Assessment of Decentralized Wastewater Options:

A Survey of Needs, Capacity and Solutions for Historic Waitsfield Village and Irasville, Vermont

FINAL REPORT

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This project is being performed by Stone Environmental, Inc. for the Waitsfield Planning Commission's Wastewater Committee with funding provided by the Vermont Department of Housing and Community Affairs.

Prepared for:
Waitsfield Planning Commission, Wastewater Committee
9 Bridge Street
Waitsfield, VT 05673
Tel. / 802.496.2218
E-Mail / drew@madriver.com

Prepared by:
Stone Environmental, Inc.
535 Stone Cutters Way
Montpelier, VT 05602
Tel. / 802.229.4541
Fax / 802.229 5417
E-Mail / amacrellis@stone-env.com

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Executive Summary

Following a failed bond vote at Town Meeting in March 2008 for a proposed centralized wastewater collection, treatment, and dispersal system to serve Irasville, the Town of Waitsfield's Selectboard approved a request from the Planning Commission review alternative options for wastewater management in Waitsfield Village and Irasville. This request recognized that a centralized wastewater treatment solution was unlikely to move forward, but significant wastewater treatment and capacity challenges still existed in the two village areas.

The Town of Waitsfield's Planning Commission appointed a Wastewater Committee to undertake a decentralized wastewater study funded by a FY10 Municipal Planning Grant from the Vermont Department of Housing and Community Affairs (DHCA). Stone Environmental Inc. (Stone) was retained by the Committee using the grant funding to update an existing (2001) survey of property owners and consider decentralized wastewater treatment options for the Historic Waitsfield Village and Irasville areas, located along Vermont Route 100.

The overall goals of the study are to:

- Update the existing 2001 survey of water supply and wastewater treatment infrastructure;
- Re-evaluate wastewater treatment and dispersal capacity and needs in light of the municipal water project currently under construction; and
- Evaluate wastewater management options and develop a summary report.

This report provides information about current conditions, the range of wastewater treatment and capacity needs expressed in the survey, and an approach to meeting those expressed needs by providing targeted wastewater capacity with decentralized treatment systems where and when that capacity is needed.

The information gathered and updated from property owners during this study indicated that substantial wastewater treatment needs currently exist within Waitsfield Village and Irasville. Examples of current wastewater challenges, as described by respondents to the property owner survey, include:

- Periodic wastewater system malfunctions.
- Lack of wastewater capacity where desired by business owners to sustain and grow existing enterprises.

- Significant repair and replacement for failed or failing on-site wastewater systems, requiring owners to borrow funds and assume debt to cover repair and replacement costs.
- Lack of any strategic, community-level wastewater management support or potential solutions.

Nearly 50% of the developed properties in Waitsfield Village, and 25% of the parcels in Irasville, may not be able to replace their current on-site wastewater systems with a fully complying replacement on the same lot in the future.

The chief limitation on providing sufficient wastewater capacity for Waitsfield Village and Irasville is the proximity of wells and wellhead protection areas to on-site wastewater treatment and dispersal systems. The update of infrastructure mapping completed for this report, which includes recent wastewater system replacements or upgrades as well as an assessment of recent permits issued by the Vermont DEC, illustrated that in the absence of a municipal wastewater solution, several property owners have invested significant resources to replace their own on-lot infrastructure. However, in some cases, even these recently-replaced systems represent a "best fix" solution, with system components such as leach fields located too close to nearby potable water supply wells to meet full regulatory standards. In fact, the planning-level assessment of lot-by-lot wastewater treatment needs and capacity completed for this study indicated that nearly 50% of the developed properties in Waitsfield Village, and 25% of the parcels in Irasville, may not be able to replace their current on-site wastewater systems with a fully complying replacement system on the same lot in the future.

The Waitsfield Municipal Water Project, now under construction in Waitsfield Village and Irasville, is integral to the conversation regarding decentralized wastewater needs. A completed water system will eliminate many wellhead protection areas, and thus will directly increase the number of sites in the study area that can support on-site wastewater treatment and dispersal. The municipal water program will also address long-standing concerns regarding inadequate separation distances between water supply wells and onsite wastewater treatment systems, while also providing water supply capacity for fire protection. However, while the issues of water supply and appropriate wastewater treatment are inseparable, provision of a municipal water system will not fix existing outdated or undersized wastewater treatment infrastructure. In Waitsfield Village, the most significant limitations on wastewater capacity relate to the wellhead protection areas that will remain in force even after the municipal water project is complete. In Irasville, fewer wellhead protection areas will remain in force once the municipal water project is complete, but the underlying soils still present challenges for soil-based wastewater treatment—especially in the vicinity of Winter Park, the Skatium, and Fiddler's Green.

Engineering, treatment technology, management, and funding approaches can all be developed to address wastewater needs and the challenges of soil conditions and remaining wellhead protection areas. The Town of Waitsfield now has the opportunity to consider re-purposing previously granted wastewater infrastructure funding to address these expressed needs and physical constraints.

In the final recommendations of this study, significant attention is given to funding options that would help provide loans for upgrades or replacements of decentralized systems. This study has identified a relevant and transferable precedent in Vermont for establishing a municipal program of long-term, low-interest revolving loan funds for property owners repairing and/or replacing decentralized wastewater infrastructure on private property. The precedent includes basic system management requirements and other legal protections to safeguard the public loan investments.

This study has identified a relevant and transferable precedent in Vermont for establishing a municipal system of long-term, low-interest revolving loan funds for property owners repairing or replacing decentralized wastewater infrastructure on private property.

Based on significant expressed and ongoing needs in the study area for improved wastewater management, an expressed desire for a broad variety of wastewater solutions, and the availability to Waitsfield of state and regional funding solutions, this study recommends establishment of a structured program that can provide incremental support for improved wastewater management to the community.

In summary, this study recommends that the Town of Waitsfield consider implementation of a revolving loan fund based on relevant Vermont precedent, and to proceed by first establishing a Wastewater Management District. This District would oversee a structure and process for directing existing EPA State and Tribal Assistance Grants, Clean Water State Revolving Loan Funds, and other available funding solutions, to support the provision of appropriately managed decentralized wastewater treatment and dispersal capacity in Waitsfield Village and Irasville.

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1. INTRODUCTION

The Town of Waitsfield's Planning Commission received a FY10 Municipal Planning Grant from the Vermont Department of Housing and Community Affairs (DHCA) to update an existing survey of property owners and consider decentralized wastewater treatment options for the Waitsfield Village and Irasville areas, located along Vermont Route 100 (Figure 1).

The objectives of the study are to:

- Update the existing survey of water supply and wastewater treatment infrastructure;
- Re-evaluate wastewater treatment and dispersal capacity and needs in light of the municipal water project now under construction; and
- Evaluate wastewater management options and develop a summary report.

Stone Environmental Inc. (Stone) was selected by the Town of Waitsfield to conduct this study. This final report provides information on each of the objectives listed above.

1.1. Project Background

The Town of Waitsfield's Selectboard requested that the Planning Commission review the potential options for wastewater management in Waitsfield Village and Irasville, following a failed bond vote for a proposed centralized wastewater collection, treatment, and dispersal system to serve Irasville at Town Meeting in 2008. The Planning Commission appointed a Wastewater Committee to undertake this effort in the spring of 2010. The following paragraph, from the Town's Request for Proposals to complete this project, describes Waitsfield's ongoing search for wastewater management solutions:

> For well over a decade, the Town of Waitsfield has explored options for providing wastewater needs in the town's center (Waitsfield Village Center and Irasville)…An organized wastewater system would replace currently inadequate and failing septic systems and increase capacity for new development within the Mad River Valley's commercial and residential core. Waitsfield's 2004 *Wastewater Facilities Plan* focused on a proposal for a centralized wastewater collection system providing significant wastewater capacity at a projected cost of $12 million in two phases. Due to the Plan's capacity design, the feasibility of decentralized options to supply wastewater capacity did not receive detailed study. A town bond vote in 2008 for the proposed centralized collection and treatment system serving only Irasville failed by a significant margin due to concern over substantial initial and ongoing costs. Despite this setback, the need for wastewater management continues to be paramount… Examination of decentralized wastewater options as an alternative or part of a phased implementation of a centralized system is an important step in enabling Waitsfield to move forward.

1.2. Local Outreach

Although the scope of this planning grant did not require local outreach, it was nonetheless an important component of the work of the project. The Waitsfield Planning Commission's Wastewater Committee actively participated in and oversaw the project; the members are all residents of Waitsfield. The members of the Wastewater Committee are listed in Appendix A. The committee met regularly during the course of the project to take part in detailed discussions on the study scope and results. Members of the Wastewater Committee wrote columns and letters to the editor for publication in the Valley Reporter announcing the property owner survey and inviting participation (Appendix B), and contacted or met individually with key property owners to ensure that their opinions were reflected in the survey results.

The property owner survey questionnaire was the primary outreach tool utilized in this project. Two versions of the survey were developed and distributed to the study area property owners:

- Survey I was distributed to property owners who responded to the property owner survey regarding water and wastewater infrastructure distributed by Phelps Engineering, Inc. in November 2001. This version of the survey asked for information about any changes to water and wastewater systems since the last survey, and about the property owners' plans (or desires) for the future.
- Survey II was distributed to property owners who did not respond to the 2001 survey. This version of the survey asked for basic information about existing water and wastewater systems, and about the property owners' plans (or desires) for the future.

The results of the surveys are summarized in Tables 1 (Survey I) and 2 (Survey II). Question responses that were identical between the two survey versions are included in Table 1; these responses are also tabulated separately within the Survey II summary for respondents to that survey only. The overall response rate for the surveys was 44%, or 68 out of 154 surveys mailed. Figure 2 summarizes the geographical distribution of respondents to both version of the survey. Details of the survey responses are described further in Section 3 of this report.

2. STUDY AREA DESCRIPTION

The study area includes parcels within the Village Business, Village Residential, and Irasville Village zoning districts in Waitsfield, Vermont. The study area is further bounded by the service area for the municipal water project, to include only properties within these zoning districts on the northern/western side of the Mad River. Waitsfield Village and Irasville are located along Vermont Route 100 near the western border of the Town of Waitsfield. Waitsfield is located in Washington County in the northeast portion of the state. Figure 1 shows the borders of the study area in their wider geographical context. Table 3 includes a list of properties within the study area including parcel identification numbers, street addresses, owner or contact names, property uses, and approximate parcel sizes.

2.1. Community Profile

Waitsfield serves as the commercial center of the Mad River Valley, and is located between the villages of Moretown and Warren in central Vermont. The Town is bordered by Moretown and Duxbury to the north, Northfield to the east, Warren to the south, and Fayston to the west. Waitsfield Village contains residences and commercial development, as well as municipal services including the Waitsfield Elementary School, fire and ambulance services, the Town Offices, and the Joslin Memorial Library. Existing development in Irasville is primarily commercial, through there are a few residences, as well as apartments and senior housing. Woodlands and agricultural land surround both village areas.

The Town of Waitsfield's population grew from 1,422 in 1990 to 1,659 in 2000 (US Census, 2000 and Waitsfield Town Plan, 2005), representing a 17% increase in this ten year period. The population results of the 2010 US Census are not currently available, but are expected in the spring of 2011.

The Waitsfield Village and Irasville study area includes 139 properties, totaling approximately 255 acres. Within the Waitsfield Village area, 21 properties contain single-family residences or multi-unit residential condominiums. The area contains over a dozen small retail stores, offices, cafés, and restaurants, some with accessory apartments or residences, as well as the Mad River Valley Health Center. There are also several public buildings including the Town Offices, post office, library, Waitsfield-Fayston Fire Station, Mad River Valley Ambulance, the Waitsfield United Church of Christ, Mad River Valley Welcome Center, and the Waitsfield Elementary School. The Irasville area, in contrast, functions as the Mad River Valley's "downtown" for commercial and service businesses (Waitsfield Town Plan, 2005)—and hosts two grocery stores and a natural foods market, several restaurants, the Mad River Green and Village Square shopping centers, the Waitsfield Inn, a movie theater, lumber yard, and three gas stations, as well as senior and affordable housing, additional commercial enterprises, and 10 residences. Property sizes for developed properties in both areas range from less than 0.1 acre to about 26 acres.

2.2. Natural Resources

Natural features can pose both opportunities for and limits to the construction and successful operation of decentralized wastewater dispersal systems. These features, such as topography, surface waters, wetlands, and soils, are described below with particular attention to their impact on the potential for onsite wastewater dispersal in Waitsfield Village and Irasville. Figure 3 identifies environmental sensitivities within the study area.

2.2.1. Topography

The study area lies in the heart of the Mad River Valley, ultimately bounded by the main ridge of the Green Mountains to the west and by the Northfield Range to the east. Both the Irasville and Waitsfield Village areas are relatively flat along Route 100 (Figures 1 and 3). There are some areas of steep slopes near the Mad River in Irasville, where the developed plateau drops off into the river's floodplain, as well as on the hillslopes to the northwest of Waitsfield Village. Generally, elevations range from around 900 feet above mean sea level (AMSL) on the hillslope at the end of Mehuron Drive towards the northwest of Waitsfield Village, to a low of 700 feet AMSL to the north where the Mad River leaves the study area.

2.2.2. Surface Water and Wetlands

The Mad River is by far the most prominent water feature in the study area, flowing from southwest to northeast past Irasville and Waitsfield Village, and nearly the entire eastern border of the study area lies within the FEMA-designated 100-year floodplain for the Mad River, as well as the Fluvial Erosion Hazard Area for the Mad River defined by the Vermont DEC's River Management Section (Figure 3). Several small, unnamed tributaries to the Mad River flow from the Green Mountains southeast through both village areas, and there is a small pond on Town-owned land in the Irasville area near the Big Picture Theater. There are several land areas, often associated with the unnamed tributaries, which are included in the Vermont Significant Wetlands Inventory (Figure 3). These wetland areas include portions of the Flemer Green, formerly known as the "Polo Field" parcel, at the north end of Waitsfield Village and the area north of the town-owned pond and the Big Picture Theater.

Irasville and Waitsfield Village are located entirely within the Mad River's watershed area. The Mad River is designated a "Class B" water by the Vermont Department of Environmental Conservation, and its seasonal impairment by elevated levels of bacteria is a continued cause of concern (Friends of the Mad River, 1995 and 2010; Waitsfield Town Plan, 2005). The portion of the Mad River between the covered bridge in Waitsfield Village and the river's mouth remains listed on the state's impaired waters list (also known as the "303(d) list") for *E. coli* contamination (Vermont DEC, 2008).

2.2.3. Soils

There is a range of soil types in the study area. Soils vary based on geologic material, slope, hydrology, human disturbance, and other factors. The best generalized source of soils data for this area is the Soil Survey Report of Washington County prepared by the Natural Resource Conservation Service (NRCS). The NRCS data was derived by mapping the landscape with spot field checks to arrive at an approximate level of resolution of 3 acres, with acknowledged inclusions of other soils. This report describes the soil series, or groups of soils with common properties, found in the study area.

32% of the land in the study area appears to be suitable for conventional onsite wastewater treatment systems.

10% of the study area is likely to require either at-grade systems or conventional systems with pretreatment.

Another 32% of the study area is likely to require either mound systems or at-grade systems with pretreatment.

About 7% of the study area is likely to require both some form of advanced pretreatment and a mound dispersal system.

About 17% of the land is likely to require some form of 'best fix' solution.

The NRCS soils information is planning-level data, and the 3-acre resolution means that it is not intended to be precise for parcel-specific soil conditions. Site-specific testing, including backhoe test pits and/or percolation tests, would be required to determine the proper wastewater treatment options for an individual property.

For the purposes of this assessment, we are primarily concerned with soil properties that determine suitability for the siting of onsite wastewater systems: depth to seasonal high groundwater, depth to bedrock, soil permeability, and slope. Figure 3 shows the soils in the study area and vicinity, and soil characteristics are summarized in Table 4.

In the Waitsfield Village area, most of the existing historic development is clustered to take advantage of soils that are best suited to onsite wastewater treatment and dispersal (Figure 3). The area along Vermont Route 100 through most of both villages is apparently underlain by Colton gravelly loamy sands, which are well drained and have few limitations with regard to shallow seasonal groundwater or bedrock. Based on the NRCS soils information, about 32% of the land in the study area appears to be suitable for conventional wastewater treatment systems, though 2% of that may be limited by the presence of steep slopes. Some of the development pattern in Irasville—but by no means all of it—is similarly clustered on these well-drained soils.

There are also significant portions of both village areas that appear to have limited suitability for conventional subsurface wastewater dispersal systems. Approximately 10% of the study area is likely to require either at-grade systems or conventional systems with pretreatment, primarily to overcome limitations due to shallow seasonal groundwater. The soils with this limitation are primarily Waitsfield

silt loam soils (Table 4), which surround the better-drained soils near Route 100 in Waitsfield Village and underlie most of the Fiddlers' Green development in Irasville (Figure 3). Another 32% of the study area is likely to require either mound systems or at-grade systems with pretreatment. Although most of the soils in this grouping, the Tunbridge-Lyman complex soils (Table 4), are limited by shallow bedrock, only a small portion is located where development is concentrated (on the north side of Route 100, along the break in slope between Waitsfield Village and Irasville). The other soils within this grouping are primarily limited by shallow seasonal groundwater, and underlie much of Flemer Green (the former "Polo Field") in Waitsfield Village, as well as much of the area immediately north and west of the Mad River in Irasville. About 7% of the study area, primarily located near the Town-owned pond in Winter Park and north-northwest of the Flemer Green in Waitsfield Village, is likely to require both some form of advanced pretreatment and a mound dispersal system, primarily to overcome limitations due to high seasonal water tables. Finally, about 17% of the land in the study area, mostly in Irasville extending in an arc from east of the town-owned pond beneath Allen Lumber and south beneath the Irasville Business Park and Shaw's grocery, is likely to require some form of 'best fix' solution. 'Best fix' means that if the property is already developed and its wastewater treatment system fails, it may not be possible to construct a replacement system that meets all of the conditions of Vermont's current wastewater treatment rules. If a property with these difficult soils is undeveloped, it may not be developable for uses that generate wastewater.

2.2.4. Water Supplies

Onsite wells and springs can limit onsite wastewater capacity because of the required protective setbacks between water supply wells and wastewater dispersal systems. Currently, all properties within both village areas are served by individual or shared water supplies. Information about the location and type of potable and non-potable water supply wells in the study area, as well as the protective buffer distance or "well shield" for each water supply, is shown on Figure 4. In order to construct this figure, we began with the existing water supply and wastewater treatment inventory compiled by the staff of Phelps Engineering, Inc. during the completion of the Town's 2004 *Wastewater Facilities Plan*. This inventory was provided by Phelps Engineering in AutoCAD format, and was converted into feature classes within an ArcGIS geodatabase. We then updated the inventory with information from Vermont DEC potable water supply and wastewater system permits issued since the inventory was compiled in 2001-2002, as well as with information provided by respondents to the property owner surveys.

Figure 4 displays water supplies and their protective buffers, as well as current knowledge about the location and components of onsite wastewater treatment systems (which are discussed in more detail in Section 3). This figure clearly illustrates the overlap on many parcels between well buffers, within which soil based wastewater dispersal should not occur, and onsite wastewater treatment and dispersal components. (The wastewater treatment aspects of this map are discussed in Section 3 of this report.)

Within the Irasville Village area, approximately 78% (46 of 59 respondents) of the property owners have opted to connect to the municipal water system. In contrast, within the Waitsfield Village area, about 53% (28 of 53 respondents) opted to connect to the municipal water system.

An important aspect of this study was to evaluate how individual property owners' decisions regarding connection to the municipal water system currently under construction in the Waitsfield Village and Irasville areas might affect future decisions about wastewater management. In order to illustrate how connections to the municipal water system may increase the wastewater treatment capacity located on existing properties in the study area, we obtained a spreadsheet of water project connection status and anticipated water demands from the Town's Municipal Project Manager. The connection status for each property within the study area, as reported in that master spreadsheet, was linked to a parcel polygon in GIS by the parcel's unique Parcel ID.

Figure 5 shows the status of connections to the municipal water project on a parcel-by-parcel basis, as of November 2010. Green-shaded parcels on Figure 5 denote properties that have currently committed to connect to the municipal water system. Within the Irasville Village area, approximately 78% (46 of 59 respondents) of the property owners have opted to connect to the municipal water system. In contrast, within the Waitsfield Village area, about 53% (28 of 53 respondents) opted to connect to the municipal water system.

In order to illustrate how the implementation of the municipal water project alters the picture regarding onsite wastewater treatment capacity, the well buffers associated with water supplies that will be decommissioned after connections to the municipal water system are made were hidden in the infrastructure inventory (Figure 6). It is apparent that the incidence of wastewater treatment infrastructure potentially interfering with potable water supplies in the Irasville area will be significantly reduced once the project is complete. Within the Waitsfield Village area, however, a significant number of well shields will remain once the municipal water project is complete, and many of the remaining well shields will still overlap with onsite wastewater treatment components on the same or neighboring parcels. Connection to the municipal water system is voluntary for existing properties; therefore, where owners have opted not to connect to the municipal system, wellhead protection areas for public or private water supplies will remain in effect after the municipal water project is complete.

2.3. Zoning Districts

The study area covers three different zoning districts: the Village Business District, the Village Residential District, and the Irasville Village District (Figure 3).

Waitsfield's 2009 Zoning Bylaws state the purposes of each of these districts, as follows:

> The purpose of the Village Business District is to promote a mix of uses in the traditional center of Waitsfield Village while preserving the area's historic character, architectural resources and ability to function as a livable community, as described in the Waitsfield Town Plan. A mix of residential, civic, cultural, and commercial uses are allowed, providing such uses are compatible with existing uses.
>
> The purpose of the Village Residential District is to maintain and enhance the residential and historic character of Waitsfield Village outside of the commercial core, as described in the Waitsfield Town Plan, and to allow for additional residential, public, institutional, and very limited commercial uses in a manner that supports the historic settlement pattern of the Village and maintains the Village's ability to function as a livable community.
>
> The purpose of the Irasville Village District is to function as the town's growth center as defined in the Waitsfield Town Plan, to enable coordinated expansion of residential development, shopping facilities, and other commercial uses that minimize traffic impacts, and which concentrate development into a more compact village setting.

Minimum lot sizes in the Village Business and Village Residential districts are ¼ and ½ acre, respectively, for each family dwelling unit or principal structure—significantly smaller than other districts in the Town. Interestingly, although the stated purpose of the Irasville Village District is to also allow concentrated development in a compact village setting, the minimum lot size in this district is 1 acre.

Zoning district and bylaw changes have been proposed for the Irasville Village District for some time, but these changes are on hold primarily due to a lack of supporting municipal utility infrastructure. The *Master Development Plan for the Irasville Growth Center* (2002), the resultant proposed zoning revisions (Town of Waitsfield, 2007), and the Town of Waitsfield's attempt to gain designation as a growth center for the Irasville area (Town of Waitsfield, 2008) were all conditioned upon the provision of municipal, centralized water supply and wastewater treatment infrastructure. The lack of a growth center designation also stopped the Town from applying for the formation of a Tax Increment Financing (TIF) district, which had the potential to encourage public and private real property development or redevelopment while providing some revenue to the Town in the form of property taxes that would be utilized to pay the debts incurred to provide municipal water supply and wastewater infrastructure.

