

VERMONT ENVIRONMENTAL BOARD  
10 V.S.A. chapter 151

RE: Warren and Mary Noyes  
Land Use Permit Amendment #5W0663-10-EB

FINDINGS OF FACT, CONCLUSIONS OF LAW, AND ORDER

This decision, dated August 21, 1992, pertains to an appeal filed by Andrew and Judith Caroline (the Appellants) from a decision of the District #5 Environmental Commission permitting the placement of a mobile home and a sewage disposal system on a 40-acre tract of land located in Moretown. As is explained below, the Board concludes that the installed septic system may contaminate the Appellants' well and ground water and therefore does not meet the requirements of Criterion 1(B) (waste disposal).

I. SUMMARY OF PROCEEDINGS

Land Use Permit #5W0663-9, issued on September 8, 1987, authorized Warren and Mary Noyes (the Permittees) to sell a 40+-acre parcel of land at the site of a previously approved subdivision. Condition #5 of that permit provided that, prior to the construction of a home or placement of a mobile home on the 40-acre parcel, soil data and a site plan for a waste disposal system were to be submitted to the District Commission. On July 18, 1991, the Permittees filed a site plan for a waste disposal system with the District Commission. The Appellants, who had been granted party status under Criterion 1(B) (waste disposal) and 4 (erosion) in the proceeding relating to Land Use Permit #5W0663-9, requested a hearing be held concerning the site plan.

On November, 22, 1991, the District #5 Environmental Commission issued Land Use Permit #5W0663-10, which authorized the Permittees to place a mobile home on a gravel pad and to make associated improvements for a driveway, water supply and sewage disposal. No findings of fact were issued with that permit amendment.

On December 13, 1991, the Appellants appealed that permit amendment under Criteria 1 (water pollution), 1(B) (waste disposal), 1(E) (streams), and 3 (burden on existing water supply). On December 16, 1991, the District Commission issued Land Use Permit #5W0663-10, Findings of Fact, Conclusions of Law, and Order in support of the permit amendment issued on November 22, 1991. In view of the District Commission's findings, the parties agreed, at the prehearing conference held on January 14, 1991, that only Criterion 1(B) is at issue.

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An administrative hearing panel of the Board convened a public hearing and conducted a site visit on April 1, 1992. The following parties participated in the hearing:

Permittees by Richard Unger, Esq.  
Appellants by Bruce Bjornland, Esq.

The Panel conducted a preliminary deliberation on April 1, 1992, and determined that additional information was needed in order for the Panel to reach a decision. A memorandum was issued to the parties on April 13, 1992, advising that the Permittees would be required to dig four additional test pits in order to determine depth to ground water of the site of the installed septic system. The requested information was submitted to the Panel on April 28, 1992. The hearing was reconvened on May 20, 1992. The Panel recessed the hearing on that date pending the submission of proposed findings of fact and conclusions of law. Proposed findings were filed on June 3 and 5. A proposed decision was sent to the parties on July 17, 1992. The parties were provided an opportunity to file written objections to the proposed decision and to present oral argument before the full Board. Oral argument was held on August 12. The Board deliberated on August 12. On that date, following a review of the proposed decision and the evidence and arguments presented, the Board declared the record complete and adjourned the hearing. To the extent any proposed findings of fact and conclusions of law are included below, they are granted; otherwise they are denied.

## II. ISSUE

Whether the septic system that has been installed by the Permittees meets the requirements of Criterion 1(B).

