Winfield Township Wastewater Management Plan

Options for Structure and Function of the Management System

1. Introduction and Background

It has been determined by the Winfield Township Board of Supervisors that the preferred option for a wastewater management system is a "decentralized concept" system that will include on-lot systems and small-scale collective systems. Citizens will continue using on-lot systems where that is practical and desired by the lot owners. Existing and future developments will employ small-scale collective systems where:

- It is impractical due to site restrictions to employ an individual on-lot system meeting code requirements;
- It is the desire of the lot owners to be included in a collective system, due to cost efficiency or any other reasonable circumstance;
- It is determined that cost efficiency of addressing failing systems within a neighborhood urges the inclusion of all properties in that neighborhood in a collective system;
- It is the desire of an owner/developer of a new project to utilize collective systems.

A guiding principle of the management plan is to minimize governmental mandates that an owner abandon his failing on-lot system and join a collective system, subject to cost efficiency of addressing identified on-lot system failures. It is reasonable to suppose that all involved would voluntarily agree to a collective system if that would be the least costly option. It is understood, however, that values other than fiscal advantage might guide these decisions, and if so, that situation would have to be dealt with. This is the same situation as would have occurred had the previously proposed centralized sewerage system been installed, for which it seems to have been presumed that all properties along a sewer line would have been required to join the system. If the management entity which would have been created to run that system was presumed to have the power to require participation in a collective solution for the mutual benefit of all participants, it is reasonable to presume that the management system created to run the small-scale collective systems would have the same power. The community must determine if this should be the case.

It has been established that the collective will of the citizens of Winfield Township is to restrict the density of development within the township, and this will has been expressed in the township's Zoning Ordinance. The management plan must be capable of addressing whatever level of development that would be legal under the terms of that ordinance.

It has been preliminarily determined that the township's decentralized concept management system should provide active management for ALL wastewater systems within the township, including on-lot systems which comply with the on-lot code, on-lot systems which are presently considered to be "alternate" or "experimental" and all collective systems. The level of oversight applied to each system would be as deemed relevant to the technology employed in each circumstance. Thus, there would be a minimal level of "intrusion" for management of on-lot systems that meet current code requirements and do not include complex components—for example, triennial visual inspection and provision for tank pumping. While this is a level of oversight not currently applied, it is deemed beneficial to the long-term proper operation of the overall wastewater system to include active oversight of these systems within the management concept. A basic decision the citizens of Winfield Township must make is whether to actively manage all systems, or to focus the management program only on those systems that would incur higher operations and maintenance (O&M) liabilities.

Within this basic structure, there are a number of options for the "reach" and the structure and function of the management system. These are reviewed in this paper.

2. Standards for Compliance

The community must decide: What are the "standards" to be used to determine what is an adequate level of protection of public health and environmental values?

A basic issue here is the very definition of system failure. Is a failure defined as:

- A system in which there is a discharge to the surface that can be clearly traced to that system?
- A system for which there is a "reasonable" expectation that "adequate" treatment would not be achieved before system effluent percolates to a limiting condition (groundwater or rock or impermeable layer) regardless of whether it can be unequivocally established that effluent from THAT system is causing degradation of public health and/or environmental values? [NOTE: "Reasonable" and "adequate" must be explicitly defined if this standard is used.]
- Any system found to be non-compliant with the current code, regardless of any liability it may create?

Before proceeding, an important distinction should be made between system failure and the necessity for repairs. It is presumed to be implicit that the management entity would have authority to require repairs of any system under its jurisdiction without needing to show cause that there may be any potential for the system effluent to impact on public health and/or environmental values. Examples of circumstances requiring a repair would be a malfunctioning alarm on a pump system or a broken hatch cover on a tank.

The question here is what is the "trigger" for the management system to require upgrading or replacement of a system. The Pennsylvania Department of Environmental Protection (DEP) has stated that the "usual" standard applied is the first one listed above—visual evidence of discharge of system effluent to the surface. This, of course, only identifies failures well after the fact, and completely fails to identify systems failing to provide adequate treatment before effluent leaches into groundwater. The community should determine if that standard provides the level of protection it deems necessary for the short term and long term safety and well-being of its citizens, or if it desires a more pro-active standard.

Another question is whether it is reasonable to apply different standards in different situations. It may be of long term benefit to use the not-up-to-code standard in Cabot and Marwood where there are already many system failures by the surfacing effluent standard. It has been stated that odds are good that other systems in these areas that are not up to code are also failing. The validity of this should be tested of course, but it would almost certainly be more cost efficient to serve those systems with the collective system being installed for the already identified failures rather than waiting till the failure can be observed and then dealing with it individually. Using the not-up-to-code standard to define failure would incorporate all the confirmed and likely failures into a unified system.
Of course, this situation might be addressed by making the inspection of these systems thorough enough to determine the status of those for which it is not readily apparent that they are failing by the surfacing effluent standard—e.g., conducting dye testing. This highlights that it must also be determined what degree of diligence the management entity would exert to expose system failures and to determine the need for upgrading. There are two aspects of this matter to be considered:

- The initial inspection. If the township implements a management plan that includes all on-lot systems, does this imply there would be an initial inspection of all existing systems to determine their status in regard to the criterion selected as the definition of failure? If all systems were not inspected initially, upon what basis would it be determined which ones—in addition to those already identified as failing—to inspect?

- On-going inspections. Thereafter, does the township only respond to complaints from citizens? Does it only respond to failures brought to its attention by enforcement agents? What do the on-going management activities for on-lot systems include in regard to identifying system failure?

The community should determine the level of effort in regard to both initial and on-going inspections that will provide the degree of protection it deems necessary for the safety and well-being of its citizens. Whatever standard of failure is chosen, it must be determined what this implies for the inspection program. To what lengths would the inspection go to determine system status, what would this cost, who would make the final judgment of failure, and on what basis?

Another aspect of this issue is whether merely meeting the existing on-lot code does indeed provide "adequate" protection of public health and environmental values. What is the nature of local water resources? How vulnerable are they to, for example, nitrate pollution, which is a factor not addressed by the current code? If all future development uses wastewater systems that disperse effluent into the soil—where presumably much of it will percolate into groundwater—rather than piping the wastewater "away", what are the long-term implications for local water resources? Would there be a point in the future when it would be necessary to provide a higher quality of treatment prior to soil dispersal, and if so, would it be prudent—and cost efficient—to begin requiring that level of treatment for all new and upgraded systems today? DEP has stated that it has no knowledge about the vulnerability of local groundwater resources, and it would not require any efforts to make any such determinations, other than hydrogeological investigations normally required under the rules. Therefore here again this is a matter for the community to determine the degree of protection it deems necessary for the long-term safety and well-being of its citizens.

All those aspects of the "reach" of the management system must be resolved and made explicit in the plan. This will allow current citizens to understand the implications of the plan for their existing systems, and it will establish the standards for evaluating all systems in regard to the necessity for requiring an upgrade or replacement, either initially or at any point in the future.

Another issue to be resolved regarding standards for the management system is the legal status of collective systems relative to a provision of the Zoning Ordinance. Does a collective system under active management by the management entity constitute "public or community … sewerage facilities" as that term is used in the Zoning Ordinance?

The meaning of "public or community … sewerage facilities" is not defined in the Zoning Ordinance. Therefore its interpretation is presumably left to the general understanding of that term as commonly used. It could be fairly stated that the "common" usage of this term is some form of conventional, centralized sewer system. Thus, it is called to question whether dispersed small-scale collective systems would constitute "public or community … sewerage facilities" for the purposes of applying the Zoning Ordinance. This is a critical question because it would determine the allowable density of development that might be served by a collective system.

It is suggested that "common sense" dictates that the small-scale collective systems, under active management, do indeed constitute Winfield Township's "community" wastewater system, as they replace a conventional, centralized sewerage system. However, this is a legal interpretation that must be provided by the appropriate authorities. It is necessary to resolve this matter, as this will define the types of development scenarios to which the management scheme must be able to respond.

3. Management System Structure and Function

3.1 System Ownership

3.1.1 Total private ownership

A very basic option is system ownership. One option is for all systems, including collective systems, to be owned by the owners of the properties being served. For collective systems, this would require the creation of a legal instrument to be executed by all the owners binding them to paying for installation, observation and maintenance. The major advantage of this arrangement is that it caters to the tradition of private ownership of on-lot systems, and extends that tradition to systems with both on-lot components and components that do not lie on the lot being served. This speaks to a "sensibility" of being loathe to having any governmental entity "intruding" onto private property.