3. HISTORIC AND CURRENT WASTEWATER TREATMENT

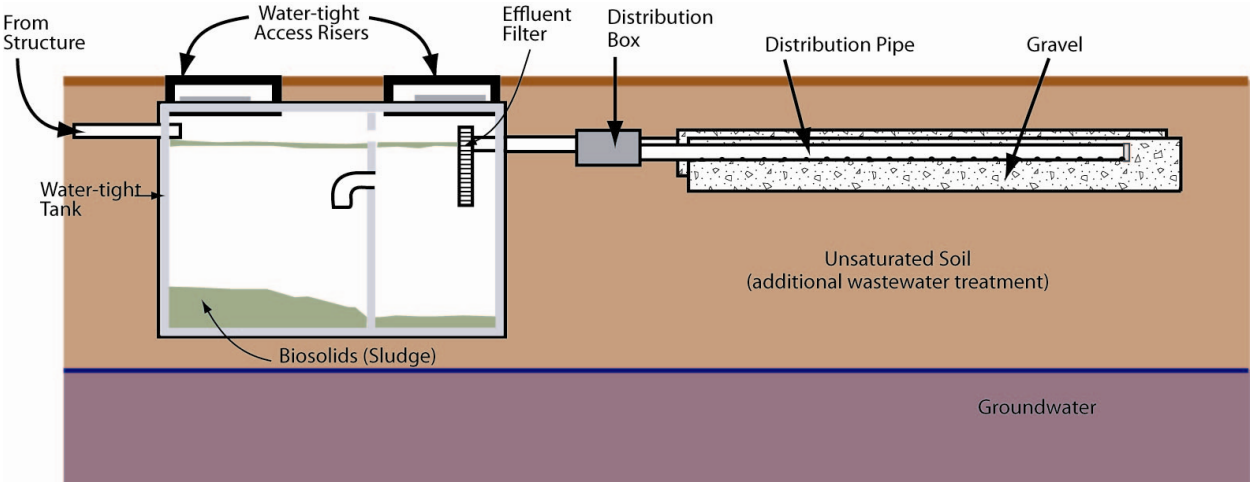
The properties in Waitsfield Village and Irasville are served by individual and shared onsite wastewater treatment systems. There are no wastewater treatment plants or sewers in the study area. Information on the existing wastewater treatment systems was gathered from the wastewater system and water 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.

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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).

4. NEEDS ASSESSMENT

The needs assessment portion of this study includes a data-driven Geographic Information System (GIS) analysis that combines spatial information, such as USGS topography and NRCS soils information, with local information such as parcel boundaries, building footprint areas, and building uses, to determine what, if any, constraints a property may contain for onsite wastewater treatment and dispersal. The results of the GIS analysis are indicated on Figure 7 by colors summarizing the key constraint(s), if any, for each property.

The results of that analysis were confirmed and refined by including all other sources of information collected and described in Sections 2 and 3. This review resulted in an overall summary of the known and potential limitations on each property. The property-specific recommendations do not necessarily reflect the current actual conditions of the individual wastewater treatment systems in the study area. A displayed limitation simply means that, if an individual system were to malfunction in the future and need replacement, it may be difficult to site a replacement system on the property that meets all of the setbacks and separation distances that are required by the current State wastewater rules. The results of this assessment are summarized on Tables 6-8 and on Figure 7.

Following is a detailed description of the Needs Analysis and a summary of the results for the study area.

4.1. Data-Driven GIS Needs Analysis

The Needs Analysis was performed to identify parcels that may not be suitable for onsite septic systems. There are two main components to the needs analysis: an “available area” analysis and a “required area” analysis, each of which is described below.

The objective of the available area analysis was to identify which developed parcels would be constrained by inadequate lot size if required to install an upgraded onsite system. There are many factors that result in areas of a parcel being unavailable for construction of an onsite system. For example, state and local regulations require that certain "setbacks" or distances from natural or artificial features be maintained in order to protect those resources. One such setback is a required separation of 50 feet from surface waters such as ponds or streams. It is because of setback regulations that the total available area on a parcel is significantly reduced when determining which areas are suitable for onsite systems. A second and equally important part of determining if a parcel has enough suitable land area to support an onsite system is the analysis of the soil conditions on the parcel to determine the area required to treat the wastewater flows from the parcel. Both the determination of available area and that of required area for onsite systems for each developed parcel were addressed. The last step identified those properties with soil conditions where the seasonal high groundwater table was 24 inches or less or where the depth to bedrock was less than 24 inches. Both of these conditions impact the type of onsite system that may be built.

The following assumptions and criteria were used to conduct the needs analysis.

4.1.1. Available Area Analysis

The first step in the assessment of suitable areas was to determine the available area on each developed parcel. This process involved both analyses of GIS data to identify areas unsuitable for onsite system development, as well as complex database operations to identify parcel features that might further limit onsite system development. The table below lists each of the setbacks of features examined in the available area analysis. Each of these features will be briefly discussed.

Limiting Features	Horizontal Setback (ft)
Surface waters (ponds and streams)	50
Wetlands	50
Top of embankment, or slope greater than 30%	25
Bedrock Escarpments	25
Property line	25
Zone 1 Wellhead Protection Area	Extent of defined Wellhead Protection Area
Private Drilled Wells*	100
Private Shallow Wells or Springs*	150
Foundation, Footing, or Curtain Drains	35

** The exclusion distance for private drilled wells and springs also extends up-gradient from the supply location for at least 200 feet (drilled wells) to 500 feet (shallow wells/springs), and can vary additionally depending upon the design demand on the water supply.*

Source: Vermont Environmental Protection Rules, Wastewater System and Potable Water Supply Rules, eff. September 2007.

1. Surface Waters: Streams and ponds were identified from the Vermont Hydrography dataset. These lines and areas were spatially buffered with the indicated setback distance using GIS.
1. Wetlands: Wetlands were identified from the 2010 Vermont Significant Wetlands dataset. The features in this dataset will be spatially buffered with the indicated setback distance using GIS.
2. Top of Embankment, or Slope greater than 30%: Areas with slopes of greater than 30% were identified from the GIS Digital Elevations dataset. These areas were spatially buffered with the indicated setback distance using GIS.

3. Bedrock Escarpments: Bedrock Escarpments were obtained from the Washington County soils dataset. Escarpments were spatially buffered with the indicated setback distance using GIS.
4. Property Lines: Property lines were obtained from the Waitsfield GIS parcel dataset. Property lines were spatially buffered with the indicated setback distance using GIS.
5. Water Supplies: Water supply information was collected from spatial data sources and from permit files. Spatial well locations and wellhead protection areas (for public water supply wells with Zone I Wellhead Protection Areas) were obtained from the State Water Supply GIS dataset, and these data were confirmed against the infrastructure inventory compiled by Phelps in 2000-2001 and updated during this project. Each water supply point was spatially buffered with the indicated setback distance using the shield polygons associated with each point in the inventory. Only protective well buffers belonging to properties that have not opted to connect to the municipal water system were included in the analysis.
6. Building Footprints: Building footprints were obtained from the infrastructure inventory compiled by Phelps in 2000-2001 and updated during this project based on permits, current orthophotographs, and local knowledge. The building footprints were buffered using GIS, and their areas were included in the analysis as areas unavailable for onsite systems.
7. Available Area Calculation: The total available area for a parcel was determined by subtracting an assumed building footprint area from the area of the parcel outside the required setback buffers as calculated by the GIS analysis. This calculation is shown in the following equation:

   Area Available = Parcel Area – Required Setback Buffer – Building Footprint – Wellhead Protection Area Buffer

4.1.2. Required Area Analysis

The required area for construction of an onsite system was estimated from two primary pieces of information: 1) soil properties (percolation rates and long-term acceptance rates) for each parcel, 2) design parameters for each onsite system. Assumptions made regarding the determination of each of the inputs to the required area calculation are described below.

4.1.2.1. Soil Properties

Percolation rates and application rates were estimated for each soil type within the study area. We assigned average percolation rates using the soil textures from the NRCS soils data and the average rates listed in the Vermont Indirect Discharge Rules. Each parcel was assigned the properties of the predominant soil type for purposes of determining the required area.

4.1.2.2. Onsite System Design Assumptions

Where suitable soils existed, the onsite system was assumed to be a standard trench leach field design. The standard Vermont Wastewater System and Potable Water Supply Rules application rates were used in the sizing of the leach field. A standard three-foot wide trench, with four feet separation was used as the typical layout. This resulted in a range of areas needed for the leach field depending on the soil's assumed percolation rate. For soils where only mound systems would be feasible, an estimate of the required area for a mound dispersal system was calculated using the application rates for mounds specified in the Rules. It was assumed that if a leach field (or mound) could be successfully sited on the property there was adequate area for other system components, such as septic tanks and distribution boxes.

Two different methods were used to determine the volume of wastewater (in gallons per day) that would need to be treated on each developed parcel. If there was a DEC permit for the parcel that specified the capacity of the wastewater treatment system, that volume was assumed to be the capacity that would need to be located on the parcel if the existing wastewater system were to be replaced. If no permitted capacity for the wastewater system was available, the flow that would need to be treated and dispersed on that parcel was estimated based on the water supply allocation for the parcel in the master spreadsheet for the municipal water project. We generally multiplied that water supply allocation by a factor of two, because while the municipal water allocation is relatively low to account for flow equalization over many connections, each wastewater system is still on-site or shared among a relatively small number of users. The factor of two is somewhat conservative, but represents the likely peak flow that an individual wastewater system might reasonably be expected to treat.

4.1.3. Area Analysis Assessment

The available area for an onsite system was compared to the required area for each parcel. The required area for a system was based on the predominant soil type on the parcel. Parcels were identified as area limited if the available area was less than the required area. Parcels were identified as being unconstrained by area when the available area was greater than or equal to the required area.

4.1.4. Seasonal High Groundwater Analysis

An additional GIS analysis was conducted for parcels with potential groundwater limitations. Soils with groundwater depths of less than 24 inches would require a raised system, such as a mound, and would indicate a constraint to a typical subsurface system. A parcel was identified as having a groundwater limitation if the area of the parcel with a groundwater depth of greater than 24 inches represented an area smaller than that required for a traditional onsite system. This analysis may overestimate site limitations regarding depth to groundwater, as it does not account for filtrate systems, alternative systems, or desktop hydrogeologic analyses that may be used under the Wastewater System and Potable Water Supply Rules.

4.1.5. Depth to Bedrock Analysis

Depth to bedrock was assessed to identify parcels with potential bedrock limitations. Parcels with shallow bedrock, of less than 24 inches, would require additional fill to allow an onsite system to function properly. A parcel was identified as having a bedrock limitation if the area of the parcel with a depth to bedrock of greater than 24 inches represents an area smaller than that required for a conventional onsite system.

4.2. GIS Analysis Results

The results of the analysis are represented on Figure 7 and summarized in Tables 6 and 7. The factors affecting the analysis results are included in the table.

Of the 63 parcels within the Waitsfield Village portion of the study area, there were 36 parcels that can support an onsite wastewater dispersal system under the assumptions listed above (Table 6). These parcels met all the environmental setbacks required in the Area Analysis Criteria table in section 4.1.1 as well as the depth to groundwater and bedrock criteria described in Sections 4.1.4 and 4.1.5.

There were 27 parcels that the GIS analysis estimated may not be able to support an onsite wastewater dispersal system—however, all of these parcels were constrained by only environmental setbacks (Figure 7). Nearly all of the area-limited parcels in the Waitsfield Village area (21 of the 27 parcels, see Table 6) were limited by the presence of wellhead protection areas. Properties limited by setbacks from steep slopes, as well as properties with predominant soils that were ranked “Not Suited” or “Not Rated” and those with limitations related to setbacks from wetlands, are clustered at the break in slope where Route 100 rises into the Irasville area, at the south end of Waitsfield Village. Properties limited by proximity to surface waters and floodplains included the area at the break in slope described above, but also properties along Bridge Street between Route 100 and the Mad River.

Of the 72 parcels within the Irasville portion of the study area, there were 55 parcels that can support an onsite wastewater dispersal system under the assumptions listed above for the area, depth to groundwater, and depth to bedrock analyses described above (Table 7).

There were 17 parcels in the Irasville area that the GIS analysis estimated may not be able to support an onsite wastewater dispersal system—or only about 25% of the developed parcels in this area (Figure 7). The majority (13 of 17 parcels) were constrained by only environmental setbacks. About half of the area-limited parcels were constrained by the presence of wellhead protection areas (6 of 13 parcels, Table 7); parcels with this limitation were primarily located in the vicinity of Dugway Road, but also included the Waitsfield Inn and a single parcel at the top of the break in hill slope between the Waitsfield Village and Irasville areas. Parcels that were constrained by setbacks to wetland areas were located at the north end of Irasville, but also included the Irasville Incubator property. Parcels with area restrictions related to

surface waters or floodplains were primarily located in the southern end of the Irasville area, near the Mad River Meadows Apartments and Fiddler's Green and immediately bordering the Mad River or Mill Brook. The remaining four parcels were constrained either by shallow seasonal high groundwater only, or by both available area and shallow seasonal groundwater.

None of the currently developed parcels in either Waitsfield Village or Irasville appear to be constrained primarily by shallow bedrock.

4.3. Lot-by-Lot Review and Capacity Needs Estimations

Once the results of the GIS analyses were produced, a lot-by-lot review was conducted. This review included using all of the additional information known about the properties, confirming the results of the GIS analyses, including constraints and wastewater treatment capacity needs indicated by property owners, and as well as knowledge of other issues articulated by Wastewater Committee members.

In order to gain an approximate understanding of the potential needs for wastewater treatment capacity in Waitsfield Village and Irasville, the wastewater design flows utilized in the needs assessment (Section 4.1.2.2) were summarized for each of several categories (Tables 6 and 7, and Figure 7, as follows:

- Parcels that the GIS analysis indicated may have challenges replacing onsite systems in the future
- Parcels where property owners indicated, on the survey, that they planned to change use in the future
- Parcels where property owners indicated they might change use if wastewater capacity were available
- Parcels where property owners indicated both plans and capacity needs on the survey
- Other issues or potential issues articulated by Wastewater Committee members

The summary wastewater flow numbers in Tables 6 and 7 were estimated simply, by adding together the estimated water use/wastewater design flow numbers for each parcel that were developed for the GIS needs assessment (Figure 5). As such, these flows are indicative of the total design flow that would likely be needed if each property's wastewater treatment system were replaced on that property. The potential wastewater capacity needs described in Tables 6 and 7 are therefore conservative and do not reflect in any way the potential benefit of flow equalization that may be gained by connecting multiple parcels to a single shared wastewater treatment system.

The results of the needs assessment and the lot-by-lot review indicate some clear contrasts between Waitsfield Village and Irasville. Within Waitsfield Village, the remaining presence of many public and private water supplies results in a significant number of properties where, if a system were to need

replacement in the future, the resulting system would likely be installed in a "best fix" situation if it were installed on the property. The relatively high number of parcels identified by the GIS analysis as potentially limited does result in a significant amount of potential wastewater capacity needed (around 24,000 gallons per day maximum, see Table 6). In the Waitsfield Village area, significant areas of relatively suitable soils correspond closely with the pattern of existing dense development, and the potential future plans indicated by property owners may in some cases be accommodated through the addition of advanced wastewater treatment components to existing systems (thus increasing the capacity of pre-existing leachfields by improving the quality of the effluent these fields receive), or by providing some relatively small shared off-site dispersal capacity for extremely small lots.

Within the Irasville area, a significant number of both public and private water supplies will be taken off-line once the municipal water project is complete, and parcel sizes are generally larger than in the Waitsfield Village area. As a result, there are fewer overall parcels in this area that the GIS analysis identified as potentially limited—but because of the more water-intensive, commercial uses of most of these properties, the potential need in terms of wastewater treatment capacity stemming from the GIS analysis alone is around 33,600 gallons per day (Table 7). As should be expected in an area designated as the growth center for much of the Mad River Valley, property owners in this area indicated that they remain interested in growing their businesses, and in changing the uses of their properties in ways that require additional wastewater treatment capacity. The potential future needs or changes in use identified through the property owner survey include about 22,500 gallons per day of wastewater treatment capacity (Table 7). Other issues regarding wastewater treatment capacity identified in the Irasville area include about 5,500 gallons per day of wastewater, for which replacement systems or off-site solutions may be needed (Table 7).

The results for Waitsfield Village and Irasville are combined in Table 8 to show the overall conditions for the study area.

5. DISCUSSION OF WASTEWATER MANAGEMENT OPTIONS

A "decentralized" wastewater treatment program is one that utilizes wastewater management solutions as close to the sources of the wastewater as possible. This is often realized by utilizing a number of on-site or shared systems to treat relatively small volumes of wastewater, generally from individual buildings or groups of buildings, at or near the source. In 1997, U.S. Environmental Protection Agency (EPA) stated that both centralized and decentralized system alternatives would need to be considered when upgrading failing on-site septic systems. The State of Vermont began a process in 1999 to evaluate and revise its overall wastewater review process to make it clearer and to promote "smart growth" or conversely discourage sprawl. The State encourages the review of decentralized approaches in low-density settings in small and rural communities.

The key to the decentralized concept is that it treats both on-site and shared systems as a permanent wastewater treatment solution—as a valuable part of the infrastructure that should be planned for, sited, designed, and installed properly, operated and maintained appropriately, and monitored as required by any relevant permits. The system's owners (whether the Town or individual property owners) should meet compliance requirements and ensure that users of the system are knowledgeable about how their actions can impact the system.

The decentralized system treatment and management concept has many advantages for communities that are trying to upgrade existing on-site systems within compact developed areas. For many communities, a suitable centralized treatment option may not be cost-effective because of treatment costs, the unavailability of single large areas of dispersal capacity, or the scattered nature of compact development in village areas, which require major infrastructure (long sewers or force mains) to collect sewage for treatment. Waitsfield's prior wastewater master planning efforts have encountered all of these obstacles—even though the "centralized" wastewater collection and treatment solution that was proposed in the Town's 2004 *Wastewater Facilities Plan* also included significant reliance on existing on-site and decentralized infrastructure. That *Facilities Plan* also clearly states that the existing onsite and shared wastewater treatment systems, especially those serving residences and smaller developments, suffer from a lack of routine maintenance--and that this lack of maintenance can strain the existing systems and cause them to malfunction.

Discussions with the Wastewater Committee have made clear that a primary benefit of this study is the articulation of a wastewater management system that will allow for the alleviation of existing wastewater treatment concerns, and that will allow for some limited level of appropriate development in accordance with local initiatives and the Town's overall Plan. Responses to questions in the property owner survey, additional comments submitted by the survey respondents, and the results of this study as described in the sections above all suggest that even though owners and residents may lack consensus about exactly what

the solution is, a wastewater management solution is needed in Waitsfield Village and Irasville and the "do-nothing" option is preferred only by a very small portion of respondents.

Responses to questions in the property owner survey, additional comments submitted by the survey respondents, and the results of this study as described in the sections above all suggest that even though owners and residents may lack consensus about exactly what the solution is, a wastewater management solution is needed in Waitsfield Village and Irasville and the "do-nothing" option is preferred only by a very small portion of respondents.

While consensus has not yet been reached about what wastewater management strategy might be appropriate, time is running out for a significant proportion of the federal grant funding that has been awarded to the Town of Waitsfield for the express purpose of constructing wastewater treatment infrastructure improvements. The proportion of the town's U.S. Environmental Protection Agency State and Tribal Assistance Grant (STAG) that is intended to fund wastewater treatment improvements, approximately $1 million, will revert to the federal government if a strategy for utilizing the funding is not implemented.

The options and costs for a centralized village-wide, single wastewater *collection/treatment/dispersal* infrastructure have been firmly established in previous studies. However, previous evaluations focused on the viability of a centralized wastewater management scheme, without independently considering how the implementation of a municipal water system might improve the prospects for successfully managing wastewater treatment closer to where the wastewater is being generated. This report, by bringing together and assessing current information about connections to the municipal water system and other water supply and wastewater treatment infrastructure, enables serious consideration of the development of a wastewater *management* and decentralized infrastructure improvement funding program.

5.1. Decentralized Wastewater Management in Vermont

The current status of wastewater system regulation and management in Vermont, illustrated in the matrix below, provides a case-in-point illustration of why decentralized systems are often considered to be a "second-rate" solution, or something that is put in place just until the sewer comes along. In Vermont, complex, centralized systems with surface water discharge are highly regulated—and are also treated as permanent infrastructure, with (for example) term-limited operating permits and stable funding mechanisms in place to help pay for ongoing maintenance and replacement. At the other end of the spectrum, small scale, passive, gravity based systems have, in practice, little or no management once a system is permitted and installed. Any maintenance, routine check-ups, pumping, monitoring, or replacement of components is entirely the burden and responsibility of the property owner, and resources to fund replacements are also currently limited to those available to the property owner.

The gap in funding for decentralized wastewater treatment systems as compared to centralized systems is arguably the most critical barrier to the sustainability of a decentralized solution for Waitsfield—as for many other Vermont communities.

The gap in funding for decentralized wastewater treatment systems as compared to centralized systems is arguably the most critical barrier to the sustainability of a decentralized solution for Waitsfield—as for many other Vermont communities. Aside from bank or personal financing, there are currently very few funding sources for individual property owners to tap when small-scale wastewater treatment systems, especially those on private property, need to be replaced. The NeighborWorks® HomeOwnership Centers of Vermont do offer a low-interest revolving loan program to the owners of single-family residences for weatherization and the repair of structural problems or systems failures, subject to income limits (CVCLT, 2007). The available loan funding from this source is limited and has many competing demands upon it, and this funding is only available to home owners—not to local businesses, nor to condominium residents or landlords.

	Centralized collection, treatment, discharge wastewater systems	**>6,500 gpd onsite / decentralized wastewater systems**	**<6,500 gpd innovative/alternative technology onsite / decentralized wastewater systems**	**<6,500 gpd conventional onsite/ decentralized wastewater systems**
Current Wastewater Regulations in Vermont	Water Pollution Control Permit Regulations (NPDES)	Indirect Discharge Rules	Wastewater System and Potable Water Supply Rules	
Current Wastewater Management in Vermont	Municipally owned Certified operators Regular inspection, monitoring, and reporting Term operating permits Sinking funds often mandated locally	Municipal or private owner Certified operators (usually) Regular inspection, monitoring, and reporting Term operating permits Sinking funds…?	Private / individual owner Certified designers Regular inspection, monitoring (sometimes), and reporting…but who tracks that? Funding?	Private / individual owner Certified designers Inspection? Monitoring? Reporting? Funding?
Management Level	High (EPA's Model 5)	→	→	Low (EPA Model 1 or less)

At least one other Vermont municipality has responded to this funding gap by establishing a local low-interest revolving loan program specifically for decentralized wastewater system repairs and replacements. The Town of Colchester administers a long-term, low-interest (20-year term, 3% interest) loan fund with Clean Water SRF funding originating from the Vermont DEC (Town of Colchester,

2010a). They see their income-sensitive loan program as critical to the success of a decentralized wastewater management program, especially as the more complex treatment systems now being installed cause the Town's concerns to shift toward increased levels of management. Colchester's loan program is open to homeowners, including those in condominiums and homeowners' associations—which constitute the vast majority (over 85%) of developed properties in the Town. The funding available through this loam program is also limited, so the Town has implemented a simple priority system to ensure that the funding is being used to fix the most significant environmental problems while assisting those with the most financial need (Town of Colchester, 2010b).

By implementing a management program for decentralized wastewater infrastructure in Waitsfield Village and Irasville, the Town has an opportunity to transition the infrastructure and investment that already exists into something that is sustainable and affordable to those who live and do business here—an infrastructure that supports local objectives and is an amenity rather than a liability. Creating a voluntary program for maintenance that owners can opt in to, and a local funding program for repairs and replacements, will allow the Town to move forward from its current situation.

