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Subject: 104 Boston Post Road Stony Brook Weston
Date: May 17, 2017 at 5:02 PM
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Date: May 18, 2017

Noreen,

Hand Delivered to Weston ZBA: Four (4) copies of Stantec Consulting Services Inc. May 12, 2017 Proposed WWTF Executive Summary

As requested by the ZBA at the May 2, 2017 Hearing for the ZBA's information a one page executive summary was requested as it relates to the onsite waste water treatment facility which requires review and permitting with Mass DEP. The "one page summary" is 10 pages including process flow diagram, Technical Criteria and Regulatory Compliance. We have also furnished this executive summary to the Cambridge Water Department.

Please feel free to call with any questions.

All the best.

Dave Calhoun
617-947-9587

**CONCEPTUAL DESIGN EXECUTIVE SUMMARY
FOR
PROPOSED WASTEWATER TREATMENT
AND EVAPORATION FACILITIES**

**104 Stony Brook LLC
Stony Brook Apartments
104 Boston Post Road
Weston, Massachusetts 02493**

Weston Zoning Board of Appeals

Prepared for:

104 Stony Brook LLC
P.O. Box 158
Waban, MA 02468

Prepared by:

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May 12, 2017

Stantec Project No. 195150441

This Executive Summary presents key technical criteria and regulatory requirements associated with the conceptual design and construction of a wastewater treatment facility (WWTF) and evaporators for the proposed 150-unit apartment building, Stony Brook Apartments (the Project), being developed by 104 Stony Brook LLC, and permitted through the Town of Weston in accordance with the requirements of the Massachusetts Comprehensive Permit Act: Chapter 40B. The apartment building will be located on a 2.09-acre site accessed off Boston Post Road and Sibley Road in Weston, Massachusetts. The WWTF and evaporators will be installed within the basement of the apartment building, beneath the lower garage level. Due to the interior location of these facilities, sewage will be conveyed solely by the building plumbing system, and no exterior sewage collection system will be needed.

1 TECHNICAL CRITERIA

1.1 Treatment System

The WWTF will have a design flow of 25,850 gallons per day (gpd) based upon design criteria established in the *"Guidelines for the Design, Construction, Operation and Maintenance of Small Sewage Treatment Facilities with Land Disposal"* published by the Massachusetts Department of Environmental Protection (MassDEP). The proposed facility will use an OVIVO microBLOX™ membrane bioreactor (MBR) treatment system for organic matter and nitrogen reduction. The treatment process produces effluent quality consistent with MassDEP Reclaimed Water Standards and the influent requirements of the proposed ENCON Thermal Evaporators that will be used for effluent elimination. Below is a brief discussion of the main components of the OVIVO microBLOX™ MBR, and the unit processes preceding and following it.

Raw wastewater will be conveyed by the apartment building plumbing system to a pretreatment (septic) tank that will be installed within the building to remove grease, grit and primary solids from the waste stream. Clarified liquid will flow from the pretreatment tank by gravity to a flow equalization tank that will be equipped with a duplex pumping system to transfer wastewater through a fine screen to the anoxic (low oxygen) zone of the OVIVO microBLOX™ MBR.

The OVIVO microBLOX™ MBR is skid-mounted and shipped to the Project site with process tanks, pumps, blowers and controls pre-wired and nearly ready for operation. The treatment system incorporates 4 separate treatment zones: an anoxic zone; a waste activated sludge (WAS) storage zone; and two MBR treatment zones. The MBR treatment system will be followed by ultraviolet (UV) light disinfection, process monitoring and flow measurement that enable the treatment system to consistently meet rigorous effluent quality requirements. The disinfected effluent will flow by gravity to an effluent storage tank from which reuse-quality water will be pumped to evaporators for elimination of the effluent. If regulations allow in the future, about 30% of the effluent will be pumped to the building's plumbing system for toilet flushing.

