

**TOWN OF TRURO
ZONING BOARD OF APPEALS**

Meeting Minutes
March 12, 2020 – 5:30 pm
Truro Town Hall

Present (Quorum): Arthur Hultin (Chair); Fred Todd (Vice Chair); Chris Lucy (Clerk); John Dundas; John Thornley; Darrell Shedd (Alternate); Heidi Townsend (Alternate)

Other Participants: Jeffrey Ribeiro, AICP – Truro Town Planner; Barbara Huggins Carboni, Esq. – Town Counsel, KP Law; Mark Nelson, P.G. – Principal, Sr. Hydrogeologist, Horsley Witten Group; Ted Malone – Community Housing Resource; John O'Reilly – Project Engineer

Members of the Public Addressing the Board: Dave Straznitskas, Peter Herridge, Tom Gold, Lauren Anderson

Meeting convened at 5:30 pm by Chair Hultin.

Chair Hultin advised that the meeting was being videotaped and audio recorded and will be available on Truro TV.

Public Hearing – Continued

2019-008 ZBA – Community Housing Resource, Inc. seeks approval for a Comprehensive Permit pursuant to G.L. c. 40B, §§20-23 to create 40 residential rental units, of which not less than 25% or 10 units shall be restricted as affordable for low or moderate income persons or families, to be constructed on property located at 22 Highland Road, as shown on Assessor's Map 36 and Parcel 238-0 containing 3.91 acres of land area.

Chair Hultin stated that they were going to start off with comments from the Town Planner, then proceed to a presentation of updates by the applicant, and then move on to a presentation of the peer review by Mark Nelson.

Town Planner, Jeffrey Ribeiro, gave a brief overview of events since the last Hearings in December to date and stated that they had been working with the applicant, refining the site drive configuration, and there were some slight changes to the site plan that the applicant will go over. The bulk of this Hearing is to ensure the Board and the public understand the peer review report. Copies are available here and are also available on the website under the Cloverleaf page. Given that this report is only one week old, we don't have new plans or responses to the comments, which will all be dealt with at the next public hearing. Our next public hearing will be at the Community Center, which was not previously available.

Chair Hultin stated that the review is quite complex and that each Board Member has reviewed it, probably more than once, since receiving the report and they will have questions.

Updates were provided by the applicant, Ted Malone. Mr. Malone stated that a follow-up meeting was held with the Fire Chief, and a conferencing with the State Fire Marshall, to discuss the evolving access road to meet the radius turns coming in for safe emergency vehicle entrance to the site as well as through the site. From that meeting it was determined that further work was needed, so John O'Reilly and I worked on plans based on issues brought to our attention. The road was straightened out a bit coming into the site, and the island was removed. In doing this parking and entrance to the easternmost section of building #7 needed redesign. Grading was still at 10 percent, which was originally proposed, but it did change the positioning coming up the hill which achieved what the Fire Chief and State Fire Marshall wanted; however, redesign of the buildings at the front of the site was now needed.

Mr. Malone gave a general overview of how things changed. The left-hand side buildings (#2, 4, 6, 8) are now 2-family buildings with a single-unit walk-up and a 2-bedroom duplex below. One of those buildings is replicated on the right-hand side of the street (#1, 3) which also has a walk-up and then buildings #5 and #7 have basically the same concept in those units but are separated into 2-unit buildings. Fire sprinkler system no longer needed; the only building that currently does is the rear building #21. Adjustments were made there, but another key thing is that a unit was lost (one of the replicated buildings) and all the building numbering had to change. We are now down to 39 units.

Mr. Malone continued and stated that in anticipation of the Horsley Witten report, and the filing deadline of costs analysis to the State for funding by February 20, John O'Reilly was able to redesign a septic system that is fully located at the rear of the site. We are now in a better position to accommodate and respond to what will be presented by Horsley Witten tonight.

Mr. Malone stated that there were a few outstanding border issues around the edges of the site which were in response to preserving more of the natural vegetation around the perimeter of the site (between buildings #10, 12, 14, 16, 18, 20). More of this area has been saved. The two undisturbed areas out front, on either side of the reworked roadway, actually grew.

Chair Hultin stated that after Mr. Nelson gives his presentation, the process will be for the Board Members to ask questions, there will be some time after that for public comment and questions; we are not looking for testimony, we are looking to clarify the report as presented. Chair Hultin introduced Mark Nelson of Horsley Witten.

Mr. Nelson introduced himself as a Principal of the Horsley Witten Group based in Sandwich. He stated that they submitted their peer review which was distributed on Monday. There are three major areas that were looked at. One was the overall water quality issues associated with this project, and looking at if this project is built, what are the water resources that are downstream or down gradient from this area and what are the potential concerns that need to be looked at in that regard. We looked at more detail in the engineering design of the site recognizing that it is a work-in progress and that some of what we have looked at has yet to be designed in full, so we are not giving it a full detail at this point. This has been discussed with John O'Reilly.

Mr. Nelson stated that they have looked at some of the design considerations regarding the septic system and with the stormwater management facilities for the site. Some comments came up as

we looked at some of the other things, especially the hydrogeology of this area where groundwater flows and what that means for the septic system and the stormwater facilities at the site. Referencing the map that is on the screen now, it shows the water table contours that we created when we installed three wells – one of them on the property, and two of them to the west on the other side of Route 6 – and we installed some staff gauges in the marsh and in the pond to be able to measure the water level in the pond as well, and be able to say which way groundwater is flowing across this area. On the map, the purple lines are the water table elevations/contours on the property just below five feet above mean sea level which is just about right when looking at what the US Geological Survey has mapped for this area of the Cape. This extends lower down, by the pond, to about 3.6 feet surface water in the pond. Groundwater is flowing from the area of the proposed development to the west and somewhat to the southwest. The blue line on the map is an approximation of where that flow would go leaving the site, crossing Route 6, and heading down toward the pond. In that area, there are a number of homes and businesses that have private wells. There is public water that extends up along Shore Road, and extends portions of Highland Avenue, but there are properties in that area that are also on private wells. This was our main issue to look at as we reviewed the proposed development for the parcel.