Stone recommends that the Town determine whether the STAG funding described above can be allocated to a decentralized management strategy, and conduct a financial analysis of appropriate wastewater management program and loan program alternatives. Such a program can appropriately value the investment that property owners have already made in constructing and maintaining existing wastewater infrastructure, enable maintenance to be completed in accordance with permitting requirements, and—most importantly—provide long-term, low-interest financing to property owners for onsite or shared system repair or replacement. Members of the Wastewater Committee have already started to explore this recommendation by initiating discussions with Josh Nemzer of the U.S. Environmental Protection Agency's Region 1 office, who is the administrator of the STAG funding program.

5.2. Who's Responsible? Wastewater Management Models and Governance

There are several different levels of management programs that the Town of Waitsfield might choose to pursue, and varying structures for the governance or the ultimate "manager" of any decentralized wastewater management program that the Town might choose to implement for the Waitsfield Village and Irasville areas. The U.S. EPA uses the term "responsible management entity" or RME to describe the manager of a decentralized wastewater management program, and they define an RME as *a legal entity responsible for providing management services to ensure that decentralized onsite or clustered wastewater treatment facilities meet established criteria* (U.S. EPA, 2003 and Water Environment Research Foundation, 2008).

The level of management that an RME can provide for decentralized systems varies significantly. The following paragraph, extracted from guidance documents that Stone helped to prepare for the Water Environment Research Foundation in 2007-2008, illustrate the different conceptual roles that an RME might fulfill. More details are included in Appendix E.

> The U.S. EPA identifies a broad range of management levels, where increased management controls correlate with increased risks to public health and the environment and/or complexity of treatment technology. For example, in low-risk contexts—where there are few serious consequences from failure—maintenance reminders to homeowners can achieve adequate management—the homeowner awareness management level in the EPA's terminology. Increased probability or consequences of failure require management by competent professional service providers rather than leaving the responsibility with property owners, be they residential, commercial, institutional, or industrial.

The sidebar at right describes how the EPA groups RMEs and associated service providers.

Several different types of RME are possible within Vermont's wastewater and utility rules, and the state's legal framework. Governance structures that could function as RMEs in Vermont communities include the following:

- Local Government
  - Municipality (via local water/wastewater ordinance)
  - Fire District
- Local Non-Government

EPA Decentralized Wastewater Management Models

Maintenance Contracts. The local regulatory authority (e.g. a public health regulator) requires property owners to have contracts with appropriately qualified, and in some cases certified, service providers to ensure proper and timely site and soil evaluation, design, installation, and professional maintenance.

Operating Permits. The local regulatory authority implements a management program that issues permits to property owners for operating their systems, with conditions and requirements for proper maintenance. The operation and maintenance must be carried out by qualified, and often certified, service providers. The authority monitors and enforces compliance, and may or may not act as the service provider.

RME Operation and Maintenance. The public health and/or environmental risks are high enough to require management by a qualified organization on behalf of the property owners. The regulatory authority permits the RME to take on obligations to meet compliance on behalf of property owners, in exchange for a fee. The RME does not own the infrastructure, so this situation is also known as "contract operation."

RME Ownership. The RME owns all the infrastructure assets including systems located on private (e.g., residential, commercial, institutional, etc.) property. For users, the service provided appears equivalent to centralized services with the RME taking on all the associated obligations to ensure performance in exchange for a fee for services. In many states, statutes mandate that RMEs providing sewerage service to multiple properties for a fee be chartered as public utilities, either governmental or private.

- Local Utility
- Co-operative
- Limited Liability Corporation (LLC)

In Waitsfield, the most efficient management entity structure is likely the first one listed—the municipality via a local wastewater ordinance—much like the ordinance that is now being constructed for the operation and management of the municipal water system.

Due to the private nature of ownership of the current wastewater infrastructure in Waitsfield Village and Irasville, and also due to the challenging environment that now surrounds the municipal water project's implementation, we strongly recommend that any management entity formed for the purpose of decentralized wastewater management be invested with the authority to manage onsite wastewater systems *only* with the consent and agreement of individual property owners.

The management entity and program could be phased in over time, as well. Initially, management activities could be documented by property owners with reporting to the management entity (similar to the EPA "Maintenance Contract" or "Operating Permit" models in the sidebar above). If replacement systems are shared between multiple property owners as the management program progresses, at some point it may become more logical for the Town of Waitsfield to either manage those systems directly, or potentially to take complete responsibility for those systems (similar to the EPA "RME Operation and Maintenance" or "RME Ownership" models described above).

5.3. How Might a Decentralized Wastewater Management Program Work in Waitsfield Village and Irasville?

The description that follows is one example of how a management program for existing decentralized wastewater infrastructure could be structured and operated for Waitsfield Village and Irasville. We offer it as a first step in what we hope will be a sustained and productive dialogue about what is truly appropriate for Waitsfield's village areas.

The Town could consider establishing a "Wastewater Management District," (similar in concept to the Town's recreation or conservation districts) with boundaries corresponding to the boundaries of the Waitsfield Village and Irasville-related zoning districts (Village Business, Village Residential, and Irasville Village). Alternately, the boundaries of the Wastewater Management District could correspond to the boundaries of the municipal Water Service Area. Within the district, properties could voluntarily choose (or be required, if the Town and property owners in the district made that decision) to have their systems managed by a public entity (such as the Town). The public entity could choose to perform the management activities itself, either by training existing staff or by hiring additional qualified individuals—or the entity might choose to contract the management activities to a local engineer, site

designer, maintenance provider, or other qualified firm and be responsible only for program administration.

Each system could be inspected annually, and the tank would be pumped as needed (generally every 3 to 5 years). The frequency of evaluation, and the performance of routine maintenance, could be varied depending on the type of system, whether the system utilized pumps, filters, or advanced treatment, and depending upon whether any additional maintenance was required by any Vermont DEC permit issued for the system.

If problems were found during a routine evaluation, the property owner would be notified and information about the Town's long-term, low-interest loan program for repairs would be offered if the property owner wished to take advantage of that funding to fix the problem. The payback periods of these loans would be on the order of 20 years with 2% interest (or they could be paid back when a property was sold), allowing for lower individual payments that would be more affordable for property owners than most other conventional finance vehicles. The loans would be secured with a lien against the property (as is also the case with other revolving loan programs in Vermont); thus, the debt could also transfer to a new owner if the property was sold.

The funding for the loan program would "revolve," so that as property owners paid back the loans over time, that principal would again be available to loan to another property owner. A priority system for awarding loan funds could be developed, to ensure that if requests for funding exceeded the amount available, the funds would be distributed equitably and transparently, in accordance with agreed-upon principles (such as financial need, environmental or public health impacts being addressed, etc.). If the STAG formed a portion of the funding available through the loan program, the Town could keep that money local and continue to revolve it. If the Clean Water SRF was the only funding available through the loan program, the loan repayments would return to the State of Vermont.

Property owners encountering significant malfunctions with their wastewater treatment systems who did not initially choose to be part of the management district could still be allowed to apply for low-interest loan funding to help with repair costs. In order to ensure that the investment of revolving loan funds in the system repair was protected, the property could be required to join the management district for at least the duration of the loan.

This approach has several benefits:

- Regular inspection and maintenance extends the life of existing systems and results in fewer malfunctions
- The Town can monitor areas of septic problems and plan for future wastewater treatment needs

- Property owners will be more aware of the importance of proper system use

A typical range of fees for this management service might be on the order of $100 to $500 per year for a single-family residence, depending on the complexity of the system and whether pumpout costs are included. (The Town's 2004 *Wastewater Facilities Plan*, for instance, estimated that managed users would be charged $200 per equivalent residential unit per year for services such as system check-ups and pumpouts, not including system upgrades such as the addition of access risers during the construction phase of the proposed municipal wastewater system.)

To reiterate, this decentralized management approach is only presented as an example. The Committee, with input from the community at large, will need to make decisions about the optimal wastewater management strategy for local conditions and users.

6. RECOMMENDATIONS

This study has shown that wastewater treatment and capacity needs remain in Waitsfield Village and Irasville, and that property owners are still demanding an appropriate solution. A program of managing existing wastewater infrastructure while providing long-term, low-interest funding for system upgrades and replacements has the potential to leverage existing grant funding to fix problems and facilitate targeted, carefully considered growth in the village areas. This report contains information that can now be considered by Planning Commission members, the Selectboard, town staff, and residents and business owners for implementation. While the consultant can recommend a path forward, the real decision lies with the community.

Following are some items to consider for the next steps in a potential decentralized wastewater management project:

Committee/Town Work

- Review and decide on how to move forward, including local administration/governance options
- Develop and implement public involvement plan to start building understanding of and support for a management and low-interest loan program
- Continue to work with consultants on technical work (described below).

Technical Work

- Continue discussions with Vermont DEC and US EPA staff regarding use of STAG and Clean Water SRF funding towards implementing a decentralized wastewater management district and locally revolving low-interest, long-term loan program for targeted wastewater system repairs and replacements.
- Conduct two further technical analyses, using and expanding upon data collected in the process of completing this study, to characterize the financial aspects of decentralized wastewater management:
  - Assess the longevity of existing onsite wastewater systems in the villages.
  - Conduct a financial analysis to estimate the value of existing wastewater infrastructure in the villages and potential future scenarios of replacing systems using a revolving loan program.
- If a decision is made to implement a management program, begin to develop the practical "nuts and bolts" of the program—including the enabling local ordinance and governance structure for the management district; a priority system for the loan program; and a detailed, financially viable, and actionable plan for implementation.

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TABLES AND FIGURES

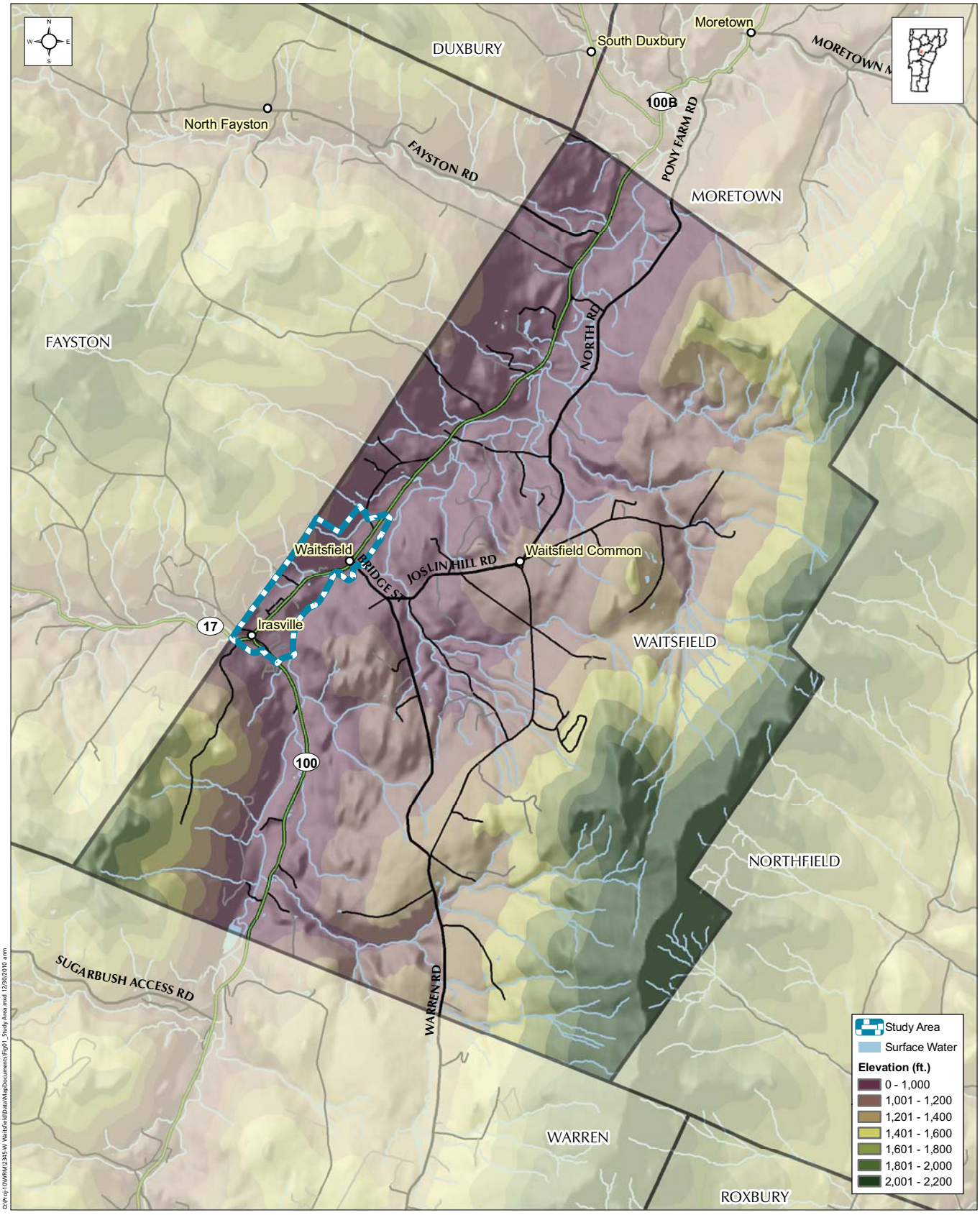

FIGURE 1: LOCATION MAP
Decentralized Wastewater Treatment Options, Waitsfield Village and Irasville
Town of Waitsfield, Vermont

Sources: Hydrography, VCGI, 2009; Roads, VCGI, 2009;
Digital Elevation Model, VCGI, 2001; Town Boundaries, VCGI, 2001.

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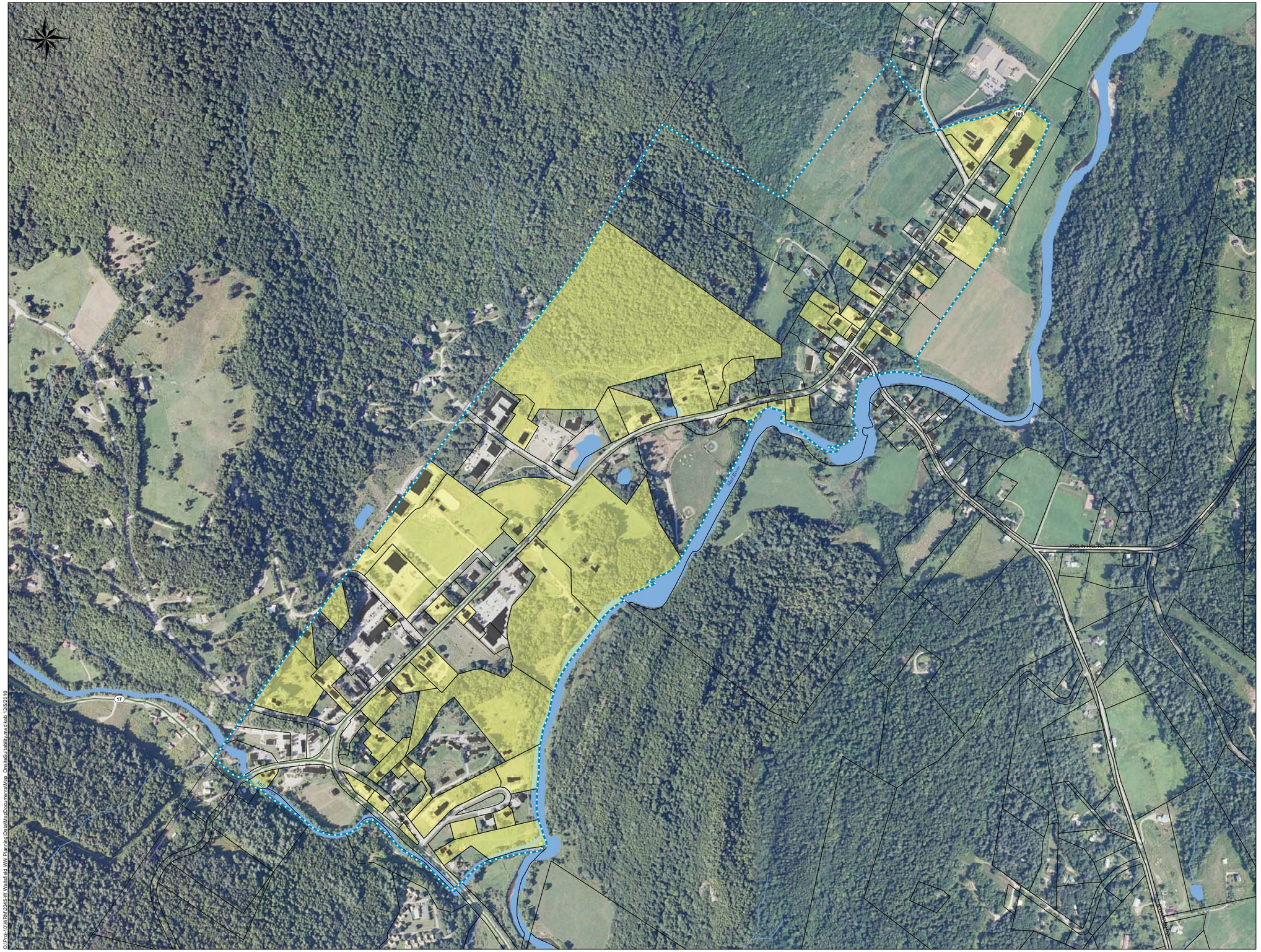
535 Stone Cutters Way
Montpelier, Vermont
05602 USA
Phone / 802.229.4541
Fax / 802.229.5417
Web Site / www.stone-env.com

Figure 2
Property Owner Survey Responses

Decentralized Wastewater Treatment Options

Waitsfield Village and Irasville, Vermont



Building

Survey Returned

Parcel Boundary

Study Area

Sources: VCGI: Streams, Water Bodies, Imagery; Town of Waitsfield: Parcel Boundaries; Stone: Survey Responses (current to November 30, 2010); Phelps and Stone: Buildings

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Montpelier, Vermont
05602 USA

Phone / 802.229.4541
Fax / 802.229.5417
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Figure 3
Environmental Sensitivities

Decentralized Wastewater Treatment Options

Waitsfield Village and Irasville, Vermont

- Study Area
- Fluvial Erosion Hazard

Zoning Districts (2010)

- Village Commercial
- Village Residential
- Irasville Village
- Commercial Lodging District
- Underground Storage Sites
- Hazardous Sites

Water Supply Wells

- Drilled
- Drilled shared
- Drilled - non potable
- Dug Well or Spring
- Public Water Supply Well
- 50 ft Contour
- Building

Status

- Well Shield
- Parcel Boundary
- Slope > 30%
- FEMA 100-Year Flood Zone
- Wetlands

Onsite System Suitability

- Conventional Subsurface
- Conventional, Excessive Slope/Permeability
- At-grade or Filtrate + Conventional
- Mound or Filtrate + At-grade
- Mound w/Curtain Drain or Filtrate + Mound
- Filtrate + Mound w/Curtain Drain
- Performance Based System or Not Suited
- Not Ranked

Sources: VCGI: Streams, Water Bodies, Soils (NRCS), 50 ft contours, Structures, Underground Storage Sites, Hazardous Sites, Flood Zones (FEMA); VT ANR: Wetlands; Town of Waitsfield: Parcel Boundaries, Zoning Districts; Stone: Onsite System Suitability Classification; Phelps and Stone: Well Shields, Water Supply Wells, Buildings; Central Vermont Regional Planning Commission (CVRPC): Fluvial Erosion Hazard

Note: Well shields are the "future case" after the water project is completed, based on municipal water connection status as of November 19, 2010.

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535 Stone Cutters Way
Montpelier, Vermont
05602 USA
Phone / 802.229.4541
Fax / 802.229.5417
Web Site / www.stone-env.com

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Figure 4
Current Water Supply and Wastewater Infrastructure

Decentralized Wastewater Treatment Options

Waitsfield Village and Irasville, Vermont

- Building
- Parcel Boundary
- Study Area
- Wastewater Tanks
- Wastewater Conveyance

Wastewater Dispersal

- In-ground (trench or bed)
- At-Grade
- Mound
- Mound-Filtrate
- Drywell
- Replacement Area

DEC Permit Status

- Permit Issued Since 2000
- Pre-2000 Permit On File

Water Supply Wells

- Public Water Supply Well
- Dug Well or Spring
- Drilled - non potable
- Drilled shared
- Drilled

- Well Shields and Zone 1 WHPAs

Sources: VCGI: Streams, Water Bodies; Town of Waitsfield: Parcel Boundaries; Phelps and Stone: Water Supply and Wastewater Infrastructure, Well Shields, Buildings; Stone: DEC Permit Status.

Note: The well shields on this figure represent what is currently known about water supply infrastructure, prior to any connection to the community water system now under construction.

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535 Stone Cutters Way
Montpelier, Vermont
05602 USA

Phone / 802.229.4541
Fax / 802.229.5417
Web Site / www.stone-env.com

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Figure 5
Community Water Project Connection Status

Decentralized Wastewater Treatment Options

Waitsfield Village and Irasville, Vermont

Building

Water Project Connection Status

- Yes
- No
- Land, no connection
- Blank
- Parcel Boundary
- Study Area

Sources: VCGI: Streams, Water Bodies, Imagery; Town of Waitsfield: Parcel Boundaries, Community Water Connection Status (current to December 7, 2010); Phelps and Stone: Buildings.

Parcel labels describe the wastewater flow for that parcel, estimated using permitted design flow or community water use allocation as available. The report details how these values were calculated.

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Montpelier, Vermont
05602 USA
Phone / 802.229.4541
Fax / 802.229.5417
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Figure 6
Future Water Supply and Wastewater Infrastructure

Decentralized Wastewater Treatment Options

Waitsfield Village and Irasville, Vermont

- Building
- Parcel Boundary
- Study Area
- Wastewater Tanks
- Wastewater Conveyance

Wastewater Dispersal

- In-ground (trench or bed)
- At-Grade
- Mound
- Mound-Filtrate
- Drywell
- Replacement Area

DEC Permit Status

- Permit Issued Since 2000
- Pre-2000 Permit On File

Water Supply Wells

- Public Water Supply Well
- Dug Well or Spring
- Drilled - non potable
- Drilled shared
- Drilled

- Well Shields and Zone 1 WHPAs

Sources: VCGI: Streams, Water Bodies; Town of Waitsfield: Parcel Boundaries; Phelps and Stone: Water Supply and Wastewater Infrastructure, Well Shields, Buildings; Stone: DEC Permit Status.

Note: The well shields on this figure represent what is currently known about water supply infrastructure, assuming that connections to the community water system (as of November 19, 2010) are completed.

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Montpelier, Vermont
05602 USA

Phone / 802.229.4541
Fax / 802.229.5417
Web Site / www.stone-env.com

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Figure 7
Wastewater Treatment and Capacity Needs

Decentralized Wastewater Treatment Options

Waitsfield Village and Irasville, Vermont

Building

Parcel Boundary

Study Area

Future Plans and Capacity Needs

Plan to change property use

Would change use if WW capacity available

Current plan and ww capacity need

Other known issue

Onsite Disposal Restriction (GIS)

Area Restriction Only (38)

Groundwater Restriction Only (2)

Groundwater and Area Restriction (2)

Sources: VCGI: Streams, Water Bodies, Town of Waitsfield: Parcel Boundaries, Zoning Districts; Stone: Onsite Disposal Restriction (GIS); Phelps: Buildings

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535 Stone Cutters Way
Montpelier, Vermont
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Phone / 802.229.4541
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Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 1: Summary of Survey Responses Regarding Needs and Options
Survey I: Surveys Mailed: 154, Surveys Returned: 68, Response Rate: 44%

Survey Question		Response	Number of Responses	% of Responses
1a	Has anything about your water supply changed since the last property owner survey was completed in November-December 2001?			
		No changes	50	76%
		Deepened my existing well	3	5%
		Installed a water softener or filter	2	3%
		Decided to connect to municipal water	8	12%
		Other (describe in comment)	4	6%
1b	Has anything about your wastewater system changed since the last property owner survey was completed in November-December 2001?			
		No changes	55	83%
		Discovered a problem, but have not fixed it yet	1	2%
		Replaced septic tank	2	3%
		Replaced or upgraded leachfield	6	9%
		Other (describe in comment)	4	6%
2	If you made changes that required an Act 250 permit or a DEC water supply/wastewater system permit, please provide the permit number.			
		Permit number provided (in comment)	9	14%
		Permit number not provided or no answer	59	89%
3	Have you ever experienced any of the following conditions in or around your leach field or drywell?			
		Surfacing sewage or effluent	10	14%
		Sink holes	1	1%
		Sewage smell	2	3%
		None	62	86%
4	Have you ever experienced sewage back up into a building?			
		Yes	10	14%
		No	63	88%

Source: Property owner surveys, Stone Environmental, 2010.

