Attachment A (underline/strikethrough version)

Wastewater Disposal

Summary

The vast majority of County residents and businesses located within the County's urban areas rely on municipal sewers and special sanitary districts to provide centralized wastewater treatment and disposal services. However, the majority of the unincorporated County is located outside city Urban Service Areas and sanitary districts, where wastewater disposal is achieved by means of onsite wastewater treatment systems. Consistent with countywide urban growth management policies, lands outside cities' Urban Service Areas and sanitary districts will continue to rely upon onsite wastewater treatment systems indefinitely. The most common conventional systems are also known as septic systems or onsite wastewater treatment systems (OWTS), using tanks and drain lines to dispose of and treat effluent.

A septic system is an underground wastewater treatment system used to treat and disperse wastewater onsite. With ~~very few~~ some exceptions, ~~the~~ most homes, farms, and businesses in rural unincorporated Santa Clara ~~dispose of~~ County treat and disperse waste water through a ~~septic tank system. For most of~~ conventional OWTS. Construction standards and performance expectations for these ~~uses, the reality is that they will indefinitely utilize septic tanks with leach fields or some other on-site method of waste disposal. This reality requires that we look at septic tank system design and placement somewhat differently than we~~standard tank and drain field systems have ~~in the past when septic systems were viewed~~evolved over time because they are no longer seen as a temporary ~~precursor to~~ means of achieving sanitary wastewater treatment and dispersal. Furthermore, alternative OWTS technologies provide additional options to serve community ~~wide sanitary sewers~~ needs where conventional OWTS may not be feasible due to certain kinds of site constraints, or where modifications are necessary to repair failing systems.

This section of the Rural Unincorporated Health and Safety Chapters identifies ~~the concerns surrounding waste~~issues regarding onsite wastewater treatment and disposal systems, protection of water ~~disposal~~quality, and the policies with which those concerns may be addressed.

STRATEGY DIRECTIONS

Several chapters in the General Plan include development policies intended to protect watersheds, and surface and groundwater supplies. The strategies in this section focus on the long term maintenance of a safe and clean supply of water by:

- Ensuring the Long Term Reliability of Onsite Wastewater Systems;
- Preventing Waste Water Contamination of Surface and Groundwater Supplies; and

- Monitoring Surface and Groundwater Quality.

GROUNDWATER PROTECTION IN RURAL UNINCORPORATED AREAS

The integrity of the groundwater system is a countywide concern. The County identifies the protection of groundwater aquifers as a major issue in rural, unincorporated area development. Interested readers should refer also to the Resource Conservation Chapter: Rural Unincorporated Area Issues and Policies for additional discussion of groundwater protection strategies.

Background

LONG-TERM RELIANCE ON SEPTIC TANK SYSTEMS

In years past, septic tank systems were seen as a temporary ~~waste water~~wastewater disposal solution. It was ~~commonly~~ perceived that ~~in time~~eventually municipal sewer services would replace septic systems as development expanded outward from previously urbanized areas~~.~~, particularly valley lands. For some parts of rural unincorporated Santa Clara County, this may still prove to be true, particularly for those undeveloped areas adjacent to city urban service areas~~.~~, where managed urban expansion may occur through urban service area expansion approvals. However, most ~~homes, farms and businesses~~rural properties will ~~likely~~ continue to rely ~~on septic~~upon onsite wastewater treatment systems (OWTS) for ~~waste water disposal for many years to come.~~a variety of reasons, described further below.

Chiefly, countywide growth management policies provide for only low density, non-urban uses outside city urban service areas. Secondly, many of the lands outside cities and urban service areas are mountainous, and the sheer size of this geographic area, over 500,000 acres, makes traditional municipal sewer services impractical and cost-prohibitive. Geologic and other natural constraints have reinforced ~~growing~~ policy and public sentiments toward curbing urban sprawl, creating more compact urban communities and maintaining the agrarian, rural character of the remaining largely undeveloped open spaces. ~~This suggests that~~Consequently, if rural development occurs at all in what are now the ~~farm~~farms and ranch lands of South County, the Diablo Range, and the Santa Cruz Mountains, it will be very low density and widely dispersed.

