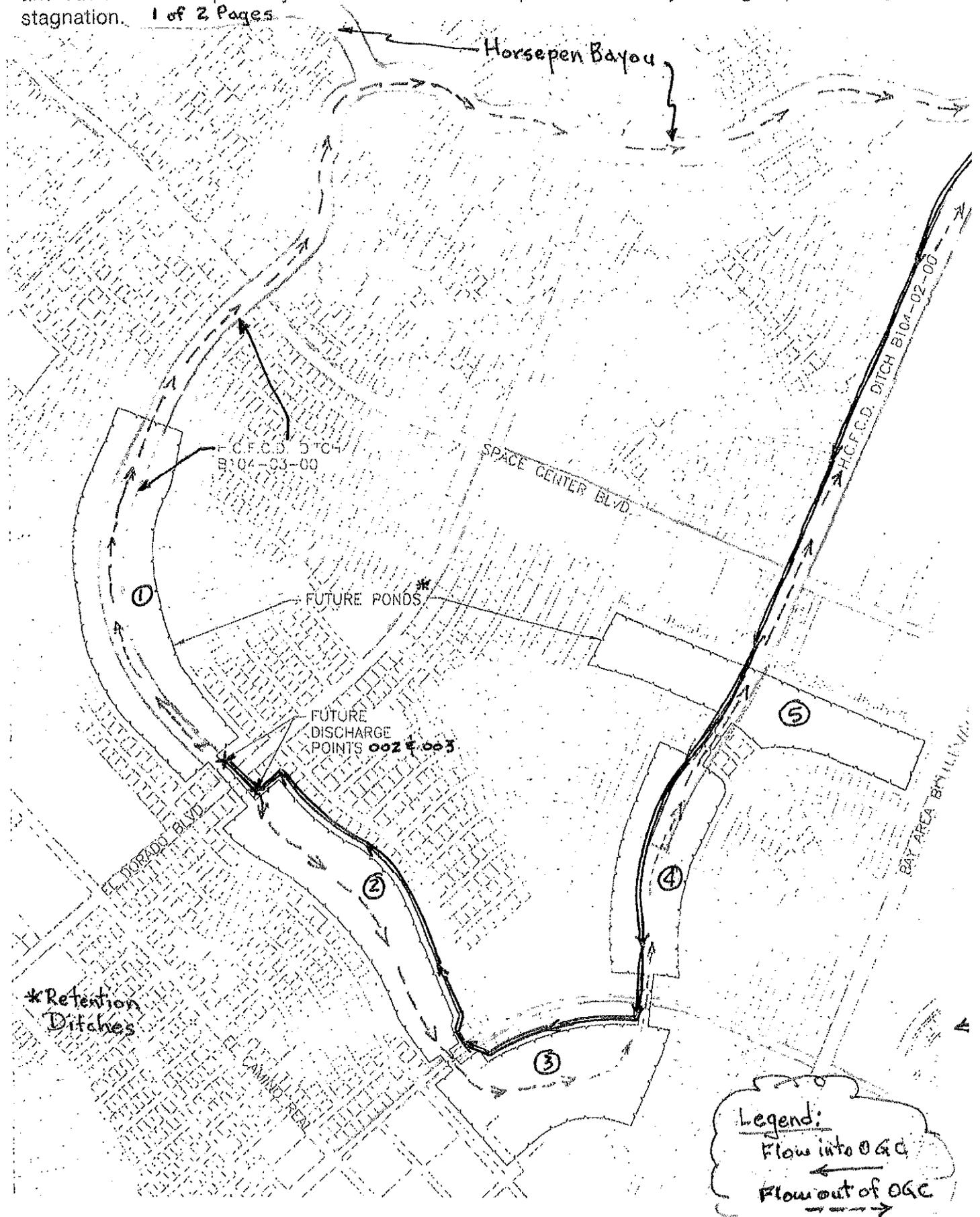
REVIEWED

JUN 09 2014

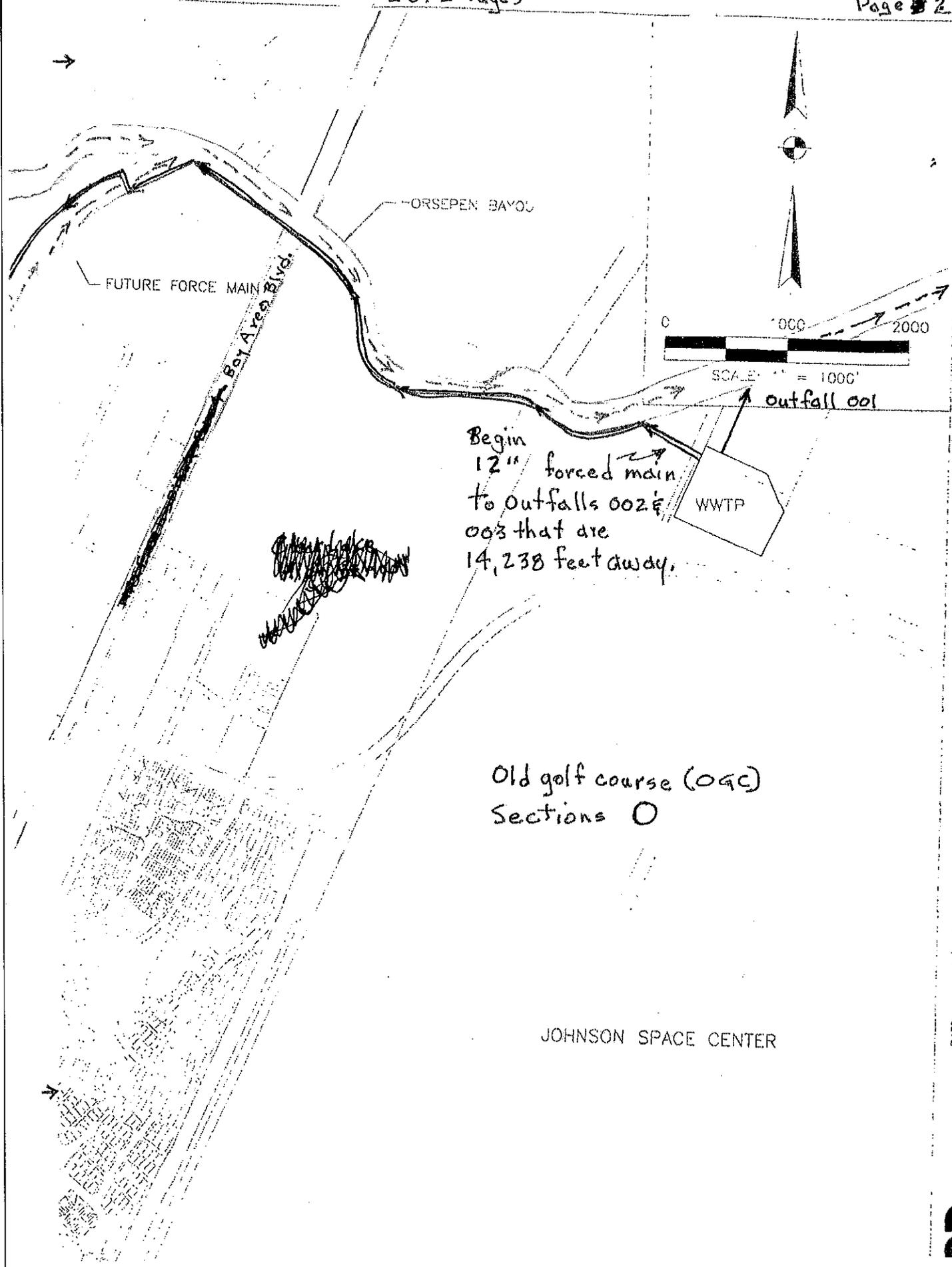
By AL

MWD

This chart displays the Master Plan flow pattern for the effluent water to be pumped to the OGC and back into Horsepen Bayou. It is to be 7 feet deep and constantly flowing to prevent any stagnation. 1 of 2 Pages



ATTACHMENT 5



ROBERT T. SAVELY
WATER RECLAMATION FACILITY

DATE: 7/20/15
DRAWN: RT

ickwood, Andrews

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, June 09, 2014 8:10 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

PM

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Saturday, June 07, 2014 2:44 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

*MWD
87424*

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: The TECQ Executive Director is requested to review the list of landowners that were mailed copies of the proposed amendment for Permit WQ0010539001 and were mailed copies of the 5-29-14 Public Meeting announcement prior to the 5-29-14 comments deadline. It is my opinion that not every landowner that will be impacted if this Permit is approved was notified by the TCEQ via mail. In an exchange of emails with TCEQ attorney, Daniel Ingersoll, I learned that some Horsepen Bayou landowners were just recently notified

MWD

and the comments deadline was extended to 6-30-14. It is my opinion that there are other landowners that will be impacted in the same way that are and are yet to be notified by the TCEQ. Any landowner whose property abuts the "future ditches" of the Clear Lake City Water Authority's (CLCWA) Master Plan (MP) is impacted by the effluent water and this Permit. The following have not been contacted via mail by the TCEQ: 1.

Approximately 40% of my neighbors whose property abuts the 178 acre golf course. Many of them are absentee landowners with renters. 2. 100% of the property owners whose land abuts Harris County Flood Control District (HCFCD) detention ditch B104-03-00. This ditch will be required to transport the effluent water from Outfall 002 of this Permit. This ditch connects the "future ditch" of Section 1 of the golf course to upper Horsepen Bayou & is not constantly transport these quantities. 3. 100% of the property owners whose land abuts HCFCD ditch B104-02-00. The ditch will be required to transport the effluent water from Outfall 003 of this Permit. This ditch connects the "future ditches" of Sections 2,3,4,& 5 of the golf course to middle Horsepen Bayou and are also designed to carry smaller quantities than proposed. 4. Harris County Precinct 2 Commissioner Jack Morman. The HCFCD of the precinct 2 County Commissioner's Office owns and maintains detention ditches B104-02-00 and B104-03-00. These storm flood control ditches are not designed to accommodate the added effluent flow from Outfalls 002 and 003 and will be severely impacted by this permit. The HCFCD has no plans at this time to modify these ditches to accommodate this Permit. Without them the effluent water will flood the excavated golf course. 5. The Clear Creek Independent School District is greatly impacted by this permit. Clear Lake High abuts the HCFCD ditch B104-02-00 that will now overflow with excessive effluent water from this permit. This will expose 3,000 students per day to this real & unnecessary health & safety hazard. It is incumbent upon the Executive Director of the TCEQ to notify these landowners as soon as possible and allow them adequate time to submit comments. it may also be appropriate to conduct a second Public Meeting for their benefit.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, June 09, 2014 8:12 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

PM

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Friday, June 06, 2014 5:52 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

MWD
87424

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charlse Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: The TCEQ Executive Director should have the Engineering members of his staff review & eliminate the errors & ambiguities in the Notice of Public Meeting for Permit WQ0010539001. Then the Director should revise and reissue it for review by all those impacted. I suggested this 4-10-14 by e-mail & am requesting it again. As written, the Notice erroneously states ---This discharge route is form the plant site via-----; via proposed Outfall 002 through a pipe; then into a future pond;-----;via proposed Outfall

MWD

003 through a pipe; then into a series of future ponds;----- . If it was correctly written, it would state --
The discharge route is from the WWTF plant site via a new 12 inch diameter forced main ;then via proposed
outfall 002; then into a future ditch {2024}; then to HCFCFCD detention ditch;then to Horsepen Bayou; then to
the Armand Bayou Tidal Basin. [This is the correct route i.e. WWTF by pipe to outfall to future ditch to
HCFCFCD ditch to Horsepen to Armand] The error as written in the public notice has the outfall before the pipe--
this is backwards. The same type error is found relative to Outfall 003---it should also come after the same 12
inch diameter forced main and flows into a series of future ditches. My concern is that the evaluators who wrote
this public announcement did not fully understand the flow pattern described in this permit/data package. Since
I am one of those who is impacted, how am I supposed to evaluate data that your writers apparently can't
properly describe or decipher from the Permit data? Earlier in that same paragraph the language on flow rates
for Outfalls is very ambiguous. Read one way, Outfall 002's flow rate is 1,080,000 gallons per day & Outfall
003's flow rate is also 1,080,000 gallons per day & Outfall 001 would be limited to 7,840,000 gallons per day.
Easily read another ambiguous way, Outfall 002's flow rate is 540,000 gallons per day & Outfall 003 is also
540,000 gallons per day & Outfall 001 would now be limited to 8,920,000 gallons per day. How will the City of
Houston correctly evaluate the added flow pressure these multiple choice flow rates will impose on the
infrastructure of city bridges where this water in various ditches will flow? Again my concern is the level of
accurate understanding the TCEQ evaluators were able to obtain from the Permit data package. To be fair &
impartial to all those impacted, the TCEQ should reissue an accurate public announcement and possibly conduct
another Public Meeting.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Thursday, June 05, 2014 4:13 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

*MWD
87424*

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Thursday, June 05, 2014 2:43 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2184888180

FAX:

COMMENTS: The Executive Director of the TCEQ should disapprove WQ0010539001 because it will lower property values, increase FEMA flood insurance rates, & result in a subpar maintenance capability when ownership is passed to the Conservancy. During the informal portion of the 5-29-14 Public Meeting, the Vice-president of the Clear Lake City Water Authority (CLCWA) board of directors, stated once again that this permit is an integral, interwoven first step requirement of their Master Plan (MP). In a nutshell, the MP is

MWD

comprised of excavation of deep detention ditches (top) and retention ditches (bottom) and filling the massive retention ditches with effluent water via the new forced main plus two new outfalls. The CLCWA will be responsible for all of these steps & it starts with this permit. A conservancy is to be created to then take ownership and beautify what was destroyed by the CLCWA's efforts [2000 trees cut down & 6 million cubic yards of soil removed]. My property values will decrease because of my modified proximity to effluent water. A neighbor recently bought a house in another area. He was told by his realtor to sell his current golf course property before excavation begins or experience a drop in value. The detention /retention ditch combination of the MP will cause my group FEMA flood insurance to increase because it brings water within 150 feet of my back door where none currently exist. If this permit is disapproved, this increase in flood insurance will not occur. Common sense reveals the dangers of transferring the excavated golf course over to the Exploration Green Conservancy. Operation and maintenance of the outfalls, the ditches, and the beautification aspects will become the responsibility of an entity that has no taxing ability and no guaranteed steady source of income. Worse case scenario would be bare un-beautified clay ditches filled with effluent water at the bottom because no grants or donations were received by the Conservancy. A less severe scenario would be no money to maintain (dredge,mow, fertilize) or operate (gates, pumps, dams) required for the Exploration Green "Park". Please put your thinking-cap on and disapprove WQ0010539001 before this flawed Master Plan is implemented by the CLCWA.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Wednesday, June 04, 2014 10:27 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Wednesday, June 04, 2014 9:18 AM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

*MWD
07424*

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: Please verify that the data on the attached 2 photo data sheets were "Approved by the TCEQ". They are copies of data presented @ a July 2013 Clear Lake City Water Authority (CLCWA) Board of Directors (open) meeting. Did the TCEQ review and approve every cost line item as stated? Did the TCEQ thereby approve the expenditure of \$3 million of \$21 million for "Detention Pond Phase 1B Construction" as stated on page 2 under Project line 10? If this was approved by the TCEQ, does this represent tacit approval of

CM

WQ0010539001, which is an integral part of the CLCWA Master Plan for the Inversion of the golf course? All of this happened prior to the 5-29-14 Public Meeting called by State Representative John Davis. Will the inputs from this meeting be utilized in reversing this tacit approval? It is important that the TCEQ disapprove this Permit that is integral to a very flawed Master Plan [reference my Analysis Part 1 & 2 as hand delivered to the TCEQ members @ the Public Meeting and referenced in my formal recorded presentation].

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, June 02, 2014 2:12 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Monday, June 02, 2014 1:51 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

MWD
87424

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: On 5-29-14 @1:44am a good citizen from the Clear Lake City Water Authority (CLCWA) district asked a question of the TCEQ via this link. Question: Can an architect design plans for flood control? A more Pertinate question for the TCEQ and everyone impacted by the CLCWA's Master Plan (MP) is who did design these plans for flood control? The best choice would have been a professional Hydrologist. South West Architects (SWA) were hired by the CLCWA @ \$80,000 to put together the MP Town Hall presentation.

MWD

But, alas they did not have a Hydrologist on staff. Did the members of the CLCWA board of directors design these plans for flood control? Which director is a professional Hydrologist? An architect, an engineer, or a stay at home mom who has had High School Algebra can do the math related to Acre-feet of detention desired for flood control. Any district citizen (even an architect) has the right to propose a flood control plan without violating any code of ethics [as was implied by this questioner]. The retention ditches to be filled with effluent water proposed by the CLCWA in this Permit are not designed to enhance flood control. They are proposed to justify wetlands where none currently exist---Why?. Who designed these plans for flood control? Later at the TCEQ Public Meeting during the informal period, the CLCWA representative gave a power point presentation. It stated that the MP was "recommended" by a Hydrologist. I have asked & still don't know who! Who did design these plans for flood control? The TCEQ should disapprove this permit and could suggest the CLCWA hire a Professional Hydrologist to determine A. Is there a real storm flooding problem? B. If so, how much detention is required to alleviate it? Then a real plan could be developed.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, June 02, 2014 8:58 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

*MWD
07424*

From: 8180fritz@gmail.com [mailto:8180fritz@gmail.com]
Sent: Monday, June 02, 2014 7:47 AM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: The Executive Director of the TCEQ should disapprove the amendment to this Permit because it has not been justified in writing by the Clear Lake Water Authority (CLCWA). The amendment and data package submitted to the TCEQ does not contain a written statement that justifies the need for or appropriateness of adding a new pipeline, new pumps and two new outfalls to divert effluent water to the high and dry old golf course (OGC) in the heavily populated Clear Lake City-Houston area. The politically astute

MWD

CLCWA Board representatives seated at the head table during the 5-29-14 Public Meeting chose not to speak during the Formal (and recorded) portion of the meeting. They did not take this opportunity to formally explain or justify the reason for this amendment. However, they did make a generic power point presentation during the informal portion of the Public Meeting. If you had enough background data & experience with the development of the CLCWA Master Plan (MP) & this integral amendment, you could connect the dots & understand why the CLCWA has never presented a written justification. The power point Presentation revealed two major reasons.

First Power Point ---The CLCWA MP and this integral permit amendment were "recommended" by a Hydrologist. History will reveal that the only Hydrologist ever employed by the CLCWA was tasked to determine the amount of detention that would be required if the OGC was completely "built-out" with homes & condos. He come up with a vast number of acre-feet that he would not verify in court under oath. His findings did not in any way relate to the unexplained/ unjustified acre-feet criteria of the current CLCWA MP. His findings also did not include pumping effluent water uphill from the Waste Water Treatment Facility to an excavated OGC. The CLCWA did hire South West Architects[SWA] (@\$80,000) to develop a very artistic MP power point package for Town Hall meetings. A little research reveals that SWA did not have a Hydrologist on staff at that time. The CLCWA can not produce a valid formal plan or data created by a Hydrologist that justifies this amendment to WQ0010539001, therefore it should be disapproved. Second Power Point--- The WWTF's operating capacity is 10,000,000 gallons per day. The WWTF is currently operating at 5,200,000 gallons per day. The amendment proposes a new 14238 foot long 12 inch diameter forced main be built to carry 2,160,000 gallons per day to the OGC and eventually back to the same point where existing outfall 001 dumps into Horsepen Bayou. This is an unnecessary ,expensive project that cannot be technically explained or justified by the CLCWA. If the capacity of existing outfall 001 is unable to handle hoped for new development's sewer permits, there is an better solution available. Why not add a 30 foot long new outfall 002 in parallel with outfall 001? This amendment as written cannot be justified and should be disapproved.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, June 02, 2014 8:58 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

MW
87424

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Sunday, June 01, 2014 6:14 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: The Executive Director of the TCEQ should disapprove this permit because of the multitude of people that will be exposed to effluent water in the "future ditches" in the golf course; the effluent water that will be pumped into the Harris County Flood Control (HCFCD) ditches[2]; and the effluent water in portions of Horsepen Bayou that are above the Waste Water Treatment Facility (WWTF). There are at least 400 homes on the perimeter of the golf course that will have large quantities of effluent water within 200 feet of their back

MW

door. There are at least 300 homes that abut HCFCD ditch B104-03-00 that now carry 1,080,000 million gallons per day of effluent water from the future ditch of golf course Section 1 to Horsepen Bayou within 200 feet of these fully populated properties. This effluent water will then flow into the upper portion of Horsepen Bayou within 300 feet of at least 250 occupied homes that abut the Bayou. All of this starts at outfall 002 of this permit. The effluent water that flows from outfall 003 of this permit, exits the golf course "future ditches" of golf course Sections 2,3,4 &5, via another HCFCD ditch (B104-02-00) where it passes within 200 feet of another 300 occupied homes, past Clear Lake Intermediate School and Clear Lake High School, before it reaches Horsepen Bayou well above the WWTF and existing outfall 001. Outfall 003 will also disperse 1,080,000 gallons per day of effluent water along this second route. It should be noted that these schools property line will be 50 feet from the center of this flowing effluent water. On any day of classes, 3000 students will be exposed. Can the TCEQ guarantee the health safety of all these people? Has the Clear Lake City Water Authority performed and submitted the required Environmental Impact Assessment for TCEQ to review? You should disapprove this permit.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, June 02, 2014 9:03 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

*MWD
067424*

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Saturday, May 31, 2014 7:45 AM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: MR Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: The Executive Director of the TCEQ should disapprove this permit for the following reasons:
1. It is incomplete---It contains no written reason or valid justification for this requested amendment to the permit. It also does not reveal that the "future ditches " will not be excavated or available for 10 years. 2. It is premature---Approval and near term construction of the 002 & 003 outfalls system would result in them sitting idle and rusting for 10 years awaiting start of "future ditched " excavation in 2024 or later. 3. It interferes with

MWD

HCFCD operations--- Harris County Flood Control District (HCFCD) owns. Maintains normally dry detention ditches located on the golf course and also some not on the golf course that funnel natural run-off to Horsepen Bayou. This permit would require Retention ditches on the the golf course that would destroy and replace the HCFCD ditches. To date the HCFCD has not agreed to these changes. This permit would add a constant overflow of effluent water through existing HCFCD ditches not on the golf course that are not designed to handle this increased flow rate. To date the HCFCD has not agreed to modify their ditches to accommodate this increased flow rate. 4. It will necessitate the modification of existing infrastructures---The effluent waters constant flow rates of 2 million gallons per day will accelerate wear & tare on existing Houston street bridges where it flows. In at least two cases, new bridges will be required before the effluent water can flow at all. To date the City of Houston has not agreed to fund these modifications. structural

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, June 02, 2014 9:03 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Friday, May 30, 2014 6:17 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

*MWD
87424*

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: Clarifications regarding my neighbor, Bill Swingles, comments about effluent water usage on the golf course. Yes it was sprayed on the golf course but in very small quantities compared to the 2,160,000 gallons per DAY that will be pooled in the proposed Retention ditches. The maximum quantity ever used in the past years to water the golf course was 2,000,000 gallons per YEAR. Big differences in sprayed versus pooled @ 7 feet deep and up to 250 feet wide. I may be more sensitive than my good neighbor but I could smell the

MWD

odor in the past even when the effluent was sprayed. Adding to the problem will be the proposed 39 acres of wetlands that will be covered by this effluent water. This will be a perfect breeding ground for mosquitoes and may make the "park" unusable. Check the laws on officially designated wetlands. You are not allowed to spray for mosquitoes. I have mosquitoes now that survive in damp shady spots in my backyard. What will it be like when there is constant water less than 200 feet from my back door? Currently there are no officially designated wetlands on the golf course. Section 2, where we live does not even have a Harris County Flood Control District (HCFCD) detention ditch. It makes no sense to me to create wetlands where there are none in the middle of a fully populated residential area. The only reasonable solution is for the TCEQ to disapprove this permit and then the CLCWA should hire a professional Hydrologist to design an dry greenspace with only a justifiable amount of detention capability (900 acre-feet or less).

TCEQ Public Meeting Form
May 29, 2014

6

Clear Lake City Water Authority
Water Quality TPDES
Permit No. WQ0010539001

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MAY 29 2014

AT PUBLIC MEETING

PLEASE PRINT

Name: Charles E. Howard (Chuck)

Mailing Address: 16003 Diana Lane

Physical Address (if different): _____

City/State: Houston, Texas Zip: 77062

This information is subject to public disclosure under the Texas Public Information Act

Email: 8180fritz@gmail.com ✓

Phone Number: 281-488-8180

• Are you here today representing a municipality, legislator, agency, or group? Yes No
If yes, which one? _____

Please add me to the mailing list. ✓

I wish to provide formal *ORAL COMMENTS* at tonight's public meeting. ✓

I wish to provide formal *WRITTEN COMMENTS* at tonight's public meeting. ✓

(Written comments may be submitted at any time during the meeting)

Please give this form to the person at the information table. Thank you.

✓
C
E
H

These formal comments are submitted to the TCEQ Executive Director & his staff for entry into the official record of this Public Meeting concerning the amendment of Permit No. WQ0010539001. They should be considered in reaching a final decision on this amendment. They are hereby submitted in writing and orally as part of this Public Meeting. Please also refer to my enclosed Written Analysis Part 1 & Part 2 for supporting details that will not be presented orally due to time limitations.

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AT PUBLIC MEETING

1. This application and it's accompanying detailed data package as submitted by the Clear Lake Water Authority (CLCWA) is incomplete in that it does not contain a written justification or viable reason for this amendment that adds two new outfalls to the existing system. It also makes no reference to the 10 year unavailability of the future ditches of the CLCWA Master Plan where effluent water will be dumped into a highly populated area.

These omissions ignore the integral relationship between the CLCWA Plan and this Application, but it must be considered by the TCEQ in final deliberations. These blatant omissions are reason enough for the TCEQ to reject the amendment.

2. Currently the gravity-feed effluent water flows via outfall 001 into Horsepen Bayou and then to the Armand tidal basin @ up to 10 million gallons per day. This amendment to WQ0010539001 will create an illogical,unjustified 14,238 feet long pipeline that diverts up to 2,160,000 gallons per day of this total effluent water flow.This diverted effluent water will flow via a new,unfunded 12 inch forced main through new outfalls 002 & 003 into "future ditches "[excavation does not begin until 2024] onto the Old Golf Course (OGC) that is in the middle of fully populated residential neighborhoods. This effluent water will pool within 250 feet of property owner's back doors at depths of 7 feet before it flows back to the Armand tidal basin via several miles of Harris County Flood Control District (HCFCD) ditches and Horsepen Bayou which are currently untainted by effluent water. This egregious amendment must be disapproved to protect the health & well-being of the citizens & students of Clear Lake High School that will now be exposed (within 50 feet) to effluent water along these routes.

3. The people who live in the CLCWA District have never formally voted to approve this CLCWA requested, unjustified amendment and have never approved any funding for this expensive project. Any surplus district funds that exist or may exist in the future should be applied to reduction of the district's \$100 million indebtedness and not used to accomplish this unjustified amendment.

4. This amendment if implemented will exacerbate flooding rather than improve it. Diverted effluent water will be pumped to the "Future Ditches" and then returned to Horsepen Bayou in concert with outfall 001. The level of Horsepen Bayou will remain the same from this action, except for a minor amount of evaporation. The evaporation will be completely off-set by the natural run-off that will flow in on top of these "future"effluent water filled retention ditches [that have destroyed & replaced the current Harris County Flood Control District(HCFCD) ditches in the middle of the OGC sections]. The constant level of Horsepen Bayou will therefore increase and result in increased potential for flooding.

5. This amendment if implemented will result in increased flow rates & water levels exceeding those that currently exist in HCFCD ditches B104-03-00 & B104-02-00 that are outside the OGC property and connect the OGC to Horsepen Bayou. HCFCD believes their ditches are adequate for area flood control.To my knowledge, the HCFCD has no plans to modify their ditches & has not given the CLCWA approval to modify HCFCD ditches (inside or out of the OGC) in any manner to accommodate these increases. Without HCFCD approval there may never be any "Future Ditches " where effluent water can be pumped & therefore this amendment is unnecessary at this time.

Therefore the TCEQ cannot ignore the integrated role of this amendment in their final deliberations.

6.This requested amendment is extremely premature. Per the CLCWA's own Master Plan (MP), the "Future Ditches" where the water will be pumped via outfalls 002 &003, will not begin to be excavated for 10 to 12 years for OGC Section 1 & 2 because of funding limitations. If this amendment is approved and the new pipeline & outfalls are built this year, they would sit idle (& rust) for at least 10 years before they can be used . The TCEQ would do well to withhold approval for at least 10 years to see if the projected CLCWA MP's future ditches become a reality.

7. It is my opinion that a new bond package to fund this amendment to WQ001053901 would not

pass now or in the next 5 years because of the current \$100 million indebtedness.

I am also submitting for your formal final deliberations a copy of my Analysis [parts 1 & 2] that addresses the CLCWA Master Plan(MP) that indirectly purposes the inclusion of these new outfalls. My analysis addresses many major flaws in the detention/retention/ pumped water schemes of the MP (it will not work)& supports the issues presented in the 7 items above.

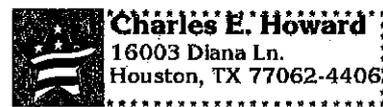
Options that are suggested to the TCEQ:

1. Disapprove the amendment to WQ001053901.
2. Hold approval in abeyance for at least 5 to10 years.
3. Prohibit implementation/start of construction until OGC section 1 & 2 "future ditches" excavation is begun in 2024 by the CLCWA.

Thank you Chuck Howard /40 year resident @
16003 Diana Lane Houston 77062
Retired NASA Logistics Engineering
Manager of the International Space
Station

Charles E. Howard
16003 Diana Ln.
Houston, TX 77062-4406

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For the Official Record I am submitting the following Data to the TCEQ at this Public meeting. I will likely not have time to orally present it in my allotted time slot. All of it should be considered & utilized in reaching a final WQ0010539001 permit decision. My studied opinion is that the permit should be disapproved or held in abeyance for 10 years because of the 12 year ditch excavation schedule planned by the CLCWA.

Analysis Part 1(Detention analysis)

Summary Presentation:

A 12 page graphical & mathematical analysis of the CLCWA's Master Plan (MP) to modify the Old Golf Course (OGC) with primary emphasis on detention. Flaws are revealed that create impossible to achieve situations that will impact the implementation of WQ0010539001 if approved.[A copy mailed to CLCWA Feb.2014]

The forced main described in the requested amendment is an integral part of the CLCWA MP an should be evaluated by the TCEQ.

Analysis Part 2 (Retention analysis)

Summary Presentation:

A 10 page graphical & mathematical analysis of the CLCWA's MP to modify the OGC with primary emphasis on retention in concert with detention. Additional flaws are revealed that exacerbate those found on Part 1 and severely impact the costs, timeliness, & implementation of WQ0010539001 if it is approved. The forced main described in the requested amendment is vital to the integration of the CLCWA MP and these new items. They must be considered by the TCEQ in reaching a valid conclusion on amending WQ0010539001.

Examples of Flaws

A. Detailed discussion of why WQ0010539001 should not be approved and implemented for OGC Section 1(see attached drawing 1):

CLCWA MP Criteria---

- Acres available -----45.6
- Acres usable for detention ditches-----29.86
- Acre-feet required for detention-----442
- Depth of detention ditch(feet) reqd.
to achieve acre-feet required -----14.8
- Depth of retention ditch(feet) reqd.-----7
- Total depth (detention over retention)-----21.8
- Retention water must flow continuously to

avoid stagnation. This effluent water flows from outfall 002 through OGC Section 1 to HCFCD ditch (B104-03-00) then to Horsepen Bayou.

Calculations based on MP criteria---

- Average elevation of Homeowner's property line where it abuts the OGC -----20 ASL [above sea level]
- Depth of combined ditches relative to property line elevations -----1.8 BSL [below sea level]
- Depth of retention ditch's upper water line relative to property lines-----5.2 ASL
- Depth of HCFCD ditch B104-03-00 into which retention water must flow -----5.8 ASL
- Depth variance -feet-----<0.6>

CONCLUSIONS

1. Without a tall dam where the Section 1 retention ditch meets the HCFCD ditch,existing water in

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Drawing 1

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5.2 feet
ASL

5.8 feet ASL

H.C.F.C.D. DITCH
B104-03-00

29.8 acres
14.8 feet deep } 442 acre-feet

FUTURE PONDS

FUTURE
DISCHARGE
POINTS

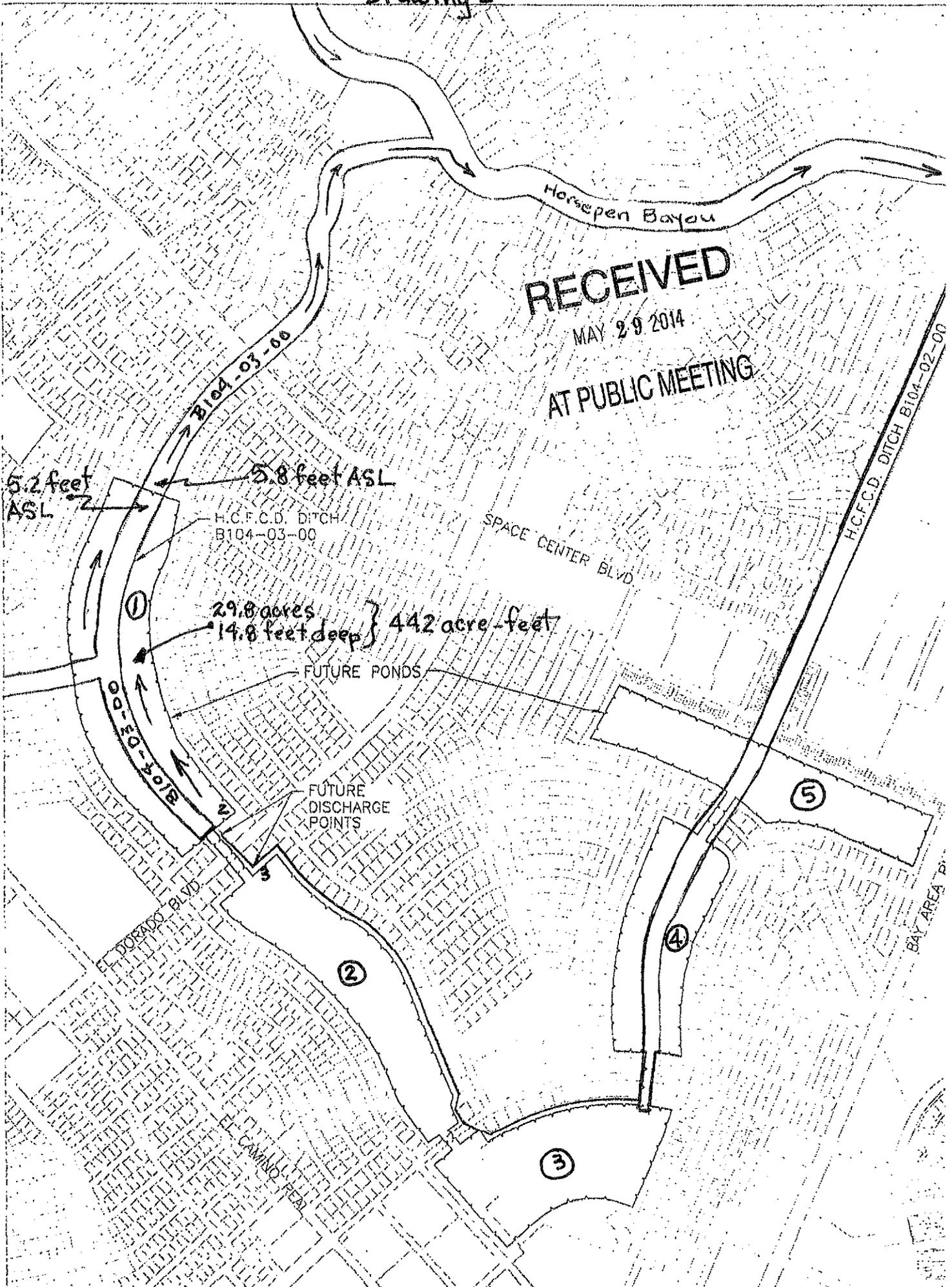
DOENOS BLVD

SPACE CENTER BLVD

H.C.F.C.D. DITCH B104-02-00

BAY AREA P...

EL CAMINO PER...



the HCFCD ditch will back flow into the OGC. To move water from the Section 1 retention ditch to the HCFCD ditch a lift station is also required. None of this is included or even discussed in the MP or WQ0010539001. This will require significant resources that are not currently approved or funded by the taxpayers.

2. The HCFCD has not agreed to allow the CLCWA to modify any part of their ditch--B104-03-00. Part of this ditch lies in the middle of OGC Section 1. Without HCFCD approval, the excavation of any ditches (detention or retention) can not be accomplished. The CLCWA MP is flawed in that it is based on excavation of property it does not control--therefore it should be abandoned or held in abeyance (5 years) until the control issue is resolved.

3. TCEQ approval of WQ001539001 will be untimely. Per the [flawed] MP, excavation of Section 1 is limited by funding availability and is not planned to begin for 10 years. If they are allowed to build the pipeline to outflow 002 in the near future, it will have to sit idle for 10 years since the water will have no ditch in which to flow. There is no rush, therefore hold it in abeyance for a few years (5). This would be an excellent way to maintain the TCEQ's image of protecting the People of Texas.

B. Detailed discussion of why WQ0010539001 should not be approved for OGC Sections 2,3,4, & 5 (see attached Drawing 2). This discussion is similar to the one above for Section 1, but more complicated. Please refer to submitted Data Packages Part 1 & Part 2 for details on criteria, calculations, and conclusions. A summary of the MP's criteria is as follows:

Effluent water will flow from outfall 003 into section 2, then to section 3, then to section 4, then to section 5, then to HCFCD ditch B104-02-00, and then into Horsepen Bayou. The effluent water flows up and down as it progresses from section to section. The roller coaster variations in criteria generated water level heights for each section & ditch are as follows: (see attached graph)

- * Section 2 to Section 3----drops 7.4 feet **
- * Section 3 to Section 4----rises 5.5 feet ***
- * Section 4 to Section 5----drops 3.9 feet **
- * Section 5 to HCFCD ditch B104-02-00
----rises 3.8 feet ***

[**dams required *** dams & lifts required]

None of the dams or lifts are described or included in the MP or this requested amendment to WQ0010539001. The CLCWA data package is incomplete without them & the dams & lifts should have been addressed in the WQ0010539001 data package for the TCEQ to evaluate. They add a great deal of unmentioned expense to build and operate for the life of this project (25 years per state law). It should also be noted for the record that none of the expense associated with this proposed effluent pipeline has been approved for funding by the Taxpayers of the CLCWA District.

CONCLUSION

Approval of this amendment to WQ0010539001 at this time would be untimely because of the 10 to 12 year excavation plans for these Sections. If it is built now it will sit idle until 2024 when section 2 excavation is planned to start. [Currently there is no ditch of any type in Section 2.] I recommend the TCEQ disapprove WQ0010539001 or hold it in abeyance for 10 years to prove this is a viable project that the taxpayers will approve and will fund if ever asked to vote for a new bond to cover the entire project.

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Effluent Water Flow Path from Outfall 003

Excavation Start Dates by OGC Section:

2023

2014

2018

2021

Exists

25

25

OGC Section 2

OGC Section 3

OGC Section 4

OGC Section 5

Existing HCFC Ditch B104-02-00

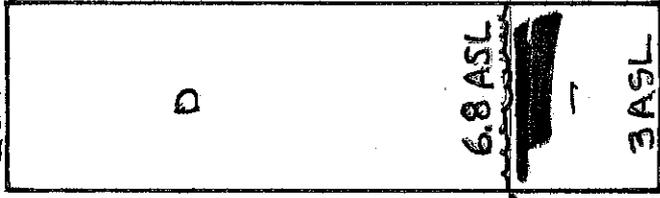
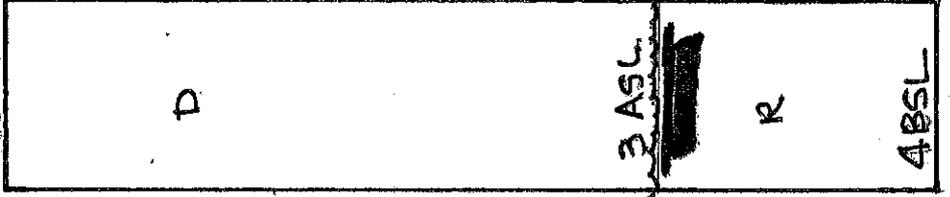
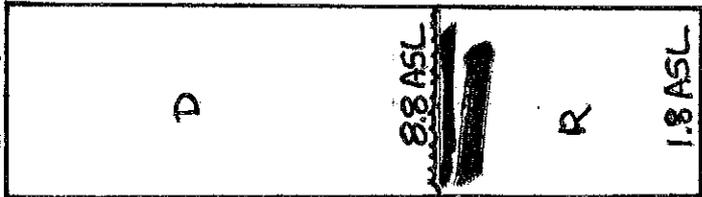
P/L 20 ASL

P/L 19 ASL

P/L 20 ASL

P/L 20 ASL

P/L 20 ASL



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7.4 FT. Drop

5.5 FT. Rise

3.9 FT. Drop

3.8 FT. Rise

w/l

w/l

w/l

w/l

w/l

w/l

0

5

10

15

20

-5

Sea Level 0

Drawing 2

Charles E. Howard
16003 Diana Ln.
Houston, TX 77062-4406

-5

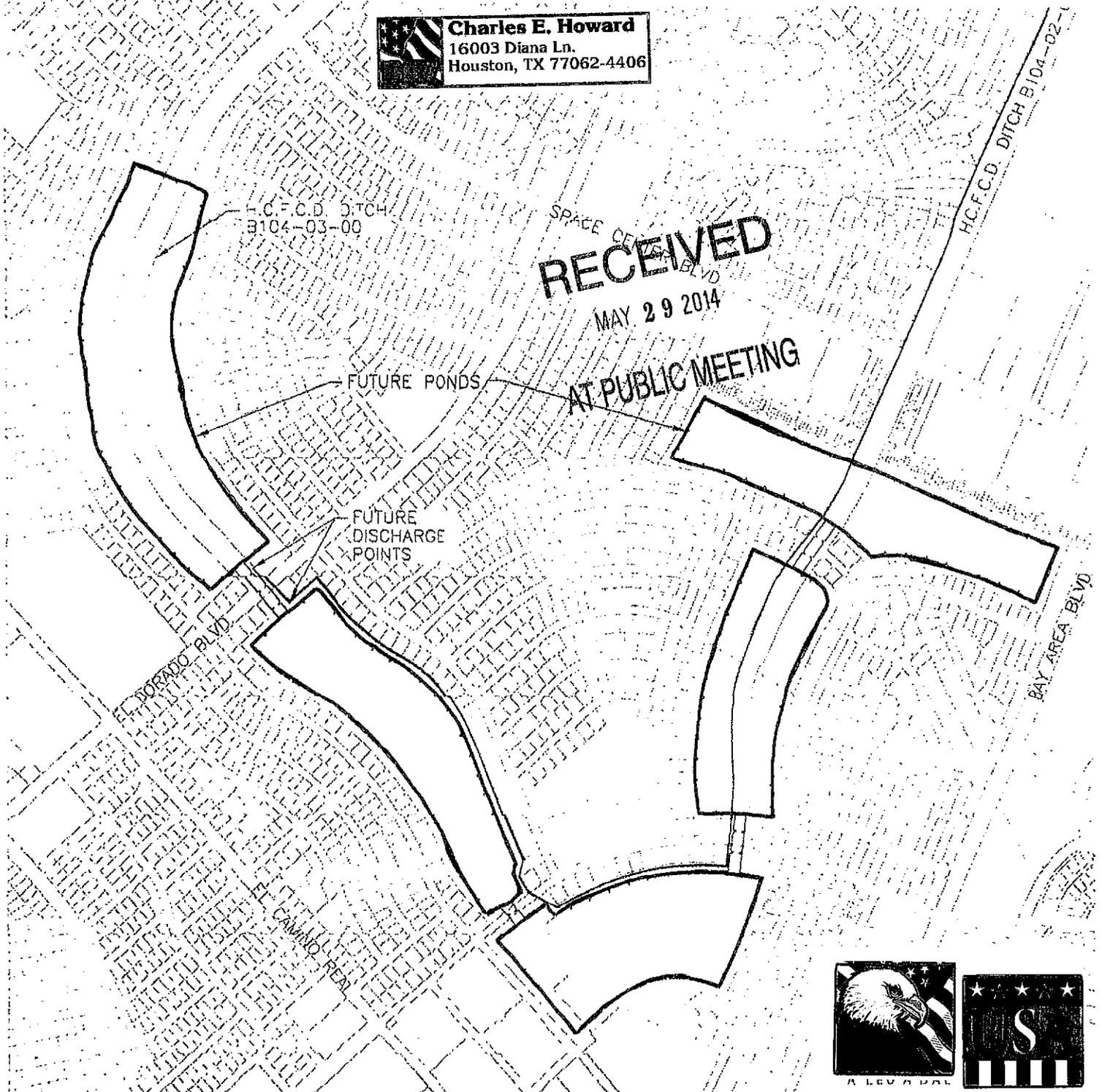
STEP 1

Begin with this OGC surface area map of the 178 acres to be modified to provide 1680 acre-feet of detention ditches on top of 400 acre-feet of retention ditches (total criteria =2080 acre-feet).

This map was part of the CLC Water Authority's (CLCWA) April 2013 request that the Texas Commission for Environmental Quality (TCEQ) amend their existing Water Quality Permit. Approval (pending) of this modification to their existing Texas Pollutant Discharge Elimination System Permit No.WQ0010539001, would allow them to pump 10 million gallons per day of effluent waste water onto the OGC. It would be pumped via a new 12 inch diameter pipeline from the Waste Water Treatment Plant more than 14,000 feet and onto the OGC in the heart of CLC. They will use this near-sewer water to fill the 400 acre-feet of retention ditches to a permanent (but flowing) depth of 7 feet.

 **Charles E. Howard**
16003 Diana Ln.
Houston, TX 77062-4406

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The most accurate (99.9%) analysis would require the use of a 3 dimensional Auto-CAD system filled with accurate data that has not been published by the CLCWA for the MP. Apparently a 3-D A-CAD has not been done by anyone. I will focus my analysis on detention.

My analysis is a geometrical one based on available data & is at least 96% accurate.

Facts from the Master Plan:

OGC Section Surface Acres Depth Acre-ft. Reqd.

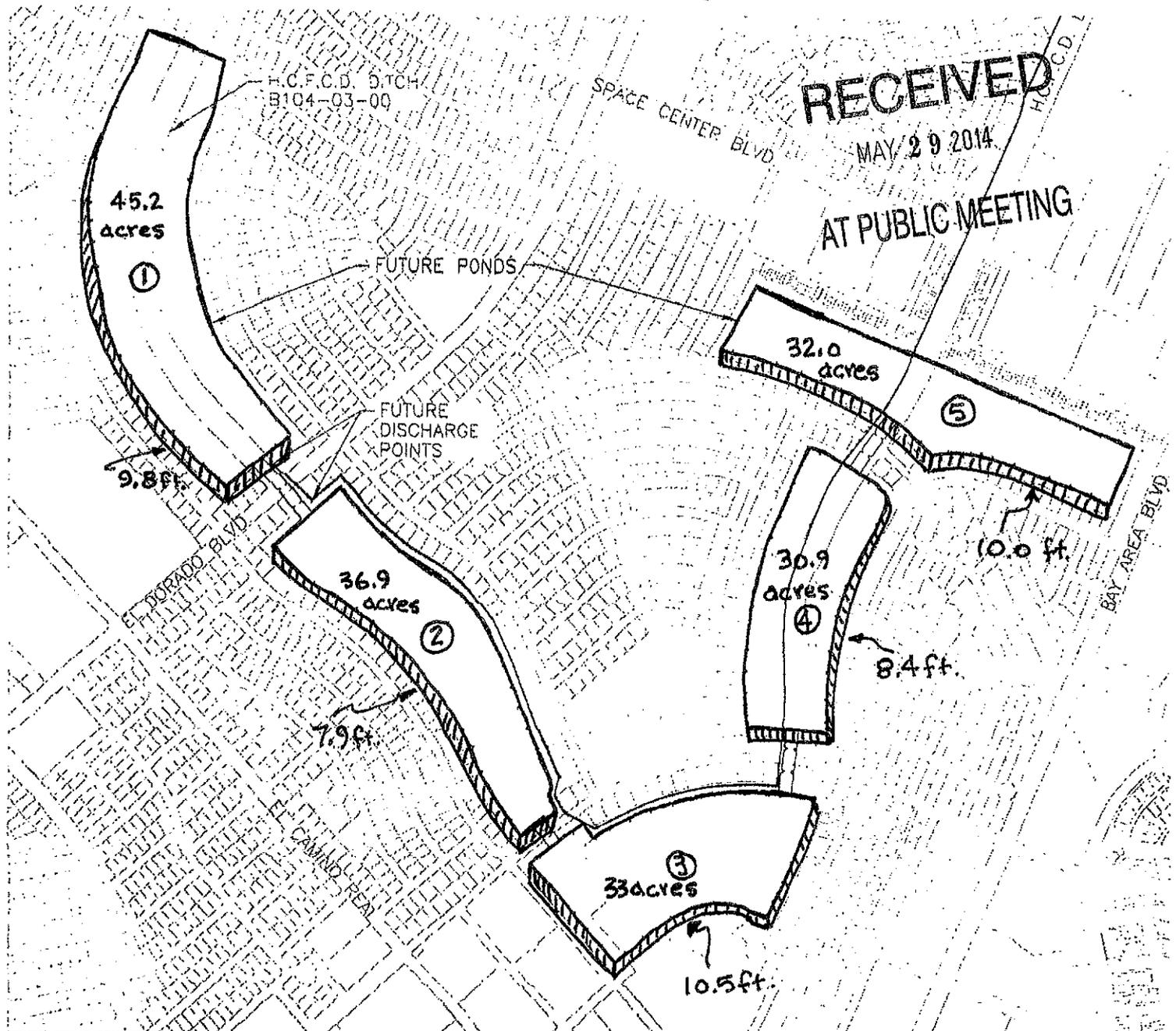
1.	45.2	*	442
2.	36.9	*	292
3.	33.0	*	345
4.	30.9	*	260
5.	32.0	*	318

Calculated depths
that meet acre-foot
requirements

				9.8
				7.9
				10.5
				8.4
				10.0
All	178.0	*	1657**	9.3 (average)

* unknown or unpublished

** 1657 not = 1680 as published-could be a SWA rounding error!



Analysis continued... STEP 3

Not all of the OGC 178 surface acres will be available to use for detention. Islands, perimeter buffer zones, curved buffer zones, athletic fields, and a parking lot will not be excavated below their existing (normal) ground level elevations. These must be deducted from the 178 surface acres to determine the usable surface acreage for detention.

