Town of Old Lyme Water Pollution Control Authority
October 8, 2013

Present: Chairman Kurt Zemba, Frank Chan, Robert McCarthy, Richard Prendergast, Doug Wilkinson, Dimitri Tolchinski, Ernest Lorda, Donna Bednar; alternate Andrea Lombard arrived at 8:25pm; Woodard & Curran representatives Jay Sheehan and David Prickett; First Selectwoman Bonnie Reemsnyder; Sanitarian Sonia Marino; Selectwoman Mary Jo Nosal was in the audience, along with 12 additional members of the public
Absent: Tom Risom (traveling out of town on business)

1. Call to Order
Chairman Kurt Zemba called the meeting to order at 7:35 pm. He stated that alternate Andrea Lombard would arrive late and will be appointed to replace Tom Risom as a voting member upon her arrival.

2. Approval of the Minutes – September 10, 2013
A correction was noted to page 3 of the minutes, 2nd paragraph, last sentence: "The annual cost range per EDU was approximately $2600 to $4000 *monthly*" – should be $2600 to $4000 ***annually.***
A motion was made by Dimitri Tolchinski, seconded by Rob McCarthy to approve the minutes with the correction. Motion passed.

3. Correspondence
Chairman Kurt Zemba announced that First Selectwoman Reemsnyder will address the November meeting of the CT Association of WPCAs on "Sewers vs. Sewer Avoidance: the Old Lyme Story."
A 9/18/13 story in the New London Day summarized the status of the Wastewater Management project as of the last WPCA meeting.
A 10/6/13 story in The Day on the environmental and health impact of chemicals and bacteria dumped into local waterways from regional wastewater treatment facility(ies) was distributed to members.

4. Chairman's Report
- FY 2013-2014 Budget Distribution Update

Carryover funds are included in WPCA budget totals for 2013-2014. A meeting will be scheduled with Finance Director Nicole Stajduhar, Attorney Andrew Lord, Chairman Kurt Zemba and Treasurer Doug Wilkinson to structure a financial reporting device that will satisfy WPCA current and future needs.

- WPCA Attorney – Update

Sanitarian Sonia Marino negotiated a rate with Attorney Lord of Murtha, Cullina. The rate was higher than anticipated and Kurt suggests retaining Attorney Lord as a specialist to deal with the Wastewater Management project, and engaging former WPCA Attorney Mike Wells as the regular WPCA attorney. Attorney Lord will also assist with the financial reporting structure.
A motion was made by Dimitri Tolchinski, seconded by Frank Chan to accept Attorney Lord's $315 hourly rate and engage his services through December 2013. Motion passed.

Motions will be requested in January 2014 to continue with Attorney Lord as a specialist, and engage Attorney Wells.

- By-Law Review – Tabled until December

Kurt will meet with Attorney Lord to solicit guidance on the WPCA By-Laws.

5. **Wastewater Management Project Discussion**

- **Discussion Re: Woodard & Curran Final Report and process**

Kurt stated that the costs(Capital Costs, Annual O & M Costs, and Total Annual Costs) for a Local alternative now appear to be lower than a Regional alternative. He reiterated that in order to evaluate an option, the WPCA must consider the following factors:

Ease of Implementation in Initial Years
Long-Term Control of Capital Needs
Long-Term Control of Sewer Capacity Allocation
Local is lower so cat is an issue now!
Ease of Permitting
Protects Long-Term Water Balance and Protection of our Natural Resources (ie no pollution)

Once the WPCA has agreed which option to pursue, the WPCA will examine and identify the land and facility pieces needed for that particular option in order to present a plan at Information Sessions for feedback from the public. The options are local alternative, regional alternative, or do nothing.

First Selectwoman Reemsnyder presented an historical overview of the State's involvement in regional sewers, and the Town's response since the 1980s. While the Town/WPCA has had 95% compliance with septic system regulations, including a 7 year pump out requirement, the remaining 5% comprise problematic systems that cannot comply for a variety of reasons.
It is those non-compliant systems, mostly located along the shoreline, that have led to the State/DEEP's Consent Orders, requiring some town beach associations to develop plans that will correct the non-compliance issues.
Point O' Woods Beach (POW) was the first to form its own WPCA and subsequently connect to the New London Regional Facility through East Lyme and Waterford. POW is using "borrowed" capacity from the State.
When two other associations were also given Consent Orders, the Town engaged Lombardo & Associates to conduct a preliminary study intended to determine if a local solution to local water pollution issues seemed feasible. The conclusions of the preliminary study led the Town to engage Woodard and Curran to perform additional analysis.
Bonnie commended the WPCA and Woodard & Curran for what they have accomplished in a short period, noting that it has been only 6 months since funding for the current study was approved at Town Meeting.

David Prickett of Woodard & Curran reviewed the Preliminary Project Summary (attached to the minutes) with the group. The summary includes results of a needs analysis, on-site testing, and a cost analysis. He noted that either the regional or local alternative(s) would mean a significant investment for individual homeowners, estimated at $2,000 to $2,500 annually per home.

WPCA members asked for clarification on capacity and cost:

- Is the local alternative able to handle the estimated capacity in the recommended service area? Yes
- Does the local alternative cost estimate include labor? Yes. Labor, Utility costs, treatment supplies/chemicals, and legal/administrative costs are included in the cost estimates.
- Are individual neighborhood collection costs included? Yes
- Is the impact of using the regional facility as a back-up included in cost estimates? No. Additional potential disposal sites have been identified in Old Lyme and a third local disposal site is probably a better back-up option.
- Has future development, both residential and business, been taken into account? Yes.
- What would the impact on estimated costs be if two beach associations were eliminated from the user numbers? The per user costs would increase but collection costs would be reduced – the net costs would remain approximately the same.

Kurt asked for input on the viable options from each member, First Selectwoman Reemsnyder and Selectwoman Nosal. He read an email from Tom Risom stating his belief in the local alternative along with his skepticism that the DEEP will approve a local plan. All members stated a preference for the local alternative, citing long term environmental and financial benefits. Several shared Tom's skepticism about the DEEP's support, and suggested using the regional alternative as a back-up plan. This was referred to by Woodard & Curran at previous meetings as a hybrid plan.
Both Selectwoman Nosal and First Selectwoman Reemsnyder also spoke in support of the local alternative. Bonnie stressed the importance of a long-term solution, local control and maintaining the character of the Town. The DEEP needs to work with us, she said, not control us.

Action on viable options
A motion to pursue the local wastewater management alternative was made by Ernest Lorda and seconded by Doug Wilkinson. Motion passed unanimously.

David Prickett outlined the next steps:
1Refining the data on the local alternative
2Confirming information with stakeholders (land owners and system users)
3Preparing & submitting a draft report to the DEEP
4Obtaining input from the DEEP regarding regulatory and permitting issues
5Finalizing the report
6 Planning and preliminary system design
7Implementation

- **Discussion on the framing and reporting of information**
- **Information Session Preparation & Scheduling - Education Committee**

The Education Committee (Donna Bednar, Chair) will meet with Bonnie Reemsnyder to develop information for distribution to residents.

- **Proposed Land Discussion –Future Actions**

The Land Review Task Force (Kurt, Bonnie, Rob) will meet on 10/24 to discuss options.

7 Sanitarian's Report – Sonia Marino

Sanitarian Sonia Marino reported that she has met with a representative from the CT Water Company, who gave her an overview of Water Company plans. They are interested in learning more about the Wastewater project. Woodard & Curran will follow up.

8 Old Business

None

9 New Business

Kurt reported his attendance at a seminar on alternative systems in use in some of the State's larger cities. He had an opportunity to speak with Carlos Esquerra/DEEP at the seminar.

10 Public Comment

Several people in the audience asked questions about the wastewater project.

Joe Kelly, Seaside Lane, asked for clarification on the regional/local cost differences. A 9/18 New London Day story indicated the regional alternative would be less expensive; the current preliminary summary shows the opposite. W&C explained that cost estimates have been refined since the last WPCA meeting.

Barry Harrison, New Britain Road, asked about the criteria for including areas in the project. Were individual properties tested? W&C described the method they used to apply data which has been collected over a number of years by the Town.

Jack Duke, White Sand Beach, asked why the estimated cost seems significantly higher than the cost he understands POW residents are currently paying for their regional connection. W&C stated that POW's cost seems lower because they are currently using borrowed capacity from the State and are facing significant deferred capital costs.

Richard Dressler, Seaside Lane, asked if homeowners with new septic systems will have to connect to the system. First Selectwoman said it is likely the DEEP will require all properties to connect.

Harvey _____, Gorton Avenue, stated that he has been told that the local system will only deal with liquids, while the regional will deal with liquids & solids. W&C said that this is a false assumption and there is no liquid/solid differentiation between the two alternatives.

11 Adjournment

A motion was made by Dimitri Tolchinski, seconded by Richard Prendergast, to adjourn at 10:05pm.

Submitted by

Catherine Frank

Catherine Frank
10/10/13

The Day

SUNDAY, OCTOBER 6, 2013 VOL. 133, NO. 97 56 PAGES NEW LONDON www.theday.com

Sports: Big Papi homers twice as Sox beat Rays, take 2-0 series lead Page B1

"The government needs to say it's safe or get it off the shelf. Why are they making guinea pigs out of all of us?"