Septic System – There are two regulations that we were looking at with regards to that: the first is Title 5, the State Environmental Code, which governs the design of septic systems in Massachusetts, and the second is your local Board of Health regulation that limits the amount of development that can take place, or the flow of wastewater that can take place, to 440 gallons of wastewater flow per acre per 40,000 sq. ft. of land. Title 5 also has that limitation in areas that are within a protection area for a public drinking water supply. That's not the case on this property, but it also has the requirement that under Title 5 "No system serving new construction in areas where the use of both on-site systems and drinking water supply wells is proposed to serve the facility shall be designed to receive or shall receive more than 440 gallons of design flow per day per acre". This is difficult to interpret. Does it imply that if you are in a neighborhood where you have private wells and septic systems that the flow is limited to 440 gallons per day per acre, or is it if you have a property that has a private well and a septic system then that application applies? In this case public water will be brought up to the property so they will be served by private water, but the neighborhood has properties that are served by their own septic system and/or a private well. The conservative way of looking at this regulation would suggest that the 440 gallons per day per acre may apply to the proposal that is in front of us here.

Title 5 and the Board of Health regulations are designed to protect public and private drinking water supplies by limiting how much wastewater is going into the ground in any one place. Assuming that you have a septic system that has little to no treatment associated with it – because a septic system will have an effluent, without treatment, of about 35 mg. per liter plus or minus of nitrogen. The drinking water standard for nitrogen is 10 mg. per liter. The State issues a planning standard that many communities work with that says what we should aim for is overall about 5 mg. per liter. Looking at the nitrogen coming from the property, a major source will be the septic system. The rain that falls on the ground, that soaks into the ground and feeds the groundwater, is diluting that a little bit and that's one of the ways that we've looked at this. We did our calculations recognizing that the applicant has proposed an advanced treatment system that hits a treatment level of about 19 or 20 mg. per liter as that effluent is going into the ground.

Mr. Nelson further stated that recognizing the Board of Health regulations and being protective of the private wells, we went to the next step in the State regulations that says if you want to get a higher level of flow on a property that may be limited by this regulation, you have to look at the concentration of the nitrogen in the effluent when that effluent crosses the property boundary. So, you have a path that is mapped by that water table map that states it is flowing to the south-southwest, it can go a short distance until it hits the property boundary, and based on the rain that falls in that zone, we calculated what the concentration would be at the property boundary and we also recognized that there's nothing between that property boundary and the other side of the state property on which Route 6 lies. So we did the calculation from the other side of that property boundary as well, and fair to say no one is drilling a private well in the middle of Route 6, so we are looking at both of those and did the calculations to see what the concentration would be when it was at the property boundary and at the edge of Route 6. What the State guidelines ask for is that you have enough land there to dilute it down to 10 mg. per liter at the property boundary that you are looking at. Really, the only way that you could do that if you adopted that approach is to increase the level of treatment that the wastewater facility would provide before it even goes into the ground. We are not looking at distances that are all that far as it is a long and narrow property, and the groundwater is flowing across the thin side of the property not the long side of the property. The wastewater treatment plant is centered in the middle based on the design so there's not a lot of room there.

Mr. Nelson stated that our recommendation would be to have a wastewater treatment facility that could be permitted through the Board of Health and through Title 5 as an advanced on-site septic system that has a higher level of treatment and that could meet a 10 mg. per liter level in the effluent discharge before it gets into the ground and before it starts to move. If it does that, it won't be above 10 mg. per liter as it leaves the property, or it crosses Route 6 and heads towards the pond and in that direction. It is just buying an additional level of safety protecting the private wells that would be across Route 6 in that area. There are facilities, a few different types, that do this. It has been done on the Cape with other residential developments recognizing the presence of private wells and septic systems in the neighborhood. There is an affordable housing project in Eastham that was done with private wells and a septic system. They installed a wastewater treatment facility under Title 5, recognizing the neighborhood had private wells too, and it's averaging between 5 and 10 mg. per liter. It is a possibility and something to consider as you are looking at the design of the property and the needs for affordable housing that if we are going to do this, and we have a Board of Health regulation that would need to be waived to meet the level of development that is proposed here, that this level of treatment gives you some certainty that the waiver is going to be protective of the properties that are down gradient. I think that's probably the biggest component of the review that we did. We wanted to know where groundwater was flowing – we have a good indication of that; we know there are some private wells in those areas; and treating the wastewater effluent to a level that is protective before it leaves the property is probably the best way of protecting those downgradient properties and the drinking water wells that they have.

Chair Hultin asked, before going further, if the Board had any comment or questions thus far. Member Dundas stated that the Eastham Housing Development was mentioned, between 5 and 10 mg. per liter, and asked approximately how many years that data has been collected. Mr. Nelson stated that he cannot quote the exact year but he believes the development was completed somewhere between 12 and 15 years ago, and the facility has been in operation at design flow full

use since then, and it's been consistently meeting those numbers. It could be a little bit above that in the winter as cold temperatures slow some of the biological processes that are part of the design. This is one design, one type of system, but there are others that are available that may have better fits for the property or better cost points for the property, but that would all have to be looked at – what is the design that the applicant might recommend, what is the track record on that design, and what would the monitoring be moving forward. Under Title 5 situation like this it is very likely its going to be tested on a quarterly basis. That is what was happening for at least 4-5 years with the property in Eastham.

Member Lucy had a question on the wells. The well on the property shows an elevation of 471 and the flow generally tends to go west to southwest, there are also properties to the east and northeast, does the water ever have the tendency of travelling in that direction. Mr. Nelson stated that it shouldn't travel in the opposite direction. The odds of groundwater flow direction to flip 180 degrees is extremely, extremely low. The main reason is a drop in the water table of about a foot as you head down towards the pond; the peak level the USGS states is about 5 ft. above sea level somewhere to the east of Route 6. If we are seeing it flow in this direction, I don't perceive that you would have something that could reverse that, and this is a long-term flow that's been established on the Cape. Member Lucy then inquired about the properties under the blue line currently are now, and have been flowing, to the west into the pond into Pond Road and that area. Mr. Nelson responded yes.

