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March 31, 2015

Ms. Marianne Brown, Chair,
and Authority Members
Water and Sewer Authority
c/o Mr. Frederick W. Hurley, Jr., Director
Public Works Department
Town of Newtown
4 Turkey Hill Road
Newtown, CT 06470

Re: Second Request to the Water and Sewer Authority to Extend Authority's Sewer Service Area at 79 Church Hill Road, Newtown, Map 38, Block 2, Lot 1; Request for Conditional Approval of Capacity and Connection

Dear Chair Brown, Authority Members, and Mr. Hurley:

This letter is one part of the applicant's two-part response to the March 12, 2015 submissions of Mr. Hurley and Mr. Mailman from Fuss & O'Neill. This letter addresses Mr. Hurley's seven page cover memo. Mr. Paier from Westcott and Mapes will respond separately to the Fuss & O'Neill report about the viability of an on-site sewage treatment system.

Unfortunately, Mr. Hurley's memo misses the point of the application before the Authority. His memo asserts that, when the sewer service district was first established, the public sewer was extended to Walnut Tree Village, and laterals were installed onto the 79 Church Hill Road property, the Authority did not "intend" to sewer all of the applicant's 35 acres. Specifically, Mr. Hurley points out that (1) the sewer district and installation were only to deal with existing septic failures, not promote new development; (2) laterals and mains would have extended further than three acres onto 79 Church Hill Road if more acreage was intended to be sewered; and (3) the "absence of any environmental problem" at 79 Church Hill Road demonstrates why the parcel should not be sewered. Mr. Hurley also asserts that any request to the State to use a portion of its substantial unused capacity would be difficult because it would require several agencies to agree. The main point of Mr. Hurley's memo appears to be that when the public sewer was installed along Church Hill Road, the Authority did not intend to sewer all 35 acres of 79 Church Hill Road.

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There are apparent contradictions to Mr. Hurley's claim that the sewer system's purpose has never been to facilitate new development: Not only has the system previously facilitated new multi-family residential development, but also the Authority has before it at this time a proposal to facilitate expansion of an existing multi-family development. Indeed, it seems that the Authority is picking and choosing *which* development it will facilitate.

In any event, the applicant accepts that it was not the Authority's original intent to sewer the entire 35 acres. Nonetheless, Mr. Hurley's effort addressing this point has been misdirected.

To clarify the question before this Authority with this application: The subject 35 acres clearly *can be* developed with an on-site community system in compliance with DEEP regulations. While the exact capacity and number of units has not yet been determined at this preliminary stage, even Mr. Mailman of Fuss & O'Neill did not dispute that the property can be developed with on-site sewage disposal. The question then is: *Will the subject property be developed under the Incentive Housing Overlay Zone adopted by the Newtown Planning and Zoning Commission in January 2015, which contains strict design rules and will give the Town / PZC substantial control of how the property is developed, or will the applicant be required to pursue a different plan, with on-site sewage disposal?* The Incentive Housing Overlay Zone expressly requires sewer. Sewer will be more protective of water quality. This is the choice before the Authority. Also, a sewered development will provide a benefit to the Town, the upgrading of the pump station, which everyone agreed on March 12 is in need of repair. Finally, as to Mr. Hurley's contention that the State of Connecticut might not grant a request from the Town to use a small part of its unused capacity – a request clearly authorized and invited by the 1993 Agreement – well, we won't know if the question is never asked, will we?

The issue before this Authority is *how* the subject parcel will be developed. Granting the applicant's requests for approval, conditioned on obtaining other necessary land use permits, will allow the applicant to work with the Town's land use agencies on an Incentive Housing Overlay Zone plan. Denying the current application will only foreclose this proposed cooperative approach.

Thank you for your attention.

Very truly yours,



Timothy S. Hollister

TSH:ekf

c: 79 Church Hill Road LLC
Westcott and Mapes, Inc.



