3. HISTORIC AND CURRENT WASTEWATER TREATMENT

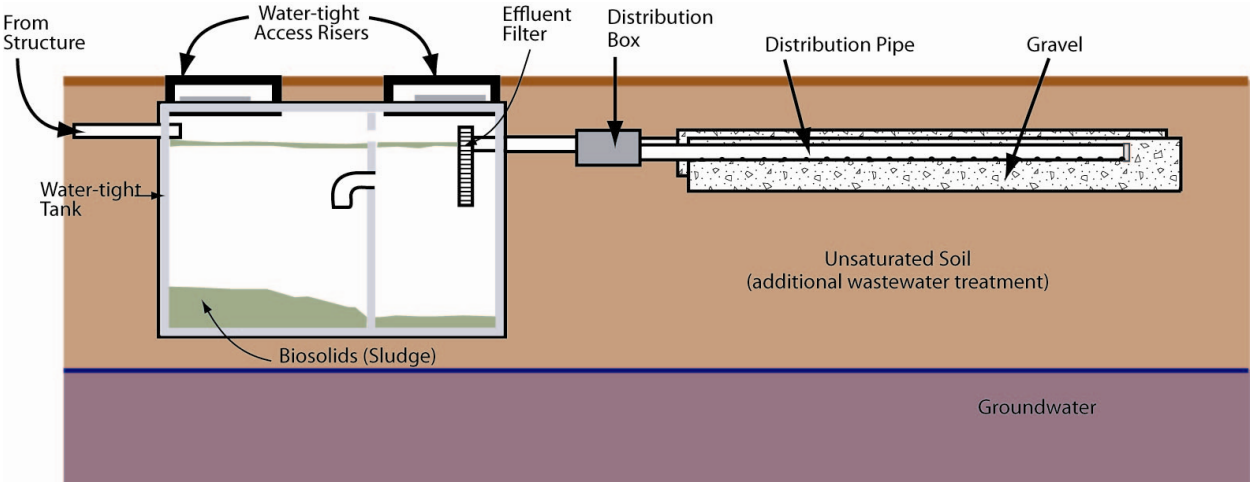
The properties in Waitsfield Village and Irasville are served by individual and shared onsite wastewater treatment systems. There are no wastewater treatment plants or sewers in the study area. Information on the existing wastewater treatment systems was gathered from the wastewater system and water supply inventory compiled by Phelps Engineering (see Section 2.2.4), Vermont DEC state and Regional Office files, the property owner survey questionnaires, informal interviews by Wastewater Committee members, and area site visits.

This section begins with some general information on onsite wastewater dispersal systems, how they function and need to be maintained, and some information on newer components, including advanced treatment systems, which can increase wastewater suitability where soils contain specific limitations. Information about the current rules and regulations governing soil-based wastewater treatment systems in Vermont is also included. Additional details on these topics are available in Appendices C and D, respectively. Finally, information gathered from prior studies, permit files, and other sources, as well as the information collected from the property owner surveys and from prior evaluations of wastewater treatment systems in the study area, is presented.

3.1. Decentralized System Components and Maintenance

Decentralized wastewater treatment and dispersal systems, when properly sited, installed, and maintained, can be a long-term effective means of wastewater treatment and dispersal. However, they can cause negative impacts when they malfunction or when they are installed too close to the water table, surface waters, or other sensitive environmental features. This section contains some general information about the components and care of decentralized wastewater systems; additional detailed information on this topic can be found in Appendix C.

A traditional, gravity flow, onsite "septic system" includes at least a 1,000 gallon concrete septic tank, a concrete distribution box, and a leach bed or leach trenches. The septic tank settles out the solids and provides some treatment; the distribution box splits the flows evenly between pipes or trenches, and the leach bed or trenches (made out of crushed stone or alternative materials with perforated pipe covered with filter fabric) along with the unsaturated soils below the system provide the final distribution and treatment. The illustration below, which is based on images that were created for the Vermont Department of Housing and Community Affairs' 2008 handbook *Wastewater Solutions for Vermont Communities*, shows the components of a traditional onsite wastewater treatment system, and their relation to the surrounding soils and groundwater.