Member Thornley asked Mr. Nelson if his company made the contour lines or did they come from the USGS survey. Mr. Nelson stated that they created these. Looking at the USGS water table map for the outer Cape, they basically have one line that shows where the 5 ft. contour is in the center of the peninsula out here in Truro, Wellfleet, and P-Town. It is not enough data to know exactly where it is flowing to the east and to the west, so we installed those three wells and added those two additional surface water measurements that allowed us to refine that information so we could be sure. If there was some possibility before those measurements that maybe the water was flowing the other way towards the east, but now I think we have solid information that says it is coming to the west southwest.

Member Todd asked Mr. Nelson, in terms of the National Park land which is to the east of the site, is there some dilution effect from that groundwater flowing through, there is no construction on that. Mr. Nelson responded yes and explained that some of that water from the east is flowing onto this property and then flowing under Route 6. That water is flowing underneath the water that is sinking into the ground on that property, e.g., the water table is flowing at an angle to the southwest, if you have rain coming down in one spot, it's flowing that way, the rain that is further uphill or upstream is going to be flowing down below that because every new bit of water is pushing the other water down, so that the rainfall on this property stays near the surface and is pushing the farther upstream water below it. The effluent from the septic system is doing the same thing. Collectively, for example if you had a large well that is mixing water from everything, then yes all of that water is mixed. If you have a small well that is picking from a small area on an individual property, it's only getting the water that's coming right at it. That's where you have the question with the plume from a septic system like this, because if you are in the line of that, you want to be sure that the water coming at you is 10 mg. per liter or below. Mr. Nelson stated that also, with this site, is the depth to water is going to be between 30 and 40 ft. below the ground

surface, because you are going up a good hill to get there, and there is only one well on the property, so you get a lot of filtration of other possible pollutants from the effluent that is leaving the septic system. Looking for a higher level of treatment that will do a lot for nitrogen and capture some of the other pollutants that might be part of our wastewater flow, but the ground below there is also a significant filter before it even reaches the water table. If bacteria is not treated in the system, it will be filtered out in that area. In our State regulations you want 4 or 5 ft. of ground to filter that; here we have 3-5 times that before you hit the water table.

Member Shedd asked a clarification question of Mr. Nelson. When speaking of gallons per day and measurements, is that gallons per day per acre? Mr. Nelson stated that the calculations they did, using gallons of water coming from the septic system, and that's the design flow based on the number of bedrooms, gallons per day for the wastewater, then looked at an area that is basically a rectangle from the septic system to the property boundary, with 18 in. of rainfall per year soaking into the ground, and will dilute that wastewater plume, so we calculate that in gallons to come up with the concentration of nitrogen down below. The 440 gallons per day per acre requirement, with the number of acres here, would give you a much lower design flow. The request is to waive that requirement because you wouldn't get the 7,800 gallons per day or the number of bedrooms that create that if that regulation stayed in effect. So, if you can treat to a level that is protective of that higher flow, then you have a better position to make a judgment on waiving that regulation.

Chair Hultin asked if you do a test well, what is the marker and can you monitor the water flow strictly by the differential of gradient or is there actually something that goes in the water that you can actually find somewhere else. Mr. Nelson stated that people have tried that, but basically what we have done to note the direction of ground water flow, is we have measured the water level in each of those wells and then we surveyed the top of the well, so if the top of the well is at 50 ft. and we have had to drop down 46 ft. to get to the water, the water elevation is going to be 4 ft. It is a physical measurement and then interpolating the differences between each individual well. The safest way is to be able to measure the depth to water, relate those to an elevation, and create those contours.

Member Dundas asked if the system location on the property will significantly change the path that is outlined? So, if the system location is in the northwest corner in the back, is that going to change this path you described? Mr. Nelson stated not dramatically, no.

Mr. Nelson further discussed their giving specific comments on the septic system and stormwater designs. He believes many of these are things that will probably be looked at in more detail as the design moves forward. From the septic system design standpoint, these were a little more significant. They are seeking further information on the proposed reserve areas. When designing a septic system, you have a leach field where the effluent is going into the ground. When you do that, State regulations require a back-up area that would also work should this leach area fail. Mr. O'Reilly has shown those areas on the plan, and we just asked for additional data to show that they can meet Title 5 if they were ever needed. The Board of Health would also be looking at this as well. On the stormwater system design, we had comments #1 and #2 on page 5 of our document. Comment #1 is the stormwater will be collected into catch basins that would go into some pits where it will sink into the ground and leach directly into the ground. They were asking if some treatment could be provided for that stormwater before it was put directly into the ground. If there

was a way to have surface vegetated stormwater facilities that would support some treatment before it's infiltrated into the ground, that would add a level of treatment that could be important. There also could be a filter that could be applied in the underground leaching basins that would provide a little bit more treatment before it went into the ground. Comment #2 may get worked out as the design process evolves, but making sure that the areas that are used to calculate the amount of drainage that these facilities are collecting take into account some of the vegetated areas that when the rain falls it might flow downhill onto a parking area or a driveway and flow into the drains and make sure that those catchments are representing the final design of the site where there may be some slopes where water is flowing up onto the pavement and going into the stormwater and that the volume of stormwater be confirmed as being caught in the calculation so everything is sized appropriately. They designed this for a 50-year storm that is already looking at a higher level of flow and designing to capture that and is appropriate for this, recognizing that over time rainfalls may be higher on a more regular basis.

Mr. Nelson stated those were the primary considerations. On page 6 we have more site design comments that can be worked through making sure that the erosion and sedimentation control are in place especially given the slopes on this property that that's managed and should come as the design continues. Just a few other things are highlighted for review and consideration.