1.2 Treated Water Evaporation System

The treated water evaporation system has been designed to accommodate the maximum daily flows from the WWTF while eliminating the need for discharge to sewers, groundwater or surface water resources. It

is anticipated that three (3) ENCON N33V2-400 natural gas-fired, thermal evaporators, each with a capacity of 9,600 gpd, will be required if 30% of the effluent can be beneficially reused for toilet flushing. Four (4) evaporators will be needed if there is no effluent reuse. When fed reuse quality effluent, the ENCON evaporators will provide >99% volume reduction.

1.3 Solids Handling

The treatment plant will generate waste solids consisting of primary sludge and scum, grit and screenings, partially digested WAS, and residuals from the evaporators. Primary solids, grease and scum will be captured and retained within the pretreatment tanks, which will be pumped out twice a year and disposed off-site by a licensed septage hauler. The fine screen installed prior to the anoxic zone will be equipped with a bag chute that will capture the screenings for off-site disposal at an approved solid waste disposal facility. WAS will be periodically transferred to an aerated storage tank that will need to be pumped out every 3 to 4 weeks. Residuals from the evaporation process will be removed from the evaporators, allowed to cool, and directed to a residuals storage tank for off-site disposal. Alternatively, ENCON drum dryers may be added to eliminate all evaporator residuals.

1.4 Special Design Features

The treatment facility will be designed to provide safe and efficient operation. The design will include contingencies intended to prevent any bypassing of treatment processes in the event of a system failure.

Redundancy: Duplicate pumps will be installed wherever pumping is required. Pumping systems will be able to handle the peak daily flow with the largest unit out of service.

Three (3) evaporators are proposed if effluent reuse for toilet flushing is allowed. At the design flow of 25,850 gpd, with the WWTF supplying reuse water to the apartment building for toilet flushing, two (2) evaporator units will be required with the third evaporator unit on stand-by. If use of effluent for toilet flushing is not allowed, the design will include four (4) evaporators, with the fourth unit on stand-by.

Emergency Storage: At the design flow of 25,850 gpd, the WWTF will provide approximately 48 hours of storage within the flow equalization tank, with an additional 46 hours of storage provided within the effluent storage tank.

Electricity: It is anticipated that 480 volt, three-phase, 60 Hz electric power will be supplied to the WWTF site. The OVIVO skid will also be factory-equipped with a 110-volt transformer.

Emergency Generator: The plant will be equipped with a permanently mounted emergency generator of sufficient size to operate the entire facility including all pumps, treatment processes, evaporators and lighting. The facility's main control panel will be equipped with an automatic transfer switch designed to activate the emergency generator in the event of a prolonged power outage. A sequential starter will also be included to prevent overload of the circuitry upon transfer to, or from, the alternate electric source. The emergency generator will be natural gas powered and will be located outside, adjacent to the building.

Alarms: Alarms will be provided to signify high/low water level or failure of any pump, drive unit or blower, or evaporator. The OVIVO alarm system will include visual and audible alarms at the treatment plant and an automatic electronic telephone dialer. The automatic telephone dialer will contact a predetermined list of individuals in the event of an alarm situation. The ENCON evaporators will include an Ethernet connection to notify the operator and area service technicians of a problem in the evaporators' operations, enabling a quick response.

Spare Parts Inventory: An on-site inventory of high-wear items for the treatment units and evaporators will be maintained at the treatment plant to facilitate repairs.

Spacing: Components of the treatment plant will be arranged to optimize operator safety, convenience, flexibility, and economy. Sufficient spacing (a minimum of four feet) between, and around, all treatment and evaporator equipment will be provided to facilitate proper operation and maintenance.

Safety Equipment: Pertinent safety equipment including a first aid kit, fire extinguisher, emergency lighting, gas detectors and smoke detectors will be provided. An emergency eye wash station and deluge shower will also be installed within the treatment building.