This perspective of future rural area development potential has led ~~many County~~environmental health professionals and ~~building staff~~policy makers to rethink the purpose, design and long term operational requirements for onsite waste water treatment facilities in those areas. ~~Their~~The intent is to ensure that policies and standards are in place which will assure ~~us that waste water disposal systems~~that OWTS function reliably over the long term to adequately safeguard public health and environmental health.

NATURAL CONDITIONS AFFECTING SEPTIC SYSTEMS

Challenges to ~~Disposal~~Treatment System Engineering

There are many parts of the rural county with geologic, hydrologic and other natural characteristics that challenge ~~septic system~~ OWTS designers and engineers. Soil texture and structure on a site can significantly affect the operation of some ~~septic systems.~~OWTS. Similarly, leachfield systems on steep slopes ~~in excess of~~ greater than 20 ~~percent~~% can ~~degrade septic system effectiveness. Where either~~present problems for slope stability and system operation. Areas that have a high seasonal or year~~-~~-around ~~water tables reach up to or just below the soil surface,~~groundwater table have the ~~system's leaching action~~potential to saturate the leachfield trenches, which can ~~be blocked.~~compromise the operation and effectiveness of the OWTS and possibly contaminate surface and subsurface water.

~~Waste water~~

Onsite wastewater treatment systems ~~normally~~ require careful design and installation, and periodic maintenance to ensure consistent effective operation. ~~Unusual~~Certain soil conditions ~~can greatly magnify those~~may affect the siting of the system and post-installation routine maintenance requirements, and ~~can shorten~~may impact the effective lifespan of the system.

Soil Permeability

Rural area soil permeability varies dramatically from one location to another. Soil permeability can be measured by calculating percolation rates. These rates define the ability of soils to absorb and transmit water, critical factors in determining appropriate system design and siting standards.

Soil percolation rates ~~less~~slower than 120 minutes per inch or ~~greater~~faster than one minute per inch are considered unsuitable for any type of ~~septic tank system.~~OWTS. Rates ~~less~~slower than 120 minutes per inch result from soils with poor permeability, ~~possibly~~potentially allowing ~~unmetabolized waste water~~minimally treated wastewater to reach the surface and be exposed to human or animal contact. Soils with rates ~~above~~faster than an inch per minute transmit waste water too quickly for natural biologic and chemical filtration processes to remove harmful contaminants. This raises the possibility that untreated waste water could reach ~~underground~~groundwater aquifers.

The U. S. Soil Conservation Service has defined and mapped general percolation rates for soils throughout the county. Portions of the rural unincorporated area ~~appear to~~ contain soils which ~~may~~ have either undesirably slow or fast percolation rates, requiring ~~extraordinary~~alternative design requirements or prohibiting the use of ~~standard septic tank systems outright. Tests are~~conventional OWTS. Soil percolation testing is performed on proposed development sites to more accurately determine percolation rates for individual parcels.

Slope and Soil Characteristics

The slope of the ~~building site~~property is ~~one~~another site characteristic which can impact ~~the~~ proper leach field functioning. Additionally, soils in mountainous areas are more likely to contain large amounts of impervious rock and less depth of soil to bedrock than flatter, valley areas.

Under certain conditions, if a leach field is constructed on steep slopes where there is an underlying layer of dense clay, rock, or other impervious material near the surface, the effluent

may flow above the impervious layer to the surface and run unfiltered down the slope face. The effluent ~~will thus~~could potentially contaminate any surface waters with which it may come into contact ~~with~~. To address this issue, leach fields proposed on steep slopes require a slope stability and/or geotechnical analysis to ensure there would be no break-through of effluent or degradation of the hillside if an OWTS were installed.

