

Open Space Development: Market and Design Challenges

An exploration of options for the Four Township Water Resources Council

➤ Overview

In the interest of promoting open space development as a means to protect water quality and rural character, the Four Township's Water Resources Council asked LSL Planning a series of questions. The principal question was the feasibility of using designated open space for septic fields or reserve systems to limit lot sizes and keep open space ratios high, particularly in the use of open space developments. In short, the question was whether septic fields or reserve systems could be located outside commonly owned open space, yet be included as part of the statutorily required open space.

As a corollary to this question, two additional questions were investigated regarding the use of open space developments:

- 1) What is the relative value of open space developments compared to traditional development?
- 2) What are the most effective means of reserving open space areas to ensure their long-term protection?

➤ Sources

This effort involved extensive research, including the following sources:

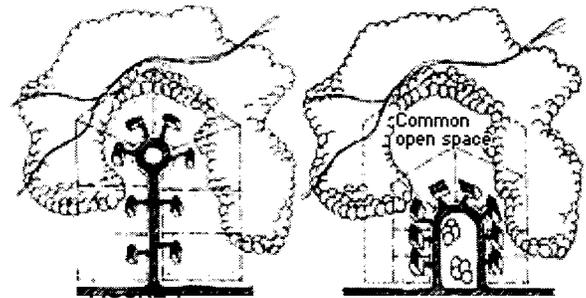
Internet: A total of 207 sites were visited, including many out-of-state sources. Sites included conservation and advocacy groups, county health departments, state health departments, local units of government, and university or Cooperative Extension offices.

Personal Contacts: The following personal contacts were also made:

- John Baukham, MTA attorney
- Eric Pessell, Chair, Michigan Association of Local Environmental Health Associations (MALEHA) now Director of the Barry-Eaton Health Department
- Green Oak Township, Livingston County
- Kalamazoo County Health Department
- Livingston County Health Department
- Ric Falardeau, Michigan Department of Environmental Quality (MDEQ, Lansing
- Fred Bower, New Jersey Department of Environmental Protection, Water Quality Division
- Rod Cortwright, MSU Extension, Charlevoix County
- Bob Lee, Loudon County VA Environmental Health Department
- Pat Donovan, MDEQ, Cadillac Office
- Mark Wyckoff, FAICP, Planning & Zoning Center
- Ken Detloff, McKenna & Assoc.
- Ted Bosgraaf, Holland area developer
- Tim Bureau, JFNew, Inc.

➤ WHAT ARE OPEN SPACE DEVELOPMENTS?

The concept of *Open Space Development* provides for a denser concentration of residential development in a limited area, with no increase in the overall, or "gross density" of the site. The gross density must conform to the requirements of the Zoning Ordinance. The objective of an open space development is not to increase the number of units developed, but to regulate the amount of land disturbed by structures, lawns, and drives. Smaller home sites are permitted to protect farmland, open space and/or significant natural features (see Figure 1) in keeping with an intent of preserving rural character, or fulfilling other community objectives.



Conventional Subdivision Cluster Subdivision
FIGURE 1

There are several challenges associated with open space development.

1) The mind set of people who want to live in a rural setting.

When home buyers are shopping in rural areas, they are often leaving what they perceive as congested subdivisions. They want rural amenities and much more space between them and their neighbors. If the open space design does not provide some sense of isolation and privacy, it may be difficult to market. Over the long-term, this will require a marketing effort by developers to "sell" the value of common open space rather than large, individual lots.

2) The developer's perception of open space developments.

The open space development process is optional and requires extra design effort (i.e. cost) and governmental approvals. Why shouldn't a developer choose traditional development, which may be cheaper, more expeditious, and have less opportunity for governmental scrutiny? In addition, "traditional" development responds to an easily predictable market.