There are four disadvantages to this approach. One is the potential difficulties it may create for assuring timely attention to maintenance and repairs of any system. Various ways of dealing with the problem could be envisioned, for example:

- The problem could be blunted by removing from the system users decisions about when and how to perform maintenance functions and execute repairs and vesting this authority with the management entity. This "right" would no doubt have to be assigned to the management entity by the execution of a legal instrument giving right of access and providing such other arrangements as are necessary to assure that the functions could be carried out. Could the owners be convinced or compelled to grant those powers to the management entity?

- If maintenance and repairs were left to the individual owners to arrange, they could be given a period of time to execute the actions and show proof of their completion, and if they failed to do so, the management entity could execute the action and surcharge its cost onto the tax bill for the property in question. Again, this would imply a right of entry and other arrangements as would be required for the management entity to carry out those actions. However, it also implies that the management entity must have the capability to carry out the maintenance or repairs if the owner fails to have them satisfactorily performed.

A second disadvantage is how to assure that all users participate equitably in the costs of operating and maintaining collective systems. Since the agreement would be a private contract among the system users, it should be presumed that non-payment by any participant would be a civil matter to be settled among the system owners. This, of course, could drag on for some time before being resolved, and in the interim, what would be the impact of this on the quality of system operations?

The third disadvantage is that privately owned collective systems could require the users to be somewhat involved in overseeing them. With individual on-lot systems, this is a normal expectation, but most of those are types of systems that do not require frequent and active oversight. However, for collective systems, utilizing technologies that demand timely oversight, the owners would need to collectively manage that oversight process. They could, of course, turn this over to a management entity as suggested above, but still the owners would be in some regard jointly responsible for the system. It has been stated that a major reason that people prefer "sewers" instead of "decentralized systems" is that they would be happy to just pay a fee and let someone else manage the wastewater system for them. It therefore may be advisable to create arrangements that make small-scale collective systems operate as much like a conventional centralized sewerage system in this regard as practical. Unless the owners agreed to give up all control of what they own, this may be impossible if the collective systems are owned jointly by the system users rather than by a management entity. But if the owners need to surrender all control in order to simply pay a fee and forget it, what is the point of having them own the system to begin with?

The fourth disadvantage is that joint private ownership of each collective system by the users "splinters" the overall management system. If the more problematic aspects of this arrangement were avoided by placing the management entity rather than the user groups directly in charge of operations and maintenance, this still leaves the management entity in the position of having to also manage the individual contracts with each of the user groups.

3.1.2 Public ownership of collective facilities, private ownership of individual facilities

This option can circumvent all the disadvantages of having each collective system jointly owned by the users by vesting ownership of those systems with the management entity. This is the model employed by conventional centralized wastewater systems. The users of those systems pay a fee to the management entity, and the management entity owns all facilities except the building hookups and assumes responsibility for operations and maintenance and for replacement/upgrading of all facilities when that is required. While this concept could obviously work just like a centralized sewerage system for off-lot components, it can be questioned how public ownership of on-lot components would be received by property owners. However, the on-lot portion of these collective systems will most likely be limited to septic tanks, and the only O&M functions would be routine observation, perhaps cleaning an effluent filter, and pumping of the tank when required. These same functions would have to be executed for all individual systems covered by the management system. O&M of these on-lot facilities could be managed on the same basis as those components of individual systems, so it would not be a necessary aspect of system organization for these components to be publicly owned.

Under this approach, individual on-lot systems would remain under private ownership. This leaves open the question of how to guarantee timely operations and maintenance for these systems. That matter will be discussed in a later section.

3.1.3 Public ownership of all facilities

Though not usually done, ownership of individual on-lot systems as well as collective systems could be vested with the management entity. This extends the municipal utility concept to on-lot systems, where the users pay a fee and the management entity unilaterally contends with all the operations and maintenance functions. Ownership would also imply that the management entity could specify the system type for all properties, so that it could require a uniform design for a high quality pretreatment system, which will incur higher O&M liabilities than conventional systems. As noted in the next section, uniformity of systems would provide for more efficient execution of operations and maintenance functions.

Ownership by the management entity might also imply that it would be responsible for replacement or upgrading if that were ever required. If this were the case, then the management entity's rate structure may have to cover a "sinking fund" for future construction. For more conventional facilities, anecdotal evidence indicates need for replacement is highly variable, so it is possible that rates would not cover all the costs of the replacement/upgrading program. It must be determined how that situation would be addressed—increasing rates system-wide, increasing rates on certain classes of systems, a special assessment on the property in question? Further, it must be questioned what other liabilities public ownership would imply—e.g., any injury claimed to be due to any sort of malfunction of the system, due to poor workmanship, or any number of other circumstances, all occurring in an environment not under the control of the management entity.

The uncertainty about replacement/upgrading costs of conventional systems might be blunted by having public ownership only of those systems that would incur higher O&M liabilities. However, it can be questioned if public ownership of individual systems would deliver benefits that would merit the additional liability of the management entity—and thus of the entire customer base—inherent in this arrangement.

3.2 Execution of Operations and Maintenance

In considering how to execute O&M functions, accountability must be the watchword. The management entity will be accountable to DEP for the performance of all the systems under its watch. If they fail to provide the degree of protection to public health and environmental values deemed to be required, no doubt DEP would "suggest" that other solutions be considered. It was to avoid those "other solutions" that Winfield Township instituted planning of a decentralized concept option. It is therefore critical that the plan for operating and maintaining the overall system provide a high degree of accountability—that is, assurance that each function would be executed competently in a timely manner. The management system should also be accountable to its customers—the system users, assuring that whatever functions it executes or causes to have executed on their behalf are highly competent and are executed as cost efficiently as practical.

To assure accountability, the management entity must assure that all persons executing the O&M functions are accountable to it. The basic options for executing these functions include:

- O&M is executed by employees of the management entity;
- O&M is executed by private sector service providers under contract with the management entity;
- O&M is executed by private sector service providers under contract with each system owner.

Clearly, accountability to the management entity is greatest under the first option, as it has immediate and direct control over its employees. There are disadvantages to executing all O&M with management entity employees, however. The management entity must raise a budget to hire a sufficient staff to competently address the O&M functions and to properly equip this staff to carry out those activities. The skills and equipment to perform those activities may already exist in the private sector. It can be questioned if a public agency should levy fees to create a bureaucracy to perform a function that can be adequately executed by private sector companies. Further, it should be investigated if it would be more cost efficient to create that bureaucracy than to contract for these services.

The least accountability is afforded by the last option, since the management entity would have no direct legal relationship with the contractors. To assure accountability, the management entity would require some means of closely tracking whether the contractors are performing. It must also have some means of compelling a non-performing contractor to perform, or to cause that contractor to be replaced. Lacking a direct legal relationship with the contractor, this may be difficult to assure, and perhaps impossible to assure it would always happen in a timely manner. Clearly, the owners who hold the contracts must also be involved in any proceedings. As noted previously, many owners may prefer to turn these matters over to a management entity rather than having to be involved in administering the management of their systems.

Also, since these contracts would be between the system owner and a private sector entity, it must be determined what would happen if the owner failed to pay for the services. The recourse for this would be a private civil matter. That might drag on for some time. Especially for system types that incur higher O&M liabilities, timeliness of action would be necessary to ensure proper operation. The contractor could not be expected to perform without assurance of being paid, so the management system may have to step in and pay the contractor directly or devise some other means of accomplishing the O&M functions, and of course it must have recourse to ultimately collect from the owner for the cost of doing so. If the management entity must have this capability anyway, what is gained by the contract being between an owner and a service provider rather than between the management entity and the service provider?

Note that if collective systems were to be owned by the management entity rather than the system users, then the concept of O&M providers contracting directly with owners is of concern only in regard to individual on-lot systems. For many of the on-lot systems, the only O&M functions would be pumping the

septic tanks, perhaps cleaning the effluent filters, and repairs as required. Typically, these activities are not time-critical, so O&M of those systems might reasonably be left to arrangements directly between the owner and a private sector contractor. For on-lot systems that incur a higher O&M liability, it would have to be determined if arrangements could be made to assure accountability if the contract is between the owner and the O&M provider.

These discussions indicate that the second option might be the best compromise between high accountability, overall efficiency, and minimizing competition by governmental entities with the private sector. A potential weakness of this arrangement is that, with an O&M provider contracted to the management entity rather than the system owner, it might not be as sensitive to protecting the owner's property as it would if the owner could fire the contractor directly. This is an aspect of accountability of the management system to the users. Options for maintaining this accountability are reviewed below for each of the O&M functions.

