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Office of  
BOARD OF HEALTH  
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## MEMORANDUM

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To: Zoning Board of Appeals  
From: Carlisle Board of Health  
Date: January 18, 2017

In Re: **Lifetime Green Homes 40B Application – Project Remand**

The Board of Health (BOH) reiterates its position that the Zoning Board of Appeals (ZBA) should not grant the local health waivers being requested by Lifetime Green Homes (LGH).

### **Waivers Requested**

#### **Carlisle Supplemental Septic Regulations**

- 15.100 General Provisions – “no rise in ground water elevation and no greater than 5 mg/L of total nitrogen at the perimeter boundary”
- 15.211 – Distances “minimum setback distance between a system 2000 GPD or larger to a well is 150”
- 15.221 – General Construction Requirements - minimum design flow requirement for three bedroom house is 495 GPD without a garbage grinder.
- 15.290-293(5) – Condominiums with design flows of 2000 GPD or greater “shall meet a minimum design flow requirement of 165 GPD per bedroom.

#### **Carlisle Water Supply Regulations**

- Section VI – “minimum of . . . one hundred and fifty (150) feet from systems 2000 GPD or greater”.

Relative to the requested waivers, the Board of Health strongly believes that there is a valid local health concern<sup>1</sup> that takes precedence over the value of additional affordable housing units. This concern is based on the testimony of the town’s consultant vis-a-vis the transport of nitrogen in groundwater from the three proposed soil absorption systems and the potential for impacting project and abutting wells. The Board’s position is also justified by its own local Supplementary Sewage Disposal Regulations which have afforded a remarkable Title 5 Inspection pass rate for septic systems in town and local Water Supply Regulations which have guaranteed safe drinking water for Carlisle residents. At the basis for these protections is the fact that Carlisle has no municipal water supply or wastewater treatment.

The Board of Health also requests that the ZBA include a condition for the applicant to meet the Board of Health’s requirement for a financial guaranty equal to the full replacement value of the

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<sup>1</sup> Local Concern – means the need to protect the health or safety of the occupants of a proposed Project or of the residents of the municipality, to protect the natural environment, to promote better site and building design in relation to the surroundings and municipal and regional planning, or to preserve Open Spaces. <http://www.mass.gov/hed/economic/eohed/dhcd/legal/regs/760-cmr-56.html>

sewage disposal system.<sup>2</sup> This is to guarantee long term operation, maintenance, and replacement of the system. The account must be fully funded prior to occupation of any units and must carry over (fully funded) to the condominium association. This requirement is important because many of the applicant's waiver requests are justified as necessary for the project's financial viability. The importance of having a funded escrow account has been demonstrated on another recently completed 40B project.<sup>3</sup> It is essential that the account be funded at the outset to avoid health issues that the condominium association is not in a position to address.

Key considerations related to nitrogen:

**Nitrate in water is a toxic substance because of its human health effects.** Nitrates in drinking water have been linked to methemoglobinemia (decreased ability of the blood to carry oxygen to tissues, including "blue baby syndrome"), colon cancer, neural tube defects, bladder cancer, breast cancer, and ovarian cancer.

Nitrate-related groundwater pollution is not merely a theoretical problem in Carlisle. At this time the Gleason Library public water supply is non-potable due to nitrate contamination. The Board of Health, the system operator and recently the state have unsuccessfully tried to locate the source of the pollution; it appears that the pollution is not library-related. Note that this has prompted the Board of Health to request funding via a warrant article to further assess the nitrate source; this cost will be borne by taxpayers. **Determining the source of nitrate contamination can be time-consuming and difficult. Implementing measures to mitigate the contaminant may include providing alternate water supplies, which can be very costly and logistically difficult.** The interim control used at the library, disconnecting drinking fountains and using only bottled water, is not practical at LGH.

**In a case of nitrate pollution, LGH residents would look to the town—which approved the local health waivers as viable— for timely identification and resolution of the unsafe drinking water situation.**

Further, a comparison of LGH with the Center suggests that **LGH will have a greater nitrate impact on the environment than housing in Carlisle Center because of its density.** In addition to the specific non-compliance at the Library, biennial well testing in Carlisle Center as a whole shows elevated nitrate levels in the drinking water. The greater housing density at LGH is therefore concerning.

Location	# Structures	Area, acres	Average density, structures/acre
Carlisle Center <sup>4</sup>	94	176.32	0.5
LGH development	20	9.84	2.0

**Virtually all industry and health & safety hazard control models prioritize source control of hazards over downstream actions** (e.g. hierarchy of hazard controls<sup>5</sup>, Health Impact Pyramid<sup>6</sup>,

<sup>2</sup> Reference: Supplementary Regulations for Sewage Disposal Systems, Town of Carlisle

<sup>3</sup> Reference ZBA Decision dated 7/16/2010 issued to Neighborhood of Affordable Homes; Sec. 1.1712

<sup>4</sup> Residence A

Prevention Through Design<sup>7</sup>, Precautionary Principle<sup>8</sup>). The basis of the precautionary principle for policy setting is that “preventing or bypassing exposures and possible adverse effects is preferable to mitigating them or analyzing whether they are worth the benefits”. **Carlisle’s Supplementary Sewage Regulations provide upstream protection consistent with these models. Prevention pays. The town would be short sighted to waive these protective measures.**

Most of the multi-unit housing developments in Carlisle have been unsuccessful at one time or another in adhering to the terms of their operation, including Benfield Farms, Rocky Point, Carlisle Village Court and Malcolm Meadows. Even with the most well-intentioned residents, boards, and management companies their ability to comply is an ongoing challenge. In some cases this reflects **agreements made by a builder or developer that are not communicated properly or are not easily attained over subsequent years (long after the builder/developer is out of the picture). This is costly and frustrating for residents and the Board of Health alike and warrants implementing protective measures at the outset.**

### **Reasons to Deny the Requested Waivers**

In addition to the testimony from the town’s consultant identifying the potential for nitrates from the three soil absorption systems to impact project and private wells nearby, which is conclusive on its own, the Board of Health would like to add the following facts.