STONE ENVIRONMENTAL, INC

Note: Responses from Survey 2 that were for identical questions asked in both surveys are included in this table.

Date/init: 11/30/2010 anm

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Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 1 (cont.): Summary of Survey Responses Regarding Needs and Options
Survey I: Surveys Mailed: 154, Surveys Returned: 68, Response Rate: 44%

Survey Question	Response	Number of Responses	% of Responses
4a	If Yes, has the situation been corrected?		
	Yes	5	7%
	No	1	1%
4b	If Yes, please briefly describe how the situation was corrected.		
	Describe in comment	7	10%
5	Are there any other changes to your property, or to neighboring land, that might affect future wastewater planning in your area?		
	No	64	97%
	Yes (describe in comment)	4	6%
6	Do you have any plans to change the way your property is used (subdivide your property, change the use of your property, etc.)?		
	No	60	82%
	Yes (describe in comment)	13	18%
7	If you had access to additional wastewater treatment capacity, is there anything you would want to do with your property that you can't do now?		
	No	46	62%
	Yes (describe in comment)	28	38%
8	Are you interested in receiving information or training about the best ways to use and maintain your wastewater treatment system?		
	No	32	44%
	Yes	24	33%
	Unsure	18	25%
9	Do you feel like you need help maintaining your wastewater treatment system?		
	No	62	86%
	Yes	6	8%
	Unsure	6	8%

Source: Property owner surveys, Stone Environmental, 2010.
STONE ENVIRONMENTAL, INC
Note: Responses from Survey 2 that were for identical questions asked in both surveys are included in this table.
Date/init: 11/30/2010 anm
Path: O:\Proj-10\2345-W-W-Waitsfield\Data\Survey\Waitsfield_Survey.mdb [rptTable1_SurveyResultsV1]

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 1 (cont.): Summary of Survey Responses Regarding Needs and Options
Survey I: Surveys Mailed: 154, Surveys Returned: 68, Response Rate: 44%

Survey Question	Response	Number of Responses	% of Responses
10	If a decentralized approach is taken, what do you think is the right wastewater treatment outcome for Waitsfield Village and Irasville?		
	Keep all wastewater treatment systems on individual properties or as they are now.	4	5%
	Keep only wastewater treatment systems that are working properly and meet regulations, and provide a few small, shared systems only to fix existing problems.	13	17%
	Keep working systems that meet regulations, and provide some capacity using shared wastewater systems to fix problems and allow for limited in-fill development, limited growth, or changes in use (adding home businesses, etc.).	21	28%
	Provide additional distributed, off-site wastewater treatment capacity for any property in Waitsfield Village or Irasville that needs it, similar to the system that was voted down in 2007.	30	40%
	Other (describe in comment)	7	9%
11	How do you think wastewater treatment systems should be maintained and managed in Waitsfield Village and Irasville?		
	Property owners should be responsible for all maintenance and management, as they are now.	21	29%
	Property owners should be responsible for replacing major components (like septic tanks, leachfields, etc.) but the Town should ensure the systems are working properly by periodically evaluating the systems and pumping septic tanks if needed.	11	15%
	The Town should be responsible for both maintenance and major component replacement (like a centralized sewer, even if a system is entirely on-site).	28	39%
	I have a different idea (describe in comment):	14	19%
12	Do you have any comments regarding wastewater management in Waitsfield Village and Irasville?		
	No (or blank)	56	78%
	Yes (describe in comment)	19	26%

Source: Property owner surveys, Stone Environmental, 2010.

STONE ENVIRONMENTAL, INC

Note: Responses from Survey 2 that were for identical questions asked in both surveys are included in this table.

Date/init: 11/30/2010 anm

Path: O:\Proj-10\2345-W-W-Waitsfield\Data\Survey\Waitsfield_Survey.mdb [rptTable1_SurveyResultsV1]

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 1 (cont.): Summary of Survey Responses Regarding Needs and Options
Survey I: Surveys Mailed: 154, Surveys Returned: 68, Response Rate: 44%

Survey Question	Response	Number of Responses	% of Responses
13	To discuss these comments in greater detail, would you like a member of the Town of Waitsfield Planning Commission's Wastewater Committee to contact you about this survey or the Decentralized Wastewater Options project?		
	No (or blank)	59	82%
	Yes (contact info in comment)	15	21%

Source: Property owner surveys, Stone Environmental, 2010.

STONE ENVIRONMENTAL, INC

Note: Responses from Survey 2 that were for identical questions asked in both surveys are included in this table.

Date/init: 11/30/2010 anm

Path: O:\Proj-10\2345-W-W-Waitsfield\Data\Survey\Waitsfield_Survey.mdb [rptTable1_SurveyResultsV1]

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 2: Summary of Survey Responses Regarding Needs and Options
Survey II: Surveys Mailed: 31, Surveys Returned: 6, Response Rate: 19%

Survey Question	Response	Number of Responses	% of Responses
1	Please indicate when your septic system was originally installed:		
	Before 1970	1	17%
	1982-1989	1	17%
	1990-1995	1	17%
	2002-present	2	33%
	Unsure	1	17%
2	Please indicate the size and construction of your septic tank by checking as many boxes as apply:		
	500 gallons	1	17%
	1,000 gallons	3	50%
	1,500 gallons	1	17%
	Other size (describe in comment)	1	17%
	Concrete	5	83%
3	Please indicate construction of your system's distribution and disposal components by checking as many boxes as apply:		
	Pump station	1	17%
	Distribution box (d-box)	5	83%
	Leach field (in-ground trenches or bed)	2	33%
	Dry well(s)	1	17%
	Other (describe in comment)	1	17%
4	If your system includes an alternative or advanced treatment component, please check the appropriate box or boxes below:		
	Other advanced treatment (describe in comment)	1	17%
	Blank or no advanced/alternative components	5	83%
5	Please describe below any upgrades or repairs that have been performed on your septic system within the last ten years:		
	Other repair (describe in comment)	2	33%
	None or blank	4	67%
6	Is your wastewater system shared with another building or property?		
	No	2	33%
	Yes (describe in comment)	4	67%

Source: Property owner surveys, Stone Environmental, 2010.
STONE ENVIRONMENTAL, INC
Date/init: 11/12/2010 anm
Path: O:\Proj-10\2345-W-W-Waitsfield\Data\Survey\Waitsfield_Survey.mdb [rptTable2_SurveyResultsV2]

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 2 (cont.): Summary of Survey Responses Regarding Needs and Options
Survey II: Surveys Mailed: 31, Surveys Returned: 6, Response Rate: 19%

Survey Question	Response	Number of Responses	% of Responses
7	How often is your septic tank pumped?		
	1-2 years	1	17%
	3-4 years	4	67%
	Unknown	1	17%
7a	Year that septic tank was last pumped, if known		
	2009	1	17%
	2007	1	17%
7b	What company pumps your septic tank?		
	Known (enter in comment)	2	33%
8	How deep below the surface is your septic tank?		
	1-2 feet	3	50%
	2-3 feet	1	17%
	Unsure	2	33%
9	Have you ever experienced any of the following conditions in or around your leach field or drywell?		
	Surfacing sewage or effluent	1	17%
	None	5	83%
10	Have you ever experienced sewage back up into a building?		
	Yes	2	33%
	No	4	67%
11	Do you have a copy of any sketches, plans, or permits of your septic system available for reference?		
	Yes	3	50%
	No	3	50%
B	If you intend to connect to the municipal water system, check here and go to Section III below.		
	Checked	1	17%
12	Please indicate which type of water system you have:		
	Individual drilled well	3	50%
	Individual dug well	1	17%
	Shared drilled well	2	33%

Source: Property owner surveys, Stone Environmental, 2010.
STONE ENVIRONMENTAL, INC
Date/init: 11/12/2010 anm
Path: O:\Proj-10\2345-W-W-Waitsfield\Data\Survey\Waitsfield_Survey.mdb [rptTable2_SurveyResultsV2]

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 2 (cont.): Summary of Survey Responses Regarding Needs and Options
Survey II: Surveys Mailed: 31, Surveys Returned: 6, Response Rate: 19%

Survey Question	Response	Number of Responses	% of Responses
13	If your water system is shared with another building or property, please describe:		
	Described in comment	3	50%
	Blank	3	50%
14	Does your well casing extend above the ground?		
	Yes	5	83%
	Unsure	1	17%
15	Have you ever had contamination problems with the water supply system(s) on your property?		
	No	3	50%
	Unsure	3	50%
16	Have you ever run out of water?		
	Never	2	33%
	Every few years	4	67%
17	Do you have a water softener?		
	Yes	2	33%
	No	4	67%
18	Has the property had any other problems with water, or has work been done on the water system in the last 10 years?		
	Yes (describe in comment)	4	67%
	No	1	17%
	Unsure	1	17%
19	Do you have any plans to change the way your property is used (subdivide your property, change the use of your property, etc.)?		
	No	4	67%
	Yes (describe in comment)	2	33%
20	If you had access to additional wastewater treatment capacity, is there anything you would want to do with your property that you can't do now?		
	No	4	67%
	Yes (describe in comment)	2	33%

Source: Property owner surveys, Stone Environmental, 2010.
STONE ENVIRONMENTAL, INC
Date/init: 11/12/2010 anm
Path: O:\Proj-10\2345-W-W-Waitsfield\Data\Survey\Waitsfield_Survey.mdb [rptTable2_SurveyResultsV2]

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 2 (cont.): Summary of Survey Responses Regarding Needs and Options
Survey II: Surveys Mailed: 31, Surveys Returned: 6, Response Rate: 19%

Survey Question	Response	Number of Responses	% of Responses
21	Are you interested in receiving information or training about the best ways to use and maintain your wastewater treatment system?		
	No	3	50%
	Yes	1	17%
	Unsure	2	33%
22	Do you feel like you need help maintaining your wastewater treatment system?		
	No	4	67%
	Yes	1	17%
	Unsure	1	17%
23	If a decentralized approach is taken, what do you think is the right wastewater treatment outcome for Waitsfield Village and Irasville?		
	Keep only wastewater treatment systems that are working properly and meet regulations, and provide a few small, shared systems only to fix existing problems.	1	17%
	Keep working systems that meet regulations, and provide some capacity using shared wastewater systems to fix problems and allow for limited in-fill development, limited growth, or changes in use (adding home businesses, etc.).	2	33%
	Provide additional distributed, off-site wastewater treatment capacity for any property in Waitsfield Village or Irasville that needs it, similar to the system that was voted down in 2007.	1	17%
	Other (describe in comment)	2	33%

Source: Property owner surveys, Stone Environmental, 2010.
Date/init: 11/12/2010 anm
Path: O:\Proj-10\2345-W-W-Waitsfield\Data\Survey\Waitsfield_Survey.mdb [rptTable2_SurveyResultsV2]

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 2 (cont.): Summary of Survey Responses Regarding Needs and Options
Survey II: Surveys Mailed: 31, Surveys Returned: 6, Response Rate: 19%

Survey Question	Response	Number of Responses	% of Responses
24	How do you think wastewater treatment systems should be maintained and managed in Waitsfield Village and Irasville?		
	Property owners should be responsible for all maintenance and management, as they are now.	1	17%
	Property owners should be responsible for replacing major components (like septic tanks, leachfields, etc.) but the Town should ensure the systems are working properly by periodically evaluating the systems and pumping septic tanks if needed.	1	17%
	The Town should be responsible for both maintenance and major component replacement (like a centralized sewer, even if a system is entirely on-site).	2	33%
	I have a different idea (describe in comment):	2	33%
25	Do you have any comments regarding wastewater management in Waitsfield Village and Irasville?		
	No (or blank)	4	67%
	Yes (describe in comment)	2	33%
26	To discuss these comments in greater detail, would you like a member of the Town of Waitsfield Planning Commission's Wastewater Committee to contact you about this survey or the Decentralized Wastewater Options project?		
	No (or blank)	4	67%
	Yes (contact info in comment)	2	33%
27	Please indicate the approximate location of your house or other building, driveway, septic tank, leach field, and water supply.		
	Sketch provided	5	83%
	No sketch provided	1	17%
28	Is any portion of your property restricted from development by an easement, deed restriction, natural feature, or something else?		
	Yes, and restrictions indicated on sketch	1	17%
	No restrictions indicated	5	83%

Source: Property owner surveys, Stone Environmental, 2010.
Date/init: 11/12/2010 anm
Path: O:\Proj-10\2345-W-W-Waitsfield\Data\Survey\Waitsfield_Survey.mdb [rptTable2_SurveyResultsV2]

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 3: Study Area Description

Parcel ID	Property Location	Owner or Contact Name	Acres	Property Description
99130.000	021 Baird Lane	Andrew Baird, Jr.	9.1	DWL/APT
99130.100	123 Baird Lane	Andrew Baird, III	1.9	DWL
99163.000	118 Bragg Hill Road	Bragg Hill LLC	3.9	DWL
01004.000	20 Bridge Street	Mary Schramke	0.26	COMM BLDG
99108.000	40 Bridge Street	Jason Gulisano	2	HISTORIC WAITSFIELD VILLAGE #1
01002.000	45 Bridge Street	Bonnie McTigue	0	COMM BLDG
01003.000	45 Bridge Street	Bonnie McTigue	1.5	DWL W/APT COMM BLDG
01005.000	50 Bridge Street	Caroline Bargerstock	0.02	SHOP
38010.000	049 Butcher House Drive	Patrick Thompson	1	STORAGE BARN
38009.000	118 Butcher House Road	Brian Shupe	10.31	DWL
38008.000	144 Butcher House Road	Garth Genge	7.33	24 APT UNITS
23001.000	048 Carrol Road	Ted Joslin	2.7	LAND
23001.100	048 Carrol Road	Claudia Becker	1	MOVIE THEATHE
23002.000	0 Carroll Road	Quentin Pearson	1.3	LAND
99129.000	0 Carroll Road	Brian Joslin	8.88	LAND
99129.100	098 Carroll Road	Sparky Potter	1.52	COMM
23005.000	154 Carroll Road	Robert Allen	2.11	LUMBER SUPPLY
23003.000	155 Carroll Road	Jimmy Kohl	2.07	COMM BLDG
99172.100	041 Dugway Road	David Olenick	0.2	OFFICE BLDG
99172.000	051 Dugway Road	Debra Jones	0.3	COMM BLDG/APT
38006.000	058 Dugway Road	Andrew Paquin	0.86	DWL
38004.00A	100 Dugway Road	Jeremy Gulley	0	UNIT A GREENACRES
38004.000	100-102 Dugway Road	Sandra MacDowell	1.07	COMMON LAND

Source: Town of Waitsfield Grand List, 2009 and community water project master table, 2010.

STONE ENVIRONMENTAL, INC

Notes: Parcel acreage and description is from the Assessor's list. If data was unavailable, the value was left blank.

Path: O:\Proj-10\WRM\2345-W Waitsfield\Data\GISData\WW_Analysis_2.mdb [rptTable03_StudyAreaProperties]

Date/init: 12/28/10 anm

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 3 (continued): Study Area Description

Parcel ID	Property Location	Owner or Contact Name	Acres	Property Description
38004.00B	100B Dugway Road	George Soules	0	UNIT B GREENACRES
38004.00C	100C Dugway Road	Sandra McDowell	0	UNIT C GREENACRES
38004.00D	100D Dugway Road	Genevieve Uris	0	UNIT D GREENACRES
38004.00E	100E Dugway Road	Robert McMullin	0	UNIT E GREENACRES
38004.00F	100F Dugway Road	Jeffrey Kiess	0	UNIT F GREENACRES
38004.00G	100G Dugway Road	Ellen Strauss	0	UNIT G GREENACRES
38004.00H	100H Dugway Road	Kevin Davis	0	UNIT H GREENACRES
38004.00I	100I Dugway Road	Todd D. Sheinfeld	0	UNIT I GREENACRES
38005.000	106 Dugway Road	Brian B. Fleisher	0.21	DWL
38003.000	112 Dugway Road	James Dodds	0.86	DWL/APT
38002.000	152 Dugway Road	Suzanne Peterson	1.11	DWL
38001.000	156 Dugway Road	Russell Heaton	1.41	OFFICE/4 APTS
99102.000	34 Farr Lane	Maryanne Greeley	0.9	COMM BLDG/2 APTS
99103.000	46 Farr Lane	Alan Uris	0.5	2 APTS/OFFICES
99107.000	54 Farr Lane	Roger Nishi	3.16	496 DIAL OFFICE
99173.000	049 Fiddlers Green	William Parker	4.08	OFFICE BLDG
99178.000	124 Fiddlers Green	Marc DiMario	0.48	CAR WASH
99177.000	138 Fiddlers Green	Stephen S. Zonies	0.53	OFF BLDG/2 APTS
99176.000	156 Fiddlers Green	David Clark	0.86	COMM BLDG/APT
99175.000	168 Fiddlers Green	Nicholas Pitt	1.77	LAUNDROMAT
99147.000	157 Mad River Canoe Road	Robin Morris	3.53	IND BLDG
99147.000	167 Mad River Canoe Road	Robin Morris	3.53	IND BLDG
99148.000	27 Mad River Canoe Road	Richard Daley	3.08	SUPERMARKET

Source: Town of Waitsfield Grand List, 2009 and community water project master table, 2010.

STONE ENVIRONMENTAL, INC

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Path: O:\Proj-10\WRM\2345-W Waitsfield\Data\GISData\WW_Analysis_2.mdb [rptTable03_StudyAreaProperties]

Date/init: 12/28/10 anm

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 3 (continued): Study Area Description

Parcel ID	Property Location	Owner or Contact Name	Acres	Property Description
99149.000	80 Mad River Green	Norman Nadeau	0.18	BANK MAP 6A
99152-Wht	100 Mad River Green Phase	Patrick Thompson	0	COMM BLDG/MR GREEN
99152-Ph2	100 Mad River Green Phase	Patrick Thompson	0	COMM BLDG/MR GREEN
99152-Ph1	100 Mad River Green White	Patrick Thompson	7.1	COMM BLDG/MR GREEN
99063.000	0 Main Street	Town of Waitsfield	0.05	VETERANS MEMORIAL
99124.000	0 Main Street	William Parker	16.9	LAND
99135.000	0 Main Street		3.5	CEMETERY
99051.000	3951 Main Street	Richard Schattman	3.7	SCHOOL
99048.000	3962 Main Street	Aaron Flint	0.26	DWL
99049.000	4036 Main Street	Ed Read	2	COMM BLDG
99052.000	4061 Main Street	Town of Waitsfield	0.97	WAIT HOUSE
99053.000	4102 Main Street	Sonya F. Phillips	0.5	DWL
99051.100	4103 Main Street	Delbert Palmer	1.3	COMM
99051.200	4125 Main Street	Michael Ketchel	0.7	COMMON LAND
99051.201	4125 Main Street Unit 1	Jeffrey Coy	0	SCHOOLHOUSE UNIT 01
99051.202	4125 Main Street Unit 2	Peter Laskowski	0	SCHOOLHOUSE UNIT 02
99051.203	4125 Main Street Unit 3	Lisa Williams	0	SCHOOLHOUSE UNIT 03
99051.204	4125 Main Street Unit 4	Barrie Fisher	0	SCHOOLHOUSE UNIT 04
99051.205	4125 Main Street Unit 5	Elizabeth Bisbee	0	SCHOOLHOUSE UNIT 05
99051.206	4125 Main Street Unit 6	Martin Loeffler	0	SCHOOLHOUSE UNIT 06
99051.207	4125 Main Street Unit 7	Patricia Duran	0	SCHOOLHOUSE UNIT 07
99051.208	4125 Main Street Unit 8	Mary McKhann	0	SCHOOLHOUSE UNIT 08
99051.209	4125 Main Street Unit 9	Wolfgang Frandl	0	SCHOOLHOUSE UNIT 09

Source: Town of Waitsfield Grand List, 2009 and community water project master table, 2010.

STONE ENVIRONMENTAL, INC

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Path: O:\Proj-10\WRM\2345-W Waitsfield\Data\GISData\WW_Analysis_2.mdb [rptTable03_StudyAreaProperties]

Date/init: 12/28/10 anm

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 3 (continued): Study Area Description

Parcel ID	Property Location	Owner or Contact Name	Acres	Property Description
99051.210	4125 Main Street Unit 10	Howard Gabor	0	SCHOOLHOUSE UNIT 10
99051.211	4125 Main Street Unit 11	Michael Ketchel	0	SCHOOLHOUSE UNIT 11
99051.212	4125 Main Street Unit 12	Peradventure Inc.	0	SCHOOLHOUSE UNIT 12
99051.213	4125 Main Street Unit 13	Peradventure Inc.	0	SCHOOLHOUSE UNIT 13
99055.000	4147 Main Street	Barry Bender	0.36	COMM BLDG/1 APT
99056.000	4167 Main Street	Timothy Stafford	0.25	DWL
99057.000	4177 Main Street	MRVAS	2.61	COMM
99058.000	4199 Main Street	Sandy Lawton	0.67	DWL
99046.002	4200 Main Street Unit 2	Peter Reynells	0.62	COMMON LAND
99046.C01	4200 Main Street Unit 1	Peter Reynells	0	UNIT 1 MAIN ST CONDOMINIUMS
99046.C03	4200 Main Street Unit 3	Pennilee Reynells	0	UNITS 2 & 3 MAIN ST CONDOS
99046.C04	4200 Main Street Unit 4	Norman Gage	0	UNIT 4 MAIN ST CONDOMINIUMS
99046.C05	4200 Main Street Unit 5	Peter Reynells	0	UNIT 5 MAIN ST CONDOMINIUMS
99046.C06	4200 Main Street Unit 6	Sorayya Khan	0	UNIT 6 MAIN ST CONDOMINIUMS
99046.C07	4200 Main Street Unit 7	Peter Reynells	0	UNIT 7 MAIN ST CONDOMINIUMS
99059.000	4219 Main Street	Richard King	0.27	OFFICE/4APTS
99054.000	4224 Main Street	Nancy Hornbeck	0.23	DWL
99060.000	4235 Main Street	David Leppla	0.5	DWL
99046.000	4242 Main Street	Yves Compere	26	DWL
99046.100	4242 Main Street	Yves Compere	158	LAND
99062.001	4254 Main Street	Charles Kettles		DWL
99062.002	4254 Main Street			DWL
99061.000	4261 Main Street	Henri Borel	0.56	DWL

Source: Town of Waitsfield Grand List, 2009 and community water project master table, 2010.