MAE WU, ATTORNEY FOR HEALTH PROGRAMS AT THE NATURAL RESOURCES DEFENSE COUNCIL

Professor Allison MacKay and Dave Cohen of the Marine Science program at the University of Connecticut at Avery Point in Groton take water samples from the Thames River in August as part of a growing body of research on "emerging contaminants," byproducts of human consumption that make their way into the environment.

Research: Fight against bacteria is harming environment, humans

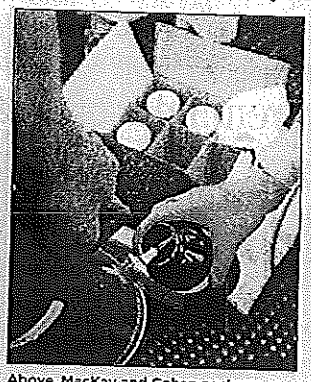
Unregulated, potent, germ-killing chemical triclosan, commonly found in cleaning products and cosmetics, breezes through sewage treatment plants to enter waterways, including Thames River

By JUDY BENSON, Day Staff Writer • Photos by SEAN D. ELLIOT, Day Staff Photographer

Every time you brush your teeth with Colgate Total, coat your underarms with Arm & Hammer Essentials deodorant, or wash your hands with Dial Complete liquid soap or your dishes with Dawn Ultra, you may be polluting the Thames River.

These and dozens of other cleaners and cosmetics, along with toothbrushes, socks, underwear, yoga mats, hockey helmets, cutting boards and other items carrying labels like "Biofresh," "Microban," and "antimicrobial," contain triclosan. This powerful chemical kills bacteria but also is the target of growing concern about its harmful effects on human health and the environment.

This summer, The Day worked with University of Connecticut environmental engineering professor Allison MacKay to collect and test samples from the river and from the effluent that's discharged into the river by the region's largest sewage treatment plants. For the past year and a half, MacKay has been researching the presence of 11 chemicals from medications and cleaning products, including triclosan, in two other rivers in the state. In the Thames River tests, triclosan showed up in three of the four wastewater samples.



Above, MacKay and Cohen package water samples during an August boat trip on the Thames. Above right, a sampling of the commonly available

TEST RESULTS

Groton City: Ibuprofen: 3100 nanograms per liter; Gemfibrozil: 566 nanograms per liter; triclosan: 493 nanograms per liter.

Norwich: Triclosan: 102 nanograms per liter, 115 nanograms per liter in duplicate sample.

New London: Triclosan: 141 nanograms per liter; 150 nanograms per liter in duplicate

Crisis a key par of GOP strateg

For some, shutdown component of plan tc defund health care la

By SHERYL GAY STOLBERG and MIKE McINTIRE
New York Times News Service

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SEE HATRED PAGE

SEE RELATED STORY ON A4

Phones offer advertisers intimate acces

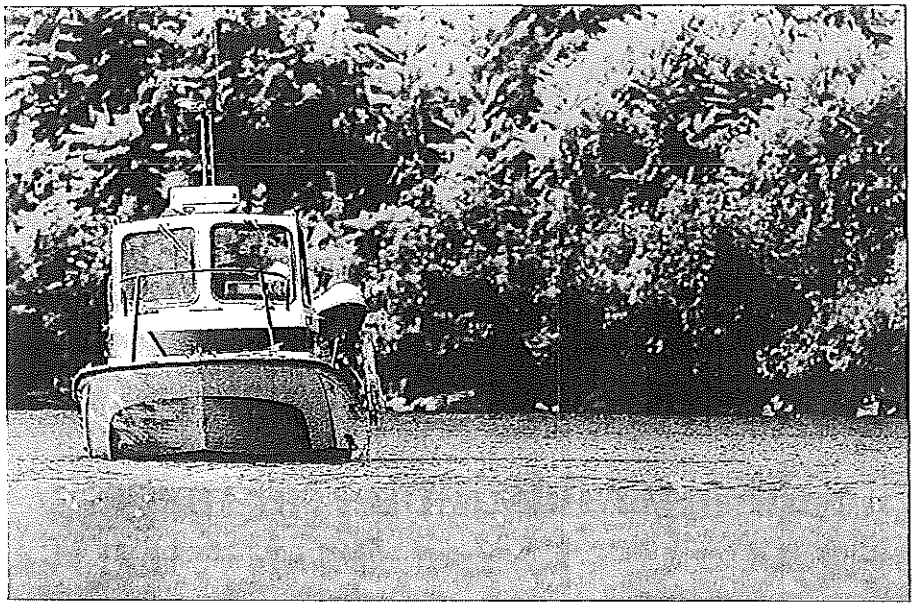
Experts worry users don't know how much private information is on mobile devices

By CLAIRE CAIN MILLER and SOMINI SENGUPTA
New York Times News Service

San Francisco — Once, only ha dressers and bartenders knew pe ple's secrets.

Now, smartphones know ever thing — where people go, what th search for, what they buy, what th do for fun and when they go to be That is why advertisers, and te companies like Google and Fac book, are finding new, sophisticat ways to track people on their phon and reach them with individualize hypertargeted ads. And they are d ing it without cookies, those tir bits of code that follow users arou the Internet, because cookies dor work on mobile devices.

Privacy advocates fear that co



Professor Allison MacKay and Dave Cohen of the Marine Science program at the University of Connecticut at Avery Point in Groton take water samples from the Thames River in August as part of a growing body of research on "emerging contaminants," byproducts of human consumption that make their way into the environment.

Research: Fight against bacteria is harming environment, humans

Unregulated, potent, germ-killing chemical triclosan, commonly found in cleaning products and cosmetics, breezes through sewage treatment plants to enter waterways, including Thames River

By **JUDY BENSON,** Day Staff Writer • **Photos by SEAN D. ELLIOT,** Day Staff Photographer

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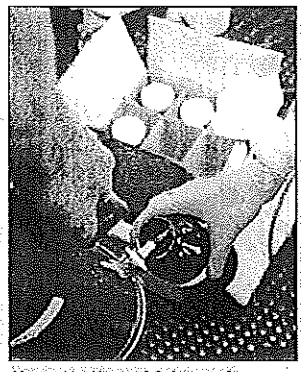
SEE TWO COMPANIES PAGE A7



Above, MacKay and Cohen package water samples during an August boat trip on the Thames. Above right, a sampling of the commonly available health and beauty products that contain triclosan.

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www.theday.com Go online to watch a video of researchers collecting water samples from the Thames River.

strategy

For some, shutdown a component of plan to defund health care law

By **SHERYL GAY STOLBERG** and **MIKE McINTIRE**
New York Times News Service

Washington — Shortly after President Barack Obama started his second term, a loose-knit coalition of conservative activists led by former Attorney General Edwin Meese III gathered in the capital to plot strategy. Their push to repeal Obama's health law was going nowhere, and they desperately needed a new plan.

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"We felt very strongly at the start of this year that the House needed

SEE HATRED PAGE A6

SEE RELATED STORY ON A4

Phones offer advertisers intimate access

Experts worry users don't know how much private information is on mobile devices

By **CLAIRE CAIN MILLER** and **SOMINI SENGUPTA**
New York Times News Service

San Francisco — Once, only hairdressers and bartenders knew people's secrets.

Now, smartphones know everything — where people go, what they search for, what they buy, what they do for fun and when they go to bed. That is why advertisers, and tech companies like Google and Facebook, are finding new, sophisticated ways to track people on their phones and reach them with individualized, hypertargeted ads. And they are doing it without cookies, those tiny bits of code that follow users around the Internet, because cookies don't work on mobile devices.

Privacy advocates fear that consumers do not realize just how much of their private information is on their phones and how much is made vulnerable simply by downloading

SEE NEW STARTUPS PAGE A8

WEATHER

Cloudy today with a chance of showers, high 66. Clouds with some sun Monday, high 73. B6

INDEX

BARKEEP GETS $17,500 TIP

Springfield, Ore. — One of bartender Aurora Kephart's regulars at Conway's Restaurant and Lounge often tips her with Keno tickets. On Tuesday evening, the man who wishes to remain anonymous asked Kephart to choose two.

When she checked the numbers, her first won $5. The second turned into a $17,500 gratuity.

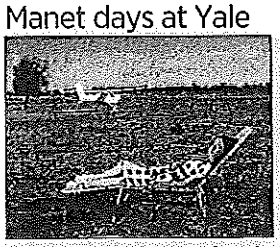
"The look on his face was incredible," Kephart, 25, told The Register-Guard newspaper. "I automatically handed it back to him; it was his ticket."

But the man wouldn't take it and made Kephart sign it so she would be the only one able to collect the prize.

Kephart said she gave the man a percentage of her winnings. "I just couldn't not give him some of it," she said.

— Associated Press

Manet days at Yale



In honor of the 150th anniversary of two of Edouard Manet's masterworks, an exhibition of more than 30 artworks based on or inspired by the historic paintings is on in New Haven.

See DAYBREAK

"We've gone crazy with these products. We just don't need them."

DANA KOLPIN, SENIOR RESEARCH HYDROLOGIST AND TEAM LEADER AT THE U.S. GEOLOGICAL SURVEY'S CONTAMINANTS OF EMERGING CONCERN PROJECT

Two companies, one state take action against triclosan

FROM A1

"This is a stupid use of a toxic chemical," said Mae Wu, attorney for health programs at the Natural Resources Defense Council, a nonprofit group with a pending lawsuit to force the Food & Drug Administration to regulate and curtail use of triclosan and its close cousin, triclocarban.