March 31, 2015

Ms. Marianne Brown, Chair,
and Authority Members
Newtown Water and Sewer Authority
c/o Mr. Frederick W. Hurley, Jr., Director
Public Works Department
Town of Newtown
4 Turkey Hill Road
Newtown, CT 06604

SENT VIA E-MAIL: fred.hurley@newtown-ct.gov

RE: 79 Church Hill Road
Response to Review Memo
Dated March 10, 2015 by Fuss & O'Neill
W&M Project No. 14-004-10

Dear Ms. Brown, Mr. Hurley and Authority Members:

In response to the March 10, 2015 review Memorandum prepared by Fuss & O'Neill, Westcott and Mapes, Inc. provides the following:

Second Request to the Water and Sewer Authority to Extend Authority's Sewer Service Area at 79 Church Hill Road, Newtown Map 38 Block 2 Lot 1; Request for Conditional Approval of Capacity and Connection Dated February 4, 2015

1. Albeit not hydraulically necessary, a new 8" diameter sanitary service lateral with sanitary manhole can easily be incorporated into the project design to meet Newtown standards.
2. The treatment plant design capacity is reported as 930,000 gpd, while the estimated existing average daily flow appears to be at or below 500,000+/- gpd. Based on this data, noting that there is 300,000 to 400,000+/- gpd of unused daily treatment capacity, it appears that the plant can physically handle and treat the requested 43,845 gpd without compromise to function.
3. All parties agree that the existing Sandy Hook Pump Station is currently at or near capacity. Should the use of the pump station become necessary for the proposed development, it is our understanding that the developer would be willing to upgrade the station for the need.

Application for Preliminary Review by Newtown WSA

1. As we have done, the use of the "NEIWPCG Guides for the Design of Wastewater Treatment Works, TR-16" as the guide for calculating peak flow, is standard practice. We believe the confusion occurs via representing a particular peaking flow for a peak hour for a maximum 24 hour scenario. A peak factor of 4.0 to 5.6 is agreed to be appropriate for a peak on maximum day. A maximum peak flow rate in the format of 121 gallons per minute is acceptable and can be reported as such.
2. The application refers to a proposed plan with 350 residential units desired and intended to be connected to the existing municipal sanitary sewer. In contrast, 400 units are represented on the Conceptual Design Site Plan Subsurface Sewage Disposal System, sheet SP-1 as an attainable number of units, based upon the geometry and size of the represented on-site disposal system.

Subsurface Sewage Disposal Feasibility Report Newtown Residential Development 79 Church Hill Road Newtown, Connecticut dated February 4, 2015

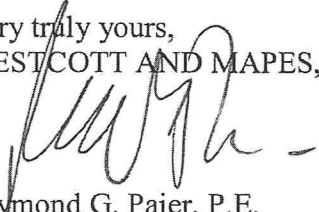
1. Agreed, the calculation methods are consistent with DEEP Large Scale Onsite Wastewater Renovation Guidelines document dated 2006. We did, as requested by the director of public works, conceptually investigate and prove the feasibility of an onsite wastewater disposal system for the project, based upon in house data. A geotechnical site exploration was performed, and soils borings were taken for overall site development investigative purposes. A copy of the Geotechnical Engineering Report, dated August 2014, prepared by Heller and Johnsen, is provided with this correspondence. Conservatively, for conceptual design purposes, we based the calculations on a substantial envelope of controlled, septic sand fill material and its associated permeability rate, we did not consider any travel through the underlying existing soils. Should this project progress to a formal application to the State DEEP, additional investigations and soil testing may be performed in coordination and compliance with the State.
2. The total separation at the leaching bed area was graphically measured using the developed plan/profile sheets.
3. a.) We used a conservative proportion method of depth of flow based upon actual flow vs. 150% flow. The Westcott and Mapes, Inc. number reported is a conservative design number. We have reviewed and revised the actual depth of flow based upon your comment, thereby resulting in an even greater/better rate of removal than indicated in the initial report. (See attached calculations)

b.) The correct width of flow for the critical segment is 230 feet. The transposed numbers were corrected as well. The number calculation in the report has been corrected as such, the resulting phosphorous removal rates are even higher/greater than originally reported. (See attached calculations)

Conceptual Site Plan Subsurface Sewage Disposal System – Sheets SP-1,2,3,4,5

1. We concur that the dimensions of the leaching beds and extent of engineered fill locations are consistent with the dispersal area required for the 50,000 gpd flow. We have included a copy of the geotechnical report for your awareness.
2. As a matter of design, Westcott and Mapes, Inc. would prepare a typical dimensional cross-section and provide it to the State DEEP during the design application, submission process.
3. We concur, that the proposed decentralized onsite wastewater treatment facility (Amphidrome) is capable of treating the design flow.
4. The plan represents a site concept. The architectural design parameters including unit sizes, building heights and number of stories per building are not identified nor inferred by the plan nor should they be assumed. Building specifics fall under the design and direction of the project Architect.