STEP 3-A Deduction of the perimeter buffer zone--- the 10 foot wide ^{Zone} that starts at the home owner property line and goes around the OGC perimeter (6 miles). Mathematically converted to surface acres.

STEP 3-B Deduction of the Islands in surface acres.

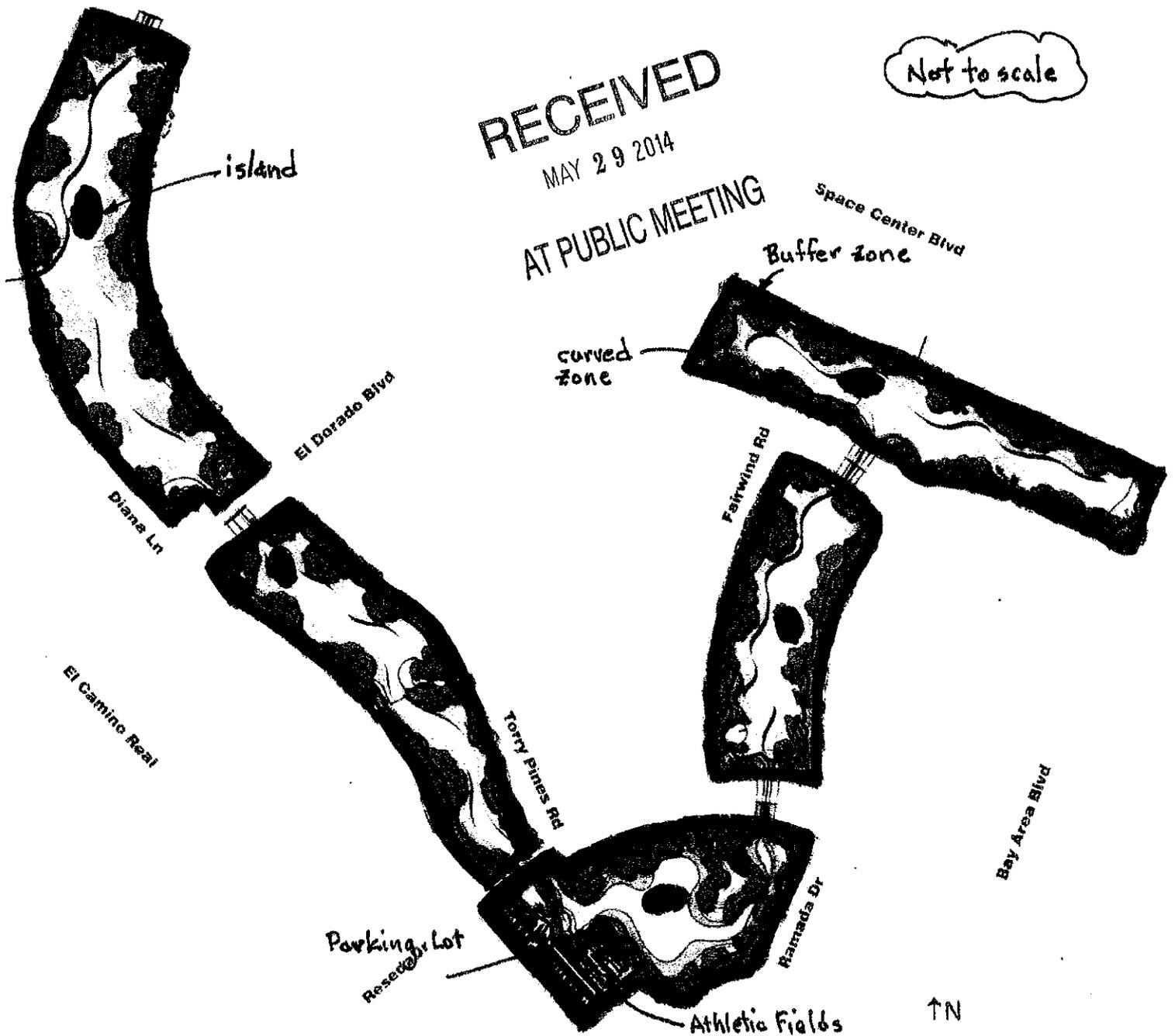
STEP 3-C Deduction of the upper elevation perimeter zone curved surface acres (esthetic enhancement) that abuts the buffer zone.

STEP 3-D Deduction of the Section 3 parking lot and athletic fields surface area.

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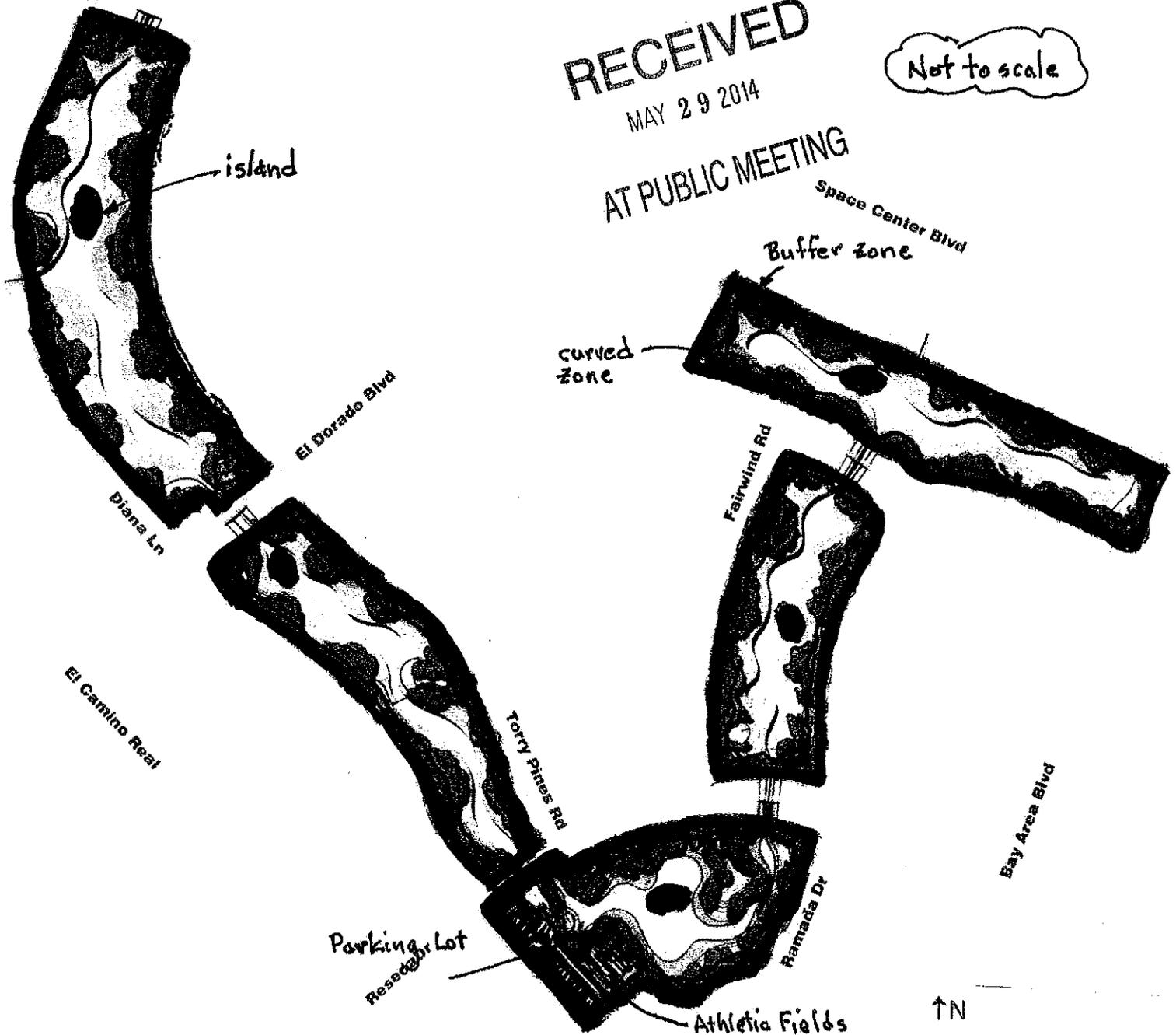
Not to scale



STEP 3 continued....
Surface acres

Section of OGC	Max. avail.	Perimeter		Island	Parking & ath.	Usable
		buffer	curve			
1.	45.2	1.8	3.6	0.5	---	39.24
2.	36.9	1.5	2.9	0.5	---	32.04
3.	33.0	1.5	2.9	0.5	5.0	23.12
4.	30.9	1.9	3.8	0.5	---	24.64
5.	32.0	2.6	5.0	0.5	---	23.95
All	178.0	9.2	18.3	2.5	5.0	142.99

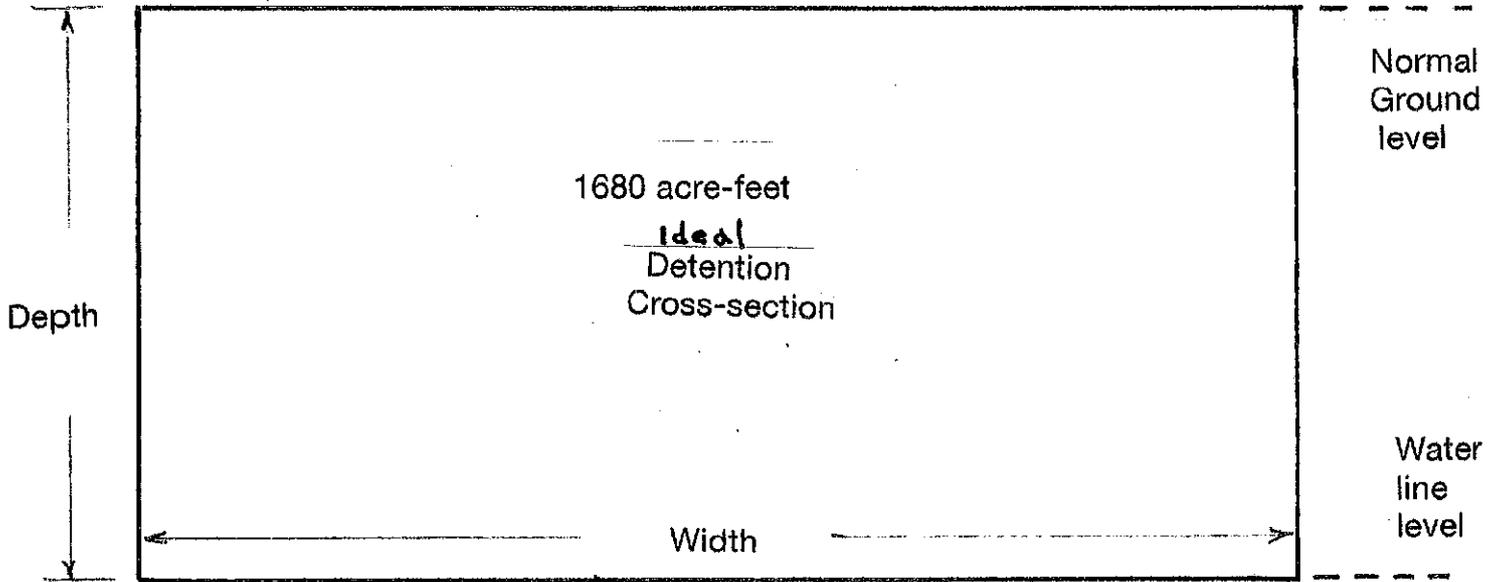
This Step 3 data displays the reduced detention surface acres that are available for use. 178 acres minus 35.01 acres that are not available for detention equals 142.99 acres.



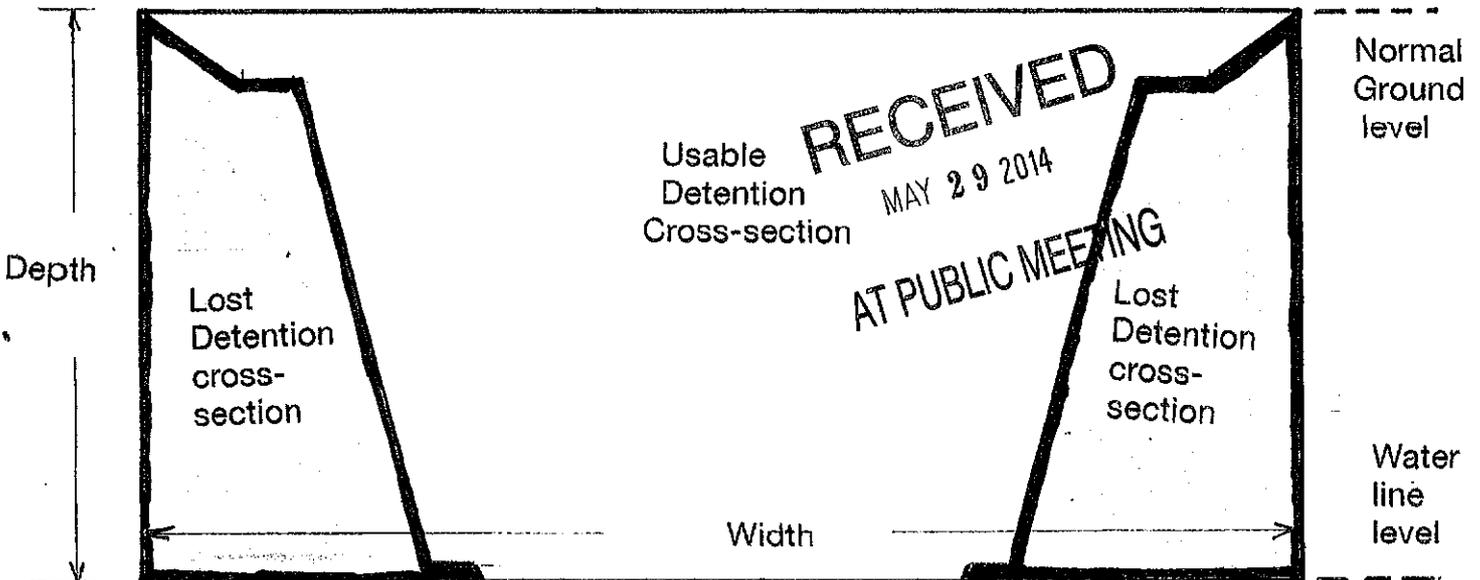
Analysis continued.... STEP 4

The total OGC acres available for detention usage is also impacted by the Master Plan "typical" cross-section for the OGC. The two configurations are displayed below.

Mathematical (rectangular) Configuration



Master Plan Typical Configuration

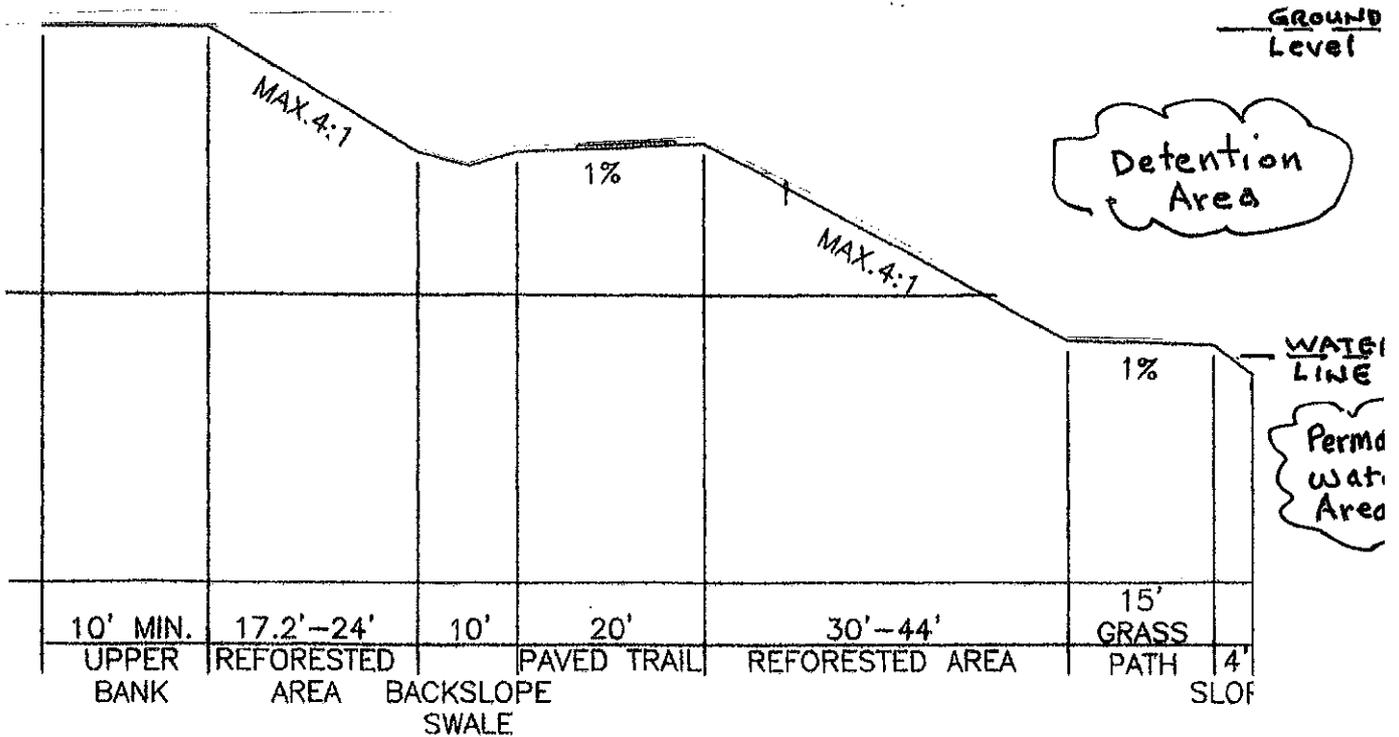


Not to scale

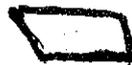
Analysis continued.... STEP 4

A more detailed view of the Master Plan typical configuration clarifies the relative size of the lost detention cross-section.

A. Informational view



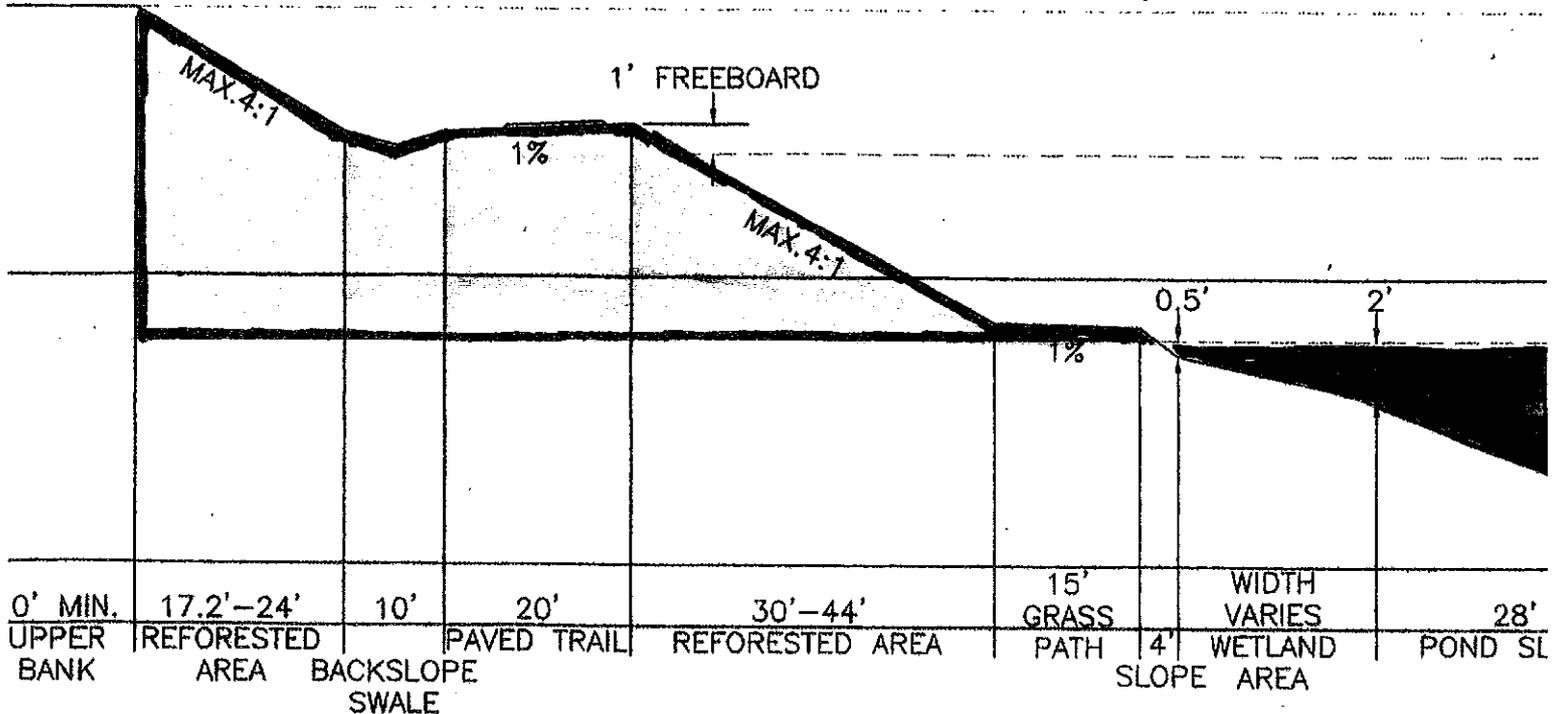
B. view with lost detention highlighted



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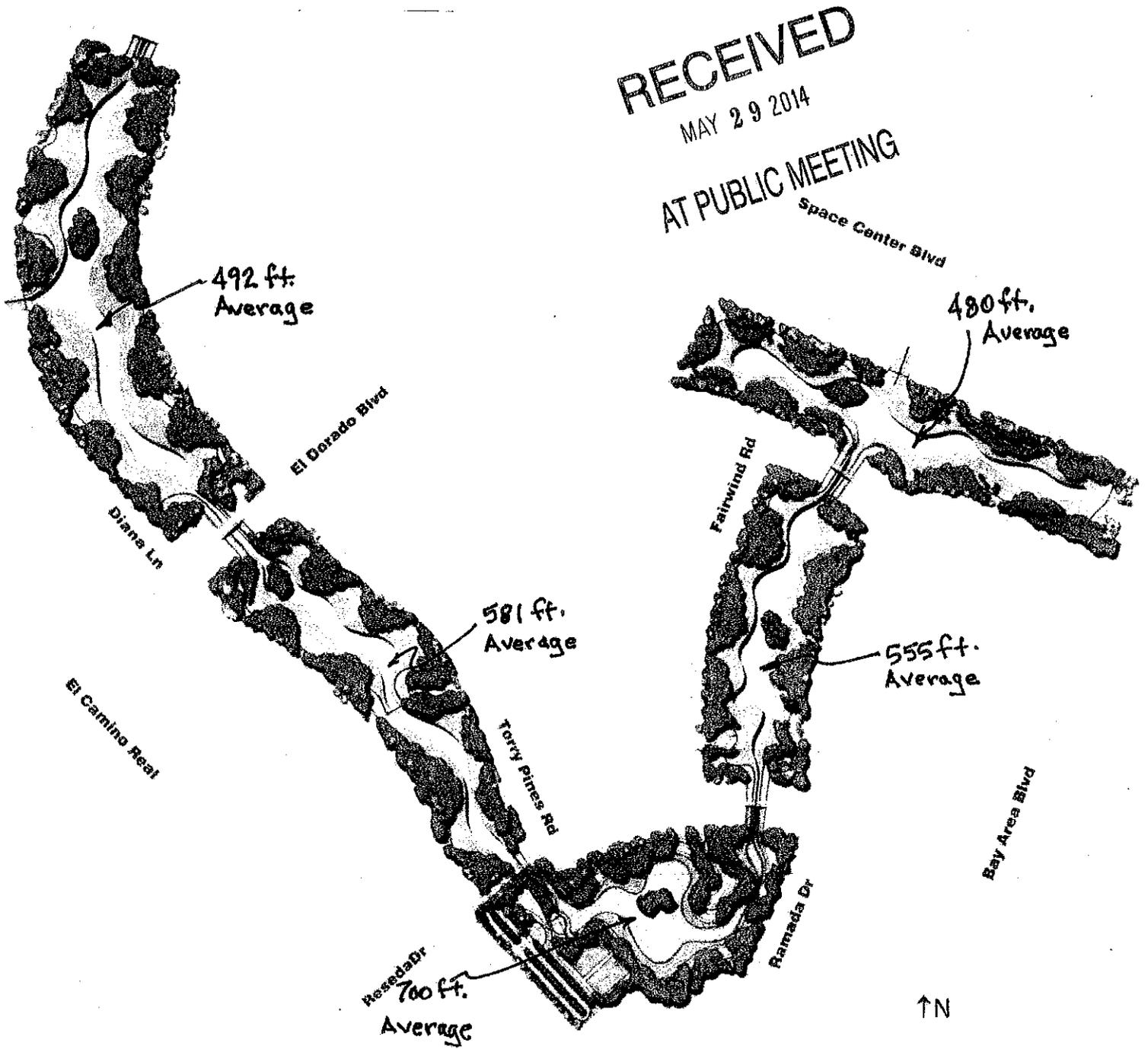
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C. View of inverted trapezoid shaped island lost detention area is not shown, but was used in calculation of % of lost detention cross-section.

The average width of each OGC Section was obtained by taking multiple width measurements with an Apple Application. This chart displays those averages for each OGC Section. This data will be used to Calculate cross-section areas.



A mathematical examination reveals the following:

<u>Section</u>	<u>OGC % of loss</u>	<u>cross-section acres loss</u>	<u>cross-section acres usable</u>
1.	24	9.4	29.84
2.	18	5.9	26.14
3.	15	3.5	19.6
4.	19	4.7	19.9
5.	22	5.3	18.7
<u>All</u>	<u>19.62</u> avg.	<u>28.8</u>	<u>114.28</u>

Which leads to the actual depth required to meet the 1680 acre feet requirement in the Master Plan(MP).

<u>Section</u>	<u>MP acre-feet of detention required</u>	<u>Usable acres</u>	<u>Final depth --feet</u>
1.	442	29.84	14.8
2.	292	26.14	11.2
3.	345	19.6	17.6
4.	260	19.9	13.1
5.	318	18.7	17.0
<u>All</u>	<u>1657*</u>	<u>114.28</u>	<u>14.6</u> avg.

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Analysis continued... STEP 4

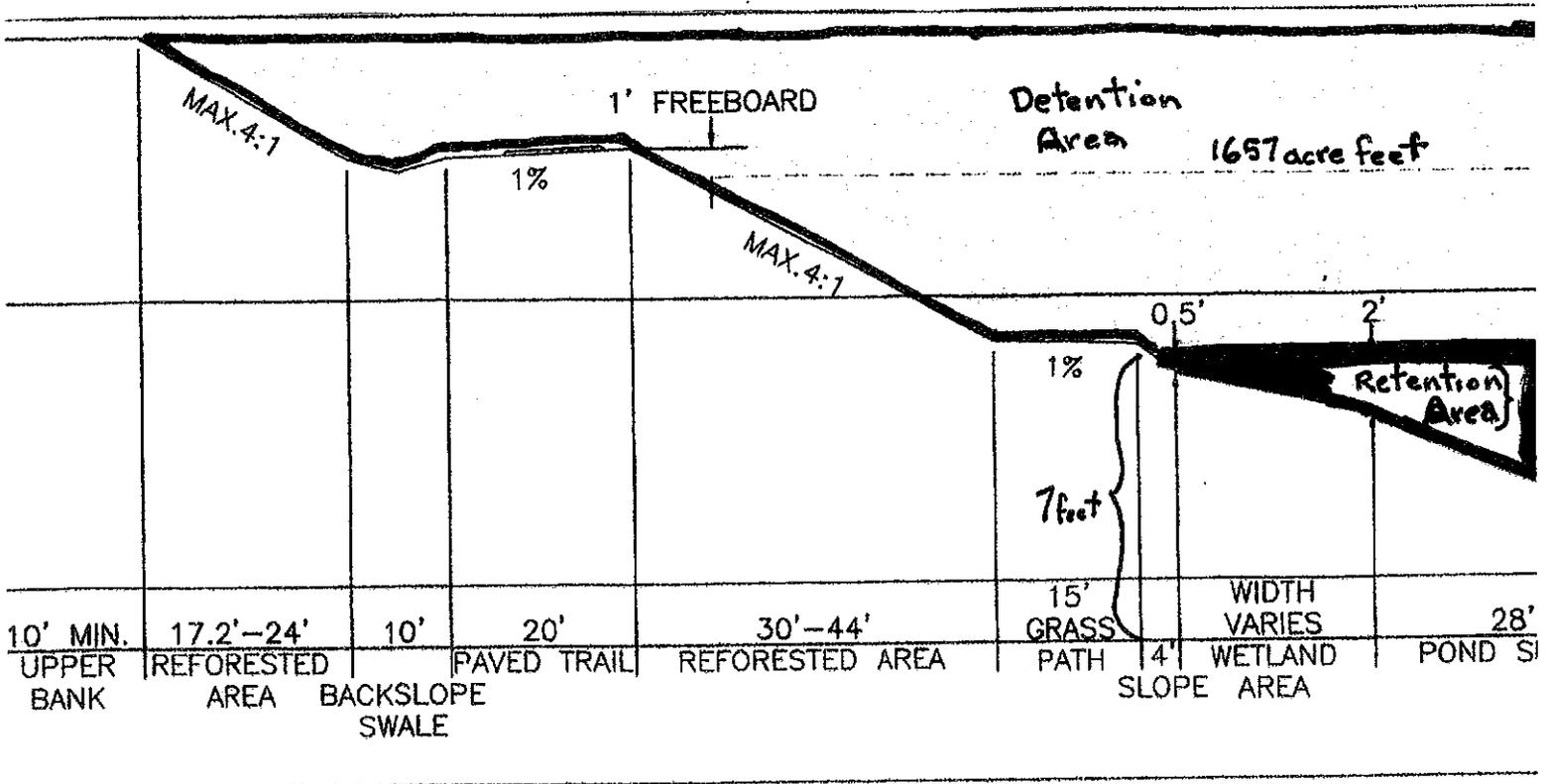
The attached diagram displays the Detention Ditch stacked on top of the Retention Ditch. The Retention ditch is 7 feet for all sections of the OGC. The depth of both ditches are added to determine the actual depth of the excavations called for in the CLCWA Master Plan. The combined actual depth is more meaningful when compared to property/perimeter line elevations where excavation will begin. They are also expressed in terms feet of above or below sea level for clarification. ASL (above) or BSL (below)---

Average property line elevation	Detention ditch depth	Combined ditch depth	Bottom of ditch relative to Sea level ★
1.] 20	14.8	21.8	1.8 BSL
2.] 20	11.2	18.2	1.8 ASL
3.] 19	17.6	24.7	5.7 BSL
4.] 20	13.1	20.1	0.1 BSL
5.] 20	17.0	24.0	4.0 BSL

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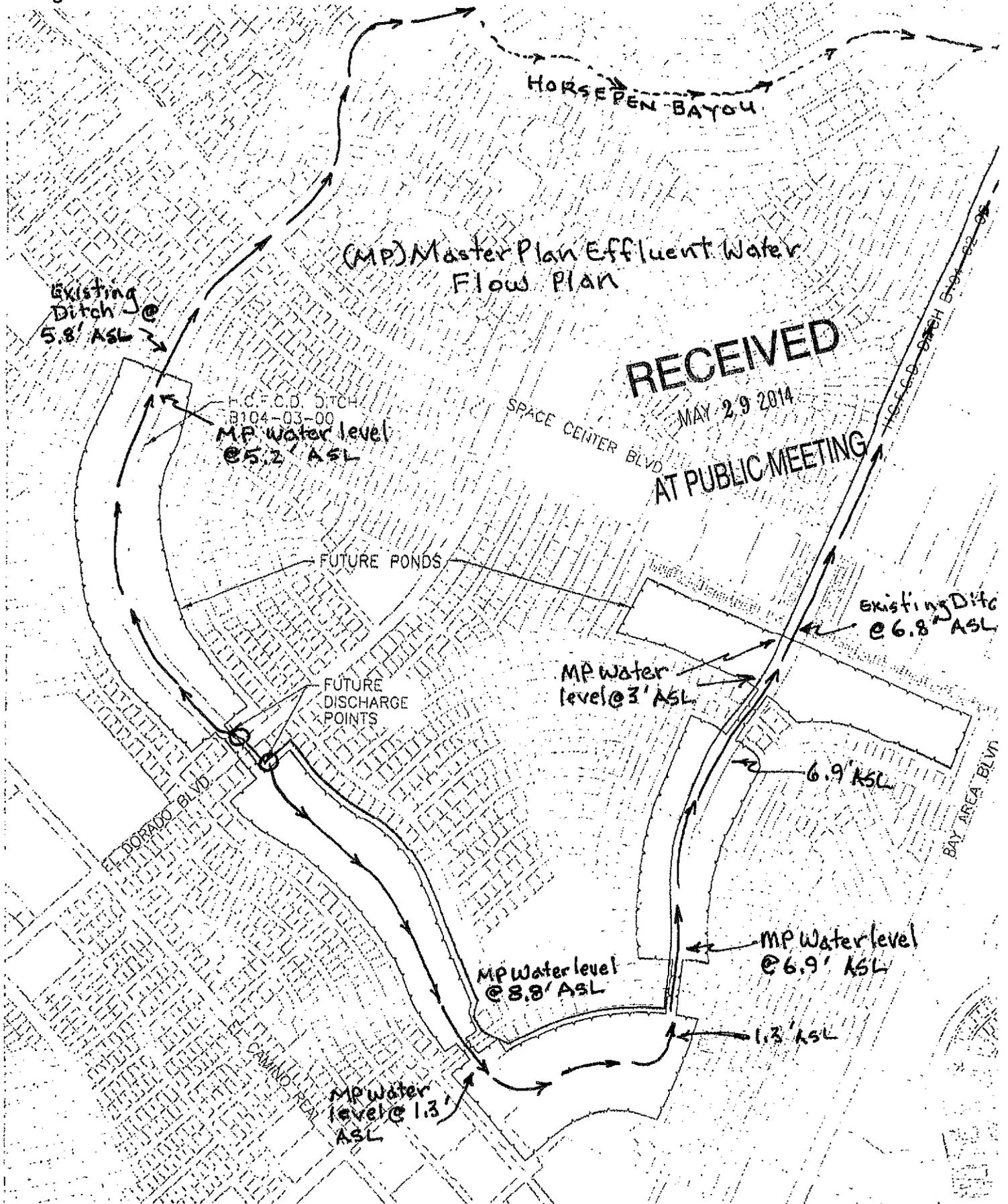
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Analysis continued...STEP 5

This chart displays the Master Plan flow pattern for the effluent water to be pumped to the OGC and back into Horsepen Bayou. It is to be 7 feet deep and constantly flowing to prevent any stagnation.

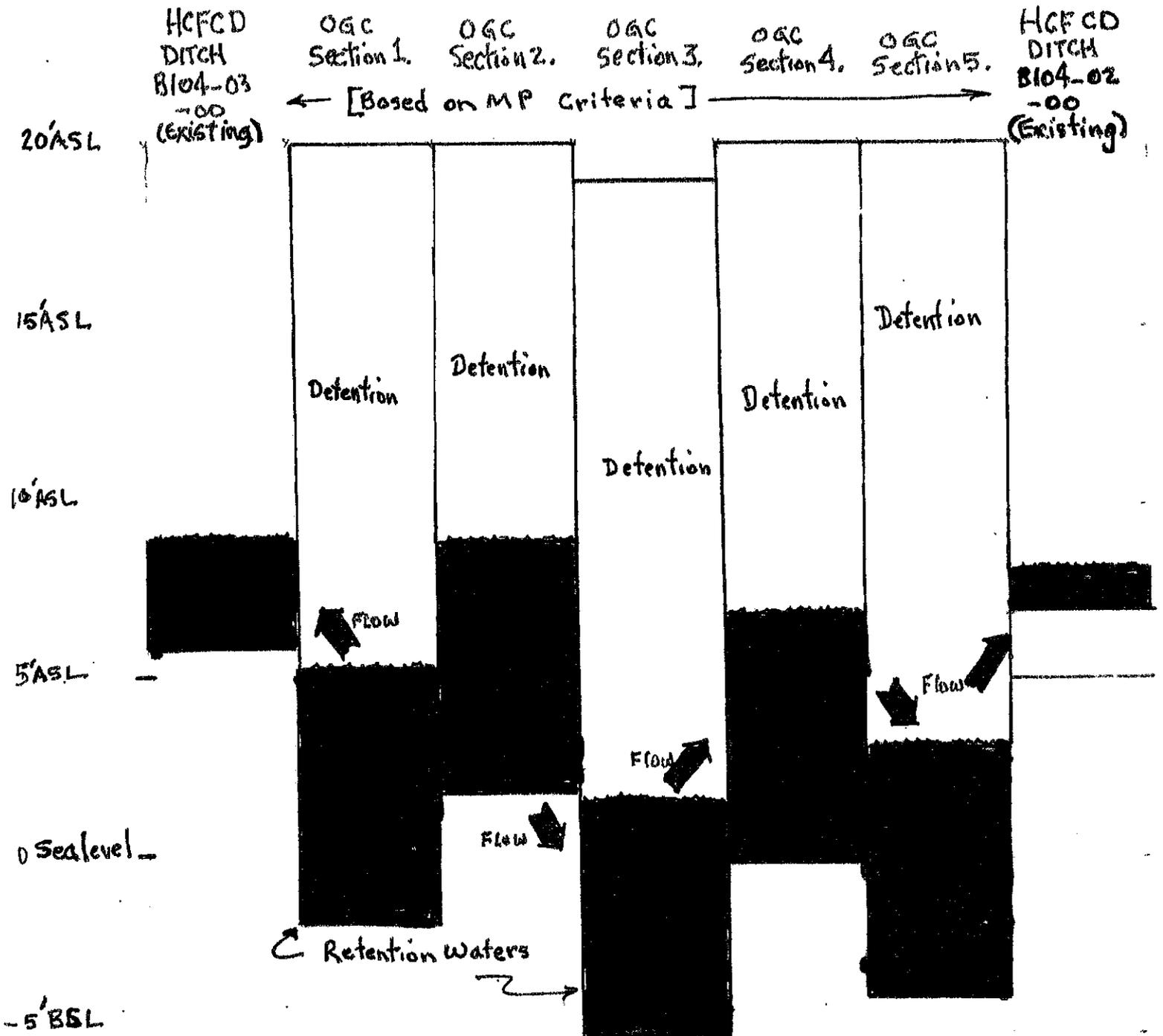


This chart addresses the differences in each sections water level (retention ditch top). Close examination reveals the need for dams & pumps to move from one section to another. They are also needed to move from the OGC to the existing HCFCD existing ditches. Pumps and dams are not addressed in the MP. These will be expensive to acquire & maintain over the next 25 years. This is not covered under existing bonds.

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Analysis continued...Major Concerns

1. The depths of the combined ditches is excessive and driven by the unverified 1680 criteria, creates unnecessary problems, and should be re-evaluated ASAP. Consider the worse case--Section 3, and is to be the first excavated. The bottom will be 24.7 feet below the 20 foot ASL normal ground level for that section. This puts it at 5.7 feet below sea level (BSL). The water table is well above sea level in the entire OGC area. Before any digging is started, the WA should have a core sample drilled & analyzed for stability since it will be in permanent water (i.e. Retention ditch). The clay (not reinforced) soil at this level could promote seepage and cave-ins of the walls of the detention & retention ditches. "Think Florida Sink Hole Disaster". If you don't know, don't dig.
2. The WA Master Plan (MP) does not address the method to be applied to off-set the variances in ditch depths between the 5 sections of the OGC. For example, Section 3 @ 5.7 feet BSL will have difficulty flowing retention water into Section 4 at 0.1 BSL @ a permanent depth of 7 feet (or 6.9 feet ASL). This means the water would back-flow into Section 3 by as much as 6.9 feet. This would destroy the lower grassy walk path and part of the re-forested area of section 3. Sounds like a Panama Canal system of locks (very expensive) will be needed. Who pays for all this? Another example is just as bad and requires the approval of the HCFCD. In Section 5, the retention water tops out @ 4 feet ASL, but the HCFCD ditch bottoms out at 10 feet ASL. This 6 foot difference means the retention water must flow uphill into the existing HCFCD ditch or backwash into Section 4 & again destroy the lower level improvements. Tell me once again why we are doing this project.
3. Has a real Hydrologist reviewed the Master Plan and certified it will work? Does SWA have a Hydrologist on their staff?
4. Has the HCFCD approved the impact of modifying their ditches & the impact the MP will have on their existing channels? Who will they hold responsible (now & future) for excessive erosion of their existing channels to accomodate a constant flow of water?
5. I have been told that a buried industrial pipeline runs 4 feet underground the entire length of Section 5. If this is true, has the WA discussed violation of their right of way and sought permission to relocate their pipeline? At what expense to the tax payer?

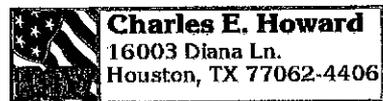
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Recommendations

1. Hire a Hydrologist and formally justify the 1680 acre-feet criteria. If it is real, let the Hydrologist develop a workable plan. If it can not be justified, consider shifting to a lesser plan such as is proposed by Steve Baxter @ 900 acre-feet with no retention ditches.
2. Formally justify the need for the retention ditches filled with effluent(7 feet) in the middle of a fully populated community. You have no mandate to create a "river walk" therefore, I recommend elimination of all retention ditches. The dams, pumps, & back-flow problems would go away & 60% of existing trees would be saved. You would not have to be concerned about cave-ins or have any effluent water public health problems for which you might be sued (or what if some school child drowns).
3. Restore the WA's credibility by formally explaining why you are spending Repair & Maintenance allocated bond funds to excavate the "cost free" Section 3 of the OGC. Will this reduce your ability to maintain the existing WA infrastructure? When will you run short of R & M funds?
4. You folks do a grand job of water supply & sewer service. Go back to what you do best and just give us a nice (not elaborate) green space passive type park [no water or wetlands desired].

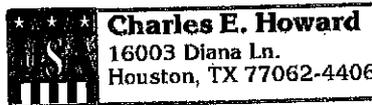
Submitted by a concerned citizen & OGC dweller(40 years)
Chuck Howard

Chuck 2-24-14



5-29-14

OGC-MP Analysis Part 2 March 2014
Retention Ditches



My first analysis concentrated on the Detention ditches of the CLCWA(Water Authority) Master Plan [MP]. However, I did reference the retention ditches that will lie below the detention ditches. This analysis will focus on the "Retention Ditches". The MP description of the Retention Ditches is as follows:

OGC		* Water Area		* Wetlands		** Start date
Phase	Section	acres/	deep	acres/	deep	
1	3	8	7	6	***	2014
2	4	5	7	9	***	2018
3	5	8	7	6	***	2021
4	2	7	7	7	***	2023
5	1	10	7	11	***	2026
All		38		39		12 yrs.

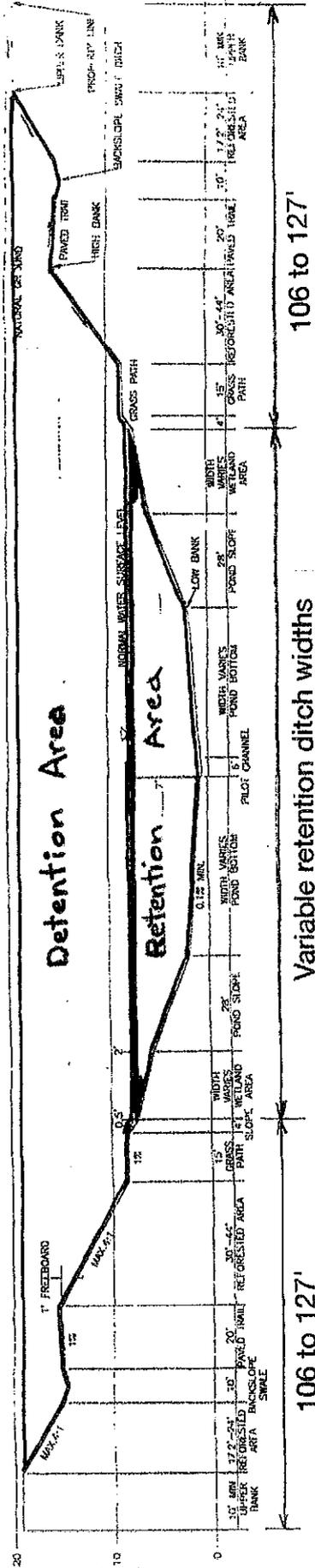
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- * permanent flowing effluent water
- ** Planned earliest excavation activity
- *** Wetlands areas covered by 0.5 to 2 feet of flowing effluent water

Next I will analyze the proposed source of the flowing effluent water and the impact it could have on the City of Houston & HCFCD.

All 5 sections of the the OGC will consist of an open detention ditch above and a retention ditch below per the CLCWA Master Plan (see typical cross section below).

TYPICAL PROPOSED CROSS SECTION



106 to 127'

Variable retention ditch widths

106 to 127'

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OGC Section	avg. section width (ft.)	avg. retention ditch width (ft.)
1	492	259
2	581	348
3	700	467
4	555	322
5	480	247

Analysis Part 2 continued----

The CLC Water Authority (CLCWA) has submitted a large data package to the Texas Commission on Environmental Quality (TCEQ) requesting a modification to their TPDES Permit No. WQ0010539001. The following 2 pages are a notification of the WA's request, which I received directly from the TCEQ [because my back yard abuts the golf course]. Unfortunately the CLCWA did not make the entire data package available to me or the general public. I was able to "bootleg" a few pages from the downtown Houston offices of the TCEQ. I am including the 2 page map from that data package that reveals their plan to bring effluent water uphill to the Old Golf Course (OGC)

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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



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NOTICE OF RECEIPT OF APPLICATION AND
INTENT TO OBTAIN WATER QUALITY PERMIT AMENDMENT

PERMIT NO. WQ0010539001

APPLICATION. Clear Lake City Water Authority, 900 Bay Area Boulevard, Houston, Texas 77058, has applied to the Texas Commission on Environmental Quality (TCEQ) to amend Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0010539001 (EPA I.D. No. TX0022543) to authorize the addition of two outfalls. The domestic wastewater treatment facility is located at 14210 Middlebrook Drive, Houston, in Harris County, Texas 77058. The discharge route is from the plant site via Outfall 001 to Horsepen Bayou; thence to Armand Bayou Tidal; via proposed Outfall 002 through a pipe; thence into a future pond; thence to a Harris County Flood Control District ditch; thence to Horsepen Bayou; thence to Armand Bayou Tidal; via proposed Outfall 003 through a pipe; thence into a series of future ponds; thence to a Harris County Flood Control District ditch; thence to Horsepen Bayou; thence to Armand Bayou Tidal. TCEQ received this application on February 26, 2013. The permit application is available for viewing and copying at the Clear Lake City Water Authority Office, 900 Bay Area Boulevard, Houston, Texas. This link to an electronic map of the site or facility's general location is provided as a public courtesy and not part of the application or notice. For exact location, refer to application.