Density is the principal issue related to any residential development. Communities with open space development regulations use various methods to calculate density. One method often used calculates "net" densities by eliminating roads and undevelopable lands and applying a minimum lot size to the remainder; a method often noted by developers as being counter productive. Instead, in the view of many developers, communities should be encouraging open space developments through bonus density provisions. One township in Allegan County, for example, has designated minimum 3-acre lot sizes in the area where open space development is encouraged. However, if the open space provision is used, the developer is automatically awarded a 10 percent bonus density.

3) The community's approach to open space developments.

Even those communities who have had open space development provisions in their ordinances for some time do not have a great deal of experience with these developments. In large part, this is likely due to the comfort level developers have with traditional subdivisions and site condominiums, and the fact that special approvals were necessary for open space developments (for example, open space developments are often processed as Planned Unit

Developments or special land uses.) Oftentimes, Planned Unit Developments require a visit to both the Planning Commission and the legislative body; a process most developers prefer to avoid.

4) The concentration of septic fields and wells in a much smaller development area.

At odds with the concept of open space developments is the public health concerns of placing wells and septic systems for the same number of homes in a much smaller area. Well dispersed home sites do not concentrate pollutants and lawn chemicals like an open space development can.

➤ What is the relative value of Open Space Developments compared to traditional development?

Michigan-based studies comparing the market value of open space development to traditional development were not found, probably because of the relative lack of development experience and the general reluctance to share market studies.

Most of the literature and references from around the country investigating open space value were studies involving the value of property adjacent to parks, which is a form of open space. Overall, the comparisons made between properties adjacent to open space and properties away from open space are difficult to compare to one another because of varying methods of analysis by the researchers. But it was clear, no matter what the method or geography, that property adjacent to parks, natural open areas, and trails was more valuable than other properties. Some urban communities are even trying to create open space as a means to combat blight and increase property values.

- The Trust for Public Land referenced several interesting studies associated with parks and trails. A 1992 study involving the Chesapeake Bay (Maryland) demonstrated that land use restrictions in the area showed an *"increase in housing prices ranging from 14 to 27 percent for houses within the Critical Zone (1,000 feet inland from the Bay and major tributaries)..."*
- A study from the Trust for Public Land, in Sacramento, California stated that *"one developer in San Diego County found he could increase the sale price of his houses by 25 percent by scaling back his development 15 percent and adding natural open space corridors visible from every home."*
- The Neighborhood Open Space Coalition in New York cited a 1974 study by the Regional Science Research Institute that looked at several hundred properties in 16 different housing developments near a Philadelphia Park. The study found that property values decreased the farther away it was from open space. *"At 40 feet, the park accounted for 33 percent of the land value. This dropped to 9 percent of the value at 1, 000 feet."*
- An article by Philip Larsen, "Open Space that Sells," in *Land Development*, the publication of the National Association of Homebuilders, explores how well-planned open space can enhance a development market value. As Larsen notes: *"The key is to view the various open space requirements as opportunities rather than as liabilities. A look at the most successful projects in any region will reveal that open space has*

not been wasted. Projects that feature open space are projects that sell and, at the same time, provide environmental amenities and opportunities for recreation."