Very truly yours,
WESTCOTT AND MAPES, INC.



Raymond G. Paier, P.E.
Vice President of Engineering

Cc: Kurt Mailman – Fuss & O’Neill
Timothy Hollister – Shipman & Goodwin
Raymond A. Macaluso – Westcott and Mapes, Inc.

7.0 POLLUTANT RENOVATION

7.10 Virus Removal

The DEEP's criteria to provide for adequate virus removal from the leach field bed is to provide two feet of unsaturated soil or greater from the bottom of leach bed to the mounded level of water as established from the hydraulic analysis as demonstrated in the previous section. Based on the average daily design capacity flow rate of say 50,000 gpd, the depth of the mounded flow will be $50,000/74,959 \times 7' = 4.67'$. Based on the sections prepared for the leaching system the total separation at the leaching bed area approximates $4.5' > 2'$ therefore OK.

7.20 Nitrogen

The criteria for nitrogen treatment is to ensure that total nitrogen levels should not exceed 10 mg/l at the property line, surface water source or wetland. The proposed enhanced pre-treated system that can be designed for this facility has shown that it can meet these criteria at the non-point discharge points of leaching field bed.

7.30 Phosphorus Removal

The accepted DEEP criteria for soil adsorption calls for the sorption of 180 days worth of phosphorus generation based on an adsorption rate of 8 mg/100 grams of soil and a phosphorus discharge rate of 9 mg/L which would lead to a zero rate of phosphorus prior to discharge to property line, watercourse or wetland.

Central Segment (Sections 4-6)

$Q_1 = 17,342$ gallons per day based on depth = 7.0 feet.

Based on 1.5 hydraulic capacity actual flow rate = $17,342 \text{ gpd}/1.5 = 11,561 \text{ gpd}$

Actual Depth of flow = $(11,561/0.072 \times 20 \times 7.48)/230 = 4.67$ feet

Width of flow = say 230'

Cubic feet of soil = $230' \times 4.67' \times 130'$ of length (See Section 7.4 of report) = 139,633 CF

Total Phosphorus Discharge (180 day period) = $11,561 \text{ gpd} \times 3.785 \text{ liters/gal} \times 9 \text{ mg/L} = 3.94 \times 10^5 \text{ mg/day}$

Based on 180 days, total weight of Phosphorus = $180 \times 3.94 \times 10^5 = \underline{7.09 \times 10^7 \text{ mg of P}}$

Total Leaching soil available = $110 \text{ lb/CF} \times 454 \text{ g/lb} = 49,940 \text{ g/CF}$

Mass of soil which the P-laden water will flow = $139,633 \text{ CF} \times 49,940 \text{ g/CF} = 6.97 \times 10^9$ grams

Total sorption capacity of the soil = $8 \text{ mg/100 grams} \times 6.97 \times 10^9/100 = \underline{5.58 \times 10^8 \text{ mg. of P}}$

OK greater than 7.09×10^7 mg of P which will be generated in 180 days of discharge.

Northern and Center Southern Segment (Sections 1-4 + Sections 6 to 7)

$Q_2 = 43,564$ gallons per day based on depth = 7.0 feet.

Based on 1.5 hydraulic capacity = $43,564 \text{ gpd}/1.5 = 29,042 \text{ gpd}$

Actual Depth of flow = $(29,042/0.080 \times 20 \times 7.48)/520 = 4.67$ feet

Width of flow = say 520'

Cubic feet of soil = $520' \times 4.67' \times 144'$ of length (See Section 7.4 of report) = 349,689 CF

Total Phosphorus Discharge (180 day period) = $29,043 \text{ gpd} \times 3.785 \text{ liters/gal} \times 9 \text{ mg/L} = 9.89 \times 10^5 \text{ mg/day}$

Based on 180 days, total weight of Phosphorus = $180 \times 9.89 \times 10^5 = \underline{1.78 \times 10^8 \text{ mg of P}}$

Total Leaching soil available = $110 \text{ lb/CF} \times 454 \text{ g/lb} = 49,940 \text{ g/CF}$

Mass of soil which the P-laden water will flow = $349,689 \text{ CF} \times 49,940 \text{ g/CF} = 1.74 \times 10^{10}$ grams

Total sorption capacity of the soil = $8 \text{ mg}/100 \text{ grams} \times 1.74 \times 10^{10}/100 = \underline{1.39 \times 10^9 \text{ mg. of P}}$

OK greater than $1.78 \times 10^8 \text{ mg of P}$ which will be generated in 180 days of discharge.