<http://www.tceq.texas.gov/assets/public/44610/index.html?lat=29.5775&lng=-95.0922&zoom=12&type=7>

The application is subject to the goals and policies of the Texas Coastal Management Program and must be consistent with the applicable Coastal Management Program goals and policies.

ADDITIONAL NOTICE. TCEQ's Executive Director has determined the application is administratively complete and will conduct a technical review of the application. After technical review of the application is complete, the Executive Director may prepare a draft permit and will issue a preliminary decision on the application. **Notice of the Application and Preliminary Decision will be published and mailed to those who are on the county-wide mailing list and to those who are on the mailing list for this application. That notice will contain the deadline for submitting public comments.**

PUBLIC COMMENT / PUBLIC MEETING. You may submit public comments or request a public meeting on this application. The purpose of a public meeting is to provide the opportunity to submit comments or to ask questions about the application. TCEQ will hold a public meeting if the Executive Director determines that there is a significant degree of public interest in the application or if requested by a local legislator. A public meeting is not a contested case hearing.

OPPORTUNITY FOR A CONTESTED CASE HEARING. After the deadline for submitting public comments, the Executive Director will consider all timely comments and prepare a

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AT PUBLIC MEETING

Page 5

response to all relevant and material, or significant public comments. Unless the application is directly referred for a contested case hearing, the response to comments, and the Executive Director's decision on the application, will be mailed to everyone who submitted public comments and to those persons who are on the mailing list for this application. If comments are received, the mailing will also provide instructions for requesting reconsideration of the Executive Director's decision and for requesting a contested case hearing. A contested case hearing is a legal proceeding similar to a civil trial in state district court.

TO REQUEST A CONTESTED CASE HEARING, YOU MUST INCLUDE THE FOLLOWING ITEMS IN YOUR REQUEST: your name, address, phone number; applicant's name and proposed permit number; the location and distance of your property/activities relative to the proposed facility; a specific description of how you would be adversely affected by the facility in a way not common to the general public; and, the statement "[I/we] request a contested case hearing." If the request for contested case hearing is filed on behalf of a group or association, the request must designate the group's representative for receiving future correspondence; identify an individual member of the group who would be adversely affected by the proposed facility or activity; provide the information discussed above regarding the affected member's location and distance from the facility or activity; explain how and why the member would be affected; and explain how the interests the group seeks to protect are relevant to the group's purpose.

Following the close of all applicable comment and request periods, the Executive Director will forward the application and any requests for reconsideration or for a contested case hearing to the TCEQ Commissioners for their consideration at a scheduled Commission meeting.

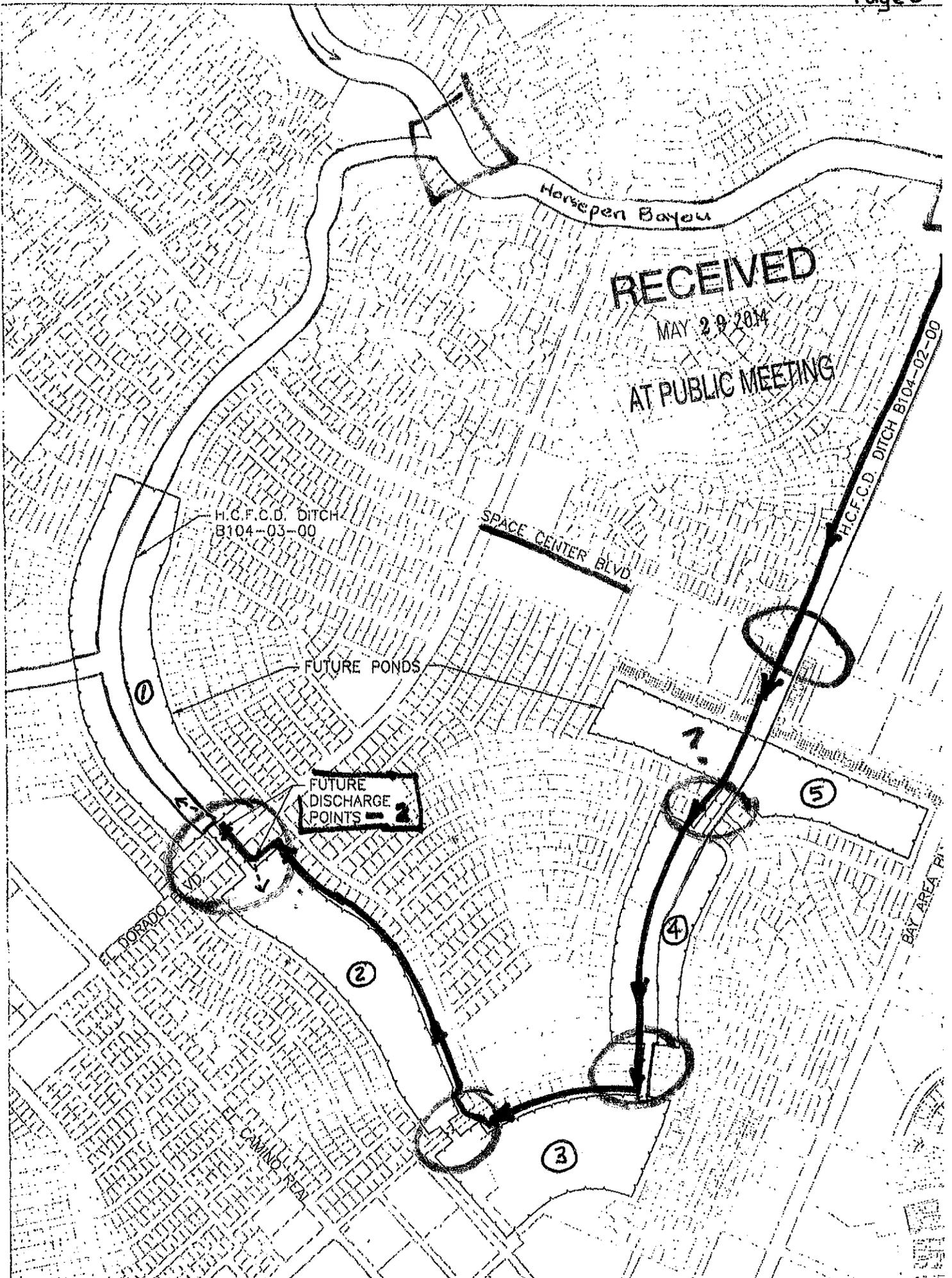
The Commission will only grant a contested case hearing on disputed issues of fact that are relevant and material to the Commission's decision on the application. Further, the Commission will only grant a hearing on issues that were raised in timely filed comments that were not subsequently withdrawn.

MAILING LIST. If you submit public comments, a request for a contested case hearing or a reconsideration of the Executive Director's decision, you will be added to the mailing list for this specific application to receive future public notices mailed by the Office of the Chief Clerk. In addition, you may request to be placed on: (1) the permanent mailing list for a specific applicant name and permit number; and/or (2) the mailing list for a specific county. If you wish to be placed on the permanent and/or the county mailing list, clearly specify which list(s) and send your request to TCEQ Office of the Chief Clerk at the address below.

AGENCY CONTACTS AND INFORMATION. All written public comments and requests must be submitted to the Office of the Chief Clerk, MC 105, TCEQ, P.O. Box 13087, Austin, TX 78711-3087. If you need more information about this permit application or the permitting process, please call TCEQ Public Education Program, Toll Free, at 1-800-687-4040. Si desea información en Español, puede llamar al 1-800-687-4040. General information about TCEQ can be found at our web site at www.tceq.texas.gov.

Further information may also be obtained from Clear Lake City Water Authority at the address stated above or by calling Mr. William G. Rosenbaum, P.E., Lockwood, Andrews, & Newman, Inc., at (713) 821-0455.

Issuance Date: April 29, 2013



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H.C.F.C.D. DITCH
B104-03-00

SPACE CENTER BLVD

FUTURE PONDS

FUTURE
DISCHARGE
POINTS - 2

H.C.F.C.D. DITCH B104-02-00

BAY AREA PI

E. PORADO

E. CAMINO

1

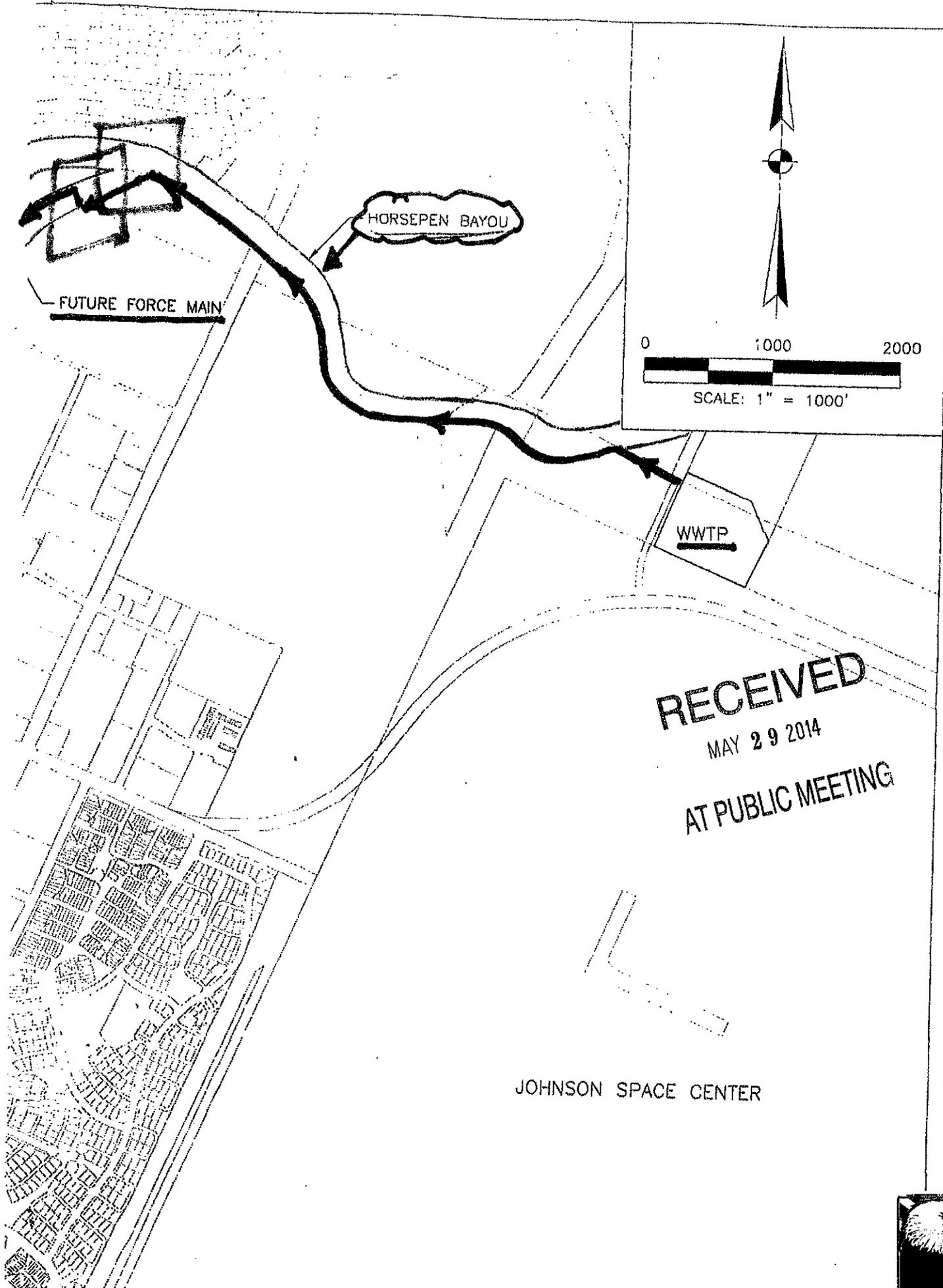
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5

2

4

3



ATTACHMENT

ROBERT T. SAVELY

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 MAY 29 2014
 AT PUBLIC MEETING

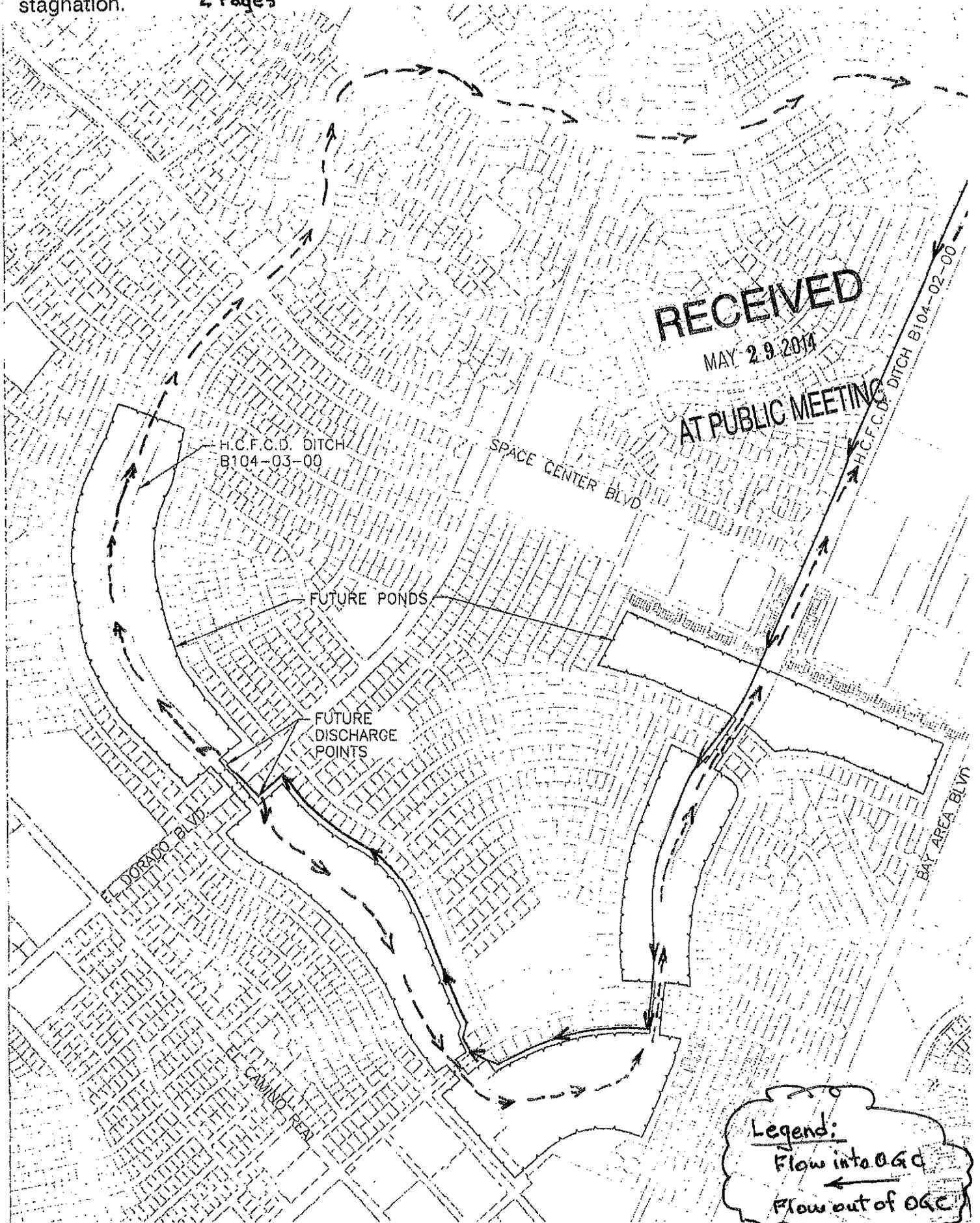
DATE: 2/20/13

DRAWN: RTI



This chart displays the Master Plan flow pattern for the effluent water to be pumped to the OGC and back into Horsepen Bayou. It is to be 7 feet deep and constantly flowing to prevent any stagnation.

2 Pages



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H.C.F.C.D. DITCH
B104-03-00

SPACE CENTER BLVD

H.C.F.C.D. DITCH B104-02-00

FUTURE PONDS

FUTURE
DISCHARGE
POINTS

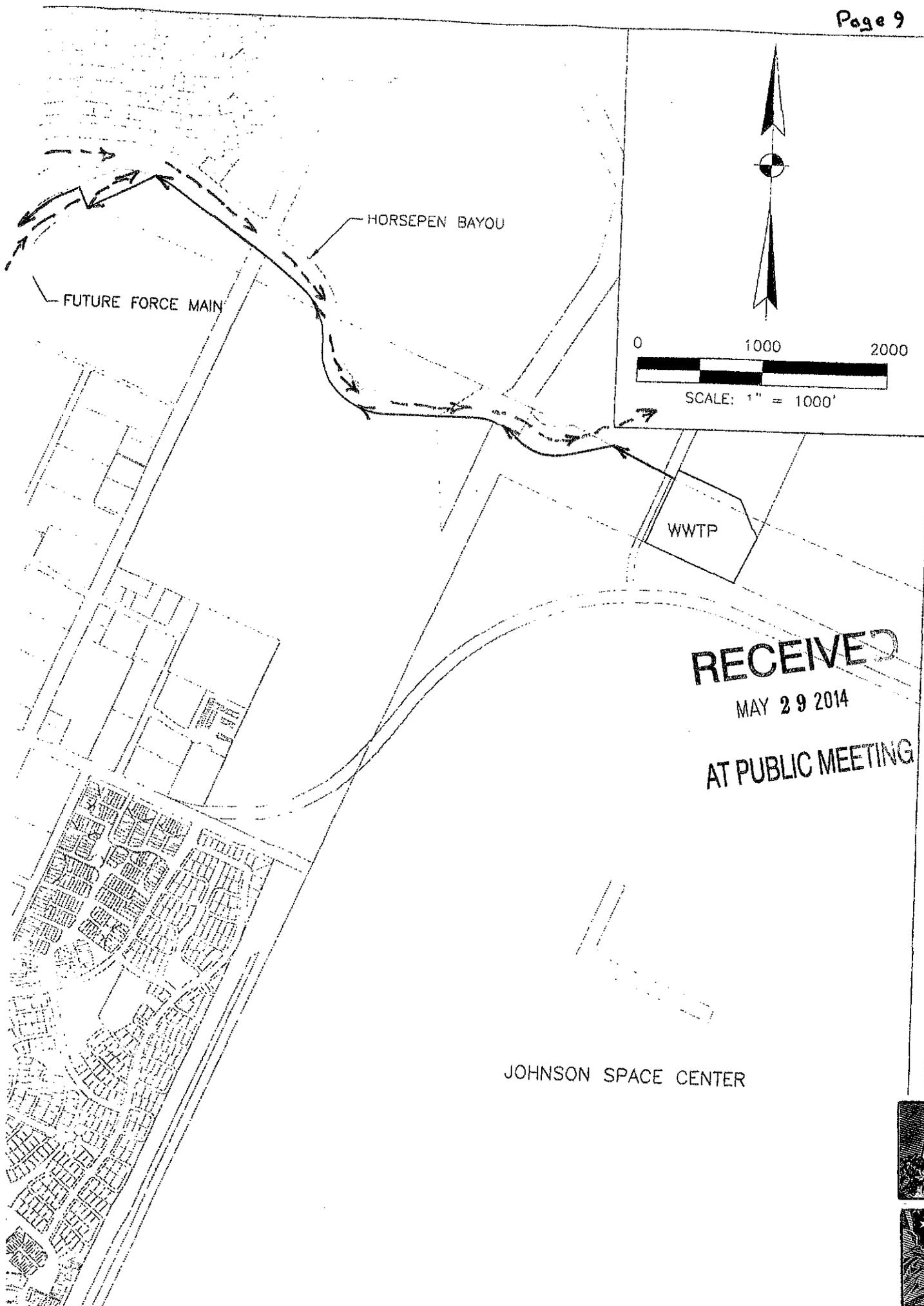
EL DORADO BLVD

EL CAMINO REAL

BAY AREA BLVD

Legend:
Flow into OGC
Flow out of OGC

ATTACHMENT

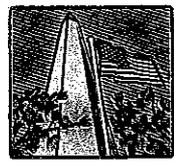


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 MAY 29 2014
 AT PUBLIC MEETING

ROBERT T. SAVELY
 WATER RECIAMATION FACILITY

DATE: 2/20/13

DRAWN: BTE



If approved by the TCEQ, the CLCWA proposes to construct a new 12 inch diameter pipeline with lift stations or pumps that will move effluent water more than 14,000 feet from the Waste Water Treatment Plant (WWTP) to the 178 acres golf course [Reference the previous highlighted Map]. The pipeline will exit the WWTF and run along side Horsepen Bayou (our major flood control artery) several thousand feet. It may require lift stations and it may be above ground or buried. Since this is a public waterway, I assume that someone (Corp., HCFCD, Houston,?) must issue a permit for this phase of the construction. Who has permit authority?

At the intersection of HCFCD ditch B104-02-00 [another major flood control artery] and Horsepen Bayou, the pipeline will turn and run along side B104-02-00 for several thousand feet until it reaches the OGC property. Again, it may require lift stations and it may be buried or above ground. If it stays above ground it will impede HCFCD's ability to periodically mow & dredge ditch B104-02-00. It will also cross over or under Space Center Blvd. (a major city street). The same question arises-- who must issue permits for this construction?

Looking at the map again as the pipeline crosses the OGC acreage known as Section 5, the plan becomes murky. Excavation of this Phase (3) will not start until 2021. The question is where to put the pipeline [in the interim 7 years] until the upper detention ditch is carved out to a depth of 17 feet (10 feet below existing HCFCD ditch B104-02-00)?

The pipeline continues in similar murky fashion through the subsequent 3 sections of the OGC with the same inherent problems & questions. But a new problem arises with these next 3 sections. The pipeline now must cross 3 bridged city streets and one city street (Reseda) that has no bridge or underground passageway at present. Who is to issue permits for these modifications? Will Houston fund modifications?

The pipeline terminates with 2 new "outflows". Outflow #2 is at the North end of Section 2 of the OGC and will flow effluent water south through sections 2, 3, 4, & 5 and then via HCFCD B104-02-00 and back into Horsepen Bayou. Outflow #3 will flow effluent water north through section 1 of the OGC, then via HCFCD B104-03-00 and back into Horsepen Bayou. Please note that Section 1 & 2 of the OGC will not start excavation until 2026 & 2023 respectively. Will various permits be issued by local entities in 2014 for the proposed pipeline? The ditches they will feed will not be completed before 2026. The same inherent murky problems as previous Sections also arise.

Conclusions/ recommendations:

It is my opinion that these retention ditches do not provide any additional flood control and may actually create new problems [reference my previous Detention Analysis]. Think of the proposed "retention ditches" as a massive bathtub with 2 spigots flowing water into it. At either end of the tub is an overflow drain. 10 million gallons per day flow into the tub. Once it reaches its 7 foot deep steady-state it overflows through these drains. With a very insignificant loss due to evaporation, the water overflows back into Horsepen Bayou at the input rate of 10 million gallons per day. Horsepen Bayou is not lowered and flood capacity has not improved. Also the houses along upper Horsepen Bayou now have effluent water flowing behind them. Another bad aspect of this plan is Clear Lake High School on HCFCD ditch B104-02-00 now has effluent water flowing behind it. This is a massive waste of effort and resources and may create a new health hazard for the CLC Houston area. These Retention ditches should be deleted from the Master Plan.

Texas Representative John Davis has formally asked the TCEQ to conduct a Town-hall review of the CLCWA permit request in the CLC area. It is tentatively scheduled for late May 2014. To date the TCEQ has received over 200 objections to this permit from Clear Lake residents, thus prompting the town-hall review. I am requesting that the City of Houston, HCFCD, And County Commissioner's precinct office send representatives to this meeting. The CLCWA is in charge of the exact date and location of this meeting. I am including a copy of the instructions the CLCWA received from the TCEQ. Upon receipt of final plans, I will email each of you that information.

Thanks for your support of a concerned citizen & 40 year OGC resident. Chuck 3-7-14



Charles E. Howard
16003 Diana Ln.
Houston, TX 77062-4406

Chuck

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, April 14, 2014 8:12 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

*MWD
87424*

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Saturday, April 12, 2014 7:18 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: MR Charles Howard

E-MAIL: 8180fritz@gmail.com

COMPANY:

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: Permit no. WQ0010539001 and the TCEQ letter announcing a Public Meeting to review your preliminary decisions have created several areas of confusion. There are 2 ambiguous statements in the letter, and the letter is supposed to accurately reflect the contents of the amendment package submitted by the Clear Lake Water Authority (CLCWA). Please clarify the following ambiguities and certify that they are based upon the data package presented to you by CLCWA. Ambiguity #1. Letter paragraph 1 says, outfall 001's flow is not

RM

to exceed 10,000,000 gallons per day and outfall 002 & 003 both shall not exceed 1,080,000 gallons per day. Does this mean that the flow rate of outfall 002 is 1,080,000 gals. per day and the flow rate of outfall 003 is also 1,080,000 [total 2,160,000]? Or does it mean the flow rate of outfall 002 is 540,000 gals. per day and the flow rate of outfall 003 is 540,000 gals per day [total 1,080,000]? It is ambiguous in that it can easily be read either way and is confusing. Are we also to assume from your letter that the flow rate of outfall 001 will be reduced by the combined flow rates of outfalls 002 & 003? Your statement --the combined outflows from outfalls 001,002, & 003 are not to exceed 10,000,000 gals. per day implies that. The CLCWA Master Plan states that outfall 002 & 003 will be fed by a single 12 inch diameter new forced main. The Main starts @ the WWTF, proceeds 14,000+ feet & eventually to the Old Golf Course (OGC) to a point near the intersection of Tory Pines & El Dorado streets, and terminates at outfall 002 in Section 1 & at outfall 003 in Section 2 of the OGC. This data was in the amendment data package submitted by the CLCWA as part of WQ0010539001. It is important to clarify these flow rates because they have a direct impact on the depth & maintenance of the Harris County Flood Control District (HCFCD) ditches into which this water must flow to return it to Horsepen Bayou.

Ambiguity #2. Letter Paragraph 1 also is confusing concerning the route the water takes to get to outfalls 002 & 003. Your letter depicts the outfalls as coming before the pipe (main) which feeds them. You put the cart before the horse (see route description above). This needs to be corrected prior to the conduct of a public review meeting in May. Almost a year ago I inquired about the status of a required Environmental Impact Study & Statement. Has the CLCWA provided it as part of their application? Since the CLCWA plans to build a beach/wading pool on this water, has the application been assessed by TCEQ for "human recreational use " as well as limited aquatic use? Your stated evaluation standards don't seem to address the possibility of humans ingesting the effluent water. Children playing in this water will swallow some of it. Thanks Chuck

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, July 01, 2013 8:51 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

PM

From: 8180fritz@gmail.com [mailto:8180fritz@gmail.com]
Sent: Thursday, June 27, 2013 4:41 PM
To: donotReply@tceq.state.tx.us
Subject: Public comment on Permit Number WQ0010539001

*MWD
87424*

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Chuck Howard

E-MAIL: 8180fritz@gmail.com

COMPANY: retired

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: Public Meeting Required/Requested for this Permit Application . Justification /reasons for meeting are found in my previous comments submitted May 15,17,&24,2013. Please reference or adjust them as appropriate. Administrative suggestion for TCEQ ---If you require certain words be used in this comments format in order to get a public or contested meeting(for any application) please put it on the form. Laymen,such as I , need that kind of prompting if you want grassroots inputs on subjects that impact our lives . Thanks.

MWD

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Thursday, June 27, 2013 3:26 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

From: 8180fritz@gmail.com [mailto:8180fritz@gmail.com]
Sent: Thursday, June 27, 2013 2:47 PM
To: donotReply@tceq.state.tx.us
Subject: Public comment on Permit Number WQ0010539001

mwd
87424

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Chuck Howard

E-MAIL: 8180fritz@gmail.com

COMPANY: Retired

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

COMMENTS: This is a second request to have my (Charles--Chuck Howard) 3 previous inputs [5-15, 5-17, & 5-24-2013] LISTED as Requests for a Public Review of this permit application. It was not intuitively clear when I originally submitted them in your format that I must spell it out on the form. Here it is---Public review required & requested for all 3. Thanks.

mwd

Marisa Weber

From: PUBCOMMENT
Sent: Friday, May 24, 2013 12:44 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

From: PUBCOMMENT-OCC
Sent: Friday, May 24, 2013 9:53 AM
To: PUBCOMMENT
Subject: FW: Public comment on Permit Number WQ0010539001

*MWD
87424*

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Friday, May 24, 2013 9:26 AM
To: donotReply@tceq.state.tx.us
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Chuck Howard

E-MAIL: 8180fritz@gmail.com

COMPANY: Retired

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

Crw

COMMENTS: I skimmed through [redacted] s permit's data package in your Hou. [redacted] office & did not find a section that addressed other permits that should be approved prior to approval of this application. The proposed pipeline (new forced main) will be a modification to property in the Oakbrook subdivision of Clear Lake City/Houston. Any modification of property in this CLC Community Association deed restrictions jurisdiction must be reviewed and approved by the CLCCA Architectural committee prior to any action to modify. This has not been done and you would not glean that from the permit Data Package, therefore this application is incomplete and should be returned for resubmission. A second area of incompleteness deals with the modification of existing Harris County Flood Control District canals (2) that transport water from the old golf course property to Horsepen Bayou. Installing a new pipe in one of these Canals and changing the size/configuration of both canals to carry effluent water to Horsepen Bayou requires HCFCD approval, a 404 Corp. of Engineers permit, and a TCEQ formal environmental impact study /report. None of these have been done or included in the permit data pack. I don't think TCEQ has all the data needed to make a comprehensive judgement on the subject application and should return it to the CLC Water Authority for revision.

Marisa Weber

From: PUBCOMMENT
Sent: Friday, May 17, 2013 9:58 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

From: PUBCOMMENT-OCC
Sent: Friday, May 17, 2013 9:49 AM
To: PUBCOMMENT
Subject: FW: Public comment on Permit Number WQ0010539001

Handwritten:
mwd
87424

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Friday, May 17, 2013 9:38 AM
To: donotReply@tceq.state.tx.us
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Chuck Howard

E-MAIL: 8180fritz@gmail.com

COMPANY: NASA retired

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

Handwritten:
Cm

COMMENTS: The TCEQ is skillfully being used by the CLCWA by asking you to renew and amend (expand) permit WQ0010539001. The amendment is untimely & unjustified. I have been unable to view or obtain from the CLCWA, a copy of the detailed map & data they submitted as part of their application. However, I have obtained a copy from your Houston office and must now recommend the amendment be disapproved by TCEQ. Please reference the following items in the application package to understand why I recommend disapproval. (1.) Domestic Administrative Report 1.0 Attachment 2A & 2B Description of Discharge Route (2.) Maps-- Attachment A, 4A, & 4B Reasons Amendment should be disapproved as revealed in above references: ## 1- Existing Discharge Point--- The treated effluent is currently discharged into an unpopulated area /nature preserve. The CLCWA should have requested a second outflow along this route if they can justify a need for more capacity. Have they submitted a formal request to TCEQ for an outflow capacity increase? ## 2A & 2B--- The proposed treated effluent would be discharged onto the Old Golf Course (OGC) which is part of an established, fully populated residential area of Clear Lake City (CLC)/Houston. This is undesirable, unhealthy, untimely, and physically impossible at this time. The referenced "future ponds" are not in place and are to be part of an unfunded, poorly conceived CLCWA project that may never happen. The CLCWA Master Plan for the OGC calls for a combination of large detention ponds (300ft.X 17ft. X 500ft.) that are positioned over smaller retention ponds (100ft.X 6ft. X 500 ft.) that will hold the effluent water from the proposed outflows. The CLCWA labels this "permanent" water good for fishing and boating. WOW! The CLCWA also states in their plan that these ponds will not be available for 12 years. The same question arises relative to the need for this capacity. Has the CLCWA submitted a request /justification for increased capacity? Have they asked TCEQ to approve dumping millions of gallons into a residential area? Is it possible the CLCWA is obsessed with development of the open land in the district and is manipulating the TCEQ to accomplish their unjustified goals? I might speculate they need this amendment for prospective builder/developers who are unable to build because CLCWA does not have enough outflow capacity to accommodate them. This application should not be approved by the TCEQ. Thank You.

Marisa Weber

From: PUBCOMMENT
Sent: Thursday, May 16, 2013 10:18 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

From: PUBCOMMENT-OCC
Sent: Thursday, May 16, 2013 7:22 AM
To: PUBCOMMENT
Subject: FW: Public comment on Permit Number WQ0010539001

*MWD
87424*

From: 8180fritz@gmail.com [<mailto:8180fritz@gmail.com>]
Sent: Wednesday, May 15, 2013 8:36 PM
To: donotReply@tceq.state.tx.us
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Chuck Howard

E-MAIL: 8180fritz@gmail.com

COMPANY: retired

ADDRESS: 16003 DIANA LN
HOUSTON TX 77062-4406

PHONE: 2814888180

FAX:

MWD

COMMENTS: On May 15, 2013, I received a copy of a letter from someone (unsigned) @TCEQ relative to amending permit WQ0010539001. It references a detailed map for the area in question (not included with letter). After repeated unsuccessful attempts to acquire a copy from the Clear Lake Water Authority (CLCWA), I am appealing to you for assistance. I live on the Old Golf Course (OGC) which was recently purchased by the CLCWA. My property abuts the OGC and I am assuming (sans map) this is where the CLCWA plans to dump the Grey/sewer water if and when "future ponds" ever materialize. The OGC is surrounded by fully developed subdivisions of 40 year old homes. It is populated by approximately 30,000 people whose property line will be 15 feet from the dumped grey /sewer water. This amendment is not recommended for approval. It would expose thousands of residents to biological hazards & mosquito breeding grounds not now present. The future ponds referenced are part of a controversial unfunded CLCWA plan for the OGC that is loosely scheduled to "start soon & be complete sometime in the next 12 years". This permit could not be physically implemented because it is not in sync with the ill conceived "future ponds" of the CLCWA. FYI a Sunset Review Bill (SB207) of the CLCWA is in progress and may end all their planning for the OGC and this permit amendment. I strongly recommend that you withdraw the permit request and place it in abeyance pending the outcome of the sunset legislation. This will save tax \$, avoid useless reviews of a poorly written ambiguous amendment and make it healthier for us old folks who live in the area. Rep. John Davis is aware of the blighted history of the CLCWA if you need more insight. I am a fifth generation Texan who has lived 40 of my 75 years on the OGC. Your help in this matter will be greatly appreciated.

March 19, 2015

RECEIVED

MAR 23 2015

COMPLIANCE & ENFORCEMENT

Mr Richard A. Hyde, P.E., Executive Director
Texas Commission on Environmental Quality
P. O. Box 13087
Austin, TX 78711-3087

REVIEWED

MAR 30 2015

By [Signature]

MWD
87424
HCHFB

H

Dear Mr. Hyde,

I am requesting the TCEQ to conduct a contested case hearing of the CLCWA proposed amendment of TPDES Permit No. WQ0010539001. I recommend disapproval, Eilene Kenney, 1719 Neptune Lane, Houston, TX 77062, 281-488-0653, ekenney2@comcast.net.

I am an "Affected Person". TCEQ approval of this amendment and CLCWA implementation of it will have a detrimental effect on me and my family in the following areas:

1. Health

My property abuts the old golf course where currently nonexistent massive ditches will be excavated and where 1,080,000 gallons per day of partially treated effluent water will slowly flow and pool in acres of man-made swampy wetlands and new retention ditches. This new effluent water hazard will be within 100 feet of my property line. I am 81 years of age and have a weakened immune system due to age.

Historically the TCEQ allows effluent water to be added to existing flowing bodies of water. This massive effluent water project adds effluent water to a (currently) non-existent dry detention ditch. A project this massive has never been added to a fully occupied residential area and TCEQ permitted in Texas. Therefore, the biological and health impacts are currently not quantifiable. The TCEQ cannot guarantee that the proposed quantity of partially treated effluent water will be safe for someone with my health conditions. It is my position that my health and possibly even life are endangered by the bacteria, germs, and hordes of mosquitoes that will appear if this permit is approved.

2. Finances

My FEMA flood insurance category will change to a more hazardous flood zone because of my properties new proximity to the effluent water. As a result, my annual costs rate will increase by 30%.

Per general discussions with local realtors, my property value will decrease by as much as 15% (estimated @ \$20,000 to \$30,000) during the CLCWA planned 15 year development period (excavation and construction) of this project.

My CLCWA District taxes will increase as the board issues new bonds to pay for this currently unfunded \$50 million project. As I am an 81 year old widow, I live on a limited income.

Please disapprove the amendment to Permit WQ0010539001.

Thank you,

Eilene Kenney

Eilene Kenney

March 19, 2015

TEXAS
COMMISSION
ON ENVIRONMENTAL
QUALITY

2015 MAR 7 PM 2:44
CHIEF OF STAFFS OFFICE

[Handwritten mark]


Mrs Eileen Kenney
1719 Neptune Ln
Houston TX 77062-6107



NORTH HOUSTON TX 77060

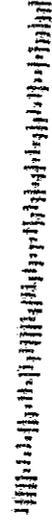
TEXAS
COMMISSION 20 MAR 2015 PM 2 L
ON ENVIRONMENTAL
QUALITY

2015 MAR 27 AM 2:45

Mr. ~~Richard~~ *Richard* A. Hyde, P.E.
Executive Director Environmental Quality
Texas Commission on
P.O. Box 13087
Austin, TX 78711-3087

RECEIVED
MAR 23 2015
TCEQ MAIL CENTER
CJ

78711308787



TCEQ Public Meeting Form
May 29, 2014

Clear Lake City Water Authority
Water Quality TPDES
Permit No. WQ0010539001

RECEIVED

MAY 29 2014

PLEASE PRINT

AT PUBLIC MEETING

Name: Eilene Kenney

Mailing Address: 1719 Neptune Lane, Houston 77062

Physical Address (if different): No

City/State: Houston TX Zip: 77062

This information is subject to public disclosure under the Texas Public Information Act

Email: ekenney2@comcast.net ✓

Phone Number: 281-488-0653

• Are you here today representing a municipality, legislator, agency, or group? Yes No

If yes, which one? Against the effluent water in my neighborhood

Please add me to the mailing list.

I wish to provide formal *ORAL COMMENTS* at tonight's public meeting.

I wish to provide formal *WRITTEN COMMENTS* at tonight's public meeting. ✓

(Written comments may be submitted at any time during the meeting)

Please give this form to the person at the information table. Thank you.

mcu

May 27, 2014

To Whom it May Concern:

My name is Elaine Kenney
I live at 1719 Neptune Lake,
Houston 77062. My husband
and I have lived at this
address for 45 years. Our
lot is adjacent to the ditch runs
back across and the ditch runs
back with my home to the
I have paid. I have to the
Clear Lake Water Authority CISO
and Houston all this time.

My family and I oppose
the 200 percent water to be
adjacent to my property
and neighborhood. It will
and public health risk to not
a public health risk to
only me and my family and
my hundreds of students
these schools.

RECEIVED
MAY 29 2014
Elaine Kenney ✓
Michael Kenney AT PUBLIC MEETING
Summer Kenney ✓

Marisa Weber

From: PUBCOMMENT
Sent: Wednesday, May 15, 2013 2:01 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

H

From: PUBCOMMENT-OCC
Sent: Wednesday, May 15, 2013 1:47 PM
To: PUBCOMMENT
Subject: FW: Public comment on Permit Number WQ0010539001

*MWJ
5/15/13
1:47 PM*

From: m73merlin@yahoo.com [<mailto:m73merlin@yahoo.com>]
Sent: Wednesday, May 15, 2013 1:40 PM
To: donotReply@tceq.state.tx.us
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Michael Merritt

E-MAIL: m73merlin@yahoo.com

COMPANY:

ADDRESS: 1638 BEACHCOMBER LN
HOUSTON TX 77062-5409

PHONE: 2814551742

FAX:

MWJ

COMMENTS: I have recently been informed of this permit via email from a opposition group to this development. The land in question runs through the middle of our community and neighborhood. I have concerns over the lack of public disclosure or discourse regarding the usage of the land for treated waste water. The community was led to believe the land would be developed for rain water run-off and drainage. We were suspicious of the size of the ditches required since they were so much larger than the current drainage system (which did not seem undersized 99% of the time). Now we have been enlightened that the land will also be absorbing 10 million gallons of treated waste water effluent. This is cause for some concern for reasons beyond just the obfuscation of the truth by the land owner. I would like to request a public hearing so that the residents in the community can be better informed about the water quality that is going to be dumped into our neighborhood, the continued safety of our greenspace for recreational use, and the destruction and potential reconstruction of the natural habitat that is already there.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Tuesday, April 07, 2015 8:14 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

RFR
H

*MWD
74424*

From: zxpeng37@gmail.com [mailto:zxpeng37@gmail.com]
Sent: Monday, April 06, 2015 5:56 PM
To: DoNot Reply
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Zhan X Peng

E-MAIL: zxpeng37@gmail.com

COMPANY:

ADDRESS: 15519 DIANA LN
HOUSTON TX 77062-4013

PHONE: 3143788233

FAX:

COMMENTS: I am requesting that the Executive Director of the TCEQ reconsider and amend the decision relative to TPDES Permit WQ0010539001. I believe that issues of public health, property use and economic impact have not been sufficiently considered. I am requesting a contested case hearing. I am also requesting that the TCEQ Commissioners conduct a contested review of TPDES Permit WQ0010539001.

MWD

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Thursday, July 25, 2013 8:26 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

H

From: tony_jean.peszko69@sbcglobal.net [mailto:tony_jean.peszko69@sbcglobal.net]
Sent: Wednesday, July 24, 2013 6:21 PM
To: donotReply@tceq.state.tx.us
Subject: Public comment on Permit Number WQ0010539001

MWD
7/24/13

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: MR Anthony Joseph Peszko

E-MAIL: tony_jean.peszko69@sbcglobal.net

COMPANY:

ADDRESS: 1637 BEACHCOMBER LN
HOUSTON TX 77062-5408

PHONE: 2814882402

FAX:

COMMENTS: I am requesting that a contested review be conducted by TCEQ concerning the Clear Lake City Water Authority request to modify permit Number WQ0010539001 to allow 10 million gallons per day of treated sewage effluent to be discharged into future detention ponds on the old clear lake city golf course. The Clear Lake City Water Authority has also requested a \$22 million bond issue which includes \$3 million to start detention pond construction that includes treated sewage water supply pipes to the new requested discharge

MWD

points on the old golf course. There has been no public notification concerning this bond issue and no public vote by affected citizens in the vicinity of the future detention ponds. This is gross injustice to the residents of the Oakbrook subdivision of Clear Lake City. Thank You, Anthony J. Peszko

①

TCEQ Public Meeting Form
May 29, 2014

Clear Lake City Water Authority
Water Quality TPDES
Permit No. WQ0010539001

PLEASE PRINT

Name: ANTHONY J. PESZKO

Mailing Address: 1637 BEACHCOMBER LANE
HOUSTON, TX 77062

Physical Address (if different): _____

City/State: HOUSTON, TX Zip: 77062

This information is subject to public disclosure under the Texas Public Information Act

Email: tony_jean.peszko69@sbcglobal.net ✓

Phone Number: 281-488-2402

• Are you here today representing a municipality, legislator, agency, or group? Yes No

If yes, which one? _____

Please add me to the mailing list. ✓

I wish to provide formal *ORAL COMMENTS* at tonight's public meeting. ✓

I wish to provide formal *WRITTEN COMMENTS* at tonight's public meeting. ✓

(Written comments may be submitted at any time during the meeting)

Please give this form to the person at the information table. Thank you.

RECEIVED

MAY 29 2014

AT PUBLIC MEETING

MW

**Comments Presented at TCEQ Public Meeting
against Permit WQ0010539001
May 29, 2014**

Anthony J. Peszko
1637 Beachcomber Lane
Houston, Texas 77062
Phone: 281-488-2402
tony_jean.peszko69@sbcglobal.net

RECEIVED
MAY 29 2014
AT PUBLIC MEETING

The Centers for Disease Control and Prevention (CDC) says antibiotic resistance is its top concern, and warns that antibiotic-resistant bacteria strains spread quickly through communities. These nightmare bacteria called “superbugs” are so tough that no antibiotics on earth exist that can cure their infections. One of the worst superbugs is Methicillin-Resistant Staphylococcus Aureus (MRSA), a bacterium that in 2005 killed nearly 19,000 people in the United States alone. Each year in the United States, at least 2 million people become infected by superbugs and at least 23,000 people die each year as a direct result of these infections, and many more die from complications caused by antibiotic-resistant infections.

Researchers in Europe and the United States identified MRSA in wastewater treatment plants. MRSA was found in 83 percent of the influent samples taken from all water treatment plants tested. Half of all the effluent wastewater samples taken in the United States were found positive for MRSA. Research demonstrated that extremely high numbers of antibiotic-resistant bacteria are released from municipal wastewater treatment plants, even when chlorine and other disinfection are performed. Furthermore, DNA already coded for antibiotic resistance has been proven to emerge from sewage plants. Since bacteria have three methods of exchanging genetic material, they can actively shop for the genes that protect them from antibiotics. This is why and how they can evolve antibiotic resistance so rapidly.

The concentrated mixture of bacteria and antibiotics reacting together in a confined space at wastewater treatment plants is a perfect environment for antibiotic resistance. Many experts believe that superbugs are born in sewage treatment plants, and treatment plants are the source of community-acquired MRSA.

A new study of New York City residents who contracted MRSA infections finds that these people’s homes were “major reservoirs” for the bacteria strains. So antibiotic-resistant “superbugs” that have long affected hospitals and other health care facilities around the world have now found a new “reservoir” location inside homes in the United States. The CDC reported that most MRSA strains are skin infections that are spread by physical contact, such as the sharing of towels or razors. It can be spread by contact with people, clothing, and pets. Schools,

gymnasiums, exercise facilities, swimming pools, physical training and other close-quarter living areas are at risk.

RECEIVED

MAY 29 2014

We are now living in a time where a simple cut or scratch received in your own home could become infected with antibiotic-resistant MRSA bacteria. Without antibiotic available to stop the rapid spread of a MRSA infection, a person could lose his arm, a leg, have a badly disfigured face, or even die from a MRSA infection.

AT PUBLIC MEETING

Based upon results obtained at wastewater treatment plants in the United States and Europe, it is highly likely that MRSA and other types of antibiotic-resistant bacteria are in the effluent from the Robert T. Savely Water Treatment Plant. Effluent from the Savely plant has never been tested for MRSA or any of the other known killer superbugs. In fact, the Robert T. Savely Waste Water Treatment Plant is routinely tested only for E. coli and Enterococci, but never tested for ciprofloxacin resistant E. coli, MRSA, or any superbug bacteria that are proven to exist in sewage effluent worldwide. Yet the CLCWA wants to put this untested effluent containing unknown quantities of antibiotic-resistant bacteria into our backyards via the new outfalls 002 and 003. The TCEQ should not approve these outfalls, but instead should order the CLCWA to test this effluent for all known types of antibiotic-resistant bacteria before the effluent flows into our old golf course. Let's find out what exactly is in this sewage effluent and how likely it is that we residents of the old golf course and the surrounding area will get very sick from it.

Concentrated effluent water continually flowing through a wetlands in a heavily populated area just a few feet from walking paths and less than 300 feet from peoples' homes is a completely new application for sewage effluent. This technique has never before been done in the state of Texas or anywhere else in the United States. The long term effects upon public health of living and playing next to open areas of concentrated effluent water containing many kinds of superbugs and other pathogenic bacteria are completely unknown. There have been no studies conducted by the TCEQ or other responsible agency to determine the safety of living next to effluent wetlands. There is no data and there are no statistics compiled to determine the safety of living near these effluent wetlands. What is the probability of getting a disease from this effluent openly stored within an urban environment? What the CLCWA wants to do and what the TCEQ is willing to go along with is a dangerous experiment using the residents of Clear Lake City as guinea pigs. No where else in the state of Texas has this ever been done. Where in Texas has the TCEQ ever approved effluent wetlands so close to homes and schools? Where in the United States have effluent wetlands in the heart of a populated urban area ever been attempted? What were the results upon public health five or ten years later? Nobody knows the answers to these questions. And yet the CLCWA wants to subject the residents of the Old Golf Course to this biological hazard! How dare the water authority experiment with our health and lives! This entire effluent wetlands

scheme that requires approval of a permit for two new effluent outfalls should be thrown out by the TCEQ since the intended use of this permit is not compatible with public health or common sense. This Grand Experiment upon the lives and health of our residents will be performed without their knowledge or consent. The TCEQ cannot in good conscience approve the permit for two new sewage effluent outfalls without at least testing this water for superbugs and other dangerous pathogens. People will be playing on the beach of the effluent lake, boating on effluent water, or wading through the effluent wetlands. We need to know what the effect on public health will be before the effluent flows and people come in direct contact with the superbug infested effluent.