In addition to the perforated pipe and aggregate trenches shown in the illustration above, traditional wastewater dispersal options in Vermont also include drywells and mound systems. Some newer wastewater dispersal options in Vermont include at-grade systems and subsurface drip irrigation (see Appendix C for additional details on these technologies).

The survey responses and information in the inventory of existing wastewater systems indicated that approximately 20% of developed properties currently use drywells, which typically follow septic tanks and consist of concrete cylinders with open bottoms and holes in the sides, surrounded by stone, which holds the wastewater until it disperses into the ground. New or replacement drywells have not been permitted in Vermont since 2002.

> 20% of developed properties currently use drywells.
>
> New or replacement drywells have not been permitted in Vermont since 2002.

Maintenance of gravity-based, passive traditional technologies is relatively simple. In addition to proper operation, maintenance consists of having someone check the levels in the septic tank and pumping it out when necessary, checking and cleaning effluent filters regularly, checking to make sure that the distribution box and outlet pipes are level, and inspecting the dispersal field for any seepage or surfacing of effluent.

Advanced pre-treatment components can be added after the septic tank to improve wastewater treatment prior to dispersal. Pre-treatment components may also allow for increased capacity of onsite systems, which maximizes available soil resources, may allow for the use of sites not previously approved under the state's rules for wastewater systems, or may allow the use of a leachfield that has a smaller footprint or has a shallower vertical separation to seasonal high groundwater or bedrock (see Section 3.2 and Appendices C and D for more details).

As decentralized wastewater systems become more complex, as with those that use advanced pre-treatment or rely on pumps or blowers, it becomes even more important to make sure that they are operating properly. Since the more complicated systems are often installed to overcome difficult site conditions like shallow groundwater, there is less of a 'margin of safety' if the system malfunctions before sensitive resources such as shallow groundwater are negatively impacted. Systems that use pumps to distribute wastewater effluent, like at-grade or mound systems, should be checked at least once a year to make sure that the pumps are cycling and operating properly. The maintenance requirements for pre-treatment systems vary with the permit requirements of the individual technology, but should include at least one inspection per year.

3.2. Vermont Regulations for Soil-Based Wastewater Treatment Systems

Design and permitting criteria for onsite and off-site or shared wastewater systems with soil-based dispersal in Vermont are contained in two sets of regulations: Chapter 1 of the Environmental Protection Rules (EPRs), Wastewater System and Potable Water Supply Rules, and Chapter 14 of the EPRs, the Indirect Discharge Rules (IDRs). This section provides information about these rules, which are essentially the design criteria that are used in Section 4 of this report to evaluate whether or not a replacement system that complies with modern regulatory requirements could be sited on individual parcels within the Waitsfield Village and Irasville areas. Highlights of recent changes in the rules and regulations are also described. Details and supporting information about these rules can be found in Appendix D to this report.

3.2.1. Wastewater System and Potable Water Supply Rules

The latest revisions to these rules, generally referred to as the "EPRs" or "EPR Chapter 1", became effective on September 29, 2007. The EPRs apply to decentralized wastewater dispersal systems with design flows of up to 6,499 gallons per day (gpd) and to sewer connections for any design flow.

Important changes were made in many areas of the EPRs in 2007, including the implementation of universal jurisdiction and the 'clean slate'. New construction (including of single family residences), construction or modification of a wastewater system and/or potable water supply; new connections to an existing wastewater system and/or potable water supply; subdivision of land; and repair or replacement of a failed wastewater system and/or potable water supply are all activities that now require permits under the EPRs. On or after January 1, 2007, a permit is required when any action covered under these rules is taken (for example, if a property is subdivided or a repair or replacement is needed).

Other changes to design requirements that may be useful to landowners in the study area include:

- Reduction in minimum design flow for a single family residence to 2 bedrooms (from 3 bedrooms).