In any case, the use of sole-source providers of O&M functions must be questioned. If a certain function is available only from one contractor within the area, then it must be questioned how effectively the management entity could compel performance. Certainly there are legal procedures available to sanction a contractor for non-performance, but these may not assure timeliness or competence. If there are no competing contractors who could be quickly "plugged in" to provide timely response, the management entity may be unable to assure performance. This aspect of accountability also has implications for the choice of system types, as discussed below.

3.2.1 Routine observation

Of all the O&M functions, routine observation is the one which arguably could be most beneficially performed directly by employees of the management entity. This is the process by which the management entity is informed of the condition of systems for which it is accountable, and so it is the function over which the most direct control would be urged. However, the arguments presented above regarding the fairness and efficiency of hiring employees vs. contracting for services should be considered. In this case though, routine observation is a function not currently being executed within Winfield Township, so it can be questioned if executing this function with employees of the management entity would create competition with the public sector. Still, the personnel and skills required to execute this function are no doubt available in existing private sector companies—e.g., observation of conventional systems at least might readily be performed by pumpers.

A potential problem with management entity employees executing routine observation is that there are scheduled maintenance procedures that would be most expeditiously executed at the time of these routine observation inspections. Examples would be cleaning of effluent filters and filters on pump systems, or cleaning various components of a treatment unit. It makes little sense to require both an observation inspector and a system maintainer to visit each site to execute these routine activities. Certainly, however, the inspectors could be trained to execute these rather straightforward functions. For certain classes of systems, it may in fact be cost efficient to schedule routine observation in conjunction with a scheduled maintenance procedure. An example is a conventional on-lot system, where the observation inspector could schedule his visit to coincide with the pumper coming to pump the septic tank (assuming it was decided to pump on a set schedule, a matter which is discussed in the next section). In this case, of course, it can be questioned if it would be more cost efficient to simply train and pay the pumpers to execute the routine observation.

Another concern is whether an employee of the management entity would be as sensitive to protecting the owner's property as would a contractor, on the theory that a government employee has no incentive to take considerable care—e.g., to carefully avoid damaging a flower bed in the course of executing his work—because the property owner cannot fire him. Clearly, however, an employee of the management entity

would be every bit as capable of showing such courtesy as would the employee of a private sector contractor. And the management entity would be every bit as capable of censuring an employee who creates ill will in the community by being careless about his work as would a private sector contractor. In the end, it comes down to one's attitude about whether "government" cares about people, and about having a "government agent" on one's property. It could readily be questioned if it is any better to deal with an indirect agent, the private contractor, than to deal with a management entity employee. This is an aspect of accountability of the management system to its customers that the citizens of Winfield Township must deliberate.

If routine observation is performed by private sector contractors, some thought should be given to keeping this function independent from the process by which other O&M functions are executed. On the one hand, if the observation contractor is also the contractor that would execute repairs and replacements, this may be a motivation for finding problems. An owner who might question the need for a repair expense should be assured that this determination was made independently of someone who would profit from that evaluation. On the other hand, if the observation contractor were the vendor and/or installer of the equipment being inspected, there would be a motivation to overlook problems so that the reputation of the equipment and/or the contractor's installation skills would not come under question. This might lead to greater, more expensive problems down the road. The system owner should be equally assured that the evaluation of system condition is made by someone who does not have a vested interest in reporting that all is well. These too are aspects of the accountability of the management system to its customers.

3.2.2 Tank pumping and septage management

A basic management function for all systems is pumping of the septic tanks at some interval. Decisions must be made how to define that interval and what arrangements are to be made to execute the pumping. As with ownership of facilities, different arrangements might be considered for collective systems vs. individual on-lot systems, and also for more conventional on-lot systems vs. those which would incur a higher O&M liability.

3.2.2.1 Pumping intervals and septage volume

Regarding timing of tank pumping, there are two basic options. One is to pump all tanks on a given schedule. A three-year interval seems to be what is commonly accepted as a "standard" for this. It can be questioned if this is cost efficient. According to a model that has been widely circulated, "average" pumping intervals might be well in excess of 3 years, assuming the septic tank is "adequately" sized. Then too, the speed at which sludge builds up in any given tank depends on the water use habits of the users and what they choose to route down the drain. Many tanks might safely go for longer intervals before pumping than this modeled average.

The other option is to monitor sludge depth and pump each tank only when needed, according to the standard considered appropriate for each tank. If the predictions of pumping intervals by the model are correct, this may save considerable pumping costs. It would also save the associated cost to society of having to manage the excess volume of septage created by too frequent pumping. Since this cost is presumably reflected in what pumpers charge, minimizing the volume of septage to be managed should tend to hold down those charges. However, the monitoring program would also have costs attached to it.

First, it must be determined what the monitoring intervals should be. This should be determined by the liability perceived if a tank is pumped "late"—that is, if sludge builds up to the level where the tank should be pumped sometime during the chosen interval. This is probably only an issue for passive on-lot systems, for which a triennial inspection may suffice in all other regards. For systems with higher O&M liabilities, it is expected that they would be visited at least biannually in any case, so biannual monitoring of sludge depth would add negligible cost to the oversight program. Typically sludge builds up so slowly that annual

measurement of sludge depth should be the maximum frequency that needs to be considered, and biannual monitoring is expected to also be sufficient. It can be questioned, however, if three years is too long of an interval, as it would be 6 years before another observation and that may be pushing the limit for many tanks. If this is so, then the cost of more frequent inspections of these systems must be considered.

This concern can be blunted by requiring that an effluent filter be installed in the septic tank. That action is strongly recommended in any case because it is very cheap "insurance" against problems with downstream components—most notably, clogged drainfields, requiring costly replacements. The manufacturers of effluent filters typically recommend cleaning them every three years, which matches the suggested observation interval for conventional systems. If sludge builds up too high in the septic tank sometime between observations, it is very likely to cause clogging of the effluent filter. This will manifest itself as a "plumbing backup" no doubt generating an emergency call for service. This sort of inconvenience to the system user could be circumvented by installing an alarm on the effluent filter, which would be triggered by a rise in water level in the tank, so the "backup" could be detected before it started to actually back up into the house drain. The alarm would trigger an unscheduled inspection. During this inspection, it could be determined if the sludge level was up to the depth requiring pumping, or if the effluent filter simply clogged prematurely.

For expeditious observation, each tank must be modified so that a hatch over the effluent filter would be readily accessible at the ground surface. There may also be difficulties in fitting an effluent filter on to the outlet pipe of existing septic tanks, and the tank would have to be pumped in order to do this work. If all systems are to be inspected initially in any case, this may include an inspection of tank integrity, requiring the tank to be pumped in any case. If that were done, then tank pumping to install an effluent filter would not constitute any additional cost.

The liability of going into the septic tanks to install the effluent filter must also be considered. The precautions to be required for tank entry and their cost must be clarified. If installation of an effluent filter in an existing tank were required by the management entity, it must be determined what legal liability that entity might have if injury or death occurred due to tank entry.

In summary, the cost of pumping more frequently than may be warranted must be balanced against costs incurred to install an effluent filter and facilities to make it easy to clean it and to measure sludge depth. Also to be considered are the potential benefits of an effluent filter for preventing premature drainfield failure and the benefits of generating a lower volume of septage to be managed.

Regardless of the decision on pumping intervals, it is quite likely that the total volume of sludge to be handled will increase after implementation of a management program that covers all on-lot systems. Anecdotal evidence indicates that many tanks are not being pumped at all. What will be the impact on volume of septage to be handled if all septic tanks in the township begin to be pumped, either on a regular schedule or as found to be needed? And what will be the implications of that increased volume for the septage management program? Would the existing arrangements for handling septage still be viable, or would new arrangements have to be considered? Would these new arrangements increase the cost of pumping? This potential problem must be considered in determining arrangements for pumping. The management entity may find it cost efficient to create its own septage management facility.

3.2.2.2 Execution of tank pumping

The management entity could purchase its own fleet of pumper trucks, hire its own pumpers, and conduct all pumping with its own forces. This is likely to entail a considerable initial investment, and the administrative procedures to certify its operation as well. With pumping companies already established to execute this function, that investment and effort are of questionable merit at present. This option would, of course, remain open for the future if conditions warranted its consideration—e.g., if the volume of

pumpage came to be such that the total cost of contract pumping greatly exceeded that of an in-house operation. It should be kept in mind, however, that raw cost is not the only value to be served here, as discussed above.