Controls: The computer control system is equipped with programming, dial-out alarms and remote operation capabilities necessary for seamless integration. All electrical controls within the treatment plant will be installed in sealed, NEMA 4X control panels to prevent malfunction due to contact with moisture or corrosive gasses. All electrical fixtures will be non-corrosive and moisture proof.

Potable Water and Heat: The building will be provided with potable water for sanitary use and equipment washdown. The water supply to the plant will be protected by an approved backflow prevention device in accordance with MassDEP requirements. Natural gas-fired unit heaters will supply heat to the treatment area.

Following this Executive Summary is a two-page process flow diagram taken from our Conceptual Design Submission for this Project to MassDEP. This diagram illustrates the various components of the proposed wastewater treatment and evaporation systems. The diagram assumes state regulations will allow in the future effluent reuse for toilet flushing, and shows three (3) evaporators. If such reuse is not allowed, four (4) evaporators will be needed.

2 REGULATORY COMPLIANCE

2.1 314 CMR 20.00: Reclaimed Water Permit Program and Standards; Section 20.03

If future regulations allow, the WWTF's design and plumbing within the apartment building will provide for recycling approximately 30% of the treated effluent for toilet flushing, with the remainder eliminated using ENCON N33V2-400 natural gas-fired, thermal evaporators. A Reuse Management Plan will need to be completed to obtain a permit for this activity in accordance with Section 20.03 of 314 CMR 20.00. Since

there will be no discharge of treated effluent to municipal sewers, groundwater or surface water resources, Discharge Permits for these activities will not be required.

2.2 257 CMR 2.00: Rules and Regulations for Certification of Operators of Wastewater Treatment Facilities

The permitted WWTF must be operated by a Certified Wastewater Treatment Plant Operator in accordance with the above regulation.

2.3 314 CMR 12.00: Operation and Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Discharges

The permittee bears the ultimate responsibility of providing for the proper operation and maintenance of the facilities in accordance with the above regulation.

2.4 314 CMR 5.00: Groundwater Discharge Permit Program; Section 5.06(1)(g)

Section 5.06(1)(g) of this regulation prohibits MassDEP from issuing a permit for discharge of treated effluent from a privately owned WWTF within the Zone A of a public water supply. Because this project will use evaporators to eliminate the effluent, there will be no discharge to groundwater or surface water, and this permit requirement is not applicable.

2.5 314 CMR 7.00: Sewer System Extension and Connection Permit Program; Section 7.06(3)

Section 7.06(3) of this regulation prohibits sewer line construction within a Zone A of a public surface water supply. The proposed design will contain all piping within a building where it will become part of the plumbing, eliminating the need for any sewer line construction. Thus, this regulation does not apply.

2.6 314 CMR 12.00: Operation, Maintenance, and Pretreatment Standards for Wastewater Treatment Works and Indirect Dischargers; Section 12.08(10)

Section 12.08(10) of the above regulation prohibits sewer line construction within a Zone A of a public surface water supply, unless it is necessary to eliminate a pollution source, or to cross a tributary of the surface water. Although neither of these exclusions apply to this project, as noted above, all piping will be contained within the building, where it will become part of the plumbing, eliminating the need for any sewer line construction. Thus, this regulation does not apply.

2.7 314 CMR 20.00: Reclaimed Water Permit Program and Standards; Section 20.17 (1)(b)

The WWTF has been designed to incorporate water reuse pursuant to the Interim Guidelines on Reclaimed Water (Policy # BRP/DWM/PeP-P00-3). The MBR treatment facility will be designed to consistently comply with the following effluent limitations for Class A Water Reuse for toilet flushing as identified in 314 CMR 20.17 (1)(b):

- pH = 6.5 – 8.5
- BOD < 10 mg/L
- TSS < 5mg/L
- Turbidity < average of 2 NTU within a 24-hour period, cannot exceed 5 NTU more than 5% of the time with a 24-hour period, and cannot exceed 10 NTU at any time

- Total Nitrogen < 10 mg/L
- Median of no detectable fecal coliform/100 mL over continuous seven-day sampling periods, not to exceed 14/100 mL in any one sample

2.8 314 CMR 20.00: Reclaimed Water Permit Program and Standards; Section 20.12(3)

Section 20.12(3) of the above regulation requires discharge of the average daily flow to a reserve soil absorption system or a wastewater collection system for transport to other treatment or disposal facilities. For the proposed project, if the treated effluent does not meet reclaimed water standards, there is sufficient evaporation capacity available to evaporate the entire Title 5 flow. Therefore, the project meets the intent of 314 CMR 20.12(3).