- If a primary dispersal system is designed and constructed with pressure distribution that can handle 150% of the design flow, no replacement area is required. This change will enable some lots that were not developable (because they lacked the space and soils needed to site the required identical replacement system) to be developed.
- If a mound system is designed and constructed for 100% of the design flow, no replacement area is required. In some cases, properties with mound systems and replacement areas that were permitted before the 2007 rule revision may be able to subdivide or redevelop property that was previously at its maximum wastewater treatment capacity.
- Composting toilets are now specifically allowed in the EPRs. The rules also allow a smaller leachfield to be used for graywater only when a composting toilet is proposed.

In the 2010 legislative session, House Bill H.779 was passed, which requires applicants for a Wastewater System and Potable Water Supply Permit under the EPRs to notify other landowners whenever isolation distances related to proposed wastewater systems or potable water supplies extend onto property not owned by the applicant. Appendix D contains more information about this obligation.

3.2.2. Indirect Discharge Rules

The 1986 Vermont Legislature established new criteria for larger soil-based wastewater systems, which took into account these larger systems' potential impacts on water quality and aquatic biota (living organisms) in Vermont surface waters. Since January 1990, wastewater treatment systems with design flows of 6,500 gpd or greater have been regulated under Chapter 14 of the EPRs, commonly known as the Indirect Discharge Rules or IDRs. The IDRs are used to permit septic tanks and leach fields, and also treatment plants and spray dispersal systems, which use soil as part of the wastewater treatment process. Following primary and/or secondary treatment, the soil provides final effluent polishing and renovation before it reaches groundwater and, eventually, surface water. This is in contrast to direct discharge systems, which may discharge through a pipe directly to surface waters.

Under the IDRs, a community wastewater treatment system constructed in or near the study area to support both existing and new development would be considered a "System with New Indirect Discharge to Class B Waters" under the IDRs. These systems are required to obtain an indirect discharge permit before construction begins. In order for a permit to be issued, the permittee would be required to demonstrate that the new discharge:

- will not significantly alter the aquatic biota of the receiving waters;
- will not pose more than a negligible risk to public health;
- will be consistent with existing and potential beneficial uses of the waters; and
- will not violate Water Quality Standards.

The latest IDRs became effective in April 2003. A General Permit is now allowed for systems with design flows of 15,000 gpd or less that do not require a certified operator to manage the system. Annual inspections and reporting of system failures are required under the General Permit.

3.3. Prior Wastewater Planning Initiatives and History

Wastewater planning efforts for Waitsfield Village and Irasville have been underway for well over twenty years.

In 1987, a "Planning Level Study for Water and Sewerage Facilities for the Waitsfield Village and Irasville Areas of the Town of Waitsfield" was prepared by consultants at Phillips and Emberley, Inc. This planning study outlined many of the potential limitations related to community water supply and wastewater treatment that the Town continues to struggle with, including challenging soils and wetland areas in portions of Irasville, small lots and floodplain issues in Waitsfield Village, and conflicts between wastewater dispersal areas and potable water supplies throughout both village areas.

From the late 1990s through 2004, the Town and the Mad River Valley Planning District (MRVPD) made concerted efforts to move forward with land use and wastewater master planning initiatives. In 2002, a *Master Development Plan for the Irasville Growth Center* was completed for the Town and MRVPD by Lamoureux and Dickinson Consulting Engineers, Inc. and The Office of Robert A. White, ASLA (see http://www.waitsfieldvt.us/docs/Irasville_plan_2002.pdf). The Master Development Plan clearly stated the importance of municipal wastewater treatment and water supply infrastructure in support of a more densely developed village center in the Irasville area: "…[T]he development of a plan for municipal sewer and water for Waitsfield Village and Irasville are essential to the vision of having a compact mixed use village center for the community" (p. 3). However, the report also clearly acknowledged the limitations being encountered by Phelps Engineering, Inc. as they concurrently developed a *Wastewater Facilities Plan.*