It appears that at least upon startup of the management system, contracting with existing pumpers would be the preferred course of action. As the discussion at the beginning of this section indicates, accountability to the management entity would be better assured if the contract were between the management entity and the pumper rather than between the system owner and the pumper. However, since pumping is a specific action that is fairly easy to track, this is the one O&M function which might be suited to allowing a direct contract between the system owner and the private sector pumper. Regardless of contracting arrangements, to make the process run more smoothly, the management entity could take responsibility for notifying the pumper when a certain system is to be pumped, whether that is based on a set schedule or upon the results of sludge depth observation. The pumper and the owner could then schedule the pumping at their mutual convenience and the pumper would report completion of the pumping to the management entity.

A potential advantage of contracting the pumping through the management entity is that it may be possible to obtain a better price for pumping by assuring the pumping contractor of a certain volume of business. This implies some exclusivity to the contract. With that being the case, then system owners would have no choice of which contractor comes to pump their tank. If the owner had any complaints about the pumper—e.g., they trampled a flower bed in the course of executing the pumping—they could only register them indirectly to the management entity. With an exclusive contract, the management entity would have no recourse except to terminate the contract, or to threaten to do so unless the contractor began to perform so as to eliminate such complaints.

That situation could be addressed by entertaining contracts with any number of pumpers and allowing each owner to choose the contractor they prefer from among this "pool" of pumpers. Then if an owner became disenchanted with the performance of one pumper, he could direct the management entity to use another company for the pumping of his tank the next time. In this manner, the pumpers would be directly accountable to the system owners, yet all arrangements and payments could be handled through the management entity. Under this arrangement, however, it may not be possible to gain a "volume discount" from any of the pumpers since the volume of business each would receive would be indeterminate.

As noted previously, it may be efficient for pumpers to also conduct routine observation, at least for some classes of systems. If this were to be done, the management entity would need to establish a training course for the pumpers so that they could properly conduct system observation to the standards set by the management entity. Taking this course might be required as a condition of service for any pumper that wished to do business in Winfield Township. Recalling the previous discussion of separating the observation function from any action that would result in business based on the observations, this would "disqualify" pumpers from being responsible for monitoring sludge depth. If this stipulation were imposed, pumpers could only do observation on systems where pumping was executed on a fixed schedule.

3.2.3 Repairs and component replacement

If all systems were to be covered by the management system, then arrangements would need to be made to assure timely and competent repairs and component replacement for three basic types of systems:

- Conventional systems, in which the only components are the septic tank, perhaps fitted with an effluent filter, and the drainfield;
- Systems in which a pump moves septic tank effluent into the drainfield (which may be a mound) but there are no additional pretreatment components;

- Systems that contain components that provide high quality pretreatment before soil dispersal, and perhaps "alternative" dispersal fields that require some routine maintenance.

For the first type of system, any repairs would be fairly straightforward and any number of contractors are already qualified to do any such work. The second type of system is more complex, but here again, this is technology that has been code-compliant for many years, so contractors are already conversant with the procedures necessary to execute repairs and component replacement. What is missing at present is any formal observation function on these types of systems to assure that repairs and replacements are timely so that long-term operation is not compromised. However, these types of systems are very straightforward in their operation, so training of observation personnel should be relatively quick and easy.

For high quality treatment systems, the arrangements required to assure execution of repairs and component replacement in a timely and competent manner may also be rather easy and straightforward, or it may be somewhat more difficult, depending on choices made in regard to the types of technologies that must be accommodated by the management system. Based upon the analysis presented in the paper entitled "Overview of Options for Management Strategies and Technologies" prepared as a part of this planning process, the Board has concurred that using the high performance biofiltration treatment concept would provide the best assurance of continuously and reliably producing a high quality effluent while incurring the lowest operating costs and maintenance liabilities. If this were the only type of high quality pretreatment system to be used under this management system, then uniformity of system type to be serviced would make this process much easier to address than if any number of technologies claiming to provide high quality treatment were to be used.

As with the situation for pumpers, it may be advantageous to have available a number of maintenance contractors who could be "plugged in" to any job. This could again allow the system owner to choose among the contractors certified by the management entity, while unburdening the owner from all the administrative arrangements. Uniformity of system type implies that any number of potential maintenance contractors could readily be trained to execute repairs and component replacement on any high quality treatment system. Uniformity also would make it easier for those responsible for routine observation to become quickly competent in recognizing the operating condition of all these systems.

On the other hand, if several types of systems were to be used, a maintenance contractor (or management entity employee, if it were decided to conduct this function in-house) would have to be trained to service all types, or be restricted to only those types for which training has been received. For some types of systems, only the vendor may be qualified to perform the service. In particular, those that are certified under NSF Standard 40 are required to be vended with a 2-year maintenance agreement, and often the vendor is the only available carrier of that contract. As discussed previously, any type of sole-source service expertise should be avoided if possible, as this could make it difficult to assure accountability.

A proliferation of system types would also make the observation function more difficult. The observation inspector would have to become expert on all the system types. Further, as detailed in the above mentioned report, some types of systems which claim high quality performance are inherently much less stable and robust than the high performance biofiltration concept, and thus they would require more frequent attention if high quality were indeed to be maintained.

It is understood, however, that unless the systems in question were to be owned by the management entity, restricting the choices of the system owners may not be acceptable to the citizenry, especially if other options were to be offered at lower prices. If all system types claiming the required performance were to be allowed, some means must be available to ensure accountability. One suggestion would be to require that there must be a minimum of two service providers that would "register" in some manner with the management entity, committed to being on-call to service these systems, for any system to be installed within this management system for which training in system operation by the manufacturer is required (this

includes all systems certified under NSF Standard 40). This would assure the management entity that it would have at least one alternate choice if the first contractor failed to perform.

Regarding the institutional arrangements for executing these functions, the usual mode is for the system vendor or an appropriately certified maintenance company to contract directly with the system owner. This has proven to be rather problematic in a number of situations. Under that system, this same contractor is also responsible for observation inspections, potentially a major challenge to the integrity of the management system, as noted previously. Other problems are non-payment by the owners and non-performance—or at best simply "going through the motions" and filing fictional reports—by contractors.

It may be more effort for the management entity to "ride herd" on these contracts with sufficient diligence to assure accountability than it would be to contract directly, in which case it would be in a much better position to quickly replace non-performing contractors. Further, if the observation function were executed through a separate process, the contractors executing repairs and replacements would only need to be "on call" when observation (or an alarm in the system) indicated a need for their services.

Back to the issue of uniformity, it is clear that it would be a much simpler situation for the management entity if all those contracts addressed a single O&M protocol rather than having to deal with the procedures for a number of different types of systems. Again, any maintenance contractor certified with the management entity could more readily be "plugged in" to work on any system if they were all essentially the same. Note that high performance biofiltration is an "open" technology. While, if implementation of this management plan were to create a market, it is to be expected that one or more companies would step in to vend the high performance biofiltration concept as an off-the-shelf system, it is a non-proprietary concept, fully within the public domain. Thus, the management entity could train any person to work on it.

3.3 Responsibility for Choice and Construction of Systems

Presently in Winfield Township, the construction cost of each system is borne by the owner of that system. The citizenry should confirm that the basic responsibility to pay should continue to rest with the owners. There may, however, be various financing aids that might be administered by the management entity if that were beneficial to any of the system owners. Within that conceptual framework, a few other decisions need to be made.

If collective systems were be owned by the management entity, theoretically speaking these would be owned by all the customers. However, these systems would be installed only to serve specific properties. It should be expected that the management entity would assess the owners of those properties the full cost of these systems—again perhaps with financing aids—rather than financing them through its budget in a manner that spreads the costs to all the customers. The same would be true of individual on-lot systems, should it be decided that any of those would be publicly owned.

The responsibility for choosing the type of high quality treatment system was discussed in the preceding section. For the collective systems, assuming public ownership, it is reasonable to presume that the management entity would choose the system that its expertise deems the most cost efficient and trouble-free design. Just as the individual customers of a conventional centralized system do not get to choose the type of treatment plant installed at the end of the pipe—other than having the opportunity to comment at any public hearings on the matter—it is reasonable to presume that the management entity should likewise have the ultimate responsibility for this decision.