High Groundwater

Parts of the rural unincorporated area experience high groundwater and/or poor ~~wintertime~~seasonal drainage. These areas include parts of South County, particularly those areas south and east of ~~Gilroy~~Morgan Hill and Coyote Valley. Water tables are frequently very high along the sides of creeks, particularly in the early spring. ~~High~~Protection of seasonal high groundwater is extremely important since water quality in general can be degraded when untreated waste water is mixed directly with surface or near-surface water and is drawn into any of the numerous aquifer recharge areas located along rural area creeks.

MONITORING RURAL AREA WATER QUALITY AND CONTAMINATION

Well Testing Programs

Several ~~recent~~ studies have found that nitrate levels in some wells exceed the federal drinking water standard of 45 parts per million of nitrate~~; nitrate~~. Nitrate concentrations exceed 100 ppm in several rural area locations. Most of those wells are clustered toward the southern end of the Llagas ~~basin.~~Basin. While the data is inconclusive with regard to the exact source of the nitrate contamination in each well, there is adequate data to prompt local officials to intensify well testing programs throughout the South County area.

The Santa Clara Valley Water District (District) has primary responsibility for managing the groundwater basin to ensure its viability as a long term potable water supply. The District, working with other local agencies, is concerned with the elevated nitrate levels in the Llagas Basin and, as a result, has implemented a comprehensive program to identify the scope, extent and sources of contamination in South County groundwater supplies. ~~The results of this effort will also help develop alternative strategies for reducing nitrate levels in the basin.~~

Tracking the Sources of Contamination

~~The~~ For the rural area population ~~is~~ now served by ~~septic tank systems, and~~ OWTS, most of these systems are outcomes of County-regulated design, permits, and installation. Therefore, most can be assumed to be functioning satisfactorily. ~~At the same time~~However, there have been and will likely continue to be instances of system failure~~. The capricious~~, as systems age, if they are neglected, or when they are compromised. The variable nature of soil composition and the unpredictability of the movement of water ~~through the underground aquifer~~within groundwater aquifers can complicate efforts to identify the sources of water contaminants.
~~Ironically, such circumstances can mean that~~
For example, contaminants from a ~~polluting septic system or commercial use~~failing OWTS may never ~~appear in~~actually impact the property owner's well, while adjoining or even distant

property owners may ~~have~~ experience contamination in their wells~~ polluted. Aspects~~. Variables which complicate tracking down the source of contaminating agents ~~are the~~ include site-specific soil conditions, existence of perched groundwater, weather events, and the rate ~~at which~~that specific pollutants move through the soil~~ and the point where they actually enter the water table.~~. Pollutants found in a well today may actually be the result of ~~material deposited on the land long ago. Climatic and soil conditions may only now be moving the "plume" of dissolved~~ contaminants ~~down through the soil and~~released into the ~~water table. The contaminating activity may have ceased some time~~environment long ago.

The uneven distribution of contaminated wells and the vagaries of subsurface ~~water~~groundwater and contaminant movement are among two primary factors which figure heavily in current and planned District programs to identify the sources and extent of groundwater contamination in the Llagas Basin.

Health Threats Posed By Waste Water Contamination

To operate ~~efficiently, septic and other waste water~~effectively, onsite wastewater treatment systems must be designed to utilize either the intrinsic properties of the soil or be augmented with some other mechanism for removing potential pollutants from the ~~waste water.~~wastewater. Pollutants present in ~~waste water~~wastewater include suspended solids, pathogenic organisms, oxygen~~-~~-demanding organic chemicals, phosphates, sulphates, chlorides, and nitrates. Design of the leach field to capitalize on bacterial decomposition (which takes place in the upper few feet of the soil) is critical to system effectiveness. The design objective ~~should be~~is to remove all disease-causing pollutants before they can contact ground or surface waters.