First introduced into products in the 1970s, triclosan became a common ingredient in the 1990s when antibacterial hand soaps became popular, but the FDA, which declined to comment on this story, has left it unregulated.

As the use of triclosan has increased, mounting evidence has shown that the chemical may interfere with important hormonal processes in wildlife and humans, and it may spur the growth of antibiotic-resistant bacteria, Wu said.

"The government needs to say it's safe or get it off the shelf," she said. "Why are they making guinea pigs out of all of us?"

The problem with triclosan — and with other chemicals in pharmaceutical, health and cleaning products used every day — is that sending it down the drain means tiny amounts enter the environment. Traces of antidepressants, birth control pills, pain killers and other medicines have been found in treated wastewater — samples that appear crystal clear and meet all state and federal quality regulations — as well as in the waterways that receive the discharges. These are the leftovers of drugs that people take every day, but that don't get fully metabolized. Instead, they pass through with urine, get flushed into sewage treatment systems and emerge in minute quantities at the end of the process.

Collectively known as "emerging contaminants" or "contaminants of emerging concern," these byproducts of human consumption are getting a lot of attention from researchers worldwide who are trying to understand what their presence means for wildlife and people.

"People are often surprised to find out that when you take drugs, your body doesn't use all of it," said MacKay, who has been focusing her examination of wastewater and river samples from Vernon and Southbury on how emerging contaminants break down in sunlight. "There's no question that many of these pharmaceuticals have some very important public health benefits. But wastewater treatment plants were not designed to remove these compounds."

'Committed to the environment'

In August, MacKay and The Day collected samples from the Thames and from four of the five sewage plants that empty treated wastewater into the river. Officials at the Montville plant refused to provide a sample of treated effluent for the project, citing concerns that the results would lead to orders for new and costly upgrades.

The Thames, a large tidal estuary that flows from Norwich to New London and empties into Long Island Sound, is much larger and more

JUDY BENSON/THE DAY

Groton City wastewater treatment plant operator Steve Scarpa takes samples of effluent in August, just before it is discharged. Tests found ibuprofen, the blood pressure regulator gemfibrozil and triclosan in the clear liquid.

al of which agreed to provide samples of treated effluent just before it entered the river. The samples had been through the multi-s tage settling, biological and chlorination processes at the plants that remove all the obvious contaminants people send down their drains every day.

"We're the first responders to human health," said Kevin Cini, chief plant operator of the Groton City plant, which discharges 2 million gallons of treated wastewater daily into the Thames. "I tell young people who tour the plant all the time that (emerging contaminants) are probably the next thing we're going to have to be dealing with."

At the New London plant, where 6 million gallons a day from the city, Waterford and East Lyme are treated and discharged into the river daily, Joseph Lanzafame, director of public utilities, said he and other plant operators are looking for direction from federal and state regulators as to what to do about emerging contaminants.

"If these things end up being regulated, we'll upgrade," he said. "We're committed to the environment."

Highest level in Groton City

After samples were collected from the four plants, they were stored on ice and taken that day to the Environmental Engineering Lab at UConn in Storrs. There, Laleen Bodhipaksha, who is pursing his doctorate in chemistry, began the tests.

Bodhipaksha has been working with MacKay, running dozens of the advanced, highly sensitive tests known as ultra-high performance liquid chromatography-mass spectrometry. As the name suggests, it is a multi-step, complicated process requiring expensive equipment and advanced analytical chemistry skills.

It is only over the last 15 years or so that the techniques and equipment needed to detect minute quantities of drugs and consumer chemicals have become available, MacKay said, so in many ways, the technology has driven the rising concern about emerging contaminants. They've

sults. Since the triclosan is in the treated wastewater, it's clearly getting into the Thames, which daily receives about 18 million gallons of effluent from the five plants. True, the tests found what amounts to a tiny speck of the stuff per bucketful — 493 nanograms per liter was the highest level found — but day after day, in a steady stream, those specks taken together may be significant.

"This is definitely a compound that's high on our radar," said Dana Kolpin, senior research hydrologist and team leader at the U.S. Geological Survey's Contaminants of Emerging Concern Project. "It's fairly common to find triclosan in effluent, but the big question is, in these concentrations, does it mean anything?"

Kolpin, who began researching emerging contaminants in 1998, is considered one of the nation's experts on the issue. He noted research that shows triclosan can spur the emergence of antibiotic-resistant bacteria, as well as findings that it degrades in the environment into methyltriclosan, "a dioxin-like compound." Dioxin exposure can cause cancer and immune and developmental disorders, among other effects.

"It's not just the active ingredient," Kolpin said. "It's that it can degrade into something just as bad. It's very tricky chemistry."

Triclosan, he said, is an unnecessary product additive. It washes out of socks and underwear treated with it, and liquid soap with triclosan doesn't work any better than hot water and soap at getting hands clean and bacteria-free, he said.

"We've gone crazy with these products," he said. "We just don't need them."

Marc Zimmerman, hydrologist at the USGS's Northborough, Mass., office, said one of the issues with persistent triclosan contamination is that the chemical is causing incremental changes in ecosystems. He studied the issue in Cape Cod's waterways.

"It's disturbing the bacterial ecology," he said.

Company reactions

At the National Association

treat wastewater," wrote Cynthia Finley, director of regulatory affairs for the group. In other words, the chemical may be killing off the good bacteria that are key to the treatment plant processes, potentially causing plants to fail water-quality tests, "resulting in substantial costs for utilities."

Since treatment plants have no control over what comes in, Finley argued, EPA and FDA regulations limiting use "are the most practical means of controlling discharges of these chemicals into wastewater and preventing adverse impacts to (plants), human health or the environment."

The nonprofit Environmental Working Group is a strong ally of NACWA's position. Citing evidence from its own water tests in San Francisco and tests of blood samples from 20 teenage girls showing that triclosan and other emerging contaminants are getting into the environment and into people's bodies, the nonprofit group began calling for a ban on all non-medical uses of triclosan.

"Triclosan targets the thyroid system of humans and wildlife," said Sonya Lunder, senior analyst with the group. "The potential for human harm is high, and there's a real concern for the aquatic environment. The benefits of triclosan are minimal, if any."

She and others noted that Johnson & Johnson announced in 2012 that it would stop using triclosan in its products. This year, Proctor & Gamble followed suit, pledging to phase it out by 2014.

Also this year, Minnesota became the first state to ban purchases of triclosan-containing products by state agencies. The action came in response to a University of Minnesota study that found the dioxin-like breakdown products of triclosan in sediments of lakes that receive treated wastewater, along with studies linking it to antibiotic resistance and endocrine disruption.

As the concerns mount, the Personal Care Products Council is resisting calls to ban or curtail the use of triclosan. A request for comment from the group, which represents health and beauty products

tines for millions of people around the world," Francis Kruszewski, director of human health and safety at the cleaning institute, said in the statement.

Consequences of choices

At the EPA, research into triclosan and other emerging contaminants continues, but it's expensive and highly complicated, said Katrina Kipp, manager of the ecosystems assessment unit at the agency's New England office.

"There isn't yet a regulatory framework for controlling emerging contaminants, and states don't have the water quality criteria they need," she said. To regulate these chemicals, researchers would have to figure out what levels are harmful, among many other questions. Still, there is ample published research showing that exposure to some of these contaminants causes male fish to develop female characteristics, results in changes in fish behavior and affects thyroids in frogs, among other findings, so there clearly is a need for more studies, she said.

"Even at very low levels, there have been effects," Kipp said.

In Connecticut, the state Department of Energy and Environmental Protection is aware of the emerging contaminants issue but doesn't appear ready to recommend actions such as those taken in Minnesota. The state Department of Administrative Services, which sets supply purchase policies for state agencies, did not respond to a request for comment about products containing triclosan.

"At this point, we are following the science and analyzing all available data, but we do not yet have enough information to recommend any specific regulatory action," DEEP spokesman Dennis Schain said. "This issue does point to the fact that choices we all make as consumers can have consequences for our environment, and people should try to make informed decisions about the products they purchase."

Traci Iott, supervising environmental analyst at DEEP, said her agency is using public education to try to keep pharmaceuticals and personal care products from being flushed down the drain and to encourage people to bring unused products to community collection events.

While scientists and regulators continue to work on the emerging contaminants problem, MacKay sees a larger lesson for the public. People can become aware that their choices about products affect the larger environment, she said. They can decide not to use products with triclosan, and they can be more careful with their pharmaceuticals. And, if these compounds are able to survive the sewage treatment process, how much greater are the effects of chemicals people carelessly spill or dump directly into waterways?

"This is a rather indirect pathway to the environment," she said, "and I would hope that people might be more conscious in their decisions about products that would have more direct pathways, like lawn care products and things you use working on your car."

j.benson@theday.com

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'Committed to the environment'

In August, MacKay and The Day collected samples from the Thames and from four of the five sewage plants that empty treated wastewater into the river. Officials at the Montville plant refused to provide a sample of treated effluent for the project, citing concerns that the results would lead to orders for new and costly upgrades.

The Thames, a large tidal estuary that flows from Norwich to New London and empties into Long Island Sound, is much larger and more complicated than the other rivers MacKay has tested. At the outset, she acknowledged that because of this, the chances of finding traces of any of the 11 compounds — including antibiotics, over-the-counter pain medications and triclosan — were slim. Indeed, the river water tests, collected at three depths near the Norwich and New London wastewater outfall pipes on a bright, late summer day, revealed no detectable quantities.