## III. FINDINGS OF FACT

1. The tract of land on which the Permittees have installed a septic system is a 40+-acre parcel, which is the remaining lot of a subdivision located off U.S. Route 2 in Moretown, Vermont. Only a small portion of the tract is flat enough to support any development.
  2. Land Use Permit #5W0663-10 was issued to the Permittees on November 22, 1991. That permit authorized the Permittees to place a mobile home on a gravel pad and to construct associated improvements for a driveway, water and sewage disposal.
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3. Subsequent to the issuance of the permit, the Permittees sold the 40-acre tract to Wilfred Kelley. The tract was sold, a septic system was installed, and a mobile home was moved onto the site, prior to the filing of this appeal.
  4. The installed sewage disposal system consists of an existing primary subsurface leachfield (the primary leachfield) and a replacement leachfield (the replacement area), which is south of the primary leachfield. The existing primary leachfield has been constructed in the area originally designated as the "replacement area" in the July 1991 site plan, last revised November 12, 1991. The area originally designated as the replacement area was later determined to be the preferred area for the primary leachfield because it was judged to pose less risk of migration of contaminants to the Appellants' well.
  5. The Appellants reside on property adjacent to the 40-acre parcel. Their property was one of the lots previously owned by the Permittees and approved for subdivision. They have a drilled well that is their only source of potable water. The well, which was installed in 1987, is located to the northeast of the primary leachfield and is 103.5 feet away from the closest point of the primary leachfield.
  6. Sewage contains pathogens that are harmful to human health. If sewage effluent enters the Appellants' well, their water supply may pose a health hazard.
  7. In June and August 1991, six test pits were dug at the site to a depth of over eight feet to determine the depth to the water table or ledge. No water table was reached and no ledge was found. Mottling was found at one test pit at a depth of 70 inches. Mottling in soil may indicate the presence of seasonal high ground water at the depth of the mottling. Neither the primary leachfield or replacement area was located where mottling was found.
  8. In November 1991, two additional test pits were excavated at the primary leachfield at the request of the Appellants. These test pits revealed mottling at 36 inches at the primary leachfield.
  9. In April 1992, two test pits were excavated at the edges of the primary leachfield. Test pit A showed ground water at ten inches below the presumed bottom of leachbed. Test pit B showed ground water at 30 inches below the bottom of the leachbed stone. The water table under
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the primary leachfield was less than 36 inches from the bottom of the leachbed for a continuous 11-day period in April 1992.

10. In April 1992, two test pits were excavated as close as possible under the footprint of the replacement area. Test pit C encountered no ground water, but the soils indicated a seasonal high water table at 47 inches. Test pit D encountered a variety of construction debris and trash to a depth of 3.0 feet and water at 5.7 feet. Test Pit C is closer to the footprint of the replacement area than Test Pit D. As reflected in Test Pit C, there is an adequate separation between the bottom of the replacement area and ground water.
  11. The Department of Water Resources Environmental Protection Regulations, effective September 10, 1982, (the EPR) set standards for the siting of leachfields and septic systems for single-family residences. Pursuant to § 3.02(D) of the EPR, the Permittees are not required to obtain a State subdivision permit for the installed system because the tract of land on which the system was installed is greater than ten acres. However, it is common practice and in keeping with good engineering standards to adhere to the requirements of the EPR in the design of septic systems.
  12. Section 7.07(A)(1)(c) of the EPR requires that all disposal systems shall have a minimum three foot separation between the bottom of crushed stone placed in the disposal system trenches to seasonal high ground water.
  13. The zone of unsaturated soil between the bottom of a leachfield and the seasonal high water table is where most of the removal of contaminants in septic tank effluent occurs. There is not an adequate depth of unsaturated soil between the bottom of the installed septic system trenches in the primary area and seasonal high water table to ensure the removal of contaminants.
  14. The EPR also establishes minimum isolation distances from disposal systems to surrounding wells. Pursuant to § 7.08(D) and Appendix 7D of the EPR, a leachfield must be a minimum of 100 feet from a drilled well that is a source of drinking water. Appendix 7D also provides that this minimum isolation distance assumes that the flow of water is from the well to the disposal field. If the flow is from the disposal field to the well, the isolation distances provided for in § 8.07 of the EPR applies.
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15. Section 8.07 of the EPR requires a minimum 100-foot isolation distance between a leachfield and a drilled well. However, the rule also provides that this minimum isolation distance "presumes that geologic conditions exist which would prevent movement of contaminants from the leachfield to the well."
  16. The general direction of ground water flow is eastward from the area of the primary leachfield toward the Appellants' well. The direction of ground water flow from the replacement area is also toward the Appellants' well.
  17. In addition to the horizontal east-west gradient between the primary leachfield and the replacement area and the Appellants' well, there is also a vertical downward gradient which will cause shallow ground water in the vicinity of the primary leachfield and the replacement area to flow vertically downward towards the Appellants' well.
  18. Contaminants from the primary leachfield may come in contact with ground water flowing eastward toward the well and downward through the sand and into bedrock fractures. This hydrogeologic connection between the primary leachfield and the Appellants' well poses a significant risk that contaminants from the leachfield will contaminate ground water and may reach the well.
  19. For contaminants to permeate bedrock, the bedrock must be fractured. Bedrock in Vermont is generally fractured. Bedrock at this site cannot be presumed to form an impermeable boundary between the effluent and the well.
  20. As effluent moves through soil it spreads laterally, or bulges, as it travels downgradient. If contaminants are in soil in the vicinity of the well, when the pump for the well is turned on, contaminants within the zone of influence of the well may be drawn into the well. In the hydrogeologic setting at this site, the degree of risk is not contingent on where the zone of influence falls. Rather, because the well is hydrologically downgradient of the leachfield, any fracture in the bedrock may allow ground water to reach the well.
  21. Section 8.08(A) of the EPR provides that if a hydrogeologic connection exists between a water supply and a source of contaminants, a system can be approved if there is a "minimum residence time in saturated materials of two years in order to reasonably insure that microorganisms will be eliminated."
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22. There is approximately 33 feet of sand over bedrock in the area between the leachfield and the Appellants' well. There is no restrictive or impeding layer in the soil profile overlying the bedrock. The sand which overlays the Appellants' well could not meet the two-year "minimum residence time." "Residence" or "travel" time in the saturated fine sands located at this site is likely to be much less than two years.
  23. Existing geologic and hydrogeologic conditions at this site will not prevent the movement of contaminants from the primary leachfield to the well or from the replacement area to the well.
  24. Section 7.14(A) of the EPR provides that certain site limitations, including seasonal high ground water level, may be improved by site modifications in order to overcome the limitations of an otherwise unacceptable site. A curtain drain can be used on some sites in order to lower the water table and thereby create 36 inches of unsaturated soil between the bottom of a leachfield and ground water. Section 7.14(C) of the EPR provides that when a curtain drain is used to lower a seasonal high water table, it must be installed and tested during spring conditions to demonstrate effectiveness before approval of the disposal system. This requirement may be waived if a consultant has provided sufficient evidence to show that the drain will work effectively.
  25. The installation of a curtain drain might lower the seasonal high water table, but it would not alter the direction of ground water flow so that it would no longer flow toward the Appellants' well.
  26. The primary leachfield must be at least 100 feet from the well, 50 feet from a stream located on the 40-acre parcel and ten feet from the replacement area. Given these required isolation distances, there is not room for primary and replacement septic areas on the 40-acre parcel that will not result in a significant risk of contamination of the Appellants' well.
  27. There is no other location on the Appellants' property where they could drill another well if the existing well should become contaminated. Tests of the Appellants' water supply have indicated that there has been no contamination of their well as yet. As a new septic system is used, the ability of the contaminants to pass through to deeper levels of soil and ground water increases over time.
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IV. CONCLUSIONS OF LAW