Contaminants associated with septic ~~tank~~ system failure include nitrate salts~~ and~~ , fecal microorganisms~~. The most serious of these contaminants are~~ and viruses~~, including those associated with human wastes. Some~~ . Bacteria and viruses ~~(polio, for example) have been known to live for up to five years in soil environments. Fecal microorganisms~~ can cause ~~infectious hepatitis, typhoid fever, bacterial dysentery and intestinal ailments. Elevated nitrate concentrations are linked to a blood disorder in infants, methemoglobinemia, also known as the "blue baby" syndrome. There have been some studies~~many human diseases. Fecal coliform is an indicator that ~~suggest that elevated nitrate levels may also be linked to some forms of cancer and birth defects. These assocations are currently undergoing further study. In Santa Clara County, the presence of nitrates in groundwater is directly attributable to both agricultural fertilizers,~~there is a problem with human or warm-blooded animal waste~~, and septic tank effluent~~ (from pets, wild animals, human sewage) present in the water. Viruses are highly persistent in wastewater and may remain a viable means of infection for months after their entry into the wastewater.

Another potential contaminant that can come from septic systems is nitrogen. Nitrogen can also be introduced into the environment in from fertilizers and manure. If the nitrogen level of well water is too high, the water can potentially be hazardous to infants in their first six months of life. Nitrogen in lower concentration levels can also contribute to contamination that leads to increased enrichment of nutrients in rivers, streams, or estuaries. This can cause algae blooms and loss of dissolved oxygen, detrimental to plants and animals in estuarine waters.

EVOLUTION OF ON-SITE WASTEWATER TREATMENT SYSTEMS

Conventional Onsite Wastewater Treatment Systems (OWTS)

OWTS technology has evolved significantly since sealed tank and drain-field systems began replacing cesspools in the 1950s and 1960s. Not only has conventional system design been improved, but alternative wastewater treatment design and technologies have improved in design and reliability. The predominant design for most rural properties is the conventional tank and drain field, commonly known as a septic system [see sidebar, "Conventional Residential Septic Systems"].

The design for conventional OWTS is relatively simple, reliable, and works on most parcels that do not have geologic or hydrologic constraints. Permitting by the Department of Environmental Health involves a review of site conditions, soils testing, and system design consistent with prescribed standards, with no requirement for an operating permit. The only recommended maintenance is to utilize the diversion valves installed on most systems to "rest" each independent leach field area annually, and to pump the solids from the septic tank every 3-5 years. For these reasons, conventional OWTS will likely remain the most common onsite means of disposing of wastewater for both residential and non-residential uses in the rural unincorporated area.

Alternative Waste Water Disposal Systems

~~**Where Traditional Systems Are Inappropriate**~~

Where the land area available for a conventional OWTS on a parcel of land is limited, or soil conditions are poor (e.g., high seasonal groundwater table or bedrock), property owners may need to consider a modified onsite wastewater treatment system, also known as an alternative onsite wastewater treatment system. Alternative OWTS use pre-treatment of septic tank effluent before it is discharged to the soil of a drain field or mound. These pre-treatment systems include either the use of sand, peat, or textiles as a medium where filtration and biological degradation of fine solids, pathogens, and nutrients occur. Other types of pre-treatment units use oxygen to break down organic matter. Because these aerobic treatment units decompose organic solids quickly, the wastewater leaving the system is cleaner.

With either of these alternative technologies, filters or aerobic treatment units, more contaminants are removed prior to dispersal in the drain field. Consequently, the size of the drain field may be reduced. Alternative OWTS also include a variety of approaches to drain field design, which offer flexibility in where the drain field can be located on a parcel [see sidebar, "Alternative Waste Water Systems"].

~~The standard septic tank system is now and will likely remain the most common means of disposing of waste water for both residential and commercial uses in the rural unincorporated area for the foreseeable future. However, circumstances suggest that the County and other local~~

agencies will see an increase in the number of proposals for alternative types of waste water systems for use on sites where traditional septic tank systems are not the best option.
There are many undeveloped rural area parcels, some of which are already subdivided, that will never be able to meet standard septic system standards. for conventional OWTS. Generally, these are substandard parcels on very steep slopes;, some with bedrock at or very close to the surface. Others may have high groundwater or , drainage problems, or both.limited space. Still more may be composed entirely of soils which that do not percolate properly. Those who wish to develop such sites, whether for residential or commercial non-residential purposes, will likely investigate the availability of alternatives to traditional septic tank systems.