STONE ENVIRONMENTAL, INC

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Date/init: 12/28/10 anm

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 3 (continued): Study Area Description

Parcel ID	Property Location	Owner or Contact Name	Acres	Property Description
99064.000	4276 Main Street	Aldo Speroni	0.63	COM BLDG/3 APTS
99065.000	4277 Main Street	Yves Compere	0.62	DWL
99067.000	4312 Main Street	Ian Buchanan	0.78	SHOP/DWL
99066.000	4317 Main Street	Robert Burley	0.77	COM BDG/4 APTS
99068.000	4318-4330 Main Street	Joan F. Wilson	0.47	2 COMM BLDGS
99072.000	4335 Main Street	Nancy McHugh	0.52	CHURCH
99069.000	4348 Main Street	Troy Kingsbury	0.5	MINI MART/SPT
99070.000	4366 Main Street	James Donkersloot	0.2	SHOP/ 3 APTS
99071.000	4376 Main Street	Rick Rayfield	0.06	MASONIC HALL
01001.000	4391 Main Street	John Reilly	0	LIBRARY
99104.000	4402 Main Street	Thomas Barefoot	0.3	OFFICE BLDG
99108.200	4403 Main Street	Norman Abend	0	HISTORIC WAITSFIELD VILLAGE #2
99105.000	4412 Main Street	Martin DeHeer	0.2	COMM BLDG/APT
99106.000	4412 Main Street	Martin DeHeer	0	COMM BLDG
99108.300	4429 Main Street	Craig Goss	0	HISTORIC WAITSFIELD VILLAGE #3
99108.400	4457 Main Street	David Darr	0	HISTORIC WAITSFIELD VILLAGE #4
99110.000	4477 Main Street	Christopher Pierson	1.6	OFFICE BLDG
99109.100	4492 Main Street	Jay Higgins	0.5	DWL
99109.100	4492 Main Street	Dori Ingalls	0.5	DWL
99111.000	4509 Main Street	William Maclay	1	OFFICE/DWL
99112.000	4524 Main Street	George Pakk	0.22	DWL
99113.000	4529 Main Street	Ray Larochelle	0.3	OFFICE/2 APTS
99114.000	4544 Main Street	John Matusz	0.25	SHED/SHOP

Source: Town of Waitsfield Grand List, 2009 and community water project master table, 2010.

STONE ENVIRONMENTAL, INC

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Path: O:\Proj-10\WRM\2345-W Waitsfield\Data\GISData\WW_Analysis_2.mdb [rptTable03_StudyAreaProperties]

Date/init: 12/28/10 anm

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 3 (continued): Study Area Description

Parcel ID	Property Location	Owner or Contact Name	Acres	Property Description
99116.000	4576 Main Street	Douglas White	1	DWL
99115.000	4581 Main Street	Wesley Lowe	1.7	DWL
99117.000	4631 Main Street	Jason Chojnicki	0.3	AUTO REPAIR GARAGE
99120.000	4740 Main Street	Joseph Grant	1.5	COMM
99125.000	4751 Main Street	Stanley Barosky	11.6	REC FIELD
99121.000	4752 Main Street	Russell Bennett	2	COMM BLDG
99123.000	4805 Main Street	Paul Lavoie	2.9	WAIT FARM INN
99127.000	4919 Main Street	William Parker	17.1	DWL/SHOP
99128.000	4976 Main Street	Betsy P. Brothers	4	DWL
99142.000	5070 Main Street	CB Richard Ellis	2	BANK
99143.000	5086 Main Street	Melissa Dunbar	0.53	COMM BLDG
99133.000	5091 Main Street	Irene T. Mehuron	0.87	STORE
99132.000	5119 Main Street	William Simendinger	0.33	MINI-MART MAP 6A
99144.000	5134 Main Street	Thomas Kaminski	0.73	COMM
99136.000	5197 Main Street	Brian Shea	1.6	COMMON LAND
99136.001	5197 Main Street Unit 1	Lisa Russell	0	UNIT 1 IRASVILLE COMMON
99136.002	5197 Main Street Unit 2	Otto Noack	0	UNIT 2 IRASVILLE COMMON
99136.003	5197 Main Street Unit 3	Paige	0	UNIT 3 IRASVILLE COMMON
99136.004	5197 Main Street Unit 4	Guy Neveu	0	UNIT 4 IRASVILLE COMMON
99136.005	5197 Main Street Unit 5	Guy Neveu	0	UNIT 5 IRASVILLE COMMON
99136.006	5197 Main Street Unit 6	Ann Martin	0	UNIT 6 IRASVILLE COMMON
99136.007	5197 Main Street Unit 7	James Leyton	0	UNIT 7 IRASVILLE COMMON
99136.008	5197 Main Street Unit 8	Beckeley Holdings	0	UNIT 8 IRASVILLE COMMON

Source: Town of Waitsfield Grand List, 2009 and community water project master table, 2010.

STONE ENVIRONMENTAL, INC

Notes: Parcel acreage and description is from the Assessor's list. If data was unavailable, the value was left blank.

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Date/init: 12/28/10 anm

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 3 (continued): Study Area Description

Parcel ID	Property Location	Owner or Contact Name	Acres	Property Description
99138.000	5267 Main Street	Michael Kelley	1.15	WAITSFIELD INN
99158.001	5274 Main Street	William Curley	0.24	COMM
99158.002	5274 Main Street	William Curley	0	COMM/SKI SHOP
99139.000	5275 Main Street	Kathryn Rose	2.5	RETAIL STORE
99140.000	5285 Main Street	John Clayton	1	DWL
99131.000	5301 Main Street	Marion Baraw	3.8	SHOPPING CTR.
99131.000	5301 Main Street	Marion Baraw	3.8	SHOPPING CTR.
99159.000	5308 Main Street	Garth Genge	0.9	AFFORDABLE HOUSING
99141.000	5351 Main Street	Edward Fitzpatrick	1.5	RESTAURANT/APT
99160.000	5354 Main Street	Patrick Thompson	1.4	COMM BLDG & DWL
99163.000	5356 Main Street	Patrick Thompson	3.9	DWL
99161.000	5358 Main Street	Irwin Barkan	1.09	COMM BLDG
99170.000	5513 Main Street	David Dion	0.48	OFFICE/APT
99171.000	5523 Main Street	Jon Jamieson	0.4	OFFICE BLDG
99183.000	5639 Main Street	Rob Scharges	3.3	DWL
99183.200	5677 Main Street	Trish Hopkins	1.2	COMM BLDG
99122.000	Main Street & Carroll Road	Town of Waitsfield	2	POND LOT
37003.000	047 Mehuron Drive	Jessamine Larrow	0.6	DWL
37004.000	060 Mehuron Drive	Christopher Mack	0.7	DWL
37005.000	115 Mehuron Drive	Irene Mehuron	1.6	DWL
37006.000	155 Mehuron Drive	Bruce Mehuron	17	DWL
12026.000	756 Old County Road	Louise Moulton	1	DWL
99050.000	859 Old County Road	Sue Frechette	1	HEALTH CTR

Source: Town of Waitsfield Grand List, 2009 and community water project master table, 2010.

STONE ENVIRONMENTAL, INC

Notes: Parcel acreage and description is from the Assessor's list. If data was unavailable, the value was left blank.

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Date/init: 12/28/10 anm

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 3 (continued): Study Area Description

Parcel ID	Property Location	Owner or Contact Name	Acres	Property Description
37001.000	45 Parsonage Lane	David Dion	0.75	APT BLDG
37002.000	55 Parsonage Lane	Andrew Cunningham	0.5	PARSONAGE
99153.000	0 Post Office Road	Patrick Thompson	0.76	LOT B-3
99156.000	165 Post Office Road	Stephen S. Alpert	1.25	DWL
99119.000	039 Radcliff Drive	Tad W. Schirmer	1.84	DWL
99118.000	118 Radcliff Drive	Reginald Orr	2.3	DWL & SHOPS
99118.000	118 Radcliff Drive	Reginald Orr	2.3	DWL & SHOPS
99157.000	0 Slow Road	Patrick Thompson	0.6	LAND
99146.000	040 Slow Road	Patrick Thompson	10.17	
99145.000	171 Slow Road	Cheryl Patty	0.6	2 COMM BLDG
99164.000	08 Vermont Route 17	Bernard Isabelle	0.9	COMM REST
99169.000	09 Vermont Route 17	John Morris	5.7	RETAIL/4 APTS/BARN
99165.000	16 Vermont Route 17	Steven White	1	MINI MART/GAS STATION
99166.000	24 Vermont Route 17	Steven White	2.8	OFFICE BLDG/APT
99167.100	32 Vermont Route 17	Andrew Baird, Jr.	0.25	SAWMILL
99167.000	40 Vermont Route 17	James Garilli	1.95	GARAGE

Source: Town of Waitsfield Grand List, 2009 and community water project master table, 2010.
Notes: Parcel acreage and description is from the Assessor's list. If data was unavailable, the value was left blank.
Path: O:\Proj-10\WRM\2345-W Waitsfield\Data\GISData\WW_Analysis_2.mdb [rptTable03_StudyAreaProperties]
Date/init: 12/28/10 anm

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 4
Summary of Soil Characteristics Related to Onsite Wastewater Treatment

Series Name	Mapping Unit	Slope (Percent)		Water Table (Feet)		Hydric Soil	Depth to Bedrock (Inches)		Potential On-Site System Suitability	% Study Area
		Low	High	Low	High		Low	High		
Buxton silt loam	41D	15	25	1.5	3	N	60	60	Mound or Filtrate + At-grade	0.0
Cabot silt loam	17C	8	15	0	1.5	Y	60	60	Performance-Based or Not Suited	1.6
Colonel fine sandy loam	14C	8	15	0.5	2	N	60	60	Filtrate + Mound w/Curtain Drain	3.0
Colton gravelly loamy sand	39A	0	3	6	6	N	60	60	Conventional Subsurface	11.3
Colton gravelly loamy sand	39B	3	8	6	6	N	60	60	Conventional Subsurface	12.2
Colton gravelly loamy sand	39C	8	15	6	6	N	60	60	Conventional Subsurface	2.9
Colton gravelly loamy sand	39D	15	25	6	6	N	60	60	Conventional Subsurface	3.6
Colton gravelly loamy sand	39E	25	60	6	6	N	60	60	Conventional w/Excessive Slope or Permeability	2.0
Grange silt loam	58A	0	3	0	1.5	Y	60	60	Performance-Based or Not Suited	9.0
Lamoine silt loam	44C	8	15	0.5	1.5	N	60	60	Filtrate + Mound w/Curtain Drain	4.4
Machias fine sandy loam	33A	0	3	1.5	2.5	N	60	60	Mound or Filtrate + At-grade	3.9
Machias fine sandy loam	33B	3	8	1.5	2.5	N	60	60	Mound or Filtrate + At-grade	3.1
Peru gravelly fine sandy loam	77D	15	25	1.5	2.5	N	60	60	Mound or Filtrate + At-grade	0.0
Rumney fine sandy loam	3A	0	2	0	1.5	Y	60	60	Performance-Based or Not Suited	3.3
Salmon very fine sandy loam	43E	25	50	6	6	N	60	60	Not Suited	2.3
Scantic silt loam	45A	0	3	0	1	Y	60	60	Performance-Based or Not Suited	1.4
Tunbridge-Lyman complex, very rocky	72D	15	35	6	6	N	10	40	Mound or Filtrate + At-grade	22.0
Waitsfield silt loam	59A	0	3	6	6	N	60	60	At-grade or Filtrate + Conventional	9.6
Water	W	999	999	99.9	99.9	w	999	999	Not Ranked	1.1
Weider very fine sandy loam	60A	0	3	1.5	3	N	60	60	Mound or Filtrate + At-grade	3.4

Source: National Resource Conservation Service (NRCS), SEI Field Notes

Notes: % Area was calculated using data from NRCS and Geographic Information Systems (GIS) by dividing the total area (acres) of each soil series in the study by the total land area (acres) within the study area.

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Date/Initials: 12/28/10 anm

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 5: Permit Information Summary

Owner or Applicant Name	Permit No.	Location	Parcel ID	Date (if available)	Reason for Permit
Village Square Co	5W0025-2				Relocation of buildings
Village Square Co	5W0025-3	RT 100			Addition of a 3-bay sink to existing facility to be used for takeout pizza shop
Village Square Co	5W0025-4				Certification for building 3
Village Square Co	5W0025-5				Approval building D
Village Square Co	5W0025-7				Sale of Mehuron Mkt with an additional .5 acre out of entire 4.4 acres project site
Village Square Co.	5W0025-8	ROUTE 100			PB-MOVE LOCATION OF PREVIOUSLY APPROVED BUILDING
The Howard Bank	5W0035-1				Construct 864 sq ft addition & add 7 additional parking spaces to existing bank
Mad River Green Partners Inc	5W0036-10	MAD RIVER GREEN			Construction of 15000 sq ft supermarket on 3 acres on-site water & sewer
Mad River Green Partners Inc	5W0036-10R	MAD RIVER GREEN			Revised C of C
Brothers Building Co., Inc.	5W0036-12	MAD RIVER GREEN			PB-960' ADDITIONAL OFFICE SPACE, RENOVATE 1 APARTMENT TO 2 ONE-BEDROOM APARTMENTS
Brothers Building Co. Inc.	5W0036-13	MAD RIVER GREEN			EC-CONSTRUCT BLDG TO BE USED AS MAIL ORDER & WHOLESALE RETAIL, WATER SUPPLY CHANGES
Mary Lou Quinones	5W0036-16	MAD RIVER GREEN			PB-CONVERT RETAIL SPACE AT MAD RIVER GREN SHOPPING CTR TO BEAUTY SALON
Mad River Green Inc	5W0036-2	MAD RIVER GREEN			Add two addition sites to residental portion of development
Mad River Green Partners	5W0036-4A	MAD RIVER GREEN			Construction of a 36' X 84 ' wood frame building
Mad River Green Partners	5W0036-6	MAD RIVER GREEN			Addition to bank building to include office space & handicapped toilet
Mad River Green Partners	5W0036-8	MAD RIVER GREEN			Permission to subdivide in order to facilitate the sale of the subject premises to the Chittenden Tr
Mad River Green Inc	5W0036-9	MAD RIVER GREEN			Subdivide parcel B into 3 lots each for single family
Keith & Keith Inc	5W0122-1				Reinstatement of expired 5W0122 & sale of lot # 6 to ValleyDental Assoc in accord with cond # 2
Keith & Keith Inc	5W0122-2				Greenhouse addition to laundromat

Source: DEC Regional Office permit database and file review, Sept. 2010.
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Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 5 (continued): Permit Information Summary

Owner or Applicant Name	Permit No.	Location	Parcel ID	Date (if available)	Reason for Permit
Keith & Keith Inc	5W0122-3				Auto parts store & apt
Mad River Green Partners	5W0377	RT 100			Const of building 80' X 160' for light industrail use septic & water supply system
Mad River Green Partners	5W0377-1				40' X 80' warehouse storage bldg addition to existing bldg
Mad River Green partners	5W0377-2				Transfer ownership of property subdivision 1/2
James & Kathryn Henry	5W0377-3				
James & Kathryn Henry	5W0377-4				120' x 80' storage warehouse
Mad River Canoe	5W0377-5				40' X 80' pre-engineered steel bldg addition
Quintin Pearson	5W0627	TR # 6			Construct a light industrial building
Valley Housing Assoc	5W0647				24 Units family & eldery housing 3-2400 sq ft office buildings
Valley Housing Assoc	5W0647-1				Incorporate certification of compliance
Irasville Properties Inc	5W0654				Reconstruct & renovate res. into office & new retail space
Irasville Properties Inc	5W0654-3				Incorporate cert of comp approve interior plumbing 4 offices spaces & in units 4 & 5
Irasville Common Condo Assoc.	5W0654-4	RTE 100			PB-RENOVATE BLDG 1 TO CONVERT OFFICE TO PHY.THER. & BLDG 3 FOR BTY SAL.,UPGRADE DIS.SYS.
Russell Bennett & Daniel Bisbee	5W0693				Renovate residence into office & possible space
Chanterelle Ltd	5W0693-R	RT 100			Convert existing floor space to commerical catering & retail food shop
Robert & Sylvia Allen	5W0721	TH 23			1.5 acres lot with commerical bldg Supply
C.S. Construction	5W0721-1A	TH 23			PB-INCREASE CAPACITY FROM 2000 GPD TO 5000 GPD, Waitsfield Investments
Waitsfeild Investments Inc	5W0721-2				
Robert & Slyvia Allen	5W0721-23				24' X 100' storage shed & retail expansion
Winter Park Associates	5W0721-4	TOWN ROAD 23			EC-4 LOTS, ONE UNDER ABOVE DEFERRAL D-5-1648, Also see D-5-1618
Winter Park Associates	5W0721-7	TH 23			Create 3 commerical lots

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Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 5 (continued): Permit Information Summary

Owner or Applicant Name	Permit No.	Location	Parcel ID	Date (if available)	Reason for Permit
Vincent & Diana Gauthier	5W0748				40' X 60' unheated & unplumbed structure for storage of rental equipment
Historic Waitsfield Village	5W0786	BRIDGE ST. & RT. 100			PB-HISTORIC RENOVATION OF 3 BLDGS & MINOR RENOVATIONS TO 1 ADDITIONAL BLDG
Historic Waitsfield Village	5W0786-2	RT 100			PB-RELOCATE CLEARWATER CANOE BLDG & WATER LINE
Castlerock Properties Inc	5W0786-3				Convert form of ownership Historic Waitsfield Village to condominiums with each of the four buildin
Historic Waitsfield Village & PJS	5W0786-A				Historic rehabilitation of 3 buildings 1 additional building minor improvements on-site waste & wat
PJS Investments	5W0795	ROUTE 100			PB-CONVERT EXISTING APARTMENT BLDG/DAY CARE CTR TO OFFICE BLDG
Mad River Green, Inc.	EC-5-1464-6	off Route 100	99146.000		remove septic allocation on sites 7, 8, 17, & 18, Also see DE-5-3264 thru DE-5-3267
Q. Pearson	EC-5-2069	TH 23, Carrol Rd.	23001.000		septic system for 2 lots Also see DE-5-1648-1
Winter Park Associates	EC-5-2281	RT 100	23001.000		1 lot w/existing Edison Studio Also see DE-5-2673, DE-5-2674, 5W0721
Winter Park Associates	EC-5-2281-1	Carrol Road	23001.000		boundary line adjustment to a previously approved lot, also see DE-5-2673-1 and DE-5-2674-1
Fiddlers Green Homeowners	EC-5-2751	Route 100	99181.000	9/23/2003	remove lot 4 approved under EC-486 from the community sewage disposal system
Town of Waitsfield School District	EC-5-2814	RT 100	99051.000		reconfigure lot by property line adjustment w/adjacent property,Also see EC-5-2815 & WW-5-0204-2
Town of Waitsfield	EC-5-2815	RT 100	99052.000		reconfigure lot by property line adjustment w/adjacent property,also see EC-5-2814 & WW-5-0946
William & Ellen Austin	EC-5-3043	Route 100	99183.000	4/3/1998	1 lot subdivision, 1.2 acres, Also see DE-5-3333 & HE-5-0292
1840 Starch House LLC	EC-5-3043-1	Route 100	99183.000	11/30/2000	changes to the water supply location, Also see WW-5-1562 & WW-5-1516, PB-5-0430

Source: DEC Regional Office permit database and file review, Sept. 2010.
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Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 5 (continued): Permit Information Summary

Owner or Applicant Name	Permit No.	Location	Parcel ID	Date (if available)	Reason for Permit
Fiddler's Green Owners' Assoc	EC-5-3366	Fiddler's Loop	99181.000	1/30/2001	revise septic system location for lots 1, 4, 5, 6, & 7 of previously approved subd. EC-486,Also see
Winter Park Associates	EC-5-3611	TH 23, Carroll Road	23001.000	7/10/2002	Lot 3A, 0.3 acres construct portion sign fabrication facility w/1 bdrm apt Also see DE-5-3793 & 3794
Winter Park Associates	EC-5-3612	TH 23, Carroll Road	23001.000	7/10/2002	Lot 6, 0.83 acres to construct 6-employee retail bldg; Also see EC-5-3511, WW-5-1809 & WW-5-1810 - W
Waitsfield Investments	EC-5-3613	TH 23, Carroll Road	23001.200	7/10/2002	further divide Lot 4 create Lot 5 facility w/ 1-bdrm apt and Lot 5A; Also see WW-5-1809 & DE-5-3795
William Leipert	PB-5-0037				Addition to Den Restaurant consisting of a new dining room, kitchen, 2 toilets rooms , billard room
The Village Co	PB-5-0067	Village Square Shopping Center			Renovations to the existing building into a Fish Store; Also See WW-5-00093-1, WW-5-0972 and 5W0025
JV Urdaneta	PB-5-0126	Bridge ST			Renovations to an existing building into an art gallery & 15 seats soup & sandwich shop
Jose Urdaneta	PB-5-0126-1	BRIDGE STREET			NEW WATER & SEWER SUPPLY FOR EXISTING BLDG
Waitsfield Elementary School	PB-5-0221				Addition & renovations to existing building
Waitsfield Town School District	PB-5-0221-1	RT 100			Relocating movable classroom to house library & ancillary services
Town of Waitsfield School District	PB-5-0221-2	RT 100			PLUMBING & HEATING ALTERATIONS
Town of Waitsfield School District	PB-5-0221-2R	RT 100			NEW WELL
Big Top Partnership	PB-5-0222	RT 17			Residence converted to offices adjacent to Fiddlers Green
Village Grocery	PB-5-0226				Move existing deli
Lionel J Palardy	PB-5-0262	Bridge ST			Deli meat store in existing public building
A Moveable Feast Cafe Inc	PB-5-0272				Add a second bathroom in Court Yard bldg to meet liquor authority
David Millstone	PB-5-0450-1				20 seat restaurant w/ drilled well

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Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 5 (continued): Permit Information Summary

Owner or Applicant Name	Permit No.	Location	Parcel ID	Date (if available)	Reason for Permit
Valley Schoolhouse Assoc	PB-5-0466	RT 100			Renovation of old schoolhouse to 9 residential & 4 office condos
Valley Schoolhose Associates	PB-5-0466-A				Renovation of old schoolhouse to 9 residential & 4 office condos amended
Renaissance Associates	PB-5-0516				Conversion of 8 units apt bldg to seven condos
Linda McCusker	PB-5-0534	RT 100 Irasville			Renovate to add 1 bedroom in existing building
Green Mountain Coffee Roasters	PB-5-0680	RT 100			RENOVATE FORMER BREAD BASKET BAKERY,MAD RIVER GRN SHOPPING CTR TO SNACK BAR (5W0036-
Kevin Eurich	PB-5-0725	RT 100			DRILL NEW WELL FOR CHURCH
Tom Kaminski	PB-5-0739	RT 100			CONVERT EXISTING BLDG TO MINI- MART & OFFICE
Historic Brands	PB-5-0798	RT 100			ADD PLUMBING FIXTURES TO EXIST ING RETAIL SPACE,MAD RIVER GREEN SHOPPING CTR FOR
Cheryl Bernard	PB-5-0913				CONVERT OFFICE SPACE TO BEAUTY SALON, Also see 5W0786-1
Valley Rent-All	PB-5-0941	TH 23			CONSTRUCT BLDG TO HOUSE EQUIPMENT RETAL BUSINESS, Also see 5W0721-5
Randy Eastman	PB-5-0975	OFF RT. 100			CONSTRUCT CAR WASH
Grand Union	PB-5-1006	RT 100			REPAIR FAILED SEPTIC SYSTEM; Also See WW-5-0440 & Amendments and 5W0036 and Amendments
Fiddlers Green Land Assoc.	PB-5-1078	RT 100			modernize water supply pump house equipment, Also see 5W0122
Irene Mehuron	WW-5-0093	RT 100	99131.000		construct addition to grocery store; Also See WW-5-0972, PB-5-0067 and 5W0025 & Amendments
Irene Mehuron	WW-5-0093-1	RT 100	99131.000		replace existing septic system; Also See WW-5-0972, PB-5-0067 and 5W0025 & Amendments
Glentoran N.V.	WW-5-0093-2	Village Square	99131.000	10/24/2008	replacement of a failed wastewater disposal system for an existing commercial building on 4.4± acre
Mad River Canoe, Inc.	WW-5-0142	RT 100	99147.000		addition for manufacturing
Irasville Incubator & Storage, LLC	WW-5-0142-1	151/167 Mad River Canoe Road	99147.000	4/22/2004	Amend permit to reflect the installation of a pump station
Gateway Lodge & Motel	WW-5-0156	RTS 17 & 100			replace failed septic system