"It's a little bit like finding the needle in the haystack," she said after a morning boat trip on the river to collect the samples.

Just because the needle doesn't turn up after a single search of the haystack doesn't mean the needle's not there. A week after the river samples were collected, The Day visited the Norwich, Groton Town, Groton City and New London wastewater plants,

JUDY BENSON/THE DAY

Groton City wastewater treatment plant operator Steve Scarpa takes samples of effluent in August, just before it is discharged. Tests found ibuprofen, the blood pressure regulator gemfibrozil and triclosan in the clear liquid.

al of which agreed to provide samples of treated effluent just before it entered the river. The samples had been through the multi-s tage settling, biological and chlorination processes at the plants that remove all the obvious contaminants people send down their drains every day.

"We're the first responders to human health," said Kevin Cini, chief plant operator of the Groton City plant, which discharges 2 million gallons of treated wastewater daily into the Thames. "I tell young people who tour the plant all the time that (emerging contaminants) are probably the next thing we're going to have to be dealing with."

At the New London plant, where 6 million gallons a day from the city, Waterford and East Lyme are treated and discharged into the river daily, Joseph Lanzafame, director of public utilities, said he and other plant operators are looking for direction from federal and state regulators as to what to do about emerging contaminants.

"If these things end up being regulated, we'll upgrade," he said. "We're committed to the environment."

Highest level in Groton City

After samples were collected from the four plants, they were stored on ice and taken that day to the Environmental Engineering Lab at UConn in Storrs. There, Laleen Bodhipaksha, who is pursing his doctorate in chemistry, began the tests.

Bodhipaksha has been working with MacKay, running dozens of the advanced, highly sensitive tests known as ultra-high performance liquid chromatography-mass spectrometry. As the name suggests, it is a multi-step, complicated process requiring expensive equipment and advanced analytical chemistry skills.

It is only over the last 15 years or so that the techniques and equipment needed to detect minute quantities of drugs and consumer chemicals have become available, MacKay said, so in many ways, the technology has driven the rising concern about emerging contaminants. They've been getting into waterways for years, but no one knew.

"It's a new problem, but it's not a new problem," she said.

The tests detected triclosan in the samples from Norwich, Groton City and New London. The Groton City sample, which had the highest level, also contained small amounts of ibuprofen — the main ingredient in Advil and Motrin — and gemfibrozil, a blood pressure regulator. None of the 11 compounds showed up in the Groton Town sample, probably because of the four, that plant has had the most recent upgrade and is able to treat to a higher standard the 2.9 million gallons a day it takes in, John Carrington, Groton's manager of water pollution control, said.

MacKay said the levels of triclosan, ibuprofen and gemfibrozil locally were in the same range she has seen in her other testing, and also were similar to national results. Since the triclosan is in the treated wastewater, it's clearly getting into the Thames, which daily receives about 18 million gallons of effluent from the five plants. True, the tests found what amounts to a tiny speck of the stuff per bucketful — 493 nanograms per liter was the highest level found — but day after day, in a steady stream, those specks taken together may be significant.

"This is definitely a compound that's high on our radar," said Dana Kolpin, senior research hydrologist and team leader at the U.S. Geological Survey's Contaminants of Emerging Concern Project. "It's fairly common to find triclosan in effluent, but the big question is, in these concentrations, does it mean anything?"

Kolpin, who began researching emerging contaminants in 1998, is considered one of the nation's experts on the issue. He noted research that shows triclosan can spur the emergence of antibiotic-resistant bacteria, as well as findings that it degrades in the environment into methyltriclosan, "a dioxin-like compound." Dioxin exposure can cause cancer and immune and developmental disorders, among other effects.

"It's not just the active ingredient," Kolpin said. "It's that it can degrade into something just as bad. It's very tricky chemistry."

Triclosan, he said, is an unnecessary product additive. It washes out of socks and underwear treated with it, and liquid soap with triclosan doesn't work any better than hot water and soap at getting hands clean and bacteria-free, he said.

"We've gone crazy with these products," he said. "We just don't need them."

Marc Zimmerman, hydrologist at the USGS's Northborough, Mass., office, said one of the issues with persistent triclosan contamination is that the chemical is causing incremental changes in ecosystems. He studied the issue in Cape Cod's waterways.

"It's disturbing the bacterial ecology," he said.

Company reactions

At the National Association of Clean Water Agencies, a professional organization of 300 municipal wastewater treatment plants, curtailing the use of triclosan is considered a "no-brainer," Chris Hornback, the group's senior director of regulatory affairs, said. Figuring out what to do about all the emerging contaminants may take more research and significant effort on the part of regulators, but enough about triclosan is already known, he said.

"It's a good place to start," Hornback said. "We need to do more to limit how much is getting into the systems in the first place."

In May, his group sent a letter to an Environmental Protection Agency panel reviewing triclosan.

"NACWA members are concerned about the environmental impacts of triclosan in wastewater and the potential of triclosan to harm the beneficial micro-organisms that treat wastewater," wrote Cynthia Finley, director of regulatory affairs for the group. In other words, the chemical may be killing off the good bacteria that are key to the treatment plant processes, potentially causing plants to fail water-quality tests, "resulting in substantial costs for utilities."

Since treatment plants have no control over what comes in, Finley argued, EPA and FDA regulations limiting use "are the most practical means of controlling discharges of these chemicals into wastewater and preventing adverse impacts to (plants), human health or the environment."

The nonprofit Environmental Working Group is a strong ally of NACWA's position. Citing evidence from its own water tests in San Francisco and tests of blood samples from 20 teenage girls showing that triclosan and other emerging contaminants are getting into the environment and into people's bodies, the nonprofit group began calling for a ban on all non-medical uses of triclosan.

"Triclosan targets the thyroid system of humans and wildlife," said Sonya Lunder, senior analyst with the group. "The potential for human harm is high, and there's a real concern for the aquatic environment. The benefits of triclosan are minimal, if any."

She and others noted that Johnson & Johnson announced in 2012 that it would stop using triclosan in its products. This year, Proctor & Gamble followed suit, pledging to phase it out by 2014.

Also this year, Minnesota became the first state to ban purchases of triclosan-containing products by state agencies. The action came in response to a University of Minnesota study that found the dioxin-like breakdown products of triclosan in sediments of lakes that receive treated wastewater, along with studies linking it to antibiotic resistance and endocrine disruption.

As the concerns mount, the Personal Care Products Council is resisting calls to ban or curtail the use of triclosan. A request for comment from the group, which represents health and beauty products companies, was directed to a sister organization, the American Cleaning Institute. That group acknowledged The Day's request but did not comment.

The Personal Care Products Council articulated its position on triclosan in a 2010 statement to the FDA and in a 2011 announcement, both on its website. It argued that triclosan-containing products are effective and critical in reducing people's risk of disease and cited a 2011 study in the International Journal of Microbiology Research showing no increase in the presence of antibiotic-resistant staphylococcus bacteria in users of antibacterial hand soaps compared to non-users. The research was supported by the council and the cleaning institute.

"After decades of use, antibacterial wash products continue to play a beneficial role in everyday hygiene routineed," she said. To regulate these chemicals, researchers would have to figure out what levels are harmful, among many other questions. Still, there is ample published research showing that exposure to some of these contaminants causes male fish to develop female characteristics, results in changes in fish behavior and affects thyroids in frogs, among other findings, so there clearly is a need for more studies, she said.

"Even at very low levels, there have been effects," Kipp said.

In Connecticut, the state Department of Energy and Environmental Protection is aware of the emerging contaminants issue but doesn't appear ready to recommend actions such as those taken in Minnesota. The state Department of Administrative Services, which sets supply purchase policies for state agencies, did not respond to a request for comment about products containing triclosan.

While scientists and regulators continue to work on the emerging contaminants problem, MacKay sees a larger lesson for the public. People can become aware that their choices about products affect the larger environment, she said. They can decide not to use products with triclosan, and they can be more careful with their pharmaceuticals. And, if these compounds are able to survive the sewage treatment process, how much greater are the effects of chemicals people carelessly spill or dump directly into waterways?

"This is a rather indirect pathway to the environment," she said, "and I would hope that people might be more conscious in their decisions about products that would have more direct pathways, like lawn care products and things you use working on your car."

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DRAFT MEMORANDUM

WOODARD &CURRAN

TO: Kurt Zemba, Chairman, Old Lyme WPCA
FROM: Dave Prickett, PE, Vice President, Woodard & Curran
DATE: September 30, 2013
RE: Preliminary Project Summary – Coastal Wastewater Management Plan Project

INTRODUCTION

This draft memorandum provides an overview of the Wastewater Management Plan Project, including the project study area, planning and regulatory background, needs analysis, on-site soils and groundwater testing, local and regional alternatives analysis, preliminary conclusions and recommendations, and remaining tasks. The goal of the draft memorandum is to facilitate continued discussions with the Old Lyme WPCA at their upcoming October 8, 2013 meeting, as well as follow-up discussions and meetings with the CT-DEEP regarding regulatory and permitting assumptions. Based on these discussions, as well as subsequent interactions with the individual beach associations/communities, Old Lyme can begin to works towards selection of the alternative that is most appropriate for the Town its residents. Regardless of the alternative that the Town selects, the primary project goal should be to address the existing on-site wastewater management problems as efficiently as possible, while balancing the short-term and long-term wastewater management needs of the Town.