Ensuring Safe and Reliable Alternative Waste Water Systems

The experimental nature of alternative systems and the absence of a long term record of reliability have led County health and RWQCB officials to review proposals for such systems very cautiously. Nevertheless, there have been significant technological advances in alternative waste water treatment methods in the past decade. Alternative systems also raise a host of new technical and administrative problems. To ensure a fair hearingmay be able to overcome these physical limitations by taking advantage of a variety of alternative systems proposals, performance standards and operation criteria need to be clearly expressed in County land use and health policies and regulations.
Throughout the past decade, a range of alternative waste water treatment systems have been installed in different parts of the California. Most have performed well while some have had significant problems. However, because each system tends to incorporate a number of on-site or use specific design modifications and the operation of each system is influenced by local soil, geologic and hydrologic characteristics, health department officials have found it necessary to view each proposed system as unique.
Even the most conscientiously constructed and operated system can fail. With this thought in mind, officials here and elsewhere in the state have required operators of some small engineered systems to also build in "back up" devices such as large holding tanks. These devices are intended to prevent untreated waste water from polluting surface or groundwater should the system fail.

Approved Alternative Waste Water Systems

During the past decade, the RWQCB and the County have authorized the use of small engineered systems for several rural commercial developments. Each system was based on a different treatment concept and was designed to address specific use and site demands.
To date, the only application of alternative waste water systems in this county has been for commercial uses and as replacements for failed residential septic systems. The necessary studies required by the California Environmental Quality Act which will evaluate the cumulative impact of residential use of alternative waste water systems have yet to be completed. Some of the commercial systems which have been approved have established performance records at other locations in California, thus adding a level of assurance for our local officials that the systems are reliable over the long term.
All of these systems went through a rigorous County and RWQCB review process. Each of the commercial uses were required to have backup devices as discussed earlier. The owners were

also required to perform periodic monitoring and to report their findings to the permitting agency, either the County or the RWQCB. Despite this stringent process, measures were included which allow officials to order these establishments to immediately cease operating should their system fail to meet County health and regional water quality standards.

Residential Versus Commercial Use

Although no alternative waste water systems have yet been approved for residential use, they impose more complex accountability and enforcement requirements than for commercial uses, for several reasons. Should an alternative system serving a business prove unreliable and violate County regulations, County officials could require that the business cease operation. It is an action local officials do not take lightly and would employ only under the most dire circumstances, given the financial impacts of such an action on the business owner and employees.

Failure of an alternative system serving a residence might similarly require a cessation of use. However, requiring the occupants to cease using a malfunctioning residential alternative waste water system would be tantamount to condemning their home, unless an backup septic system or sewer connection were available. Consequently, the County must consider very carefully all the possible long term ramifications before moving in a policy direction which might result in or necessitate such actions.

Concerns also arise when liability is considered. The costs for maintaining and monitoring alternative waste water systems can be considerable. The costs for replacing a failed alternative waste water system, particularly one serving a number of homes, could be astronomically expensive.

County and local agencies do not have the resources to absorb these costs or the environmental cleanup costs stemming from system failure, should they prove necessary. Before such systems are approved, review procedures must identify and assign full financial responsibility for the construction, operation, long term maintenance (including all repair, replacement, and cleanup costs in the event of system failure), to the developer or to an agency established for this purpose.

Intermediate Steps to the Use of Alternative Systems

Before the County can permit more widespread use of such relatively new technology in the rural unincorporated areas, a number of key questions must be answered. The proposed system must have an established track record of successful implementation under circumstances similar to those under which it would operate in Santa Clara County. Applicants must also provide assurance that the long-term operation, maintenance and replacement costs are adequately financed through bonds held for that purpose.