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The CLCWA assures us that the effluent is perfectly safe because it meets state standards. But these quality standards for using reclaimed water only require testing for five day biochemical oxygen demand, turbidity, and 30-day geometric mean for E. coli bacteria and Enterococci bacteria. Current standards require no testing nor set any limits for the other fifty or so pathogenic bacteria strains found in effluent. Current standards do not require any testing or set any limits for MRSA or any of the other known superbugs that are found in effluent. There is no monitoring program for any of these pathogens. Today's standards are inadequate for the pathogen environment we now face since current standards were written in 1997 before the advent of widespread antibiotic-resistant superbugs. The TCEQ must look beyond current quality standards for reclaimed water and develop new quality standards that meet today's pathogen threat. The TCEQ should develop new reclaimed water quality standards that set numerical limits on specific superbug pathogen organisms, and develop monitoring programs for pathogens and superbugs such as MRSA at effluent outfalls and also downstream in the wetlands or lakes. It is imperative that the TCEQ develop new standards and monitoring procedures before approving the permit for two new sewage water outfalls 002 and 003 requested in TCEQ permit WQ0010539001. Until new standards are written, we request that the TCEQ disapprove this permit and the two new sewage water outfalls. We do not want to live in fear of a public health nightmare that the CLCWA wants to put in our backyards.

Technology has existed for many years that can cleanse wastewater effluent of superbugs and all other types of bacteria through the use of reverse osmosis. The TCEQ should require that all sewage effluent intended for direct contact with people, or where people may be reasonably expected to come in contact with the effluent, be processed through state of the art micro filtration, reverse osmosis, and ultraviolet light and hydrogen peroxide treatments. This modern method is actually used in Orange County, California, to recharge groundwater. It completely removes antibiotic-resistant and other types of pathogenic bacteria from treated wastewater without using potentially dangerous chemicals.

The CLCWA's permit application for two new sewage effluent outfalls into our Old Golf Course is a bad idea. Please do not allow our area to become the next

victim of an infectious disease outbreak. Please use common sense and disapprove this permit for two new sewage effluent outfalls that will bring 2.2 million gallons per day of untested effluent into our community. Please defend us from this health hazard the CLCWA is now creating.

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Methicillin-Resistant Staphylococcus Aureus (MRSA) Wastewater Pathogens and Antibiotic Resistance

Presented by:
Anthony J. Peszko
1637 Beachcomber Lane
Houston, Texas 77062
Phone: 281-488-2402
tony_jean.peszko69@sbcglobal.net
Reference TCEQ Permit Number: WQ0010539001

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Methicillin-Resistant Staphylococcus Aureus (MRSA)

The Centers for Disease Control and Prevention (CDC) lists antibiotic resistance among its top concerns, and warns that resistant bacteria strains can spread quickly through communities. Some bacteria, commonly called "superbugs" are so tough that no antibiotics exist that can cure their infections. The poster-child superbug is Methicillin-Resistant Staphylococcus Aureus (MRSA), a bacterium that in 2005 killed nearly 19,000 people in the United States alone.

Using reclaimed water to irrigate lawns, parks, gardens, and various other types of landscaping is common in the Clear Lake area and in many communities across the United States, particularly in areas prone to water shortages and drought. But a new study headed by researchers from the *University of Maryland* School of Public Health suggests that this practice may no longer be safe, as antibiotic-resistant "superbugs" like MRSA are now being detected in both influent and effluent water samples at wastewater treatment plants nationwide.

Swedish researchers have identified the presence of MRSA in wastewater treatment plants in Sweden. A study conducted in November, 2012 confirmed the presence of MRSA in U.S. facilities. Because infected people can shed MRSA from their nostrils and skin and through their feces, MRSA was found in a staggering 83 percent of the influent samples taken from all water treatment plants tested, indicating that this is a widespread problem of superbug contamination that is occurring in more places than just hospital rooms. Half of all the effluent wastewater samples taken from each of the waste water treatment plants tested in the United States were found to be positive for MRSA, while a similar pathogen known as Methicillin-Susceptible *Staphylococcus Aureus* (MSSA) was detected in 55 percent of all the collected samples. Ninety-three percent of the MRSA strains that were isolated from the wastewater and 29 percent of MSSA strains were resistant to two or more classes of antibiotics, including several that the U.S. Food and Drug Administration has specifically approved for treating MRSA infections.

DNA already coded for antibiotic resistance has been proven to emerge from sewage plants. Bacteria are promiscuous and have three methods of exchanging genetic material. This is why and how they can evolve antibiotic resistance so rapidly. They actively shop for the genes that protect them from antibiotics. The fact that DNA can travel through sewage plants unscathed should sound a disturbing alarm to all of us.

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Since MRSA, MSSA, and various other potentially-deadly superbugs can persist in the effluent beyond the various wastewater treatment phases, anywhere the treated water ends up getting sprayed, such as sports fields, grassy knolls, and other common areas frequented by families with children, is also being potentially doused with killer bacteria. Communities that recycle water for irrigation or recreation could be creating a major public health hazard. These findings raise potential public health concerns for wastewater treatment plant workers and individuals exposed to reclaimed wastewater since they could be exposed to these deadly superbugs.

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"Recycled" water is a term invented by developers and politicians, not geologists. "Recycled" might be more accurately described as partially-treated sewage effluent. Recycled water is not fresh water. Its use in public spaces has been controversial from the beginning because too many dangerous compounds, pollutants and pathogens are allowed, by law, to remain in it. Recycled water is not necessarily safe and carries substantial potential risks to health. Recycled water needs to be defined as ONLY water, with nothing else in it. If fresh water implies pure, meaning no contaminants and only the molecule H₂O, then contaminated water similarly should be recycled to exactly the same level.

Most sewage treatment plants employ old technologies to 'clean' sewage. A few, like the Ground Water Replenishment System in Orange County, California use advanced micro-filtration, reverse osmosis, and a combination ultraviolet light and hydrogen peroxide treatment to remove virtually all of the problems plaguing 'recycled' water. Harris County, Texas does not have a single reverse osmosis plant.

Sewage treatment plants that do not use reverse osmosis permit a whole host of pollutants to pass through the process unscathed. For example, all sewage treatment plants in Texas are permitted by law to allow a surprising amount of active pathogens AFTER treatment. In other words, not all bacteria and viruses are required to be removed and recycled water may contain active pathogens, the bugs that cause disease. The law allows some of them through.

But the problem is much more serious. Every sewage treatment plant receives material from a wide area. This includes waste from all of the sick people (not to mention animals) who live at home as well as all the sick people in hospitals and nursing homes. Sick people take a lot of dangerous drugs (and so do some

domestic animals). All of those drugs are eventually excreted and travel to the sewage treatment plant.

The sewage plant also receives all of the pathogens from the same area. This is especially troubling with bacteria. All bacteria excreted within the service area of any sewage treatment plant mix with ALL of the antibiotics in a confined space at the wastewater treatment plant. The resulting brew is a perfect recipe for antibiotic resistance. Many educated observers of sewage treatment plants suspect that super bugs are born in sewage treatment plants and are the source of community-acquired MRSA.

A new study of New York City residents who contracted MRSA infections finds that these people's homes were "major reservoirs" for the bacteria strains. So now an antibiotic-resistant "superbug" that has long affected hospitals and other health care locations around the world has now found a new "reservoir" location inside homes in the United States. According to a report released by the CDC last September, more than 2 million Americans get drug-resistant infections each year. And about 23,000 die from these diseases that are increasingly resistant to the strongest antibiotics that doctors use to fight the infections.

The Centers for Disease Control and Prevention reported that most MRSA strains are skin infections that are spread by physical contact, such as the sharing of towels or razors. It can be spread by contact with clothing, pets, and other animals. Schools, exercise facilities, physical training and other close-quarter living areas are especially vulnerable.

We are now entering a time where a simple cut or scratch received in your own home could become infected with antibiotic-resistant MRSA bacteria. With no antibiotic available to stop the rapid spread of this MRSA infection, a person could lose his arm, a leg, have a badly disfigured face, or even die. This is the reality we are now faced with.

And this situation is spiraling out of control. Recently, the Acinetobacter bacteria has drawn attention and earned a bad reputation. A January report from the Infectious Disease Society of America said that a particular strain, Acinetobacter baumannii, along with other microbes called Pseudomonas aeruginosa and Klebsiella pneumoniae, could soon rival MRSA as a killer. These bacteria are also found in treated sewage water all over the world.

Based upon these results obtained at waste water treatment plants in the United States and Europe, it is highly likely that MRSA and other kinds of dangerous antibiotic-resistant bacteria will be found in effluent from the Robert T. Savely Water Treatment Plant. Effluent from the Savely plant has never been tested for MRSA or any of the other known killer superbugs discussed above. The Clear Lake City Water Authority (CLCWA) wants to pump this effluent 24 hours per day, 7 days per week, and 365 days per year into the heart of our community via

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the two new sewage water outfalls 002 and 003 requested in TCEQ permit WQ0010539001. These new outfalls will bring MRSA superbugs and other pathogens into our backyards on the old golf course. People will come in direct contact with the sewage effluent by playing on the effluent lake beach, boating on effluent water, or wading through the effluent wetlands. Since MRSA is spread by contact with clothing and people, it is easy to see how a terrible public health disaster can occur.

Members of the TCEQ, please recognize that the CLCWA's request for two new sewage effluent outfalls into our Old Golf Course is a bad idea. Please do not allow our area to become the next victim of an infectious disease outbreak. Please use common sense and do the right thing. Disallow the CLCWA request for two new sewage effluent outfalls that will bring 2.2 million gallons per day of this disease laden effluent into our neighborhood. Please defend us from this health hazard the CLCWA is now creating.

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Wastewater Pathogens

Research in the United States and Europe has demonstrated that ~~expensive~~ ^{APPLICABLE} numbers of antibiotic-resistant bacteria are released from municipal wastewater treatment plants, even when disinfection is performed. Disinfection of wastewater does not adequately inactivate antibiotic-resistant bacteria in treated municipal wastewater. Although a 99% inactivation looks encouraging, 1% of a very large number (50 trillion) still represents a very large number (0.5 trillion) of antibiotic-resistant bacteria that are released each day from a 10 million gallon per day waste-water treatment facility such as the Robert T. Savely Waste Water Treatment Plant. 0.5 trillion microscopic bacteria contained in 10 million gallons of sewage effluent yields 50 toxic bacteria in each gallon of treated sewage water. Most bacteria are pathogens or are related to pathogens and many are resistant to multiple antibiotics. More than 50% of these bacteria harbor genes that are encoded for tetracycline resistance. These bacteria frequently harbor genes that allow bacteria to accumulate multiple genes for antibiotic resistance. Some of these bacteria can transfer their resistance to other bacteria. Lateral gene transfer is the exchange of genetic material between different bacteria; it allows bacteria to share their abilities to resist antibiotics. For example, lateral gene transfer of ciprofloxacin resistant E. coli is particularly worrisome because this trait occurs in more than 40% of bacteria strains. Simply put, municipal wastewater contains some of the most antibiotic-resistant bacteria that exist. These organisms must be prevented from reaching the environment,

But what the Clear Lake City Water Authority (CLCWA) wants to do is deliberately inject 0.5 trillion antibiotic-resistant pathogens into the old Clear Lake City golf course detention ditches as a continuously flowing stream via their newly requested sewage water outfalls 002 and 003 referenced in TCEQ Permit WQ0010539001. This effluent that has been tested only for E. Coli and Enterococci and never tested for any antibiotic-resistant bacteria will flow into a main channel that is 6 feet deep and at least 20 feet wide. From this main channel the effluent will flow out over 100 feet to form the shallow areas of wetlands. These effluent wetlands will occupy 39 acres at the bottom of the detention ditches. This effluent will flow continuously, 24 hours per day, 365 days per year. At 50 pathogenic bacteria in each gallon of Robert T. Savely Water Treatment Plant effluent, residents who are boating or playing on the beach at the new detention ditch park will come in direct contact with these pathogens.

At first glance, the most obvious solution to the problem of antibiotic-resistant bacteria in treated municipal wastewater would be to require more stringent disinfection. The majority of municipal wastewater is disinfected using chlorine. But chlorine poses a security risk since chlorine gas is very dangerous and generates disinfection by-products that are known carcinogens. Thus more stringent waste-water disinfection regulations using greater quantities of chlorine

are not warranted due to these unwanted consequences. Instead, waste-water effluents should be passed through state of the art micro- filtration, followed by a reverse osmosis process, and finally an ultraviolet light and hydrogen peroxide treatment. This method, which is actually used in Orange County, California to recharge ground water supplies, can physically remove antibiotic-resistant bacteria from treated wastewater without using potentially dangerous chemicals. At the present time micro-filtration and reverse osmosis are rarely used in wastewater treatment, but they are commonly used at drinking water treatment facilities, so the technology is well-developed and well-understood. (See Reference 1)

Antimicrobial resistance is one of our most serious health threats. Infections from resistant bacteria are now too common, and some pathogens have even become resistant to multiple types or classes of antibiotics. The loss of effective antibiotics will undermine our ability to fight infectious diseases and manage the infectious complications common in vulnerable patients undergoing chemotherapy for cancer, dialysis for renal failure, and surgery, especially organ transplantation, for which the ability to treat secondary infections is crucial.

When first-line and then second-line antibiotic treatment options are limited by resistance or are unavailable, healthcare providers are forced to use antibiotics that may be more toxic to the patient and frequently more expensive and less effective. Even when alternative treatments exist, research has shown that patients with resistant infections are often much more likely to die, and survivors have significantly longer hospital stays, delayed recuperation, and long-term disability. Efforts to prevent such threats build on the foundation of proven public health strategies: immunization, infection control, protecting the food supply, antibiotic stewardship, and reducing person-to-person spread through screening, treatment and education.

As a minimum, the TCEQ must demand that the effluent from the Robert I. Savelly Water Treatment Plant be tested for antibiotic-resistant bacteria. This testing must be thorough for all types of known antibiotic-resistant bacteria. This testing must be completed and the results thoroughly understood before the CLCWA request for additional outfalls 002 and 003 are approved by the TCEQ. In the name of common sense, we ask the TCEQ to disapprove the CLCWA's request for outfalls 002 and 003 that would continuously dump bacteria laden sewage water into the heart of our community.

Source: Dr. Tom Frieden, MD, MPH
Director, U.S. Centers for Disease Control and Prevention
Meeting the Challenges of Drug-Resistant Diseases in Developing Countries
Committee on Foreign Affairs Subcommittee on Africa, Global Health, Human Rights, and International Organizations
United States House of Representatives April 23, 2013

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The Threat Of Antibiotic Resistance

Antibiotic resistance is a worldwide problem. New forms of antibiotic resistance can cross international boundaries and spread between continents with ease. Many forms of resistance spread with remarkable speed. World health leaders have described antibiotic-resistant microorganisms as “nightmare bacteria” that “pose a catastrophic threat” to people in every country in the world.

Each year in the United States, at least 2 million people acquire serious infections with bacteria that are resistant to one or more of the antibiotics designed to treat those infections. At least 23,000 people die each year as a direct result of these antibiotic-resistant infections. Many more die from other conditions that were complicated by an antibiotic-resistant infection.

In addition, almost 250,000 people each year require hospital care for *Clostridium difficile* (*C. difficile*) infections. In most of these infections, the use of antibiotics was a major contributing factor leading to the illness. At least 14,000 people die each year in the United States from *C. difficile* infections. Many of these infections could have been prevented. (See Reference 2)

The report, *Antibiotic resistance threats in the United States, 2013* gives a first-ever snapshot of the burden and threats posed by the antibiotic-resistant germs having the most impact on human health.

Each year in the United States, at least 2 million people become infected with bacteria that are resistant to antibiotics and at least 23,000 people die each year as a direct result of these infections. Many more people die from other conditions that were complicated by an antibiotic-resistant infection.

Antibiotic-resistant infections can happen anywhere. Data show that most antibiotic-resistant infections occur in the general community; however, most deaths related to antibiotic resistance happen in healthcare settings such as hospitals and nursing homes. (See Reference 3)

The results of microbiological analyses confirmed the high efficiency of removal of indicator bacteria in the process of sewage treatment from 94 to 97%. However, after the final phase of purification in stabilization ponds, the following pathogenic bacteria were still identified in sewage effluent with the use of the EPL 21 tests: *Escherichia coli*, *Enterobacter agglomerans*, *Enterobacter aerogenes*, *Enterobacter cloacae*, *Enterobacter georgioriae*, *Citrobacter freundii*, *Klebsiella pneumoniae*, *Klebsiella oxytoca*, *Klebsiella ozaenae*, *Erwinia herbicola*, *Edwardsiella tarda*, *Serratia odorifera*, *Serratia marcescens*, *Providencia alcalifaciens*, *Hafnia alvei*, *Yersinia pestis*, *Yersinia pseudotuberculosis*, *Yersinia*

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fredericksenii, Salmonella spp., Shigella dysenteriae, Aeromons hydrophila, Pseudomonas aeruginosa.

These results show that although the sewage purification system is efficient and reduces the contamination load to the level required by state regulations and removes a great percentage of indicator bacteria, the "purified" sewage may in fact be a source of pathogenic bacteria in inland waters. (See Reference 4)

It is clear that except for Escherichia coli, the Robert T. Savely Waste Water Treatment Plant is never tested and has never been tested for any of the above bacteria that are proven to exist in sewage effluent. Now is the time for the TCEQ to order the CLCWA to test for all of the above bacteria before the effluent is dumped into our old golf course. Before Permit WQ0010539001 is approved, let's find out what exactly is in this sewage effluent and how likely is it that we residents of the old golf course and surrounding areas will get very sick from it. No one knows what the effect of long term exposure to this concentrated effluent will be. When the pathogens and superbugs in this effluent multiply in the shallow water of the wetlands, extremely high concentrations of these deadly bacteria can develop. Common sense tells us that this is not a very good situation for people living near the old golf course. The TCEQ cannot in good conscience approve the request for two new sewage effluent outfalls without at least getting answers to these questions.

Treated sewage effluent is not safe for people to come in contact with. The CLCWA is dishonest by not informing themselves and the public about the kinds and types of pathogenic bacteria present in treated wastewater from the Robert T. Savely Water Treatment Plant. There is a public health disaster looming for the residents of our area unless the TCEQ disapproves the CLCWA's request to bring these disease pathogens into the heart of Clear Lake City via two new sewage water outfalls described in TCEQ Permit WQ0010539001.

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Giardia Facts

The wide occurrence of cysts in humans and animals suggests that soil can be contaminated with Giardia through fecal deposition and sewage disposal practices. Municipal waste waters always contain Giardia cysts. Giardia is distributed worldwide in lakes, ponds, rivers, and streams.

Reported Giardia levels have ranged from 10,000 to 100,000 cysts/L in untreated sewage, 10 to 100 cysts/L in treated sewage, and 10 or few cysts/L in surface water sources and tap water. Cysts have also been detected in cisterns and in wells contaminated by surface water or sewage. Levels are generally higher in water sources influenced by agriculture (e.g., cattle or dairy farming) or municipal and residential wastewater discharges.

Giardia cysts are highly infective. As few as ten human-source Giardia cysts produced infection in a clinical study of male volunteers. The incubation period (time interval between ingestion and the first appearance of symptoms) can range from 3 to 25 days.

Giardiasis is the most commonly reported intestinal protozoan infection worldwide; an estimated 200 million people are infected each year. In the United States, *G. lamblia* is the most frequently identified parasite in stool specimens submitted for parasitological evaluation. Dogs are frequently found infected.

Giardia can be an important cause of endemic and epidemic waterborne illness. In the United States, increased risks have been found in populations where surface water sources are not filtered, persons who use shallow well water systems, persons who drink contaminated water while picnicking, camping, and hiking, and persons who accidentally ingest water during swimming and other water recreational activities. (See Reference 5)

Researchers have detected parasitic protozoans in the effluent discharged from waste water and drinking water treatment plants, as well as in the water in recreational areas. The protozoans studied, which are members of the *Cryptosporidium* and *Giardia* genres, cause intestinal upsets in cattle and immunosuppressed people. These parasites can easily survive our water treatment systems.

The results of the study, which has been published in the journal *Water Research*, reveal that *Cryptosporidium* and *Giardia* are widely distributed in the environment, and also highlight the ineffectiveness of the treatments used to reduce and deactivate these parasites.

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It is not easy to find a definitive solution to these water-borne infections, which are found all over the world. Since the parasites can overcome the normal water treatment systems used in waste water and drinking water treatment plants, there are frequent outbreaks of epidemics, even in developed countries. 403,000 people were infected by this protozoon in Milwaukee in 1993. (See Ref. 6)

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Among water-borne pathogens, protozoa of the genera *Giardia* and *Cryptosporidium* are known to be highly resistant to water treatment procedures and to cause outbreaks through contaminated raw or treated water. The overall removal efficiency of cysts in the treatment plants range from 87.0 to 98.4%

Giardiasis and cryptosporidiosis are also common infections of domestic and wild animals, which shed a large number of cysts and oocysts in the environment. These cysts are insensitive to disinfectants at the concentration commonly used in water treatment plants to reduce bacterial contamination, although it has been shown that at higher concentrations of chlorine and ozone, *Giardia* cysts are less resistant than *Cryptosporidium* oocysts. Moreover, *Giardia* cysts have been shown to survive in water for up to 2 months at temperatures as low as 8°C, and *Cryptosporidium* oocysts can survive for up to 1 year at 4°C in artificial seawater. Furthermore, the infectious dose has been estimated to be as low as 10 cysts for *Giardia* and 30 oocysts for *Cryptosporidium*.

The overall removal efficiency of *Giardia* cysts in four waste water treatment plants studied was 94.5, 87.0, 96.0, and 98.4% in plants 1, 2, 3, and 4, respectively. The removal efficiency when comparing untreated wastewater samples to those after secondary treatment was 94.5, 72.1, 86.4, and 88.0% for plants 1, 2, 3, and 4, respectively. (See Ref. 7)

This report shows more evidence of how little is actually known about the effluent of the Robert T. Savely Waste Water Treatment Plant. No one knows or routinely tests for *Giardia* in the sewage effluent. Even if 99% of *Giardia* cysts are removed by the Savely plant, there will still be billions of these cysts accumulating in the detention ditches that will be fed by new sewage water outfalls 002 and 003 referenced in TCEQ Permit WQ0010539001. Allowing these pathogens into the heart of our community will eventually result in a major public health crisis. It is incumbent on the TCEQ to look beyond current quality standards written in TCEQ Chapter 210, paragraph 210.33, Quality Standards for Using Reclaimed Water. These standards were written in 1997 before the advent of superbugs. After reviewing these papers it is clear that these standards are inadequate for the pathogen environment we face today. The TCEQ should take the lead in developing new quality standards with numerical limits for superbugs and other pathogenic bacteria found in reclaimed water that will protect the public in today's dangerous pathogen conditions. And most importantly, the TCEQ must develop monitoring methods that adequately and regularly test for these pathogens in the shallow wetland areas where these pathogens will accumulate, grow and multiply. Please TCEQ, develop these new

standards before you approve Permit WQ0010539001. Until that is accomplished, we the residents of the old golf course request that the TCEQ disapprove the CLCWA's request for two new sewage water outfalls per TCEQ Permit WQ0010539001. Why must we live in fear of a public health environment nightmare that the CLCWA wants to put in our backyards?

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Wastewater Treatment Plants Breed Superbugs

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Some bacteria at sewage treatment plants are becoming resistant to antibiotics and are winding up in the environment. A wastewater treatment plant's job description is pretty straightforward: Remove contaminants from sewage so it can be returned to the environment without harming people or wildlife. But a new study suggests that the treatment process can have an unintended consequence of promoting the spread of extra-hardy bacteria.

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Some bugs are resistant to antibiotics, so they dodge the medical bullets that wipe out others. The more antibiotic drugs that are used, the more robust the bacteria become. Bacteria reproduce quickly. One micro-organism might turn into a billion overnight. And since bacteria share DNA with others, antibiotic-resistant genes spread like Darwinian wildfire when conditions are right.

And at sewage treatment plants, it seems, the conditions are right, said microbiologist Chuanwu Xi, whose University of Michigan lab conducted the study.

"Wastewater treatment plants are most effective at treating sewage when they have conditions that allow beneficial bacteria to thrive and improve the quality of the water," said Karen Kidd, a University of New Brunswick ecotoxicologist familiar with the study.

"However, this study indicates that these conditions can also favor the mutation of some and act as a source of antibiotic resistant bacteria to the environment."

"To me," she added, "that's sobering."

These "super" organisms in the treated sewage wind up in rivers and other waters, potentially infecting people with infections that are difficult to treat.

To determine if sewage-treatment plants might be a source of resistant bugs, Chuanwu and fellow researchers collected several species of the common bacteria *Acinetobacter* from a plant in Ann Arbor, Mich. that dumps its effluent into the Huron River.

They exposed the bacteria to various antibiotics and cocktails of drugs, and found a significant increase in the percentage of *Acinetobacter* that were resistant after each stage of treatment. And while the final treatment process killed all but a tiny fraction of the bugs before releasing the water to the environment, the proportion of resistant bacteria was much higher among those that made it back to the river than those collected upstream from the plant.

The bacteria were as much as 10 times more resistant to some antibiotics after secondary treatment at the Michigan plant. Also, in the river downstream of the

plant, they were up to 2.7 times more resistant than bacteria upstream, according to the study. Chuanwu said people and wildlife that swim in or drink from the Huron River downstream may be exposed to the more stalwart strains.

Acinetobacter were chosen for their "remarkable ability" to develop resistance to antimicrobial agents, according to the Michigan study, which was published online in March in the journal *Science of the Total Environment*. The bacterium can cause pneumonia along with serious infections in wounds and in the bloodstream, according to the Centers for Disease Control and Prevention.

"We don't know whether other bacteria would respond to the treatment process in the same way the *Acinetobacter* did," Chuanwu said. "We have some unpublished data suggesting a similar trend of resistance increase among all bacterial populations."

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Past studies have examined the link between wastewater treatment and antibiotic resistance, but this is the first to look simultaneously at a plant and the water body that receives its effluent.

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At sewage treatment plants, operators intentionally create conditions that promote growth of micro-organisms in wastewater because they break down organic matter. In oxygenated waters with plenty to eat, those beneficial bacteria thrive and reproduce quickly. But so do their more harmful cousins. And because treatment plants create far higher densities of bacteria than exist in the environment, "they could very likely increase gene transfer among micro-organisms," Chuanwu said.

Before the bacteria can build resistance, though, they have to be exposed to antibiotics. That's where the average citizen comes in. When people take antibiotics, a good deal of the drugs head to the treatment plant when toilets are flushed. The same is true when they dump unused medicine down drains.

"Most antibiotics are pretty stable, so up to 90 percent of them end up in the wastewater," said Chuanwu. "In order to deal with this problem, we need to think about how to wisely reduce the use of antibiotics."

The CDC lists antibiotic resistance among its top concerns, and warns that resistant strains can spread quickly through communities. Some bacteria, commonly called "superbugs," are so tough that no antibiotics exist that can cure infections.

The poster-child superbug is methicillin-resistant *Staphylococcus aureus*, or MRSA, a bacterium that in 2005 killed nearly 19,000 people in the United States alone. But more recently, the *Acinetobacter* bacteria have drawn attention and

earned a bad reputation. A January report from the Infectious Disease Society of America said that a particular strain, *Acinetobacter baumannii*, along with other microbes called *Pseudomonas aeruginosa* and *Klebsiella pneumoniae*, could soon rival MRSA as a killer. It has also become notorious as a common infector and occasional killer of soldiers and veterans of the Iraq and Afghanistan wars.

Treatment plants do a fine job of removing most pollutants, said Jeff Cowles, an environmental engineer who used to oversee treatment plants for the Michigan Department of Environmental Quality, but they're ill-equipped to get rid of so-called "microconstituents" like pharmaceuticals, pesticides and nanoparticles.

"And we just don't know what's happening to them once they enter the system," Cowles said. "It's reminiscent of the 1950s when DDT was going into the environment. We just assumed that it was going away, but it wasn't going away."

Cowles called the study's findings "very surprising" and said if they are accurate, "that's pretty significant," he said. "That particular facility puts out one of the cleanest effluents in the country. If they're really showing that, then that's a wakeup call."

"Wastewater operators are concerned" about antibiotic resistance, Cowles said, "but it's a matter of needing research."

It's also a matter of cost.

Treatment plants use chlorine or ultraviolet light, or both, to kill microorganisms before discharging effluent to the environment, and although "in general, it's relatively safe," neither method kills all bacteria, Cowles said. For the right price, though, plant operators could wipe them out through reverse osmosis or the use of activated carbon.

"Is it possible to sterilize it? Of course," he said. A project in Orange County, Calif., for example, uses reverse osmosis and other advanced technologies to render sewage discharge pure enough to recycle as drinking water.

"The environment provides the opportunity for infection no matter where you are, upstream or downstream," he said.

Meanwhile, according to Steitz, there's an ongoing arms race between superbugs and the medical world. (See Reference 4)

Since superbug disease organisms are present in treated sewage water, one very good way to prevent these antibiotic-resistant pathogens is to not allow them to be present in the first place. The CLCWA is on record wanting to bring these pathogens into our community via a new 12 inch diameter pipeline flowing 2.2 million gallons per day into the old golf course of Clear Lake City. The

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CLCWA dismisses any criticism of their plan by saying that the treated sewage water "exceeds state standards", that "it is used to water area golf courses", that "it is clear looking water", that "it does not smell", that "it is used in the San Antonio Riverwalk". But the CLCWA does not test to determine the level of antibiotic-resistant pathogens mentioned above that are probably in the effluent of the Robert T. Savely Water Treatment Plant. They have no factual evidence. They just wave their hands and say relax, there is no problem with their effluent. Well common sense tells us that the real life situation is much more complicated than the CLCWA will admit. Please TCEQ, do not allow the CLCWA to put these dangerous micro-organisms in our environment. Please disapprove the CLCWA permit for two new sewage outfalls to put sewage water superbugs on our old golf course.

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Municipal Wastewater Treatment: A Novel Opportunity to Slow the Proliferation of Antibiotic-Resistant Bacteria?

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by Timothy M. LaPara, Sara J. Firl, Leslie J. Onan, Sudeshna Ghosh, Tao Yan, and Michael J. Sadowsky

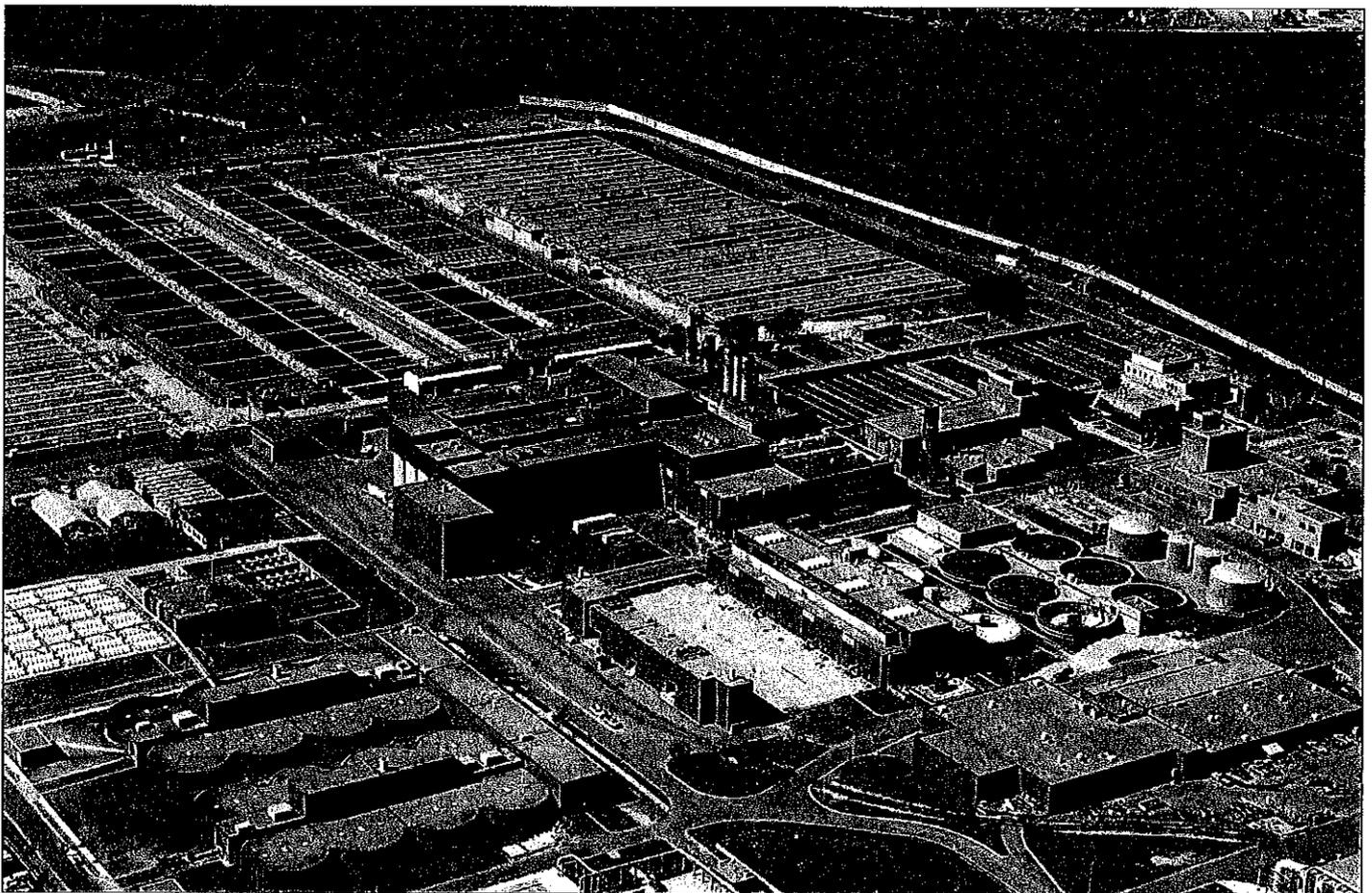


Photo © The Regents of the University of Minnesota, 2006. Used with permission of the Metropolitan Design Center.

Located on the Mississippi River in St. Paul, the Metropolitan Wastewater Treatment Facility is the largest treatment plant in Minnesota, averaging 180 million gallons of wastewater daily from 62 communities and 800 industries.

The discovery of antibiotics and their subsequent application to clinical medicine is one of the outstanding scientific achievements of the twentieth century. The tale of how antibiotics were discovered is one of scientific legend: Sir Alexander Fleming astutely recognized that a contaminated Petri dish actually contained a bacteria-killing mold. For his discovery of penicillin, Fleming shared the 1945 Nobel Prize in physiology/medicine with Sir Howard Florey and Ernst B. Chain.

The unique feature of penicillin (and other antibiotics) is not merely that it kills

bacteria—there are many compounds that have such a capability—but that it specifically affects bacteria. This key feature is absolutely critical for the medical application of antibiotic therapy. Antibiotics administered to humans are lethal to disease-causing bacteria but do not impact the patient. This is possible because antibiotics act on features of the bacterial cell that are absent in humans. For example, penicillin prevents the formation of new bacterial wall materials; human cells do not even contain a cell wall.

During the last half-century, antibiotics have become pervasive in human

medicine. Since the discovery of penicillin, a plethora of new antibiotics, semi-synthetic antibiotics, and synthetic antibiotics (antibacterials) have been discovered or developed (Table 1). These new drugs target different features of bacterial physiology, thus expanding the range of bacterial species that can be successfully treated with antibiotics. Antibiotics are also used extensively in agriculture and for other non-medical purposes. Low doses of antibiotics are often included in animal feed to promote growth and increase weight gain, as well as prevent the onset of

Table 1. Major Classes of Antibiotics and Antibacterials, and Representative Drugs In Each Class

Class	Representative Drug(s)
β -lactams	Penicillin, Amoxicillin, Methicillin
Aminoglycosides	Streptomycin, Neomycin, Kanamycin, Gentamicin
Macrolides	Tylosin, Erythromycin
Ketolides	Telithromycin
Tetracycline	Tetracycline, Oxytetracycline
Lincosamides	Clindamycin
Ansamycins	Rifampin
Glycopeptides	Vancomycin
Quinolones/fluoroquinolones	Nalidixic acid, Ciprofloxacin
Sulfonamides	Sulfamethoxazole

disease. Although reliable estimates are difficult to obtain, most scientists believe that approximately 70% of all antibiotics are used for agricultural purposes.

In this article, we report on a research project that investigated the role of municipal wastewater treatment facilities in the spread or control of antibiotic-resistant bacteria. The project was supported by a grant from CURA's Faculty Interactive Research Program, as well as grants from the Undergraduate Research Opportunity Program at the University of Minnesota. We hypothesized that the disinfection processes most treatment facilities use would adequately inactivate antibiotic-resistant bacteria in wastewater. However, our research suggests that treatment facilities, which are primarily designed to protect water quality, do not adequately prevent resistant bacteria from being released into the environment. We conclude that relatively simple changes in the design, operation, and regulation of municipal wastewater treatment facilities could substantially reduce the release of these bacteria and, we hope, slow the proliferation of antibiotic resistance among bacteria appearing in clinical patients.

A Brief History of Antibiotic Resistance

Antibiotic-resistant bacteria were discovered soon after the medical use of penicillin began. At the time, the development of resistant bacteria was largely viewed as inconsequential. If a patient had an infection that a resistant bacterium caused, then an alternative antibiotic was always available for effective treatment. However, some foresighted scientists warned of the pending

problem of antibiotic resistance. In his Nobel acceptance speech, Alexander Fleming himself cautioned doctors about the danger of giving an "underdosage" of penicillin, noting: "It is not difficult to make microbes resistant to penicillin in the laboratory by exposing them to concentrations not sufficient to kill them, and the same thing has occasionally happened in the body . . . Moral: If you use penicillin, use enough."

The pioneering work of Stuart Levy in the 1970s was also informative. Levy was concerned that antibiotic use in agriculture at subtherapeutic concentrations could lead to the proliferation of antibiotic resistance. His research demonstrated that tetracycline-resistant bacteria were present in the droppings of chickens within one week after tetracycline was included in their feed. More alarming, however, the bacteria in chickens that were fed only tetracycline became resistant to multiple antibiotics within two weeks. Finally, multiple-antibiotic-resistant bacteria dominated the fecal material of farmers working with these chickens within five months, even though the farmers had received no antibiotics during the study.

It was not until the 1980s, however, when a multiple-drug-resistant form of tuberculosis emerged, that scientists became concerned about antibiotic resistance. Multiple-drug resistance soon appeared among other pathogens, particularly among nosocomial (hospital-acquired) infections. Today, 40% to 60% of nosocomial *Staphylococcus aureus* infections are methicillin resistant. The problem of antibiotic-resistant bacteria is particularly significant for immunodeficient

patients, who are susceptible to a broader array of pathogens, many of which are multiple-drug resistant.

Many believe that the problem is linked to excessive antibiotic use in hospitals, making them a "hot spot" for resistant bacteria. Unfortunately, mounting evidence refutes this perspective. Community-acquired methicillin-resistant *Staphylococcus aureus* is becoming far more prevalent, particularly at public gymnasiums, where insufficiently sanitized towels are prevalent.

The Development of Antibiotic Resistance in Bacteria

The simplest method by which bacteria become resistant to antibiotics is via a *point mutation* of the deoxyribonucleic acid (DNA) within their genome. Point mutations are typically lethal to the bacterium or have no effect, but on rare occasions these mutations are beneficial (from the bacterium's perspective) and allow the organism to become resistant to antibiotics. Point mutations, however, are not the major concern with respect to antibiotic resistance. This form of bacterial evolution is slow and random, and it is unlikely that bacteria could rapidly achieve resistance to multiple antibiotics via point mutations alone.

Ultimately, the proliferation of antibiotic resistance is caused by the propagation of specific genes that allow bacteria to defy the lethal effects of antibiotics. These *antibiotic resistance genes* are probably not new, but likely result from millions of years of evolution, during which time bacteria have developed many mechanisms to survive the dangers that the world thrusts upon them. Certainly, many of these genes were specifically developed to counteract antibiotics, which are, after all, naturally occurring compounds. Many antibiotic resistance genes, however, likely are subtle adaptations of genes that provide protection against other toxic compounds. For example, there is a strong correlation between genes that encode for resistance to heavy metals and antibiotic resistance genes.

The existence of antibiotic resistance genes, however, is insufficient to explain the global proliferation of resistance. Bacteria also harbor other genes that are specifically designed to help bacteria rapidly evolve—genes designated as *evolution genes* by 1978 Nobel Prize winner Werner Arber. Evolution genes allow bacteria to rapidly develop new genes (usually by manipulating preexisting genes) and to spread them

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throughout the bacteria population. The evolution genes that allow *lateral gene transfer* are perhaps the most important class of evolution genes with respect to antibiotic resistance. Lateral gene transfer is the exchange of genetic material between different bacteria; it allows bacteria to share their abilities to resist antibiotics. This is believed to be the principal mechanism by which similar resistance genes are found throughout the world among many different species of bacteria.

During the last 20 years, scientists have also recognized the importance of *integrons*, another type of evolution gene. Integrons are responsible for integrating resistance genes into the genomes of bacteria, and then controlling the expression of these resistance genes. Because of this unique ability, integrons can be viewed as a genetic "luggage rack" in which different genes can be kept until they are needed. Integrons are a key component in the development of multiple-antibiotic-resistant bacteria because they allow bacteria to easily accumulate numerous genes.

Responding to Antibiotic Resistance

Although scientists have known about antibiotic-resistant bacteria for almost as long as they have known about antibiotics, the assumption was that new antibiotics would be discovered or developed faster than bacteria could become resistant. The discovery of new antibiotics, however, has slowed substantially since the 1960s. In fact, most "new" antibiotics are merely subtle modifications of previously existing ones and have little impact on bacteria that are already resistant.

During the last decade, therefore, there has been a considerable effort to restrict antibiotic use to only those applications where antibiotics are appropriate. Physicians are now reminded to avoid prescribing antibiotics for viral infections such as influenza and the common cold. Likewise, patients are carefully instructed to follow prescription guidelines so that enough of the drug is administered to limit the development of resistant bacteria. There is also increasing pressure to limit or eliminate non-medical use of antibiotics and antibacterials. As noted above, a substantial fraction of all antibiotics are used in agriculture at subtherapeutic concentrations. Although the United States appears to be far from prohibiting this practice, the European Union is banning subtherapeutic antibiotic use

in agriculture in 2006. Although more controversial, many scientists—led by the Alliance for the Prudent Use of Antibiotics—are recommending the elimination of triclosan and other antibacterials from liquid hand soap, toothpaste, and other common household items.

A New Paradigm: Resistance Control

The current situation with respect to antibiotic resistance is bad and the future is bleak. The discovery of new drugs has slowed to a trickle—a problem that will only worsen as pharmaceutical companies devote a greater fraction of their research and development budgets to less essential drugs (e.g., Botox, Viagra). Simultaneously, the ever-increasing use and misuse of antibacterials in common household products can only exacerbate the problem.

From our perspective, current efforts to reduce the spread of antibiotic resistance are an excellent first step. Certainly, our historically indiscriminate use of antibiotics needs to end. The more important issue is to identify novel approaches to limit the spread of antibiotic resistance. Our intention in undertaking this research, therefore, was to take a different approach to solving the problem of antibiotic resistance. We started by asking some simple yet fundamental questions about the proliferation of antibiotic-resistant bacteria.

First, where do the majority of antibiotic-resistant bacteria originate? Certainly, many bacteria are naturally resistant, but the majority of antibiotic-resistant bacteria result from antibiotic use. Therefore, people and animals taking antibiotics are most likely the primary source of antibiotic-resistant bacteria.

Second, how do resistant bacteria spread throughout the world after they originate inside a person? Humans actually contain about 10 times more bacterial cells in their bodies than they do human cells. The overwhelming majority of these bacterial cells reside in our gastrointestinal tracts, and most are released from the body during defecation.

Having asked and answered these two simple questions, we then inferred that municipal wastewater treatment plants, which handle virtually all human toilet waste in large municipalities (in rural areas, septic systems are more commonly used), would be critical in reducing the spread of antibiotic resistance. We hypothesized that municipal wastewater treatment facilities

could adequately control the release of antibiotic-resistant bacteria to the world.

Municipal Wastewater Treatment Facilities: How Do They Work?

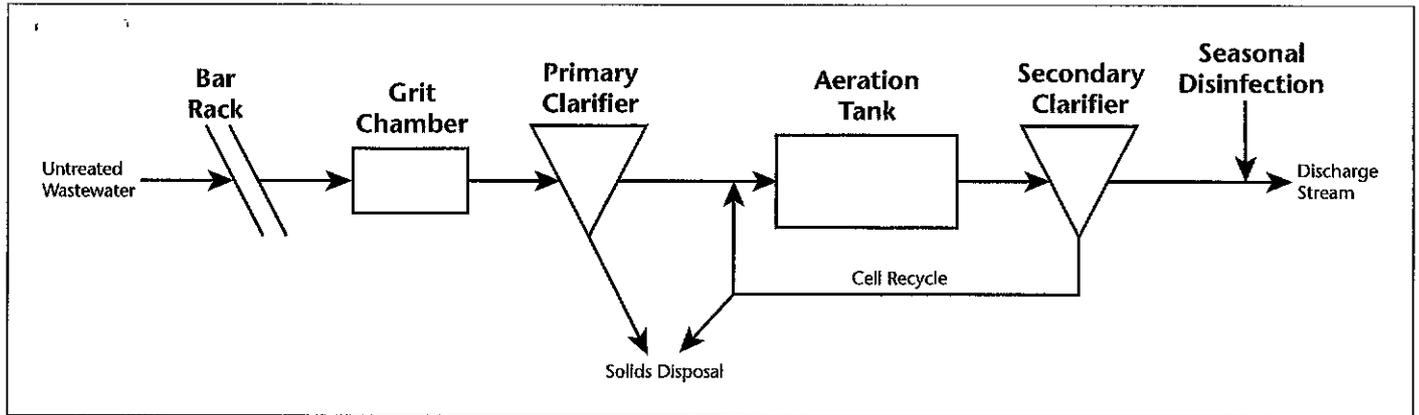
Municipal wastewater treatment facilities are primarily designed and operated to protect the environment. Municipal wastewater treatment facilities remove readily biodegradable compounds from sewage, but there is relatively little human sewage that is toxic, these biodegradable compounds are of environmental concern because if they were released untreated, they would biodegrade in the environment, resulting in oxygen depletion leading to septic conditions. Municipal wastewater treatment facilities, therefore, allow surface waters to maintain high dissolved oxygen levels, improving their aesthetic and recreational use value, as well as their ability to support healthy populations of fish and other aquatic fauna.

Although all municipal wastewater treatment facilities are unique, most are similar in design and involve a common series of unit operations (Figure 1). The first few unit operations, called primary treatment, are designed to remove particles from the wastewater. The bar rack removes large particles (greater than 1 inch), whereas the grit chamber removes sand and other dense, rapid-settling particles. The primary clarifier is a quiescent settling zone that allows organic particles to settle or float so that they can be removed. These primary treatment operations account for about 50% of the treatment that occurs.

The next unit operation, the aeration tank, is designed to remove dissolved organic compounds (which are readily biodegradable) from the wastewater by creating conditions favorable for the growth of bacteria. The tank works by bubbling air through the wastewater, allowing bacteria to metabolize pollutants that are present. Because these bacteria grow in excessive quantities, they must be removed from the wastewater. This is accomplished by the next unit operation, which is a quiescent settling chamber called the secondary clarifier. The combination of the aeration tank and the secondary clarifier is called the activated sludge process, which is the most common technology for the secondary treatment of wastewater.

Following primary and secondary treatment, the quality of municipal wastewater is quite good—not yet potable (i.e., safe to drink), but often

Figure 1. Schematic Diagram of a Conventional Municipal Wastewater Treatment Process



Note: Individual unit operations are labeled in bold lettering.

as good as or better than the quality of many lakes and rivers. This treated wastewater, however, still contains pathogenic bacteria that could make people sick if they accidentally ingested the water. Municipal wastewater treatment facilities, therefore, perform a final treatment step in which the treated wastewater is disinfected to help reduce the number of disease-causing microbes.

Disinfection is required only when recreational use of the receiving stream is a reasonable expectation. In Minnesota, for example, wastewater treatment facilities usually disinfect their wastewater only from April to November.