For individual on-lot high quality treatment systems, the pros and cons of allowing free choice vs. specifying a single technology were reviewed above. It comes down to what the citizens feel is the "correct" viewpoint—maximizing individual choice or maximizing overall efficiency and effectiveness of the management system, which would be beneficial to the whole community. Of course, the management

system may allow that choice but "skew" it by setting more frequent observation requirements—incurring higher inspection fees—for those system types it considers to be less consistent and reliable.

There is another aspect of choice—what is allowed or restricted under the procedures governing the system types allowed on each site. DEP informs that for all systems with a design flow rate of less than 10,000 gallons/day that disperse effluent into a soil bed of any type, the governing rules for these systems—whether individual on-lot or collective—is the code for on-lot systems. Under that code, a Sewage Enforcement Officer (SEO) certified by a state-sponsored training program must evaluate each site and report the type(s) of system that would be allowed on that site.

It is speculated that many properties in Winfield Township would not "pass" for a conventional system. Many new systems will probably need to be mounds. Anecdotal evidence suggests that mounds are experiencing widely varying service lives before failing (by the surfacing effluent standard). This being the case, it is proposed that the owners of these properties be offered the option of installing a high quality pretreatment system and some form of alternate dispersal field acceptable under the on-lot code. While a pretreatment system can "fail" as well, typically failure begins in the components of the treatment system. Only if such failures are left unattended does a significant amount of poorly treated effluent get into the field, so failure of the dispersal field should hardly ever occur if these systems are well managed. Therefore, the owner should have the option of choosing a system with a greater likelihood that the field would last a long time. That choice would most likely be driven by the relative costs of a mound plus the on-going O&M costs of its pump system vs. the costs of a high quality pretreatment system plus its on-going O&M costs.

Another aspect of the construction process is system design and permitting. Being governed under the on-lot code, all systems—including collective systems—would be permitted through the existing processes, being submitted to an SEO for review and approval. The responsibility for executing system design could be left with the system owner, as at present, or it could be assumed by the management entity. If the latter, a fee to cover this cost would have to be charged, or else these costs would have to be covered by some other revenue source—e.g., higher observation fees.

The decision to assume that process or leave it to the owner's resources may be made differently for different classes of systems. An example is design and permitting of high quality pretreatment systems. Because the management entity would assume ultimate responsibility for O&M of these systems, accountability would require it to review designs submitted by someone hired by the property owner in any case, so it may be more efficient for the management entity to execute the process itself. This would be particularly efficient if the management entity were to require a single technology for all high quality pretreatment systems.

3.4 Funding Assistance for Facilities

Three sources of potential funding assistance have been identified. Of these, only the Pennsylvania Infrastructure Investment Authority (PENNVEST) has a program that could provide assistance for construction of individual on-lot systems. A PENNVEST representative has stated that public ownership of on-lot systems would have no impact on eligibility for funding—any publicly owned on-lot systems still must be funded through the on-lot program. According to program literature, the system owner is responsible for making the application. It should be determined what assistance, if any, the management entity should provide potential applicants.

In addition to another PENNVEST program, the Pennsylvania Department of Community and Economic Development (DCED) and Rural Development (formerly Farmer's Home Administration), through its Rural Utilities Service (RUS) program, are potential sources of funding assistance for collective systems. It

would appear that collective systems would be eligible for these forms of assistance only if they were publicly owned. PENNVEST has stated that these funds could be used for on-lot components of collective systems, regardless of their ownership. The actual availability of these funds and their applicability to projects in this management plan must be investigated. This will be done later in the planning process when preliminary plans of some collective systems are developed and cost estimates have been prepared.

4. Summary of Decisions to be Made by the Community

Decisions regarding scope of management system:

- Does the property owner have the right to choose whether to correct a failure with an individual on-lot system or to join into a collective system, or does the management entity have the power to compel property owners to join a collective system? What justification must be shown by the management entity to do this?
- Does the management system cover all wastewater systems, or only collective systems and types of on-lot systems that incur higher operations and maintenance (O&M) liabilities?

Decisions regarding system quality to be required:

- What is the "standard" to be used to define a system failure, requiring a replacement or upgrade of that system?
- Is the same standard to be used for all systems, or will systems where "clusters" of failures are identified be subject to the not-up-to-code standard, while for the rest, evidence of failure must be observed?
- Will ALL existing systems be subjected to an initial inspection? If not, what is the basis for determining which ones to inspect?
- What degree of diligence will be put forth to identify system failures in the initial inspections?
- What degree of diligence will be put forth to identify system failures in the on-going program?
- What efforts will be made to determine vulnerability of local water resources to potential pollution by the proliferation of wastewater systems that route effluent to soil dispersal systems?
- Lacking any mandate from DEP, what standards for effluent quality would be imposed in order to assure the quality of local water resources will not be degraded?

Decision regarding legal status of collective systems:

- Does the decentralized concept plan to be implemented by the township constitute "public or community … sewerage facilities" as that term is used in the Zoning Ordinance?

Decisions regarding system ownership:

- Who owns the systems? Are they all privately owned, are only collective systems publicly owned, are both collective systems and individual on-lot systems that incur higher O&M liabilities publicly owned, are all systems publicly owned?
- If collective systems are publicly owned, are the on-lot components of these systems publicly owned or privately owned?

Decisions regarding execution of O&M functions:

- What arrangements are made for operating and maintaining the systems? Are O&M functions executed by management entity employees, by private sector contractors under contract to the management entity, or by private sector contractors under contract to the system owners?
- Is this decision made separately for each O&M function, or separately for each type of system, or are arrangements to execute all functions to be the same for all systems?
- If O&M functions are executed by contractors, how is accountability to be maintained? What degree of control or oversight capability must the management entity have to ensure competent, timely performance?
- How is accountability of the management system to its customers—the users of the wastewater systems under the jurisdiction of the management system—to be maintained?
- Should routine observation of systems be performed by parties that have no interest in the outcome of the inspection, or can it be allowed to be performed by persons who have a vested interest in the outcome?
- Are septic tanks to be pumped on a fixed schedule, or are they to be monitored and pumped only when needed? If the former, what is the interval? If the latter, what is the standard for pumping, and what actions will be required to enable effective monitoring? How much will they cost?
- Is this decision made uniformly for all systems, or separately for different classes of systems?
- If all systems come under the management system, will annual volume of tank pumpage increase dramatically? What impact will this have on the ability to manage the septage, and the cost of those operations?
- With whom do the pumpers contract, the management entity or the systems owners?
- If pumpers contract with the management entity, do systems owners get a choice of contractors?
- If pumpers contract with the management entity, how is accountability to system owners maintained?
- Do pumpers also execute routine observation?
- Are repairs and component replacement service handled differently for different classes of systems?
- Do these maintenance providers contract with the management entity or the system users?
- If these maintenance providers contract with the management entity, do systems owners get a choice of contractors?
- If these maintenance providers contract with the management entity, how is accountability to system owners maintained?
- If these maintenance providers contract with the system owners, how does the management entity assure accountability for these services?

Decisions regarding choice of system and responsibility for construction:

- Who is responsible for paying for the construction of each system?
- For collective systems, would the owners of the properties served by each system be totally responsible for the construction costs?
- Would the management entity provide assistance in obtaining funding?
- Who is responsible for choice of system? Does the management entity have the power to impose a uniform system type for all high quality treatment systems, or does the system owner have the right to choose any system that meets the agreed-upon standard? What is that standard?
- If the system owner is allowed to choose the system type, how is accountability maintained?
- Should systems for which maintenance expertise is only available from a single source be entertained?
- If the system owner were allowed to choose the system type, what would be the impact on the quality of system observation?
- Should owners whose properties would accept a mound be allowed to install a high quality treatment system and dispersal field?
- Who should execute system design and permitting? For collective systems? For individual on-lot systems? Is this decision made separately for different classes of systems?

- If the management entity executes design and permitting, how is this cost covered?

Decisions regarding funding assistance for system construction:

- What arrangements are made for assistance with funding of systems?
- Would the management entity assist individual on-lot system owners with funding applications?

5. Discussion and Recommendations

Some of the questions listed in the previous section are very basic—for example, the standard of system failure—and the township citizenry must simply make those choices. To assist the citizens in evaluating many of the other decisions, a set of preliminary recommendations for management system structure and function is offered. Understand clearly that to make any such recommendations requires that value judgments be rendered about the "best" answer to all those questions. The heart of this planning process is that the citizens of Winfield Township must examine these recommendations and determine if the value judgments they embody are ones they can support. If one disagrees with a judgment, the section of this report dealing with that issue should be reviewed for a discussion of what would be implied by choosing to handle the matter a different way.