- Studies cited by the National Park Service reported that *"the amenity influence of greenbelt land on property values also applies to privately held greenbelt land, according to a study of the Salem metropolitan area in Oregon. In this case, the greenbelt was comprised of rural farmland. Greenbelt zoning had been applied to this prime farmland beginning in 1974 in an effort to contain urban sprawl and preserve farmland. The study found that urban land adjacent to the greenbelt was worth approximately \$1,200 more per acre than urban land 1,000 feet away from the greenbelt boundary, all other things being equal. However, rural land values within the restrictive zoning actually decreased in value by \$1,700 per acre (Nelson, 1986)."*
- A 1990 study of market appreciation for clustered (open space) housing with permanently-protected open space in Amherst and Concord, Massachusetts, found that clustered housing with open space appreciated at a higher rate than conventionally-designed subdivisions. Appreciation was measured as the percent increase in open-market sales price. The study compared one clustered development and one conventional subdivision in each community. The clustered homes studied in Amherst appreciated at an average annual rate of 22%, as compared to an increase of 19.5% for the more conventional subdivision. This translated into a difference in average selling price of \$17,100 in 1989 between the two developments. In both Amherst and Concord, the homes in the clustered developments yielded owners a higher rate of return, even though the conventional subdivisions had considerably larger lot sizes (Lacy, 1990).
- Hamburg Township in Livingston County, Michigan, has had open space zoning since 1992. Although not an in-depth study, an article that recently appeared in *Planning & Zoning News*, a publication of the Planning & Zoning Center, entitled "An Examination of Open Space Zoning in Hamburg Township" noted that *homes in cluster developments were selling for more than in traditional neighborhoods*. It was noted in the article that *the Township no longer has to convince developers to utilize the Open Space Community option, as only two developments of 22 since 1996 have opted for traditional development consideration*.

➤ **Open Space Reservation**

Reservation of open space areas is usually through deed restrictions that hold the land in open space in perpetuity. Reservations should include sufficient detail to be clear well into the future, property restrictions should be registered with the County Register of Deeds.

The predominant tools to legally reserve common open space are conservation easements, restrictive covenants, or deed restrictions. In these mechanisms, the described open space is typically deeded to a property owner's association, unit of government, or an appropriate non-profit entity, like a nature conservancy. In Charlevoix County, townships are requiring that the open space be deeded to two entities, making it more difficult to get the land out of open space designation because both entities would have to sign-off on changing the dedication.

In the reservation documents it is important to clearly define the open space areas in both map form and as a complete property description. The documents dedicating the property to

open space in *perpetuity* also need to be properly filed with the County Register of Deeds so future property transactions include legal restrictions on the land. Use restrictions for undeveloped areas can also be documented in reservation language including the prohibition of.

- ✓ Dumping or storing of any material or refuse;
- ✓ Activity that may cause risk of soil erosion or threaten any living plant material;
- ✓ Cutting or removal of live plant material except for removal of dying, or diseased vegetation or invasive non-native plant species;
- ✓ Use of motorized off-road vehicles;
- ✓ Use of pesticides, herbicides or fertilizers within open space.

The ability of the zoning approval itself to preserve open space should not be overlooked. Approval of an open space development should include a condition that the open space be maintained in perpetuity and that the appropriate recording measures described above be utilized. However, the zoning approval itself cannot stand alone as the reservation method. Changes to zoning districts and regulations, amended approvals, and other legal processes related to zoning (variances, etc.) highlight the need for other, more permanent protection measures.

As part of the project review process, an escrow fund can be established (if authorized by ordinance or resolution of the legislative body) to cover professional review fees, including an attorney reviewing the reservation documents to ensure the open space is appropriately and permanently protected.

➤ **Septic and Reserve Systems in Open Space Developments**

In areas where public water and sanitary sewer systems are not available, the ultimate size of individual lots may be dictated by the County's septic and well isolation requirements. As a result, septic system requirements can force the lots to be larger than what is intended for true open space development design. On some properties, this may make the use of open space developments unfeasible.

Since the passage of the 2001 Open Space Preservation Development amendments to the various Zoning Enabling Acts, the general practice (and in most cases a requirement), has been to keep individual septic systems and required reserve areas on individual lots or site condominium units.

1. Administrative and Legal Requirements - Definition and Use of Open Space

Public Health Code Limits

- By administrative rule, the Michigan Department of Environmental Quality (MDEQ) asserts that individual septic systems and reserve areas may not be placed in common open space or any area that is not controlled by the property owner using the septic system. Therefore, subdivisions and other residential developments falling within their jurisdiction must abide by these rules. Group systems may only be placed in common open space and must be managed by a designated entity (e.g., property-owner's association or sewer authority).