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Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 5 (continued): Permit Information Summary

Owner or Applicant Name	Permit No.	Location	Parcel ID	Date (if available)	Reason for Permit
Waitsfield School District	WW-5-0204	Route 100	99051.000		school expansion
Waitsfield School District	WW-5-0204-1	RT 100	99051.000		replace water reservoir, Also see WW-5-0298
Town of Waitsfield School District	WW-5-0204-2	RT 100	99051.000		allow General Waite house to connect to school's water supply,Also see Ec-5-2814 & WW-5-0946
Brothers Building Co., Inc.	WW-5-0250	RT 100	99152.000		Convert Retail Shop to Beauty Salon, Also see 5W0036
Brothers Building Co., Inc.	WW-5-0280	RT 100	99152.000		Construct addition & add 20 seats to restaurant in Bldg #3, also see 5W0036 & WW-5-0250
Waitsfield Fire Department	WW-5-0298	RT 100	99051.100		replace water reservoir, also see WW-5-0204-1
Town of Waitsfield	WW-5-0426	RT 100, Bridge Street	01001.000		drill well forTownClerk Office share w/WW-5-0427
Bonnie and Gaelic McTigue	WW-5-0427	RT 100, Bridge Street	01003.000		drill new well for RetailStore share with WW-5-0426
Grand Union Company	WW-5-0440	RT 100	99148.000	5/4/1993	construct septic system, also see PB-5-1006 & 5W0036 & Amended
Grand Union Company	WW-5-0440-1	RT 100	99148.000	5/26/1995	rebuild septic system, also see PB-5-1006 & 5W0036-14
Mad River Green Partners, Inc.	WW-5-0440-2	27 Mad River Road	99148.000	10/29/2008	replacement of a failed wastewater disposal system for an existing 15,000 square foot supermarket on
Stevenson Flemer	WW-5-0446	RT 100	99062.000		new well for theater &mtg hall
Odd Players	WW-5-0446-1	RT 100	99062.000		new water supply for theater and meeting hall
Skatium, Inc.	WW-5-0457	RT 100	99146.000		construct ice skating facility Also see EC-5-2362
Skatium, Inc.	WW-5-0457-1	Slow Road	99146.000	1/30/2009	amend Permit WW-5-0457 to allow winter use of a single portolet at the previously approved outdoor i
Andrew Baird, Jr.	WW-5-0667	Route 100			auto repair shop in residence, Also see HE-5-0075
Frederick Bashara	WW-5-0828	RT 100	99175.000		replace failed septic system serving laundromat
FGB Corporation	WW-5-0828-1	Fiddler's Loop	99175.000		Water supply for laundromat on Lot 4, Also see EC-5-3366
Freeman G. White	WW-5-0866	Route 17	99165.000		new gas station and convenience store without public restrooms

Source: DEC Regional Office permit database and file review, Sept. 2010.
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Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 5 (continued): Permit Information Summary

Owner or Applicant Name	Permit No.	Location	Parcel ID	Date (if available)	Reason for Permit
Freeman G. White	WW-5-0866-1	RT 17	99165.000		relocate storm drain to be less than 25' from septic system
Town of Waitsfield	WW-5-0946	RT 100	99052.000		convert General Waite house to offices, construct new leachfield & connect to school's water supply,
Glentoran N.V.	WW-5-0972	RT 100	99131.000		add 10 restaurant seats to retal store in bldg C; Also See 5W0025 & Amended, WW-5-093-1 and PB-5-006
Brothers Building Co., Inc.	WW-5-1056	RT 100	99152.000		construct new building 4 for bank & 2 bedroom apt.
Brothers Building Co., Inc.	WW-5-1057	RT 100	99152.000		construct building 5 for office & retail space & 3 two-bedroom apts.
Brothers Building Co., Inc.	WW-5-1058	RT 100	99152.000		construct building 6 for retail space & 4 two-bedroom apts.
Brothers Building Co., Inc.	WW-5-1059	Rt 100	99152.000		construct building 7 for retail space
Waitsfield House Mgt. LLC	WW-5-1182	Route 100 & Bridge Street	99108.000		amend prior permit (PB-5-0913) to decrease beauty salon charis to 1; Also See WW-5-5191 replace fail
Waitsfield House Mgt. LLC	WW-5-1183	Rt 100 & Bridge Street	99108.000		change office/retail space to 24 seat cafe serving 2 meals/day; Also See WW-5-5191
William Maclay	WW-5-1214	RT 100	99111.000		convert 4 bedroom residence to 3 bedroom residence & 10 employees in garage
William and Alexandra Maclay	WW-5-1214-1	4509 Main Street, VT Route 100	99111.000	4/23/2008	construction of a building addition and reallocate flows to convert 3-bedroom single-family residenc
William and Alexandra Maclay	WW-5-1214-2	4509 Main Street, VT Route 100	99111.000	9/18/2009	reallocation of approved water and wastewater design flows to allow for a 2-bedroom apartment, a 1-b
Mad River Sr Citizens Inc.	WW-5-1287	Route 100	99159.000	1/28/1999	change use to 18 double occupancy rms & 55 restaurant seats
Evergreen Place, Inc.	WW-5-1287-1	5308 Main Street	99159.000	2/16/2005	Construct addition and change unit occupancy to 12 single-occupant units, 6 double-occupant units
Evergreen Place housing Ltd Partnership	WW-5-1287-2	5308 Main Street	99159.000	7/29/2005	change water supply cistern with new storage tanks, Also see 5W0932-2

Source: DEC Regional Office permit database and file review, Sept. 2010.
Path: O:\Proj-10\WRM\2345-W Waitsfield\Data\DEC Permits\PermitSummary.xls
Date/init: 10/28/2010 anm

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 5 (continued): Permit Information Summary

Owner or Applicant Name	Permit No.	Location	Parcel ID	Date (if available)	Reason for Permit
Evergreen Place Housing Ltd Partnership	WW-5-1287-3	Main Street, RT 100	99159.000	1/19/2006	add chlorination equipment to water system
Evergreen Place Housing Ltd Partnership	WW-5-1287-4	5308 Main Street, RT 100	99159.000	3/10/2009	reduce design flows to accommodate 17 single occupancy units, 1 elderly, double occupancy unit, 50 s
Kathryn Henry Trust	WW-5-1336	Route 100	99143.000	5/26/1999	convert office to 2-chair beauty salon and 1-bedroom apartment
Bisbee/Bennett partnership	WW-5-1343	Route 100	99121.000	11/1/1999	expand septic system to allow a 24-seat bagel shop with 3 employees
Irene Mehuron	WW-5-1346	Route 100	99133.000	5/19/1999	replacement septic system design with amended flows
Irene Mehuron	WW-5-1346-1	RT 100	99133.000	8/10/2004	replace failed septic system serving Mehuron's Market
Randy Eastman	WW-5-1363	Route 100	99057.000	7/9/1999	convert gas station to service station w/no pumps an a 3-bedroom apt
Mad River Ambulance Service	WW-5-1363-1	RT 100, 4177 Main Street	99057.000	6/13/2002	convert an auto repair facilitiy to an ambulance building
Spencer & Margery Gregory	WW-5-1511	Main Street	99067.000	7/20/2000	convert a residence to retail space with a 2-bedroom apt
Ian Buchanan & Sarah Shorett	WW-5-1511-1	4312 Main Street	99067.000	7/12/2006	convert previously approved bldg to 2 two-bdrm apts and 9 employee office space and replace failed w
Vermont Pack & Paddle Co	WW-5-1516	Route 100	99183.000	11/30/2000	convert a barn to a retail store with 4 employees
Vermont Canoe	WW-5-1516-1	RT 100	99183.000	2/2/2006	change use of previously permitted barn from retail to light manufacturing with 10 employees
Roger Boyle	WW-5-1519	Fiddler's Loop	99173.000	1/30/2001	Approve 25 person office and restaurant w/16 seats on Lot 1, Also see EC-5-3366,WW-5-0828-1,WW-5-152
F.A.P. Properties Inc.	WW-5-1520	Fiddler's Loop	99176.000	1/30/2001	4 employee auto parts store & a two-bedroom apt. on Lot 5, Also see EC-5-3366
Valley Dental Associates	WW-5-1521	Fiddler's Loop	99177.000	1/30/2001	dental office & 2 one-bedroom apts, on Lot 6
Mad River Car Wash Inc.	WW-5-1522	Fiddler's Loop	99178.000	1/30/2001	Potable water for 3 employees at car wash on lot 7,

Source: DEC Regional Office permit database and file review, Sept. 2010.
Path: O:\Proj-10\WRM\2345-W Waitsfield\Data\DEC Permits\PermitSummary.xls
Date/init: 10/28/2010 anm

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 5 (continued): Permit Information Summary

Owner or Applicant Name	Permit No.	Location	Parcel ID	Date (if available)	Reason for Permit
1840 Starch House LLC	WW-5-1562	Route 100	99183.000	11/30/2000	changes to the water supply location, Also see EC-5-3043-1, WW-5-1516, PB-5-0430
John & Elizabeth Mansfield	WW-5-1589	4366 Main St; RT 100	99070.000	3/23/2001	convert apt bldg to an 18 seat restaurant;pottery studio; & two 1 bdrm apts
Tavern Condominium Assoc.	WW-5-1642	RT 100 (4200 Main St.)	99046.002	10/24/2001	construct replacement septic system for failed system serving 7 condominiums, Also see PB-5-0516
Wait Farm Motor Inn	WW-5-1716	4805 Main St; RT 100	99123.000	7/25/2002	drill new well for motel & residence
Paul Lavoie	WW-5-1716-1	Main Street	99123.000	1/14/2008	divide 3.04± acre lot of Permit WW-5-1716 to create Lot 1 being 1.01± acres
Paul Lavoie	WW-5-1716-2	4805 Main Street	99123.000	12/9/2008	amend Permit WW-5-1716-1 to allow the current use of the lodging house to continue and re-design of
Wait Farm Partners	WW-5-1716-3	4805 Main Street	99123.000	2/2/2010	change in use for the existing lodging facility on Lot 2 of Permit WW-5-1716-2 into 2 apartments
Winter Park Associates	WW-5-1809	Carroll Road	23001.200	7/10/2002	construct sign fabrication facility w/a 1-bdrm apt.; Also see Ec-5-3613
Winter Park Associates	WW-5-1810	TH 23, Carroll Road	23001.000	7/10/2002 Revoked 12/14/06	construct 6-employee retail bldg on Lot 6; REVOKED 12/14/06 Also see WW-5-1809, EC-5-3611 & 3612 RE
Alan Goldman	WW-5-1898	Routes 100 & 17	99164.000	9/19/2002	approval for previoiusly constructed wastewater disposal system serving Gallagher's
Russell & Linda Heaton	WW-5-2518	152 Dugway Road	38002.000	1/7/2004	further divide lot approved under EC-5-0757
Valley Housing Associates	WW-5-2834	Butcher House Road	38008.000	8/17/2004	approval for as-built wastewater dispsoal systems for prevoiusly permitted 24 units of housing
Central Vermont Community Land Trust	WW-5-2834-1	Butcher House Road	38008.000	5/16/2006	reconfigure prior approved lot and increase size to 5.07 ac.
Kitchener House Ltd	WW-5-3104	Rt 100 & Bragg Hill Road	99161.000	3/18/2005	connect barn containing a 3 employee retail space and 1 person office space to existing septic system
Mad River Valley Health Center	WW-5-3123	Route 100, Old County Road	99050.000	3/31/2005	increased use of health center
Benjamin & Stevenson Flemer, Jr. & Wrenn Flemer Compere	WW-5-3499	4242 Main Street	99046.000	12/19/2005	approval for prior conversion of 6 bdrm residence into a 6 bdrm duplex on 76 acres

Source: DEC Regional Office permit database and file review, Sept. 2010.
Path: O:\Proj-10\WRM\2345-W Waitsfield\Data\DEC Permits\PermitSummary.xls
Date/init: 10/28/2010 anm

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
TABLE 5 (continued): Permit Information Summary

Owner or Applicant Name	Permit No.	Location	Parcel ID	Date (if available)	Reason for Permit
Wrenn Flemer Compere, Trustee	WW-5-3499-1	4242 Main Street	99046.000	12/29/2008	further divide 76± acre lot of Permit WW-5-3499, now being 72.92± acres, to create Lot 4 of 1.19± ac
Central Vermont Community Land Trust	WW-5-3640	Butcher House Road	38008.000	5/16/2006	construct a 4 unit apt. bldg w/total of 8 bdrms on 2.08 ac. lot w/another building to be subject to
Mad River Meadows L.P.	WW-5-3640-1	Butcher House Road	38008.000	12/17/2008	add 1 bdrm to bldg 1 for a total of 9 bdrms in 4 units
Central Vermont Community Land Trust	WW-5-3641	Butcher House Road	38008.000	5/16/2006	construct a 4 unit, 8 bdrm apt. bldg on 2.08 ac. w/another bldg subject to WW-5-3640
Mad River Meadows LP	WW-5-3641-1	Butcher House Road	38008.000	12/17/2008	add 1 bdrm to bldg 2 for a total of 9 bdrms in 4 units
Claudia Becker	WW-5-3728	TH 23, Carroll Road	23001.100	6/1/2006	expand footprint of previously approved theater, add a 30 seat restaurant, and reduce theater seats
Revolution Theater, LLC	WW-5-3728-1	Carroll Road	23001.100	12/29/2006	add a 14 child daycare & community center to existing 150 seat theater & 30 seat cafe
Revolution Theater, LLC	WW-5-3728-2	Carroll Road	23001.100	4/21/2008	amend permit WW-5-3728-1 to eliminate Condition 1.5 and allow on-site food production to be consumed
Historic Waitsfield Village Condominium Association	WW-5-5191	Bridge and Main Streets	99108.000	8/14/2009	replacing a failed community wastewater disposal system serving 4 existing commercial buildings

Source: DEC Regional Office permit database and file review, Sept. 2010.
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Date/init: 10/28/2010 anm

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
Table 6: Summary of Needs Assessment Results, Waitsfield Village

Description:

23	Single Family Residences
1	Apartment Building
12	Commercial Properties
15	Mixed Residential/Commercial Properties
8	Municipal or Institutional Properties
4	Open Land
63	Properties Total

Water Supplies:

27	Planned Connections to Community Water System
17	Individual or shared drilled wells
2	Individual or shared shallow wells/springs
1	Public Water Supply (Drilled Well)

Factors Affecting GIS Needs Assessment:

Factor	Number of Properties Affected	% of Total
Limited Available Area Only	27	43%
Proximity to Structures or Property Lines	27	100%
Proximity to Water Supply Wells	21	78%
Proximity to Steep Slopes	3	11%
Proximity to Surface Waters	7	26%
Proximity to Wetland	3	11%
Proximity to Floodplain	8	30%
Proximity to Soils Ranked 'Not Suited'	4	15%
Shallow Seasonal Groundwater Only	0	0%
Shallow Seasonal Groundwater and Limited Available Area	0	0%
Shallow Bedrock Only	0	0%
No Restrictions	36	57%

Potential Capacity or Management Needs:

Factor	Number of Properties	Total Design Flow (gallons/day)
GIS Area or Groundwater Limitation	27	23,805
Plan to change property use in future	3	1,335
Plans to change use need wastewater capacity	3	5,480
Change planned and wastewater capacity needed	2	580
Other issues	0	0

Source: Survey results; Town Grand List data table; Phelps 2004 WW Facilities Plan; VT DEC permits; parcel GIS database; November 2010 water project information

STONE ENVIRONMENTAL, INC

Note: Within the potential capacity or management needs, if a parcel has both a GIS limitation and a survey response, the parcel's wastewater design flow is counted in both applicable categories.

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Date/init: 12/29/2010 anm

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
Table 7: Summary of Needs Assessment Results, Irasville

Description:

12	Single Family Residences
2	Apartment Buildings/Properties
37	Commercial Properties
11	Mixed Residential/Commercial Properties
3	Municipal or Institutional Properties
7	Open Land
72	Properties Total

Water Supplies:

46	Planned Connections to Community Water System
10	Individual or shared drilled wells
2	Individual or shared shallow wells/springs

Factors Affecting GIS Needs Assessment:

Factor	Number of Properties Affected	% of Total
Limited Available Area Only	13	18%
Proximity to Structures or Property Lines	13	100%
Proximity to Water Supply Wells	6	46%
Proximity to Escarpments	4	31%
Proximity to Surface Waters	5	38%
Proximity to Wetland	2	15%
Proximity to Floodplain	2	15%
Proximity to Soils Ranked 'Not Suited'	1	8%
Shallow Seasonal Groundwater Only	2	3%
Shallow Seasonal Groundwater and Limited Available Area	2	3%
Shallow Bedrock Only	0	0%
No Restrictions	55	76%

Potential Capacity or Management Needs:

Factor	Number of Properties	Total Design Flow (gallons/day)
GIS Area or Groundwater Limitation	17	33,560
Plan to change property use in future	2	980
Plans to change use need wastewater capacity	10	20,073
Change planned and wastewater capacity needed	5	1,455
Other issues	5	5,500

Source: Survey results; Town Grand List data table; Phelps 2004 WW Facilities Plan; VT DEC permits; parcel GIS database; November 2010 water project information

STONE ENVIRONMENTAL, INC

Note: Within the potential capacity or management needs, if a parcel has both a GIS limitation and a survey response, the parcel's wastewater design flow is counted in both applicable categories.

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Date/init: 12/29/2010 anm

Study of Decentralized Wastewater Options for Waitsfield Village and Irasville
Town of Waitsfield, Vermont
Table 8: Summary of Needs Assessment Results

Description:

35	Single Family Residences
3	Apartment Buildings/Properties
49	Commercial Properties
26	Mixed Residential/Commercial Properties
11	Municipal or Institutional Properties
11	Open Land
135	Properties Total

Water Supplies:

73	Planned Connections to Community Water System
27	Individual or shared drilled wells
4	Individual or shared shallow wells/springs
1	Public Water Supply (Drilled Well)

Factors Affecting GIS Needs Assessment:

Factor	Number of Properties Affected	% of Total
Limited Available Area Only	40	30%
Proximity to Structures or Property Lines	40	100%
Proximity to Water Supply Wells	27	68%
Proximity to Steep Slopes	3	8%
Proximity to Surface Waters	12	30%
Proximity to Wetland	5	13%
Proximity to Floodplain	10	25%
Proximity to Soils Ranked 'Not Suited'	5	13%
Shallow Seasonal Groundwater Only	2	1%
Shallow Seasonal Groundwater and Limited Available Area	2	1%
Shallow Bedrock Only	0	0%
No Restrictions	91	67%

Potential Capacity or Management Needs:

Factor	Number of Properties	Total Design Flow (gallons/day)
GIS Area or Groundwater Limitation	44	57,365
Plan to change property use in future	5	2,315
Plans to change use need wastewater capacity	13	25,553
Change planned and wastewater capacity needed	7	2,035
Other issues	5	5,500

Source: Survey results; Town Grand List data table; Phelps 2004 WW Facilities Plan; VT DEC permits; parcel GIS database; November 2010 water project information

STONE ENVIRONMENTAL, INC

Note: Within the potential capacity or management needs, if a parcel has both a GIS limitation and a survey response, the parcel's wastewater design flow is counted in both applicable categories.

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Date/init: 12/29/2010 anm

APPENDIX A: WAITSFIELD PLANNING COMMISSION, WASTEWATER COMMITTEE MEMBERS

Drew Simmons, Chair – Waitsfield Planning Commissioner

Robin Morris – Waitsfield Water Task Force

Darryl Forrest – Waitsfield Water Task Force

Peter Lazorchak, P.E. – former Waitsfield Planning Commissioner

Joshua Schwartz – Executive Director Mad River Valley Planning District

APPENDIX B: VALLEY REPORTER ARTICLES AND LETTERS

Letter to the editor by the Wastewater Committee members, page 16 from the September 16, 2010 issue of the Valley Reporter

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Waitsfield survey

To The Editor:

As part of the Town of Waitsfield Planning Commission's "Assessment of Decentralized Wastewater Options," this week property owners in historic Waitsfield village and Irasville will receive a brief voluntary survey.

As background to the assessment, in the fall 2008, the majority of Waitsfield voters voted against a taxpayer-supported centralized wastewater system. Known as a "big pipe" system, that plan is now in Waitsfield's past.

This fall, to plan for the economic sustainability and future environmental health of Waitsfield, the town is continuing the process of evaluating wastewater needs and options in historic Waitsfield village and Irasville. The focus of this effort is to determine if decentralized, or "small pipe," wastewater solutions are an appropriate fit for our community.

Decentralized wastewater approaches have proven successful in many communities due to the flexibility of their application. These systems can include traditional septic tank-leachfield systems of varying sizes, wastewater treatment systems shared between properties, and/or systems with advanced treatment. New technologies have created some options previously unavailable to us.

As the first step in this planning process, we are conducting a brief voluntary survey of property owners in historic Waitsfield village and Irasville. Known as the Assessment of Decentralized Wastewater Options, this survey will help the town assess the health and capability of current wastewater systems and also accurately gauge future needs.

The survey and planning process is being fully funded by a municipal planning grant. All information provided through the survey is intended for use only by the Planning Commission Wastewater Committee and its consultants and will not be provided to any regulatory entities. In any shared reporting done by the committee, information will be summarized or combined and will not include the names of individual landowners or individual property locations.

The committee is striving for 100 percent cooperation to provide the basis for informed and accurate decision-making. For more information please email wastewaterPC@gmail.com.

Thank you in advance for your time and consideration.

Town of Waitsfield Planning Commission Wastewater Committee:
Drew Simmons
Darryl Forrest
Peter Lazorchak
Robin Morris
Joshua Schwartz

View Mackey

Letter to the editor by the Wastewater Committee members, page 14 from the October 21, 2010 issue of the Valley Reporter

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ter Welch when he wrote the Retrofit for Energy and Environmental Performance Act and the subsequent Home Star Energy Retrofit Act. The work to make homes more energy efficient benefits Vermont: it puts people to work, it saves homeowners money on their energy bills, and it helps us reduce our reliance on fossil fuels. The legislation Peter wrote will meet those needs.

I urge you to get out and vote on November 2 to send Peter Welch back to Washington for another term.

Brad Cook
Warren

Deadline extended

To The Editor:

If you are a property owner in historic Waitsfield Village or Irasville, the Town Planning Commission Wastewater Committee has extended the deadline for incoming surveys regarding "decentralized wastewater options" to next Friday, October 29, 2010.

The original survey was sent out in September with the goal of helping the town assess the health and capability of current wastewater systems and also accurately gauge future needs for decentralized (aka "small pipe") systems. The survey and planning process is being fully funded by a Municipal Planning Grant.

For more information regarding the process or to request a new copy of the survey, please email wastewaterPC@gmail.com or contact the town office at 496-2218.

Thank you in advance for your time and consideration.

Town of Waitsfield Planning Commission Wastewater Committee: Drew Simmons, Darryl Forrest, Peter Lazorchak, Robin Morris, Joshua Schwartz

Excerpt from "The top ten stories of 2010 in review", (at right) by Lisa Loomis and Kara Herlihy, page 24 from the December 30, 2010 issue of the Valley Reporter.

Waitsfield creates task force to revisit question of municipal septic

With its municipal water project funded and at least partially underway, pending unresolved legal issues, Waitsfield turned its planning attention once again to the issue of municipal septic. At the behest of the town planning commission, the town applied for and received a grant to investigate the feasibility of decentralized wastewater treatment options for Irasville and Waitsfield Village.

