Cape Pickle, LLC

Project Address: 51 Evergreen Circle, Mashpee MA 02649

Company Address: 166 Hollidge Hill Lane Marstons Mills, MA 02648

NITROGEN MITIGATION FEE UPDATE – 23Dec24

Summary:

This document is to Cape Cod Commission Staff and all Commissioners for clarification and consideration to a proposed nitrogen mitigation fee that is less than what Water Resources Technical Bulletin calculates. This is the first and only written communication by the applicant to the full commission body as subcommittee hearings have concluded and the DRI is now before them for File No. 24023 - an indoor recreation facility proposed for development at 51 Evergreen Circle, Mashpee.

The applicant recommends that the nitrogen mitigation fee for staff and full commission review should consider the following:

1. Upon the request of the project applicant, which has been previously provided, the Commission may waive full and literal compliance or consistency with any specific RPP goal or objective, or required method, applicable to a project.
2. Commission staff stated in the 2Dec subcommittee hearing that the fee should be proportional to the project output and factors relevant to such project.
3. Nitrogen remediation period should consider that the facility is intended to connect to town sewer during Phase 5 of the Mashpee Clean Water Plan, when sewer installations will reach Evergreen Circle in 2037-2041. 2037 is eleven years from the projected opening of this facility and the average of this period is 13 years.
4. Mashpee Clean Water Plan will provide sewer to this location well before 20 years' time as mentioned by both applicant and staff at the 2Dec hearing. Therefore, the fee should not be based on a 20-year remediation.
5. Commission staff has agreed with provided data and substantiates that this projects I/A septic effluent actual flow is 50% of Title V Design Flow. That effluent will be at 10 ppm-N per I/A septic capabilities. Less effluent, less nitrogen to mitigate.
6. While Water Resources Technical Bulletin calculates a reduced stormwater management nitrogen mitigation fee for redevelopment of existing lots it does not calculate a reduced fee for lots that are fully disturbed, used as a parking and maintenance lot for large construction equipment and offers no current remediation to current use which is predominately storage and maintenance of large construction equipment on an existing paved and gravel lot.

The applicant proposes a nitrogen mitigation fee of $129,162. This is a calculated fee using the Water Resources Technical Bulletin Fee Calculation with adjustments for actual data and conditions specific to this project. A detailed description of this proposal follows.

Applicant Fee Substantiation:

The Water Resources Technical Bulletin determines nitrogen mitigation fee based on 1) the amount of nitrogen that the site creates **(Load)**, and 2) the cost to remove that nitrogen in a municipal wastewater treatment facility (**Remediation**). Or,

Fee = Load * Remediation

- Load is defined by two sources, Septic system and stormwater runoff
- Remediation is defined as a cost of $8,290 per kg of nitrogen removed for 20 years. As this is a 20-year basis, that same remediation can be expressed as $8290/20 or $414.5 per kg per year. Therefore,

Fee = Load * Remediation = (Septic + Stormwater) * $414.5 per year * Years of remediation

The bulletin defines Septic Load for a commercial facility as Title V Design Flow. However, when sufficient data is provided to detail an actual flow using like facility data, an actual flow input to the calculation is provided and uses the average of Design Flow and Actual Flow as the fee basis.

Stormwater nitrogen is calculated for the two sources for this project: Rooftop and Parking Area nitrogen sources.

To summarize, the calculation of the Nitrogen Mitigation Worksheet Fee is,

Fee = ((**Design Flow** + Actual Flow) / 2 + **Roof + Pavement)** * $414.5 per year * **20 years**

The applicant has three substantiated changes to the calculation specific to DRI application, File No. 24023. These are:

1) The use of 13 years for a lesser period of remediation versus 20 years
2) The elimination of the use of Design Flow in the nitrogen calculation, and
3) A change to stormwater mitigation fee based upon existing conditions and the specific calculated efficiency of the solutions offered by the application.

1) Remediation Period:

The 2018 RPP requirement that remediation must be completed within five years' time to allow a waiver of the nitrogen fee is not aligned with mandates of sweeping reform being driven by the 2023 MA Clean Water Act M.G.L.c,32. There are Mashpee town-wide sewer installations ongoing through the Mashpee Clean Water Plan. This will drive substantial estuary health recovery, and the total plan should be considered in this project's fee proposal.

Mashpee Clean Water Plan Phase 1 and 2 will remove over 42% of the nitrogen load currently flowing to the Popponesset estuary. Phase 3, which is in detailed planning now, is intended to provide similar remediation to the Waquoit estuary. Phases 1 sewer installations are nearing completion and Phases 2 and 3 are expected to be completed within the next few years.