In addition to treating the wastewater, municipal wastewater treatment facilities must deal with the solid residues that the primary and

secondary clarifiers collect. These solid residues are readily biodegradable organic materials that are most commonly treated by a process called *anaerobic digestion*. The conventional anaerobic digestion process, which largely mimics our gastrointestinal tracts (hence the "digestion" nomenclature), is kept free of oxygen and operated at 98.6°F. Following digestion,

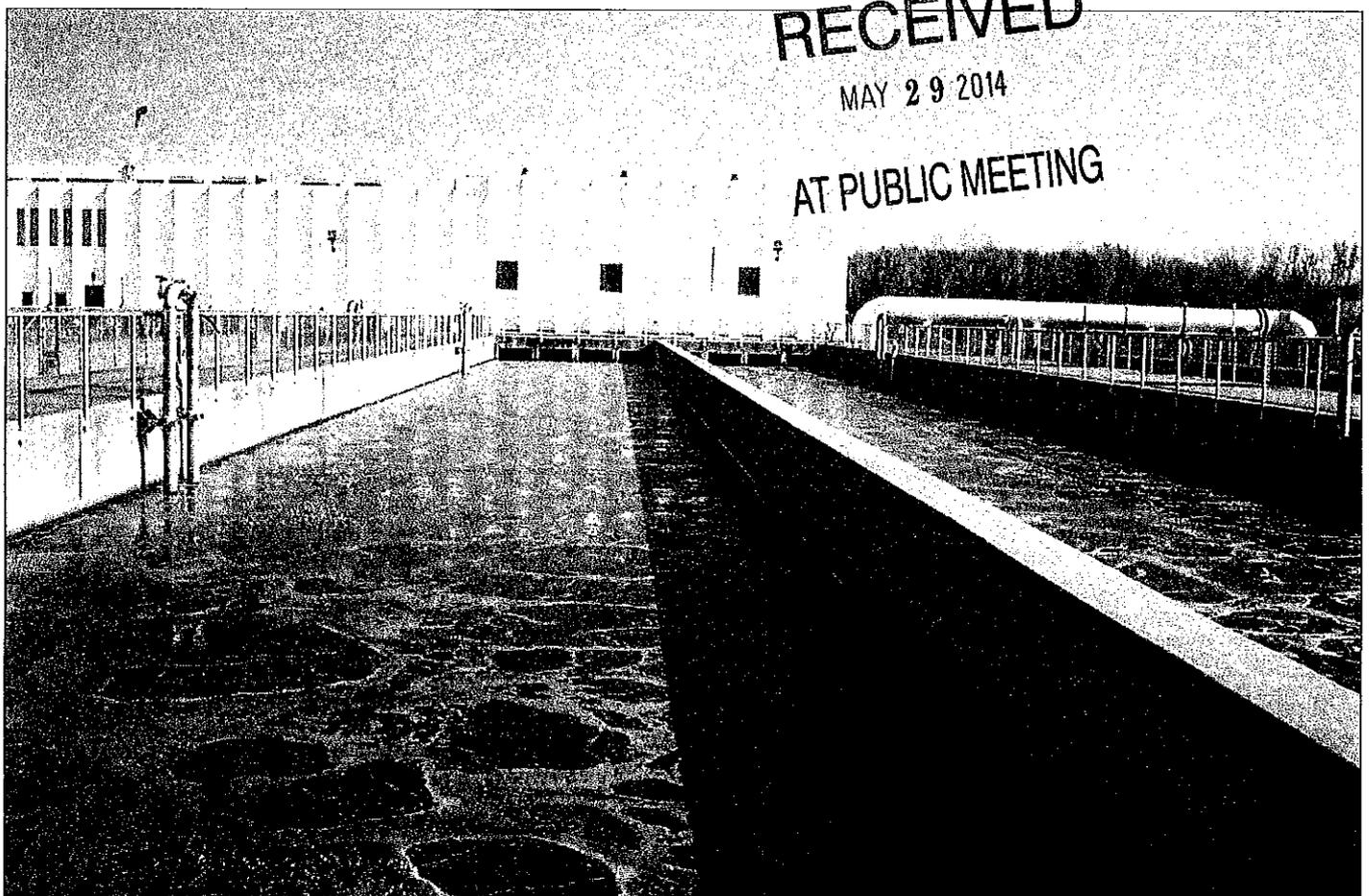


Photo courtesy of Timothy LaPara

An aeration tank at a municipal wastewater treatment plant. The tank removes dissolved organic compounds by bubbling air through the wastewater, creating favorable conditions for the growth of bacteria that are capable of metabolizing pollutants.

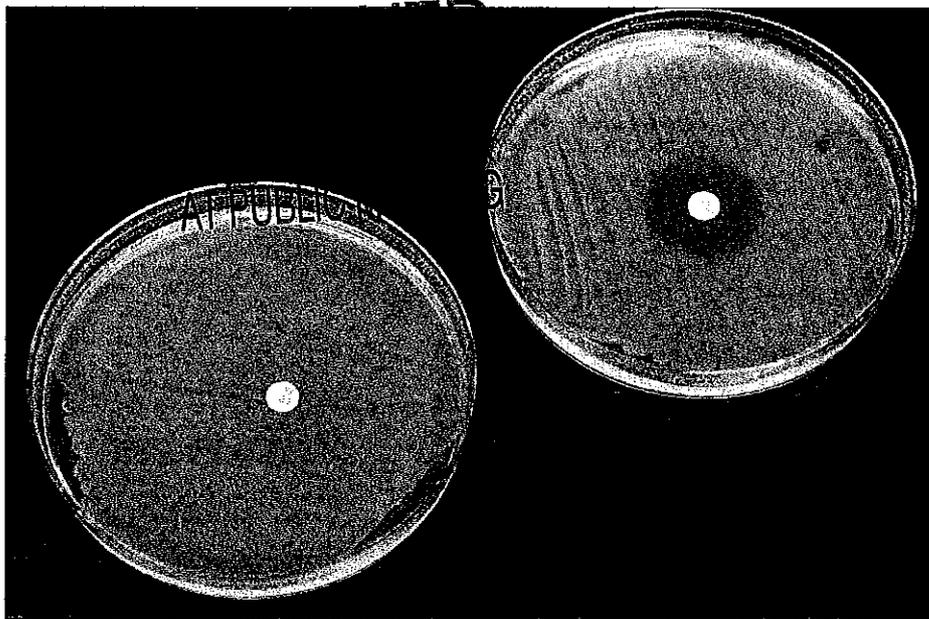
the treated wastewater solids are either applied to farmland as a fertilizer and soil conditioner, or sent to a landfill for disposal. The former alternative is preferred as a "sustainable" practice, whereas landfill space is finite.

Because anaerobic digestors operate at conditions similar to the human body, they are not particularly good at eliminating human pathogens. Numerous alternative treatment technologies, therefore, have been developed to better treat wastewater solids. All of these alternative treatment technologies are more expensive, however, and thus municipalities do not frequently use them. Perhaps the most attractive treatment alternative is thermophilic anaerobic digestion, which operates almost identically to conventional anaerobic digestion, except that it operates at sufficiently high temperatures (greater than 110°F) to kill most human pathogens.

Methodology and Analysis

The first goal of our project was to determine the extent to which municipal wastewater treatment facilities prevent the release of antibiotic-resistant bacteria. There are two potential paths by which antibiotic-resistant bacteria can escape a municipal wastewater treatment facility. The most obvious is in the treated wastewater. Our research, therefore, investigated the importance of secondary clarification and disinfection in preventing the release of antibiotic-resistant bacteria from the aeration tank. Resistant bacteria could also be released in the solids collected during primary treatment and from the secondary clarifier. Our research, therefore, compared the effectiveness of two variations of conventional anaerobic digestion and thermophilic anaerobic digestion at destroying resistant bacteria.

We investigated the efficacy of wastewater disinfection at the Metropolitan Wastewater Treatment Facility in St. Paul. This facility is very large, treating an average of 180 million gallons of sewage each day. Typically, the quality of treatment from the Metropolitan plant is top-notch, and the facility regularly wins state and national awards for operational excellence. Throughout the year, we quantified about 100,000 (10^5) tetracycline-resistant bacteria per milliliter of water in the aeration tanks at the Metropolitan plant. From the treated wastewater, we quantified about 300 tetracycline-resistant bacteria per milliliter in the winter (i.e., when



Bacteria growing on petri dishes that include disks treated with the antibiotic tetracycline. The bacteria growing on the left petri dish were obtained from treated wastewater and are resistant to tetracycline, as shown by the ability of the microbes to grow near the white disk. The bacteria growing on the right petri dish are a tetracycline-sensitive strain of *E. coli*. The circular ring around the disk shows that these microbes cannot grow in the presence of tetracycline.

disinfection was not performed) and about 30 tetracycline-resistant bacteria per milliliter during the summer (i.e., during the disinfection period). That is, about 99.6% and 99.97% of the resistant bacteria in the aeration tanks are removed in the winter and summer, respectively. Although this removal efficiency might seem sufficient, 30 bacteria per milliliter translates to more than 10 trillion (10^{13}) tetracycline-resistant bacteria released each day from this treatment facility into our waterways.

We also investigated the efficacy of anaerobic digestion at the Western Lake Superior Sanitary District (thermophilic process) and the Empire Wastewater Treatment Facility (conventional process), which are located in Duluth and Farmington, respectively. Both of these plants have also earned awards for operational excellence. We again detected about 100,000 (10^5) tetracycline-resistant bacteria per milliliter in the waste stream entering the anaerobic digestors at each of these treatment facilities. However, we were unable to detect any tetracycline-resistant bacteria in the waste stream leaving the anaerobic digestors at these two treatment facilities, in part because the research method we used is unable to detect levels of tetracycline-resistant bacteria below 1,000 (10^3) per milliliter of sludge solids. However, this suggests that both

anaerobic digestion processes were able to inactivate at least 99% of antibiotic-resistant bacteria. We are currently attempting to develop an alternative technique to measure the efficiencies by which these anaerobic digestors inactivate antibiotic-resistant bacteria.

The second goal of our research was to characterize the antibiotic-resistant bacteria in sewage. From the three treatment facilities, we isolated and identified 173 bacterial strains that were resistant to tetracycline. All of these bacterial strains were pathogenic (disease-causing—e.g., *Shigella* or *Klebsiella* spp.), possibly pathogenic (e.g., *Escherichia coli*), or non-pathogenic but related to pathogens (e.g., *Citrobacter* spp.). In more than 50% of these bacteria, we also detected at least one gene encoding for tetracycline resistance.

Based on these initial data, we then studied 14 different tetracycline-resistant bacterial strains in more detail. All 14 of these strains contained an integron and were resistant to at least three different antibiotics (we tested resistance to amoxicillin, ampicillin, chlortetracycline, enrofloxacin, erythromycin, sulfamethoxazole, trimethoprim, and tylosin). We also tested these bacteria for lateral gene transfer. Although this work is still ongoing, many of these bacterial strains are capable of

exchanging with other bacteria a gene encoding for tetracycline resistance.

Following our work on tetracycline-resistant bacteria, we isolated an additional 65 different bacteria that were resistant to ciprofloxacin. Ciprofloxacin is a relatively new antibiotic and there is not much known about bacterial resistance to it. Once again, we found that all of these bacterial strains were pathogenic, possibly pathogenic, or related to pathogens. We then focused our efforts on 11 of these strains, all of which were resistant to at least four different antibiotics. About half of these strains contained an integron or a gene encoding for resistance to tetracycline. Although this work is also ongoing, our analysis revealed that several of these strains were capable of laterally exchanging genes encoding for resistance to ciprofloxacin.

Conclusion and Policy Recommendations

Our research has demonstrated that extremely high numbers of antibiotic-resistant bacteria are released from municipal wastewater treatment plants, even when disinfection is performed. Our original hypothesis was that disinfection would adequately inactivate antibiotic-resistant bacteria in treated municipal wastewater, and that an outcome of our work would be to encourage the implementation of year-round disinfection. Instead, we learned that although a 99% inactivation looks encouraging, 1% of a very large number (10^{15} , or 1 quadrillion) still represents a very large number (10^{13} , or 10 trillion) of antibiotic-resistant bacteria that are released from the Metropolitan Wastewater Treatment Facility each day.

The bacteria that we studied were all pathogens or related to pathogens and all were resistant to multiple antibiotics. A substantial fraction of these bacteria (greater than 50%) harbored genes encoding for tetracycline resistance. These bacteria frequently harbored integrons (genes that allow bacteria to accumulate multiple genes for antibiotic resistance) and some of them were capable of transferring their resistance

to other bacteria. The frequency of lateral gene transfer of ciprofloxacin resistance, which occurred in more than 40% of the strains we studied, is particularly worrisome because this trait is typically very rare (less than 1%) among clinical strains of ciprofloxacin-resistant *E. coli*. Simply put, the bacteria that we detected in municipal wastewater are some of the most resistant bacteria ever studied. There is a substantial need, therefore, to prevent these organisms from reaching the environment.

At first glance, the most obvious solution to the problem of antibiotic-resistant bacteria in treated municipal wastewater would be to require more stringent disinfection. The majority of municipal wastewater is disinfected using chlorine, which poses a security risk (chlorine gas is very dangerous) and generates disinfection by-products that are known or suspected carcinogens. Although we recommend a policy shift to include year-round wastewater disinfection, we do not recommend that more stringent disinfection regulations be imposed because of these unwanted consequences.

Instead, we recommend that wastewater effluents be passed through a sand filter prior to disinfection. Sand filters can physically remove antibiotic-resistant bacteria from treated wastewater, but without the use of potentially dangerous chemicals. At the present time, sand filters are rarely used in wastewater treatment, but they are commonly used at drinking water treatment facilities, so the technology is well-developed and well-understood. Additional research is needed, however, to optimize the removal/inactivation of antibiotic-resistant bacteria by our proposed combination of sand filtration and effluent disinfection.

Although our research on the fate of antibiotic-resistant bacteria in anaerobic digestors was inconclusive due to the limitations of our research method, we suspect that our ongoing research will demonstrate that thermophilic anaerobic digestors achieve substantially better inactivation efficiencies than conventional

technologies. This ongoing research is particularly pertinent because of a recent shift in policy that emphasizes the application of treated wastewater solids to land rather than putting these residues into landfills—that is, the “environmental friendly” practice of applying wastewater solids to land may have unexpected and undesirable consequences in terms of the proliferation of antibiotic-resistant bacteria.

Timothy M. LaPara is associate professor in the Department of Civil Engineering at the University of Minnesota. His research focuses on the microbial ecology of wastewater treatment. **Sara J. Firl** was a graduate student in the Department of Civil Engineering at the University of Minnesota during this study. She currently works for Barr Engineering. **Leslie J. Onan** was an undergraduate student in the College of Biological Sciences at the University of Minnesota during this study. She is currently attending law school at the University of Michigan. **Sudeshna Ghosh** is a doctoral candidate in the Department of Civil Engineering at the University of Minnesota. **Tao Yan** is a post-doctoral research associate in the Biotechnology Institute at the University of Minnesota. **Michael J. Sadowsky** is Distinguished McKnight Professor in the Department of Soil, Water, and Climate and the Biotechnology Institute at the University of Minnesota. His research focuses on the genetics, genomics, and biochemistry of bacteria of environmental importance.

This study was supported by a grant from CURA's Faculty Interactive Research Program. The program was created to encourage University faculty to carry out research projects that involve significant issues of public policy for the state and that include interaction with community groups, agencies, or organizations in Minnesota. These grants are available to regular faculty members at the University of Minnesota and are awarded annually on a competitive basis. Additional support was provided by grants from the Undergraduate Research Opportunity Program (UROP) at the University of Minnesota.

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ANTIBIOTIC RESISTANCE THREATS IN THE UNITED STATES, 2013

Executive Summary

Antibiotic Resistance Threats in the United States, 2013 is a snapshot of the complex problem of antibiotic resistance today and the potentially catastrophic consequences of inaction. The overriding purpose of this report is to increase awareness of the threat that antibiotic resistance poses and to encourage immediate action to address the threat. This document can serve as a reference for anyone looking for information about antibiotic resistance. It is specifically designed to be accessible to many audiences. For more technical information, references and links are provided.

This report covers bacteria causing severe human infections and the antibiotics used to treat those infections. In addition, *Candida*, a fungus that commonly causes serious illness, especially among hospital patients, is included because it, too, is showing increasing resistance to the drugs used for treatment. When discussing the pathogens included in this report, *Candida* will be included when referencing "bacteria" for simplicity. Also, infections caused by the bacteria *Clostridium difficile* (*C. difficile*) are also included in this report. Although *C. difficile* infections are not yet significantly resistant to the drugs used to treat them, most are directly related to antibiotic use and thousands of Americans are affected each year.

Drug resistance related to viruses such as HIV and influenza is not included, nor is drug resistance among parasites such as those that cause malaria. These are important problems but are beyond the scope of this report. The report consists of multiple one or two page summaries of cross-cutting and bacteria-specific antibiotic resistance topics. The first section provides context and an overview of antibiotic resistance in the United States. In addition to giving a national assessment of the most dangerous antibiotic resistance threats, it summarizes what is known about the burden of illness, level of concern, and antibiotics left to defend against these infections. This first section also includes some basic background information, such as fact sheets about antibiotic safety and the harmful impact that resistance can have on high-risk groups, including those with chronic illnesses such as cancer.

CDC estimates that in the United States, more than two million people are sickened every year with antibiotic-resistant infections, with at least 23,000 dying as a result. The estimates are based on conservative assumptions and are likely minimum estimates. They are the best approximations that can be derived from currently available data.

Regarding level of concern, CDC has — for the first time — prioritized bacteria in this report into one of three categories: urgent, serious, and concerning.

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FOREWORD

Antimicrobial resistance is one of our most serious health threats. Infections from resistant bacteria are now too common, and some pathogens have even become resistant to multiple types or classes of antibiotics (antimicrobials used to treat bacterial infections). The loss of effective antibiotics will undermine our ability to fight infectious diseases and manage the infectious complications common in vulnerable patients undergoing chemotherapy for cancer, dialysis for renal failure, and surgery, especially organ transplantation, for which the ability to treat secondary infections is crucial.

When first-line and then second-line antibiotic treatment options are limited by resistance or are unavailable, healthcare providers are forced to use antibiotics that may be more toxic to the patient and frequently more expensive and less effective. Even when alternative treatments exist, research has shown that patients with resistant infections are often much more likely to die, and survivors have significantly longer hospital stays, delayed recuperation, and long-term disability. Efforts to prevent such threats build on the foundation of proven public health strategies: immunization, infection control, protecting the food supply, antibiotic stewardship, and reducing person-to-person spread through screening, treatment and education.

Dr. Tom Frieden, MD, MPH

Director, U.S. Centers for Disease Control and Prevention

Meeting the Challenges of Drug-Resistant Diseases in Developing Countries

Committee on Foreign Affairs Subcommittee on Africa, Global Health, Human Rights,
and International Organizations

United States House of Representatives

April 23, 2013

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Urgent Threats

Clostridium difficile

Carbapenem-resistant Enterobacteriaceae (CRE)

Drug-resistant *Neisseria gonorrhoeae*

Serious Threats

Multidrug-resistant *Acinetobacter*

Drug-resistant *Campylobacter*

Fluconazole-resistant *Candida* (a fungus)

Extended spectrum β -lactamase producing Enterobacteriaceae (ESBLs)

Vancomycin-resistant *Enterococcus* (VRE)

Multidrug-resistant *Pseudomonas aeruginosa*

Drug-resistant Non-typhoidal *Salmonella*

Drug-resistant *Salmonella* Typhi

Drug-resistant *Shigella*

Methicillin-resistant *Staphylococcus aureus* (MRSA)

Drug-resistant *Streptococcus pneumoniae*

Drug-resistant tuberculosis

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Concerning Threats

Vancomycin-resistant *Staphylococcus aureus* (VRSA)

Erythromycin-resistant Group A *Streptococcus*

Clindamycin-resistant Group B *Streptococcus*

The second section describes what can be done to combat this growing threat, including information on current CDC initiatives. Four core actions that fight the spread of antibiotic resistance are presented and explained, including 1) preventing infections from occurring and preventing resistant bacteria from spreading, 2) tracking resistant bacteria, 3) improving the use of antibiotics, and 4) promoting the development of new antibiotics and new diagnostic tests for resistant bacteria.

The third section provides summaries of each of the bacteria in this report. These summaries can aid in discussions about each bacteria, how to manage infections, and implications for public health. They also highlight the similarities and differences among the many different types of infections.

This section also includes information about what groups such as states, communities, doctors, nurses, patients, and CDC can do to combat antibiotic resistance. Preventing the spread of antibiotic resistance can only be achieved with widespread engagement, especially among leaders in clinical medicine, healthcare leadership, agriculture, and public health. Although some people are at greater risk than others, no one can completely avoid

the risk of antibiotic-resistant infections. Only through concerted commitment and action will the nation ever be able to succeed in reducing this threat.

A reference section provides technical information, a glossary, and additional resources.

Any comments and suggestions that would improve the usefulness of future publications are appreciated and should be sent to Director, Division of Healthcare Quality Promotion, National Center for Emerging and Zoonotic Infectious Diseases, Centers for Disease Control and Prevention, 1600 Clifton Road, Mailstop A-07, Atlanta, Georgia, 30333. E-mail can also be used: hip@cdc.gov.

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Sanitary and bacteriological aspects of sewage treatment

<http://www.ncbi.nlm.nih.gov/pubmed/15058814>

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Filipkowska Z.

Abstract

A study into the removal of contamination load and indicator bacteria was carried out in 1992-1996 in the mechanical, biological and chemical waste-water treatment plant WTP in Lezany, in the County of Reszel, in the Province of Warmia and Mazury in Poland. The results of chemical analyses found a high efficiency of removal of carbon compounds, COD (90%) and BOD (98%), in the process of purification of household sewage. In addition, a high effectiveness of total nitrogen, on average 71%, and unsatisfactory removal of ammonia nitrogen and phosphorus compounds were found. The results of microbiological analyses confirmed the high efficiency of removal of indicator bacteria in the process of sewage treatment from 94 to 97%. In the sewage after the final phase of purification in stabilization ponds, the following pathogenic bacteria were identified with the use of the EPL 21 tests: *Escherichia coli*, *Enterobacter agglomerans*, *Enterobacter aerogenes*, *Enterobacter cloacae*, *Enterobacter georgioriae*, *Citrobacter freundii*, *Klebsiella pneumoniae*, *Klebsiella oxytoca*, *Klebsiella ozaenae*, *Erwinia herbicola*, *Edwardsiella tarda*, *Serratia odorifera*, *Serratia marcescens*, *Providencia alcalifaciens*, *Hafnia alvei*, *Yersinia pestis*, *Yersinia pseudotuberculosis*, *Yersinia fredericksonii*, *Salmonella* spp., *Shigella dysenteriae*, *Aeromonas hydrophila*, *Pseudomonas aeruginosa*. The obtained results show that although the sewage purification system is efficient and reduces the contamination load to the level required by the regulations (Ministry of Environmental Protection, Natural Resources and Forestry from 20 September 1991) and removes a great percentage of indicator bacteria, the purified sewage may be a source of pathogenic bacteria in inland waters.

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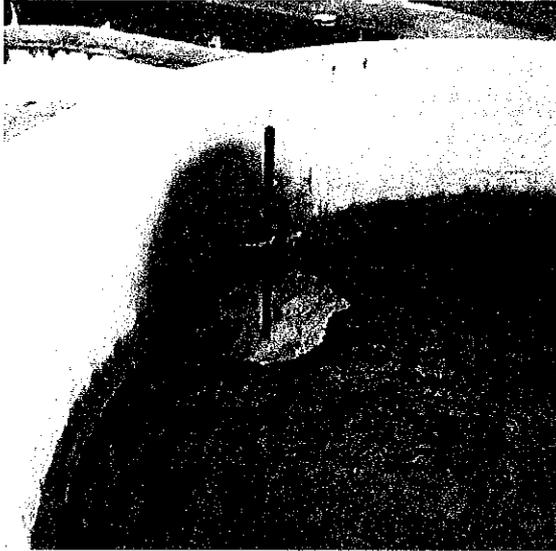
15058814

[PubMed - indexed for MEDLINE]

Sewage Plants May Be Creating Super Bacteria

Some bacteria at sewage treatment plants are becoming resistant to antibiotics and winding up in the environment

Apr 16, 2009 | By Andrew McGlashen and Environmental Health News



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<http://www.scientificamerican.com/article/sewage-plants-super-bacteria/>

A wastewater treatment plant's job description is pretty straightforward: Remove contaminants from sewage so it can be returned to the environment without harming people or wildlife.

But a new study suggests that the treatment process can have an unintended consequence of promoting the spread of extra-hardy bacteria.

Some bugs are resistant to antibiotics, so they dodge the medical bullets that wipe out others. The more drugs that are used, the more robust they become. Since bacteria reproduce quickly – one organism might turn into a billion overnight – and they share DNA with others, antibiotic-resistant genes spread like Darwinian wildfire when conditions are right.

And at sewage treatment plants, it seems, the conditions are right, said microbiologist Chuanwu Xi, whose University of Michigan lab conducted the study.

"Wastewater treatment plants are most effective at treating sewage when they have conditions that allow beneficial bacteria to thrive and improve the quality of the water," said Karen Kidd, a University of New Brunswick ecotoxicologist familiar with the study.

"However, this study indicates that these conditions can also favor the mutation of some and act as a source of antibiotic resistant bacteria to the environment."

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"To me," she added, "that's sobering."

These "super" organisms in the treated sewage wind up in rivers and other waters, potentially infecting people with infections that are difficult to treat.

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To determine if sewage-treatment plants might be a source of resistant bugs, Chuanwu and fellow researchers collected several species of the common bacteria *Acinetobacter* from a plant in Ann Arbor, Mich. that dumps its effluent into the Huron River.

They exposed the bacteria to various antibiotics and cocktails of drugs, and found a significant increase in the percentage of *Acinetobacter* that were resistant after each stage of treatment. And while the final treatment process killed all but a tiny fraction of the bugs before releasing the water to the environment, the proportion of resistant bacteria was much higher among those that made it back to the river than those collected upstream from the plant.

The bacteria were as much as 10 times more resistant to some antibiotics after secondary treatment at the Michigan plant. Also, in the river downstream of the plant, they were up to 2.7 times more resistant than bacteria upstream, according to the study.

Chuanwu said people and wildlife that swim in or drink from the Huron River downstream may be exposed to the more stalwart strains. However, the human health risk is not well understood.

Acinetobacter were chosen for their "remarkable ability" to develop resistance to antimicrobial agents, according to the Michigan study, which was published online in March in the journal *Science of the Total Environment*. The bacterium can cause pneumonia along with serious infections in wounds and in the bloodstream, according to the Centers for Disease Control and Prevention. Most infections affect people in hospitals, where common use of antibiotics promotes growth of resistant strains.

"We don't know whether other bacteria would respond to the treatment

process in the same way the *Acinetobacter* did," Chuanwu said. "We have some unpublished data suggesting a similar trend of resistance increase among all bacterial populations."

Past studies have examined the link between wastewater treatment and antibiotic resistance, but this is the first to look simultaneously at a plant and the water body that receives its effluent.

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At sewage treatment plants, operators intentionally create conditions that promote growth of microorganisms in wastewater because they break down organic matter. In oxygenated waters with plenty to eat, those beneficial bacteria thrive and reproduce quickly. But so do their more harmful cousins. And because treatment plants create far higher densities of bacteria than exist in the environment, "they could very likely increase gene transfer among microorganisms," Chuanwu said.

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Before the bacteria can build resistance, though, they have to be exposed to antibiotics. That's where the average citizen comes in. When people take antibiotics, a good deal of the drugs head to the treatment plant when toilets are flushed. The same is true when they dump unused medicine down drains.

"Most antibiotics are pretty stable, so up to 90 percent of them end up in the wastewater," said Chuanwu. "In order to deal with this problem, we need to think about how to wisely reduce the use of antibiotics."

The CDC lists antibiotic resistance among its top concerns, and warns that resistant strains can spread quickly through communities. Some bacteria, commonly called "superbugs," are so tough that no antibiotics exist that can cure infections.

The poster-child superbug is methicillin-resistant *Staphylococcus aureus*, or MRSA, a bacterium that in 2005 killed nearly 19,000 people in the United States alone. But more recently, the *Acinetobacter* bacteria have drawn attention and earned a bad reputation. A January report from the Infectious Disease Society of America said that a particular strain, *Acinetobacter baumannii*, along with other microbes called *Pseudomonas aeruginosa* and *Klebsiella pneumoniae*, could soon rival MRSA as a killer. It has also become notorious as a common infector and occasional killer of soldiers and veterans of the Iraq and Afghanistan wars.

Thomas Steitz, a biochemist at Yale University who researches new kinds of antibiotics, said it is unlikely that drugs in most sewage could be strong enough to cause resistance, but the University of Michigan's medical school in Ann Arbor could contribute already-resistant bugs that can share the resistant genes with other bacteria at the plant.

Resistant bacteria could also come from farm runoff, he said, since livestock at many large feedlots are regularly fed low doses of antibiotics.

Treatment plants do a fine job of removing most pollutants, said Jeff Cowles, an environmental engineer who used to oversee treatment plants for the Michigan Department of Environmental Quality, but they're ill-equipped to get rid of so-called "microconstituents" like pharmaceuticals, pesticides and nanoparticles.

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"And we just don't know what's happening to them once they enter the system," Cowles said. "It's reminiscent of the 1950s when DDT was going into the environment. We just assumed that it was going away, but it wasn't going away."

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Cowles called the study's findings "very surprising" and said if they are accurate, "that's pretty significant," he said. "That particular facility puts out one of the cleanest effluents in the country. If they're really showing that, then that's a wakeup call."

"Wastewater operators are concerned" about antibiotic resistance, Cowles said, "but it's a matter of needing research."

It's also a matter of cost.

Treatment plants use chlorine or ultraviolet light, or both, to kill microorganisms before discharging effluent to the environment, and although "in general, it's relatively safe," neither method kills all bacteria, Cowles said. For the right price, though, plant operators could wipe them out through reverse osmosis or the use of activated carbon.

"Is it possible to sterilize it? Of course," he said. A project in Orange County, Calif., for example, uses reverse osmosis and other advanced technologies to render sewage discharge pure enough to recycle as drinking water.

"It's a matter of money," said Cowles. "But it's very unlikely that the American public would tolerate the cost of doing that."

It's also unclear whether the risk of letting a few bugs survive in effluent warrants the high cost of completely eradicating them, he added.

"The environment provides the opportunity for infection no matter where you are, upstream or downstream," he said.

Meanwhile, according to Steitz, there's an ongoing arms race between

superbugs and the medical world.

"Evolution trumps intelligent design," he said. "Even though you get really smart drugs, they'll eventually get around it."

This article originally ran at Environmental Health News, a news source published by Environmental Health Sciences, a nonprofit media company.

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GIARDIA: DRINKING WATER FACT SHEET

What is *Giardia*?

Giardia (je-ar' de-ah) are protozoan parasites which occur in a trophozoite and an oval-shaped cyst form. Cysts excreted in the feces of an infected host move passively through the environment. If cysts are ingested, infection may be transmitted to another vertebrate host. The trophozoite causes infection. Excystation to the trophozoite form is initiated in the stomach and completed in the small intestine. The trophozoites divide, attach to the small intestine, and then detach for unknown reasons. During the encystment process, they become rounded and elaborate a cyst wall that protects the cyst as it is excreted and carried through water and other media.

Numerous species of *Giardia* have been found in a variety of mammals, birds, reptiles, amphibians, and fishes. *Giardia* has also been detected in beaver, muskrats, wading birds, voles, mice, shrews, gerbils, rats, deer, native marsupials, Australian brush-tail possums, ringed seals, and llamas. There is no general agreement on the criteria to define species; host specificity, body size and shape, internal structures, and biochemical, molecular, and genetic techniques have all been used. Scientists and physicians describe the specie(s) responsible for human infections as *G. lamblia*, *G. duodenalis*, or *G. intestinalis*.

Where has *Giardia* been found?

The wide occurrence of cysts in humans and animals suggests that soil can be contaminated with *Giardia* through fecal deposition and sewage disposal practices. Municipal waste waters likely always contain *Giardia* cysts. *Giardia* is distributed worldwide in lakes, ponds, rivers, and streams. It is even found in high quality water sources with no municipal wastewater discharges. All surface waters probably contain *Giardia*, and whether cysts are detected depends largely on the methods used to collect and analyze water samples.

In North America, higher levels in water are often reported in the late summer, fall and early winter. Generally, there is no correlation of cyst levels in water with coliform bacteria. When *Giardia* cysts are detected in environmental samples, information about viability, infectivity, or species is not usually available.

Reported *Giardia* levels have ranged from 10,000 to 100,000 cysts/L in untreated sewage, 10 to 100 cysts/L in treated sewage, and 10 or few cysts/L in surface water sources and tap water. Cysts have also been detected in cisterns and in wells contaminated by surface water or sewage. Levels are generally higher in water sources influenced by agriculture (e.g., cattle or dairy farming) or municipal and residential wastewater discharges. Contamination levels may

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fluctuate due to storms, agricultural practices, and the operation of wastewater facilities.

Giardia has been detected on stainless steel and Formica® surfaces in day care centers. Limited information is available on the levels of cysts in foods; improvements are needed in both sampling and analytical methods. There are no published reports on the occurrence of *Giardia* in air.

How long can *Giardia* cysts survive in the environment?

The survival of *Giardia* cysts in the environment is significantly affected by temperature; survivability decreases as the temperature increases. A small fraction of cysts can withstand a single freeze-thaw cycle. Cysts can survive for 2 to 3 months in water temperatures of less than 10 °C, and at 21 °C, cysts have remained viable for almost one month. Cysts are killed in 10 minutes at a water temperature of 54 °C. Raising the water temperature to boiling immediately kills cysts.

How infective are *Giardia* cysts?

Giardia cysts are highly infective. As few as ten human-source *Giardia* cysts produced infection in a clinical study of male volunteers. The incubation period (time interval between ingestion and the first appearance of symptoms) can range from 3 to 25 days.

Can *Giardia* be transmitted between animal species?

Giardia from some animals exhibit an apparent high degree of host specificity, but other isolates may infect more than one host. The role of animals in causing human infection is not clear, but evidence suggests that the beaver and possibly the muskrat is a source of infection for humans.

How prevalent is *Giardia* infection in humans?

Giardiasis is the most commonly reported intestinal protozoan infection worldwide; an estimated 200 million people are infected each year. In the United States, *G. lamblia* is the most frequently identified parasite in stool specimens submitted for parasitological evaluation.

Giardia infection tends to be more common in children than adults. Depending on the geographical area, studies have found from 1-68% of children to be infected. In many developing countries, most children under five years of age have been infected at least once. In two studies in the United States, 7% of children aged 1 to 3 years and 11% of infants and toddlers tested for admission to day-care centers were found to be infected.

How prevalent is *Giardia* infection in domestic and wild animals?

Giardia is a common protozoan parasite of farm animals, especially calves and lambs. Dogs are frequently found infected; cats less frequently. In different areas of the United States, 7-16% of beavers were found to be infected; 95% of muskrats were found to be infected.

What are the health effects of *Giardia* infection?

Giardia infection may be acquired without producing any symptoms, and this is often the case for children. In symptomatic patients, acute diarrhea is the predominate feature. In some instances, diarrhea may be transient and mild, passing without notice; in others diarrhea can be chronic. Other symptoms may include abdominal cramps,

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bloating, flatulence, steatorrhea (daily losses of fat in feces greater than 7 grams), weight loss, and occasionally vomiting. Stools may be pale, greasy, and malodorous. Weight loss may be significant. In some patients, symptoms last for only 3 or 4 days, while in others symptoms can last for months or years.

Rarely does *Giardia* infection cause death, but each year 4,600 persons with giardiasis are estimated to be hospitalized in the United States. Hospitalized cases are primarily children under five years of age, and dehydration is the most frequent co-diagnosis.

A potentially serious consequence is nutritional insufficiency which may result in impaired growth and development of infants and children. Other reported associations with giardiasis in children include malabsorption of iron, allergic reactions, inflammation of the synovial membranes of major joints, and non-progressive retinal changes; these all require additional study.

Is treatment available for giardiasis?

As with all diarrheas, fluid replacement is important. Anti-giardial agents can be important in the management of individual cases but may not prevent reinfection of children in day-care centers or areas where exposures are frequent. Drugs have different effectiveness in their ability to clear *Giardia*, and side-effects should be considered, especially for pregnant women.

Who is at risk?

Giardia is frequently spread directly from person to person, especially among young children in day-care centers, nurseries, or institutions and among persons living in

areas with poor sanitation and hygiene. Although 7-54% of children attending day-care centers in the United States may be infected, infections are primarily without symptoms and do not result in adverse growth effects. An estimated 5-20% of household contacts and 9-35% of care-center staff also may be infected.

Studies have not found that pets are an importance source of infection. Several small foodborne outbreaks have been associated with ice and foods contaminated by food service workers, but restaurant-associated transmission of *Giardia* does not appear to be a significant problem. High attack rates have been reported in travelers to endemic areas. Giardiasis can also be transmitted by some sexual activities, particularly among male homosexuals who practice oral-anal sex.

Giardia can be an important cause of endemic and epidemic waterborne illness. In the United States, increased risks have been found in populations where surface water sources are not filtered, persons who use shallow well water systems, persons who drink contaminated water while picnicking, camping, and hiking, and persons who accidentally ingest water during swimming and other water recreational activities. Poorly maintained wading and swimming pools and heavily used swimming areas at lakes and ponds pose an increased risk, especially if they are used by diaper-age toddlers or other persons prone to fecal accidents.

What causes waterborne outbreaks?

Since 1971, *Giardia* has been the most commonly identified pathogen in waterborne outbreaks reported in the United States. More than 130 waterborne outbreaks have been

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reported in 27 states; both residents and travelers have been affected. Outbreak statistics emphasize the need for filtration of surface water, optimization of the filtration process, frequent monitoring of treatment effectiveness, and better protection and treatment for ground water.

How effective is water treatment?

When operated under appropriate conditions, commonly used filtration technologies can effectively remove *Giardia* cysts from water. The highest removal by granular filters is achieved when coagulation is optimized. Care must be exercised when selecting membranes; those that can remove *Giardia* cysts may not be effective for other protozoa, like *Cryptosporidium*, that are smaller in size. Commonly used water disinfectants can effectively inactivate *Giardia* cysts depending on the disinfectant concentration and contact time. Cysts are relatively more resistant to disinfectants than bacteria and viruses, and high doses and lengthy contact times may be needed. This may result in high levels of disinfection by-products which are regulated by the EPA.

What is being done to reduce waterborne risks?

EPA's Surface Water Treatment Rule (SWTR) requires that public water systems filter, except in rare circumstances, and disinfect surface water and groundwater that is directly impacted by surface water; 99.9% of *Giardia* must be removed or killed.

How important is waterborne transmission of giardiasis?

A risk assessment has estimated that in the United States as many as 250 infections per 10,000 people may occur each year from

exposures to *Giardia* in drinking water. Although the limitations of this risk assessment are recognized, this estimate suggests that more stringent water treatment requirements may be needed. The EPA is currently collecting occurrence information about *Giardia* in water systems throughout the country. When this information becomes available, waterborne risks can be estimated again using this and other newly developed risk assessment models.

Whom should I contact if I suspect an outbreak is occurring?

If you or members of your family are diagnosed with giardiasis and suspect that your neighbors, fellow travelers, or children's friends may also be infected, you should discuss this with your physician or a public health worker in your local or state health department. Most health departments require that physicians and laboratories report giardiasis cases to them. Health department epidemiologists investigate disease clusters and increased reports of disease to determine if they are caused by contaminated water or food or other sources. Health departments may ask the Centers for Disease Control and Prevention (CDC) in Atlanta to assist in an outbreak investigation. The EPA can assist the CDC in the investigation of suspected waterborne outbreaks.

Whom should I contact if I am concerned about my drinking water?

If you suspect your water system is contaminated, you should contact your water utility and ask about the effectiveness of their treatment. State agencies can also provide information about public water systems and their water quality. In some states, the health

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department will have regulatory jurisdiction; in others, a department of environmental quality or natural resources will have this responsibility. Your health department or county agriculture extension office can provide assistance and advice about the contamination and water treatment of non-public or individual water systems.

Home and personal water treatment systems should be carefully selected. If your home water supply is subject to contamination with *Giardia*, you should select a system that can remove or kill 99.9% of *Giardia* and *Cryptosporidium* and 99.99% of waterborne enteric viruses and bacteria. Independent testing groups, like NSF International, evaluate the effectiveness of water treatment devices. Heating water to at least 70° C for 10 minutes or boiling water for one minute at sea level (three minutes at high altitudes) is also acceptable.

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Parasitic protozoons survive waste water and drinking water treatment plants in Galicia

Date:

February 23, 2011

Source:

Plataforma SINC

Summary:

Researchers have detected parasitic protozoons in the effluent discharged from waste water and drinking water treatment plants in Galicia (Spain), as well as in the water in recreational areas. The protozoons studied, which are members of the *Cryptosporidium* and *Giardia* genuses, cause intestinal upsets in cattle and immunosuppressed people.

Researchers from the Galician Institute of Food Quality have detected parasitic protozoons in the effluent discharged from waste water and drinking water treatment plants in Galicia (Spain), as well as in the water in recreational areas. The protozoons studied, which are members of the *Cryptosporidium* and *Giardia* genuses, cause intestinal upsets in cattle and immunosuppressed people.

"The presence of two resistant forms of protozoons, the oocysts from the *Cryptosporidium* genus and cysts of the *Giardia* genus, is one of the greatest public health problems in water supply, because these parasites can easily survive our water treatment systems," says José Antonio Castro Hermida, a scientist at the Galician Institute for Food Quality in the Xunta de Galicia (regional government).

A team led by this researcher took 232 water samples in 55 Galician towns, and confirmed the presence of these infectious life forms in waste water treatment plants, drinking water treatment plants, and recreational areas.

The results of the study, which has been published in the journal *Water Research*, reveal that *Cryptosporidium* and *Giardia* are widely distributed in the environment, and also highlight the ineffectiveness of the treatments used to reduce and deactivate these parasites.

Giardia cysts appeared in 96% of the waste water samples discharged from treatment plants, at levels of up to 6,000 per litre, while 64% of samples contained *Cryptosporidium* oocysts. These figures were 36.5% and 32.7%, respectively, in the case of drinking water treatment plants, and around 60% in recreational areas, for both protozoons.

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It was also found that treatment plants located along the coastal belt discharge their effluent directly into the sea, while those located in inland areas get rid of their water straight into rivers. "This represents a significant risk to human and animal health," warns Castro Hermida.

Cryptosporidiosis and giardiasis are parasitic illnesses that cause a syndrome of poor nutrient absorption and diarrhoea in mammals and birds. This causes high morbidity and mortality rates in domestic ruminants during their first month of life, leading to significant economic losses for livestock farms. In humans, the prevalence of these two illnesses is heightened among people with AIDS and other immunosuppressant conditions

A global problem and possible solutions

The researchers acknowledge that it is not easy to find a definitive solution to these water-borne infections, which are found all over the world. Since the parasites can overcome the normal water treatment systems used in waste water and drinking water treatment plants, there are frequent outbreaks of epidemics, even in developed countries.

"Protecting water sources, making progress on treatment and monitoring the parameters of water quality indicators in real time are some of the preventive measures that can be put in place," says Castro Hermida, "as well as drawing up control plans to monitor the levels of presence, viability and ineffectiveness of these protozoans in the waste water from drinking water and waste water treatment plants."

Cooperation between governments and the industries involved in monitoring water is also considered essential. In the United Kingdom and the USA, the Drinking Water Inspectorate (DWI) and the Environmental Protection Agency (EPA), respectively, oblige water companies to monitor the presence or absence of these two parasites.

Legislation in Spain states that action must be taken to determine the amount of *Cryptosporidium* and other organisms in the water when water turbidity exceeds 5 UNF (the unit used to measure this aspect). However, 403,000 people were infected by this protozoon in Milwaukee (USA) in 1993, when water turbidity levels fluctuated between 0.25 and 1.70 UNF, so the researchers recommend that the presence of the two enteropathogens should be monitored at much lower turbidity levels.

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Story Source:

The above story is based on materials provided by Plataforma SINC. *Note: Materials may be edited for content and length.*

Journal Reference:

1. José Antonio Castro-Hermida, Ignacio García-Preledo, Marta González-Warleta, Mercedes Mezo. **Cryptosporidium and Giardia detection in water bodies of Galicia, Spain.** *Water Research*, 2010; 44 (20): 5887
DOI: [10.1016/j.watres.2010.07.010](https://doi.org/10.1016/j.watres.2010.07.010)

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***Giardia* Cysts in Wastewater Treatment Plants in Italy**

1. Simone M. Cacciò¹,
2. Marzia De Giacomo¹,
3. Francesca A. Aulicino² and
4. Edoardo Pozio^{1,*}

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<http://aem.asm.org/content/69/6/3393.full>

1. ¹Laboratory of Parasitology
2. ²Laboratory of Environmental Hygiene, Istituto Superiore di Sanità, 00161 Rome, Italy

ABSTRACT

Reductions in annual rainfall in some regions and increased human consumption have caused a shortage of water resources at the global level. The recycling of treated wastewaters has been suggested for certain domestic, industrial, and agricultural activities. The importance of microbiological and parasitological criteria for recycled water has been repeatedly emphasized. Among water-borne pathogens, protozoa of the genera *Giardia* and *Cryptosporidium* are known to be highly resistant to water treatment procedures and to cause outbreaks through contaminated raw or treated water. We conducted an investigation in four wastewater treatment plants in Italy by sampling wastewater at each stage of the treatment process over the course of 1 year. The presence of the parasites was assessed by immunofluorescence with monoclonal antibodies. While *Cryptosporidium* oocysts were rarely observed, *Giardia* cysts were detected in all samples throughout the year, with peaks observed in autumn and winter. The overall removal efficiency of cysts in the treatment plants ranged from 87.0 to 98.4%. The removal efficiency in the number of cysts was significantly higher when the secondary treatment consisted of active oxidation with O₂ and sedimentation instead of activated sludge and sedimentation (94.5% versus 72.1 to 88.0%; $P = 0.05$, analysis of variance). To characterize the cysts at the molecular level, the β -giardin gene was PCR amplified, and the products were sequenced or analyzed by restriction. Cysts were typed as assemblage A or B, both of which are human pathogens, stressing the potential risk associated with the reuse of wastewater.

At the global level, there has been a growing shortage of freshwater reserves, mainly those of good quality, as a result of increasing human consumption and, in some regions, decreases in the annual rainfall or annual rainfall consisting mostly of heavy rain, which is poorly absorbed by the soil (19, 20, 21). To

address this problem, dual water networks in which treated wastewater can be used for domestic, industrial, and agricultural purposes, for which the use of water with a low level of chemical or microbiological contaminants would not represent a threat to human health have been proposed (18).

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The importance of microbiological and parasitological criteria for controlling the contamination of recycled water has been repeatedly emphasized. In industrialized countries, the most common human parasitic protozoa transmitted by water belong to the genera *Giardia* and *Cryptosporidium* (34). Giardiasis and cryptosporidiosis are also common infections of domestic and wild animals, which shed a large number of cysts and oocysts in the environment. These cysts are insensitive to disinfectants at the concentration commonly used in water treatment plants to reduce bacterial contamination, although it has been shown that at higher concentrations of chlorine and ozone, *Giardia* cysts are less resistant than *Cryptosporidium* oocysts (35). Moreover, *Giardia* cysts have been shown to survive in water for up to 2 months at temperatures as low as 8°C (26), and *Cryptosporidium* oocysts can survive for up to 1 year at 4°C in artificial seawater (36). Furthermore, the infectious dose has been estimated to be as low as 10 cysts for *Giardia* (1) and 30 oocysts for *Cryptosporidium* (12).

Numerous water-borne outbreaks of giardiasis and cryptosporidiosis have been documented in the past several decades, mainly in the United States, Europe, and Australia (33, 34). This has led the U.S. Environmental Protection Agency (EPA) to regulate the level of *Giardia* cysts and *Cryptosporidium* oocysts allowed in drinking water (40). To detect oocysts, many methods have been developed based on the filtration of large volumes of water, followed by centrifugation, clarification (either by density gradients or immunomagnetic separation), and microscopic screening of the sample after staining with monoclonal antibodies (28). Although these methods have proven to be very useful for determining whether or not waters are contaminated with parasites, they cannot distinguish among the different species or genotypes. To this end, PCR assays have been developed (33), yet the efficiency of amplification techniques is often reduced by the presence of inhibitory substances in water samples, such as humic and fulvic acids (37, 42).