- There are 45 health departments serving Michigan's 83 counties and each entity adopts its own code, although the Upper Peninsula recently adopted a unified code. Each health department also has its own administrative approach, which can make open space development planning challenging because of the differing opinions on how to manage private utilities. Some health departments have been viewed as discouraging open space developments, primarily because of their negative experiences with septic system maintenance.
- The Michigan Association of Local Environmental Health Associations noted that given most codes, septic tanks are usually 10-20 feet from the home and drain fields are usually within 100 feet of the tank (or they need a pump to get liquids to the drain field). Additionally, septic systems generally require a 50-foot isolation distance from the well and 10 feet separation from property lines. With these general siting requirements, fitting the well, septic system, and reserve field on the smaller lots often permitted in open space developments can be difficult, and in some cases, impossible.

Using Open Space for Drain Fields and Reserve Areas.

- The Michigan Association of Local Environmental Health Associations reported that some health departments have been permitting reserve areas and drain fields in the "limited common" elements of site condominium developments, which are part of the open space, but not in "common areas," which, in open space developments would be the area outside of the lots. Traditional subdivisions could likely take the same approach by using various easement or restrictive covenants for septic system elements outside of the area of a groomed/developed lot.
- The concept of having the drain field and/or reserve area in ungroomed, undeveloped open areas was explored. If the undeveloped green space designated for drain field and/or reserve area is in close proximity to the home and existing septic tank, this could be an option to keep formal, mown areas to a minimum, thus supporting a more rural character open space design. There would still be the challenge of placing the "limited common" open space in an appropriate manner which keeps the reserve area in a greenway in an undeveloped (unmown, ungroomed) state that the developer and future owners can live with.
- While exploring the idea of having septic drain fields in undeveloped open space areas, the question was posed if drain fields operated as well in unmown areas as mown areas. The reviews were mixed. One public health official thought that as long as the native species in the drain area did not have heavy, invasive roots that would clog the drain pipes and field, drain fields in unmown areas would work. Another thought traditional lawns (mown grass) allowed more evaporation from the drain field than native species and that not mowing drain areas could be a problem. Regardless, reserve fields could remain unmown until they were needed, then the original field could "grow wild" while it repaired itself.

In site condominium developments the open space areas are delineated as "general common elements" in the master deed. Areas associated with individual owners are "limited common elements" and thus may be used for septic reserve areas.

Legal Terminology

- Limited common elements, as defined in the Condominium Act (PA 59 of 1978), refers to exclusive use of less than all the co-owners, which could mean one homeowner: *"Limited common elements " means a portion of the common elements reserved in the master deed for the exclusive use of less than all of the co-owners.*
- Amendments to the Township Zoning Act (125.286h, Sec. 16h (b)) require that "A percentage of the land area specified in the zoning ordinance, but not less than 50%, will remain perpetually in an undeveloped state by means of a conservation easement, plat dedication, restrictive covenant, or other legal means that runs with the land, as prescribed by the zoning ordinance. " A similar amendment to the City and Village Zoning Act requires 20% open space.

The Zoning Act further defines terms related to open space (*emphasis provided*): *"Undeveloped state" means a natural state preserving natural resources, natural features, or scenic or wooded conditions; agricultural use; open space; or a similar use or condition. Land in an undeveloped state does not include a golf course but may include a recreational trail, picnic area, children's play area, greenway, or linear park. Land in an undeveloped state may be, but is not required to be, dedicated to the use of the public.*

Recent amendments to the Zoning Acts permits Planned Unit Development approvals to allow "open space that is not contiguous with the rest of the planned unit development. " While the overall implications of this amendment are not yet evident, there may be some application to permitting open space to be located in areas other than strictly within the PUD, including, perhaps, in a common drain field. Of course, this would be subject to the approvals of the applicable health department.

"Greenway " means a contiguous or linear open space, including habitats, wildlife corridors, and trails, that link parks, nature reserves, cultural features, or historic sites with each other, for recreation and conservation purposes.