Chair Hultin asked if the Board had any comments or questions. Member Dundas asked Mr. Nelson to review the map from the top down. Referencing the calculation sheets and map being viewed on the screen, Mr. Nelson explained that there are four calculations, each of them done with the same math but slightly different inputs. The variation in the input for each of these is going to be the concentration of the effluent that's leaving the septic system. If it is from the leach field to the property line, which is the left column, what is the concentration of nitrogen at the property line. The right column is what is the concentration of nitrogen if you cross Route 6 to get to the state property line on the other side of Route 6. We are saying that there is an area of impact, which is at the top of each one of those squares or calculations, that has a width and a length, and the length would be from the back side of the leach field down to the property line. We calculate that area, in this case 6.45 acres, and we say we are going to have 18 in. of rainfall that falls on that area and 16 in. of recharge that comes from rainfall that falls on that area. We are going to mix that with the design flow of the septic system that's also coming in. We calculate the liters that go with that; need to convert from gallons per day and square feet to milligrams per liter. We converted this over to how many liters per day of water were mixing with that 20 mg. per liter coming from the wastewater system. Basically, we are saying that we have 7,800 gallons per day of effluent coming in – it's at 20 mg. per liter. We can convert that to how many liters of wastewater that is per day – about 29,000 liters per day, and at 20 mg. per liter we are going to be able to dilute that with about 1/10th of that volume coming from rainfall if you make the assumption that a yearly flow is broken out and how much is it averaging day by day. We are saying that the 20 mg. per liter effluent leaving the septic system is diluted such that at the property line, if you put a well there and measured it, the number would be 18.3 mg. per liter. That is the first calculation.

Mr. Nelson went on to state if you look at the leach field to downgradient homes to the end of the state boundary, you are deleting that same volume of water with roughly four times as much recharge as there is more land area where the rain is falling and you are deleting that from 20 mg.

per liter down to 14 mg. per liter. We also showed the standard septic system and what those numbers would look like too starting at 35 mg. per liter and being diluted. The working number, based on the plans that are in front of you, are that FAST System at 10 to 20 mg. per liter being diluted to 18 at the property line and 14 across Route 6. Those are the numbers, that are still above 10, that are suggesting the value of increasing the level of treatment before it gets into the ground.

Member Lucy had a further question on the numbers for the FAST System and the numbers being used and was wondering where the conversion comes from. Member Lucy refers to the lower left box, Leach A to property line, and the conversion shows 3,500 gallons per day – where does that come from. The upper boxes are using higher gallons per day. Mr. Nelson stated that he believes that number may have been a typo, but he will double check and review the spreadsheet for accuracy.

Mr. O'Reilly stated that if they refer back to the Cape Cod Commission comment letter, they were referencing nitrogen values in that range at the bottom of the sheet so he believes that it may be a typo on the spreadsheet's numbers. Member Lucy asked Mr. O'Reilly if he is assuming the lower equation is correct, and Mr. O'Reilly stated that he is assuming that the 32 and 24.9 are accurate loads untreated, conventional Title 5 septic system. Those numbers are very similar to the numbers that we run as well as what the Cape Cod Commission has officially submitted. Member Lucy stated that he believed the number the Commission was showing was 19, but location clarification is needed.

Member Thornley asked Mr. Nelson if he were living at the head of that blue arrow, would he feel comfortable with this. The arrowhead is downstream of all this – how would you feel living there. Mr. Nelson stated that if you are looking at treating this to a level where the nitrogen is meeting drinking water standards before it leaves the site, he believes that will be a protective way of looking at these properties that are downgradient. Private wells are collecting from a variety of places in the neighborhood and other people's septic systems, stormwater runoff from the roads – we all deal with that with private wells. Taking a development like this and treating it so you are protecting it before it leaves the leach field and putting it in the ground, it will be below even further when it hits that arrowhead.

Member Todd stated he would be interested in the general description of the kind of treatment proposed, the FAST System, and some of the alternatives that are discussed in the report. Mr. O'Reilly stated that, when we were last here, we proposed to combine the two systems to have the opportunity to have one treatment unit/component. We were looking at the site being compliant with Title 5 and looking to address the local requirement which tends to be 19 parts per million for I/A technology. In fact, small residential flows of 19 is an approved value. We proposed a FAST unit that was designed to meet the 19 parts per million so as to coincide with the local Board of Health requirement. Mr. O'Reilly stated where Mr. Nelson and I disagree is on Title 5. Mr. O'Reilly further stated Mr. Nelson is looking to step up the treatment to a higher level to that 10 parts per million. Mr. O'Reilly stated that we need Title 5 requirements and were trying to address the local level marks report, and Horsley Witten's report is taking it one step further. There is technology, it is just a matter of picking the right one for type of waste, type of flow. Meeting 10 is attainable, but everything has a cost. It is my next step to try to cost things out for Ted to see what type of cost it would be to meet that 10.

Member Todd asked what the difference is in the technology of the systems that allow it to reach that. Mr. O'Reilly stated that it is a process unit – the FAST is more introduction of air and recirculation to knock the nitrogen down where you try to get to a level of 10. You are dealing with a different technology where you almost have a polishing agent that polishes that waste down to a finer number.

Chair Hultin asked if this is strictly a chemical reaction that happens through the process. Mr. O'Reilly responded stating the process is a chemical reaction, nitrifying/denitrifying process, and that is how you get your reduction in nitrogen in the wastewater. Some units do have, if your reduction is not as strong as it should be or not as good as it should be, treatment by the plant operator who has tools at his/her disposal to fine-tune that system whether it is to introduce more carbon, always watching the pH alkalinity. Those type of things go into the operation of the plant.

Chair Hultin asked if the nitrate is a molecule that gets broken down or is it a complex molecule. Mr. Nelson responded stating that typically to get to 10 you are going to have a two-step process. We have nitrogen in our waste, a lot of that is ammonia, and when you run it through the first system, like the FAST System, you aerate that and the bacteria in the system, if there's oxygen present, will take that ammonia and organic nitrogen and break it down to nitrate. The second step is to put that nitrate someplace where there is no oxygen, and the anaerobic bacteria then look at that nitrate as a huge food source and they break that down and we get carbon dioxide and we get nitrogen gas and it comes back up into the atmosphere – 70% of what we breathe is nitrogen gas, so it is just putting it back up into the atmosphere. A system like a FAST will get you part of the way there through that aeration process, and if you recirculate the effluent to a septic tank you get a little bit more. If you run it through some sort of filter or secondary process that goes anaerobic then you get all the rest of the polishing of the effluent and that's basically the two ways that it works.