PROJECT STUDY AREA

The Project Study Area is shown in Figure 1, and consists of ten Sub-Areas. Each of the ten Sub-Areas is listed in Table 1. In general, the Project Study Area consists of the currently unsewered beach communities and neighborhoods south of and along Route 156, between the previously sewered Point-O-Woods neighborhood to the east, and the White Sand Beach neighborhood to the west.

The total number of EDUs, as well as average daily and maximum daily sanitary flow for each sub-area, are shown in Table 1. Average daily sanitary flow was calculated based on the Town's census data of 2.39 people per household at an average water consumption of 75 gallons per day per capita. The maximum daily sanitary flow is shown as two times the average daily sanitary flow. Infiltration and inflow (I/I) are excluded from this data, but were included in estimated system flows for the various collection system options, since I/I will vary based on the type of sewer system that it selected.

PRIOR PLANNING AND REGULATORY BACKGROUND

Several years ago, the Point-O-Woods neighborhood was the first Old Lyme beach community to install sewers. Wastewater infrastructure was installed to alleviate poor on-site septic systems. Point-O-Woods conveys its wastewater to New London through its own pump station and force main, flowing through East Lyme's and Waterford's collection systems. The Point-O-Woods community is just east of the Project Study Area.

A Wastewater Management Plan, prepared by RFP Engineering and amended by Fuss & O'Neill in June 2012, outlined the disposal issues for Old Colony Beach Club Association (OCBCA) and the Old Lyme Shores Beach Club Association (OLSBCA), and recommended that a conventional collection system with conveyance of wastewater to the New London WPCF through intermunicipal agreements with the Town of East Lyme, Town of Waterford, and the City of New London. CT-DEEP approved the Wastewater Management Plan and required completion of the bidding documents within 850 days of the Order (October 30, 2014). CT-DEEP subsequently issued Consent Orders to the Old Colony Beach Club Association (OCBCA) and the Old Lyme Shores Beach Club Association (OLSBCA) on August 14, 2012 and October 1, 2012, respectively. The Consent Orders require compliance by June 30, 2016 to alleviate on-site disposal system challenges by reviewing alternatives and complying with appropriate regulatory wastewater standards.

Lombardo Associates, Inc. (LAI) more recently performed an alternatives analysis for the collection, treatment and dispersal of wastewater for portions of the Project Study Area. In the Report, dated October 2, 2012, LAI summarized two alternatives: (1) installation of a collection system within OCBCA/OLSBCA and conveyance of wastewater to the New London WPCF for treatment and surface water disposal; and (2) on-site collection and local treatment/disposal. The second alternative was sub-divided into: (A) nearby off-site sub-surface disposal or reuse; (B) treatment and disposal within the OCBCA confines; and (C) treatment through multiple cluster systems. This report concluded that the second alternative is less costly, and recommended further evaluation of the local alternative.

GOALS

In response to the prior planning documents and on-going Consent Orders, the Town of Old Lyme contracted Woodard & Curran to perform more detailed evaluations of the local and regional wastewater management alternatives for the Project Study Area. This project, termed the Coastal Wastewater Management Plan, is focusing on a more comprehensive analysis of short-term and long-term wastewater management needs within the Project Study Area, as well as wastewater infrastructure (collection, treatment, disposal and reuse), operation and maintenance (O&M) costs, annual and lifecycle costs, as well as non-cost factors including water balance, wastewater management preferences, and implementation measures to manage system capacity allocation.

SCOPE OF WORK

In order to build on the past planning documents, address the project goals, and maintain the Consent Order schedules for portions of the Project Study Area, the following scope of work was developed:

- Task 1 – Grant Funding & Finance Assistance: This task included securing a CWF grant for the planning phase work, as well as evaluating project funding and financing options once the recommended plan is finalized.
- Task 2 – Project Initiation and Key Meetings: Kick-Off Meeting: Task 2 includes meetings with the Wastewater Task Force, WPCA, and Selectmen, as well as several Public Informational Meetings with the public to review observations, alternatives and recommendations.
- Task 3 – Evaluation of Sub-Surface Disposal and Reuse Alternatives: This task emphasizes preliminary on-site testing at two sites including test pits, soil borings and monitoring wells, groundwater monitoring and slug testing, to estimate seasonal high water table, thus facilitating a hydraulic capacity analysis and hydrogeological modeling. The Task 3 scope will result in a preliminary basis of design for each of these sites for disposal and reuse opportunities associated with the local alternative.
- Task 4 – Prioritization of Wastewater Needs in Project Areas: Task 4 includes a wastewater needs analysis for the ten sub-areas, including an estimation of current and future sanitary flows. The prioritization of the needs analysis was used to develop the proposed service area for the highest-need areas.
- Task 5 – Evaluation of Wastewater Treatment Alternatives: This task includes an evaluation of wastewater treatment alternatives for the local alternative, including the impacts of collection system selection on wastewater treatment needs, as well as capital and annual costs for the various wastewater treatment alternatives.
- Task 6 – Evaluation of Wastewater Collection Alternatives: Task 6 includes an evaluation of wastewater collection (i.e. sewer) alternatives for the local and regional alternatives, including the impacts of collection system selection on infiltration and inflow (I/I), as well as capital and annual costs for the collection system alternatives.

- Task 7 – Evaluation of Regional Wastewater Management Alternatives: This task includes an evaluation of the regional alternative, including meetings with East Lyme, Waterford and New London to confirm capital/O&M cost needs, to facilitate comparison with the local alternative.
- Task 8 – Development of Recommended Plan and Implementation Schedule: Task 8 includes development of the recommended plan, including integration of wastewater collection, treatment, disposal and reuse infrastructure, though capital, annual and lifecycle costs, implementation measures, and the preparation of a Report for the Project.

NEEDS ANALYSIS

In order to determine and prioritize wastewater management needs for the ten sub-areas in the Project Study Area, a wastewater management needs analysis was conducted. Individual lots within each sub-area were quantitatively ranked by:

- Lot Size - Individual parcels were ranked based on the size of the property minus the building footprint. Properties with a net available land area of less than 10,000 square feet (sf) were scored highest.
- Utilities - Assessor's data was used to determine utilities present at each parcel. Lots listed with a drinking water well and a septic system on the same property were ranked were scored highest.
- Soils Data (Drainage Classification) - The State of Connecticut soils types and classifications, including Drainage Classifications, are ranked from "very poor" to "excessive." Properties at both ends of the spectrum were scored highest.
- Topographic Description - Topographic descriptions were also included in the Town's Assessor data. Developed parcels delineated as "swampy" were scored highest in this category.
- Location - The Town Assessor's data also included a list with generic locations described such as rural/waterfront. Waterfront areas were ranked highest due to their proximity to Natural Resources.

The above categories were used to develop an average need per parcel for each sub-area. The results of the needs analysis are summarized in Table 1. Sub-Areas 2, 5, 6, 7 and 8 have the highest need for wastewater management solutions in lieu of the existing on-site systems. The high-needs wastewater service area is shown in Figure 2. Table 2 shows only the high needs areas, including average daily and maximum daily sanitary flows and total number of EDUs per sub-area. There are approximately 1,349 EDUs in the high-needs sub-areas, with corresponding average daily and maximum daily sanitary flows of 242,820 and 485,640 gpd, respectively. The flow data in Table 2 was calculated in the same manner as Table 1. Although only five of the 10 sub-areas are high-needs, this represents over 90% of the sanitary flow from the Project Study Area.

ON-SITE FIELD TESTING

One of the primary goals of this project is to substantiate opportunities for effluent disposal and reuse in proximity to the project area. Woodard & Curran, Inc. performed preliminary subsurface investigations in May and June 2013 at the Black Hall Golf Course (Black Hall) and former driving range (Cherrystone) site. These areas are shown in Figures 3 and 4. Although these were only the first two of many sites available in the Town, their proximity to the project areas was a good place to start to establish baseline soil and groundwater data that can be used to evaluate additional sites, if necessary. The following activities were performed:

- Test Pitting (Cherrystone): In May 2013, Woodard & Curran, the Town of Old Lyme, and the Connecticut Department of Energy & Environment (CT-DEEP) monitored the excavation of seven test pits at Cherrystone. The objective of test pitting is to characterize the bedding, grain size, and transitions of various soil types. Historical test-pit data are available at Cherrystone, and the new pits are intended to fill spatial data gaps both laterally and vertically. Test pits were excavated to a depth of roughly 10 feet or shallower if bedrock was encountered. Test pits TP-01, TP-04, and TP-05 encountered refusal, which is interpreted as granitic bedrock; test pits TP-02, TP-03, TP-07, and TP-08 did not encounter refusal conditions. All of the test pits are shown on Figure 3. In general, the test pits

contained less than one foot of topsoil; roughly one to two feet of silty/sandy loam; and unconsolidated sands, gravel, cobbles, and boulders to the bottom of the test pit. The material beneath the loam was visually classified as permeable aquifer material. Perforated plastic standpipes were installed in each test pit prior to backfilling for future monitoring events and to mark the location of test pits.