Southern Segment (Sections 7-8)

$Q_3 = 14,053$ gallons per day based on depth = 7.0 feet.

Based on 1.5 hydraulic capacity = $14,053 \text{ gpd}/1.5 = 9,369 \text{ gpd}$

Actual Depth of flow = $(9,369/0.11 \times 20 \times 7.48)/122 = 4.66$ feet

Width of flow = say 122'

Cubic feet of soil = $122' \times 4.66' \times 198'$ of length (See Section 7.4 of report) = 112,567 CF

Total Phosphorus Discharge (180 day period) = $9,369 \text{ gpd} \times 3.785 \text{ liters/gal} \times 9 \text{ mg/L} = 3.19 \times 10^5 \text{ mg/day}$

Based on 180 days, total weight of Phosphorus = $180 \times 3.19 \times 10^5 = \underline{5.74 \times 10^7 \text{ mg of P}}$

Total Leaching soil available = $110 \text{ lb/CF} \times 454 \text{ g/lb} = 49,940 \text{ g/CF}$

Mass of soil which the P-laden water will flow = $112,567 \text{ CF} \times 49,940 \text{ g/CF} = 5.62 \times 10^9$ grams

Total sorption capacity of the soil = $8 \text{ mg}/100 \text{ grams} \times 5.62 \times 10^9/100 = \underline{4.49 \times 10^8 \text{ mg. of P}}$

OK greater than $5.74 \times 10^7 \text{ mg of P}$ which will be generated in 180 days of discharge.

7.40 Bacterial Survival

The accepted criteria that DEEP uses to evaluate to provide to virus removal is to provide a minimum of 3 weeks detention time prior to discharge to, property line, water course or wetlands limit. The velocity of the discharge through the sand filter is determined by the equation ($V = k \times i / \text{soil porosity, } n$)

Check Central Segment (Sections 4-6)

$k = 30 \text{ ft./day}$ (Maximum in range of permeability)

$I = 0.072 \text{ ft./ft.}$

MEMORANDUM

TO: Ms. Marianne Brown
Newtown WSA Chair

FROM: Kurt A. Mailman, P.E. , Philip E. Forzley, P.E., LEED AP, Matthew Jermine, P.E.

DATE: April 1, 2015

RE: 79 Church Hill Road Proposed Development - Additional Review Comments

The Newtown Water and Sewer Authority (WSA) solicited the services of Fuss & O'Neill to review documents related to a proposed development at 79 Church Hill Road in Newtown (hereinafter referred to as the "subject parcel") on February 12, 2015. A listing of the documents reviewed and results of the review follow:

The following documents were submitted to Fuss & O'Neill on March 31st at 11:35 AM for review and response by April 1st for the 6:00 pm Newtown WSA public meeting.

- *79 Church Hill Road Response to Review Memo Dated March 10, 2015 by Fuss & O'Neill, W&M Project No. 14-004-10* dated March 31, 2015 prepared by Westcott and Mapes Inc. Consulting Engineers.
- *Geotechnical Engineering Report Proposed Apartment Development 79 Church Hill Road Newtown, Connecticut* Dated August 2014 by Heller and Johnsen.

Review Comments:

1. The geotechnical engineering report is inadequate for a subsurface investigation when designing a DEEP Large Scale Onsite Wastewater Renovation System (OWRS). Without proper subsurface information, a preliminary design of the OWRS cannot be adequately prepared to a level of detail suitable for submission to the DEEP.
 - a. Test pits are needed to characterize the soil stratum, identify seasonal high groundwater mottling, and depth to restrictive layer
 - b. The geoprobe subsurface investigation occurred in July and August of 2014. Seasonal high groundwater observations with monitoring wells must occur during the Spring and/or Fall when the groundwater is elevated.
 - c. The two (2) observation wells identified are not located in close proximity to the proposed OWRS.
 - d. Sufficient subsurface data was not prepared for the limits of the OWRS leaching bed and downgradient soil.