In Italy, there are few published data on the prevalence of *Giardia* and *Cryptosporidium* in wastewaters. The objectives of the present study were to evaluate the prevalence of these parasites in four wastewater treatment plants, to estimate the efficiency of treatment plants in removing these parasites, to develop a reliable method for DNA extraction from concentrated water samples, and to determine the species and genotype of these parasites by means of a molecular assay.

MATERIALS AND METHODS

Sample collection and processing. Samples were collected at four wastewater treatment plants. One plant was located in northern Italy (plant 1, located in the city of Bergamo, Lombardy region), and three plants were located in southern Italy (plant 2, city of Naples, Campania region; plant 3, city of Cagliari, Sardinia region; and plant 4, city of Palermo, Sicily region). Samples (15 to 20 liters) of untreated wastewater (influent) and of primary, secondary, and final effluent were collected during the spring, summer, autumn, and winter of the year 2000. To be able to examine the same wastewater at various points in the treatment process, when collecting the samples, the holding times of each step in the process were respected.

The specific steps in the treatment process used in each of the four plants are described in Table 1. The treatment carried out at plant 1 differed from that at the other three plants. Specifically, primary treatment did not include sedimentation, and secondary treatment consisted of oxidation with O₂ and sedimentation, whereas in the other three plants it consisted of activated sludge and sedimentation. Furthermore, no disinfection was used in plant 1. In plant 1, since it was not physically possible to collect samples at the end of the primary treatment, the first sample of treated wastewater was collected shortly after the oxidation process had begun. In plant 4, samples were not collected after the primary treatment.

TABLE 1.

Main features of treatment plants and removal of *Giardia* cysts

The water samples were filtered through a 50-mesh sieve (300 µm) to remove large particles and then concentrated by filtration on cellulose-acetate filters (0.8-µm pore size, 142-mm diameter; Nucleopore-Whatman, Clifton, N.J.) (2). The filter was placed in a 50-ml conical polypropylene centrifuge tube and dissolved with acetone. After centrifugation at 4,620 × *g* for 10 min at 4°C, the supernatant was discarded, and about 5 ml of pellet was left at the bottom of the tube. The pellet was resuspended in 50 ml of 95% alcohol, centrifuged, resuspended in 50 ml of 70% alcohol, centrifuged, resuspended in 50 ml of phosphate-buffered saline containing 0.1% Tween 80, 0.1% sodium dodecyl sulfate, and 0.001% antifoam agent B (Sigma, St. Louis, Mo.), and centrifuged, leaving a 5-ml pellet. An aliquot of 50 µl of the pellet was serially diluted (1:10, 1:50, and 1:100) and examined by immunofluorescence with anti-*Giardia* and anti-*Cryptosporidium* monoclonal antibodies conjugated to fluorescein isothiocyanate according to the manufacturer's protocol (Meridian Diagnostics, Inc., Cincinnati, Ohio).

Giardia cysts were identified based on their size, shape, and the pattern and intensity of immunofluorescent assay staining (i.e., bright green fluorescence of the cyst wall). *Cryptosporidium* oocysts were identified based on their size,

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shape, and the presence of a suture on the oocyst wall at a magnification of 1,000×. The number of oocysts was counted for each sample in triplicate.

Statistical analysis. To evaluate the removal efficiency of *Giardia* cysts at the four plants, the logarithm of the number of cysts in the influent and in the effluent before disinfection was evaluated to overcome the biases due to the variable number of cysts in the influent of the four plants and the fact that, independently of the efficiency of a plant, the higher the number of cysts in the influent, the larger the difference between the number of cysts in the influent and that in the effluent. The removal efficiency of plant 1 (i.e., that with an active oxidation with O₂ and sedimentation) was compared with those of plants 2, 3, and 4, which used activated sludge and sedimentation, by analysis of variance, having specified the active oxidation with O₂ and sedimentation as nested within the plant.

DNA extraction and PCR amplification. DNA extraction was performed according to the method of Da Silva et al. (11). Briefly, 0.4 ml of concentrated wastewater was homogenized with the FP120 FastPrep cell disruptor (Q-Biogene, Carlsbad, Calif.). The DNA released from disrupted cysts was purified with the FastDNA kit (Q-Biogene, Carlsbad, Calif.), and stored at 4°C.

A 753-bp product from the β-giardin gene of *Giardia* was amplified with the forward primer G7 (5'-AAGCCCGACGACCTCACCCGCGAGTGC-3') and the reverse primer G759 (5'-GAGGCCGCCCTGGATCTTCGAGACGAC-3') (7). The variable region of the small-subunit rRNA gene of *Cryptosporidium* was amplified with the forward primer 5'-AAGCTCGTAGTTGGATTCTG-3' and the reverse primer 5'-TAAGGTGCTGAAGGAGTAAGG-3' (17). The PCR mix consisted of 1× buffer containing 1.5 mM MgCl₂, 200 μM deoxynucleoside triphosphate mix, 25 pmol of each primer, 1.25 U of AmpliTaq DNA polymerase (Applied Biosystems, Branchburg, N.J.), and 1 to 5 μl of purified DNA in a final volume of 50 μl. Negative and positive controls were included in each batch of experiments.

PCR was performed as follows: after an initial denaturation of 5 min at 94°C, a set of 35 to 40 cycles was run, each consisting of 30 s at 94°C, 30 s at 65°C, and 60 s at 72°C, followed by a final extension of 5 min at 72°C. PCR products were detected by agarose gel electrophoresis and visualized by ethidium bromide staining. The products were purified with the QiaQuick kit (Qiagen, Hilden, Germany).

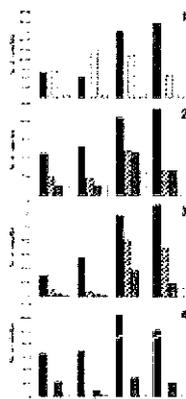
Molecular identification of cysts by sequence analysis or PCR-restriction fragment length polymorphism analysis. PCR products were sequenced with the ABI Prism BigDye terminator cycle sequencing kit (Applied Biosystems, Branchburg, N.J.) and a set of internal primers. Sequencing reactions were analyzed on an ABI 310 automatic DNA sequencer (Applied Biosystems, Branchburg, N.J.). Sequences were assembled with the program SeqMan II (DNAStar).

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Nucleic acids were extracted from aliquots (0.4 ml) of concentrated influent samples collected at the four plants; each aliquot contained approximately 600 to 2,000 cysts. To identify *Giardia* cysts, aliquots of β -giardin PCR products were digested for 4 h at 37°C with 10 U of *Hae*III (New England BioLabs, Beverly, Mass.) in a final volume of 20 μ l. The predicted restriction patterns were fragments of 202, 201, 150, 126, and 74 bp for assemblage A, and fragments of 202, 176, 150, 117, 84, and 24 bp for assemblage B. Restriction fragments were separated by electrophoresis on a 3% Metaphor gel (FMC, Rockland, Maine) and visualized after ethidium bromide staining.

RESULTS

Prevalence of protozoa in wastewater samples. *Giardia* cysts were found in the influents of all plants throughout the year. The estimated mean number of cysts per liter ranged from 2.1×10^3 to 4.2×10^4 . In all plants, the highest number of cysts was found in autumn and winter (Fig. 1). *Cryptosporidium* oocysts were only detected in two plants: twice in the influents of plant 1 (40 and 2.5 oocysts/liter) and once in the influent of plant 4 (277 oocysts/liter), always during the spring and only before primary treatment.



[View larger version:](#)

FIG. 1.

Number of *Giardia* cysts per liter in wastewater samples collected at different steps in the treatment process at treatment plants in Bergamo (plant 1), Naples (plant 2), Cagliari (plant 3), and Palermo (plant 4) in the spring, summer, autumn, and winter of the year 2000. Solid bars, influent samples; thick striped bars, samples after primary treatment; gray bars, samples after secondary treatment; white bars, effluent samples. In plant 1, the thin striped bars show the number of *Giardia* cysts shortly after oxidation with O_2 had begun, and the white bars show the number of *Giardia* cysts after oxidation with O_2 and sedimentation was completed. In plant 4, no samples were collected after primary treatment.

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The removal efficiency of *Giardia* cysts after primary treatment, which was evaluated at plants 2 and 3, was 50.2 and 65.2%, respectively (geometric means for the four seasons). At plant 1, where the first treated sample was collected shortly after the oxidation process had begun, the number of cysts was observed to have increased by 17.5% in the spring and by 132.9% in the summer.

In plants 2 and 3, the removal efficiency of the secondary treatment (i.e., activated sludge and sedimentation) was 43.9 and 61.0%, respectively. In a single sample collected during the winter at plant 2, an increase of 4% in the number of cysts was observed (Fig. 1). The removal efficiency of the disinfection process, which was carried out at plants 2, 3, and 4, was 53.2, 70.8, and 87.0%, respectively (Fig. 1).

The overall removal efficiency of *Giardia* cysts was 94.5, 87.0, 96.0, and 98.4% in plants 1, 2, 3, and 4, respectively (Fig. 1). The removal efficiency when comparing untreated wastewater samples to those after secondary treatment was 94.5, 72.1, 86.4, and 88.0% for plants 1, 2, 3, and 4, respectively. At plant 1, the secondary treatment consisted of active oxidation with O₂ and sedimentation (i.e., the final treatment), because a disinfection process was not applied at this plant. This treatment resulted in a higher removal efficiency in comparison to that observed in the other three plants, and the difference was significant ($P = 0.05$, analysis of variance).

Molecular identification of parasites. PCR amplification of the 753-bp fragment of the β -giardin gene was performed on these templates, and products of the expected size were obtained with 1 to 2 μ l of template, which corresponds to 10 to 50 cysts (Fig. 2). At least one PCR product from each plant was sequenced (Table 2), whereas all 16 influent samples were analyzed with a PCR-restriction fragment length polymorphism assay (Fig. 3).

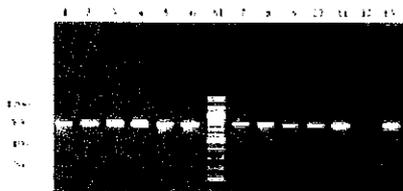


FIG. 2.

Electrophoretic separation of β -giardin amplification products from wastewater samples. Lanes 1 to 3, influent samples from the plant 1; lanes 4 to 6, influent samples from plant 2; lane M, 100-bp molecular ladder; lanes 7 to 9, influent samples from plant 3; lanes 10 and 11, influent samples from plant 4; lane 12, negative control; lane 13, positive control.

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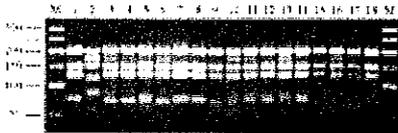


FIG. 3.

Electrophoretic separation of β -giardin PCR products after restriction with the endonuclease *HaellI*. Lanes M, 50-bp molecular ladder; lane 1, positive control for assemblage A; lane 2, positive control for assemblage B; lanes 3 to 6, samples of influent from plant 1; lanes 7 to 10, samples of influent from plant 2; lanes 11 to 14, samples of influent from plant 3; lane 15 to 18, samples of influent from plant 4. For each plant, influent samples from spring, summer, autumn, and winter were typed and are shown in that order. Note the concomitant presence of restriction fragments specific for assemblages A and B in samples 3, 4, 5, 10, 11, 13, 16, and 18.

TABLE 2.

Genetic typing of *Giardia* cysts detected in four wastewater treatment plants in Italy

As shown in Table 2, cysts of assemblage A were detected in eight samples, whereas in the other eight samples cysts of both assemblages A and B were detected by sequencing and/or by PCR-restriction fragment length polymorphism (Fig. 3). Amplification of *Cryptosporidium* DNA from the three positive samples was not obtained.

DISCUSSION

Giardia and *Cryptosporidium* spp. can be transmitted to humans through contaminated water and food, in addition to the classical oral-fecal route. Transmission is sustained by both a zoonotic and an anthroponotic cycle (14, 38). The infected hosts, whether animals or humans, shed very large numbers of oocysts with their feces, thereby increasing the environmental contamination. Moreover, oocysts can withstand normal water disinfection processes, and they have been found in significant quantities in the final effluents of sewage treatment works (e.g., see reference 31).

Our investigation of the four plants revealed that *Giardia* cysts were ubiquitous, whereas *Cryptosporidium* oocysts were quite rare. Similar prevalence rates were reported in wastewater collected at a treatment plant in Bari, a city in southern Italy, where the number of *Giardia* cysts was 100-fold than the number of *Cryptosporidium* oocysts (5). Since the parasites detected in our study were probably of human origin, given that the wastewater was from cities and not from agricultural areas, these results suggest that the prevalence of cryptosporidiosis is lower than that of giardiasis; this is also supported by the results of surveys of

intestinal parasites in Italy's general population (3, 10, 23). That the prevalence of cryptosporidiosis is relatively low in Italy compared to other countries is supported by the results of previous studies, in which the prevalence among persons with AIDS before the introduction of highly active antiretroviral therapy, which is considered to reflect the prevalence among the general population, was 1.9% (27), compared to 5 to 6% in the United States (9). A prevalence of 1.9% was also reported among immunocompetent children in Italy (4).

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Although *Giardia* cysts were found in all of the wastewater samples in the four treatment plants throughout the year, the greatest number of cysts was found in the autumn and winter. Although a similar seasonal pattern has been reported by some authors (16, 41), it has not been confirmed by others (15, 30); thus, it is not clear whether or not seasonality is a general feature of *Giardia* contamination.

As shown in Fig. 1, an increase in *Giardia* cysts was observed three times during the purification process in the plants. As *Giardia* does not reproduce outside the host, this was probably due to the fact that the aggregated protozoa desegregated before sedimentation, thus increasing the concentration of free parasites in the sample, as also observed by other authors (6).

The overall removal efficiency ranged from 87.0 to 98.4% at the different plants, which is consistent with estimates from other treatment plants that use similar processes (8, 31). The highest removal efficiency was at plant 4 (98.4%), perhaps as a consequence of filtration, which was applied after the secondary treatment and before disinfection; although the filter had 60- μm pores and *Giardia* cysts measure 15 to 18 μm , aggregated cysts could have been trapped. However, the process of oxidation with O_2 and sedimentation used at plant 1 resulted in greater cyst reduction than that obtained by the activated sludge and sedimentation methods used at the other three plants ($P = 0.05$, analysis of variance). To determine whether active oxidation with O_2 is truly more effective than activated sludge in reducing the number of *Giardia* cysts, additional research will be needed. In fact, the present results may be biased by several factors, including the limited number of samples examined, the different volume of water treated in each plant (from 500 to 6,000 m^3/hour), and the seasonality in the number of *Giardia* cysts.

Most studies on *Giardia* contamination of water have been limited to estimating the prevalence (15, 16, 22), and little information has been published on the specific contaminating species. However, this is of particular importance, since only *Giardia duodenalis* is associated with human infection (38), and only two of the seven *G. duodenalis* assemblages (i.e., assemblages A and B) have been found in humans (39). Therefore, the simple presence of *Giardia* cysts in the absence of data on the species or assemblage does not imply a risk of transmission to humans. Most studies have been conducted by spiking water samples with a known number of cysts, followed by evaluation of procedures for recovery and typing of the organism (32). In the few instances when nonspiked

water samples were studied, the sensitivity and specificity of the PCR assays were low. In a study of drinking water samples performed after an outbreak of giardiasis in Canada, the direct typing of cysts by PCR amplification of the triose phosphate isomerase gene was unsuccessful, possibly because of the small number of cysts (25). In a study on sewage samples from Finland, nonspecific PCR amplifications were observed with primers targeting the glutamate dehydrogenase gene, and a further characterization of the *Giardia* cysts was not possible (29).

In our study, nucleic acids were efficiently extracted from concentrated wastewater samples with a method that had been developed for detecting protozoa present in fecal samples (7, 11). This method is rapid, in that it allows up to 12 samples to be simultaneously processed in about 1 h, and the DNA extracted is essentially free of inhibitors and can thus be efficiently amplified by PCR (Fig. 2). Moreover, we have shown that the β -giardin PCR assay yields robust and specific amplification products and that it allows the rapid identification of genotypes by sequence analysis or restriction analysis (Fig. 3). The better performance of this assay is probably due to the amplification target chosen, since giardin proteins are considered unique to *Giardia* (13), and primers that do not cross-react with other organisms can be designed (24).

The results indicate that water processed at the four treatment plants could be a potential source of human infection with *G. duodenalis*, although the viability of the cysts was not investigated. In Italy, about 80% of drinking water is from ground water, and only 20% originates from surface water, which is more easily contaminated with parasitic protozoa. However, the release of contaminated effluents into the environment could increase the risk of human infection with these pathogens through the consumption of vegetables. Moreover, the results stress the importance of the microbiological control of effluents from wastewater treatment plants and the need for regulations that establish the acceptable concentrations of oocysts based on the use of wastewaters, i.e., if they should be recycled in the cities for public and/or in-house dual systems, for agricultural purposes, which could be limited to certain crops only, or for industry.

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***Giardia* Cysts in Wastewater Treatment Plants in Italy**

TABLE 1. <http://aem.asm.org/content/69/6/3393/T1.expansion.html>

Main features of treatment plants and removal of *Giardia* cysts

Plant	Population served	Primary treatment	Secondary treatment	Disinfection	% Removal of <i>Giardia</i> cysts (mean geometric value)
1	153,000	Screening and grit separation	Oxidation with O ₂ and Sedimentation	None	94.5
2	300,000	Screening, grit separation, and sedimentation	Activated sludge and sedimentation	Chlorination (0.05-1 ppm)	87.0
3	330,000	Screening, grit separation, and sedimentation	Activated sludge and sedimentation	Chlorination (0.05-1 ppm)	96.0
4	100,000	Screening, grit separation and sedimentation	Activated sludge and sedimentation	Filtration (60- μ m pore) and peracetic acid (4 ppm)	98.4

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Methicillin-Resistant *Staphylococcus aureus* (MRSA) Detected at Four U.S. Wastewater Treatment Plants

Rachel E. Rosenberg Goldstein,¹ Shirley A. Micallef,^{1,2} Shawn G. Gibbs,³ Johnnie A. Davis,⁴ Ashish George,¹ Lara M. Kleinfelter,¹ Nicole A. Schreiber,¹ Sampa Mukherjee,⁴ Amir Sapkota,⁵ and Amy R. Sapkota¹

¹Maryland Institute for Applied Environmental Health, University of Maryland School of Public Health, College Park, Maryland, USA; ²Department of Plant Science and Landscape Architecture and Center for Food Safety and Security Systems, University of Maryland, College Park, Maryland, USA; ³Department of Environmental, Agricultural & Occupational Health, College of Public Health, University of Nebraska Medical Center, Omaha, Nebraska, USA; ⁴Center for Veterinary Medicine, U.S. Food and Drug Administration, Laurel, Maryland, USA; ⁵Department of Epidemiology and Biostatistics, University of Maryland School of Public Health, College Park, Maryland, USA; ⁶Department of Cell Biology and Molecular Genetics, University of Maryland College Park, College Park, Maryland, USA

BACKGROUND: The incidence of community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA) infections is increasing in the United States, and it is possible that municipal wastewater could be a reservoir of this microorganism. To date, no U.S. studies have evaluated the occurrence of MRSA in wastewater.

OBJECTIVE: We examined the occurrence of MRSA and methicillin-susceptible *S. aureus* (MSSA) at U.S. wastewater treatment plants.

METHODS: We collected wastewater samples from two Mid-Atlantic and two Midwest wastewater treatment plants between October 2009 and October 2010. Samples were analyzed for MRSA and MSSA using membrane filtration. Isolates were confirmed using biochemical tests and PCR (polymerase chain reaction). Antimicrobial susceptibility testing was performed by Sensititre[®] microbroth dilution. Staphylococcal cassette chromosome *mec* (SCC*mec*) typing, Panton-Valentine leucocidin (PVL) screening, and pulsed field gel electrophoresis (PFGE) were performed to further characterize the strains. Data were analyzed by two-sample proportion tests and analysis of variance.

RESULTS: We detected MRSA ($n = 240$) and MSSA ($n = 119$) in 22 of 44 (50%) and 24 of 44 (55%) wastewater samples, respectively. The odds of samples being MRSA-positive decreased as treatment progressed: 10 of 12 (83%) influent samples were MRSA-positive, while only one of 12 (8%) effluent samples was MRSA-positive. Ninety-three percent and 29% of unique MRSA and MSSA isolates, respectively, were multidrug resistant. SCC*mec* types II and IV, the *pvl* gene, and USA types 100, 300, and 700 (PFGE strain types commonly found in the United States) were identified among the MRSA isolates.

CONCLUSIONS: Our findings raise potential public health concerns for wastewater treatment plant workers and individuals exposed to reclaimed wastewater. Because of increasing use of reclaimed wastewater, further study is needed to evaluate the risk of exposure to antibiotic-resistant bacteria in treated wastewater.

KEY WORDS: antibiotic resistance, community-acquired methicillin-resistant *Staphylococcus aureus*, methicillin-resistant *Staphylococcus aureus*, methicillin-susceptible *Staphylococcus aureus*, MRSA, MSSA, reclaimed wastewater, wastewater, wastewater treatment plant. *Environ Health Perspect* 120:1551–1558 (2012). <http://dx.doi.org/10.1289/ehp.1205436> [Online 6 September 2012]

Staphylococcus aureus is a bacterial pathogen associated with a wide range of human infections, including skin infections, pneumonia, and septicemia (Bassetti et al. 2009). Infections with this microorganism can be difficult to treat because the strains are often resistant to one or more antibiotics, including methicillin. Methicillin-resistant *S. aureus* (MRSA) was first isolated in 1960, and for the past four decades MRSA infections have been largely associated with hospital environments and referred to as hospital-acquired MRSA (HA-MRSA) (Bassetti et al. 2009; Gorwitz et al. 2008). However, in the late 1990s, community-acquired MRSA (CA-MRSA) infections began to appear in otherwise healthy people who had no known risk factors for these infections (Bassetti et al. 2009; Gorak et al. 1999). The incidence of CA-MRSA has continued to increase in the United States. Outbreaks of CA-MRSA have occurred

among individuals sharing close contact with others in schools, prisons, and locker rooms, but other possible environmental reservoirs of MRSA have yet to be comprehensively explored (Diekema et al. 2001).

Identifying environmental reservoirs of MRSA in the community is critical if the spread of CA-MRSA infections is to be controlled. Of other potential environmental reservoirs, wastewater has been identified as a possible source of exposure to MRSA in the community (Börjesson et al. 2009, 2010; Plano et al. 2011). Colonized humans shed MRSA from the nose, feces, and skin; therefore, MRSA can end up in municipal wastewater streams (Börjesson et al. 2009, 2010; Plano et al. 2011; Wada et al. 2010). Börjesson et al. (2009) recently detected MRSA resistance genes in all treatment steps at a Swedish municipal wastewater treatment plant (WWTP). These authors

also cultured MRSA from influent samples (Börjesson et al. (2009), as well as influent and activated sludge samples (Börjesson et al. 2010). Currently, as water shortages expand, treated municipal wastewater is increasingly used for applications including landscape and crop irrigation, groundwater recharge, and snowmaking (Levine and Asano 2004; Tonkovic and Jeffcoat 2002). During these activities, individuals applying, using, or coming in contact with reclaimed wastewater could potentially be exposed to MRSA and other bacteria that may remain in treated wastewater (Iwane et al. 2001).

To our knowledge, no studies have demonstrated the occurrence of MRSA in wastewater in the United States. In the present study, we evaluated the occurrence of MRSA and methicillin-susceptible *S. aureus* (MSSA) at four WWTPs located in two different regions of the United States: the Mid-Atlantic region and the Midwest. To further assess the MRSA strains, isolates were characterized by staphylococcal cassette chromosome *mec* (SCC*mec*) typing and pulsed field gel electrophoresis (PFGE), and screened for Panton-Valentine leucocidin (PVL), an exotoxin often associated with virulent strains of *S. aureus*.

Materials and Methods

Study sites. Four WWTPs were included in this study: two in the Mid-Atlantic region and two in the Midwest. The treatment steps and sampling locations at each of the treatment plants are illustrated in Figure 1.

Address correspondence to A.R. Sapkota, University of Maryland School of Public Health, Maryland Institute for Applied Environmental Health, 2234P SPH Building, College Park, MD 20742 USA. Telephone: (301) 405-1772. Fax: (301) 314-1012. E-mail: ars@umd.edu

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Mid-Atlantic WWTP1 (Figure 1A) is a tertiary WWTP in an urban area that processes 681,390 m³/day of wastewater, with a peak capacity of 1.51 million m³/day. Mid-Atlantic WWTP2 (Figure 1B), a tertiary WWTP in a suburban area, processes 7,570 m³/day of wastewater and has a peak capacity of 45,425 m³/day. Tertiary wastewater treatment includes primary treatment (physical removal of solids), secondary treatment (biological treatment), and additional treatment that can include, but is not limited to, chlorination,

ultraviolet radiation, or filtration. The incoming wastewater (influent) at both Mid-Atlantic plants includes domestic and hospital wastewater, and effluent (discharge) from both Mid-Atlantic plants is piped to landscaping sites for reuse in spray irrigation.

Midwest WWTP1 (Figure 1C) is a tertiary WWTP in a rural area that processes 1,363 m³/day of wastewater, with a peak capacity of 10,978 m³/day. The incoming water includes domestic wastewater and agriculturally influenced stormwater. Seasonal

chlorination takes place in June, July, and August, and unchlorinated effluent is piped to a landscaping site for reuse in spray irrigation. Midwest WWTP2 (Figure 1D), a secondary WWTP (with no on-site disinfection) in a rural area, processes 1,439 m³/day and has a peak capacity of 7,571 m³/day. Secondary wastewater treatment includes only primary treatment (physical removal of solids) and secondary treatment (biological treatment). The incoming water at this plant includes domestic wastewater, wastewater from a food production facility, and agriculturally influenced stormwater. Unchlorinated effluent is piped to an agricultural site for crop irrigation.

Sample collection. A total of 44 grab samples were collected between October 2009 and October 2010: 12 samples from Mid-Atlantic WWTP1; 8 from Mid-Atlantic WWTP2; 12 from Midwest WWTP1; and 12 from Midwest WWTP2. The timing of each sampling event was determined by the availability and schedule of the WWTP operators. The sampling time schedule and specific sampling locations for each plant are indicated in Tables 1 and 2 and Figure 1. Samples were collected in 1-L sterile polyethylene Nalgene® Wide Mouth Environmental Sample Bottles (Nalgene, Lima, OH), labeled, and transported to the laboratory at 4°C. All samples were processed within 24 hr.

Isolation. Membrane filtration was used to recover *S. aureus* and MRSA from wastewater samples. Briefly, 300 mL of each sample were vacuum filtered through a 0.45-µm, 47-mm mixed cellulose ester filter (Millipore, Billerica, MA). Filters were then enriched in 40 mL of m Staphylococcus broth (Becton, Dickinson and Company, Franklin Lakes, NJ), vortexed, and incubated at 37°C for 24 hr. A 10-µL loopful of each enrichment was then plated in duplicate on MRSAselect (Bio-Rad Laboratories, Hercules, CA) and Baird Parker agar (Becton, Dickinson and Company) for the isolation of MRSA and total *S. aureus*, respectively. Plates were incubated at 37°C for 24 hr. Resulting black colonies with halos on Baird Parker agar and hot pink colonies on MRSAselect were considered presumptive

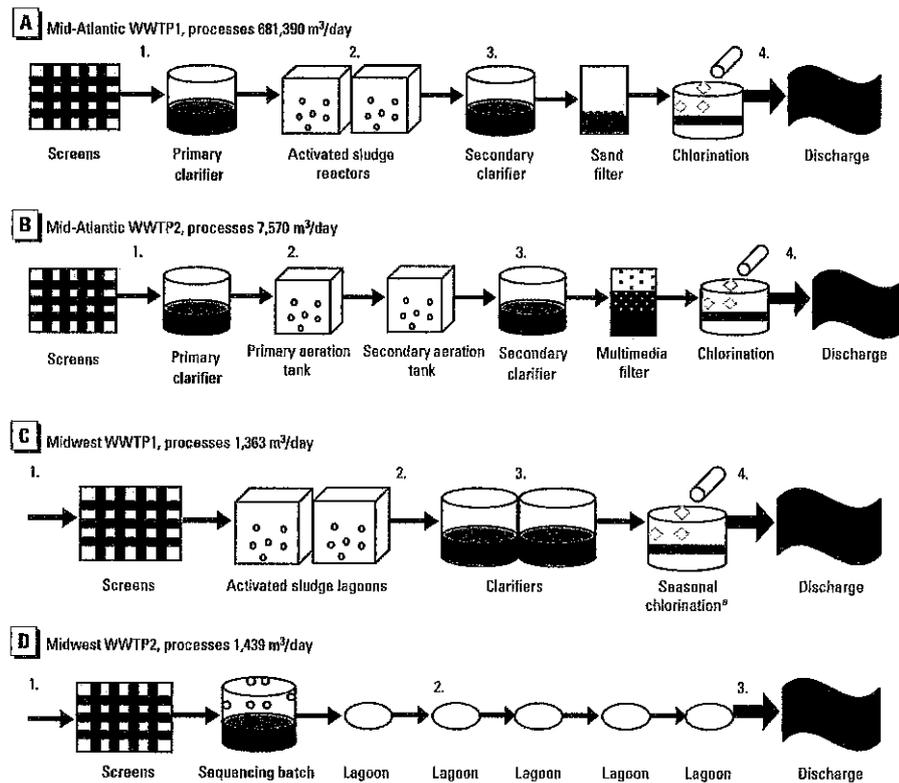


Figure 1. Schematic of wastewater treatment processes at four wastewater treatment plants in the Mid-Atlantic and Midwest regions of the United States. For Mid-Atlantic WWTP1 (A) and Mid-Atlantic WWTP2 (B), 1 = influent, 2 = activated sludge reactor, 3 = post aeration, and 4 = effluent. (C) For Midwest WWTP1, 1 = influent, 2 = post aeration, 3 = secondary clarifier, and 4 = effluent. (D) For Midwest WWTP2, 1 = influent, 2 = cell B, and 3 = effluent.

*Seasonal chlorination takes place in June, July, and August.

Table 1. Distribution of MRSA-positive and -negative wastewater samples at all WWTPs by sampling event and sampling location.

Sampling location (total samples collected)	Mid-Atlantic WWTP1 (n = 12)			Mid-Atlantic WWTP2 (n = 8)		Midwest WWTP1 (n = 12)			Midwest WWTP2 (n = 12)				Total positive samples (%)
	Oct 2009	Dec 2009A	Dec 2009B	Oct 2010A	Oct 2010B	Jul 2010	Sep 2010	Oct 2010	Jul 2010	Aug 2010	Sep 2010	Oct 2010	
Influent (n = 12)	Pos	Pos	Pos	Pos	Pos	Neg	Pos	Pos	Pos	Pos	Neg	Pos	10/12 (83)
Activated sludge reactor (n = 5)	Pos	Pos	Pos	Pos	Pos	—	—	—	—	—	—	—	5/5 (100)
Post aeration (n = 3)	—	—	—	—	—	Neg	Pos	Pos	—	—	—	—	2/3 (67)
Cell B (n = 4)	—	—	—	—	—	—	—	—	Neg	Neg	Neg	Neg	0/4 (0)
Secondary clarifier (n = 8)	Neg	Pos	Pos	Neg	Neg	Pos	Neg	Pos	—	—	—	—	4/8 (50)
Effluent (n = 12)	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Pos ^a	Neg	Neg	Neg	Neg	1/12 (8)
Total positive samples (%)	2/4 (50)	3/4 (75)	3/4 (75)	2/4 (50)	2/4 (50)	1/4 (25)	2/4 (50)	4/4 (100)	1/3 (33)	1/3 (33)	0/3 (0)	1/3 (33)	22/44 (50)

Abbreviations: Neg, negative sample; Pos, positive sample. Samples were collected twice during December 2009 at Mid-Atlantic WWTP1 (A and B) and twice during October 2010 at Mid-Atlantic WWTP2 (A and B).

^aSample was collected when chlorination of effluent was not taking place.

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S. aureus and MRSA, respectively. These colonies were purified on Brain Heart Infusion (BHI) agar (Becton, Dickinson and Company) and archived in Brucella broth (Becton, Dickinson and Company) with 15% glycerol at -80°C. For quality control and quality assurance throughout the isolation process, *S. aureus* ATCC 43300 [American Type Culture Collection (ATCC), Manassas, VA] was used as a positive control and phosphate-buffered saline was used as a negative control.

Identification. *S. aureus* and MRSA were confirmed using Gram stain, the coagulase test (Becton, Dickinson and Company), the catalase test, and polymerase chain reaction (PCR). DNA extraction was carried out using the MoBio UltraClean® Microbial DNA Isolation Kit (Mo Bio Laboratories, Carlsbad, CA) following the manufacturer's recommendations. For confirmation of *S. aureus*, we carried out PCR amplification of the *S. aureus*-specific *nuc* gene using NUC1 and NUC2 primers (Fang and Hedin 2003). For MRSA differentiation, we performed PCR amplification targeting the *mecA* gene, which encodes for methicillin resistance, using ECA1 and MECA2 primers, as previously described by Fang and Hedin (Brakstad et al. 1992; Fang and Hedin 2003; Smyth et al. 2001). The method was modified by including an internal control, using primers targeting the 16S rDNA genes, in a multiplex PCR assay (Edwards et al. 1989). PCR amplification consisted of an initial denaturing step of 95°C for 3 min, followed by 34 cycles of denaturing at 94°C for 30 sec, annealing at 55°C for 30 sec, and extension at 72°C for 30 sec, with a final extension at 72°C for 5 min.

Antimicrobial susceptibility testing. We performed antimicrobial susceptibility testing on all PCR-confirmed MRSA (*n* = 240) and MSSA (*n* = 119) isolates using the Sensititre® microbroth dilution system (Trek Diagnostic Systems Inc., Cleveland, OH) in accordance with the manufacturer's instructions. Overnight cultures were transferred to sterile demineralized water (Trek Diagnostic Systems) to achieve a 0.5 McFarland standard. Then, 30 µL of each suspension was transferred to sterile cation-adjusted Mueller Hinton broth

(Trek Diagnostic Systems) and 50 µL of the broth solution was then dispensed into GPN3F minimal inhibitory concentration (MIC) plates (Trek Diagnostic Systems Inc.) with the following antibiotics: erythromycin (ERY; 0.25–4 µg/mL), clindamycin (CLI; 0.12–2 µg/mL), quinupristin/dalfopristin (SYN; 0.12–4 µg/mL), daptomycin (DAP; 0.25–8 µg/mL), vancomycin (VAN; 1–128 µg/mL), tetracycline (TET; 2–16 µg/mL), ampicillin (AMP; 0.12–16 µg/mL), gentamicin (GEN; 2–16, 500 µg/mL), levofloxacin (LEVO; 0.25–8 µg/mL), linezolid (LZD; 0.5–8 µg/mL), ceftriaxone (AXO; 8–64 µg/mL), streptomycin (STR; 1,000 µg/mL), penicillin (PEN; 0.06–8 µg/mL), rifampin (RIF; 0.5–4 µg/mL), gatifloxacin (GAT; 1–8 µg/mL), ciprofloxacin (CIP; 0.5–2 µg/mL), trimethoprim/sulfamethoxazole (SXT; 1/19–4/76 µg/mL), and oxacillin+2%NaCl (OXA+; 0.25–8 µg/mL). *Enterococcus faecalis* ATCC 29212 and *S. aureus* ATCC 29213 strains were used for quality control. MICs were recorded as the lowest concentration of an antimicrobial that completely inhibited bacterial growth [Clinical and Laboratory Standards Institute (CLSI) 2010]. Resistance break points published by the CLSI were used (CLSI 2010). Multidrug resistance (MDR) was defined as resistance to two or more classes of antibiotics.

SCCmec typing. We used a multiplex PCR assay developed by Milheiro et al. (2007) to characterize the MRSA isolates (*n* = 240) by SCCmec type (Milheiro et al. 2007; Oliveira and de Lencastre 2002). SCCmec strains COL (type I), BK2464 (type II), ANS46 (type III), MW2 (type IVa), HAR22 (type IVh), and HDE288 (type VI) were used as positive controls for SCCmec typing.

PVL screening. All MRSA isolates, confirmed by possession of the *nuc* and *mecA* genes by PCR and an identifiable SCCmec type (*n* = 236), were screened for PVL by PCR of the *pvl* gene according to Strömmenger et al. (2008). *S. aureus* ATCC strain 25923 was used as a positive control.

PFGE. We performed PFGE on a subset of 22 MRSA isolates. To ensure a diverse, representative subset, isolates were selected using

the following criteria: treatment plant, sampling date, SCCmec type, and each sampling location that had a positive sample. PFGE was based on the Centers for Disease Control and Prevention (CDC) Laboratory Protocol for Molecular Typing of *S. aureus* by PFGE (CDC 2011). We used *Sma*I (Promega, Madison, WI) to digest genomic DNA. Digested samples were run in 1% SeaKem® Gold agarose gels (Cambrex Bio Science Rockland Inc., Rockland, ME) in 0.5X TBE (tris-borate-EDTA) using a CHEF Mapper (Bio-Rad) for 18.5–19 hr at 200 V, 14°C, and initial and final switch of 5 and 40 sec. Cluster analysis was performed using BioNumerics software v5.10 (Applied Maths Scientific Software Development, Saint-Martens-Latem, Belgium) using Dice coefficient and the unweighted pair-group method. Optimization settings for dendrograms were 1.0% with a position tolerance of 0.95%. Based on the similarity of the control strains, isolates were considered clones if similarity was ≥ 88%. *Salmonella* serotype Braenderup strain H9812 was used as the standard. PFGE strain types were compared with USA types (100, 200, 300, 400, 500, 600, 700, 800, 1000, and 1100).

Statistical analyses. Descriptive statistics include the percentages of wastewater samples positive for MRSA (Table 1) and MSSA (Table 2) by WWTP. Because PFGE was not performed on all isolates, statistical analyses of antibiotic resistance data were limited to MRSA (*n* = 84) and MSSA (*n* = 58) isolates expressing unique phenotypic profiles; this allowed us to reduce bias that could be introduced by including clones. Two-sample tests of proportions were performed between MRSA and MSSA isolates with respect to the percent resistance of each group of isolates to each of the 18 tested antibiotics. Analysis of variance was then used to compare the average numbers of antibiotics against which MRSA and MSSA isolates were resistant. In all cases, *p*-values ≤ 0.05 were defined as statistically significant. All statistical analyses were performed using Stata/IC 10 (StataCorp LP, College Station, TX) and SAS 9.2 (SAS Institute Inc., Cary, NC).

Table 2. Distribution of MSSA-positive and -negative wastewater samples at all WWTPs by sampling event and sampling location.

Sampling location (total samples collected)	Mid-Atlantic WWTP1 (<i>n</i> = 12)			Mid-Atlantic WWTP2 (<i>n</i> = 8)		Midwest WWTP1 (<i>n</i> = 12)			Midwest WWTP2 (<i>n</i> = 12)				Total positive samples (%)
	Oct 2009	Dec 2009A	Dec 2009B	Oct 2010A	Oct 2010B	Jul 2010	Sep 2010	Oct 2010	Jul 2010	Aug 2010	Sep 2010	Oct 2010	
Influent (<i>n</i> = 12)	Pos	Pos	Pos	Pos	Pos	Pos	Neg	Pos	Pos	Pos	Neg	Pos	10/12 (83)
Activated sludge reactor (<i>n</i> = 5)	Pos	Pos	Pos	Pos	Pos	—	—	—	—	—	—	—	5/5 (100)
Post aeration (<i>n</i> = 3)	—	—	—	—	—	Pos	Pos	Pos	—	—	—	—	3/3 (100)
Cell B (<i>n</i> = 4)	—	—	—	—	—	—	—	—	Pos	Neg	Neg	Neg	1/4 (25)
Secondary clarifier (<i>n</i> = 8)	Neg	Pos	Pos	Neg	Neg	Pos	Neg	Pos	—	—	—	—	4/8 (50)
Effluent (<i>n</i> = 12)	Neg	Neg	Neg	Neg	Neg	Neg	Pos ^a	Pos ^a	Neg	Neg	Neg	Neg	2/12 (17)
Total positive samples (%)	2/4 (50)	3/4 (75)	3/4 (75)	2/4 (50)	2/4 (50)	3/4 (75)	2/4 (50)	4/4 (100)	2/3 (67)	1/3 (33)	0/3 (0)	1/3 (33)	24/44 (55)

Abbreviations: Neg, negative sample; Pos, positive sample. Samples were collected twice during December 2009 at Mid-Atlantic WWTP1 (A and B) and twice during October 2010 at Mid-Atlantic WWTP2 (A and B).

^aSamples were collected when seasonal chlorination was not taking place.

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Results

Occurrence of MRSA. We detected MRSA at all WWTPs in this study. The distribution of MRSA-positive samples differed by WWTP, sampling date, and sampling location (Table 1). Across all treatment plants sampled, 55% (24/44) of wastewater samples were positive for MRSA; 60% (12/20) of samples from Mid-Atlantic WWTPs and 50% (12/24) of samples from Midwest WWTPs. Eighty-three percent (10/12) of influent samples from all WWTPs were MRSA-positive; 100% (5/5) from Mid-Atlantic WWTPs and 71% (5/7) from Midwest WWTPs. MRSA was not detected in any tertiary-treated (chlorinated) effluent samples (Table 1). However, MRSA was detected in one effluent sample from Midwest WWTP1 in October 2010 when chlorination was not taking place. Overall, Midwest WWTP2 had the lowest percentage of MRSA-positive wastewater samples, with MRSA detected only in the influent (Table 1). This plant is the only WWTP in the present study that does not use an activated sludge reactor step; instead, it uses a system of lagoons for biological treatment.

Occurrence of MSSA. MSSA was also detected at all WWTPs in this study. The

distribution of MSSA-positive samples differed by WWTP, sampling date, and sampling location (Table 2). Across all treatment plants sampled, 55% (24/44) of wastewater samples were positive for MSSA; 60% (12/20) of samples from Mid-Atlantic WWTPs and 50% (12/24) of samples from Midwest WWTPs. Eighty-three percent (10/12) of influent samples from all WWTPs were MSSA-positive; 100% from Mid-Atlantic WWTPs and 71% from Midwest WWTPs. MSSA was not detected in tertiary-treated (chlorinated) effluent samples (Table 2). However, MSSA was detected in two effluent samples from Midwest WWTP1 in September and October 2010 when chlorination was not taking place. Of all four WWTPs, Midwest WWTP2 had the lowest percentage of MSSA-positive wastewater samples, and MSSA was detected only in the influent.

Antibiotic resistance patterns. In total, 240 MRSA isolates were isolated from all of the WWTPs. However, because PFGE was not performed on all isolates, the statistical analyses concerning antibiotic resistance patterns among these isolates were limited to those that could be confirmed as unique ($n = 84$) using phenotypic analyses. The unique MRSA isolates had a median

OXA+ MIC of $\geq 16 \mu\text{g/mL}$ (range, 4 to $\geq 16 \mu\text{g/mL}$) and expressed resistance to several antibiotics approved by the U.S. Food and Drug Administration for treating MRSA infections, including TET, CIP, LEVO, GAT, and CLI, as well as LZD and DAP (Figure 2), which are important alternatives to older antibiotics for treating severe MRSA infections (Johnson and Decker 2008).

Antimicrobial resistance patterns among unique MRSA isolates varied by WWTP and sampling location (Figure 2). In general, at both Mid-Atlantic WWTPs and at Midwest WWTP1, the percentage of isolates resistant to individual antibiotics increased or stayed the same as treatment progressed (Figure 2A–2C). At Midwest WWTP2, only influent samples were positive for MRSA, and the majority of these isolates were resistant to most of the tested antibiotics (Figure 2D).

In total, 119 MSSA isolates were isolated from all WWTPs. Similar to our statistical analyses of MRSA isolates, our analyses of antimicrobial resistance patterns among MSSA isolates were limited to those isolates that could be confirmed as unique ($n = 58$) using phenotypic analyses. Antimicrobial resistance patterns among unique MSSA isolates also

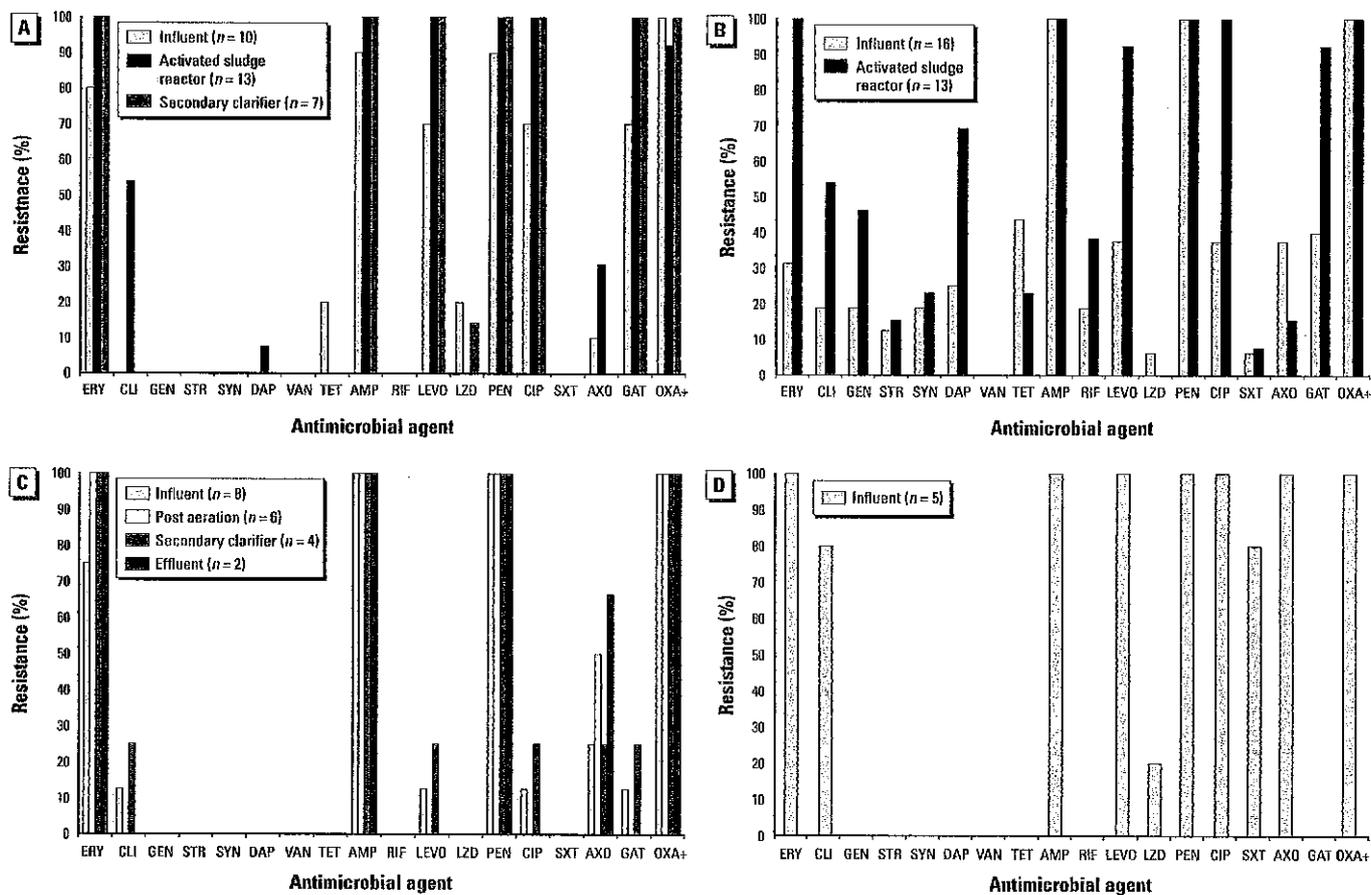


Figure 2. Resistance to antimicrobial agents detected among MRSA isolates at (A) Mid-Atlantic WWTP1, (B) Mid-Atlantic WWTP2, (C) Midwest WWTP1, and (D) Midwest WWTP2. The process for each plant is shown in Figure 1.

varied by WWTP (Figure 3). The percentages of ERY-, AMP- and PEN-resistant unique MSSA isolates at Mid-Atlantic WWTP1 increased as treatment progressed, whereas the percentages of isolates resistant to the fluoroquinolones (LEVO, CIP, and GAT) decreased from influent to activated sludge reactor samples (Figure 3A). At Mid-Atlantic WWTP2, the percentages of ERY-, AMP-, PEN-, and GAT-resistant MSSA isolates increased from influent to activated sludge reactor samples (Figure 3B). Similarly, among Midwest WWTP1 and Midwest WWTP2 MSSA, resistance to AMP and PEN increased as treatment progressed (Figure 3C,D).