- Soil Borings/Monitoring Well Installation (Black Hall, Cherrystone): In May 2013, Woodard & Curran contracted with Northeast Geotech, Inc. (NE Geotech) to advance soil borings and install monitoring wells at the Cherrystone and Black Hall properties. Monitoring wells allow soils to be classified at greater depths than do test pits, and allow water-level measurements and groundwater-flow directions to be obtained. Black Hall has an existing network of monitoring wells near its central irrigation pond (Figure 3); therefore, soil investigations were conducted east of the pond. At four of the five locations (BH-1, BH-2, BH-4, and BH-5), the drill rig encountered refusal conditions prior to intersecting the water table, and monitoring wells therefore were not installed. At location BH-3, groundwater was encountered before refusal, permitting the installation of a shallow (MW-3S) and deep (MW-3D) monitoring well couplet. In general, the top several feet of soils are silty with roots and other organic matter, underlain by sandy soils with varying amounts of gravel and silt. For the Cherrystone site, observations of soil generated from the borings are similar to those from test pits. The top two or three feet of soils are silty/sandy loams with roots and other organic matter, underlain by unconsolidated sands and gravel with varying amounts of cobbles and boulders. Visual observation suggests permeable aquifer material beneath the loam. Depths of the soil borings range from 11.5 feet (WC-4) to 30 feet (WC-2, WC-3). Locations WC-1 and WC-4 encountered refusal conditions, presumably bedrock, at 20.3 feet and 11.5 feet, respectively; locations WC-2 and WC-3 did not encounter refusal at the maximum proposed depth of 30 feet. Refer to Figures 3 and 4.

- Aquifer Testing (Black Hall, Cherrystone): In May 2013, Woodard & Curran conducted slug testing at five wells at Black Hall and three wells at Cherrystone to quantify the permeability of saturated soils. A slug test involves removing a slug of water from a monitoring well and measuring the rate of water-level recovery. The recovery rate and information about the aquifer geometry and well construction permit an estimate of saturated hydraulic conductivity (K), the ability of a geologic material to transmit water. Two wells, WC-1 (Cherrystone) and MW-H (Black Hall), did not receive slug testing due to an inadequate column of water in the well. The assumptions used in calculating hydraulic conductivity, such as whether the geologic material has differing lateral and vertical conductivity, affects the resulting calculation and accounts for the range in values. The hydraulic conductivity ranges from less than 1 ft/day to approximately 25 ft/day, suggesting silty sands as the aquifer material. The soils at Black Hall appeared to contain a greater proportion of silt than did soils at Cherrystone, and grain size is a dominant factor in the ability of a soil to transmit water. Variations in the hydraulic conductivity of preexisting wells MW-A, MW-E, and MW-I may reflect the amount of silt in the soils, although it should be noted that boring logs for these wells are not available.

- Water Level Monitoring (Black Hall, Cherrystone): In May and June 2013, Woodard & Curran monitored water levels at Cherrystone (four wells) and Black Hall (six wells) to determine the seasonal high water table (SHWT). The SHWT is calculated by comparing the water level at an observation well with the minimum depth to water (SHWT) at a sentinel well operated by the US Geological Survey (USGS). Time "T" was selected as 00:00 on June 16, 2013, the average time when site wells experienced a high water table during the May-June 2013 monitoring period. Using the above calculations for two USGS sentinel wells with similar water depths as those measured at Cherrystone, the seasonal high water table at the Cherrystone property is approximately 7 feet (WC-3) to 15 feet (WC-1, WC-2) (Table 3). The SHWT calculations at Cherrystone are roughly 1.5 to 2.5 feet shallower than the shallowest depth to water measured during the May-June 2013 monitoring period. The SHWT for WC-4 was not considered, as this well likely does not represent aquifer conditions, but rather is ponded water on top of a bedrock surface. The SHWT at Black Hall for the newly installed wells MW-3S and MW-3D ranges from approximately 12 to 19 feet (Table 3). SHWT calculations for the remaining Black Hall wells are not considered, as these wells are located in an area inaccessible to potential SAS construction and

have prohibitively low hydraulic conductivity. In August 2013, Pereira Engineering, Inc. (Pereira) completed an elevation survey of groundwater wells, soil borings, and test pits at the Cherrystone and Black Hall properties. The surveyed elevations allowed a determination of groundwater-flow direction at each property. The direction of groundwater flow at Cherrystone is to the west, toward Mile Creek (Figure 4); and the direction of flow at Black Hall is toward the west toward the Connecticut River (Figure 5).

- Groundwater Mound Simulations (Cherrystone): An evaluation of the potential for subsurface water absorption at Cherrystone was conducted using the field data described above and a conceptual groundwater-flow model. Woodard & Curran utilized two models for calculations of groundwater mounding to increase confidence in the mounding results: an analytical simulation of mounding beneath infiltration basins provided by the USGS, and the numerical modeling code MODFLOW with the graphical user interface Groundwater Vistas. In each simulation, the Cherrystone area was assigned a constant recharge rate of 0.16 feet/day, equivalent to the 1.2 gallons/day/ft^2 flow limit recommended by the State; specific yield of 0.2 based on literature values; and aerial footprint of 400 feet by 400 feet, the maximum estimated usage area for infiltration, roughly 3.7 acres. The simulations assign the recharge rate to the entire simulated area, and using the maximum potential area therefore provides an upper estimate of mounding height for infiltration of roughly 190,000 gallons/day. Hydraulic conductivity was varied from 50 ft/day to 250 ft/day based on results of slug testing, and the saturated thickness of the aquifer (depth below water table to bedrock) varied from 10 feet to 30 feet. The simulations used a time period of 1,500 days, after which it is assumed that groundwater will discharge to Mile Creek and mounding will stop expanding. The simulations were considered successful if mounding was less than five feet. Assuming a three-foot depth of a subsurface absorption system (SAS) and the mandated minimum three-foot separation from the SAS and the SHWT, a five-foot mound would provide at least six feet of unsaturated soils. The most representative conditions for the Cherrystone property, based on field data, are a saturated thickness of 20 feet and a hydraulic conductivity of 150 ft/day. These input parameters generated successful mounding simulations for both the USGS analytical model and the MODFLOW numerical simulation (Appendix C). It should be noted that well WC-3 would not achieve the prescribed six feet of unsaturated soils during mounding simulations, but this well is located at a notably lower elevation than the more representative WC-2 (12.45 feet elevation compared with 20.55 feet), and likely would require added fill for a topographically level SAS. Increasing the elevation of soils near WC-3 would achieve six feet of separation from the groundwater mound to the ground surface. Incorporating a safety factor of between one half and two thirds of the simulated infiltration rate, the system, as simulated, can handle between 150,000 and 190,000 gallons per day of treated wastewater. These daily volumes translate to an area of approximately 3 acres at the loading rate of 1.2 gallons/day/ft^2.

Although the data above provides an overview for the on-site testing that was performed, CT-DEEP will require additional detailed information to provide regulatory feedback on the Back Hall and Cherrystone sites. Again, these are not the only two sites available to the Town, but were simply the first two sites that were evaluated.

WASTEWATER MANAGEMENT ALTERNATIVES

In general, wastewater management systems consist of collection, treatment, disposal and reuse components. For this project, there are two overall alternatives: (1) the Local Alternative; and (2) the Regional Alternative. Following is a brief overview of the wastewater system components considered for the two alternatives:

- Regional Alternative - For the regional alternative: collection system alternatives that were evaluated within the Project Study Area include gravity, low pressure, vacuum, and septic tank effluent gravity/pumping (STEP/STEG); conveyance through the Towns of East Lyme and Waterford is through existing gravity sewers, pump stations and force mains; treatment consists of the existing New London Water Pollution Control Facility (WPCF); disposal occurs via surface water discharge related to the City's NPDES discharge permit from CT-DEEP; there is no effluent reuse associated with the regional alternative.

- Local Alternative - For the local alternative: similar to the regional alternative, collection system alternatives that were evaluated within the Project Study Area include gravity, low pressure, vacuum, and septic tank effluent gravity/pumping (STEP/STEG); treatment consists of a single new centralized WPCF in Old Lyme; disposal is through a combination of subsurface discharge via a future CT-DEEP UIC permit, and supplemented by local reuse through a CT-DEEP NPDES permit.

COLLECTION COSTS

An opinion of probable cost for each collection system alternative, for both the local and regional alternatives, was developed as part of this Project. These capital costs reflect total costs to each homeowner. For example, the gravity alternative includes the cost of abandoning the septic system and connecting a sewer lateral to the main/stub. Similarly, the low pressure option includes the costs associated with the on-site grinder pumps, as well as electrical improvements in the home. This data is summarized in Table 3. The capital costs within the high-needs sub-areas are shown separate from the common sewer for both local and regional alternatives. The cost for the common sewer for the regional alternative is significantly higher than the local alternative, due solely to the lengths of pipe (i.e. force main) for the two alternatives. The basis and assumptions for the downstream regional collection costs are summarized in Tables 6 and 7. The gravity sewer alternative has the lowest capital cost for both the local and regional alternatives. Due to differential surface elevations within the Project Study Area, the hydraulics associated with vacuum sewers are not ideal, and thus vacuum sewers were eliminated from further consideration. Total capital and annual O&M costs for the collection system options for the local and regional alternatives are shown in Table 4. Similar to the capital costs, the annual O&M costs reflect total costs to the homeowner. For example, the STEP/STEG options include septage removal, and the low pressure option includes the electrical costs for running the grinder pumps.