Also, it is possible that the design of the management system set forth in this preliminary recommendation may be found, upon closer examination, to rule afoul of regulations or statutes, that the powers to be presumed by the management entity cannot be legally guaranteed. Any proposals must therefore be reviewed by DEP and legal counsel as well.

The recommendations are made in such a manner that the answers to some of those basic questions are left open to be plugged in when they are made. The management plan would simply incorporate those decisions and would basically work in the manner described. In regard to other decisions, the management plan is "segmented" in such a way that if the community comes up with a different judgment than used to generate the preliminary plan presented here, only the portion of the plan directly impacted by that decision need be eliminated or altered. An example of this is the decision whether to cover all on-lot systems with the management plan. If it were determined, for example, that conventional on-lot systems would not be included, the part of the plan that addresses these systems is simply eliminated.

Two principles guide the formulation of the preliminarily recommended management plan;

- Equity – to the maximum extent practical all citizens collectively, and the users of each type of system as a class, should be dealt with as equally as practical.
- Choice – the choices of the system owners should not be restricted, subject to reasonable measures to ensure accountability, overall cost efficiency of the management plan for all its customers, and accomplishing the basic purposes of implementing the plan.

As noted, the concept of equity suggests that all citizens be dealt with on the same basis. So it is questionable whether it is fair to target systems only in certain areas simply because failing systems have already been identified in that area while failing to investigate the status of systems that might be of equally questionable function in other areas. Therefore, it is proposed that all existing on-lot systems be covered by the management plan. One way to look at this is that it is the cost of "insurance" against the eventual encroachment of centralized sewerage systems, with their attendant higher costs and their potential for wholesale modification of community character, the very thing the Township Board wishes to prevent by implementing a decentralized concept management plan.

All systems to be included in the management system would undergo an initial inspection by an SEO to determine their status relative to the standard chosen for determining if a system is functioning or has failed. Note that the standard for determining system failure is left open for the community to decide. Those that have failed—under the chosen standard—will be required to upgrade or have a replacement system installed within a given time frame. Thereafter, each system would be inspected and otherwise managed as described for each class of system in the outline of the management system presented in the next section.

The plan will establish "Collective System Districts" in those areas where "clusters" of failing systems are located. Initial districts would be in Cabot and Marwood, within areas that would have been served by the previously proposed centralized system, where Winfield Township is under DEP mandate to remedy the failing systems. In these areas, some properties clearly could not accommodate an individual on-lot system, as least not without it costing far more than participation in a collective system would cost. For these initial districts, it is proposed to set aside the principle of choice and require participation in collective systems to maximize cost efficiency for all the properties collectively. Residents of any other existing neighborhood could choose to petition the management entity to become a Collective System District so that a group of systems could be replaced by a small-scale collective system. Their decision might be based upon an analysis of options for that neighborhood conducted by the management entity, which, upon identifying a "cluster" of failures, would determine if collective systems would be more cost efficient than upgrading each system. The management entity may pro-actively establish a Collective System District where the nature of development is such that when failures are detected, a collective solution would be necessary or clearly more cost efficient. Where a Collective System District is established, all failing on-lot systems in these districts would be abandoned and a small-scale collective system would be designed and installed by engineers and installers under contract to the management entity.

Owners of new developments may also petition to have the project designated as a Collective System District. The management entity would contract with engineers to design the system(s) required to serve the development(s) within the district. The cost of this work would be part of the fees paid in order to create the development. It is presumed to be more cost efficient for the management entity to execute the design, since a uniform type of system concept and treatment technology would be used. The developer would contract with installers to build the facilities, with the management entity assuring accountability through inspections of the construction. Fees to cover the inspections would also be charged to the development. That part of the process is standard operating procedure when installing infrastructure on the development site in conventional centralized systems, so should be readily accepted and accommodated under this management plan as well.

All small-scale collective treatment units and their associated dispersal fields would be owned by the management entity. For new developments, lots would be platted or areas would be otherwise legally dedicated to this function, and effective control of these areas would be vested with the management entity. For existing developments, the availability of an appropriate site will be a factor in determining the most cost efficient layout, including price of outright purchase or an easement to house the treatment center and dispersal field. The option of a perpetual easement, running with the land, for housing the treatment centers and/or dispersal fields would be considered as an alternative to purchase if that were preferred by the property owner(s). To the maximum extent practical, locations of the facilities would be worked out with the property owner(s).

Generally, on-lot septic tanks and service laterals of collective systems would be owned by the property owner, as would all individual on-lot systems. General easements would provide access as required for execution of management functions. Other components of collective systems, including collection lines and any effluent pump stations required, would be owned by the management entity. They would be located off the lots as much as practical. Especially in already impacted areas, however, they may have to be located on the lots in some situations, particularly the collection lines. If so, they would be housed in

perpetual easements. Access to all these facilities for the purpose of carrying out management functions would be provided by the terms of the easements.

For installation of septic tanks and service laterals in those collective systems serving existing development, in-fill development of established neighborhoods, or individually platted lots of new development, the management entity would issue design standards and the property owner would be free to contract this work as he sees fit. This offers the owner the choice of who works on his property and direct control of this work, but to ensure accountability, the work would be subject to inspection and acceptance by the management entity. However, at the owner's option, the management entity could facilitate having this construction done by the contractor hired to install the off-lot components. If these tanks were installed at the same time as the rest of the system, it is to be expected that this would be more cost efficient for the property owners, so that many of them may choose to have the on-lot construction administered in that manner. For installation of any other components installed on private property, these would be housed within easements as noted previously, and they would be designed and built by engineers and installers under contract to the management entity.

All small-scale collective systems would incorporate high quality pretreatment systems and dispersal fields of appropriate design, to be determined based on acceptability under the on-lot regulations for the site and soil conditions encountered in each case. This decision is based on the presumption that maximizing system longevity and providing adequate long term protection of public health and environmental values urges the use of pretreatment for larger flow systems, even if site and soil conditions would allow systems without pretreatment under the current on-lot regulations. Using the high performance biofiltration treatment concept for small-scale treatment centers, these would incur little additional O&M liability relative to that required by, for example, a mound system, yet proper management could preclude the system from ever failing in such a catastrophic manner as a mound might fail.

Regarding conduct of system observation, DEP has stated that an SEO has no statutory operating authority, but has said that an evaluation of system failure must be rendered by an SEO. Since part of the routine observation program is the identification of system failures, this implies that observation should be conducted by an SEO. Therefore, it is proposed that routine observation of on-lot systems be conducted by one or more SEO's retained by the management entity. They may be full time employees or under contract, as is found to be most cost efficient for the actual workload.

However, it is proposed to train pumpers to do routine observation for conventional on-lot systems (those consisting only of a septic tank and gravity-dosed drainfield) at the time they visit the site to execute pumping (or measure sludge depth). If a failure is observed, the pumper would report this to the management entity and a follow-up visit by an SEO would be made for the "formal" evaluation of system failure. This would not entail any additional effort, since an SEO would have to evaluate the site and propose corrective actions in any case. While this arrangement has the potential for loss of accountability—a pumper may feel it will lose business if it "turns in" one of its clients—failures of conventional systems that "pass" the initial investigation are expected to be infrequent and this arrangement can be allowed in the name of overall cost efficiency.

All contracts for any of the O&M functions will be between the service provider and the management entity. This unburdens the system owners from having to administer the management of their systems, it frees the service providers from having to chase payments for their services, and it places the management entity in a much better position to assure accountability. The system owners would be billed by the management entity for all services. These billings could take the form of set periodic fees and/or assessments for specific services. Provisions for dealing with non-payment must be considered, since it is not an option to simply "turn off" this service. One possibility is to surcharge these payments onto the property tax bill. The legality of this would have to be determined.

To offer choice of service providers to the system owners, the management entity would qualify and register service providers in the manner deemed appropriate for each service, and each system owner could specify the service provider from among this group to be used on his system. All calls for service would go to the management entity, which would alert the chosen provider. The service provider would schedule the work with the system owner, would complete the work, and would provide a report to the management entity. For periodic service, such as pumping of septic tanks on a fixed schedule, the management entity would keep track of the schedule and notify the service provider, who would schedule the work and report to the management entity upon completion. The management entity would issue payment to the service provider upon receiving a proper report.