- The Zoning Act defers to the Natural Resources and Environmental Protection Act's definition of "conservation easement" which states: (324.2140 Definitions) (a) *"Conservation easement means an interest in land that provides limitation on the use of land or a body of water or requires or prohibits certain acts on or with respect to the land or body of water, whether or not the interest is stated in the form of a restriction, easement, covenant, or condition in a deed, will, or other instrument executed by or on behalf of the owner of the land or body of water or in an order of taking, which interest is appropriate to retaining or maintaining the land or body of water, including improvements on the land or body of water, predominantly in its natural, scenic, or open condition, or in an agricultural, farming, open space, or forest use, or similar use or condition."*

An easement to place portions of septic or reserve areas in open space could "limit the use on the land" by prohibiting structures, mowing or other disruption, keeping the land in an "open condition," (i.e., unmown) as alluded to in the definition of conservation easement.

2. Local Regulations

- Currently, there are no institutional mechanisms to protect reserve areas once a newly built septic system gets final approval from the health department. If local ordinances differentiated lands in an "undeveloped state" (i.e., areas under one

owner's control set aside for reserve areas, or drain fields) from common open space to permit the development of smaller lots it may actually be a better way to protect septic areas and reserve fields. These undeveloped open space areas would be under deed or easement restrictions prohibiting the placement of sheds, pools or other structures over reserve fields.

- Ordinances could also provide expanded definitions for easements to more specifically manage various portions of open space areas (including, perhaps, a swath of septic field easements between groomed lots and common open space).
- The Vergennes Township Zoning Ordinance explicitly permits drain fields in common areas (emphasis provided):

Septic System. If not served by public sanitary sewer or a privately owned public sewer system, the proposed Open Space Preservation Community development shall fully comply with the requirements of the Kent County Health Department as they apply to siting and development of on-site wastewater treatment and disposal. With the approval of the Planning Commission, the Township Board, the Kent County Health Department, and the Homeowner's or Condominium Association, an approved drainfield may be located within an area dedicated as common open space.

- The Open Space Requirements in the Ross Township Zoning Ordinance includes a provision that may provide for the placement of septic facilities within open space.

The provision states:

The Planning Commission may allow not more than 10 percent of the minimum required open space to be comprised of areas within the perimeter of a lot(s), if the location of such areas enhance or complement other designated open space areas lying outside the perimeter of the lot(s) or unit(s). Such intra-lot/unit areas shall be subject to the open space requirements in this section, except such areas shall not be required to be accessible to all residents of the open space preservation development and such areas may be under the ownership of the owner of the individual lot(s) or unit(s) within which the areas are located.

3. Septic System Management

A byproduct of this research was the level of concern regarding the maintenance (or lack thereof) of on-site disposal systems. Movements in several eastern and southern states suggest that Michigan may need to be more assertive regarding septic system maintenance. Regular inspections, mandatory maintenance, and nitrate modeling are becoming more common in areas where groundwater and surface water quality have been severely affected by nitrates and other septic system pollutants.

Group Systems

A common approach with open space developments in other parts of the country has been to have individual septic tanks placed on a lot with a common drain field placed in the open space. An easement is provided for the common drain field in addition to the conservation easement for the open space.

A conversation with a Virginia health official, noted that soils in a drain field can be replaced if a reserve area is not required because the system fails. A MDEQ official indicated that replacing the old drain field is much more costly than using the reserve area. Disposing of the contaminated soil can also be a liability. Additionally, the original field can repair itself over time and perhaps be reused.

Pumps are usually required, however, to get the affluent to the drain field.

Many of the eastern states having significant troubles with failing systems and nitrate loading in groundwater and surface water are not permitting cluster developments unless there is a community or group system. They are finding that property owners and owner's associations are simply not providing adequate maintenance for the individual systems. Lack of septic system maintenance particularly troublesome in a open space design where wells are closer to septic fields and septic fields are closer to one another than in traditional large-lot scenarios.