TREATMENT COSTS

The capital and annual O&M costs for the local and regional treatment alternatives are summarized in Table 5.

For the regional alternative, only the New London WPCF option is available. New London, together with East Lyme and Waterford, allocate capital and annual O&M costs through the Tri-Town Agreement, which apportion costs on a per-gallon basis. Currently, capital costs are allocated: 55% for New London; 30% for Waterford; and 15% for East Lyme. The capital costs for the regional alternative are based solely on total gallons, regardless of wastewater composition, so the regional treatment costs are the same for all of the various collection system alternatives. The only difference in annual O&M costs for the regional treatment alternatives is related to wastewater quantity, particularly the difference in anticipated I/I between the sewer alternatives that are coupled with the treatment options.

For the local alternative treatment includes a new centralized WPCF. Because the local alternative will include sub-surface disposal and reuse, the WPCF will likely include an advanced membrane bioreactor (MBR) with ultraviolet light disinfection. Therefore, the level of treatment for the local alternative is far more advanced that the regional treatment alternative. The local WPCF also includes pre-equalization to balance incoming flows to the treatment system. The capital costs for the local alternative, also shown in Table 5, differ slightly based on the strength of the wastewater from each sewer alternative that precedes treatment. The annual O&M costs for the local treatment alternatives also differ based on the anticipated I/I between the sewer alternatives that are coupled with the treatment options.

DISPOSAL/REUSE COSTS

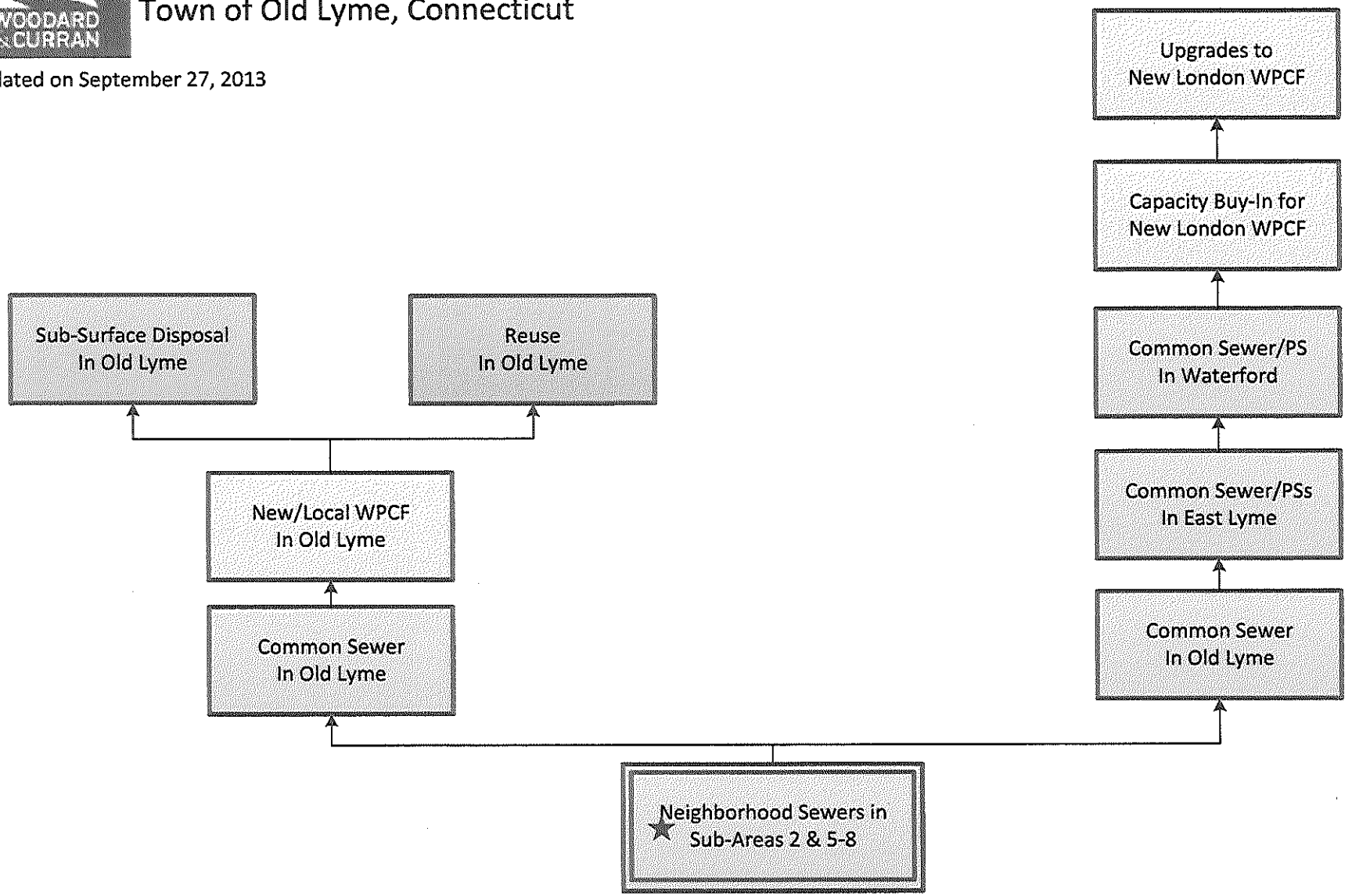
The capital and annual O&M costs for the local disposal and reuse alternatives are summarized in Table 8. Although the Cherrystone and Black Hall sites were the first two sites tested, based on the preliminary soils and groundwater testing, these two sites appear to have sufficient capacity to receive the entire maximum daily flow projected for the High-Needs Service Area. Only sub-surface disposal at the Cherrystone site is anticipated, but the Black Hall site has the potential for significant reuse, and supplemental sub-surface disposal.

Figure 5 – Summary of Wastewater Management Alternatives

Wastewater Management Plan Project

Town of Old Lyme, Connecticut

Updated on September 27, 2013



LEGEND:

- Collection Alternatives
- Treatment Alternatives
- Disposal Alternatives
- Reuse Alternatives
- Local Alternatives
- Regional Alternatives
- ★ 1,349 EDUs Total

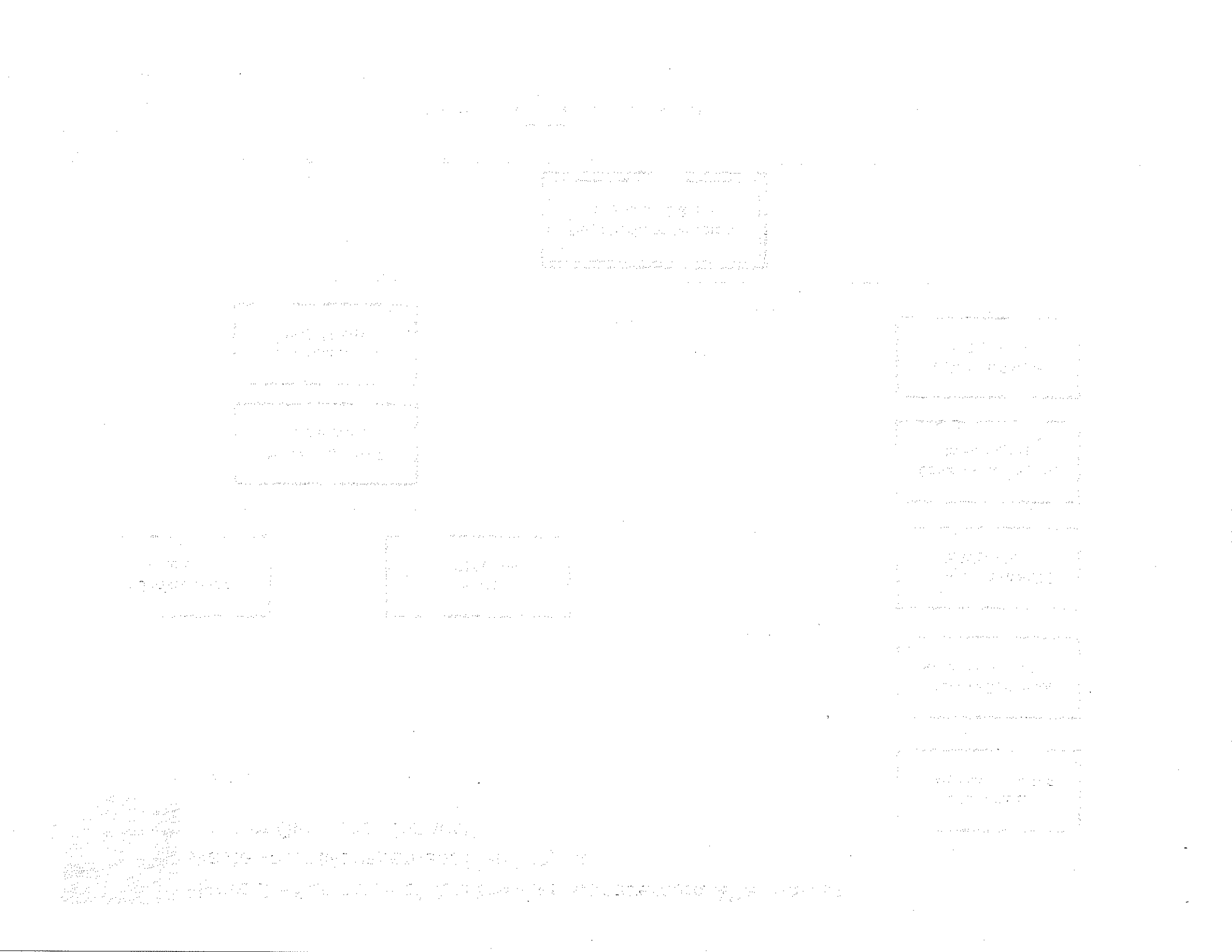


Table 1

Project Study Area					
Sub-Area	Association or Street Name	Number of Equivalent Dwelling Units (EDU)	Estimated Average Daily Residential Flow	Estimated Maximum Daily Residential Flow	Needs Rank
1	Griswold Point & Osprey Road	26	4,680	9,360	Medium
2	White Sand Beach	204	36,720	73,440	High
3	Haywagon Drive	27	4,860	9,720	Low
4	Dogwood Drive	36	6,480	12,960	Low
5	Hawks Nest & Miami Beach	392	70,560	141,120	High
6	Sounds View	342	61,560	123,120	High
7	Old Colony Beach	219	39,420	78,840	High
8	Old Lyme Shores Beach	192	34,560	69,120	High
9	Edge Lea and Cutler Road	28	5,040	10,080	low
10	Hatchet Point Road	11	1,980	3,960	low
	Totals	1,477	265,860	531,720	