2.9 314 CMR 20.00: Permit Requirements for Reclaimed Water Systems; Section 20.03

If, in the future, regulations allow effluent reuse for toilet flushing at this site, a Reuse Management Plan will be required in accordance with 314 CMR 20.03: Permit Requirements for Reclaimed Water Systems. The reuse of water for toilet flushing is proposed to conserve water, reduce evaporation costs and energy, and incorporate a sustainable approach to resource management. If the regulations do not support this reuse application, additional evaporator capacity will be provided for elimination of the entire wastewater flow.

2.10 Treatment Plant Siting Requirements

The treatment plant tanks and equipment, and evaporators will be constructed within the basement of the proposed apartment building. The location of the tanks and equipment will be consistent with the property line, well and surface water setback distances detailed in Table 2 – Minimum Acceptable Setback Distances of the *"Guidelines for the Design, Construction, Operation and Maintenance of Small Sewage Treatment Facilities with Land Disposal"*. There will be no subsurface tanks, leaching facility, or underground sewers required.

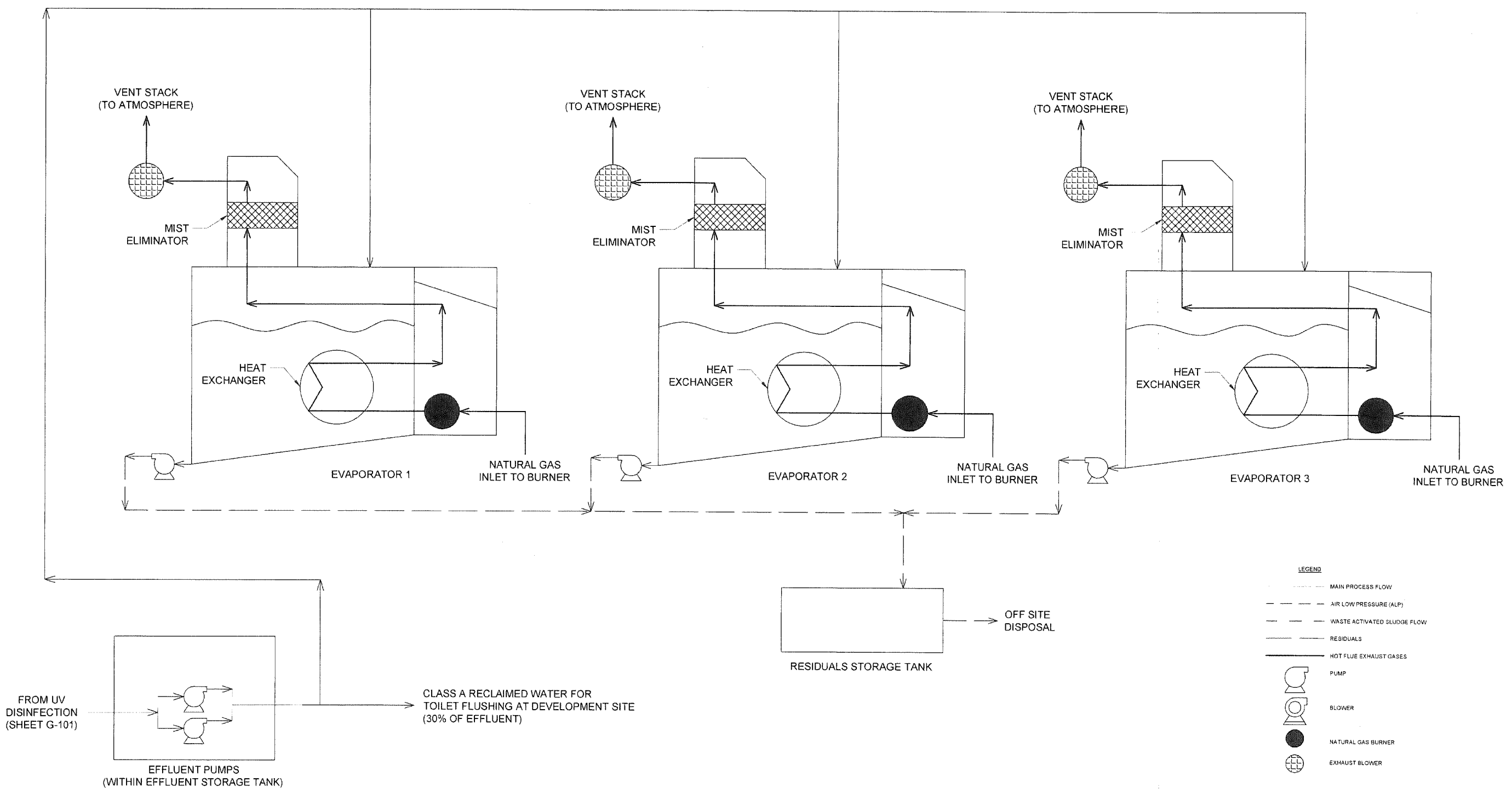
2.11 310 CMR 7.00: Air Pollution Control