This summer the town received an $8,450 grant from the Vermont Department of Housing and Community Affairs to fund the study and hired Stone Environmental to conduct the study.

Drew Simmons, a member of the planning commission and chair of the commission's wastewater committee, said that the grant will be used to look at existing wastewater needs in the village and Irasville, soil types and disposal options and the needs of home and business owners.

A year ago, the planning commission went to the town select board and asked whether the planning commission should be looking at what is next for municipal wastewater treatment, since a proposal for a large centralized wastewater system was turned down by voters two years ago.

The town formed a planning commission wastewater committee, which includes Simmons, Joshua Schwartz of the Mad River Valley Planning District, former planning commissioner Peter Lazorchak, Darryl Forrest, who serves on the town's water task force, and Robin Morris, who serves on the water task force and is a former planning commissioner.

The subcommittee applied for and received the grant and is now working towards identifying the town's future plans for dealing with wastewater in The Valley.

Simmons said the issue of wastewater must be dealt with to maintain a sustainable economy in The Valley.

Task force members hope to come up with some solutions that are less costly than a large centralized system and that are better suited to the community's needs.

Article regarding a public meeting presenting the results of this project, by Lisa Loomis, page 1 from the January 20, 2011 issue of the Valley Reporter.

Waitsfield PC to present wastewater study result

Options for bringing municipal wastewater to Waitsfield via a decentralized system will be presented by the Waitsfield Planning Commission at a public hearing next month.

The February 1 public meeting will be held at the Big Picture Theater in Waitsfield on February 1 at 7 p.m. Last summer and fall the planning commission worked with Stone Environmental of Montpelier to undertake a study of wastewater options for Waitsfield Village, with an emphasis on exploring whether a series of smaller, decentralized systems could work for Waitsfield, opposed to a single, larger, "big pipe" solution.

Waitsfield voters rejected a single, large, municipal wastewater system three years ago when such a system was presented along with the municipal water project that was approved and is under construction (and litigation) right now.

At the February 1 meeting, the Waitsfield Planning Commission will present the findings of a fall 2010 committee study, "Assessment of Decentralized Wastewater Options: A survey of needs, capacity and solutions for Historic Waitsfield Village and Irasville, Vermont." Funded by a municipal planning grant, the study evaluates the needs and capacity for "small pipe" decentralized wastewater treatment options in Irasville and historic Waitsfield Village. The effort was initiated by the Waitsfield Select Board as a method to evaluate viable alternatives to the "big pipe" taxpayer-supported centralized wastewater system, which was voted down in spring 2008.

Launched last August, the study was prepared by Stone Environmental and was overseen by a volunteer subcommittee of the Waitsfield Planning Commission. The study updates the existing 2001 survey of water supply and wastewater treatment infrastructure in the town, re-evaluates wastewater treatment and dispersal capacity and needs in light of the municipal water project now under construction, and evaluates wastewater management options.

The final report and executive summary, both of which will be available at the meeting, incorporate results from a homeowner/landowner survey of the study area, detailed maps that spotlight capacity and need, and recommended next steps.

—LAL

APPENDIX C: ONSITE WASTEWATER SYSTEMS— TECHNOLOGIES, COMPONENTS, MAINTENANCE

Onsite wastewater dispersal systems, when properly sited, installed, and maintained, can be a long-term effective means of wastewater treatment and dispersal. However, they can negatively impact surface waters and groundwater when they malfunction or when they are placed too close to the groundwater table or surface waters.

C.1. Wastewater Treatment and Distribution

The traditional gravity flow onsite septic system in the study area (and around Vermont) 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.

Effluent filters can now be added to the outlets of septic tanks, and are required on new tanks. These filters screen solids from the effluent when it leaves the tank. If the tank is full of solids, the filters will plug and the system will slow or back up before solids leave the tank and enter the dispersal field. This helps to protect the leachfield from solids that can carry over from the septic tank into the dispersal system from the septic tank if that tank is not pumped at appropriate time intervals. The filters need to be hosed off usually once a year.

Pump stations are added after the septic tank if the distribution box in the dispersal field is not low enough in elevation relative to the building outlet, or for mounds, at-grade systems, and advanced treatment systems. Pressurizing the dispersal field also allows for improved distribution of the effluent, making more effective use of the entire field and preventing overloading of a portion of the field.

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, or may allow for the use of sites not previously approved under the Vermont Environmental Protection Rules (Rules). Since August 2002, the Rules have contained a process through which "innovative/alternative" technologies can be approved for use in the state. Since the revised Rules were implemented, several different technologies have been approved by DEC and are available for designers to consider (a list of all approvals can be found at http://www.anr.state.vt.us/dec/ww/innovative.htm). A designer should think about the availability of component parts, local service providers, and ongoing operation and maintenance costs when considering or recommending any particular component. Pre-treatment technologies may replace, or partially off-set,

the cost of an avoided off-site system or a mound system, or depending on the site and system, may add $5,000-$10,000, or more, to the construction cost of a system. The ongoing costs of innovative/alternative systems are also often higher than those of a conventional septic system, because they need to be maintained regularly in order to operate properly.

C.2. Wastewater Dispersal Options

Traditional wastewater dispersal options in Vermont include drywells, in-ground leachfields, and mound systems. 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. Two concerns with drywells are that they typically contain a small volume and can be undersized for their intended uses, and that they are usually quite deep in the soil profile, sometimes close to 10 feet. Therefore, they may not have sufficient separation to groundwater, impermeable soils, or bedrock, to provide adequate treatment.

Most people are familiar with in-ground leachfields and mound systems. Both systems utilize either trenches or beds that either contain distribution pipes and crushed-stone or prefabricated leaching chambers. These dispersal options both provide treatment in the vicinity of the interface between the trenches (or bed) and the soil, and in the unsaturated soil beneath the trenches (or beds). A traditional leachfield is usually dosed by gravity, where effluent flows from the septic tank to the leachfield based on how much water flows into the septic tank from the structure. An in-ground leachfield requires 36 inches of unsaturated soil between the bottom of the leachfield and groundwater, and 48 inches to bedrock. Since the trenches can be installed up to 36 inches deep, this means at least 3.5-7 feet of suitable soil are needed for an in-ground leachfield to work properly.

A mound system is used where soil conditions are more limited. Unlike in-ground leachfields, they are dosed using pressure, usually from a pump tank or siphon placed between the septic tank and the dispersal field. The “mound” is built out of specified sand fill material that meets certain technical requirements, and which provides additional unsaturated soil for wastewater treatment between the bed or trench and the limiting condition (groundwater or bedrock). To be used without any additional pretreatment, a mound system needs at least 18 inches of undisturbed, unsaturated soil between the ground surface and the groundwater or bedrock.

Some newer wastewater dispersal options in Vermont include at-grade systems and subsurface drip irrigation. At-grade systems are dosed using pressure, like a mound system, but the crushed stone infiltration areas are built on the existing soil surface and then covered with non-specified fill material and topsoil. This material can either be moved from another part of the site or brought in from off-site. Since

the trenches are built on top of the existing ground surface, they need 3 feet of unsaturated soil (less than is needed for an in-ground system). Subsurface drip irrigation was approved in Vermont in 2007, and uses small-diameter, flexible tubing with widely spaced "emitters" to distribute treated wastewater effluent. Because of the small diameter of the emitters, wastewater must be pre-treated using an advanced treatment technology if subsurface drip dispersal is to be used. However, this technology can be installed without the use of crushed stone aggregate, making it a viable option in small spaces where earth-moving equipment cannot gain access. Since pre-treatment is required, subsurface drip irrigation can be used as a filtrate system (see below).

If advanced pre-treatment technology is used on a septic system, Vermont's Rules allow the use of a dispersal system called a filtrate system. The term "filtrate" acknowledges that the pre-treatment component has already done much of the work that the soil would normally do in a traditional septic system, and so less treatment is required of the soil. Filtrate systems may consist of any approved wastewater dispersal technology, but smaller sizes are allowed (up to ½ the area of traditional in-ground leachfield, at-grade system, or mound system), which can be important on small lots. Pre-treatment may also eliminate the need for a mound system in situations with shallow groundwater or bedrock limitations, since reductions in the vertical separations to limiting soils are also gained when pre-treatment is used.

Vermont's Rules also allow for the design and permitting of performance based systems on sites with 18 inches of soil above bedrock and as little as 6 inches of soil above the seasonal high water table. These systems almost always involve advanced pre-treatment and a mound wastewater dispersal system.

C.3. Operation and Maintenance of Wastewater Treatment Systems

Operation and maintenance of conventional sewage dispersal systems is quite simple. Operation or use of the system can be greatly enhanced by the use of water conservation devices and developing appropriate habits, such as only doing one load of laundry a day and eliminating in-sink garbage disposals. Keeping records of the locations of buried components, tank pumpouts, and repairs can be crucial during a system inspection and is invaluable information for future owners of the system.

Maintenance on conventional systems consists of having someone check the levels in the septic tank and pumping it out when necessary. For the homeowner, this usually means calling the septic tank pumper and always paying for a pumpout, whether it is really necessary or not; homeowners can avoid this unnecessary expense by checking the tank themselves. Depending on the use of the system, it may need to be pumped every year to every seven years. The condition of the tank, particularly its baffles and access, should also be inspected. If there are multiple tanks or pump station tanks, these should be inspected regularly and pumped when necessary due to the accumulation of solids greater than 25-33% of the tank volume. Any mechanical or electrical parts (such as pumps, valves, switches, or alarms) should

be inspected and tested yearly. The effluent filters also should be checked and cleaned on a yearly basis, with greater or lesser frequencies in specific situations depending on use.

Maintenance of tanks is a lot easier when access to the tank is not a problem, as is the case when the tank is buried under a couple of feet of soil. New septic tanks are required to have risers to grade with adequately designed and installed lids to prevent entry by children. If the top of an existing tank is deeper than 12 inches below the surface, access risers should be installed on the tank. In the past the risers were constructed of thick heavy concrete, but lightweight plastic and fiberglass materials for risers are now available, although again, child safety must be considered.

Another maintenance item is to check the distribution box and make sure the outlet pipes are level. If this box is not level (which can easily happen in Vermont's freezing climate), one portion of the dispersal field may be overloaded while other parts go unused. There are plastic devices available that can easily be installed to make the outlet pipes level.

The dispersal field itself should be checked for seepage or surfacing of effluent, or for water loving plant growth, the roots of which can clog pipes. If there is untreated wastewater surfacing or discharging into a ditch or surface waters, there is a real public health hazard that should be addressed immediately. Although not typical in Vermont, some dispersal fields (leach fields) include monitoring pipes so that the stone in the dispersal field can be checked for ponding. Some ponding of treated wastewater in the field can be acceptable, but if the system has a thick clogged mat or is being hydraulically overused the wastewater system may surface or back up.

As septic systems become more complex, 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. Most technology manufacturers sell maintenance contracts with their systems to ensure that the pre-treatment units keep functioning properly after they are installed, and most users of these technologies are required to have a current maintenance contract as a condition of the system's permit.

APPENDIX D: VERMONT REGULATIONS FOR SOIL-BASED WASTEWATER TREATMENT SYSTEMS

This appendix provides additional details about current design and permitting criteria for decentralized wastewater systems in Vermont. Design and permitting criteria for onsite wastewater systems 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). Following is a summary of important rule requirements, as well as information about recent changes in the rules and regulations.

D.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. These rules 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, including the implementation of universal jurisdiction and the 'clean slate', an overall re-organization of the EPRs to improve readability, and the addition of several alternative technologies.

With the latest revision to the EPRs, wastewater systems and potable water supplies that were previously exempt from state regulation may be required to obtain a permit for activities such as:

- new construction (including single family residences that need sewage dispersal and/or water);
- 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.

Vermont is the last state in the nation to implement this kind of permit requirement for all properties statewide. This is often referred to as the state having "universal jurisdiction" over sewage and water.

The legislation includes a "clean slate" exemption that basically grandfathers all buildings, campgrounds, lots, wastewater systems, and potable water supplies that were in existence before January 1, 2007. On or after the January 1, 2007 date, 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). If the wastewater system or potable water supply fails, a variance from the rules is available if no fully complying replacement can be

found. (This is often referred to as a "best fix" situation, see Section 3.1.) This provides relief for a number of properties that currently are unmarketable due to non-compliance with the rules.

New, clearer definitions are provided for "failed" water supplies and wastewater systems. This is important because anyone with a failed system now needs a repair permit and also has a defect in their property title.

The EPRs now include general approvals for the use of constructed wetlands and subsurface drip distribution systems for the dispersal of wastewater in addition to the different types of alternative systems allowed through product-specific approval. The general use approvals enable these innovative/alternative components to be used when designing wastewater systems.

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). This will allow smaller wastewater systems to be built.
- 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. Designers and engineers have advised that, in nearly every case, failed mounds can be replaced or restored to full function on the original footprint. This also means that 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, and there is no longer a requirement that a project have enough area to build a septic system even though a composting toilet is proposed. The new rules also allow a smaller leachfield to be used for graywater only when a composting toilet is proposed.
- Language has been added to make clear that water and wastewater systems may not be constructed within a floodway and that construction requirements apply when constructing within the flood plain.

During the 2010 legislative session, House Bill H.779 was passed which creates an obligation on all applicants for a Wastewater System and Potable Water Supply Permit under the EPRs to notify other landowners whenever the isolation distances related to wastewater system and potable water supplies extend onto property not owned by the applicant. The notification requirement was added because of concern that current permit review procedures did not take into account the potential for proposed

wastewater systems and potable water supplies to restrict future development on land not owned by the applicant, due to the requirements for isolation distances between water supplies and soil-based wastewater systems. Further information about the notification requirement is available from DEC's website.

D.1.1. Dispersal System Options

Many options are available for the dispersal of treated wastewater from decentralized systems under the WSPWSRs. Septic tanks and absorption trenches or beds are commonly utilized under favorable site conditions (those having percolation rates of between 1 and 60 minutes per inch and at least 3.5-7 feet to seasonal high groundwater levels and bedrock). At-grade and mound dispersal systems are generally used where minimum site conditions are met, but the site conditions are not favorable enough for the design of subsurface systems. Finally, filtrate effluent dispersal systems may be used when innovative/alternative treatment is a component of the wastewater system. Any of the previously discussed soil-based dispersal systems are permissible as filtrate systems; further, loading rates may be increased and vertical separation distances from bedrock and seasonal high water tables may be reduced if the treated effluent meets certain standards (see Section 3.1 for more detail on wastewater dispersal options).

Spray dispersal (disposing of treated wastewater into native soil by surface application, using sprinklers) may also be used under the WSPWSRs for systems with design flows of up to 6,499 gpd. A continuous impeding layer beneath more permeable soils must underlie a spray dispersal site, and increased isolation distances to surface waters and drinking water sources are required. While these site conditions may be found near the study area, the treated wastewater must be chlorinated before dispersal, and there are significant requirements for restricting access and for seasonal storage of wastewater that may be difficult to meet.

D.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.

Any flows directed to a cluster wastewater treatment system with design flows of greater than 6,500 gpd that is constructed to support development that was already complete as of May 17, 1986 will likely be considered an "Existing Indirect Discharge" under the IDRs. The DEC is required by statute to issue a permit for existing indirect discharges unless they find that the discharge is causing a violation of the Vermont Water Quality Standards. This application category, however, is limited to indirect discharges already occurring in 1986 and thus may not be suitable if significant new development is desired within the study area.

Under the IDRs, a community wastewater treatment system constructed in the study area to support both existing and new development would be considered a "System with New Indirect Discharge". If wastewater dispersal sites with design flows of greater than 6,500 gpd are located near one of the unnamed streams on the outskirts of the village, they may be considered "Systems with New Indirect Discharges 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 permittee must also document compliance with the Aquatic Permitting Criteria, the Reliability Permitting Criteria, and the Public Health Protection Criteria as stated in the IDRs before a permit will be issued. The larger a proposed cluster system is, the more likely it is to trigger additional hydrogeological and biological testing and monitoring requirements. Permits issued under the IDRs typically include effluent monitoring and downgradient groundwater monitoring requirements.

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

The Aquatic Permitting Criteria include sampling for nutrient parameters (including total dissolved phosphorus and nitrate-nitrite nitrogen). The current IDRs allow a range of options that permittees can use to demonstrate compliance with the Aquatic Permitting Criteria for projects with smaller design flows that do not appear to have the potential for significant environmental impact.

APPENDIX E: FURTHER READING, RESPONSIBLE MANAGEMENT ENTITIES

establishing successful RMEs

FACT SHEET **1**

WERF
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what is an RME and why do we need them?

READ THIS FACT SHEET IF...

you are new to the decentralized wastewater systems field.

The term "Responsible Management Entity" (RME) was coined by the EPA in its *Voluntary National Guidelines for the Management of Decentralized (Onsite and Cluster) Wastewater Systems*. Briefly, the EPA defines an RME as a legal entity responsible for providing management services to ensure that decentralized onsite or clustered wastewater treatment facilities meet established criteria. (See www.epa.gov/owm/septic/pubs/septic_guidelines.pdf.)

Decentralized wastewater treatment systems encompass both onsite systems serving a single property and cluster systems serving multiple properties. Decentralized systems were long regarded as a temporary stopgap until centralized sewerage services could be provided. That changed when a review by the EPA in 1997 concluded that decentralized wastewater systems could be "a cost-effective and long-term option for meeting public health and water quality goals," provided these systems were adequately managed.

"Adequate management" depends on the situation. It certainly includes proper design, installation, and ongoing operation and maintenance. The EPA identifies a broad range of management levels, where increased management controls correlate with increased risks to public health and the environment and/or complexity of treatment technology. For example, in low-risk contexts—where there are few serious consequences from failure—maintenance reminders to homeowners can achieve adequate manage-

TABLE ROCK LAKE WATER QUALITY, INC.

ment—the homeowner awareness management level in the EPA's terminology. Increased probability or consequences of failure require management by competent professional service providers rather than leaving the responsibility with property owners, be they residential, commercial, institutional, or industrial.

LEVELS OF MANAGEMENT

The EPA groups RMEs and associated service providers according to the level of management required:

- **Maintenance Contracts.** The local regulatory authority (e.g. a public health regulator) requires property owners to have contracts with appropriately qualified, and in some cases certified, service providers to ensure proper and timely site and soil evaluation, design, installation, and professional maintenance.
- **Operating Permits.** The local regulatory authority implements a management program that issues permits to property owners for operating their systems, with conditions and requirements for proper maintenance. The operation and maintenance must be carried out by qualified, and often certified, service providers. The authority monitors and enforces compliance, and may or may not act as the service provider.

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CONFUSING TERMINOLOGY

Terminology in this field can be confusing. Some people prefer the term "distributed" to "decentralized." The basic idea is a focus on responsible management of small-scale wastewater systems (from a single lot to a few thousand households). Many different kinds of organizations could do this, which is why the EPA chose the generic term of "Responsible Management Entities." This terminology leaves the field open to public organizations such as existing municipal or regional utilities, as well as private organizations such as wastewater pumpers looking to expand their business by taking on responsibility for the systems they service.

However, "public" and "private" also mean different things to different people in different states, and those terms can also come together—for example, through publicly regulated, privately owned utilities. Then there's the issue of how regulations determine what kinds of management are required and what kinds of organizations can supply it, and these change from state to state, and sometimes county to county. The goal of these fact sheets is to help clear a path through this confusion.

For more on terminology, see the CIDWT's Decentralized Wastewater Glossary at www.onsiteconsortium.org.

- **RME Operation and Maintenance.** The public health and/or environmental risks are high enough to require management by a qualified organization on behalf of the property owners. The regulatory authority permits the RME

TABLE ROCK LAKE WATER QUALITY, INC.

to take on obligations to meet compliance on behalf of property owners, in exchange for a fee. The RME does not own the infrastructure, so this situation is also known as "contract operation."

- **RME Ownership.** The RME owns all the infrastructure assets including systems located on private (e.g., residential, commercial, institutional, etc.) property. For users, the service provided appears equivalent to centralized services with the RME taking on all the associated obligations to ensure performance in exchange for a fee for services. In many states, statutes mandate that RMEs providing sewerage service to multiple properties for a fee be chartered as public utilities, either governmental or private.

RME VS. SERVICE PROVIDER

In practice, there is disagreement about precisely what should constitute an RME. According to some, including the EPA in its *Voluntary National Guidelines*, the term RME should be restricted to those organizations to which the regulatory authority issues an operating permit—as in the last two scenarios described above. In practice, though, individual organizations may reflect mixtures of the scenarios outlined above.

The goal of these resources is to provide guidance for professional service provider organizations that have the necessary technical, managerial, and financial skills to ensure both their own long-term viability and the long-term performance of decentralized systems. To that end, these resources use the terms "RME" and "service provider."

"RME" is intended in the restricted sense outlined above—that is, a permitted organization with ultimate compliance responsibility. "Service provider" is intended to cover all the other kinds of organizations involved in implementing distributed wastewater management, such as contract operation and maintenance providers; water authorities supplying contract operation services to property owners; technology suppliers who include operation and maintenance contracts within their sales; etc. Other organizations may be neither RMEs nor service providers but have important roles in some contexts and can benefit from these resources. These organizations include homeowners' associations and developers.

The context determines which type or types of RMEs and service providers may be most appropriate *(Fact Sheets #2, #3,* and *#4)*. The status of the communities and treatment systems that RMEs and service providers work with is a strong determinant of the types of organizations involved *(Fact Sheets #2* and *#4)*.

For example:

- Existing communities with older systems seldom have an RME. They are more likely to have service provider arrangements through maintenance contracts or operating permits issued to the property owner.
- Existing communities with new treatment systems may engage with either RMEs or service providers. The fact that systems have been replaced suggests a higher risk situation, so it is likely that permits of some kind will be necessary.
- New developments with new treatment systems are the preferred situation for RMEs since this allows the organization to avoid the risks associated with taking on old systems with unknown histories and unpredictable futures.

A rural electric cooperative offers wastewater services.

Connexus Energy, a rural electric cooperative in Minnesota, joined forces with an existing provider of operations and maintenance services for decentralized wastewater systems (Eco-check—see *Fact Sheet #7*) to become the RME Connexus Waterways. Connexus Energy is able to utilize its existing administrative systems to offer wastewater services to a portion of its customers.

CLASSIFICATIONS

RMEs and service providers may also be characterized by type of organization (*Fact Sheets #2* and *#4*). These may include:

- Government-owned public utilities.
- Privately owned, publicly regulated utilities.
- Limited liability, for profit entities.
- Private not-for-profit organizations (such as cooperatives) that provide services and can make a profit but cannot take those profits out of the corporation.

Yet another way to characterize RMEs is by the other types of services or asset and environmental protections they offer—for example, electricity, drinking water, stormwater management, centralized wastewater, or watershed protection.

The resources presented here are intended to help new and existing RMEs, service providers, and associated entities work out how to develop and improve their managerial and financial capacities in order to be successful. Consulting with various advisers, including an attorney, will likely be part of this process. These resources complement the many existing resources that focus on technical management of decentralized systems. See EPA's *Handbook for Managing Onsite and Clustered (Decentralized) Wastewater Treatment Systems* at www.epa.gov/owm/septic/pubs/onsite_handbook.pdf, as well as other related resources in the *Guide to the Fact Sheets*.