Member Shedd asked about the depth of the leach field being at one ft. He asked if it was okay to park on those leach fields – everything going down, no evaporation. Mr. O'Reilly stated that the leach field they specified is a foot thick, comprised of piping stone, and rated for H20 wheel load as long as you have the proper cover. There are portions of the field that are outside of the travel lanes, and they will be designed to meet that wheel load. Member Shedd asked if someone could drive over it as well as park over it. Mr. O'Reilly replied yes.

Chair Hultin and Member Shedd asked for clarification on the leach field process – evaporation not just absorption. Mr. Nelson stated that some may happen, but it is often a sign that something is not going well with the leach field. Most of it is going to soak into the ground. When we did the well installation, only fairly permeable sand was all the way down and matched what John had seen with the boring that he did, so it's going to flow into the ground fairly quickly. There will be some vapor that gets managed with the wastewater treatment facility. Sometimes you will see a vent on a leach field and that's part of the design for a larger field but it's not a release for the water that's coming into the field.

Member Lucy asked when all this has been treated and we get down to 10 parts or less, at the property line, and we have the comparative for drinking water levels that anything over 10 is not

good – at the property line can you give us a better description of what is going on if the property line is 10 and someone's well is right next to the property line, what happens then – what is the comparative there. Mr. Nelson stated that we need to start with the leach field. If we are asking the treatment facility to discharge the effluent at 10 into the stone in that 1 ft. of leach field, it's going to go through those dilution calculations, that I need to update, but we would end up with a number at the property boundary as you look at this at 9 or below. Cross Route 6 and it will be further below that number. All of that will take place, and if meeting that 10 mg. per liter standard will move forward, we can do an updated calculation to show what that would look like in the same way as the other two calculations were done and you can see the 10 mg. per liter. When Horsley Witten wrote the letter, the standard to meet was 10 at the property boundary. If you do that before it is even poured into the leach field, you have clearly met it at the property boundary, it will be below that. Member Lucy reiterated that 10 at the leaching field and by the time it gets to the property line it will most likely be less. Mr. Nelson responded yes.

Member Lucy went on to state that to his knowledge there are no other innovative systems in this area, downgradient in that blue arrow. So even if this was 18, or 14, that is still low going into the leach system and then downgradient it would degrade lower. So, even if we ran with this system we have currently, but you are suggesting a better one which would have the least amount of impact on downgradient as far as nitrates by comparison to other septic systems in that blue arrow. Mr. Nelson stated there are two parts to the answer. One is a traditional septic system which is going to have a higher discharge concentration than any of the treatments we are talking about. So that is going in at 35, and our initial proposal was at 19 or 20, and now we are talking about 10. So, both of those are better. The question then comes with the volume of flow you have and the size of the plume that leaves the leach field. A septic system for a 3-bedroom house is 330 gallons has potentially less risk associated with it than a larger system, but it all depends on what is where – septic system and well – one could be upgradient from the other. The 440 Rule that is in the Board of Health regulations states we can probably site a small well – a small septic system and private well in a neighborhood – because those septic systems are small and we can be smart about where we put one vs the other. Now when you have the larger field, you have to think about the longer distance that it can travel and perhaps a greater width to what that can travel. The safest way to look at that is have it treated to that higher level before it even gets in the ground.

Chair Hultin wanted to further discuss stormwater management and proposed filters, etc., and asked Mr. Nelson if they were detailed in his report as to what those might be or is the applicant going to propose them. Mr. Nelson stated more of the second. They were saying is there a feasible way to add a level of treatment, more ability to capture something that may go wrong on the pavement before it goes straight into the ground. There are a variety of different ways that can be done either with a vegetated swale or surface stormwater treatment. The site is limited in space to allow some of that to take place, so there are some filters that can be installed in the below ground leaching facilities. He believes Mr. O'Reilly was going to look at that to see what was possible. Chair Hultin asked about the nature of the vegetated swale that would be effective to some degree on the surface. Mr. Nelson replied that it would be where the ground is leveled out a bit so water is coming off the side of the driveway, or the side of a parking area, and moving through that swale before it goes into a catch basin or into the ground. You get a lot of the nutrients captured by the grass, by the soil, the metals if some of that is soaking into the ground, the metals get captured by the topsoil and things like that. If there is an accidental release, you are more likely to know about

it if its travelled over the ground before it goes down into a catch basin, you will smell it and might see it better, you would be able to react to it more quickly. This is one of the benefits of this superficial treatment, and trying to balance everything else on the site, maybe an underground filter will provide some of that same level of treatment and fit the property.

Town Planner Ribeiro noted one more thing. With all of these systems, whether it is the stormwater systems with the filtration of some sort, and the advanced septic systems, one really important thing is operation and maintenance programs going forward. We will be looking to have those be relatively robust. The hope is to incorporate things like rain gardens and swales, but it is not always possible. Need to address what kind of operation and maintenance to have in place that could address some of this and achieve the goal. Mr. O'Reilly stated that was a comment from the Cape Cod Commission that talked about stormwater and the vegetated swales as Horsley Witten did, also noting that there isn't a lot of room on the site for those vegetated swales. The drawback of the vegetated swale is that it takes up space. Need to address that concern regarding rain garden and vegetated swales. Another possibility is that there are units, catch basin inserts, that would address the concern of catchment and controlling the contamination if a catastrophic event were to happen. Need to continue to look at that, and as these concepts are developed, discuss with Horsley Witten. Mr. O'Reilly stated that a lot of the drainage is located up around elevation 38-40, where groundwater has now been confirmed at just under 5, so there is 35 ft. of separation where when talking to the Barnstable County Environmental Department they talked about having a core sand strata to deal with phosphorus. The lower elevation, at 24, where we don't have that type of separation, is it a possibility for catch basin insert or vegetated swale – further investigation needed.