A number of land use and environmental studies are also required by state law before alternative systems can be considered, including:

- land use analysis of the potential for increased development;
- environmental impact assessment; and
- study of anticipated water quality and water usage impacts.

wastewater treatment technologies. In addition, ~~the County must comply with a court order that requires an assessment of the cumulative potential land use and environmental impacts resulting from the use of alternative systems before such systems can be approved. That requirement resulted from litigation over revisions in the early 1980s to the County's health regulations, which would have allowed consideration of alternative systems. To date, the complexity and cost of performing such a study have been prohibitive.~~because most alternative system designs can remove contaminants from effluent prior to dispersal to the drain field, they can be used to augment conventional OWTS design in cases where either the drain field is losing effectiveness or where the OWTS may have been constructed prior to the requirement for setbacks to groundwater and surface water bodies, such as lakes and creeks.
~~Until such time as the necessary studies are completed and satisfactory arrangements are made between the County and the RWQCBs, Santa Clara County has no alternative but to require that alternative systems be permitted only for parcels which can also accommodate a standard residential septic system in order to mitigate any growth-inducing potential of alternative systems.~~

Alternative OWTS also provide environmental benefits that can make them attractive to property owners, even in cases where a conventional OWTS system is feasible. As noted above, alternative systems can remove contaminants from effluent prior to dispersal to the drain field, providing added assurance that groundwater quality will not be degraded. In addition, alternative systems may require less land area and offer flexibility in drain field design, potentially reducing ground disturbance and helping to avoid impacts to environmental resources, such as creeks and trees.

Because alternative OWTS are more complex than conventional OWTS, and involve additional components such as electric pumps, filters, and electronic controllers that can fail, they require routine monitoring, maintenance, and reporting by a person certified in inspecting these systems. Unlike conventional systems, the Department of Environmental Health requires an operating permit to provide the basis for verifying system performance and ensuring ongoing maintenance.

Strategies, Policies, and Implementation

The strategies, policies and implementation measures described below are intended to prevent or ~~at least~~ minimize ~~waste water~~wastewater contamination of ~~our~~ the County's water supplies. Given the vast scale ~~and range~~of the County's rural areas, and the diverse nature and age of development in many parts of the rural county, ~~we can anticipate some contaminants will find their way into~~ preventing adverse impacts to groundwater and surface ~~water, wells and underground aquifers. However, we must act to ensure that contamination of~~waters can be a challenge. However, with proper standards for conventional systems and alternative system technologies, additional groundwater protection can be achieved, furthering the goal of protecting public and private drinking water ~~never reaches levels which pose a danger to health.~~sources.

Strategy #1: Ensure the Long Term Reliability of Onsite Wastewater Systems

There are a number of important factors that impact the reliability of onsite wastewater treatment systems over the long term, such as comprehensive design standards and County Ordinance Code provisions. These standards and provisions are periodically reviewed and updated utilizing current scientific studies and for consistency with requirements of the State Water Resources Control Board, to ensure that systems are installed with the most reliable design standards available. Requiring appropriate OWTS monitoring and maintenance are also important, as is property owner knowledge of ongoing operation and maintenance responsibilities.

For most properties, conventional OWTS will be utilized for their lower cost of installation, permitting, and ongoing maintenance and inspection needs and are a proven technology that is reliable and safe to public health and the environment. However, both conventional and alternative system technologies play a role in ensuring that OWTS can function reliably for the foreseeable future where urban services such as municipal wastewater systems are neither prescribed nor feasible for the more sparsely populated rural areas of the county.