This fact sheet was prepared by the Institute for Sustainable Futures at the University of Technology Sydney in Australia and Stone Environmental, Inc., in Vermont.

establishing successful RMEs

FACT SHEET

2 working within the local context

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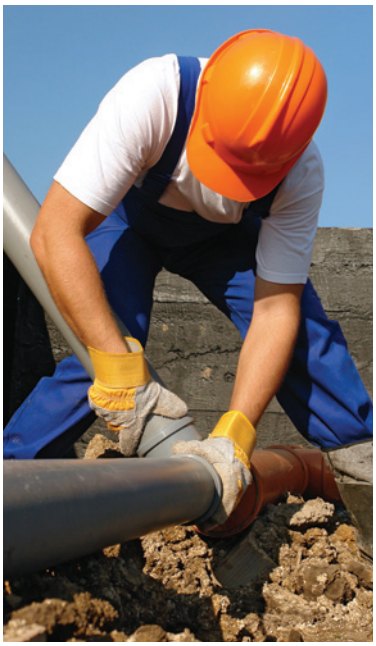
READ THIS FACT SHEET IF...

you want to work out how the local context will affect what kind of organization you set up and how it functions.

TABLE ROCK LAKE WATER QUALITY, INC.



The existing situation strongly influences the kind of business a Responsible Management Entity (RME—*Fact Sheet #1*) or other service provider may conduct and whether that business can be successful. Given this, it pays to understand the local and regional context before creating a detailed business plan *(Fact Sheet #8)*.

The local context has many dimensions. Key among them is the state of the public mandate. Is there a proven need for wastewater management services based on sound evidence of an existing or impending threat? On the other hand, what is the value proposition? How will prospective customers gain value from this initiative? Some other influential dimensions include:

- Existing infrastructure for wastewater treatment and its management.
- Environmental conditions including climate (temperature, rainfall), soils, drainage, and proximity to water tables and sensitive environments.
- People, groups, and personalities.
- History and norms of the region.
- Demographics and ability to pay.
- Trends in population growth or decline, land use, and settlement patterns.
- Availability of investment capital.

2 WORKING WITHIN THE LOCAL CONTEXT

- The competition: who provides what services already, and by extension, what is missing?
- Regulations, an important topic, addressed further in *Fact Sheet #3*.

There is a wide range of public and private possibilities for RMEs and service providers, each with their own pros and cons (*Fact Sheets #1* and *#4*). At the outset, all possibilities should be on the table. Decisions about the governance model and structure of your organization are best made by systematically assessing the opportunity through a business planning process (*Fact Sheet #8*). This process includes:

- Gathering information about what's needed and what's available (this fact sheet).
- Recognizing what regulations apply (*Fact Sheet #3*).
- Identifying what is possible, feasible, and desirable.

Below, these dimensions are organized into a set of core questions, with answers, discussion, and case examples particular to the distributed wastewater sector.

Better management of existing on-lot systems.

In Paradise, California, widespread onsite system failures and high bacteria counts in streams and some wells near a commercial development were drivers for an expensive sewer plan. Residents voted down that plan, and an onsite wastewater management zone—a legal entity under California law—became the means for the municipality to manage all systems in town via operating permits.

Such a zone, which allows a community to implement management and enforcement programs for its own onsite wastewater treatment system (OWTS), had already been formed to manage OWTS outside the proposed sewer service area. When the sewer proposal was abandoned, this zone encompassed the entire town.

CORE QUESTIONS FOR MOVING INTO THE DECENTRALIZED WASTEWATER BUSINESS

Assess existing wastewater treatment and management. What is the state of the public mandate? What defines the need and the value proposition (e.g., public health, environment, economics, social equity)?

Assess stakeholders. Is there support for RME services or for centralized sewers? Are there local action groups, regulators, or customers willing to pay?

Assess revenue base. Are there enough customers? Can they pay what you need? Will you have a monopoly?

Assess availability of capital. Can you raise the funds through public or private debt or equity financing?

Assess regulatory landscape. Do local regulations for corporate formation, utility operation, and environment/public health protection support your preferred organizational structure?

ASSESS EXISTING WASTEWATER TREATMENT AND MANAGEMENT.

What is the state of the public mandate? Is there a need for RME services? Is there a need for some other kind of service provision? What kinds of pressures exist? What type of service matches these contextual factors?

EXISTING AUTHORITY ADOPTS DECENTRALIZED APPROACH FOR NEW DEVELOPMENTS.

The Mobile Area Water and Sewer System (MAWSS), in Alabama, is a substantial urban water and wastewater utility that operates a centralized sewer system and three treatment plants. The utility was faced with

Early engagement pays off.

In Warren, Vermont, Stone Environmental, Inc., worked on behalf of the town to conduct an assessment of local wastewater treatment needs in tandem with public meetings and regular progress mailings. Workers were in regular communication with both the selectboard and members of the citizen Wastewater Action Committee.

When the assessment's lot-by-lot confirmations turned up enough problems to warrant a village-level solution, committee members held neighborhood potluck meetings to answer questions and concerns. The eventual outcome was a successful bond vote and 85% voluntary participation in the resulting community wastewater project.

To meet requirements for grant and loan funding, most components of the community system needed to be owned and managed by the town (as would be the case with a centralized sewer). The engineer and the committee worked together to make sure that the resulting sewer ordinance and user-fee structure were sensitive to residents' concerns about cost and ownership of on-lot system components.

the need to make decisions about extending its service area across a topographic divide to serve an expanding suburban area west of Mobile. Developers began to request sewer service in this area, and the MAWSS staff and board determined that providing remote wastewater service could be worthwhile. MAWSS installed several decentralized systems, which are owned and operated by the utility through a collaborative arrangement with developers.

RESPONDING TO DEVELOPMENT PRESSURE.

Depending on the situation, centralized management of decentralized systems may be used to encourage or limit growth.

In contrast to the MAWSS example above, residents of Stinson Beach, California, rejected a sewer proposal because of concerns about growth. Instead they embraced the idea of an onsite wastewater management district as a means of managing both wastewater infrastructure and what was viewed as excessive development.

HIGH SEWER COSTS DRIVE DECISIONS TO SUPPORT DECENTRALIZED SYSTEMS.

The high capital costs and ongoing operation and maintenance costs of centralized sewers are a factor in many of the examples in these fact sheets.

For MAWSS, an existing utility, it made financial sense to install and operate decentralized systems outside the utility's service area rather than extend sewers. In Broad Top/Coaldale, Pennsylvania, and Warren, Vermont, the high cost of an initial centralized sewer proposal took serious consideration of any sewer, including lower-cost alternatives, off the table for a period of several years. In both of these cases, decentralized alternatives were eventually implemented with the local municipality as the RME.

ASSESS STAKEHOLDERS.

Is there support for an RME or some other kind of service provision? What are the local public perceptions about past or failing systems? If the locals are used to "wearing pegs on their noses in the rainy season," how will they respond to an increased rate burden? Or to paying for what was formerly a "free" service? What will it take for you to build enough support?

Learn about and develop relationships with those who can help you and those you may need to win over. Engage early and often—and as appropriate to each group's power and interest. Local decision-makers need to be in favor of RMEs and/or O&M service provision, rather than replacement of onsite systems with centralized sewers.

Stakeholders include those external and internal to your organization. External stakeholders can include homeowners, other landholders and land managers, installers, realtors, developers, regulators, the local health department, environmental groups, and others. Make use of available resources for developing good relationships with these stakeholders, such as the set of communication tools about building partnerships, bringing ideas to the community, and strategies for success on the Livable Communities website administered by WERF at www.werf.org/livablecommunities/tool_comm.htm.

2 WORKING WITHIN THE LOCAL CONTEXT

Lack of opportunity for engagement leads to high cost outcomes.

The City of Marco Island in southwest Florida was incorporated in 1997, and, in 2003, it acquired the water and wastewater system from a private owner for the sum of $85 million. In 2006, it released a utility expansion plan (UEP) predicated on replacing failing septic systems with centralized sewers.

The UEP remains controversial because property owners face high costs for uncertain gains. Assessments are typically about $20,000 per lot, plus a contribution to the expansion of about $5,000 per lot. Lower-cost alternatives based on improving the management of existing septic tanks to get equivalent environmental outcomes were not seriously considered.

At the 2008 election, the candidates were split down the middle about whether to continue the program or to cancel it. Their analyses of the costs and benefits of the program differed by more than $50 million. (See www.marcoeagle.com/news/2008/jan/26/marco-islands-divisive-campaign-issue-sewer-system/.) The seven-year, $100 million program is continuing.

Assuming your organization is already up and running, internal stakeholders include employees, supervisors, and contractors already providing services. Ask yourself some basic questions about taking on responsibilities for decentralized systems:

- Can you survive for an extended period of time with minimal income from the proposed business?
- Do you have an adequate labor force already, or will you need to hire?
- Will your staff need training? (See *Fact Sheet #8* for incorporating staffing/training needs into your business plan.)
- Will you need additional licenses? (See *Fact Sheet #3* to identify relevant regulations and their impact.)

DON'T GIVE UP YOUR DAY JOB.

Getting started as an operation and maintenance (O&M) provider can take some time, and it could easily be years before you break even. Among other things, it depends on whether O&M is mandatory or not, your customers' willingness to pay, and your capacity to sell your services and build up enough of a customer base to cover your costs.

Trapper Davis is now a successful provider in Virginia. After three years, he employs two maintenance staff and services about 1,200 individual advanced treatment systems. It wasn't always so.

Initially, the state did not mandate maintenance, and Trapper realized that building up a financially sustainable customer base was going to take a long time. He reduced this through a wise decision to align himself with an equipment manufacturer who required initial two-year O&M contracts. Even so, alternate income was necessary in the early days. Now, however, because Trapper built good relationships with them and delivered a good service, his customers are sticking with him even after the initial arrangement expires, and they are recommending him to others.

ASSESS REVENUE BASE.

There are many dimensions to consider in getting a handle on your revenue base. Refer to the regulatory (*Fact Sheet #3*) and business planning (*Fact Sheet #8*) fact sheets, and think about honest answers to these questions:

- Are there enough customers?
- What kind of value proposition will work for them?
- What kind of need do they perceive? If this is different from the real public health, environmental, economic, or social equity need, how will you convince them of that?
- Can they pay you what you need to be paid to provide service?
- Do they pay for wastewater treatment services currently?
- Will they accept paying for increased management? This is especially

relevant to developing a business dealing with existing systems, where historic costs are often unrealistically low due to a lack of maintenance and management.

- Are your services mandated? What will you do if customers don't pay? Can you enforce collection? Can you work with another service provider (such as electricity or municipal water) that would be willing to enter into a disconnect agreement for non-payment?
- Is there another service that's needed locally that you can offer to reduce your overhead and increase your revenue (e.g., trash collection, storm-water management, etc.)? What long-range forecasts are available?
- What are the growth projections for your service area? What does the local planning and zoning commission have to say about how they might be serviced? What are the implications for your future customers?

State revolving funds support individual and cluster investments and upgrades.

In a few states, revolving funds support onsite wastewater repairs and upgrades.

The Pennsylvania Infrastructure Investment Authority (PENNVEST) can fund any owner and/or operator of a sewer system to construct a new or improved system to correct public health, environmental, compliance, or safety deficiencies. This includes individual on-lot systems as well as community scale investment.

For example, Chatham Township's municipal authority received more than $300,000 in 2008 at an interest rate of 1% over 25 years to upgrade distributed systems for 35 households whose income is below the state median. The project includes five individual on-lot systems, two community on-lot systems, and the replacement of 27 septic tanks, along with an ongoing management program.

ASSESS AVAILABILITY OF CAPITAL.

Is there capital available for this type of activity? What is your access to state revolving funds (SRF)? Some states restrict SRF access to governmental units. Other states allow easy access for property owners to revolving funds. For example, the Ohio Water Development Authority (OWDA) has a range of wastewater loan programs, including programs that target villages and areas of economic hardship. In addition, the OWDA, like many other state agencies, offers linked deposit loans, which are bank loans at reduced interest rates, to provide individuals, private entities, or governmental agencies with low-cost capital for onsite wastewater systems that provide non-point source pollution control outcomes. (See www.owda.org or www.decentralizedcentral.org.)

INNOVATIVE PHILANTHROPY FOR COMMUNITY DEVELOPMENT FINANCING.

ShoreBank Enterprise Cascadia's (SEC) Septic Loan program has a goal to inspire homeowners to invest in their wastewater assets by repairing or replacing poorly functioning systems.

SEC is a not-for-profit philanthropic organization whose mission is to enhance the economic, social, and environmental wellbeing of the Pacific Northwest. Its focus is improving the water quality in Hood Canal by supporting local businesses and residents. Its intent is to follow public policy rather than to make it.

Rates and terms for loans are indexed to homeowners' income and credit status, and to property sales. Responsibility for choosing designers, installers, and O&M providers rests with the property owner. SEC provides lists of registered service providers and ensures property owners have funds set aside to pay for O&M. Follow-up O&M is a condition of the loan.

The outcome is that all the incentives are pulling in the same direction, so onsite and cluster system performance in the region is improving without unbearable costs to property owners. While SEC is not an RME, its innovative approach creates a demand for high quality, financially viable service providers.

The Rural Utilities Service of the US Department of Agriculture has a revolving fund to assist small rural communities in meeting their water and wastewater needs. These grants are available to legally established, private, tax-exempt, non-profit organizations. (See www.usda.gov/rus/water/.)

The Rural Community Assistance Program (RCAP) also administers grants and revolving funds programs from the USEPA and other sources, and works with rural communities at a local level to address their wastewater problems. Check the RCAP in your region.

ASSESS REGULATORY LANDSCAPE.

Please refer to *Fact Sheet #3* for further detail on what to look for and how to assess this area and local regulatory processes. In the best situation, local regulations for management would already be in place, or at least the regulatory community would be moving in that direction. Decision-makers must be in favor of operations and maintenance for RMEs to be successful.

BRINGING IT ALL TOGETHER.

Having assessed these five areas, to assure that they do not preclude adequate technical options, ask:

- Do you know enough to a) make a good decision, and b) effectively start up and run this type of service? If not, what else do you need to know?
- Are there precedents for this type of service in this local area/region or this state? If not, why not? What are the key barriers? What would make them surmountable?

Undertaking a business planning process can help to answer these questions. (See *Fact Sheet #8*, which also suggests places to go to for help.)

This fact sheet was prepared by the Institute for Sustainable Futures at the University of Technology Sydney in Australia and Stone Environmental, Inc., in Vermont.

establishing successful RMEs

FACT SHEET

5 operating successfully as a governmental organization

Water Environment Research Foundation
Collaboration. Innovation. Results.

READ THIS FACT SHEET IF...

your organization is a governmental organization and you need help to start managing or to improve your management of decentralized wastewater systems. You might be a water or wastewater authority, special district, county health department, or a staff member of a similar organization.

If you are new to decentralized wastewater, do your research before choosing a business structure and management approach. Organizational structures that are encouraged for RMEs in one state may be prohibited by statute in another! (See *Fact Sheet* #4 for further information.)

LOCAL CONDITIONS SHAPE WHAT IS POSSIBLE.

Regulations are key determinants of business structure and operations.

- Most governmental organizations that function as responsible management entities (RMEs) or service providers are structured as special purpose districts, county health districts, regional water or wastewater authorities, or governmentally owned or chartered entities. (For an explanation of an RME, see *Fact Sheet* #1.)
- Unlike privately owned utilities, governmental utilities are seldom required to have rates approved by state-level Public Service Commissions or Public Utilities Commissions. (The state of Pennsylvania is a possibly unique exception to this rule.) However, user fees and service charges must be in line with both the expenses incurred by the utility to provide service and the ability of customers to pay for service (*Fact Sheets* #2 and #3).

Most governmental organizations taking responsibility for decentralized systems are responding to a problem.

Problems driving the need for management of decentralised systems may be related to development pressure, water quality, resource degradation, or a legacy of under-performing onsite wastewater infrastructure. Some governmental RMEs own the on-lot infrastructure. The more common scenario

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is that they own collection, secondary treatment, and reuse infrastructure. Availability of funds often drives ownership. In some states, funding opportunities are restricted to governmental utilities that own the entire system. Often, the issues facing governmental RMEs and service providers revolve first around getting stakeholder buy-in to repair or manage existing systems, and then around meeting environmental regulations.

Goals/missions for some existing governmental entities acting as RMEs for decentralized systems.

- **Protect or improve water quality in a given area. (See the discussion of Loudoun Water in Virginia on the next page.)**
- **Increase management of decentralized systems to maintain control of community character by avoiding sewering. (See the sidebar about Paradise Wastewater Management District in California in *Fact Sheet #2*.)**
- **Allow development or increase development densities outside of sewered areas. (See *Fact Sheet #2* for a discussion of Mobile Area Water and Sewer System in Alabama.)**

MAKING YOUR SERVICE VALUED.

"Successful RMEs—public or private—operate in a climate where the general public accepts the need for management and is willing to pay for it." —Yeager et al., Business Attributes of Successful RMEs, 2006

While this quotation is undoubtedly true, the difficulty lies in creating that acceptance and willingness if it does not already exist. Fundamentally, management of decentralized wastewater systems is about environmental and public health accountability.

Developing multiple strategies to ensure customer interest and compliance is essential. Sewer and wastewater customers often undervalue this service, particularly in a retro-fit situation. They may not have had to pay for wastewater service before, or perhaps have had a much lower level of service, provided at a much lower cost.

Credibility and trust will influence which paths will work and which won't, as well as what is possible (or not) for a governmental RME or service provider. Even though a governmental organization may have good enforcement strategies and regulatory backup—and can require customers to pay for RME service just as they would for centralized wastewater service—communication with customers and others will demonstrate the clear value of an RME. (Also see *Fact Sheet #10.)* Some ideas:

- Run an educational campaign to raise awareness of the severe risks associated with malfunctioning systems and of any known actual pollution of local ground or surface waters by existing onsite systems.
- Engage customers, county or state health and environmental regulators outside your organization, local government officials, service providers, and other stakeholders in creating a vision or target—for example, a 50% reduction in malfunctioning or inadequate systems within 10 years, or a quantifiable improvement in river health.
- Participate in public planning or municipal visioning processes to build rapport and trust with other local officials and others.
- If development pressure is the issue, then engage the developers, as did the Mobile Area Water and Sewer System *(Fact Sheets #2, 9,* and *10).*

Developing the confidence of potential customers is critical, as is considering the benefits of collaboration with other agencies and stakeholders. To be successful, it is essential that you work closely with your key stakeholders.

PLANNING YOUR GOALS AS AN ORGANIZATION.

The goal for governmental utilities providing RME or other services may not be to make a profit, but rather to protect a resource, fix a problem, or prevent unnecessary public infrastructure expenditures by instead implementing cost-effective distributed systems management.

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PAGE 3

Established water utility district sets up successful RME operations.

The Consolidated Utility District of Rutherford County (CUD) is the largest rural water services provider in Tennessee and has been operating for more than 40 years. Rapid growth brought new subdivisions to the county, and in 2002 CUD opened a wastewater department to offer wastewater services as well as water services to new customers.

Cost as well as the state's restrictions on discharging to streams made decentralized technology the best choice. The technology is simple and watertight—recirculating sand filters and subsurface drip dispersal fields—and ensures no infiltration or inflow. Wet weather overflows are a thing of the past.

Developers build the infrastructure to CUD's specifications and transfer ownership to CUD to operate and manage in perpetuity. Ownership includes on-lot tanks and pumps on private property as well as the land for the treatment plant and drip field. CUD now has permits in about 30 subdivisions and serves about 2,500 customers. At least another 1,600 lots are planned for the future.

Broadening your goals may be one way to ensure the financial viability of operating a management service for decentralized systems. For instance, consider innovative revenue streams by making use of the outputs of decentralized systems (such as using nutrients or clean water for recycling). Think outside the box for other revenue sources, such as land value capture, consortia, or other services such as garbage removal.

Determine goals early in your organizational planning processes and use the goals to guide your later decisions (*Fact Sheet #8*).

In some situations, particularly where a need or resource crosses jurisdictional boundaries, your original business structure may not be what you end up using to provide RME services.

CENTRALIZED MANAGEMENT MAKES GOOD SENSE

It makes good environmental and business sense for centralized water and wastewater authorities to expand into centralized management of decentralized onsite or community systems.

Loudoun Water (formerly Loudoun County Sanitation Authority) in Virginia serves the unincorporated portions of the county—around 55,000 customers in all, or 175,000 people. Loudoun Water is actively expanding into centralized management of community systems in rural parts of the county, taking on operation and in some cases ownership of systems previously run by villages, hamlets, towns, schools, and the parks and recreation department. In 2007, the number of community systems it operated grew by 32%.

Loudoun Water has the proven expertise and ability to manage these systems, bill customers appropriately, adhere to regulations, perform timely maintenance, and employ sufficient staff to cover all operational demands. Because of its centralized operations, Loudoun Water can realise economies of scale in providing these services, so the cost to the system owner is about the same. The benefits are significant: system owners avoid the headache of trying to manage something they don't fully understand, and the number of system violations has been reduced to near zero.

COMMON PROBLEMS TO BE OVERCOME.

It takes time to accept new ideas.
Your proposal might be new to the region or might require a change in an existing organization with an established way of doing things. Be patient. Starting with these fact sheets, point to related success stories nearby or elsewhere, and enlist opinion leaders. The Water and Environment Research Foundation (WERF) has a great set of resources on communication for creating change at www.werf.org/livablecommunities/tool_comm.htm.

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Starting capital is not enough to support operating expenses.
Often an RME is not able to access all the capital it needs to fund its initial years of operation. There can be ways around this, depending on your situation.

- Other facets of the organization may initially support the new RME's operating expenses. For a governmental entity, this might mean using existing staff more effectively or raising permitting fees; for a utility authority, it might mean allocating general fund reserves toward the new service.
- Some functions can be outsourced—to other facets of the existing entity, for example, or as a partnership with another organization. Billing is a great example. It requires specialized skills, tools, and knowledge to set up from scratch, but it is relatively easy to extend existing systems.
- Some governmental utility RMEs save significant funds by requiring private developers to build systems that the RME then takes over and owns, operates, and maintains.
- Some governmental utilities (special districts, utility authorities, etc.) may be able to use bond issues to raise initial capital or as the local match to state revolving fund loan funds—or other financing vehicles traditionally employed by public utilities that offer centralized water or wastewater services. This solution would be state-specific; often SRF is limited to infrastructure improvements, not management. (See *Fact Sheets #2* and *#9* for more financing options.)

A wide range of systems or technologies in various states of repair already in the ground.
Experienced RMEs know that taking on management of existing systems can be a nightmare, unless existing systems are required to be upgraded to comply with existing regulations or related performance standards before the RME accepts ownership or maintenance responsibility.

Other hurdles you may encounter and some strategies for overcoming them.

- Insufficient stakeholder interaction can literally break an RME management endeavor. (See *Fact Sheet #2* for ways to overcome this and initiate interaction with stakeholders.)
- Regulators may be unfamiliar with, or even hostile to, the concept of RMEs or decentralized systems. Engage all relevant parties early and often. Do your homework and go to meetings prepared with current or past examples of your work or of similar projects.
- Non-payment and late payment can be major problems and therefore require anticipation and mitigating strategies *(Fact Sheets #3, 6* and *#9)*.
- Staff management skills may need to be developed through formal courses such as those provided by the Consortium of Institutes for Decentralized Wastewater Treatment (www.onsiteconsortium.org), through mentoring with an existing RME, or through involvement in national, state, and regional organizations pertaining to decentralized wastewater (e.g., NOWRA, Virginia Onsite Wastewater Recycling Association, or the New England Interstate Water Pollution Control Commission).
- Keeping up to date with best practice principles, the latest management technologies and systems, and new regulations can be time consuming. Join a local or federal organization so the information comes directly to you.

Cooperation and hard work can overcome problems.

In Washington Island, Wisconsin, a handful of town leaders and citizens worked tirelessly to establish a decentralized wastewater management program when a plan for centralized treatment fell through due to high costs. They worked hard through the early 1990s to establish community consensus around the program and to convince county and state regulators the approach could work.

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