The *Wastewater Facilities Plan* for Waitsfield Village and Irasville was finalized by Phelps Engineering in August 2004. This document includes an inventory of existing decentralized wastewater and water supply infrastructure compiled from permits, property owner surveys, and other sources, a comprehensive summary of existing conditions, estimates of current and future wastewater needs and design flows, the results of an extensive search for potential large-scale shared wastewater dispersal sites, discussion of a range of potential wastewater collection, treatment, and dispersal alternatives, and a recommended strategy to move forward with a municipal wastewater management project. However, the capacity of the proposed off-site dispersal location (the "Munn site") was 70,000-87,000 gallons per day, slightly more than half of the total anticipated wastewater treatment and dispersal needs for Waitsfield Village and Irasville at a reasonable build-out condition. The *Wastewater Facilities Plan* therefore emphasized the need for retaining existing on-site wastewater infrastructure where such infrastructure was operating

properly, and the need for management of that existing infrastructure through a program of routine inspections and septic tank pump-outs.

After the *Wastewater Facilities Plan* was finalized, the recommended alternative proceeded through further design and evaluation stages, and Phases I and II of the wastewater project were brought to a bond vote at Town Meeting in March 2008. The project as designed would serve only the Irasville area. Phase I included a centralized collection system consisting of sewers, large capacity septic tanks, pump stations, and force mains to carry wastewater from properties to the "Munn site," along with conventional in-ground dispersal, to serve flows of about 18,000 gallons per day (about a third of the existing development in the Irasville area). Phase II included the construction of a tertiary-quality wastewater treatment facility on the Munn site, which would enable dispersal of up to 87,000 gallons per day in the existing in-ground dispersal field. Phase II was designed to provide for all existing Irasville properties to connect, with reserve capacity remaining for infill growth.

At the 2008 Town Meeting, Phase II of the wastewater project passed, but Phase I was defeated. A post-bond vote task force was formed, which recommended to the Selectboard that the wastewater project be put on hold and that a modified water proposal be presented to the voters. While the bond vote for the water project was eventually approved by a narrow margin (on November 4, 2008), no further action was taken with regard to wastewater management until the spring of 2010, with the conception of the grant-funded study that this writing summarizes.

3.4. State Permit Programs & File Reviews

A significant history of environmental permitting is available from state- and regional-level permit reviews, which is appropriate given the age of most commercial development in the Irasville area. Permits were found for a few residences, particularly where relatively recent renovations or subdivisions included changes to the onsite wastewater systems or water supplies. Permits were found for most public buildings in the study area. Stone conducted a review of the files at the District 5 Regional Office in Barre and the Vermont DEC's on-line permit database for Regional Office documents, as well as an inquiry regarding Indirect Discharge permits for larger onsite wastewater systems in the study area. A summary of the available Regional Office permit information is shown in Table 5.

3.4.1. Town Permits

The Town of Waitsfield records State (DEC) permits in their paper files and land records. The Town did not historically have a separate sewage ordinance or a sewage officer. Since Town permit records essentially duplicate most of the information available in the State permits, the Town's permit files were not reviewed further.

3.4.2. State Permits

Stone reviewed the DEC permit files on-line and in the Barre Regional Office for permits for public buildings (almost any occupied building except a single family residence) and for subdivisions that are less than 10 acres in size (since 1969). The main objective of the permit review was to update the existing inventory of wastewater treatment and water supply infrastructure. To this end, a targeted review was undertaken only of those permits which were issued since 2000-2001, when the information that Phelps Engineering used to construct the existing inventory was collected. Since that time, a total of 50 permits have been issued for 28 parcels in the study area (Table 5). The locations of properties with recent DEC permits are shown on Figure 4; wherever wastewater treatment component information was available in design drawings related to these permits, that information was included on Figure 4 as well.

Some of these permits were for new construction on existing lots, or for renovations or changes in use of existing buildings that required expansion of or changes to the property's wastewater treatment system—for example, at the Mad River Meadows Apartments and Evergreen Place. About a third of the permits were for changes in use that, since the change was not increasing the property's wastewater flows, did not require any changes to the onsite wastewater system. Several recent permits were issued for the replacement of malfunctioning leachfields (notably, the systems serving the Shaw's grocery and Mehuron's Market in Irasville, as well as Tavern Condominiums and the Historic Waitsfield Village commercial complex in Waitsfield Village).