MassDEP Air Pollution Control Regulations codified at 310 CMR 7.00: Air Pollution Control identify limits for discharges requiring a permit, or "Plan Approval". The proposed natural gas-fired evaporators should be exempt from the need for a Plan Approval for the following reasons:

1. Section 7.02(2)(b)30 of 310 CMR 7.00 exempts WWTFs handling less than 50,000 gpd of strictly sanitary wastewater from requiring a Plan Approval.
2. The evaporators will be supplied with highly treated, water reuse quality water that will have no volatile organic compounds. Therefore, the evaporator exhaust gas will be comprised of water vapor that contains no volatile organic compounds. Section 7.02(2)(b)7 of the Air Pollution Control regulation exempts a facility that has a de minimis increase in emissions of air contaminants, so the evaporator discharge will be exempt from the need for a Plan Approval on the basis of air contaminants.

3. Section 7.02(2)(b)15a provides exemptions from Plan Approval requirements for individual fuel utilization units having a maximum energy input capacity of less than 10 million BTU/hour (MMBTU/hr) utilizing natural gas or propane (Our project will use natural gas.). The heat input rate for each evaporator proposed for this project is 4.5 MMBTU/hr, which exempts the evaporators from needing a Plan Approval.

**PROCESS FLOW DIAGRAM
FOR
PROPOSED WASTEWATER TREATMENT AND EVAPORATION FACILITIES**



- LEGEND**
- MAIN PROCESS FLOW
 - - - - AIR LOW PRESSURE (ALP)
 - - - - WASTE ACTIVATED SLUDGE FLOW
 - RESIDUALS
 - HOT FLUE EXHAUST GASES
 - PUMP
 - BLOWER
 - NATURAL GAS BURNER
 - EXHAUST BLOWER