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2. The wastewater flow estimates are incomplete.
 - a. The wastewater flows do not account for flows from the proposed pool located in the northwest corner of the site. The total flow should include complete drainage of the pool and regular backwash flows from the filter.
 - b. The DEEP generally requires unit flow rates based on:
 - i. Actual flow data from existing facilities with similar uses
 - ii. The criteria established in the "*CTDEEP Guidance for Design of Large-Scale On-Site Wastewater Renovation Systems*" dated February 2006, or
 - iii. The "*CTDPH Connecticut Public Health Code: On-site Sewage Disposal Regulations, and Technical Standards for Subsurface Sewage Disposal Systems*" dated January 2011.
 1. For a single family residence of four bedrooms or less, the unit flow rate is 150 GPD/bedroom based on the CTDPH regulations.
 - iv. The DEEP generally would not allow unit flow rates based on Newtown's WSA Regulations for sizing the OWRS.
 1. The applicant relied on average daily flow rates calculated with a unit flow rate of 125 GPD/unit based on Newtown's WAS Regulations.
 - c. The application incorrectly calculated the effective leaching area, and hydraulic mounding analysis using the average daily flow rate. The DEEP requires the septic system and leaching system design flow rate to equal 1.5 times the average daily flow rate.
3. The leaching bed sections are difficult to interpret.
 - a. Revise with the correct building height.
 - b. The section alignments for DEEP septic system design should be perpendicular to the leaching beds, not the building footprints.
 - c. The sections are incomplete. They do not show the seasonal high groundwater, hydraulic mound, or soil strata.
 - d. The toe of the slope of the fill section is covered with rip rap. The design does not adequately demonstrate what happens to the wastewater effluent downstream of the fill section. The soil sieve analysis indicates extremely low permeability in the soils based on high percentages of fines passing the #200 sieve. That would indicate the underlying soil has very limited hydraulic capacity to convey the effluent discharged by the septic system. If the wastewater effluent seeps out of the toe of the slope of the fill section, and then travels an additional 100 feet on the surface to wetlands; the DEEP would likely consider the condition as an unpermitted effluent breakout.
4. The Effective Leaching Area calculation incorrectly includes the area between the ten discrete leaching beds which comprise of adjacent rows of Infiltrators where the effluent discharge gravity pipe laterals are located.

MEMO- Ms. Marianne Brown

March 10, 2015

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5. The OWRS appears to show gravity pipe lateral distribution to the leaching beds.
 - a. Wastewater effluent from a pretreatment system should not be distributed to the leaching system through a gravity fed distribution system per DEEP regulations.
6. The DEEP criteria for unsaturated soil separation distance between the bottom of the leaching bed and the top of the hydraulic mound is three (3) feet. The applicant incorrectly states this distance as two (2) feet.
7. The phosphorus removal calculation is incorrect. The DEEP allows for phosphorus removal within the first 3 feet of unsaturated soil located directly beneath the leaching system. The applicant incorrectly based the calculation on the entire fill volume which also includes saturated soil.
8. A septic system designed to DEEP regulations would require consideration of site utilities: specifically the stormwater system. The applicant does not show the storm water collection system or potential storm water retention basin/discharges. These facilities have the potential to affect the groundwater hydraulics of the site which could potentially negatively impact the proposed leaching system.
9. The leaching facility as depicted on the layout plan would be within the 25 foot setback of the building foundation drain.
10. The latest Concept Plan shows two (2) additional buildings as well as additional parking spaces over the proposed location of the OWRS design. If the application is approved, this space must remain clear.
11. Note: We were advised by the applicant's engineer to disregard the height and dimensions of the buildings depicted on the applicant's drawings when determining the site's suitability for wastewater treatment through an OWRS. We evaluated the submittal on the premise that the building locations depicted on the plan sheet "SP-1" dated 02/03/2015 by Westcott and Mapes, Inc. represent the site layout the applicant plans to construct.

In summary, Fuss & O'Neill cannot conclude that the OWRS design as proposed is suitable to handle the design wastewater flow. Significant further information and investigation would be required to render a determination of the site to handle the wastewater flow generated from the proposed development.

c: Fred Hurley – Newtown DPW Director
David Grogins Esq. – Cohen and Wolf