Evergreen Circle is a location that Mass DEP defines in the Estuary Projects Reports as a GT10 site, or a location where it takes greater than 10 years' time for water from this location to reach estuary bodies. Thus, Evergreen Circle is planned for sewer in Phase 5. This enables the town to achieve the greatest recovery in the earlier phases that provide sewer to 1) the most concentrated locations of the town and 2) locations where water flows in less than 10 years' time to estuary bodies.

Phase 5 is planned for completion in 2037-2041, or approximately 11 to 15 years after the opening of this facility. The applicant proposes the use of 13 years (the average of this period) versus 20 years for fee calculation given the specific applicability to this project.

Fee = ((Design Flow + Actual Flow) / 2 + Roof + Pavement) * $414.5 per year * **13 years**

2) Elimination of Design Flow from Calculation:

The applicant understands and agrees that a factual independent basis for septic load is necessary for fee determination and Title V does represent a good source for such. But Design Flow is not a relevant representation of what the continuous, daily, actual output of a facility – whether commercial or residential – represents. It, like all engineering designs, includes substantial safety margins factored into its basis to ensure the safe, long-term operation of the system. As Title V details it,

- Design Flow - The quantity of sanitary sewage, expressed in gallons per day (gpd), for which a system must be designed in accordance with 310 CMR 15.203. Design Flow - The quantity of sanitary sewage, expressed in gallons per day (gpd), for which a system must be designed in accordance with 310 CMR 15.203.

Title V Design Flow is based upon water use data defined in 1978 – a time when standard toilets would consume 5 to 7 gallons of water per flush. Today, the Federal requirement for flow is 1.28 gallons per flush for a toilet and 1.0 gallons per flush for a urinal. (Note – This facility will install 1.0 gallon per flush toilets and zero water urinals but neither of these points factor into the actual calculation being proposed. They simply offer further safety margin to system performance and effluent output).

Design flow assumptions for commercial facilities have not been updated since 1978, but residential data was. In 1995, the flow calculation per bedroom was reduced to 110 gallons per bedroom to reflect system improvements in water consumption as stated above. But Title V

chose to keep the same values defined in 1978 for commercial facilities as added safety margin in the Design Flow calculation.

Title V allows the use of actual water data for system design when there is no data to reflect Design Flow in the details of Title V. When actual flow data is used to determine Design Flow, the basis is 200% of actual water data to describe Design Flow. This ensures that the overall system design can support an instance when a specific daily flow is greater than actual water flow basis as the septic design must be able to accommodate that surge output. But on average, over an extended period, such as 13 years of daily flow which is the proposed basis of this projects fee, the Actual Flow will be representative of the actual, annualized output of that facility as days that have higher instances are countered by days that have lower output flow. This is standard septic design practice. Therefore, Design Flow is not a relevant value to define the nitrogen fee for septic load.

Said differently (per Title V):

- Actual Flow - Any design flow established by the Department pursuant to 310 CMR 15.203(6), shall be based on 200% of average water meter readings in order to assimilate maximum daily flows or on other methods determined to be appropriate by the Department.

The applicant has provided actual water data from 14 like facilities to the commission for defining fee calculations. These locations are detailed in the following table:

#	Name	Description	Correlation to Island Pickle
1	**Willys Gym**	14 courts, 7 tennis, pool (filled with tap water), turf field, rock wall, weightroom, bar/restauant w 34 seatas	A - Very High
2	**Mid-Cape Athletic Club**	34 ppl bar, 4 pickle, 6 tennis, gym, lockroom	A - Very High
3	**Village Sports Club (Champrions Golf)**	Indoor Golf, Indoor Pickleball, Swimming pool, steam room, tennis courts, basketball courts, spin classes, Fitness Center	A - Very High
4	**PicklesNE**	Six Courts, Bar, Snacks, streetching area	A - Very High
5	**Planet Fitness**	Fitness Center with Showers	A - Very High
6	**Southcoast Pickleball**	7 Pickleball courts with Food & plus other facilities within building	B - High
7	**Lanes Bowl and Bistro**	Bowling Alley and Restarant/Bar	B - High
8	**Five Iron Golf**	Indoor Golf and Restaurant/Bar	B - High
9	**PKL**	Indoor Pickleball and Restaurant/Bar	B - High
10	**Planet Fitness**	Fitness Center, Kitchen Design Center, Other Retail	C - Med
11	**Dino's Pizza and Sports Bar**	Restaurant and Sports Bar	C - Med
12	**Cape Cod Coffee**	Restaurant, Bar, Roasting Facility, Distillery	C - Med
13	**Five Bays Bistro**	Restaurant & Bar	C - Med
14	**Olde Barnstable Fair Grounds**	Country Club with Restaurant, bar and Locker Rooms	C - Med

The applicant compared the actual water consumption for each facilities septic Design Flow detailed on their detailed design drawings for those that connect to septic solutions and not

municipal sewer. The median actual water consumption for this study was 35.9% of Design Flow and the average actual water consumption was 39.4%.

