



## **Blackthorne Inn** Water Treatment Summary

### ***Engineering Plan -- Onsite Dispersal Evaluation for the New Property Usage***

We will be preparing a detailed report to be submitted with the Special Exceptions application that will cover the following categories:

1. Design Flows and Wastewater Characterization
2. Proposed Treatment and Dispersal Methods
3. Sludge Management
4. Operation and Maintenance
5. Watersheds and Drainage
6. Aquifer Characteristics and Hydrogeology
7. Existing Well Capacity
8. Existing Septic Infrastructure
9. Soil Characteristics
10. Underlying Geology
11. Hydraulic Conductivity Tests and Analysis
12. Site Capacity for Treated Wastewater Dispersal
13. Recharge and Groundwater Flow
14. Groundwater Sensitivity
15. Nitrogen Analysis
16. Groundwater Mounding Analysis
17. Groundwater Monitoring Plan

Current findings and notes.

1. The existing conventional septic systems are antiquated and in poor condition and we found them to represent a pollution hazard. We will be replacing them with the latest proven technology, environmentally friendly treatment systems utilizing drip dispersal.

2. As part of our detailed analysis of the site, we reviewed the existing conditions and completed a series of 46 backhoe pits/soil borings and in addition, completed 24 saturated hydraulic conductivity tests to determine how the property can best support the dispersal of treated effluent.
3. Our analysis and calculations determined that the dispersal area available on the property far exceed our requirements for primary and 200% reserve capacity -- 14.8 acres (645,000 sqft) is available versus 6.9 acres needed -- 100,000 sqft for primary and 200,000 sqft for reserve area required -- thus we have a factor of 2.1x available. Clearly sufficient to allow for further adjustments as required to provide the most efficient and safe design -- our stated criteria.
4. Drip dispersal is shallow and will allow us to keep the land in its native, rural state vs a single treatment facility which would necessitate clearing acres of trees to accommodate. It allows us to use irregular areas without re-sculpting the land. We will be able to save trees and efficiently use the woodlands on the property in its natural state. By treating the wastewater and using drip dispersal the wastewater will extremely clean prior to being absorbed by the water shed.
5. Key points from our engineering analysis -- Despite generating more wastewater with the new use of the property as compared to the previous usage, we will be dispersing significantly less pollutants into the aquifer than the previous usage because of the increased treatment level, removal of Nitrogen, use of UV disinfection, and importantly, use of drip dispersal in the most appropriate dispersal horizon. In addition to treating the wastewater per VDH regulations (TL3 effluent quality) we will be disinfecting (UV Disinfection) the treated wastewater prior to drip dispersal. This will not be required by VDH, but we will be doing more to remove the potential for groundwater contamination that is a risk given the sites conditions with fractured rock potentially short circuiting the treatment. Thus, we are exceeding the VDH requirements with this plan.

We will not be constructing one large treatment system with one large dispersal area. By spreading out these treatment systems and dispersal areas we avoid concentrating the wastewater, protect the aquifer and maintain the critical rural environment with minimum impact. *We are going to be constructing smaller treatment systems close to the generation point of the wastewater and distributing the effluent around the property in many areas. This will provide redundancy and eliminate concentration of wastewater.*