Since 1983 Carlisle has imposed local design standards on all new and upgraded systems. Most systems in town now fall within this category. One can conclude that it is the local design standards that have played an important part in protecting the public health and environment and therefore should not be waived. For example, beginning in 1995 the state under 310 CMR 15.300 required all septic systems to be inspected upon transfer of ownership. Carlisle has a very high pass rate for Title 5 Inspections (see below). We believe that waiving key elements of the local regulations would be detrimental to public health.

<b>Title 5 Inspections</b>	<b>Year</b>	<b>% Pass</b>
	2015	89
	2014	89
	2013	89
	2012	92
	2011	92

The Board of Health also reiterates that according to an opinion dated 7/25/06 from Mass. DEP the overall project flows consisting of a series of three on-site systems exceed 2000 GPD and is subject to 15.290-293 of the local supplementary sewage disposal regulations. These regulations were

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<sup>5</sup> Centers for Disease Prevention and Control, National Institute for Occupational Safety and Health. Hierarchy of Controls. <https://www.cdc.gov/niosh/topics/hierarchy/> (accessed January 14, 2017)

<sup>6</sup> Frieden, T. R. (2010). A Framework for Public Health Action: The Health Impact Pyramid. *American Journal of Public Health, 100*(4), 590–595. <http://doi.org/10.2105/AJPH.2009.185652>

<sup>7</sup> Centers for Disease Prevention and Control, National Institute for Occupational Safety and Health. Prevention Through Design. <https://www.cdc.gov/niosh/topics/ptd/>

<sup>8</sup> Martuzzi, M. (2007). The precautionary principle: in action for public health. *Occupational and Environmental Medicine, 64*(9), 569–570. <http://doi.org/10.1136/oem.2006.030601>

implemented to specifically address loadings associated with larger soil absorption systems like the one proposed for this project.

Along with on-site nitrogen concerns, the following table shows additional topics that should be addressed at this stage by the Zoning Board.

<b><u>Additional Considerations</u></b>	
Water Supply Reserve Account	A Public Water Supply requires a Business Plan to deal with any issues that might arise. The Board strongly recommends that the Business Plan include the immediate establishment of a Reserve Account to provide access to repair funds. The Board does not believe it is sufficient to allow the homeowner's association to manage repairs and/or replacement through " <i>special assessments</i> ", especially since some of the units will have reduced contributions.
Abutting Wells	LGH has offered to connect to the project's Public Water Supply System any nearby private well that might become polluted. The Board of Health believes the Zoning Board of Appeals does not have the authority to make this condition which supplants the rights of private property owners. Regardless of the impracticality of enacting this solution, the ZBA has no control over adjacent private property or legal mechanism to enforce this solution.
PWS Permitting Process	The Board of Health requests to be copied and participate in the PWS permitting process. Although only advisory, this will provide additional oversight and input, for example in identifying nearby private wells to be tested during the PWS Pump Test.
Well field	ZBA should give consideration to the placement of multiple wells in the same area and request the applicant to obtain a determination from the state on whether it creates a well field and whether the proposed Zone I is sufficient in size.
Nitrogen Loading Calculations	The existing septic system was built in 1974. It only has a single 1500 gal. tank (dual compartment or 2-tanks in series currently required) and no garbage grinder allowance. The system is designed for four bedrooms (800 sf leaching area). The system passed two Title 5 Inspections (2003, 2005). The existing house has eleven rooms (Assessor's Field Card) and will require a five-bedroom system upon upgrade. This will result in additional nitrogen loading for the project at some point in time.
Fire Cistern	LGH should clarify the water source for the 45,000 fire cistern. If it is a private well it needs to be shown on the plan.
Sprinklers	Research has shown that fire sprinklers save lives and reduce property loss. Whereas the availability of a fire cistern is important, construction materials and home density also factor into the ability to suppress a fire <sup>9</sup> .

In summary, the State Environmental Code 310 CMR 15.00 (Title 5) provides minimum standard requirements for the siting of septic systems for all 351 communities in the state. In accordance with Mass. Gen Laws, Chap. 111, Sec. 31 "Boards of Health may make reasonable health regulations" for the protection of public health, safety and the environment. Local regulations provide additional safeguards for communities such as Carlisle where sewage systems and wells coexist in less than ideal ground conditions. Pollution does not respect geographic boundaries so our regulations play a critical role. The Board of Health asks the ZBA to protect the Carlisle residents by thoughtful requirements for LGH.

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<sup>9</sup> [www.firesprinklerinitiative.org](http://www.firesprinklerinitiative.org)