

Chris Koerner - Testimony before the Planning Commission regarding ZMOD - Jan 28, 2021

Good Evening, and thank you all for your incredible patience.

My name is Chris Koerner. I have lived on Fox Mill Road in Oakton for 23 years. I have degrees in Chemistry and Civil Engineering/Hydrology and have held registered Professional Engineer licenses in 11 States, including Virginia. I am a Diplomat in the American Academy of Environmental Engineers, was past Chair of the Chesapeake Bay Preservation Ordinance ERC, am currently an elected member of the Board of Directors of the Northern Virginia Soil and Water Conservation District, and Vice President of the Fox Heritage HOA. I am speaking as a concerned citizen, not as a representative of any of the above.

I am in agreement with most of the comments tonight, and am specifically expanding on the comments made by Jim Hart and others regarding septic systems.

I spent a good portion of my career as a technical expert dealing with some of the worst groundwater contamination challenges in the US and around the world. I am very concerned about the ZMod changes in this "Time of Covid" resulting in significant numbers of "By-Right" ALUs and in-home businesses being added to homes on septic systems. Many of the older septic systems in the County are in stressed condition and have marginal excess capacity. Thousands are not even pumped on a regular basis. Many were installed when the building code was not as stringent as it is now and would not meet current code. They are not sized to handle the additional waste load from an ALU or home business.

Household bleach, ammonia, and excessive use of anti-bacterial soap are not recommended in household septic systems beyond occasional and low dose amounts. It's not recommended to wash back-to-back bleached loads, and front-end washers are a problem, as there is not enough water to dilute the bleach. At my home, we bleach in a separate container and toss the residual on the driveway to keep our bacteria happy.

The anaerobic bacteria in a septic tank create a living system that does a remarkably effective job of degrading the waste material from a normal household, as long as they are not mistreated. I moved and replaced my tank and lines 15 years ago, and closely observed the old one before dismantling it. I was quite impressed with how well it all worked - the clarity of the discharge, and the lack of accumulated solids.

The frequent discharge of waste materials associated with beauty and nail salons, barber shops, repair shops, art studios, etc. will certainly be detrimental to the health of the bacteria in the tank. Many of the waste chemicals from these businesses would be toxic to those sensitive bacteria; they don't tolerate oxygen or oxidizers, and anti-bacterial solutions kill them. The "bleach" used for hair lightening is a fairly strong oxidizer and the salon folks wear rubber gloves when using it. The bacteria have no such PPE.

If the daily concentration shock of disposed bleach/oxidizer/dye/anti-bacterial soap/cleaners and whatever else is too great or the disposal rate is too frequent, it can quickly poison and kill the entire colony of bacteria that break down the solid waste. Undigested anaerobic waste would then flow out into the leach field, and possibly prevent the aerobic bacteria in the field from doing their job - resulting in a clogged system. The result would essentially be the disposal of raw, potentially disease-carrying sewage and toxic chemicals directly to the soil, aquifer, and surface water.

As you know, a septic system is designed based on the number of bedrooms in the house with an assumed number of persons and gallons per day of discharge. If this volume is exceeded, the system becomes flooded with waste that it is not designed to handle. The addition of ALU inhabitants, and/or a business employee and multiple customers/couples (theoretically up to six, but who's counting) using the bathroom in a home business may significantly add to the total waste load – possibly equivalent to an extra bedroom or two, or three – inundating a system of marginal capacity, even if no chemicals are disposed.

In addition to the health of the system bacteria, the transport of the disposed chemicals migrating untreated through the septic tank and leach field to the aquifer are of significant concern. Many County residents on septic also get their water from private wells. Therefore, the disposal of wastes from a home business may in fact threaten the quality of their own and their neighbors' drinking water. In my 40 years' experience of developing groundwater treatment strategies and building multi-million dollar treatment systems, I have been involved with numerous CEC's – Contaminants of Emerging Concern. Very often, these CEC's became CBCs – Contaminants of Big Concern – usually because they were not taken very seriously or dismissed in the beginning when something could have been done. My recommendation is to take this issue very seriously.

In short- allowing ALUs to overload marginal septic systems, and home business that dispose toxic chemicals to septic is a very bad idea. Please do not allow by-right ADUs or home businesses. A thorough site-specific review, including a Public hearing must be mandatory.

Thank you