Stone also requested information about current and pending Indirect Discharge Permits (for wastewater systems with design flows of 6,500 gallons per day or higher) from John Akielaszek of the DEC's Wastewater Management Division office in Waterbury. There is currently a single Indirect Discharge-permitted system in the study area, serving the Mad River Green Shopping Center in Irasville. The permittee for this system is currently in the process of renewing the system's permit through the General Permit process within the Indirect Discharge Rules (Section 3.2.2 and Appendix D).

3.5. Property Owner Survey

The main goal of the property owner survey was to obtain information regarding existing septic systems. The survey was mailed to Waitsfield Village and Irasville property owners in early September 2009. Of the 185 surveys sent, we received responses from 74 owners (40%). The number of surveys mailed is larger than the number of parcels in the study area because the survey was sent to each individual owner of a residential or commercial condominium unit, rather than only to the common land owner or property manager. Tables 1 and 2 contain summaries of the responses.

The data collected from the individual surveys were very useful to the project consultants during the assessment process. The survey provided information about ages and types of septic systems, whether any

changes to onsite wastewater or water supply systems had been completed since the initial survey in 2001, when septic tanks were last pumped, and whether the owners had made repairs or had plans on file.

Approximately 10 of the respondents' onsite systems (representing about 8% of the parcels in the study area) have experienced a malfunction (surfacing sewage, sewage back-up into a structure, etc.) since the 2001 survey. Most, but not all, respondents reported that the system malfunction had been remedied; remedial strategies included building sewer cleanouts and pipe repairs, septic tank replacements, and leachfield replacements. Most respondents to both surveys indicated that their systems continued to function properly.

Approximately 10 of the respondents' onsite systems (representing about 8% of the parcels in the study area) have experienced a malfunction (surfacing sewage, sewage back-up into a structure, etc.) since the 2001 survey. Most, but not all, respondents reported that the system malfunction had been remedied.

About 20% of the respondents indicated that they currently had a plan to change the use of their property—but almost 40% indicated that if they had access to additional wastewater treatment capacity, they would implement plans for their property that could not be implemented under current conditions.

Two questions on both versions of the survey were directed towards residents' interest in obtaining information and training on maintaining their wastewater systems, or in receiving direct assistance with maintenance. A majority of respondents were interested in receiving training (33%) or were unsure (25%), while a significant minority were not interested in training or information (46%). Most residents (86%) did not feel that they needed any help with maintaining their wastewater systems.

Besides collecting important information and updates on wastewater treatment systems and water supplies, a series of questions were formulated to gauge whether wastewater capacity was a limiting factor in property owners' plans for the future. About 20% of the respondents indicated that they currently had a plan to change the use of their property—but almost 40% indicated that if they had access to additional wastewater treatment capacity, they would implement plans for their property that could not be implemented under current conditions (Table 1). Potential plans described by respondents included constructing additional residences or commercial buildings, expanding existing commercial uses (including medical or dental practices), and allowing expansion of municipal amenities (more library space, change school food program, etc.).

Additional questions were focused on ascertaining the residents and property owners' perspective on the appropriate role for the Town to pursue in terms of building wastewater treatment capacity and managing/maintaining existing or future wastewater treatment infrastructure. Responses to these questions make two things clear: respondents think *something* should be done with regard to wastewater treatment and management, but there is a broad range of opinion about what level of treatment and management service (if any) should be provided by the Town (Table 1). For instance, only four

> [Survey] respondents think *something* should be done with regard to wastewater treatment and management, but there is a broad range of opinion about what level of treatment and management service (if any) should be provided by the Town.

respondents (about 5%) felt that the right wastewater treatment option for Waitsfield Village and Irasville was to keep all systems as they are now, significant minorities felt that existing problems should be fixed (17% of respondents) and/or that limited capacity should be provided for future growth (28% of respondents), and a plurality (40%) felt that wastewater capacity should be provided for any property that needs it, similar to the system that was voted down in 2008 (Table 1, Question 10). A similar diversity of opinions was expressed about how wastewater infrastructure should be maintained and managed in Waitsfield Village and Irasville (see Table 1, Question 11).