Town Planner Ribeiro stated that we will be reconvening again so there will be more opportunity for the public. Mr. Ribeiro asked that the public comments be kept short as that would be helpful.

Mr. Malone stated, just for clarification, that he is unable to respond to any public comments at this time. This is all recorded, and it will be able to be heard, but his engineer, John O'Reilly, has another public commitment this evening and will be leaving this meeting; however, he will be able to listen to the public comment or read anything written out.

Chair Hultin explained that this meeting will now be opened up for public questions relating to the material presented and stated that it is not general public comment open for various topics but specific to tonight's presentation.

Public Question Period:

Dave Straznitskas, 9 Highland Road, identified himself. Mr. Straznitskas asked, going back to the map with the contours and blue lines, asking if it was the direction wastewater would flow from the treatment plant. Mr. Nelson responded that it was a general approximation of where that effluent would flow. Mr. Straznitskas asked that, based on that, no wastewater would cross Highland Road before it crosses Shore Road. Mr. Nelson replied by stating the effluent from that central portion of the property, which is where the leach field would be located, is going to be flowing mostly west before it turns south, it's probably in that general area of that intersection the first time it would be crossing Highland. Mr. Straznitskas also asked if the plant was located in

the northwest corner, and if you extended the blue line up and had a leach field going up all the way through the whole thing, is there no additional dilution before it comes out to where it is coming out now. Mr. Nelson replied that the way the project is designed now, the septic system leach field is basically in the center of the parcel, in the area where the road circles around – in the middle of that, so with the direction the water is flowing from that middle area is straight to the property line. You are not getting the added dilution of things taking place. Mr. Straznitskas asked if the plant was up there, you might? Mr. Nelson replied that you would have basically the same level of dilution. If it's all going into the ground in one place, and just a function of the fact that it is a rectangular parcel, the water is flowing across the shorter-distance side of the rectangle.

Peter Herridge, 15 Overlook Drive, identified himself. Mr. Herridge asked if it would inform the analysis at all to know that there are in fact hundreds of private wells in Pond Village, and that Pond Village now, and for many years, has had the highest nitrate levels of any part of Truro. Mr. Herridge stated that there are 22 private wells in Pond Village that have levels that the EPA would consider contaminated, that is over 3. Numerous wells in Pond Village have had levels over 7-9, and in one case 11. Mr. Herridge asked Mr. Nelson if that would change his analysis at all. Chair Hultin stated that Mr. Herridge has presented what he has for information, and if Mr. Nelson has more that needs to be presented scientifically... Mr. Herridge returned to the podium and remarked that at the last time he made a presentation here he stated that he is a physician, and he has been searching medical literature for the effects of nitrates on health. Mr. Herridge has made a record for the ZBA of 5 of the most recent articles he could find from refereed, respected journals, mostly medical journals, one an environmental research journal, showing that levels of nitrate, that are below 10, can increase rates of cancer, birth defects, thyroid disease, and a number of other diseases, to a statistically significant manner. This means that if someone is drinking water with nitrate levels of 2 and you bring them up to 8 – and that's not a problem? – that's wrong. This medical literature is a fairly recent finding, and I understand why people may not be aware of it because unless you look at review articles over the last couple of years you don't see it. People will say: no, 10 mg. of nitrate is enough to make sure you don't get Blue Baby Syndrome – Blue Baby Syndrome by the way being a particularly hideous outcome of poisoning by nitrates – but lower-level nitrates also cause increases in cancer. Mr. Herridge asked "Do we have the right to do that to the people at Pond Village?" and responded "I don't think so".

Town Planner Ribeiro stated to Chair Hultin and the Board that he does have a submittal from Mr. Herridge that he will be giving them copies of later – we just got it today.

Tom Gold, 30 Highland Road, identified himself. Mr. Gold asked about the Eastham site inquiring as to how many acres and how many units. Mr. Nelson responded that it is a slightly larger area, but he doesn't recall the number of units. Mr. Gold asked Mr. Nelson if a drought has been taken into consideration. We are talking about rainfall, but we do have droughts, so what would be the impact. Mr. Nelson stated the amount of recharge that we calculate into this a fairly low amount. As our weather patterns change, as we get more extreme storms, typically more of that water is going to soak into the ground to be used by the trees and plants, so we are probably likely to see the recharge rates on average go up, but they are going to vary. Extreme storms are accompanied by extreme droughts. There will be some variability, but we have done a fairly conservative calculation on that dilution.

Chair Hultin asked about the impact of a long-term drought – has the water table dropped significantly or could it have any impact on any of these calculations? Mr. Nelson stated that water tables will drop some, but it is dictated as much by how much rain is coming in and as to how quickly it can leave at the coastline, and that is typically slow as it is heading out. Long-term drought wouldn't have a significant effect on overall water quality for a couple of reasons. One is if you are treating to this higher level, you are saying we are doing that because dilution isn't going to do enough at the beginning, so we are trying to take the dilution out of the equation to a certain extent. It is not completely gone, but we are trying to do a better job of what is going into the ground is closer to what's safe for everybody. With a drought you don't have stormwater runoff that's bringing other things that come down into the ground until that next rainfall arrives. It is complex but comes down to where an individual property's private well is, where its septic system is, where its neighbor's septic system is, where the road is, and those design parameters are listed out in Title 5 to keep some of those separations.

Chair Hultin stated that the water level is shown at Pond Village's pond at 3.6, and then we all know there is an old railroad bed near the bay, so what happens between that 3.6 and the bay. Mr. Nelson stated that it is reflective of what the water table is in that area. The pond is connected to that water, the groundwater is flowing into it. The fact that it is maintaining that elevation as close to the coast as it is implies that it is not flowing out very rapidly in leaving the pond, either coming back into groundwater to head out or whatever. It's reflective of the water table, or the elevation of the water table, in that general neighborhood around Pond Village and that area. Chair Hultin stated that basically that whole marshland and Pond Village have the same basic water table, surface water elevation, more or less. Mr. Nelson replied yes.