In terms of resistance among the groups of isolates, a greater percentage of MRSA isolates than MSSA isolates were resistant to the following 14 antibiotics: ERY, CLI, STR, SYN, DAP, TET, AMP, RIF, LEVO, PEN, CIP, AXO, GAT, and OXA+ (Table 3). MRSA isolates were resistant to more antimicrobials (on average 6.94) than were MSSA isolates (on average 2.26) ($p < 0.001$).

Multidrug resistance. Of phenotypically unique MRSA isolates from all WWTPs, 93% (78/84) were MDR, whereas 29% (17/58) of unique MSSA isolates from all WWTPs were

MDR. The summary of MDR MRSA and MSSA by sampling location (across all plants) is shown in Figure 4.

SCCmec typing. SCCmec types II and IV were identified among the MRSA isolates (Table 4). Overall, 83% (199/240) of

the MRSA isolates were type IV and 15% (37/240) were type II. For all WWTPs, except Mid-Atlantic WWTP1, only one SCCmec type was identified at each plant (Table 4). Four isolates (2%) displayed resistance to OXA+ in antimicrobial susceptibility testing,

Table 3. Percentage of MRSA and MSSA isolates resistant to each tested antibiotic, compared using two-sample tests of proportions.

Antibiotic	Percentage of resistant isolates		p-Value (one-sided)
	MRSA	MSSA	
ERY (erythromycin)	82.14 (69/84)	28.57 (16/56)	< 0.0001
CLI (clindamycin)	27.38 (23/84)	1.72 (1/58)	< 0.0001
GEN (gentamicin)	10.71 (9/83)	3.45 (2/58)	0.0537
STR (streptomycin)	4.76 (4/84)	0 (0/58)	0.0459
SYN (quinupristin/daptomycin)	7.14 (6/84)	0 (0/58)	0.0188
DAP (daptomycin)	16.67 (14/84)	0 (0/58)	0.0005
VAN (vancomycin)	0 (0/83)	0 (0/57)	—
TET (tetracycline)	14.29 (12/84)	0 (0/58)	0.0013
AMP (ampicillin)	98.81 (83/84)	68.97 (40/58)	< 0.0001
RIF (rifampicin)	9.76 (8/82)	0 (0/58)	0.0071
LEVO (levofloxacin)	15.79 (12/82)	15.79 (9/57)	< 0.0001
LZD (linezolid)	5.95 (5/84)	3.45 (2/58)	0.2494
PEN (penicillin)	98.81 (83/84)	73.21 (41/56)	< 0.0001
CIP (ciprofloxacin)	63.10 (53/84)	15.79 (9/57)	< 0.0001
SXT (trimethoprim/sulfamethoxazole)	2.38 (2/84)	0 (0/58)	0.1184
AXO (ceftriaxone)	30.49 (25/82)	0 (0/58)	< 0.0001
GAT (gatrifloxacin)	62.65 (52/83)	18.97 (11/58)	< 0.0001
OXA+ (oxacillin+2%NaCl)	98.81 (83/84)	0 (0/58)	< 0.0001

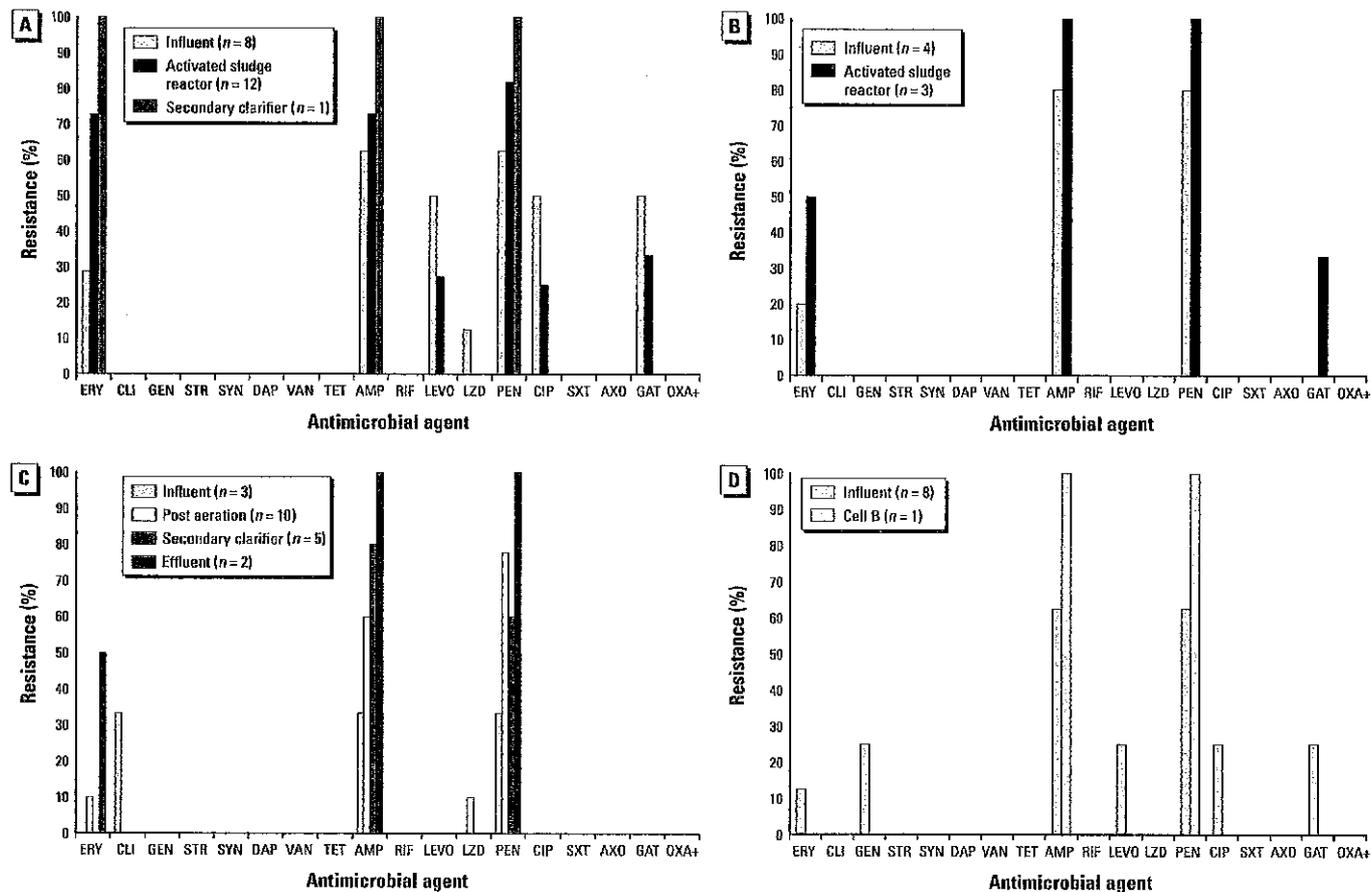


Figure 3. Resistance to antimicrobial agents detected among MSSA isolates at (A) Mid-Atlantic WWTP1, (B) Mid-Atlantic WWTP2, (C) Midwest WWTP1, and (D) Midwest WWTP2. The process for each plant is shown in Figure 1.

but did not have the *mecA* band in the Fang and Hedin PCR multiplex or the *mecA* band in the SCCmec PCR multiplex.

PVL screening. Among our total MRSA isolates where SCCmec type could be confirmed, 68% (161/236) were positive for the *pvl* gene: 72% at Mid-Atlantic WWTP1, 75% at Mid-Atlantic WWTP2, 83% at Midwest WWTP1, and 0% at Midwest WWTP2 (Table 4).

PFGE. Clusters based on > 88% similarity resulted in 12 unique types among our subset of 22 isolates, suggesting a heterogeneous population among MRSA from U.S. WWTPs (Figure 5). Three different USA types, 100, 300, and 700, were identified. Nine isolates did not match any of the USA types.

Discussion

MRSA and MSSA occurrence in U.S. wastewater. Although MRSA has been identified in WWTPs in Sweden (Börjesson et al. 2009, 2010), to our knowledge, this is the first report of the detection of MRSA at municipal WWTPs in the United States. Fifty percent of total wastewater samples were positive for MRSA, and 55% of total samples were positive for MSSA. Yet, the odds of samples being MRSA-positive decreased as treatment progressed. For example, 10 of 12 (83%) influent samples were MRSA-positive, but only 1 of 12 (8%) effluent samples was MRSA-positive (Table 1). Based on these findings, wastewater treatment seems to reduce the number of MRSA and MSSA isolates released in effluent. However, the few isolates that do survive in effluent might be more likely to be MDR and virulent isolates.

Previous studies conducted in Sweden have also reported a decline in MRSA as wastewater treatment progressed. Specifically, Börjesson et al. (2009) showed that the concentration of MRSA as measured by real-time PCR assays decreased as treatment progressed from approximately 6×10^3 to 5×10^2 *mecA* genes per 100 mL from inlet to outlet, except

for a peak in activated sludge reactor samples of 5×10^5 *mecA* genes per 100 mL (Börjesson et al. 2009). On the basis of these findings, we might also expect to see an overall decrease in MRSA concentrations throughout the wastewater treatment process in the United States, except for perhaps a peak in activated sludge. It is also interesting that at Midwest WWTP2, the only WWTP in the study that did not employ an activated sludge step, MRSA was detected only in the influent. The lack of MRSA detected beyond influent at Midwest WWTP2 could be due to the effectiveness of an anaerobic step in the sequencing batch reactor (Figure 1) (Minnigh H, personal communication).

Cycling of MRSA between humans and the environment. Our findings also provide evidence that municipal wastewater could serve as a medium for the cycling of CA-MRSA strains between humans and the environment. MRSA has been found at concentrations between 10^4 and 10^8 colony-forming units (CFU)/g of fecal material (Wada et al. 2010). PVL-positive strains, SCCmec type IV, and USA 300, all of which characterize the majority of the MRSA isolated from wastewater in the present study, have traditionally been associated with CA-MRSA in the U.S. population compared with those in other countries could explain the high percentage of PVL-positive MRSA isolates in wastewater in the present study (Seybold et al. 2006; Tristan et al. 2007). The association of PVL-positive MRSA and CA-MRSA

with skin and soft tissue infections could also explain the occurrence of PVL-positive MRSA isolates in wastewater samples in the present study, because MRSA could be shed in showers at concentrations of approximately 1.4×10^4 – 1.0×10^5 CFU/person (Lina et al. 1999; Plano et al. 2011). The large cluster of MRSA isolates we recovered that were PVL-positive and showed similarity to USA 300 is concerning because both USA 300 strains—which are typically resistant to erythromycin and β -lactam antibiotics—and the *pvl* gene are associated with increased virulence, severe bloodstream infections, and necrotizing pneumonia (Gorwitz et al. 2008; Lina et al. 1999; McDougal et al. 2003).

Moreover, the abundance of SCCmec type IV among the recovered MRSA isolates could indicate superior survival characteristics, namely the lower energy cost of SCCmec type IV carriage (Börjesson et al. 2010). SCCmec type IV strains that we recovered appeared to persist longer in the wastewater treatment process than type II strains. However, this phenomenon warrants further investigation because our results are based on only one WWTP (Mid-Atlantic WWTP1), and a previous study found that SCCmec types were not significantly associated with MRSA survival (Levin-Edens et al. 2011).

Four isolates that did not have the *mecA* band in SCCmec typing but were found to be OXA⁺ resistant through antimicrobial susceptibility testing could have the novel *mecA* homolog, MRSA-LGA 251, as identified by García-Álvarez et al. (2011). Interestingly,

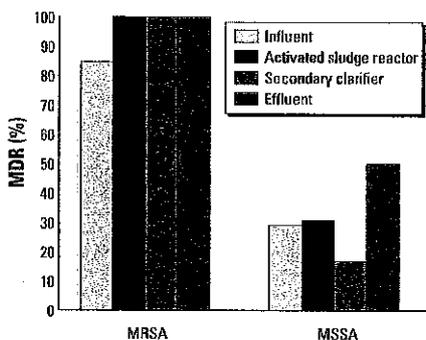


Figure 4. Percentage of multidrug-resistant (resistant to two or more classes of antibiotics) MRSA and MSSA isolates from all WWTPs, by wastewater treatment step.

Table 4. Number (%) of MRSA isolates recovered from wastewater by SCCmec type and by possession of the *pvl* gene.

Sampling location	SCCmec type ^a			
	Type II	Type IV	No <i>mecA</i>	PVL-positive ^b
Mid-Atlantic WWTP1 (n = 100)				
Influent (n = 40)	0 (0)	40 (100)	0 (0)	28 (70)
Activated sludge reactor (n = 40)	13 (33)	27 (68)	0 (0)	25 (63)
Secondary clarifier (n = 20)	0 (0)	19 (95)	1 (5)	18 (95)
Effluent (n = 0)	0 (0)	0 (0)	0 (0)	0 (0)
Total (n = 100)	13 (13)	86 (86)	1 (1)	71 (72)
Mid-Atlantic WWTP2 (n = 47)				
Influent (n = 20)	0 (0)	20 (100)	0 (0)	9 (45)
Activated sludge reactor (n = 27)	0 (0)	27 (100)	0 (0)	26 (96)
Secondary clarifier (n = 0)	0 (0)	0 (0)	0 (0)	0 (0)
Effluent (n = 0)	0 (0)	0 (0)	0 (0)	0 (0)
Total (n = 47)	0 (0)	47 (100)	0 (0)	35 (75)
Midwest WWTP1 (n = 69)				
Influent (n = 22)	0 (0)	19 (86)	3 (14)	9 (47)
Post aeration (n = 21)	0 (0)	21 (100)	0 (0)	20 (95)
Secondary clarifier (n = 13)	0 (0)	13 (100)	0 (0)	13 (100)
Effluent (n = 13)	0 (0)	13 (100)	0 (0)	13 (100)
Total (n = 69)	0 (0)	66 (96)	3 (4)	55 (83)
Midwest WWTP2 (n = 24)				
Influent (n = 24)	24 (100)	0 (0)	0 (0)	0 (0)
Cell B (n = 0)	0 (0)	0 (0)	0 (0)	0 (0)
Effluent (n = 0)	0 (0)	0 (0)	0 (0)	0 (0)
Total (n = 24)	24 (100)	0 (0)	0 (0)	0 (0)

^aSCCmec types I, III, V, and VI were not identified in any sample. ^bPVL PCR was performed only on isolates with the *mecA* gene.

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three of these four isolates were from Midwest WWTP1, which is surrounded by animal production facilities. García-Álvarez et al. (2011) detected the novel *mecA* homolog in bovine MRSA, although the original source of MRSA-LGA 251 is still under investigation (García-Álvarez et al. 2011). Because traditional *mecA* primers do not detect this homolog (García-Álvarez et al. 2011), there could be an even greater number of wastewater samples containing MRSA than were detected in the present study. However, it was beyond the scope of the present study to further assess the wastewater samples for the presence of MRSA-LGA 251.

Public health implications. Our findings raise potential public health concerns for WWTP workers and individuals exposed to reclaimed wastewater. WWTP workers could potentially be exposed to MRSA and MSSA through several exposure pathways, including dermal and inhalation exposures. However, few studies have evaluated microbial exposures among WWTP workers. Mulloy (2001) summarized findings of exposures to *Leptospira*, hepatitis A, and bacterial enterotoxins and endotoxins among WWTP workers (Mulloy 2001). Yet, to our knowledge, no studies have evaluated MRSA or MSSA carriage rates among these populations. Encouraging frequent handwashing and the use of gloves among WWTP workers could reduce the potential risks associated with possible MRSA exposures.

Other individuals who are exposed to reclaimed secondary wastewater, including spray irrigators and people living near spray irrigation sites, could be potentially exposed to MRSA and MSSA. No federal regulations exist for wastewater reuse from either secondary or tertiary facilities, although the U.S. Environmental Protection Agency (EPA) has issued water reuse guidelines (U.S. EPA 2004). States determine whether to develop regulations or guidelines to oversee the use of reclaimed wastewater within their boundaries, and most state guidelines allow secondary effluent to be used for certain reuse applications, including spray irrigation of golf courses, public parks, and agricultural areas (U.S. EPA 2004). In the present study, we detected MRSA and MSSA in unchlorinated effluent from Midwest WWTP1, a WWTP with only seasonal chlorination (it could be defined as a secondary treatment plant during periods when chlorine is not applied). Our findings suggest that implementing tertiary treatments for wastewater that is intended for reuse applications could reduce the potential risk of MRSA exposures among individuals who are working on or living by properties sprayed with reclaimed wastewater.

Limitations. There are some notable limitations of this study. First, the number and timing of sampling events and samples collected at each WWTP was not the same because of access issues at some of the plants. Second,

enrichment of the samples preempted our ability to report concentrations of MRSA and MSSA in wastewater. Finally, although PFGE was performed on a representative subset of all MRSA isolates, the true heterogeneity of the MRSA isolates contained in the wastewater samples may have been underestimated. On the other hand, MRSA strains have evolved from a small number of clonal strains, so the likelihood of isolating MRSA with phenotypic and genetic similarities during our isolation procedure was high (Enright et al. 2002; Fang and Hedin 2003; Oliveira et al. 2002). However, the goal of the present study was to evaluate the occurrence of MRSA at WWTPs in the United States and, even if clones were selected, the findings concerning the presence and types of MRSA at the four WWTPs are still accurate.

Conclusions

To our knowledge, our study is the first to demonstrate the occurrence of MRSA in U.S. municipal wastewater. Although tertiary wastewater treatment may effectively reduce MRSA in wastewater, secondary-treated wastewater (unchlorinated) could be a potential source of exposure to these bacteria in occupational settings and reuse applications. Because of increasing use of reclaimed wastewater, further study is needed to evaluate the potential risk of antibiotic-resistant bacterial infections from exposure to treated wastewater.

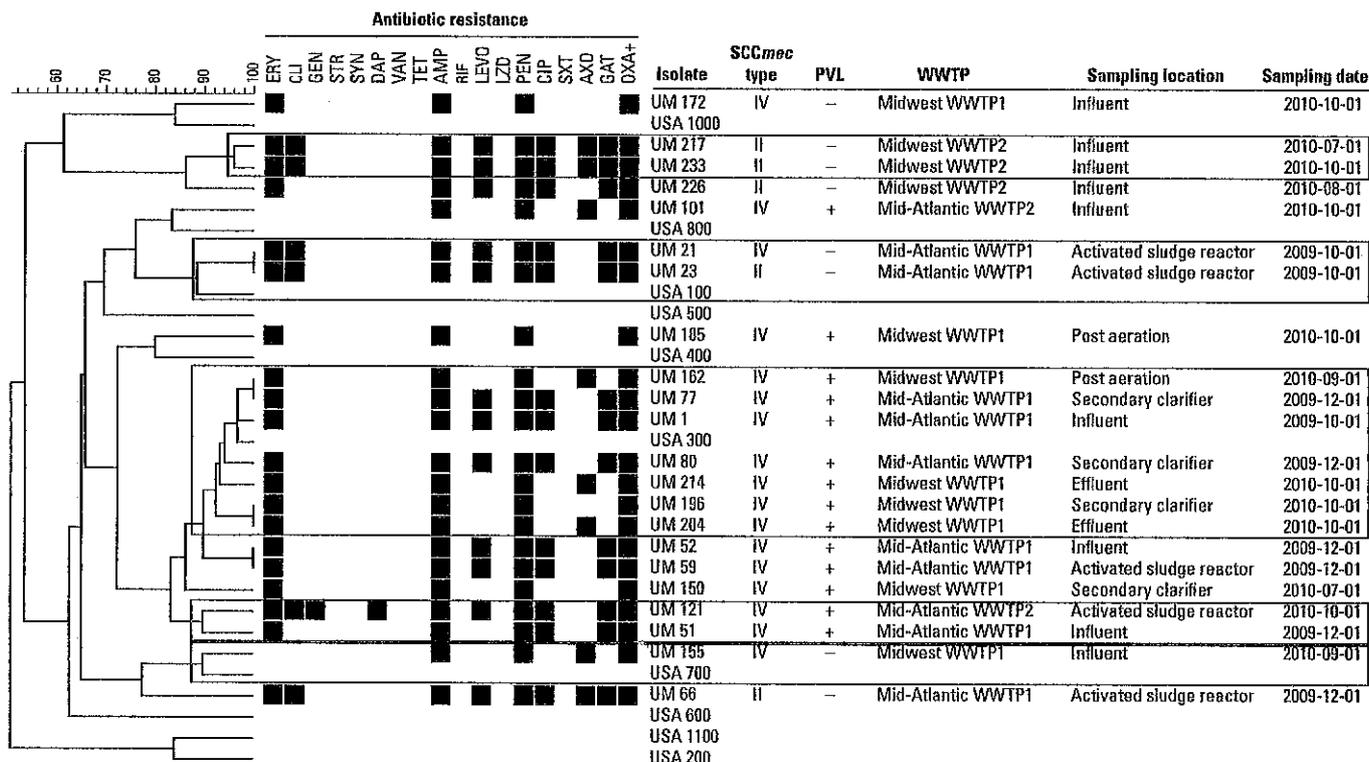


Figure 5. PFGE-based dendrogram, antimicrobial resistance profile, SCCmec type, PVL status (positive or negative), and source of a representative subset of MRSA isolates recovered from wastewater. Clusters were based on $\geq 88\%$ similarity and are outlined in red. For antimicrobial resistance phenotypes, black indicates resistance and white indicates intermediate or susceptible. UM, University of Maryland isolate.



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http://articles.baltimoresun.com/2012-11-06/features/bal-bmg-superbugs-found-in-us-wastewater-treatment-plants-20121106_1_mrsa-infections-wastewater-treatment-treatment-plants

'Superbug' found in US wastewater treatment plants

UM study suggests plant workers at risk for antibiotic-resistant infection



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Chlorination at treatment plants, such as Baltimore's... (Amy Davis)
November 06, 2012|Tim Wheeler

Hospitals aren't the only places where people can pick up a nasty "superbug." A University of Maryland-led team of researchers has found methicillin-resistant *Staphylococcus aureus*, or MRSA, at sewage treatment plants in the mid-Atlantic and the Midwest.

MRSA is a well-known problem in hospitals, where patients have picked up potentially fatal bacterial infections that do not respond to antibiotic treatment. But since the late 1990s, it's also been showing up in otherwise healthy people outside of health-care facilities, prompting a search for sources in the wider community.

"MRSA infections acquired outside of hospital settings – known as community-acquired MRSA or CA-MRSA– are on the rise and can be just as severe as hospital-acquired MRSA," said Amy R. Sapkota, assistant professor in the Maryland Institute for Applied Environmental Health and research study leader.

"However, we still do not fully understand the potential environmental sources of MRSA or how people in the community come in contact with this microorganism.

Sewage plants are one possible source, because infected people can shed MRSA through their feces, as well as from their nose and skin. The resistant bacteria have been detected before in wastewater plants in Sweden, but researchers at UM's School of Public Health say this study, conducted in partnership with the University of Nebraska Medical Center, is the first to spot it in US facilities. Their findings were published in the November issue of Environmental Health Perspectives.

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Researchers at the two schools collected wastewater samples at two Mid-Atlantic and two Midwestern treatment plants, which were not identified in the paper. They said they chose the plants, in part, because treated effluent from these plants is reused as "reclaimed wastewater" and sprayed on fields to irrigate and fertilize them. The researchers wanted to see if MRSA could be spread that way.

The study found MRSA in 83 percent of the raw sewage entering the plants, but the incidence declined as the sewage progressed through the treatment process. Only one plant still had the bacteria in its fully treated water, researchers found, and that facility did not regularly use chlorination to finish disinfecting its wastewater.

"Our findings raise potential public health concerns for wastewater treatment plant workers and individuals exposed to reclaimed wastewater," says Rachel Rosenberg Goldstein, environmental health doctoral student and the study's first author. "Because of increasing use of reclaimed wastewater, further research is needed to evaluate the risk of exposure to antibiotic-resistant bacteria in treated wastewater."

Besides sewage plants, living near livestock farms may be another potential source of exposure. A recent study in the Netherlands led by researchers from Johns Hopkins' Bloomberg School of Public Health found the risks of getting MRSA there highest among people living in a region with high concentrations of cattle and pigs.

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<http://www.owlfoundation.net/Recycled-Water-Really.html>

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The current drought in California has seen a dramatic increase on the use of 'recycled' water to make up the shortfalls in fresh water. There is something called "The Water Cycle" which actually cleans all of the water on earth. The Water Cycle is how we get fresh water. "Recycled" water is a term invented by developers and politicians, not geologists. "Recycled" might be more accurately described as partially-treated sewage effluent. Recycled water is not fresh water. Its use in public spaces has been controversial from the beginning because too many dangerous compounds, pollutants and pathogens are allowed, by law, to remain in it. Recycled water is not necessarily safe and carries substantial potential risks to health.

The amount of water on earth is fixed. We do not get anymore water than is here already. This means that if we are to survive, we absolutely MUST recycle water and use it again. But recycled water needs to be defined as ONLY water, with nothing else in it. If fresh water implies pure, meaning no contaminants and only the molecule H₂O, then contaminated water similarly should be recycled to exactly the same level.

Bacteria

Here is the concern: back in the 1950's and '60's, hospitals knew about a particularly difficult infection called Hospital Staph. Over time, this bacterium, a form of *Staphylococcus aureus*, developed an adamantine resistance to the drug of choice, methicillin, giving rise to the name: methicillin-resistant staphylococcus aureus, or MRSA for short. Hospital Staph was the world's first 'super bug'.

Sometime in the 1970's, due to shortfalls in fresh water supplies, developers, cities and states began using sewage effluent for non-potable applications of water.

By a striking coincidence, this was also the time that Hospital Staph escaped the hospital setting and entrenched itself in the community. Today there are two types of MRSA: the hospital variety, called MRSA-HA, for 'hospital acquired' and MRSA-CA, for 'community aquired'.

Super bug infections are now a national priority due to their continued ability to evolve yet more resistance to virtually all antibiotics even Vancomycin, the so-called 'last stop' on the antibiotic trail. Nearly 19,000 people died of MRSA in 2005, more deaths than those attributed to AIDS. Hospitals have made some inroads in reducing MRSA infections but the community aquired MRSA is a growing problem. U.C. Davis reports infections among children hospitalized for MRSA-CA infections doubled from 2000 to 2007, a stunnig revelation.

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Amy Pruden, Ph.D., has tracked DNA already coded for antibiotic resistance in the Poudre River and in the South Platte River, bolstering suspicions that superbugs do indeed emerge from sewage plants. Bacteria are promiscuous and have three methods of exchanging genetic material. This is why and how they can evolve antibiotic resistance so rapidly. They are actively shopping for the genes that protect them from antibiotics. The fact that Amy Pruden discovered DNA that had already traveled through sewage plants unscathed and in the wild should sound a disturbing alarm to all of us.

AT PUBLIC MEETING

Hormone Impersonators

The other area of concern is a family of chemicals called phthalates. These ubiquitous chemicals are found virtually everywhere and if ingested, mimic the female hormone estrogen. Phthalates are widely used in plastics to make them flexible and account for that 'new car smell' because all that plastic is releasing phthalate volatiles into the air. But phthalates are also used in shampoos, hair spray, deodorant, nail polish and perfume specifically because phthalates penetrate the skin, thereby making cosmetics more 'effective'..

But phthalates are extremely dangerous precisely because they mimic hormones. Hormones are the most powerful chemicals used in your body because they tell the cells what to do. Due to such a high level of control over the entire body, hormones are known to cause various cancers. Even menopausal hormone therapy (MHT) has been reassessed for safety after the discovery that certain types of cancers are triggered by the use of hormone therapy.

Scientists have determined that phthalates are responsible for the presence of ovaries in male fish, a phenomenon noticed worldwide. Phthalates are not necessarily removed during the normal sewage treatment process. So 'recycled' water may contain varying dosages of this hormone analogue depending on the sewage treatment process from which it emerged.

Virtually all of the legal requirements that bind sewage treatment plants were created in the 1970's under the Clean Water Act ("CWA") of 1972. Out of the, approximately 80,000 known chemicals created by human beings and released into the wild, the CWA stipulated about 200 of them absolutely had to be removed in the sewage treatment process. Unfortunately, since 1972 very few of those named chemicals are manufactured anymore. Worse, thousands upon thousands of new chemicals have appeared. So sewage treatment plants may claim that they clean sewage even beyond what is legally required, but that bar has been so low for so many decades that the claims seem meaningless.

Most sewage treatment plants employ 100-year old technologies to 'clean' sewage. A few, like the famous plant serving Orange County, uses reverse osmosis and can substantially remove virtually all of the problems plaguing 'recycled' water. Sonoma County does not have a single reverse osmosis plant.

Sewage treatment plants that do not use reverse osmosis permit a whole host of pollutants to pass through the process unscathed. For example, all sewage treatment plants in California are permitted by law to allow a surprising amount of active pathogens AFTER treatment. In other words, not all bacteria and viruses are required to be removed and recycled water may contain active pathogens, the bugs that cause disease. The law allows some of them through.

But the problem is much more serious. Every sewage treatment plant receives material from a wide area. This includes waste from all of the sick people (not to mention animals) who live at home as well as all the sick people in hospitals and nursing homes. Sick people take a lot of dangerous drugs (and so do some domestic animals). All of those drugs are eventually excreted and travel to the sewage treatment plant.

The sewage plant also receives all of the pathogens from the same area. This is especially troubling with bacteria. All bacteria excreted within the service area of any sewage treatment plant mix with ALL of the antibiotics in a confined space. The result is a perfect recipe for antibiotic resistance. Many educated observers of sewage treatment plants suspect that super bugs were born in sewage treatment plants and are the source of the community-acquired MRSA.

As you will see in the readers, some drugs that go into sewage plants can be altered by the very chemicals used in the wastewater treatment process itself. The subsequent reactions can create completely new compounds, even lethal ones. These lethal chemical compounds arose inside the plant and were never part of the sewage waste stream. New chemicals are emerging from sewage plants all over the world and they are troubling scientists everywhere.

What's in YOUR water?

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'Superbug' MRSA Found in U.S. Wastewater Treatment Plants

Posted by [News Editor](#) in [Latest News](#), [RSS](#), [Waste](#), [Water](#) on November 14, 2012 10:43 am / [no comments](#)

COLLEGE PARK, Maryland, November 14, 2012 (ENS) – The “superbug” methicillin-resistant *Staphylococcus aureus*, or MRSA, is prevalent at several U.S. wastewater treatment plants, scientists have found in the first study to investigate U.S. wastewater as an environmental reservoir of the bacteria.

MRSA is well known for causing bacterial infections that are difficult to treat and potentially fatal in hospital patients. Since the late 1990s it also has been infecting otherwise healthy people in community settings.

“MRSA infections acquired outside of hospital settings – known as community-acquired MRSA or CA-MRSA – are on the rise and can be just as severe as hospital-acquired MRSA,” says research study leader Amy Sapkota, assistant professor in the Maryland Institute for Applied Environmental Health.

“However, we still do not fully understand the potential environmental sources of MRSA or how people in the community come in contact with this microorganism,” Sapkota said.



Scientist examines samples for the presence of MRSA at University of Nebraska Medical Center (Photo courtesy UNMC)

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The study indicates that wastewater treatment plant workers and anyone who lives, works or plays near wastewater treatment plants could be exposed to these superbugs.

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Because infected people can shed MRSA from their nostrils and skin and through their feces, wastewater treatment plants are a likely reservoir for the bacteria.

Swedish researchers have identified the presence of MRSA in wastewater treatment plants in Sweden, and this new study confirms the presence of MRSA in U.S. facilities.

The research team, including scientists from the University of Maryland School of Public Health and the University of Nebraska Medical Center, collected wastewater samples throughout the treatment process at two Mid-Atlantic and two Midwestern wastewater treatment plants.

These plants were chosen, in part, because treated effluent discharged from these plants is reused as reclaimed wastewater in spray irrigation activities. The researchers were interested in whether MRSA remained in the effluent.

They found that MRSA, as well as a related pathogen, methicillin-susceptible *Staphylococcus aureus*, or MSSA, were present at all four wastewater treatment plants, with MRSA in half of all samples and MSSA in 55 percent of the samples.

MRSA was present in 83 percent of the influent – the raw sewage – at all plants, but the percentage of MRSA-and MSSA-positive samples decreased as treatment progressed.

Only one wastewater treatment plant had the bacteria in the treated water leaving the plant, and this was at a plant that does not regularly use chlorination, a tertiary step in wastewater treatment.

“Our findings raise potential public health concerns for wastewater treatment plant workers and individuals exposed to reclaimed wastewater,” says Rachel Rosenberg Goldstein, environmental health doctoral student in the School of Public Health and the study’s first author.

Ninety-three percent of the MRSA strains that were isolated from the wastewater and 29 percent of MSSA strains were resistant to two or more classes of antibiotics, including several that the U.S. Food and Drug Administration has specifically approved for treating MRSA infections.

At two wastewater treatment plants, MRSA strains showed resistance to more antibiotics and greater prevalence of a gene associated with virulence at subsequent treatment stages, until tertiary chlorination treatment appeared to eliminate all MRSA.

This suggests that while wastewater treatment plants effectively reduce MRSA and MSSA from influent to effluent, they may select for increased antibiotic resistance and virulence, particularly at those facilities that do not employ tertiary treatment with chlorination.

Rosenberg Goldstein is calling for further research to determine the extent of risk to people who work, play or reside near agricultural and recreational land irrigated with reclaimed wastewater, saying, "Because of increasing use of reclaimed wastewater, further study is needed to evaluate the risk of exposure to antibiotic-resistant bacteria in treated wastewater."

Frequent hand washing and the use of gloves by wastewater treatment plants workers could reduce risk and through tertiary treatment of wastewater that is to be used for irrigation.

The study is published in the November issue of the journal "Environmental Health Perspectives," a publication of the U.S. National Institute of Environmental Health Sciences.

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Communities that recycle water for irrigation, drinking could be creating major public health hazard

But the issue gets even worse. According to the team's findings, which were published recently in the journal *Environmental Health Perspectives*, MRSA, MSSA, and various other potentially-deadly superbugs can even persist beyond the initial treatment phases. Effluent samples collected at one of the WWTPs tested positive for MRSA, which means anywhere the partially-treated water ends up getting sprayed -- recycled water is often sprayed on sports fields, grassy knolls, and other common areas frequented by families with children -- is also being potentially doused with killer bacteria.

"Our findings raise potential public health concerns for wastewater treatment plant workers and individuals exposed to reclaimed wastewater," added Rachel Rosenberg Goldstein, one of the study's lead authors. "Because of increasing use of reclaimed wastewater, further research is needed to evaluate the risk of exposure to antibiotic-resistant bacteria in treated wastewater."

Sources for this article include:

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http://www.naturalnews.com/040432_mrsa_wastewater_sewage_treatment.html

Study: Deadly 'superbug' MRSA now being found at U.S. wastewater treatment plants

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Tuesday, May 21, 2013 by: Ethan A. Huff, staff writer
Tags: MRSA, wastewater, sewage treatment

(NaturalNews) Using reclaimed water to irrigate lawns, parks, gardens, and various other types of landscaping is common in many communities across the U.S., particularly in areas prone to water shortages and drought. But a new study headed by researchers from the *University of Maryland School of Public Health* suggests that this practice may no longer be safe, as antibiotic-resistant "superbugs" like methicillin-resistant *Staphylococcus aureus* (MRSA) are now being detected in both influent and effluent water samples at wastewater treatment plants nationwide.

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Study author Amy R. Sapkota, an assistant professor at the *Maryland Institute for Applied Environmental Health*, and her colleagues, some of whom came from the *University of Nebraska Medical Center*, collected wastewater samples from two mid-Atlantic and two Midwestern wastewater treatment plants (WWTPs) for their study, and analyzed them for the presence of superbugs like MRSA. The team drew samples of influent, which is the raw sewage directly fed into a treatment plant, as well as effluent, which is partially treated wastewater that is commonly recycled for irrigation purposes.

Shockingly, half of all the wastewater samples taken from each of the WWTPs tested positive for MRSA, while a similar pathogen known as methicillin-susceptible *Staphylococcus aureus* (MSSA) was detected in 55 percent of all the collected samples. As far as influent is concerned, the team detected MRSA in a staggering 83 percent of the samples taken from all plants, indicating a widespread problem of superbug contamination that is occurring in more places than just hospital rooms.

"MRSA infections acquired outside of hospital settings -- known as community-acquired MRSA or CA-MRSA -- are on the rise and can be just as severe as hospital-acquired MRSA," said Sapkota in reference to her team's findings. "However, we still do not fully understand the potential environmental sources of MRSA or how people in the community come in contact with this microorganism."

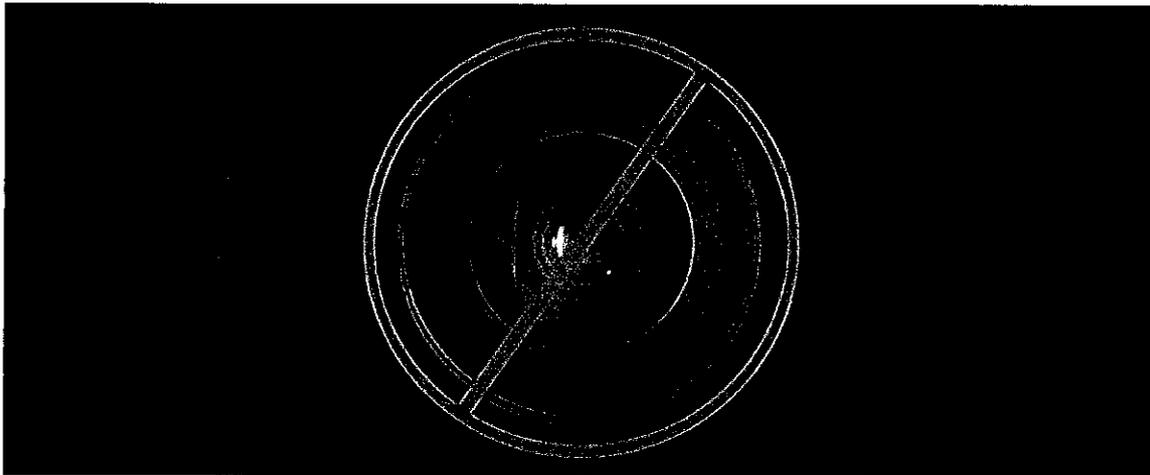
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<http://www.huffingtonpost.com/2012/11/08/mrsa-wastewater-treatment-plants n 2083862.html>

MRSA Found In Wastewater Treatment Plants

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Posted: 11/08/2012 2:11 pm EST



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Drug-resistant bacteria has made its way to wastewater treatment facilities, according to a new study from the University of Maryland.

Published in the journal *Environmental Health Perspectives*, the findings show that methicillin-resistant *Staphylococcus aureus* (MRSA) is present at two water treatment facilities in the Midwest and two facilities in the mid-Atlantic region.

"Our findings raise potential public health concerns for wastewater treatment plant workers and individuals exposed to reclaimed wastewater," study researcher Rachel Rosenberg Goldstein, a doctoral student in environmental health at the University of Maryland's School of Public Health, said in a statement. "Because of increasing use of reclaimed wastewater, further research

is needed to evaluate the risk of exposure to antibiotic-resistant bacteria in treated wastewater."

MRSA is of particular importance in the public health realm because it is resistant to the usual antibiotics that are used to fight staph. It's particularly common in hospitals, what is known as hospital-acquired MRSA, though community-acquired MRSA is also possible (like if you are living in a crowded area, such as a jail or childcare center, or if you play certain contact sports), according to the Mayo Clinic.

The study included samples from the four different water treatment plants as they went through the treatment process. MRSA was found in half of all the samples gathered, while MSSA (methicillin-susceptible Staphylococcus aureus) was found in 55 percent of all the samples gathered. MRSA was found in 83 percent of the raw sewage, but researchers noted that as the water went through the treatment process, fewer and fewer samples had MRSA.

By the end of the treatment process, only one of four plants had a sample with MRSA, though researchers noted that this particular plant is known to not chlorinate its water regularly -- a step known as "tertiary treatment."

Researchers were also able to glimpse a snapshot of the kinds of MRSA and MSSA that were in the wastewater facilities -- 93 percent of the MRSA strains identified are resistant to at least two antibiotic classes, as were 29 percent of the MSSA strains.

Researchers said that it was good to find that treated water from wastewater treatment plants were largely rid of MRSA, but they also noted that the tertiary process of chlorination seemed to be important for eliminating the MRSA.

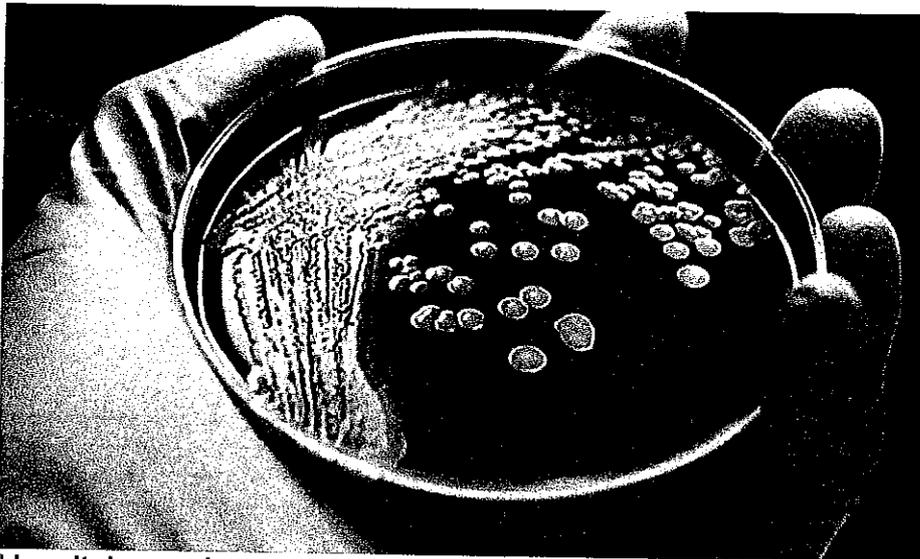
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<http://www.theguardian.com/society/2013/jan/23/antibiotic-resistant-diseases-apocalyptic-threat>

Antibiotic-resistant diseases pose 'apocalyptic' threat, top expert says

Chief medical officer Dame Sally Davies tells MPs issue should be added to national risk register of civil emergencies

- [Ian Sample](#), science correspondent
- [The Guardian](#), Wednesday 23 January 2013 14.41 EST
- [Jump to comments \(503\)](#)



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Hospital superbugs such as MRSA are some of the best known antibiotic-resistant diseases, but MPs were warned about infections such as gonorrhoea and TB that affect the general population. Photograph: Getty Images

Britain's most senior medical adviser has warned MPs that the rise in drug-resistant diseases could trigger a national emergency comparable to a catastrophic terrorist attack, pandemic flu or major coastal flooding.

Dame Sally Davies, the chief medical officer, said the threat from infections that are resistant to frontline antibiotics was so serious that the issue should be added to the government's national risk register of civil emergencies.

She described what she called an "apocalyptic scenario" where people going for simple operations in 20 years' time die of routine infections "because we have run out of antibiotics".

The register was established in 2008 to advise the public and businesses on national emergencies that Britain could face in the next five years. The highest priority risks on the latest register include a deadly flu outbreak, catastrophic terrorist attacks, and major flooding on the scale of 1953, the last occasion on which a national emergency was declared in the UK.

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Speaking to MPs on the Commons science and technology committee, Davies said she would ask the Cabinet Office to add antibiotic resistance to the national risk register in the light of an annual report on infectious disease she will publish in March.

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Davies declined to elaborate on the report, but said its publication would coincide with a government strategy to promote more responsible use of antibiotics among doctors and the clinical professions. "We need to get our act together in this country," she told the committee.

She told the Guardian: ""There are few public health issues of potentially greater importance for society than antibiotic resistance. It means we are at increasing risk of developing infections that cannot be treated – but resistance can be managed.

"That is why we will be publishing a new cross-government strategy and action plan to tackle this issue in early spring."

The issue of drug resistance is as old as antibiotics themselves, and arises when drugs knock out susceptible infections, leaving hardier, resilient strains behind. The survivors then multiply, and over time can become unstoppable with frontline medicines. Some of the best known are so-called hospital superbugs such as MRSA that are at the root of outbreaks among patients.

"In the past, most people haven't worried because we've always had new antibiotics to turn to," said Alan Johnson, consultant clinical scientist at the Health Protection Agency. "What has changed is that the development pipeline is running dry. We don't have new antibiotics that we can rely on in the immediate future or in the longer term."

Changes in modern medicine have exacerbated the problem by making patients more susceptible to infections. For example, cancer treatments weaken the immune system, and the use of catheters increases the chances of bugs entering the bloodstream.

"We are becoming increasingly reliant on antibiotics in a whole range of areas of medicine. If we don't have new antibiotics to deal with the problems of resistance we see, we are going to be in serious trouble," Johnson added.

The supply of new antibiotics has dried up for several reasons, but a major one is that drugs companies see greater profits in medicines that treat chronic conditions, such as heart disease, which patients must take for years or even decades. "There is a broken market model for making new antibiotics," Davies told the MPs.

Davies has met senior officials at the World Health Organisation and her counterparts in other countries to develop a strategy to tackle antibiotic resistance globally.

Drug resistance is emerging in diseases across the board. Davies said 80% of gonorrhoea was now resistant to the frontline antibiotic tetracycline, and infections were rising in young and middle-aged people. Multi-drug resistant TB was also a major threat, she said.

Another worrying trend is the rise in infections that are resistant to powerful antibiotics called carbapenems, which doctors rely on to tackle the most serious infections. Resistant bugs carry a gene variant that allows them to destroy the drug. What concerns some scientists is that the gene variant can spread freely between different kinds of bacteria, said Johnson.

Bacteria resistant to carbapenems were first detected in the UK in 2003, when three cases were reported. The numbers remained low until 2007, but have since leapt to 333 in 2010, with 217 cases in the first six months of 2011, according to the latest figures from the HPA.

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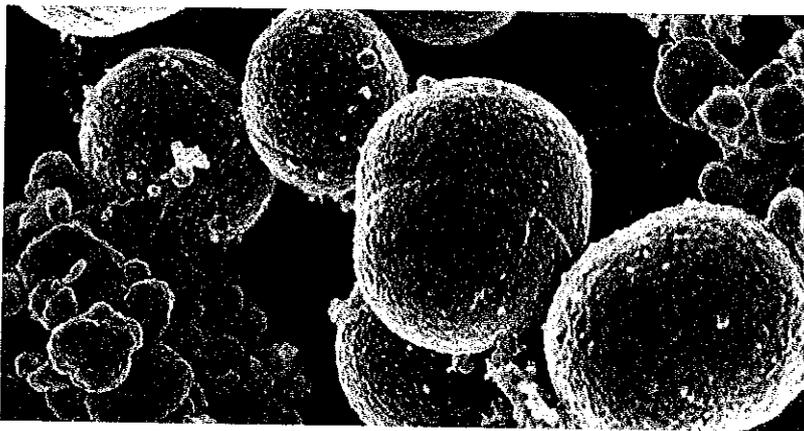
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<http://www.infowars.com/scientists-we-cant-do-anything-about-the-antibiotic-resistant-superbugs-that-will-soon-kill-millions-of-us/>

We Can't Do Anything About The Antibiotic-Resistant Superbugs That Will Kill Millions

Michael Snyder
American Dream
November 19, 2013

The "wonder drugs" that we have been using since the middle of the last century are rapidly losing their effectiveness, and medical authorities are warning that the emergence of very powerful antibiotic-resistant superbugs represents "one of the gravest threats in the history of medicine". Of course the "wonder drugs" that I am talking about are known today as antibiotics.



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Image: Superbugs (Wikimedia Commons).

These drugs attack bacteria, and when they first began to be developed back in the 1950s and 1960s they were hailed as "miracles" that would save countless numbers of lives. Well, it turns out that nature is having the last laugh. All over the planet bacteria are developing resistance to these drugs, and scientists are warning that they can't really do anything to stop these superbugs. With each passing year these superbugs are gaining ground, and there appears to be not much hope on the horizon of being able to fight them. In fact, no new classes of antibiotics have been invented since 1987, and none are being developed right now. Meanwhile, scientists are telling us that many current antibiotic treatments will be completely obsolete by the year 2030. Are you starting to understand why so many high profile members of the scientific community are using the words "catastrophic threat" to describe this crisis?

An article about these superbugs that appeared in the Independent the other day got a lot of attention all around the world. That article claims that prominent British doctors are warning that these superbugs could undo “a century of medical advances”...

Drug-resistant “superbugs” represent one of the gravest threats in the history of medicine, leading experts have warned.

Routine operations could become deadly “in the very near future” as bacteria evolve to resist the drugs we use to combat them. This process could erase a century of medical advances, say government doctors in a special editorial in *The Lancet* health journal.

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That sounds quite serious.

So what would life be like without antibiotics?

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Well, before antibiotics were invented if you scraped your knee and got an infection, there was a good chance that they would cut off your leg...