A. Statute and Applicable Regulations

10 V.S.A. § 6086(a)(1)(B) provides that, prior to issuing a permit, the Board must find that:

[T]he development or subdivision will meet any applicable health and environmental conservation department regulations regarding the disposal of wastes, and will not involve the injection of waste materials or any harmful or toxic substances into ground water or wells.

The burden of proof under this criterion is on an applicant. 10 V.S.A. § 6088(a). Under Board Rule 19(E) and (F), permits or certifications issued by other State agencies and filed with the Board create a presumption that Criterion 1(B) is met. However, pursuant to § 3.02(D) of the EPR, the Permittees are not required to obtain a permit and they have not entered a permit or certification of compliance issued by another State agency into the record. Therefore, they are not entitled to a presumption under Rule 19(E).

With respect to applicable regulations, the septic system installed by the Permittees is not required to meet the standards set forth in the EPR because the parcel of land is more than ten acres. The Board's determination of whether the septic system meets Criterion 1(B) therefore must be based solely on whether it will result in harmful substances entering ground water or the Appellants' well. However, the parties have presented evidence related to compliance with the EPR and the Board believes that the standards set forth in the EPR provide useful guidelines for it to consider in assessing whether the installed septic system may result in harmful substances entering ground water or the well.

B. Sewaration from Ground Water

The Board believes that the evidence is uncontroverted that there is less than a three-foot separation between the bottom of the leachfield and ground water in the primary area of the leachfield. At the hearing held on April 1, there was conflicting testimony regarding separation from ground water. The Panel therefore requested additional testing be conducted at the site to conclusively determine if there was a **three-**foot separation. The information submitted by Mr. Heindel, the Appellants' expert witness, was that the additional testing revealed that there **was** ground water within ten inches of the bottom of the leachfield at one test pit installed at

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the edge of the primary area and within 30 inches of the second test pit.

That finding was not contested by the Permittees at the hearing held on May 20. Rather, the Permittees contend that, irrespective of the lack of a three-foot separation from ground water, the direction of ground water flow in the area will preclude contamination of the Appellants' well. The question of ground water flow is discussed below.

The Permittees also contend that a curtain drain could be installed in order to lower the water table at the site and thereby create 36-inches of unsaturated soil. The Board concludes that the Permittees have not proven that the installation of a curtain drain would create an adequate separation from ground water. No evidence regarding the proposed design of a curtain drain was offered.

More importantly, the Board notes that the EPR provides that a curtain drain should be monitored for one year before a permit is issued, absent evidence that a proposed drain will achieve the desired result. The Board believes that the Appellants cannot be asked to bear the risk of a contaminated water source for an additional year during which the operation of a curtain drain would need to be monitored. If the curtain drain was not effective, the Appellants' well could be contaminated before that time period elapsed. Furthermore, as is discussed below, the direction of ground water flow at the site would pose an unreasonable risk to the Appellants' well even if there was a 36-inch separation from ground water.