The likely actual water consumption for this project should be well below the 35.9 to 39.4% of the Design Flow of like facilities given the use of lowest flow toilets and zero water urinals previously mentioned. That said, 50% of Design Flow was accepted to define Actual Flow by staff and applicant for this facility. But the bases a fee adjustment should be based on this Actual Flow only, not the average of Actual Flow and Design Flow.

The applicant proposes removal of the fee escalator of Design Flow from this specific project given the details and rationale summarized above, to result in the calculation of:

Fee = (**Actual Flow** + Roof + Pavement) * $414.5 per year * 13 years

3) Stormwater Fee Reduction Justification:

3A) Roof Top Nitrogen:

The Water Resources nitrogen mitigation worksheet calculates a reduced fee for a project that is a redevelopment of an existing property. It bases the reduction on existing paved area and rooftop size using the same formulas for reduction as it would for a new development load. But that reduction is not possible to calculate by the worksheet for development of a fully disturbed existing site such as Evergreen Circle.

An undisturbed site will have trees, ground plants, loam and other carbon containing materials that reduce the effects of nitrogen in rainwater and ultimately provide for less nitrogen to flow to an estuary from that pristine site.

But that is not the case for Evergreen Circle as the two photos below attest.





51 Evergreen Circle is a fully cleared site. No trees, no ground vegetation, no "B Layer" soil. Just sand, gravel, and a large portion that is paved too.

The rainwater that falls on the rooftop of this proposed facility will be directly discharged to on site, 100% Low Impact Development (LID) stormwater management solutions consisting of infiltrating bioretention basins and underground bioretention basins. Such LID management solutions will reduce the nitrogen content of the rainwater collected. The Technical Bulletin nitrogen mitigation worksheet does not apply a roof top nitrogen reduction for projects such as this one that connect that rainwater to LID mitigation.

Given 1) there is a net improvement to rooftop rainfall as the current site is fully disturbed with no carbon layer to mitigate the effects of nitrogen, and 2) Such rainfall is collected in 100% LID retention solutions, the applicant proposes the elimination of rooftop nitrogen as a source of load.

Fee = (Actual Flow + ~~**Roof**~~ + Pavement) * $414.5 per year * 13 years, or

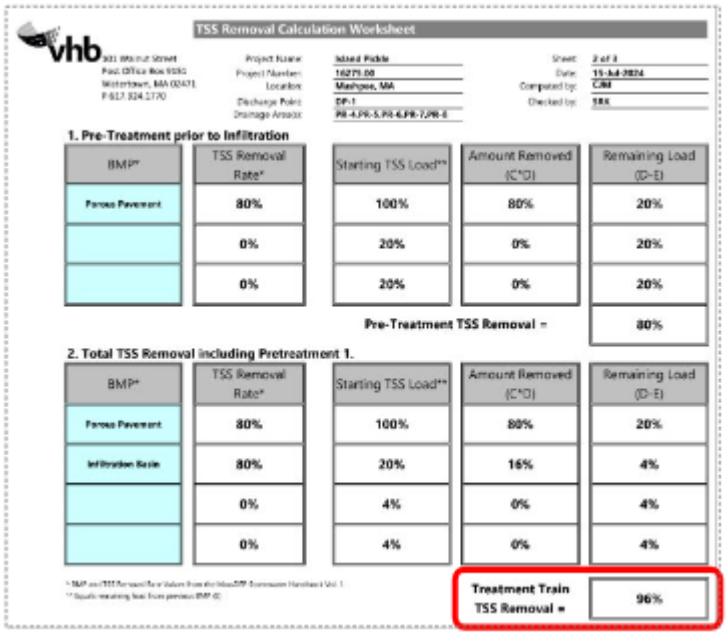
Fee = (Actual Flow + Pavement) * $414.5 per year * 13 years

3B) Pavement Nitrogen:

The Water Resources nitrogen mitigation worksheet applies a nitrogen reduction factor for the use of LID solutions based upon the percentage of the project that uses LID. In this project, 100% of pavement mitigation is through LID stormwater management practices.