Further, health officials are requiring that after the developer builds the group system, it must be turned over to a unit of government or sewer authority to ensure the system is properly maintained. Units of government and authorities then assess maintenance fees to the property owners. Managing entities can also receive grant monies or low interest loans from the state (New Jersey and Virginia) to maintain and improve the systems.

Different figures have been presented regarding the minimum number of homes that can be on a group system to make it viable. The consensus from the officials contacted was that a minimum of 15 to 30 units was required (depending on the price of the lots/developed homes) to make a group system economically feasible.

Recent Litigation

A recent Michigan Court of Appeals case may fundamentally change how Michigan manages group systems. In *Lake Isabella Development Corporation v. the Village of Lake Isabella and the Michigan Department of Environmental Quality* (published November 13, 2003) the court found that "Rule 33," which required local units to sign off on group systems, was invalid, "because it constitutes an unlawful delegation of discretionary power to local municipalities." Essentially, "Rule 33" requires that the local unit of government agree to take responsibility for group systems if the owner failed to maintain it properly.

In the court case, the Village of Lake Isabella refused to take responsibility for a proposed group system, so MDEQ would not consider the developer's permit request for a group system. The developer filed suit against the Village and MDEQ and prevailed in Circuit Court. MDEQ appealed the decision and lost at the Michigan Court of Appeals.

At this point, because of that decision, MDEQ can no longer require a local unit of government to take responsibility for the system under its current rules. This could mean that responsibility for maintaining group systems or dealing with failed systems will ultimately lie with the property owner's association or the individual owners, if an association is not formed. Regardless, communities may wish to consider developing a sewer fund which can be quickly activated should the need arise. Another appropriate action would be to form the necessary special assessment districts (during the development approval process) under the provisions of PA 188 of 1954, "Public Improvements," so the assessment district can be used to finance system improvements if it becomes necessary. If the assessment district is in place prior to the sale of any properties, time delays and political frustrations of getting a district in place after the fact may be avoided.

New Technology

There was also a great deal of information on "alternative" systems like sand filters, recirculating sand filters, effluent filters, and drip irrigation found during the research process for this paper. Constructed wetlands are growing in popularity for group systems in open space developments. Constructed wetlands are being used as an alternative where soils are too heavy to percolate or too sandy to filter the effluent properly. According to JFNew, a company that designs and constructs alternative systems, wetland systems are also being constructed in many areas to manage stormwater runoff.

Septic System Function

Most traditional septic systems rely on a septic tank and a drain field. Solids in the septic tank are digested by anaerobic (non-oxygen needing) bacteria, that turn the raw waste into sludge, which is held in the tank. The relatively solid-free effluent then runs off into the drain field where pipes disburse the fluid into the soil, filled with aerobic (oxygen loving) bacteria that further breakdown the wastewater.

In a properly functioning system the water percolating into the drain field is relatively clean. The number-one cause of septic failure, and subsequent release of pollutants to groundwater and surface water, is the lack of adequate maintenance of the system (most notably septic tank pumping). Overly full tanks will flush sludge into the drain field, which can clog the lines and soil pores that the wastewater filters through. If waste water spills into the drain system too fast because of an overly full tank, the "black water" does not get properly treated. Failing systems can eventually contaminate groundwater and surface waters.

There is a great deal of effort being put into educating homeowners in various parts of the country about septic system maintenance.

- Communities like Douglasville, Georgia, are passing ordinances that require septic tank pumping every five years. Residents need to provide proof that they have complied with the ordinance (e.g., with tax bill payments) or the city will pump the system and bill the owner.
- Virginia and New Jersey have professional septic system inspectors, who inspect the entire septic system (tank and field) when a property is sold because mortgage companies in these states require an inspection before they loan money. Although not licensed, there is an independent association of private septic inspectors who take tests and follow procedures from a state developed manual when inspecting systems.
- New York, Massachusetts, and Pennsylvania are also getting more assertive with septic system management (e.g., testing, maintenance, and stricter rules for new systems) as a means to protect groundwater and surface water quality. Much of their land has solid rock near the surface, or soil types that make it easy for pollutants to reach streams and estuaries. Biological and health problems have spurred this effort, but only well after significant damage has been detected to water supplies and biota (e.g., severe declines in shell fish populations).
- Contacts in both Virginia and New Jersey advised that Michigan communities to embrace septic system management and work to ensure that systems stay healthy through education, regulation, and the development of management and fee levying