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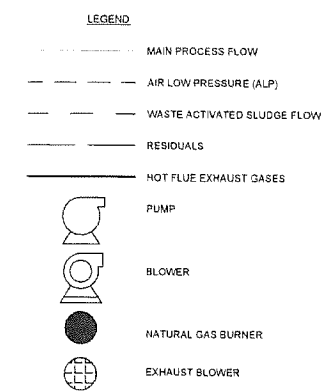
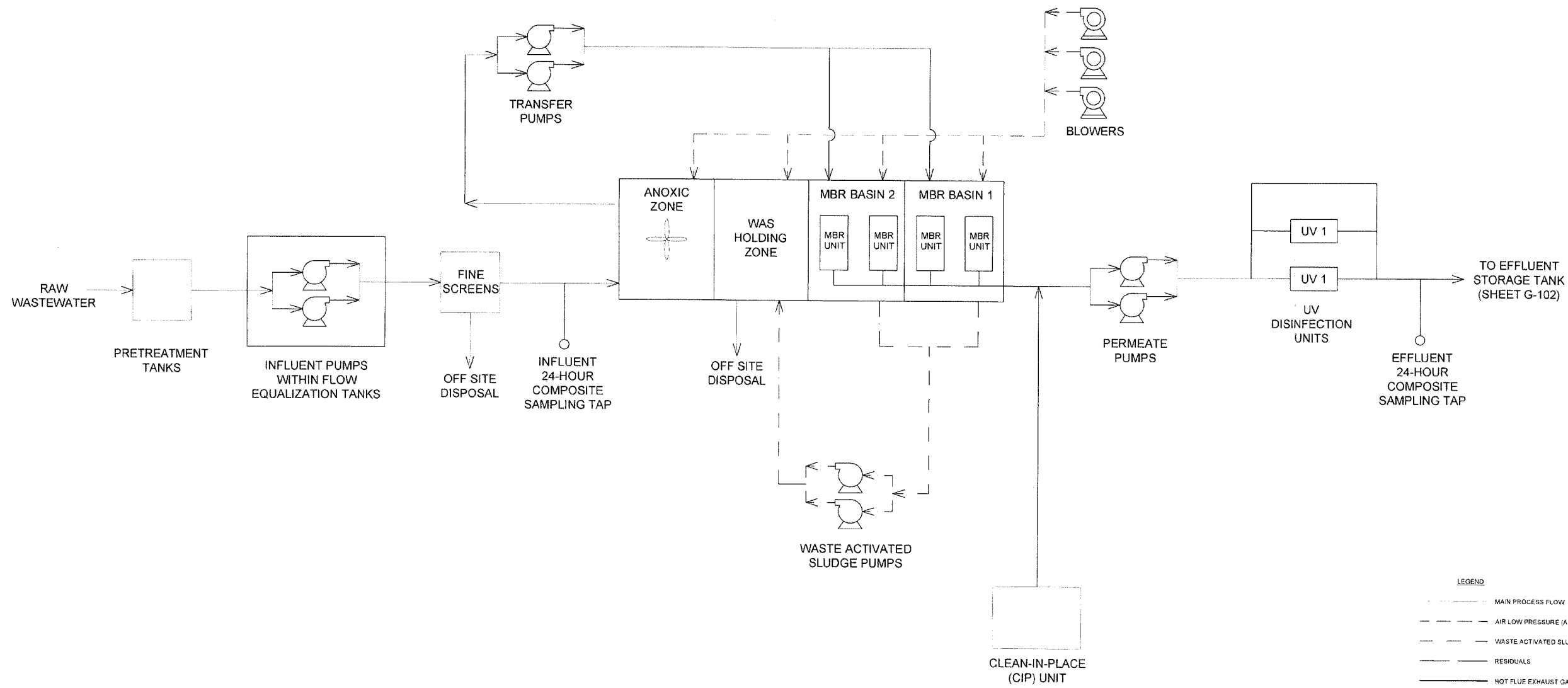
Proposed Wastewater Treatment Facilities
Stony Brook Apartments
104 Boston Post Road, Weston, MA

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PROCESS FLOW DIAGRAM 2 OF 2

Project No. 19150441
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Drawing No. G-102
Sheet 7 of 14
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Stony Brook Apartments
104 Boston Post Road, Weston, MA

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Project No. 195150441	Scale NOT TO SCALE
Drawing No. G-101	Sheet 6 of 14
Revision 0	