A special case is that provisions must be made to ensure timely replacement of a failed pump. Individual on-lot systems almost universally use simplex pump systems, with an emergency storage volume above the alarm that would signal pump failure. If the failure were to occur at the start of a long holiday weekend, for example, there must be a plan to assure the pump could be replaced in a timely manner. It is proposed to have a service provider that could perform this function "on call" over weekends and holidays. This may be one service provider that agrees to assume this duty, or this duty may rotate among all the available contractors, with a willingness to accept this duty being a condition of service for being registered with the management entity.

With these organizational principles having been defined, the structure and function of the management system is now detailed.

6. Outline of Preliminarily Recommended Management Plan

In the following outline of the plan, it is presumed that all the questions have been deliberated, the answers have been rendered and ratified by the Town Board, and the plan has been approved by DEP in whatever form required. Therefore, the starting point of this outline is the creation of the management entity, vested with powers sufficient to execute the duties assigned to it by the plan. However, discussion of the choice of that entity—and thus of the measures required to create it—is deferred until the plan has been deliberated and the powers required have been clearly defined.

6.1 Develop standards and procedures

One of the first duties of that entity would be to develop standards, procedures and information for people doing business with the management entity. These may include:

- Evaluation protocol to be used in initial investigations and on-going observation.
- Standard contracts for pumpers and other service providers.
- Quality standards for treatment systems—in particular, the standard of performance required for high quality pretreatment systems and dispersal fields for these systems.
- Procedures for evaluating/planning wastewater facilities for new developments.
- Application and permitting materials.
- Design standards for components of a collective system.
- Design standards for individual on-lot system components as necessary to facilitate management functions.
- Standard O&M protocol for each class of system.
- Standard easement agreements.
- Reporting and tracking forms for O&M activities.
- Training programs for contract service providers.
- Educational materials for system users.
- Schedules of fees, rates and fines, and billing procedures.

6.2 Initial inspection program

The next duty of the management system would be to conduct the initial inspections of all the systems to be covered by the plan. One or more SEO's would be retained to execute the inspections, determine the condition of each system relative to the standard of failure chosen, and determine what corrective actions would be required/allowed for each system judged to be failing. The SEO's conducting this work would have to become familiar with the management entity's standards and procedures, where they may differ from the statewide code, so the entity may have to conduct a specialized training program for that purpose.

To execute this process in an equitable manner, the management entity would have to establish an inspection protocol. Depending on the standard of failure chosen, this might include:

- Reviewing records of the system.
- Pumping of the septic tank and checking the tank for watertightness and structural integrity.
- Checking the balance of the system for integrity—e.g., broken pipes, alarms on pump systems.
- Probing or excavation to confirm field location.
- Excavation to determine construction of the field—for proper construction and/or for depth between bottom of trench and rock, groundwater or impermeable layer.
- Walkover inspection of field area, checking for signs of surfacing effluent.
- Investigation of nearby slope breaks for evidence of seeping effluent, or to find straight pipes.
- Dye testing to confirm that seeps do include effluent from the system in question.
- Flow testing to confirm that a straight pipe emanates from the system in question.
- Determining proximity of the field to wells.
- If corrective action is indicated, site analysis procedure to determine corrective actions.

The management entity would need to determine the costs of each of these actions and weigh that against the likelihood that any undetected failures would create a significant threat to public health and environmental values. The age of the system and availability and completeness of records may dictate that greater or lesser efforts be made to determine system status.

To make this a manageable process, the management entity would establish a multi-year program for executing the initial investigations. The first year would target the areas in Cabot and Marwood where the township is under DEP mandate to take corrective actions, and other currently impacted areas considered to be potential higher risk zones. Other areas would be prioritized as determined by the management entity.

On the basis of investigation results, the management entity would designate Collective System Districts in those areas where that action is indicated. All systems to remain as individual on-lot systems would be classified as to type, to be managed according to the protocol for that type, as set forth below. All of these systems found to be failing would need to be upgraded or repaired by the system owner within one year of the date that the management entity notified the owner of the evaluation. An effective sanction for non-compliance would have to be established. The type of system installed would determine how that system would be classed for further management interaction.

6.3 Management Plans for Each Class of System

Each class of system would go under a management protocol as described in this section. The management entity would establish a uniform set of charges for routine observation of each class of system and for routine work that can be priced on a per occurrence basis. To the maximum extent practical, there would be a uniform charge schedule for all other work—e.g., standard hourly rates, standard charges for parts. The protocol also establishes permitting procedures for each class of system.

6.3.1 Existing conventional on-lot systems

Existing conventional on-lot systems which "pass" the initial investigation will be visited for a routine observation inspection every 3 years. The activities to be executed during this inspection would be as determined based on the community's decision about the degree of diligence to be exerted to identify system failure.

Owners of these systems will be offered a choice regarding septic tank pumping. They may have it pumped every 3 years, when the inspection is performed. Or they may install an effluent filter with an alarm and a riser with a hatch that is easily accessible at the surface, in which case sludge depth would be monitored during the routine observation and the tank would be pumped when sludge depth increased to a predetermined depth. The effluent filter would be cleaned by the inspector during the triennial visit.

Routine observation of these systems would be executed by a pumper who has been properly trained to execute that activity. This violates the principle of not allowing routine observation to be executed by persons who may profit from the outcome of the observations. However it is anticipated that pumping would accompany routine observation for many of these systems, so it is considered to be most cost efficient to have the pumper execute that function. (It must, of course, be determined if pumpers are interested in conducting these inspections if a pumping fee is not also guaranteed.)

The pumper chosen by the owner would be notified by the management entity when a system is scheduled for observation and/or pumping. If necessary, the pumper would schedule this directly with the owner or resident of the property. At the completion of work, the pumper would provide a report to the management entity, including the haul manifest (or such other instrument that is used for tracking septage in Pennsylvania) if the tank was pumped. If any repairs are needed, and the pumper is qualified to execute that work, the pumper may execute the repairs as part of the observation duties, or return to do them at the convenience of the owner or resident. Any such work would be included in the report.

If the pumper is not qualified to execute the repair, or if any repairs are needed between observation visits, the owner can call the management entity to have the work scheduled with a qualified service provider. However, since any minor repair work on conventional systems is likely to be fairly simple, the owner may execute the work by his own means. The owner is expected to report any such work to the management entity. (Note that any work to remedy drainfield failure is not considered repair, rather would be considered a replacement or upgrade, requiring a new permit.)

If the owner has chosen to install the effluent filter, the owner or resident would call the management entity upon noticing the alarm. The management entity would notify the pumper chosen by the owner. Over a weekend or holiday, a pumper would be "on call" for that period, since swift response may be needed to prevent the backup that set off the alarm from backing all the way up into the house. An option is for the owner or resident to call any pumper directly. Owners could be provided a list of registered pumpers so they have the option of handling the matter immediately and directly. The pumper would, of course, report the work to the management entity in order to obtain payment.

6.3.2 New or replacement conventional on-lot systems

The management protocol for new or replacement conventional on-lot systems would be the same as for existing conventional on-lot systems, except that effluent filters with alarms would be required on all new systems. Therefore, all these systems would have sludge depth measured every 3 years and have the septic tank pumped only when needed. New or replacement conventional on-lot systems would be permitted through the management entity by the normal procedures under the on-lot code.

6.3.3 Existing on-lot systems that include a pump system

Existing on-lot systems that include a pump system but not pretreatment components that "pass" the initial inspection would be visited for a routine observation every 2 years. The activities to be executed during this inspection would be as determined based on the community's decision about the degree of diligence to be exerted to identify system failure. However, in addition to general observation, it is certain that the protocol would include checking all functions of the pump system, which is the major reason for the more frequent biannual observation for this class of system.

For these systems, since probably less than half of the observation visits would be accompanied by pumping of the septic tank, routine observation will be executed by an SEO retained by the management entity for this purpose. The SEO will schedule the visit with the owner or resident and submit a report of the observations when finished. If the SEO is a contractor, the management entity would issue payment upon receiving a proper report.

Owners of these systems would be required to install a riser with a hatch easily accessible at the ground surface, so that sludge depth monitoring could be readily executed. However, since sludge depth would be monitored at 2-year intervals, an effluent filter with an alarm would not be required. The owner may choose to install it, however, to gain the protection of his dispersal field from premature failure that the effluent filter affords. He may also choose to install the alarm so that his first notice of a clogged effluent filter would not be a plumbing backup. The person conducting the observation would clean the effluent filter in addition to his other duties.