authorities before environmental impacts make it so the issue cannot be denied. Community septic systems should be designed to tie into a public system when the time comes, including appropriately sized pipes, and establishing easements and assessment districts before the first home site is sold.

Michigan's Septic Challenge

The public's interest in the long term management of septic systems has several challenges:

- Septic systems are typically "out of site and out of mind" and when they are not operating well, or failing, the pollutants they release are rarely monitored even if a problem is detected.
- Before the 1970s, townships were under much less development pressure, so failing systems were disbursed enough, and the groundwater diluted enough, to not cause major problems. The life expectancy of an average septic system is about 20 years (less if not properly maintained, more if well maintained) so the growing concentration of systems placed in the 1970s and 1980s are likely either reaching the end of their useful life or failing. Typical detection signals like a smelly, "squishy" drain field or difficulty with pipes draining surface well past the time pollutants are loaded into the environment.
- Over the last decade rural sites have continued to be in high demand, even more so than the years between 1970 and 1990, so the concentration of septic systems has increased dramatically in rural areas. Health officials are not optimistic that homeowners have gotten better about septic system management.
- Sites that were previously not considered buildable (i.e., they did not pass percolation tests for traditional septic systems) are being developed with alternative systems. Builders in areas with heavy soils or high water tables are using "mound," "pressure mound" and other alternative systems to be able to build. Although these systems function, they need more care than traditional systems and are much more sensitive to improper installation and maintenance. This means they can fail faster if not properly constructed or maintained.
- Open space design concentrates well and septic system placement. Finding suitable locations that properly isolate wells from septic systems while providing adequate reserve drain field areas is sometimes difficult. Proper maintenance of septic systems becomes more critical when neighbors are in closer proximity to one another. One failing system in an area of higher density has the potential to contaminate several wells in the area. Further, use of pesticides, herbicides and fertilizers in more compact development scenarios increases the potential for groundwater and surface water contamination.
- Michigan households in particular have lifestyles that can put more stress on a septic system because:
 - Water is easily accessible, abundant and cheap. On average, households use 125 gallons of water per person, per day.
 - Most households now have garbage disposals, which adds more to the waste load of a septic system.

- Water softeners put salt into the septic system which can retard it's effectiveness. Further, salt is also not treated by the septic system and can reach groundwater.

Pollutant Risks

One of the pollutants that can come from failing septic systems is nitrates. Nitrates can enter drinking water supplies and be ingested by humans. According to an Extension bulletin published in Washington, *"Nitrates break down in the human body and can interfere with the natural transfer of oxygen to the blood stream. Children under the age of one year and pregnant or nursing women are at the greatest risk to what is known as methemoglobinemia, or "blue baby syndrome. " Based upon this risk more than 10 milligrams per liter of nitrate-nitrogen in drinking water is unsafe. Nitrate-nitrogen levels between 5 and 10 milligrams per liter (mg/l) serve as a clear indication that ground water quality is at risk."*

In lake areas, nutrients (such as nitrogen and phosphorus) from failing septic systems can stimulate excessive growth of aquatic plants and algae, leading to a variety of problems collectively known as eutrophication. In addition, bacteria from poorly functioning septic systems can pollute both surface and ground waters.

➤ **Conclusions and Recommendations**

CONCLUSION

Well designed open space developments can provide many benefits to a community including the:

- Protection of water quality because higher amounts of natural topography and vegetation are retained than would be in a traditional development.
- Preservation of open space and farmland.
- Retention of rural character.
- Protection of wildlife habitat.
- Creation of buffers between environmentally sensitive areas and development.
- Design of a more pleasant living arrangement for residents.
- Increased property values.