In the period before World War II ... people that got infections, they had to cut it out. They had to cut off limbs, cut off toes, because there weren't antibiotics. And oftentimes, when people talk about the fact that we might have to go back to a pre-antibiotic age, that's what they mean — that a simple scrape on the playground could be fatal.

Are you ready to go back to such a time?

You might not have to wait long. According to one very prominent doctor quoted by the Daily Mail, we have already reached the end of the age of antibiotics...

A high-ranking official with the Centers for Disease Control and Prevention has declared in an interview with PBS that the age of antibiotics has come to an end.

‘For a long time, there have been newspaper stories and covers of magazines that talked about “The end of antibiotics, question mark?”’ said Dr Arjun Srinivasan. ‘Well, now I would say you can change the title to “The end of antibiotics, period.”’

And all over the world the number of people becoming infected with these superbugs is rapidly growing.

In fact, right now 23,000 people a year are being killed by these superbugs in the United States alone...

More than two million people are infected by drug-resistant germs each year, and 23,000 die of their infections, federal health officials reported Monday. The biggest killer by far is *C. difficile*, the Centers for Disease Control and Prevention reports in its first big overview of a growing problem.

Doctors have been warning of the problem for decades, yet up to half the prescriptions written for antibiotics are unnecessary, the CDC report says. And all these unneeded antibiotics are making the superbug problem worse.

Most Americans have never even heard of many of these superbugs, but they can be extremely deadly...

C. difficile has become a scourge of hospitals and infection is often made possible when patients are heavily treated with antibiotics to fight other infections. It can cause unstoppable diarrhea and the latest treatment doesn't even involve antibiotics, but a transplant of so-called good bacteria from healthy patients.

CREs are a group of bacteria that resist even the strongest antibiotics. They include *Klebsiella pneumoniae*, which saw its infection rate jump 550 percent between 2001 and 2011.

"CRE is a nightmare bacteria we reported on in March, bacteria that can resist virtually all antibiotics," Frieden said.

Gonorrhea may not be immediately life-threatening, but it's developing resistance to the drugs that used to easily treat it. Patients can be left infertile, and, in January, Canadian researchers reported that seven percent of patients weren't cured by the only pill left to treat gonorrhea.

And this is just the tip of the iceberg. Experts are warning that we could soon see millions of people a year die from these superbugs all around the globe.

So why haven't we heard more about this?

Why is this not being widely publicized?

Some are suggesting that some of the governments of the western world are engaged in an effort to keep this under wraps. For example, just check out what has been going on in Canada...

The federal government is hobbling efforts to control antibiotic-resistant microbes by sitting on reports about bacteria that sicken and kill thousands of Canadians each year, several doctors say.

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Infectious disease experts say Ottawa is treating national microbial surveillance reports like "sensitive government documents." And the doctors are so frustrated, they are releasing the data they can obtain on their own website.

"Otherwise, it's years before we see it on the federal website," says Dr. Mark Joffe, president of the Association of Medical Microbiology and Infectious Disease Canada (AMMI), which represents physicians, clinical microbiologists and researchers.

What would the motivation be for doing this?

Are they trying to avoid panic?

Or is a more sinister motive at work here?

Ultimately, this is a crisis that is only going to get worse as time goes by.

Antibiotic-resistant superbugs are rapidly spreading and becoming more powerful.

Meanwhile, scientists all over the world are telling us that there is not a thing that they can do to stop them.

The era of antibiotics has come to an end, and nobody is quite sure what is going to happen next.

This article was posted: Tuesday, November 19, 2013 at 5:38 am

Tags: domestic news, pharmaceutical

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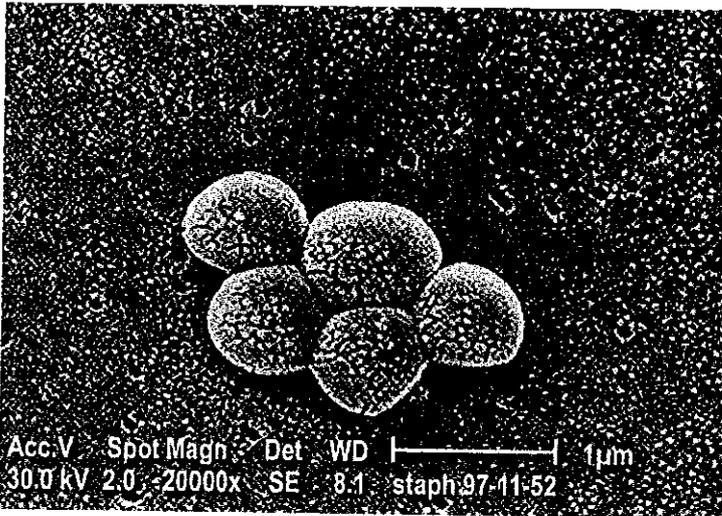
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Antibiotic-Resistant MRSA Superbug Found In US Homes

<http://atlanta.cbslocal.com/2014/04/22/study-antibiotic-resistant-mrsa-superbug-found-in-us-homes/>

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Study: Antibiotic-Resistant MRSA Superbug Found In US Homes



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Methicillin-resistant *Staphylococcus aureus* (MRSA) is a bacteria that is resistant to many of the strongest antibiotics, and although recent prevalence has been limited to hospitals and nursing homes, a new study of 161 New York City residents who contracted the MRSA infections finds that these people's homes were "major reservoirs" for the bacteria strains. (Photo by Christopher Furlong/Getty Images)

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Related Tags:

antibiotic resistant, antibiotic resistant superbug, bacteria infection, Benjamin Fearnow, cbs news, Centers for Disease and Control and Prevention, Columbia University Medical, deadly bacteria infection, Dr. Anne-Catrin Uhlemann, Healthcare, HealthDay, major reservoirs of bacteria, MRSA bacteria, nursing homes, Proceedings for the National Academy of Sciences, U.S. homes, U.S. households

Atlanta (CBS ATLANTA) – An anti-biotic resistant "superbug" that has long affected hospitals and other health care locations around the world has now found a new "reservoir" location: inside U.S. homes.

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a bacteria that is resistant to many of the strongest antibiotics, and although recent prevalence has been limited to hospitals and nursing homes, a new study of 161 New York City residents who contracted the MRSA infections finds that these people's homes were "major reservoirs" for the bacteria strains, HealthDay reports.

The Centers for Disease Control and Prevention notes that in communities outside of health care settings, most MRSA strains are skin infections that are spread by physical contact, such as the sharing of towels or razors. Athletes, military barracks, prisons and other close-quarter living areas are at an increased risk of contracting and spreading the bug.

In medical facilities, MRSA causes life-threatening bloodstream infections, pneumonia and surgical infections.

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But the new study shows that the MRSA has spread into average U.S. homes.

“What our findings show is it’s also endemic in households,” lead researcher Dr. Anne-Catrin Uhlemann, of Columbia University Medical Center in New York City, tells HealthDay, from the study published in the Proceedings for the National Academy of Sciences.

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According to a report released by the CDC last September, more than 2 million Americans get drug-resistant infections each year. And about 23,000 die from these diseases that are increasingly resistant to the strongest antibiotics that doctors use to fight the infections.

Uhlemann and fellow researchers took samples from those affected by MRSA strains along with samples of a comparison group of people who had not fallen ill. The researchers then took samples from these patients’ household surfaces and other social contacts to see if the bacteria had spread.

Ultimately, the research showed that many homes outside of just those affected by MRSA were “major reservoirs” for the MRSA strain, USA300, which HealthDay notes is the primary cause of MRSA infections in communities throughout the country.

Bedding, clothes and other everyday surfaces used by someone affected by MRSA are suggested to be cleaned by bleach and hot water, although Uhlemann says the role of surfaces in transmitting the disease is not “well delineated.”

“We can’t just treat the person with the infection,” Uhlemann told HealthDay. “We have to attempt to remove the (MRSA) colonization from the home,” and another MRSA expert not involved in the study added that the new study “confirms what we’ve suspected all along.”

Correct bandaging, protection of wounds, and hand-washing were suggested by experts as the best ways to protect family members and others who one may come in physical contact with regularly, thereby spreading the bacteria to others.

The CDC has estimated that nearly one-in-three people carry staph bacteria in their nose, and typically feel no symptoms of sickness. About 2 percent of people carry MRSA.

The World Health Organization has previously stated that the overuse of antibiotics has become so common that even normal infections may become deadly in the future, due to the evolution of these bacteria strains.

“It is not too late,” CDC director Dr. Tom Frieden said to CBSNews.com during a press conference. “If we’re not careful, the medicine chest will be empty when we go there to look for a lifesaving antibiotic for someone with a deadly infection. If we act now, we can preserve these medications while we continue to work on lifesaving medications.”

Dr. Henry Chambers, chair of the antimicrobial resistance committee for the Infectious Diseases Society of America, told HealthDay he agreed, and that “about half of antibiotics prescribed aren’t needed.”

A report earlier this month found that the drug-resistant bacteria caused a fatal blood infection in a Brazilian patient, according to Live Science. His body had developed a resistance to the powerful antibiotic vancomycin – used widely to treat the infection – during the course of his stay at the hospital.

– Benjamin Fearnow

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<http://www.who.int/mediacentre/news/releases/2014/amr-report/en/>

World Health Organization Report

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WHO's first global report on antibiotic resistance reveals serious worldwide threat to public health

New WHO report provides the most comprehensive picture of antibiotic resistance to date, with data from 114 countries

News release

30 April 2014 | Geneva - A new report by WHO—its first to look at antimicrobial resistance, including antibiotic resistance, globally—reveals that this serious threat is no longer a prediction for the future, it is happening right now in every region of the world and has the potential to affect anyone, of any age, in any country. Antibiotic resistance—when bacteria change so antibiotics no longer work in people who need them to treat infections—is now a major threat to public health.

“Without urgent, coordinated action by many stakeholders, the world is headed for a post-antibiotic era, in which common infections and minor injuries which have been treatable for decades can once again kill,” says Dr Keiji Fukuda, WHO's Assistant Director-General for Health Security. “Effective antibiotics have been one of the pillars allowing us to live longer, live healthier, and benefit from modern medicine. Unless we take significant actions to improve efforts to prevent infections and also change how we produce, prescribe and use antibiotics, the world will lose more and more of these global public health goods and the implications will be devastating.”

Key findings of the report

The report, “Antimicrobial resistance: global report on surveillance”, notes that resistance is occurring across many different infectious agents but the report focuses on antibiotic resistance in seven different bacteria responsible for common, serious diseases such as bloodstream infections (sepsis), diarrhoea, pneumonia, urinary tract infections and gonorrhoea. The results are cause for high concern, documenting resistance to antibiotics, especially “last resort” antibiotics, in all regions of the world.

Key findings from the report include:

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- Resistance to the treatment of last resort for life-threatening infections caused by a common intestinal bacteria, *Klebsiella pneumoniae*—carbapenem antibiotics—has spread to all regions of the world. *K. pneumoniae* is a major cause of hospital-acquired infections such as pneumonia, bloodstream infections, infections in newborns and intensive-care unit patients. In some countries, because of resistance, carbapenem antibiotics would not work in more than half of people treated for *K. pneumoniae* infections.
- Resistance to one of the most widely used antibacterial medicines for the treatment of urinary tract infections caused by *E. coli*—fluoroquinolones—is very widespread. In the 1980s, when these drugs were first introduced, resistance was virtually zero. Today, there are countries in many parts of the world where this treatment is now ineffective in more than half of patients.
- Treatment failure to the last resort of treatment for gonorrhoea—third generation cephalosporins—has been confirmed in Austria, Australia, Canada, France, Japan, Norway, Slovenia, South Africa, Sweden and the United Kingdom. More than 1 million people are infected with gonorrhoea around the world every day.
- Antibiotic resistance causes people to be sick for longer and increases the risk of death. For example, people with MRSA (methicillin-resistant *Staphylococcus aureus*) are estimated to be 64% more likely to die than people with a non-resistant form of the infection. Resistance also increases the cost of health care with lengthier stays in hospital and more intensive care required.

Ways to fight antibiotic resistance

The report reveals that key tools to tackle antibiotic resistance—such as basic systems to track and monitor the problem—show gaps or do not exist in many countries. While some countries have taken important steps in addressing the problem, every country and individual needs to do more.

Other important actions include preventing infections from happening in the first place—through better hygiene, access to clean water, infection control in health-care facilities, and vaccination—to reduce the need for antibiotics. WHO is also calling attention to the need to develop new diagnostics, antibiotics and other tools to allow healthcare professionals to stay ahead of emerging resistance.

This report is kick-starting a global effort led by WHO to address drug resistance. This will involve the development of tools and standards and improved collaboration around the world to track drug resistance, measure its health and economic impacts, and design targeted solutions.

How to tackle resistance

People can help tackle resistance by:

- using antibiotics only when prescribed by a doctor;
- completing the full prescription, even if they feel better;
- never sharing antibiotics with others or using leftover prescriptions.

Health workers and pharmacists can help tackle resistance by:

- enhancing infection prevention and control;
- only prescribing and dispensing antibiotics when they are truly needed;
- prescribing and dispensing the right antibiotic(s) to treat the illness.

Policymakers can help tackle resistance by:

- strengthening resistance tracking and laboratory capacity;
- regulating and promoting appropriate use of medicines.

Policymakers and industry can help tackle resistance by:

- fostering innovation and research and development of new tools;
- promoting cooperation and information sharing among all stakeholders.

The report—which also includes information on resistance to medicines for treating other infections such as HIV, malaria, tuberculosis and influenza—provides the most comprehensive picture of drug resistance to date, incorporating data from 114 countries.

For more information contact:

Glenn Thomas
WHO, Geneva
Communications Officer
Telephone: +41 22 791 39 83
Mobile.: +41 79 509 06 77
Email:thomasg@who.int

Highlights of the report by WHO region

WHO African Region

The report reveals major gaps in tracking of antibiotic resistance in the WHO African Region, with data gathered in a limited number of countries. While it is not possible to assess the true extent of the problem with the data available, that which is available is worrying. Significant resistance is reported for several

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bacteria that are spread in hospitals and communities. This includes significant *E. coli* resistance to third generation cephalosporins and fluoroquinolones—two important and commonly used types of antibacterial medicine. In some parts of the region, as many as 80% of *Staphylococcus aureus* infections are reported to be resistant to methicillin (MRSA), meaning treatment with standard antibiotics does not work.

WHO Region of the Americas

The Pan American Health Organization, WHO's Regional Office for the Americas, coordinates the collection of data on antibiotic resistance from hospitals and laboratories in 21 countries in the Region. The results show high levels of *E. coli* resistance to third generation cephalosporins and fluoroquinolones—two important and commonly used types of antibacterial medicine—in the Americas. Resistance to third generation cephalosporins in *K. pneumoniae* is also high and widespread. In some settings, as many as 90% of *Staphylococcus aureus* infections are reported to be methicillin-resistant (MRSA), meaning treatment with standard antibiotics does not work.

WHO Eastern Mediterranean Region

Data in the report show extensive antibiotic resistance across the WHO Eastern Mediterranean Region. In particular, there are high levels of *E. coli* resistance to third generation cephalosporins and fluoroquinolones—two important and commonly used types of antibacterial medicine. Resistance to third generation cephalosporins in *K. pneumoniae* is also high and widespread. In some parts of the Region, more than half of *Staphylococcus aureus* infections are reported to be methicillin-resistant (MRSA), meaning that treatment with standard antibiotics does not work. The report reveals major gaps in tracking of antibiotic resistance in the Region. WHO's Regional Office for the Eastern Mediterranean has identified strategic actions to contain drug resistance and is supporting countries to develop comprehensive national policies, strategies and plans.

WHO European Region

The report reveals high levels of resistance to third generation cephalosporins in *K. pneumoniae* throughout the WHO European Region. In some settings, as many as 60% of *Staphylococcus aureus* infections are reported to be methicillin-resistant (MRSA), meaning that treatment with standard antibiotics does not work. The report finds that although most countries in the EU have well-established national and international systems for tracking antibiotic resistance, countries in other parts of the Region urgently need to strengthen or establish such systems. WHO's Regional Office for Europe and its partners are supporting these countries through the newly-established Central Asian and Eastern European Surveillance of Antimicrobial Resistance network (CAESAR). The aim of CAESAR is to set up a network of national systems to monitor antibiotic

resistance in all countries of the WHO European Region for standardized data collection so that information is comparable.

WHO South-East Asia Region

The available data reveal that antibiotic resistance is a burgeoning problem in WHO's South-East Asia Region, which is home to a quarter of the world's population. The report's results show high levels of *E. coli* resistance to third generation cephalosporins and fluoroquinolones—two important and commonly used types of antibacterial medicine—in the Region. Resistance to third generation cephalosporins in *K. pneumoniae* is also high and widespread. In some parts of the Region, more than one quarter of *Staphylococcus aureus* infections are reported to be methicillin-resistant (MRSA), meaning that treatment with standard antibiotics does not work. In 2011, the health ministers of the Region articulated their commitment to combat drug resistance through the Jaipur Declaration. Since then, there has been growing awareness of the need for appropriate tracking of drug resistance, and all countries have agreed to contribute information to a regional database. Dr Poonam Khetrpal Singh, WHO Regional Director for South-East Asia, has identified drug resistance as a priority area of WHO's work in the Region.

WHO Western Pacific Region

Collaboration on tracking of antibiotic resistance between countries in the WHO Western Pacific Region was established in the 1980s, but suffered setbacks following a series of emergencies in the early 2000s. However, many countries in the region have long-established national systems for tracking resistance. Recently, WHO's Regional Office for the Western Pacific has taken steps to revive the regional collaboration. The report reveals high levels of *E. coli* resistance to fluoroquinolones—an important and commonly used type of antibacterial medicine—in the Region. Resistance to third generation cephalosporins in *K. pneumoniae* is also widespread. In some parts of the Region, as many as 80% of *Staphylococcus aureus* infections are reported to be methicillin-resistant (MRSA), meaning that treatment with standard antibiotics does not work.

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<http://news.nationalgeographic.com/news/2014/05/140501-superbugs-antibiotics-resistance-disease-medicine/>

National Geographic Daily News

Fatal Superbugs: Antibiotics Losing Effectiveness, WHO Says

"Genetics is working against us, almost like a science-fiction story."

Many bacterial infections, such as gonorrhea are no longer easily treated with antibiotics.

Susan Brink

for National Geographic

Published May 1, 2014

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The spread of superbugs—bacteria that have changed in ways that render antibiotics ineffective against them—is a serious and growing threat around the world, according to the World Health Organization's first global report on antibiotic resistance.

Once-common treatments for everyday intestinal and urinary tract infections, for pneumonia, for infections in newborns, and for diseases like gonorrhea are no longer working in many people.

The new report on the global threat adds to a Centers for Disease Control and Prevention report last year showing that two million people in the United States are infected annually with antibiotic-resistant bacteria, and 23,000 of them die each year as a result.

To understand the dangers posed by superbugs, National Geographic spoke with Stuart Levy, chair of the board of the Alliance for the Prudent Use of Antibiotics at Tufts University School of Medicine in Boston.

What exactly are superbugs?

They are bacteria resistant to one or more antibiotics, and they make it difficult to treat or cure infections that once were easily treated. The antibiotic has lost its

ability to control or kill bacterial growth. The bacteria can grow even in a sea of antibiotics because the antibiotic doesn't touch them.

How are the bacteria able to circumvent the power of antibiotics?

The bacteria have acquired the ability to destroy the antibiotic in order to protect themselves. They've developed a gene for resistance to, say, penicillin, and that gene protects them. A genetic mutation might enable a bacteria to produce enzymes that inactivate antibiotics. Or [a mutation] might eliminate the target that the antibiotic is supposed to attack.

A bacteria may have developed resistance to five or six antibiotics, so in treatment, you don't know which one to choose. And the bacteria accumulate resistance by developing new genes. Genetics is working against us, almost like a science-fiction story.

Why are these superbugs spreading and the threat growing?

We're continuing to use antibiotics in a bad way. They're supposed to be used to combat bacteria, not viruses. The common cold is a virus. Any time you use an antibiotic when it's not needed, you're pushing antibiotic resistance ahead. People are misusing them in their homes. They may have a stockpile they've saved, and think taking [an antibiotic] will help them with a cold. They're not helping their cold, and they're propagating resistance.

What about other uses, such as using antibiotics in animal feed by the meat industry?

This is a big issue. About 80 percent of antibiotics manufactured are given to beef cattle, chickens, and hogs to help them grow better and put on more weight. They excrete them, and the antibiotics largely are not broken down. They enter the environment—the ground and the water—and retain their ability to affect bacteria and promote antibiotic resistance.

The Food and Drug Administration has come out with a voluntary plan for industry to phase out antibiotic use. I've been championing this for 30 years.

How can we combat the further growth and spread of superbugs?

By using antibiotics only when we need them. And by eliminating their use in animals. There's a paucity of new antibiotics to take care of these multiresistant superbugs, so we're at the mercy of the bacteria.

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Are there new antibiotics in development?

The journal *Microbe* did a report this month on wakening to the need for new antibiotics. There are a number of new antibiotics being studied. They're not there yet, but at least they're in the pipeline.

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<http://www.theguardian.com/society/2014/apr/30/who-calls-urgent-action-antibiotics-antimicrobial-resistance>

WHO calls for urgent action to preserve power of antibiotics and make new ones

World faces huge public health threat that could affect anyone of any age, warns report into extent of antimicrobial resistance

- Sarah Boseley, health editor
- The Guardian, Wednesday 30 April 2014 15.41 EDT

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The World Health Organisation says: 'The world is headed for a post-antibiotic era, in which common infections and minor injuries can once again kill.'
Photograph: Murdo Macleod for the Guardian

Pneumonia will again become a feared killer, surgery risky and diarrhoea fatal if urgent action is not taken to preserve the power of current antibiotics as well as develop new ones, the World Health Organisation has warned on Wednesday.

In its first investigation of the extent of antimicrobial resistance across the world, the WHO said we are facing a huge threat to public health, which could affect anybody of any age.

No country is immune, as bacteria and viruses resistant to drugs travel the globe with ease.

In the UK, as elsewhere, there is increasing concern about infections from *Klebsiella pneumoniae*, bacterium carried in the intestines which has become resistant to the last line of antibiotics available, the carbapenems. In fragile patients on intensive care wards and newborn babies, these infections can be fatal. Meanwhile, sexually transmitted gonorrhoea is on the increase and is also resistant to the last-resort antibiotics used to treat it.

"Without urgent, coordinated action by many stakeholders, the world is headed for a post-antibiotic era, in which common infections and minor injuries which have been treatable for decades can once again kill," said Dr Keiji Fukuda, WHO's assistant director general for health security.

"Effective antibiotics have been one of the pillars allowing us to live longer, live healthier, and benefit from modern medicine. Unless we take significant actions to improve efforts to prevent infections and also change how we produce, prescribe and use antibiotics, the world will lose more and more of these global public health goods, and the implications will be devastating."

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Wednesday's report is the first to gather comprehensive data from the WHO on antibiotic resistance and has information from 114 countries. Although the data is more complete in some regions than in others, it is clear that drug-resistant strains of bacteria and viruses are common and that trying to preserve the efficacy of current antibiotics is a losing battle.

"We know that the pathogens are everywhere. They were here before humanity," Dr Carmen Pessoa Da Silva, team leader on antimicrobial resistance at WHO, told the Guardian. "It is not a problem of a single country or single region. It is a problem that belongs to the entire planet. This is important. No single country even with the best possible policies in place can address this issue alone. We need all countries to get together and discuss and put in practice possible solutions."

The report raises concerns about drug-resistant tuberculosis, which is spreading and requires more than a year of treatment with combinations of antibiotics that are unaffordable in some countries. It also looks at the rise of treatment-resistant strains of HIV, which is common in Europe and north America.

But the report's main focus is seven bacteria responsible for common infections that are now sometimes life-threatening because of antibiotic resistance. The most worrying findings are the worldwide drug-resistant K pneumoniae, the treatment failures in gonorrhoea in 10 countries – including the UK – and the widespread resistance to fluoroquinolones – one of the most widely used antibacterial drugs for the treatment of urinary tract infections caused by E coli.

New drugs are not on the horizon. There have been no new classes of antibiotics for 25 years, said Dr Danilo Lo Fo Wong, senior adviser on antimicrobial resistance to WHO Europe.

Pharmaceutical firms cannot cover the costs of research and development, because new antibiotics have to be used sparingly for fear of resistance developing – and when that begins, they have a short lifespan. "New antibiotics coming on to the market are not really new," Lo Fo Wong said. "They are variations of those we already have." That means that bacteria are likely to develop resistance to them that much sooner.

"We see treatment failure and we see people die because they are not treated in time," he said. "In some parts of the world, it is about availability." But in others, patients are treated with one antibiotic after another to try to find something that

works, increasing the risk to them because they become more ill and also further driving resistance. Some countries in Europe do not automatically carry out tests to establish what the infection is, especially if there are additional costs to the hospital or patient.

The WHO urges all countries to be more sparing in their use of antibiotics in humans and in animals and improve hand hygiene, which has been credited with reducing the numbers of cases in the UK of the "superbug" MRSA – staphylococcus aureus – that is resistant to the antibiotic methicillin.

The medical charity Médecins Sans Frontières said a global plan for the rational use of affordable antibiotics was urgently needed.

"We see horrendous rates of antibiotic resistance wherever we look in our field operations, including children admitted to nutritional centres in Niger, and people in our surgical and trauma units in Jordan," said Dr Jennifer Cohn, medical director of the MSF Access Campaign. "Countries need to improve their surveillance of antimicrobial resistance, as otherwise our actions are just a shot in the dark; without this information, doctors don't know the extent of the problem and can't take the right clinical decisions needed.

"Ultimately, WHO's report should be a wake-up call to governments to introduce incentives for industry to develop new, affordable antibiotics that do not rely on patents and high prices and are adapted to the needs of developing countries."

British experts agreed on the urgency of the problem. "The world needs to respond as it did to the Aids crisis of the 1980s," said Laura Piddock, professor of microbiology at University of Birmingham and director of the campaigning group Antibiotic Action. "To do this, we need to be ambitious to succeed."

Mandatory and funded global surveillance and public education campaigns were important, she added, "but these are just starting points. We still need a better understanding of all aspects of resistance as well as new discovery, research and development of new antibiotics." However, UK government funding for antibiotic research had dwindled, Piddock warned.

Prof Martin Adams, president of the Society for Applied Microbiology, also called for more research into how resistance develops in both human and animal antibiotic use. "Even if there are new antimicrobial drugs brought to market, we will still face the spectre of resistance unless we can learn how to minimise or slow its development," he said.

RECEIVED

JUN 29 2014

AT PUBLIC MEETING

Melissa Schmidt

From: PUBCOMMENT-OCC
Sent: Thursday, July 18, 2013 8:07 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

PM

MWD
87424

From: tony_jean.peszko69@sbcglobal.net [mailto:tony_jean.peszko69@sbcglobal.net]
Sent: Wednesday, July 17, 2013 6:29 PM
To: donotReply@tceq.state.tx.us
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: MR Anthony Joseph Peszko

E-MAIL: tony_jean.peszko69@sbcglobal.net

COMPANY:

ADDRESS: 1637 BEACHCOMBER LN
HOUSTON TX 77062-5408

PHONE: 2814882402

FAX:

COMMENTS: The CLEAR LAKE CITY WATER AUTHORITY has submitted a permit request to TCEQ to amend their current waste water disposal permit WQ0010539001. The amendment would allow the CLEAR LAKE CITY WATER AUTHORITY to discharge up to 10 million gallons per day of treated sewage waste water effluent into drainage ditches and detention ponds the CLEAR LAKE CITY WATER AUTHORITY plans to construct on the old Clear Lake City Golf Course. The ROBERT T SAVELY WATER

RECLAMATION FACILITY is rated for 10 million gallons per day of treated effluent discharge. Thus, the CLEAR LAKE CITY WATER AUTHORITY wants permission from TCEQ to discharge the entire output of the ROBERT T SAVELY WATER RECLAMATION FACILITY into the old golf course in the heart of Clear Lake City to maintain a 6 foot depth of water in proposed detention ponds and ditches. The old golf course is surrounded by thousands of homes with a population of 30,000 people. The health effects of long term exposure to treated sewage effluent held in open ditches and detention ponds are unknown. The CLEAR LAKE CITY WATER AUTHORITY offers no certification of public health safety to assure that carcinogens and other toxic products present in all treated sewage effluent will not adversely affect the health of 30,000 residents living in the vicinity of the old golf course. The CLEAR LAKE CITY WATER AUTHORITY provides no method to control the huge quantity of mosquitoes that would thrive in its open wildlands detention ponds, and provides no method to prevent the alligators, poisonous snakes, and other water creatures that could now swim upstream from Armand Bayou and Horsepen Bayou into the old golf course. It would be very hazardous for residents along the golf course to find an alligator or water moccasin in their backyard or garage. For these reasons I request that the TCEQ disapprove the requested change to TCEQ Permit WQ0010539001. I also request that a public meeting in the Clear Lake area be conducted by TCEQ concerning the proposed discharge of treated waste water effluent into our community. Thank You, Anthony J. Peszko 1637 Beachcomber Lane Houston, Texas 77062 281-488-2402 tony_jean.peszko69@sbcglobal.net

Mr. Richard A. Hyde, P.E., Executive Director,
Texas Commission on Environmental Quality
P. O. Box 13087
Austin, TX 78711-3087

MWD
DWM
7/10/15

REVIEWED
MAR 24 2015
By [Signature]

RECEIVED
MAR 23 2015
EXECUTIVE DIRECTOR

Dear Mr. Hyde,

I am requesting the TCEQ to conduct a contested case hearing of the CLCWA proposed amendment of TPDES Permit No. WQ0010539001. I recommend disapproval.

Cindy Porterfield 1927 Seakale Ln Houston TX 77062 (713 376-8255) capsells@flash.net

I am an "Affected Person". TCEQ approval of this amendment & CLCWA implementation of it will have a detrimental effect on me & my family in the following areas:

1. Health: My property abuts the old golf course where currently nonexistent massive ditches will be excavated and where 1,080,000 gallons per day of partially treated effluent water will slowly flow & pool in acres of man-made swampy wetlands & new retention ditches. This new effluent water hazard will be within 100 feet of my property line. I am 56 years of age and have a weakened immune system due to age.

Historically the TCEQ allows effluent water to be added to existing, flowing bodies of water. This massive effluent water project adds effluent water to a (currently) non-existent dry detention ditch. A project this massive has never been added to a fully occupied residential area and TCEQ permitted in Texas. Therefore the biological & health impacts are currently not quantifiable. The TCEQ cannot guarantee that the proposed quantity of partially treated effluent water will be safe for someone with my health conditions. It is my position that my health & possibly even life are endangered by the bacteria, germs, & hordes of mosquitoes that will appear if this permit is approved.

2. Finances: My FEMA flood insurance category will change to a more hazardous flood zone because of my properties new proximity to the effluent water. As a result, my annual costs rate will increase by 30%. Per general discussions with local realtors, my property value will decrease by as much as 15% (estimated @ \$20,000 to \$30,000) during the CLCWA planned 15 year development period [excavation & construction] of this project.

My CLCWA District taxes will increase as the board issues new bonds to pay for this currently unfunded \$50 million project.

Please disapprove the amendment to Permit WQ0010539001.

Thank you,

[Handwritten Signature: Cindy Porterfield]

Cindy Porterfield

CHIEF CLERKS OFFICE
15 MAR 24 AM 9:53

11 MAR 24 AM 11:11
COMMUNICATIONS DIVISION
TCEQ

[Handwritten Signature]

Porterfield
1927 Seakale Ln
Houston TX 77062

109



Houston TX 77062
19 MAR 2015 PM 9 L

Mr Richard Hyde P.E. Executive Director
Texas Commission on Environmental Quality
TCEQ MAIL CENTER
P.O. Box 13087

Austin Texas 787130877

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Thursday, April 02, 2015 12:48 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

RFR
HR

MWD
87424

From: kenneth.proctor@sbcglobal.net [mailto:kenneth.proctor@sbcglobal.net]
Sent: Thursday, April 02, 2015 11:11 AM
To: DoNot Reply
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Kenneth Proctor

E-MAIL: kenneth.proctor@sbcglobal.net

COMPANY:

ADDRESS: 15718 TORRY PINES RD
HOUSTON TX 77062-4512

PHONE: 2814801268

FAX:

COMMENTS: I am requesting that the Executive Director of the TCEQ reconsider and amend his decision relative to TPDES Permit WQ0010539001. I believe that issues of public health, property use and economic impact have not been sufficiently considered. I am requesting a contested case hearing. I am also requesting that the TCEQ Commissioners conduct a contested review of TPDES Permit WQ0010539001. I am submitting

MW

these requests via this e-Comments system in response to the TCEQ Chief Clerk's letter dated 3-6-15 that addresses TPDES Permit WQ0010395001. I am personally affected by this application. My property is in the CLCWA District and abuts the golf course property where the effluent water will be pumped. My property line is less than 100 feet from where the effluent water ditch, ponds and wetlands will be created according to the applicant's proposal. My property is approximately 0.1 miles from the outfalls 002 and 003. I recommend this application be amended. Below are requested amendments. 1) I request that the applicant should be required to treat all outfalls equally and treatment requirements and bacteria count limits of 001 be extended to 002 and 003. The residents adjacent to outfalls 002 and 003 should not be put at a greater bacteria levels than those residents living adjacent to outfall 001. All regulations that apply to 001 are to be applied to outfalls 002 and 003. Therefore I request that the discharge limits for outfall 002 and 003 be amended to 35 daily average and 104 daily maximum, the current requirements for outfall 001. Since outfall 001 is inaccessible to the public, I request that outfalls 002 and 003 be made inaccessible in a similar way. 2) I request that this application be amended to require the applicant to test for Legionella and Legionella pneumophila at the outfalls, 002 and 003, and allow no more than exists in the natural environment (where no waste water treatment plant effluent is present). I further request that the applicant be required to adjust his treatment process in order to assure that the bacteria levels of Legionella at outfalls 002 and 003 are at or below the established natural environment baseline. Because of my advanced age of 81 and diminished immune system due to cancer, radiation treatments and normal age immunity degeneration, I am particularly vulnerable to the potential fatal disease, Legionnaire's Disease, caused by this bacteria. Because this bacteria is inhaled from water aerosol (mist/fog/steam) evaporating from a contaminated water source, my proximity to this treated effluent places me at a high risk. The levels of Legionella will likely be high in the in the effluent exiting the Savely Waste Treatment plant due to City of Houston regulations and common building and treatment practice. The City of Houston requires that all air conditioner drain water, a source of Legionella, be piped into the sanitary drain lines. Legionella pneumophila is resistant to most common wastewater treatment processes especially chlorine which the applicant intends to use periodically. During periods of high air conditioner use and warm temperatures, the treated waste water at outfall 002 and 003 will likely contain high levels of treatment resistant Legionella pneumophila. Under the current proposal, outfalls 002 and 003 will create a "water aerosol" at the exit pipe that as a fine mist can travel a great distance and linger in the air. In addition because Legionella is treatment resistant, the mist/fog that will rise over the applicant's proposed ponds and streams and flow as fog into my yard (adjacent resident) will most likely contain high levels of Legionella. Proximity legionellosis is noted in the literature. Biofilm growth of Legionella in stagnant warm water(applicant's ponds) is also noted in the literature. This biofilm accumulation and aerosol transmission of Legionella may threaten my health and is not permitted by Implementation Procedures, 30 TAC Chapter 307. As a result, my health will be at risk whenever that fog is present and I will be unable to fully use my property for fear of increased risk of contracting Legionnaires disease from inhaled effluent mist. The applicant's method of testing for E.coli provides no protection to public health from this aerosol transmitted disease. Testing for Legionella is well established and should not pose a significant or undue burden on the applicant. 3) I request that this application be amended to provide financial compensations for changes in my homeowner insurance costs due to this project. Currently, there is no existing ditch or stream in my section, southeast of El Dorado. My current insurance is based on that fact. This outfall would create a stream and water body behind my house. My flood insurance(FEMA) will increase significantly as it is reclassified as close proximity to a water body. In addition, my property will be reclassified by my homeowners insurance company. If the insurance company further decides that my property is in a tidal zone due to this new waterway, my insurance company has indicated that they do not insure property in a tidal zone. Because my property description will significantly change due to the outfall and new water body, I believe that I risk losing my homeowner's insurance or paying substantially more for coverage based on reclassification. This represents direct financial harm to me and I request the application be amended to provide financial compensation should this project occur. To summarize: I request that the application be amended in the following ways prior to possible approval. I request that the application be amended in the following ways prior to possible approval. We request that the discharge limits for outfall 002 and 003 be amended to the levels for outfall 001 and outfalls 002 and 003 be made inaccessible to the public in a similar way to outfall 001. I request that this application be amended to require the applicant to test for

Legionella and allow no more Legionella at outfalls 002 and 003 than exists in the natural environment. I request that this application be amended to provide financial compensations for changes in my homeowner insurance costs due to this project. I request the Executive Director reconsider and amend his decision relative to TPDES Permit WQ0010539001. I request this for myself and also as a member of Friends of the Old Golf Course.

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, June 30, 2014 12:54 PM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

H

From: kenneth.proctor@sbcglobal.net [mailto:kenneth.proctor@sbcglobal.net]
Sent: Monday, June 30, 2014 12:40 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

*MWD
7/1/14*

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Kenneth Proctor

E-MAIL: kenneth.proctor@sbcglobal.net

COMPANY: Kenneth Proctor

ADDRESS: 15718 TORRY PINES RD
HOUSTON TX 77062-4512

PHONE: 2814801268

FAX:

COMMENTS: I AM REQUESTING A CONTESTED CASE HEARING REGARDING PERMIT WQ0010539001, requested by the Clear Lake City Water Authority. My address is 15718 Torry Pines, Houston, TX, 77062. I live less than 500 feet from the effluent discharge point as described by the current proposal. I will be approximately 130 feet from the effluent channel based on current design. As stated by the Water Authority board member and staff at the May 29th meeting, the treatment of this wastewater effluent will

MWD

vary based on turbidity levels created by storm water. As a result, the safety of the effluent discharged and flowing behind my home will vary and could contain substantial levels of pathogenic contamination. In addition, the channel required to move this discharge will significantly alter the current storm water sewer system potentially resulting in ponds of storm water runoff lingering within 130 feet of my property. According to the EPA, urban storm water runoff such as we have here in Clear Lake contains known cancer causing chemicals. Currently, I am not exposed to either treated wastewater or urban storm water runoff due to the original design of my area. I am an elderly cancer survivor and I believe the additional exposure to known cancer causing chemicals and the exposure to unknown levels of human pathogens put me at a significantly higher health risk. Additionally, as a result of allowing this permit, there will be stagnant pools of water adjacent to my property where none presently exist. These pools will breed a huge mosquito population capable of transmitting human disease pathogens potentially existing in this effluent potentially jeopardizing my health. I request the opportunity to oppose this permit.

Marisa Weber

From: PUBCOMMENT
Sent: Wednesday, May 15, 2013 9:56 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

H

From: PUBCOMMENT-OCC
Sent: Wednesday, May 15, 2013 8:36 AM
To: PUBCOMMENT
Subject: FW: Public comment on Permit Number WQ0010539001

*MWD
07424*

From: kenneth.proctor@sbcglobal.net [mailto:kenneth.proctor@sbcglobal.net]
Sent: Wednesday, May 15, 2013 8:06 AM
To: donotReply@tceq.state.tx.us
Subject: Public comment on Permit Number WQ0010539001

REGULATED ENTY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Kenneth Proctor

E-MAIL: kenneth.proctor@sbcglobal.net

COMPANY: Kenneth Proctor

ADDRESS: 15718 TORRY PINES RD
HOUSTON TX 77062-4512

PHONE: 2814801268

FAX:

MW

COMMENTS: My property lies . . . e golf course. I have a view across t . . . ay of a forest. A pathway for walking/biking is 40 feet from my property line. Two duck ponds are a short distance down the tree-shaded path. All this will be destroyed by the Water Authority digging a huge trench to pipe in this treated sewage water. I object to this. Please do not grant this permit. I request a public hearing on this matter.

TCEQ Public Meeting Form
May 29, 2014

10

Clear Lake City Water Authority
Water Quality TPDES
Permit No. WQ0010539001

RECEIVED

MAY 29 2014

PLEASE PRINT

Name: KENNETH PROCTOR

AT PUBLIC MEETING

Mailing Address: 15718 TORRY PINES
HOUSTON TX 77062

Physical Address (if different): _____

City/State: HOUSTON TX Zip: 77062

This information is subject to public disclosure under the Texas Public Information Act

Email: Kenneth.Proctor@sbglobal.net

Phone Number: 281-480-1268

• Are you here today representing a municipality, legislator, agency, or group? Yes No

If yes, which one? _____

Please add me to the mailing list. ✓

I wish to provide formal *ORAL COMMENTS* at tonight's public meeting. ✓

I wish to provide formal *WRITTEN COMMENTS* at tonight's public meeting. ✓
(Written comments may be submitted at any time during the meeting)

Please give this form to the person at the information table. Thank you.

mm

CLCWA Permit Number **WQ0010539001**

I am a retired person and a cancer survivor. My home lies on the golf course a short distance from the proposed dumping point. I look out on two duck ponds and a natural forest. This will all be destroyed by the Water Authority's plan to dig out a huge trench and pipe sewage effluent uphill into it near my house. There will be standing pools of stagnant water and weeds growing everywhere. This effluent is currently dumped into the bayou system where it becomes diluted. I do not believe anyone knows the health risks of pools of this water evaporating and becoming more concentrated with whatever pathogens are still present. Not only is the Water Authority destroying the beauty of this area, they are putting the health of the elderly in particular at risk.

I am opposed to this permit.

Kenneth Proctor
15718 Torry Pines Rd
Houston, TX 77062

RECEIVED
MAY 29 2014
AT PUBLIC MEETING

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, June 02, 2014 9:07 AM
To: PUBCOMMENT-OCC2
Subject: FW: Public comment on Permit Number WQ0010539001

From: kenneth.proctor@sbcglobal.net [mailto:kenneth.proctor@sbcglobal.net]
Sent: Thursday, May 29, 2014 2:54 PM
To: donotReply@tceq.texas.gov
Subject: Public comment on Permit Number WQ0010539001

*MWD
87424*

REGULATED ENTITY NAME ROBERT T SAVELY WATER RECLAMATION FACILITY

RN NUMBER: RN101440485

PERMIT NUMBER: WQ0010539001

DOCKET NUMBER:

COUNTY: HARRIS

PRINCIPAL NAME: CLEAR LAKE CITY WATER AUTHORITY

CN NUMBER: CN600270102

FROM

NAME: Kenneth Proctor

E-MAIL: kenneth.proctor@sbcglobal.net

COMPANY: Kenneth Proctor

ADDRESS: 15718 TORRY PINES RD
HOUSTON TX 77062-4512

PHONE: 2814801268

FAX:

COMMENTS: I am a retired person. My home lies on the golf course a short distance from two duck ponds and a natural forest. This will all be destroyed by the Water Authority's plan to dig out a huge trench and pipe sewage effluent uphill into it. There will be standing pools of stagnant water and weeds growing everywhere. This effluent is currently dumped into the bayou system where it becomes diluted. I do not believe anyone knows the health risks of pools of this water evaporating and becoming more concentrated with whatever

MWD

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Tom Reed
15923 Dinwo L.N.
Houston, TX 77062

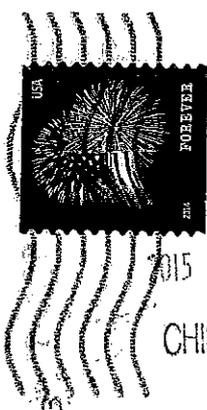
NORTH HOUSTON TX 773

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23 MAR 2015 PM 9 L

MAR 25 2015

TCEQ MAIL CENTER
BC



2015 MAR 26 AM 9:33
CHIEF CLERKS OFFICE

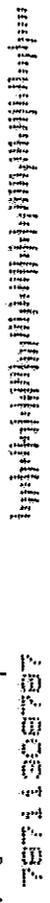
TEXAS
COMMISSION
ON ENVIRONMENTAL
QUALITY

Director
City

Richard Hyde R.E. Executive
Texas Commission on Environmental Quality

TCEQ / P.O. Box 13087
109

Austin, TX 78711-3087



7871308787

Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, March 23, 2015 7:39 AM
To: PUBCOMMENT-OCC2
Subject: FW: TCEQ TPDES Permit No. WQ0010539001
Attachments: TCEQ request414.pdf

*MWD
TCEQ
8*

H

From: Tom Reed [<mailto:tomsview2002@hotmail.com>]
Sent: Saturday, March 21, 2015 2:48 PM
To: PUBCOMMENT-OCC
Subject: TCEQ TPDES Permit No. WQ0010539001

Mr. Richard A. Hyde, P.E., Executive Director,
Texas Commission on Environmental Quality
P. O. Box 13087
Austin, TX 78711-3087

Dear Mr. Hyde, see attached

I am requesting the TCEQ to conduct a contested case hearing of the CLCWA proposed amendment of TPDES Permit No. WQ0010539001. I recommend disapproval.

Tom Reed 15923 Diana Ln. Houston, TX 77062 Saturday, March 21, 2015
Phone 281-380-5097 Email: tomsview@hotmail.com

I am an "Affected Person". TCEQ approval of this amendment & CLCWA implementation of it will have a detrimental effect on me & my family in the following areas:

1. Health

My property abuts the old golf course where proposed excavation will create massive ditches into which 1,080,000 gallons per day of partially treated effluent water will slowly flow & pool in acres of man-made swampy wetlands & new retention ditches. This new effluent water hazard will be within 100 feet of my property line. I am 62 years of age and have a weakened immune system due to Parkinson's disease, respiratory afflictions and overall diminished health. At this point Quality of life is of utmost importance to me. Allowing the unnecessary pumping of effluent (an outflow of up to 1 million gallons per day) into a proposed ditch within 100 feet of my home may be considered as willful neglect on the part of TCEQ if it approves this permit.

Historically the TCEQ allows effluent water to be added to existing, flowing bodies of water. This massive project adds effluent water to a proposed detention ditch where there is currently wooded high ground. A project this massive and hazardous has never been added to a fully established residential where a large number of residents are senior citizens. This case is unprecedented for TCEQ. Therefore the biological & health impacts are currently not quantifiable. The TCEQ cannot guarantee that the proposed quantity of partially treated effluent water will be safe for someone with my health conditions. It is my position that my health & possibly even life are endangered by the pathogens and hordes of mosquitoes that will appear if this permit is approved.

2. Finances

My FEMA flood insurance category will change to a more hazardous flood zone because of my properties new proximity to the effluent water. As a result, my annual costs rate will increase considerably, by as much as by 30%. Per general discussions with local realtors, my property value will decrease by as much as 15% (estimated @

MWD

\$20,000 to \$30,000) during the CLCWA planned 15 year development period.

My CLCWA District taxes will increase as the board issues new bonds to pay for this currently unfunded \$50 million project.

Please disapprove the amendment to Permit WQ0010539001. Thank you

Tom Reed

Date 3/21/2015

Mr. Richard A. Hyde, P.E., Executive Director,
Texas Commission on Environmental Quality
P. O. Box 13087
Austin, TX 78711-3087

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Tom Reed 15923 Diana Ln. Houston, TX 77062 Saturday, March 21, 2015
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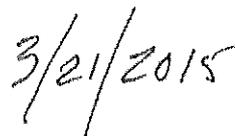
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Please disapprove the amendment to Permit WQ0010539001. Thank you

Tom Reed



Date 3/21/2015



Marisa Weber

From: PUBCOMMENT-OCC
Sent: Monday, March 23, 2015 7:40 AM
To: PUBCOMMENT-OCC2
Subject: FW: TPDES Permit No. WQ0010539001. I recommend disapproval.

H

MWD
87424

From: Tom Reed [<mailto:tomsview2002@hotmail.com>]
Sent: Saturday, March 21, 2015 1:43 PM
To: PUBCOMMENT-OCC
Subject: TPDES Permit No. WQ0010539001. I recommend disapproval.

I am requesting the TCEQ to conduct a contested case hearing of the CLCWA proposed amendment of TPDES Permit No. WQ0010539001. I recommend disapproval.

Tom Reed
2015
Ln.
Phone 281-380-5097 Email: tomsview@hotmail.com

Saturday, March 21,
15923 Diana
Houston, TX 77062

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My FEMA flood insurance category will change to a more hazardous flood zone because of my properties new proximity to the effluent water. As a result, my annual costs rate will increase considerably, by as much as by 30%. Per general discussions with local realtors, my property value will decrease by as much as 15% (estimated @ \$20,000 to \$30,000) during the CLCWA planned 15 year development period [excavation & construction] of this project.

My CLCWA District taxes will increase as the board issues new bonds to pay for this currently unfunded \$50 million project.

Please disapprove the amendment to Permit WQ0010539001. Thank you

MWD

Tom Reed _____

Date 3/21/2015 _____