If sludge level has risen to a predetermined depth, the management entity would notify the pumper chosen the owner, and the tank would be pumped under the same procedures as outlined above. If repairs are required, the management entity would notify the service provider chosen by the owner, and the work would be executed under the same procedures as outlined above. Here again, any minor repair could be executed by the owner's own means, as long as the work was reported. If it is executed by the owner or by a contractor not working within the management system, any repair work subsequent to a problem observed during the inspector's visit would require a follow-up observation (at an additional charge) to assure it was properly executed and that the repair executed did indeed address the identified problem. If the work were executed by a registered service provider, this would be confirmed by that contractor in his report to the management entity.

As reviewed previously, replacement of a failed pump in an on-lot system is a special case of maintenance, due to the critical need for timeliness. On noticing the alarm, the owner or resident would call the management entity, which would notify the service provider chosen by the owner, or the service provider "on call" during weekends and holidays, as outlined above. An option is to monitor the alarm with telemetry, freeing the owner from having to initiate the replacement process, and providing immediate notice of the problem to the management entity.

6.3.4 New or replacement on-lot systems that include a pump system

New or replacement on-lot systems that include a pump system but no treatment components would be on the same protocol as existing systems of this type. However, for all new systems, installation of the effluent filter and alarm would be required. New or replacement on-lot systems in this class would be designed and permitted through the management entity by the normal procedures for this under the on-lot code.

6.3.5 On-lot systems with a high quality pretreatment unit

Upon a finding that a property requires a high quality pretreatment unit and appropriate dispersal field, each property owner would be free to choose any type of system that has been approved by DEP as meeting the necessary standards. (Note that the standards are not yet clarified. These will need to be defined and the management entity will have to include them in its standards.) The "basic" management protocol set forth here presumes the use of a high performance biofiltration unit. Since it is presumed that this is the technology the management entity would use in collective systems, it is presumed that maintenance personnel would be available who are trained to service that type of system. The management entity may impose more frequent routine observations and/or more stringent monitoring requirements if it finds the owner's chosen system likely to be less consistent and reliable in meeting the standard of performance required. Further, if that system is the first of its type to be installed under the jurisdiction of the management entity, it may only be permitted if at least two service providers properly qualified to perform maintenance on this system have registered with the management entity and have certified that they would be available if called upon.

With the possibility for modification of these procedures in mind, individual on-lot systems containing a high quality pretreatment unit would be visited for routine observation every 6 months. These observations would be performed by an SEO retained by the management entity. The standard scheduled maintenance procedures for a high performance biofiltration unit could readily be executed by this inspector. If the system is of a type that requires other procedures, the inspector must be accompanied during the observation by the service provider certified to work on that system type who was designated as the provider of choice by the owner.

The observation inspector would also perform any routine maintenance required for the type of dispersal field being used. It is to be expected that maintenance protocol for any dispersal field technology will evolve as experience is gained in working with it. The management entity must evaluate this work and provide appropriate training for the execution of the required functions.

Included in the routine observations would be annual cleaning of the effluent filter on the outlet of the septic tank and measurement of sludge depth. Upon a finding that sludge depth has reached a predetermined level, the septic tank would be pumped by the same procedure outlined above for systems with a pump. For other types of systems, pumping protocol would be established in the maintenance plan for that system, to be set up by the management entity. Any pumping would be executed by the same procedure as for septic tank pumping.

If repairs or unscheduled maintenance are required for a high quality pretreatment unit, they must be executed by a service provider certified by the management entity for that work. They would be executed under the same procedures as set forth above for systems with a pump. Here too, replacement of a failed pump is a critical condition. This function would be addressed as outlined above for systems with a pump. For other system types with other similarly critical components, at least one of the certified service providers for that system must always be "on call" to service the unit in an appropriate time frame to maintain system integrity.

Systems using high quality pretreatment units would be permitted through the management entity by the normal processes under the on-lot code. The procedures would be as required for the technologies to be employed. (Again, the standards to be required are not yet clarified.) In consideration of the simplicity and cost efficiency that system uniformity would impart to the management process, the management entity would provide design assistance for high performance biofiltration units for the same permit fee as is charged for review of a system design in any case.

6.3.6 Collective systems serving existing development/in-fill development in existing neighborhoods

In Collective System Districts established by the management entity to remedy failures of existing systems, the design and installation process would be completely "sponsored" by the management entity. As set forth previously, all components except the on-lot septic tanks and connection pipes would be designed and built by engineers and installers under contract to the management entity. The septic tanks could be installed by owners by any means they choose—including contracting with the management entity to have the tank installed by the contractor installing the rest of the system—subject to inspection and acceptance of the work by the management entity. In regard to permitting for these systems, it must be investigated what procedures would be required for the management entity to, in essence, permit itself.

It is preliminarily proposed that routine observation of the treatment centers and dispersal fields be executed monthly. It is expected that this protocol will evolve as experience is gained with these systems. Routine observation would be executed by an employee or contractor retained for this purpose who has been trained to execute this function. This inspector would execute all scheduled maintenance procedures and would collect samples for any monitoring required by the terms of the permit. For any repairs noted to be needed by the inspector, a contractor retained for this purpose would be notified. This contractor would execute the work and report to the inspector, who would confirm that all was proper.

In collective systems, all pump systems would have duplex pumps, so that replacement of a failed pump would not be so time-critical, except in the rare event of a simultaneous pump failure. It is proposed to install telemetry to inform the management entity of alarm status so that all system alarms can be monitored frequently, and to cause an immediate dial-up notice of a simultaneous pump failure.

For other unscheduled maintenance—e.g., cleaning of the filter bed, any problem in a dispersal field, cleaning of treatment unit tanks—the management entity would notify the appropriate contractor retained for the work in question. The work would be addressed as outlined previously for contracted work on individual on-lot systems.

The observation inspector would also make an annual visit to each of the septic tanks feeding into collective systems. The inspector would monitor sludge depth and clean the effluent filter during each visit. If the sludge depth were up to the level that would require pumping, the management entity would notify the pumper chosen by the owner of the property in question, and the pumper would execute the pumping under the procedures outlined previously for on-lot systems.

As is readily apparent, only the routine observation part of this management protocol would generate a fixed price every year for the required services, as all other services are "event-driven". The management entity would "carry" all these costs except pumping charges till the end of the fiscal year, then bill an appropriate share to the owners of each property participating in the collective system for which the charges were incurred. It must be determined how the costs would be divided up—per house, per bedroom, per square foot, etc.—so that the distribution of costs is deemed to be equitable. For pumping charges, the owner would be billed for that charge directly under the same procedures established for pumping of individual on-lot systems, since this charge can be assigned directly to an individual user of the system.

6.3.7 Collective systems serving new development

For all systems in Collective System Districts established to serve new development, the on-going O&M activities, billing, etc., would be handled in the same manner as for collective systems established under "sponsorship" of the management entity. The only difference would be the manner in which the system plan was developed and the infrastructure was installed. As discussed previously, the management entity would control the design process, and the developer would install the infrastructure under observation of the management entity and turn over ownership to the management entity.

7. Closing Perspectives

As noted at the beginning of this discussion of recommendations, they are based on one perspective of the "best" way to organize the management system. Especially in regard to management of on-lot systems, one could certainly question if a governmental entity should have to do some of the functions that this plan assigns to one. It is a matter of what one views as important to ensure and of how much individuals can be trusted to do what is required to ensure it without any guidance from or observation by government. One may feel, for example, that he is fully capable of determining when to pump his septic tank or how to get a failed pump replaced in short order. But is your neighbor that competent and conscientious? How about the family down the road who moved here from the city and is only dimly aware they even have such a thing called an individual on-lot wastewater system? Does EVERYONE even want to have to be in charge of running their own wastewater system if they have the choice of paying a reasonable fee and letting someone else keep track of it?

It must also be recognized that DEP expects existing identified failing systems to be remedied, and it will no doubt continue to expect that future failures are dealt with responsibly. Also, landowners who wish to develop have a right to do so, in concert with applicable local rules of course, and they need to have wastewater management systems that responsibly serve those developments. As stressed throughout this report, the citizens of Winfield Township must evaluate what is valuable to them and how best to protect and preserve those values. One value purported to be driving this whole planning process is that local citizens should have a reasonable ability to manage how the community develops, how its character is altered or preserved in the course of that development. This management plan provides one tool to assist in managing growth by offering a wastewater management system that solves the existing problems, deals with—and helps to preclude—future problems, and provides new developments with a workable system, all without creating any large-scale, community character altering wastewater collection systems. Perhaps this is an outcome for which it is worthwhile to surrender absolute control over functions that maybe you could readily do without any guidance or oversight from the government.