Lauren Anderson, 30 Highland Road, identified herself. Ms. Anderson asked if the flow were to go in the other direction, even though highly unlikely, based on where the unit is going, on a hill, which is higher than those four pieces of property, would that effect the backwash and cause it to go in the other direction or did you measure or even take into consideration that the water, if something catastrophic happens, would not go into the other direction. Mr. Nelson stated that it is part of the thought process as we look at something like this. Basically, across Cape Cod there is a lot of variation in topography in moraine areas. In the center of the peninsula you get more of the moraine, but as you get closer to the coast it gets a little smoother in topography, not everywhere because it varies. The fact of the matter is the groundwater isn't held to that topography because the sand underneath the ground, especially here, is permeable enough that it finds its own level. If you have a hill the topography is varying, but it is all sand that comprises that hill, the water is going to find its level field, or plain. If we have those measurements, and you need a minimum of three points to know which way groundwater is flowing – we have those three wells, we have those two points in the pond and in the marsh – I have high confidence that the water is going to be flowing to the south southwest. Pretty much groundwater is going to flow from the center of Cape Cod out to the coast in all areas; we are not directly in the center, but close, which is why the water table data was requested by the Town to be able to know what we had here. The groundwater flow is going to go in the directions shown on that map.

Ms. Anderson then asked about the number of units planned as they are four times the amount that people can legally own. Ms. Anderson asked if Mr. Nelson measured the areas in the four parcels that she is referencing to see their level. Mr. Nelson stated there is a topographic map that was

created, he believes by John O'Reilly, to show the slopes and elevations, and we did look at that as we were looking at the stormwater design.

Naomi Robbins, 423 Route 6, identified herself. Ms. Robbins stated that Mr. Nelson dug three wells and asked if he checked the current nitrogen content in any of those sites or is that not part of the process. Mr. Nelson stated they did not do a water quality test in any of those wells.

Chair Hultin asked if a water quality test was done in those wells, what would be the possibilities of what it might show. Mr. Nelson stated that they weren't located for specific water quality testing purposes. If there were a question regarding that, we might have looked at slightly different locations. We were looking for places where we could get access and get a separation from well to well, so we would get a better picture of where groundwater was flowing. If those wells were sampled right now and tested, you would get a sense of what is going on in the neighborhood right now, but it would be very specific to that point because you would be looking directly upgradient from that point for x number of feet. It is three pieces of data that, unless you had a specific question for an answer or to evaluate further what is going on there, I am not sure what that gives you.

Member Thornley asked if the plume stays the same width as it is moving or does it get wider and wider, spread out. Mr. Nelson stated it will broaden some as it crosses the property line and heads downstream, and it will flow in the direction roughly as to what that blue arrow is showing. It will widen somewhat from the width of the leach field.

Chair Hultin asked if there were any more questions or comments from the public; there were none.

Chair Hultin asked Town Planner Ribeiro to speak about the next meeting and the scheduling of that. As Town Planner Ribeiro has already commented, next time we will be meeting at the Community Center.

Town Planner Ribeiro stated that Ted has been working with his team on a lot of these issues and believes many have already been incorporated into the new plans. We will discuss those when we come back. The punch list that we had from December is: enclosures on the trash structures; bike parking for the large buildings; location of utilities and propane tanks; the width of sidewalks, crosswalks and road markings; limits of clearing which has changed a little with the reconfigurations; landscape plan possibly including swales or rain gardens; deciduous versus evergreen trees and buffering to neighbors; lighting details Cut Sheets making sure of compliance with the Lighting Bylaw; locations of irrigation wells; materials palette; phasing and construction plan including details of the limits which should be answered in their response to Horsley Witten's comments; a stormwater prevention pollution plan. We would like some additional information on the systems in the area, the way they have been operating and monitoring the data – the Cape Cod Commission might have some good examples because they have reviewed many I/A systems over the years. They will be responding to the comments from the report.

Town Planner Ribeiro stated as just another quick note, he is going to give the Board copies of the public comments received to this point in addition to the other ones they have. The Bike &

Walkways Committee did submit some comments that I think mirror a lot of those walkway issues but also some general planning comments that I think are useful. They might not be part of this permit but are good to mention such as working with the Town on a bike lane, share arrows along Highland road, and long-term thinking of bike access to Route 6 without using an on-ramp. There is also another submittal from the Planning Board which included a groundwater discharge permit for a neighboring property. Town Planner Ribeiro believes it is important to look at the information they have now from the Horsley Witten Group. There are also comments from the public, but most of those are prior to the Horsley Witten report. Also, Ted did give some updated architectural drawings including current site plans which are for the four new buildings where that larger building was removed and now there are four smaller buildings. This new one is going to include the revised building numbers and some other things for clarity; there is no substantive change between the plan from their packet and this new one. Mr. Malone stated that the numbering from the Horsley Witten plan is correct as to building numbers; what was changed was the buildings themselves on the site plan which are referred to as units now, the typeface changed so it is easier to read for the updates, and there is now a designation for an existing gravel drive clarified to say "to be removed". Mr. Malone stated that these handouts are for discussion at the next meeting but wanted to provide them now to keep things moving.

Chair Hultin stated that for the Board and himself he wants to thank Mr. Nelson for his clear presentation, for the work he presented for us to study, and we now understand much better the subject matter.

Chair Hultin stated that they need to establish the time for the next meeting. Town Planner Ribeiro asked Mr. Malone when he thought he could have additional plans and updated materials taking into consideration the Board needs a week before the meeting for review. The date of Thursday, April 2 was discussed. Mr. Malone stated that the Board needs to see the updated site plan and adjustments but also the revised building plans to date. The date is agreeable to him, but he has not spoken to John O'Reilly regarding design as they need the feedback from the Board before a redesign takes place. Chair Hultin stated that discussion among the Board needs to take place to determine if they would like the redesign to be based on the 10m. Town Planner Ribeiro stated that what he is hearing from Mr. Malone is the recommendation from Horsley Witten regarding the Title 5 section that related to the higher treatment levels should be met, and Town Counsel and himself agreeing with that opinion, it is the strong recommendation that the Board require the project to meet that standard. Chair Hultin stated he understands the applicant's need to know the direction to go in. However, that is one issue and they need to discuss, as a Board, if there are other issues that need addressing to ensure a successful application and permit. Town Planner Ribeiro stated he wants to make sure that in the next few weeks we are starting work on designing a septic system that can come back to this Board and will get a stamp of approval from our experts and not still having a back and forth with multiple discussions. He would like to move toward one site plan. Mr. Malone agrees and stated based on the understanding of Horsley Witten's recommendations, they are already taking a look at the extra level of treatment beyond what we had most recently designed. Mr. Malone stated that they will continue to look at that – septic doesn't usually change the site plan, but it needs looking at and needs to be resolved. The stormwater management regarding vegetated swales and the catch basins work differently which is a lot of work to redesign.