Some of the challenges that may keep developers and buyers from choosing cluster developments include:

- The need for a special approval process for an open space option when "traditional" development only needs to meet basic lot size and setback requirements.
- Without incentives, such as bonus densities, developers are not as likely to choose open space developments over traditional layouts. The traditional development process is often faster and cheaper than a open space project, which requires a greater degree of professional design assistance.
- Open space developments are fairly new in Michigan and, therefore, have a limited history. Both developers and buyers have been apprehensive about stepping out of the

norm of traditional development design. Open space design brings home sites closer together and prospective buyers usually move out to rural areas for more space.

- Siting septic systems, reserve areas, and wells on smaller lots can be difficult and having these facilities consolidated in one area increases opportunities for groundwater contamination. Group systems and new technologies may help.

Using designated open space for septic fields or reserve areas is possible if, in the case of site condominiums, these areas are for the exclusive use of less than all of the co-owners (e.g., designated "limited common" areas). Where the Land Division Act is the means of dividing and selling land, a two-tiered easement system would likely work. The easement descriptions would have to differentiate between common open spaces, which may be used by every owner in the property-owner's association, and areas which are reserved as undeveloped open space, but may be used by adjacent lots for septic fields. Open space areas reserved for septic systems could be restricted structured to simply be a restricted part of an owner's lot.

RECOMMENDATIONS

Open Space Developments

Despite the challenges, open space development offers significant opportunities to improve both environmental health and design quality. Open space development can be promoted by:

- Offering bonus incentives to developers for choosing the open space option, including incentives for use of a group wastewater treatment system, well, or other preferred design applications.
- Encouraging open space projects by writing disincentives into the ordinance for traditional grid or strip residential development.
- Streamline the review process for open space developments. For example, allow cluster development under site plan review, or as a special land use; a process which usually stays with the Planning Commission, rather than a Planned Unit Development which could necessitate a rezoning and an additional visit to the legislative body.
- Help make the developments more attractive by expanding open space regulations to provide design standards for designated open space. As examples: require common open space adjacent to wetlands and water bodies; setbacks and buffer strips be provided in critical areas of the parcel; measures for the protection of natural vegetation, steep slopes and wood lots.

Septic/Reserve Fields

- Require, as part of the reservation process, that appropriate easements for water and sewer lines be provided so the community can immediately execute them if the need arises. Also establish a special assessment districts to finance infrastructure improvements if the need presents itself. This prevents conflict in the future if the community needs to raise funds to support public improvements.

- Work with public health officials to explore alternatives to individual septic systems on individual lots to promote the clustering concept.
- Consider requiring that the second reserve field be built at the same time the septic system is put in so it can be immediately used if there is any sign of the first field failing.
- Identify and work with the potential responsible management entity (e.g., drain commissioner) to prepare for, and perhaps promote, group wastewater treatment systems. The development of a management and fee levying authority should also be explored.
- Engage in an intensive and ongoing campaign to educate property owners about septic systems and maintenance, particularly when alternative systems are used or there is a open space development.
- Prohibit the application of pesticides, herbicides and fertilizers in common open space areas through education and open space development deed restrictions. Also discourage their use on individual lots.
- Start developing a strategy for septic system maintenance including: 1) education of property owners, governmental entities, builders, etc. 2) group septic tank pumping discounts, and 3) exploring mandatory maintenance programs.
- Help advocate for the passage and enforcement of a unified health code which is more focused on septic maintenance.
- Amending local zoning ordinances to differentiate between "common open space areas" and "undeveloped land" and permitting reserve septic areas in areas of undeveloped land that are under individual ownership as long as there are appropriate use restrictions on that land (e.g., no structures, groomed lawns, use of chemicals, etc.).