Each project must document in its stormwater management report the specific performance of stormwater basins using a factor known as Total Suspended Solids (TSS) removal rate. This defines the efficiency of that specific system. This application has three such basins and they

have a TSS (or performance rate) of 90%, 93% and 96% with an example of one spreadsheet shown below:



TSS Removal Calculation Worksheet

vhb

Project Name: Mixed Pickle
Project Number: 16271.00
Location: Mashpee, MA
Discharge Point: DP-1
Drainage Areas: P8-4,P8-5,P8-6,P8-7,P8-8
Sheet: 2 of 3
Date: 11-Jul-2024
Computed by: CJM
Checked by: SBK

1. Pre-Treatment prior to Infiltration

BMP*	TSS Removal Rate*	Starting TSS Load**	Amount Removed (C*D)	Remaining Load (D-E)
Porous Pavement	80%	100%	80%	20%
	0%	20%	0%	20%
	0%	20%	0%	20%
		Pre-Treatment TSS Removal =		80%

2. Total TSS Removal including Pretreatment 1.

BMP*	TSS Removal Rate*	Starting TSS Load**	Amount Removed (C*D)	Remaining Load (D-E)
Porous Pavement	80%	100%	80%	20%
Infiltration Basin	80%	20%	16%	4%
	0%	4%	0%	4%
	0%	4%	0%	4%
		Treatment Train TSS Removal =		96%

Combined, this facility is designed to operate above MA DEP Stormwater Handbook Vol 1 TSS Efficiency performance for Best Management Practices. It can be correlated that the higher efficiencies of the planned stormwater control solutions will reduce nitrogen at an even greater efficiency than the reduction calculated by the Water Resources nitrogen mitigation worksheet.

However, there are further adjustments warranted to the paved load.

Over 20 large trucks, excavators, grinding equipment and other heavy machinery are permanently stored and maintained on the 51 Evergreen Circle grounds that have already been detailed as having no nitrogen absorbing carbon layer as it is a gravel and paved lot. The maintenance and storage areas are larger in size than the proposed parking for this specific project.

Two additional photos are shown to document this as follows:





Current practice at 51 Evergreen Circle is to perform maintenance on all parked and stored vehicles on site. Such maintenance includes oil changes, greasing of equipment, engine repairs, hydraulic fluid system repairs and so on, resulting in unavoidable spills and leakage.

These on-site maintenance actions and the long-term storage of large construction equipment that are prone to fluid discharges generates a much greater nitrogen load than those of passenger vehicles temporarily parked in the facility parking lot. The result - a nitrogen load that is not protected from seeping into the earth groundwater and ultimately delivering nitrogen to impaired estuaries is the current status.

The roof and pavement stormwater management solutions that will be installed by the applicant at 51 Evergreen circle will significantly reduce the current nitrogen loads being discharged into estuary waters. As such, a complete elimination of the stormwater roof and pavement nitrogen

loads is substantiated for this specific project for the fee is intended to address incremental load from the current conditions.

Fee = (Actual Flow + ~~**Roof + Pavement**~~**)** * $414.5 per year * 13 years, or

Fee = Actual Flow * $414.5 per year * 13 years

Summary of Adjustments Specific To this Project File, No 24023:

The only number yet to be defined is Actual Flow. Unlike the reference to the use of Actual Flow in Title V where it is used when there is insufficient basis to define a System Design Flow from Title V document categories, this project has a Design Flow has been calculated by Title V for the septic solution.

The water study completed was to give confidence that the adoption of an Actual Flow at 50% of Design Flow would be appropriate. The comparative data already detailed and agreed to shows like facilities operate at 35.9 to 39.4% of their Design Flow and that this facility output will be even less given the use of lowest flow toilets and zero water urinals previously mentioned. However, 50% of Design flow was accepted by both staff and the applicant for this facility and it is the agreed to fee calculation basis.

Actual Flow = 50% Design Flow = 1,735 GPD.

The Water Resources nitrogen mitigation worksheet converts Actual Flow as expressed in gallons per day of water to nitrogen load in KG-N per year based upon the efficiency of the septic solution proposed. For this specific project, the BioMicronics BioBarrier I/A solution, which is the most efficient nitrogen removing I/A septic solution for a facility of this size mitigates effluent output to al level of 10ppm-N. Using such and as detailed in the preliminary final report for this project, 1,735 GPD will convert to 23.97 KG-N per year. Applying that figure into the Water Resources nitrogen calculation results in:

Fee = Actual Flow * $414.5 per year * 13 years, or

Fee = 23.97 * $414.5 * 13 = $129,162

A fee of $129,162 is a realistic, appropriate, and applicable nitrogen fee that should be considered versus the calculation imposed by the general assumptions of the Water Resources Technical Bulletin nitrogen mitigation worksheet as worksheet assumptions are not appropriate for this specific project.

The applicant proposes a nitrogen mitigation fee of $129,162 versus the fee detailed in the subcommittee report and asks for the endorsement of both staff and the full commission for support of this project specific determination.