Chair Hultin stated that he believes the 10 parts per million is an important step for the septic as this is a big project and commitment by the Town and a big step for people in that neighborhood. They need the kind of protection that very high levels of septic treatment can provide them. There are already issues with groundwater quality in that neighborhood, and we don't want to be adding to it with this project. The Town is a big co-player in this development and needs to protect everybody. He personally thinks that we should go to at least the 10 and don't contribute to something that is irreversible.

Member Dundas stated that the Board is not constrained to agree with everything from the peer review, so we can isolate this as a constraint as we move forward. Based on the recommendation from the peer review, it permits the applicant to at least move along with his planning and not wait on us. Chair Hultin agreed and stated that the one obstacle he sees is the effluent from the septic system being the most important, but other details still need to be worked out. Member Dundas agreed.

Attorney Huggins Carboni offered a comment on Chair Hultin's statement above and on the other issues regarding stormwater recommendations. She recommends to the Board following the advice of the consultant on wastewater disposal and agrees with the direction the Board is taking it. Regarding the other areas such as stormwater management or site design, part of the 40B process is the Board saying to the applicant this is what we think you should do, these are the conditions that we would impose. The applicant has the opportunity to say imposing that condition renders this project uneconomic and has to make some showing to the Board that it is the case. The Board can then rethink whatever that condition is. There is a give and take on these other issues that can take place later, and the Board doesn't really need to make a decision right now on any of these other recommendations. Member Dundas reiterated that it does set in motion those decisions, and it is closer than it is further. Attorney Huggins Carboni agreed that it is closer than further, but she was just making a distinction between the wastewater, which the Chair did as well. The other part the Board should start thinking about is what parts of Mr. Nelson's other recommendations they think are important enough that they would want to impose those as conditions and for the applicant, subsequent to that, to start thinking about what he thinks is viable for the project. So, I agree with Member Dundas that it is sooner and not later. The only decision that needs to be made tonight is just the advice to the applicant.

Town Planner Ribeiro wanted to reiterate what Attorney Huggins Carboni stated regarding decisions and also to state that they were on the same page. No firm decisions need to be made now; we just want to make sure that Ted has direction. Chair Hultin stated that the Board needs to give strong views to the applicant as to what would be acceptable or unacceptable. Town Planner Ribeiro stated that what he is hearing is the recommendations outside the wastewater are easy to address; as far as the stormwater goes, it sounds like the Board is willing to consider a mixed approach that looks at other ways to incorporate swales to the greatest extent and then incorporate other measures after and tell the applicant that. Chair Hultin and the Board agreed with that statement. Town Planner Ribeiro stated that adding pretreatment and those types of things.

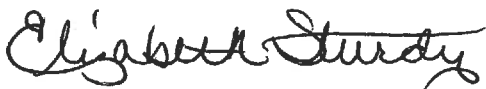
Member Todd stated that the Board has seen where the whole tenor of the reaction to the project really hinges on the septic issue, and he would support the 10 parts per million as a target. In terms

of the strategies for the stormwater, that is much more up in the air in terms of things we can negotiate and talk about. Member Townsend stated she would agree with that, and Chair Hultin stated he would as well. Member Thornley stated that the only thing that troubles him is the septic. Members Lucy and Dundas agreed with Member Thornley. Chair Hultin stated to Mr. Malone that he now has a direction to go in. Mr. Malone stated that the one other thing is the level of plan development. Generally, the level of details that were pointed out in the report went to a basically construction level detailing in plans which is beyond what 40B usually requires. Chair Hultin stated that we wouldn't require those. Mr. Malone stated that if it was handled in the narrative, the waivers or conditions, if that way is acceptable, then we don't have to go quite as far in plan development and stated that he just needed some guidance. Attorney Huggins Carboni stated something more than preliminary, but it is true the applicant isn't required to provide construction documents, but the more you can provide the better because then it is easier for the Board to make a decision including on the waivers that you have or will request. That is where it often comes up; what you are proposing – why do you need a waiver – it is often a matter of plan detail. Chair Hultin stated that the Board would expect to have a very complete list of conditions, requirements, waivers, and recommendations. That is forthcoming at some point but not tonight. We don't expect, I don't expect, them to be completed at the next meeting. They need to be discussed to the extent we are able to in one meeting, and we will keep pressing on.

Town Planner Ribeiro asked if Thursday, April 2 worked for everyone for the next meeting. All agreed. Mr. Malone asked if a subsequent meeting would be set up now, for possibly the engineering drawings, but it was determined that would be a later date. Chair Hultin asked Town Planner Ribeiro if they still had their regular meeting scheduled. Town Planner Ribeiro stated that they do have their regular meeting, not Cloverleaf, on Monday, March 23 and they do have a case, so a quorum is needed. The meeting will be posted, and packets will be available early next week.

Chair Hultin asked if anyone had something they wanted to comment on at this point. The Board had no other comments. Chair Hultin stated that he thought they had an understanding of where they were going and what they had to cover at the next meeting regarding the application. Chair Hultin moved that they continue this hearing until 5:30 pm, April 2 in the Community Center, at 7 Standish Way. Member Shedd seconded. No further discussion on that motion. Voted all in favor. So voted: 7-0. Meeting adjourned.

Respectfully submitted,



Elizabeth Sturdy