The Board concludes that the lack of an adequate separation between the bottom of the primary leachfield and the seasonal high water table at the site creates a significant risk of contamination of the groundwater and of the Appellants' well.

c. Ground Water Flow

The Permittees contend that the probable course of surface and ground water flow at this site is to the northwest based on the hydrogeology of the Winooski River Valley. They also contend that the ground water flow paths measured by a series of monitoring wells installed by Mr. Heindel at the site, indicate that the ground water flow path is at least 20 feet from the well. The Permittees also argue that the ground water flow is not vertically downward towards the Appellants' well because there is 33 feet of overburden over impermeable bedrock.

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The Board believes that the evidence concerning ground water flow presented by the Permittees is not convincing. Evidence of the probable direction of ground water flow based on the regional hydrology in the Winooski River Valley offered by the Permittees is of far less significance than the site-specific evidence concerning ground water flow offered by Mr. Heindel. Mr. Heindel's testimony clearly establishes that ground water from the primary area of the system flows eastward towards the Appellants' well.

Furthermore, even if the specific lateral flow direction were not exactly towards the well, the sandy soils at the site and the lack of impeding layers above the bedrock surface will allow contamination to migrate vertically downward to the fractured bedrock. The Permittees have failed to convince the Board that bedrock can be assumed to form an impermeable boundary. Rather, the Board believes that bedrock at the site is likely to be fractured and that ground water will therefore flow downward through bedrock.

The Permittees also contend that the installation of a curtain drain would move the flow path of the effluent away from the well. The Board finds that the the Permittees have not offered convincing evidence that the direction of ground water flow could be shifted away from the Appellants' well by the installation of a curtain drain. Furthermore, as noted above, the Board believes that the efficacy of a curtain drain for this purpose would require monitoring for a year. The Appellants have an immediate interest in ensuring the safety of their water supply and should not bear the burden of waiting for a year to determine if a curtain drain could be effective.

The Board concludes that the eastward direction of ground water flow from the primary leachfield towards the Appellants' well and downward through the overlying sands and fractured bedrock creates a significant risk of contamination of ground water and of the Appellants' well.

D. Conclusion

The Board has concluded that both the lack of an adequate separation between the bottom of the primary leachfield and the high seasonal water table and the direction of ground water flow at the site pose significant risks of contamination of ground water and of Appellants' well by the installed septic system. The Permittees have not demonstrated that the installed septic system will not involve the injection of harmful substances into groundwater and into the Appellants' well. The Board therefore cannot find that Criterion 1(B) has been met.

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The Board is aware of the considerable difficulties that this decision creates for the present owner of the property and for the Permittees. However, the Permittees were aware that the Appellants were strongly opposed to the installation of the septic system prior to its installation. In selling the property and installing the septic system before the expiration of the time allowed for appeal of the permit issued by the District Commission, the Permittees accepted the risk that the permit might be overturned on appeal.

The Permittees indicated at the hearing on May 20, 1992 that they would be willing to install a curtain drain and, if after monitoring it was determined that the curtain drain did not guarantee the safety of the Appellants' well, that the Permittees will provide the Appellants with the right to draw water from the well located on the 40-acre parcel. While these suggestions may provide a basis for negotiation between the parties, they do not provide a basis for the Board to issue a permit.

At oral argument the Permittees requested that they be given 90 days from the date of the decision to discontinue use of the septic system. The Board notes that the proposed Panel decision was issued on July 17, 1992 and that the Permittees have already had over 30 days to consider what action they might take in response to a final order to discontinue use of the septic system. The Board therefore denies the request to continue use of the septic system for a 90-day period, but it will allow the Permittees to continue using the septic system for a period of 45 days from the date of this decision.

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V. ORDER

1. Application #5W0663-10 is denied.

2. Land Use Permit #5W0663-10 is void. The continued use of the installed septic system any time after 45 days from the date of this Order will lead to the initiation of enforcement proceedings.

3. No later than 45 days from the date of this Order, the Permittee shall submit an affidavit to the District Commission attesting that: 1) the septic tank has been pumped and either removed or filled with clean fill; and, 2) the septic tank has been disconnected between the tank and the mobile home.

Dated at Montpelier, Vermont, this 21st day of August, 1992.

ENVIRONMENTAL BOARD



Elizabeth Courtney, Chair

Ferdinand Bongartz

Terry Ehrich

Lixi Fortna

Arthur Gibb

William Martinez

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