Table 2

High-Needs Wastewater Service Area				
Sub-Area	Association or Street Name	Number of Equivalent Dwelling Units (EDU)	Estimated Average Daily Residential Flow	Estimated Maximum Daily Residential Flow
2	White Sand Beach	204	36,720	73,440
5	Hawks Nest & Miami Beach	392	70,560	141,120
6	Sounds View	342	61,560	123,120
7	Old Colony Beach	219	39,420	78,840
8	Old Lyme Shores Beach	192	34,560	69,120
	Totals	1,349	242,820	485,640

Table 3

Collection System Capital Costs			
Collection System Type	Sewer Within High-Needs Sub-Areas	Common Sewer from High-Needs Sub-Areas to Old Lyme WPCF (Local Alternative)	Common Sewer from High-Needs Sub-Areas to East Lyme Town Line (Regional Alternative)
Gravity	$31,500,000	$3,600,000	$8,578,000
Low Pressure	$35,800,000	$3,600,000	$8,578,000
Vacuum	n/a	n/a	n/a
STEP	$41,074,700	$3,600,000	$8,578,000
STEG	$36,623,000	$3,600,000	$8,578,000

Table 4

Collection System Cost Summary				
Collection System Type	Local Alternative		Regional Alternative	
	Capital	Annual O&M	Capital	Annual O&M
Gravity	$35,100,000	$175,000	$52,036,000	$573,000
Low Pressure	$39,400,000	$209,000	$51,358,000	$519,000
Vacuum	n/a	n/a	n/a	n/a
STEP	$44,675,000	$425,000	$56,633,000	$519,000
STEG	$40,223,000	$378,000	$52,181,000	$573,000

Table 5

Treatment Cost Summary				
Treatment System Based on Type of Sewer System	Local Alternative		Regional Alternative	
	Capital Cost	Annual O&M Cost	Capital Cost	Annual O&M Cost
Gravity	$13,490,000	$418,000	$8,145,000	$245,400
Low Pressure	$12,950,400	$401,000	$8,145,000	$222,300
STEP	$11,655,360	$388,800	$8,145,000	$222,300
STEG	$12,141,000	$405,000	$8,145,000	$245,400

Table 6

Downstream Pump Station Capacities (Regional Alternative)										
Pump Station Name	Pump Station Capacity* (GPD)	*Existing Conditions*			*East Lyme Moderate Zoning Buildout*			*With Old Lyme Contribution*		
		Peak Hour (GPD)	Capacity Used	Capacity Concerns	Peak Hour (GPD)	Capacity Used	Capacity Concerns	Peak Hour (GPD)	Capacity Used	Capacity Concerns
Niantic[1]	6,273,000	1,823,000	29%	No	5,456,000	87%	No	6,578,000	105%	Yes
Pattagansett[1]	5,164,000	1,096,000	21%	No	4,337,000	84%	No	5,459,000	106%	Yes
Bride Brook[1]	2,880,000	668,000	23%	No	1,661,000	58%	No	2,783,000	97%	Yes
Route 156[1]	2,703,000	680,000	25%	No	1,880,000	70%	No	3,002,000	111%	Yes
Waterford[2]	10,397,000	9,034,000	87%	No	n/a	n/a	n/a	10,156,000	98%	Yes

* Calculated with largest pump offline.

1) Based on 2007 Capacity Analysis and Planning Report

2) Based on 2011 Waterford Wastewater Facilities Plan Update

Table 7

Estimated Downstream Capital Needs (Regional Alternative)				
Pump Station Name	Old Lyme % of Peak Hourly Flow	Estimated Additional Capital Cost Premium %	Capital Upgrade Cost	Estimated Old Lyme Capital Portion
Niantic[1]	21%	29%	$2,500,000	$1,239,000
Pattagansett[1]	26%	24%	$2,500,000	$1,247,000
Bride Brook[1]	68%	50%	$2,000,000	$2,351,000
Route 156[1]	60%	50%	$2,000,000	$2,194,000
Waterford[2]	12%	10%	$1,500,000	$336,000
FM Pattagansett	21%	81%	$522,000	$530,000
FM Bride Brook	40%	62%	$1,507,000	$1,542,000
FM Route 156	37%	65%	$398,000	$407,000
Gravity	n/a	100%	$2,112,000	$2,112,000
		Totals	$15,039,000	$11,958,000

Table 8

Disposal and Reuse Cost Summary (Local Alternative)				
	Capital	O&M	Disposal Capacity Range GPD	Storage Capcity GPD
Sub-Surface Cherrystone	$1,976,000	$21,000	150,000 - 190,000	n/a
Post EQ	$1,500,000	$0	n/a	250,000
Storage for Reuse	$680,000	n/a	n/a	400,000
Reuse Black Hall	$650,000	$65,000	300,000 - 400,000	n/a
Pump Station To Black Hall	$500,000	$8,000	n/a	n/a
Additional Disposal Needed Black Hall	$2,518,000	$25,000	100,000 - 150,000	n/a
Totals	$8,699,000	$119,000	550,000 - 740,000	650,000

Table 9

Total Capital and Annual O&M Costs				
	Capital		Annual O&M	
System Component	Local [1]	Regional	Local [1]	Regional
Collection	$35,100,000	$52,036,000	$175,000	$573,000
Treatment	$13,490,000	$8,145,000	$418,000	$245,400
Disposal / Reuse	$8,699,000	n/a	$119,000	n/a
Totals	$57,289,000	$60,181,000	$712,000	$818,400
Total per EDU	$42,468	$44,612		

1) Local Based on Gravity System for Service Area

Table 10

Total Annualized Costs (0% Grant, 2% Loan)								
	Local Alternative				Regional Alternative			
System Component	Annualized Capital	Annual O&M	Total Annual Cost	Total Annual Cost per EDU	Annualized Capital	Annual O&M	Total Annual Cost	Total Annual Cost per EDU
Collection	$2,131,000	$175,000	$2,306,000	$1,709	$3,159,000	$573,000	$3,732,000	$2,766
Treatment	$819,000	$418,000	$1,237,000	$917	$494,000	$245,400	$739,400	$548
Disposal / Reuse	$528,000	$119,000	$647,000	$480	$0	$0	$0	$0
Totals	$3,478,000	$712,000	$4,190,000	$3,106	$3,653,000	$818,400	$4,471,400	$3,315

1) Local Based on Gravity System for Service Area

Table 11

Total Annualized Costs (25% Grant, 2% Loan)								
	Local Alternative				Regional Alternative			
System Component	Annualized Capital	Annual O&M	Total Annual Cost	Total Annual Cost per EDU	Annualized Capital	Annual O&M	Total Annual Cost	Total Annual Cost per EDU
Collection	$1,598,250	$175,000	$1,773,250	$1,314	$2,369,250	$573,000	$2,942,250	$2,181
Treatment	$614,250	$418,000	$1,032,250	$765	$370,500	$245,400	$615,900	$457
Disposal / Reuse	$396,000	$119,000	$515,000	$382	$0	$0	$0	$0
Totals	$2,609,000	$712,000	$3,320,500	$2,461	$2,740,000	$818,400	$3,558,150	$2,638

1) Local Based on Gravity System for Service Area

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SUMMARY OF ALTERNATIVES

Table 9 includes the total capital and annual O&M costs for the local and regional alternative. The gravity sewer collection sub-alternative has the lowest overall costs. In order to assess financing impacts, Tables 10 and 11 reflect the annual costs per EDU for the local and regional alternatives, based on a 20-year loan at 2%, for 0% and 25% grants, respectively.

PRELIMINARY CONCLUSIONS

Although both the regional and local alternatives represent a significant investment for Old Lyme residents, the local alternative has a lower capital cost, as well as a lower new annual cost per EDU. The gravity sewer options are the best fit for the regional and local alternatives. Similarly, the STEP and STEG sewer alternatives are not the most appropriate options for either alternative.

REMAINING TASKS AND COORDINATION

Based on the field work, preliminary cost conclusions, and data collected thus far, the Town should continue to refine the assumptions and permitting/regulatory impacts associated with the local alternative before making a final selection of the alternative best for the Town.