Strategy #2: Prevent Waste Water Contamination of Groundwater Supplies

For Santa Clara County, a primary responsibility is ensuring the continued safety of rural area residents, farms and businesses who are, by and large, completely dependent on wells for fresh water supplies. Beyond the needs of rural area users, residents and businesses countywide are also highly dependent for their ~~fresh~~drinking water supplies on the integrity and quality of the system of ~~underground~~groundwater aquifers beneath Santa Clara and Llagas Valleys. These aquifers serve as ~~underground~~groundwater water conduits and storage for a substantial portion of the ~~populations.~~urban population. The County has a responsibility to maintain the quality of this water supply resource to the greatest extent feasible through its land use and development policies.

EFFECTIVE PROTECTIVE MEASURES

To maintain water quality, the cities, County ~~and regional water quality control boards~~, State Department of Public Health, Regional Water Quality Control Boards and the ~~SCVWD~~Santa Clara Valley Water District already have ~~a host of~~ many laws, policies, standards, and enforcement procedures in place to safeguard this critical supply of water. ~~As do those of the other public agencies,~~Implementing and enforcing County regulations necessarily impose certain financial and other ~~constraints~~obligations on individual property owners and businesses, such as OWTS permitting and maintenance costs.

While these ~~constraints~~obligations may be unavoidable ~~and~~ , the objective of protecting ~~the~~ public health is one of ~~residents it's~~the County's highest ~~priority, the County must also strive for~~priorities. The County's responsibility is to develop the most fair and effective regulatory measures. By continuing to work closely with concerned citizens, affected business and farming interests, and water quality professionals~~,~~; practical and cost-effective regulations can be implemented and unnecessary or unduly burdensome measures avoided. For example, making

greater provision for alternative onsite wastewater treatment systems is a positive development. However, with those allowances there are additional oversight, permit, and maintenance requirements to ensure the County balances public and private interests.

PREVENTING ~~Waste Water~~WASTEWATER CONTAMINATION

One very effective way to ensure long term protection of surface and ground water supplies is to minimize the opportunities for ~~waste water~~wastewater to contaminate those supplies in the first place. The County's fundamental urban development policy, that urban development should occur within cities and be served by community municipal ~~waste water~~wastewater systems, is key to achieving that objective.

~~However, some~~
Some development is appropriate for and will occur in the ~~ural~~rural area. As long as that development is appropriately located and is ~~of a~~ low density and low intensity in character, ~~the~~ cleansing and filtering actions of the natural environment ~~should be able to~~will safely treat the ~~waste water~~wastewater from ~~standard septic tank~~conventional and alternative treatment systems. To achieve this, certain conditions will need to be met. Sites with geologic, soil or hydrologic conditions ~~which~~that impair efficient septic ~~tank~~ system operation must be avoided. The design and construction of septic systems must assure effective long term operation.

Equally important to the long term effectiveness of septic systems is proper maintenance by property owners. Failure to periodically maintain septic systems can result in poor performance and increased pollutant output. ~~(see sidebar on septic system design requirements)~~(see sidebar on conventional system design requirements). The County should periodically take measures to ensure adequate awareness and understanding of property owners' obligations for proper long term care of onsite wastewater treatment systems. The following policies help serve the mutually reinforcing strategies of ensuring long term reliability of OWTS and protecting groundwater quality.

~~**Proposals for Alternative Systems**~~

~~Given the broad understanding and long history of reliable service from well-designed septic tank systems, they should remain the preferred system of waste water disposal for rural areas. However, proposals for commercial or residential alternative waste water systems may be considered when there is substantial scientific evidence that the proposed alternative system will be more effective on the site than a traditional septic system in removing contaminants from waste water. Additionally, all other public agency concerns regarding the proposal must be satisfied.~~
~~All proposals for alternative waste water systems must include a clearly defined program for maintenance and monitoring, and an assigned entity for all long term operational and financial responsibilities. Further, until all state regulations and litigation requirements are satisfied, alternative waste water systems for residential use will only be allowed on sites which can also accommodate a traditional septic system with a capacity adequate to serve the proposed development.~~

~~**Land Use Policies and Regulations to Remain Unchanged by use of alternative systems**~~

~~Alternative waste water system technology will continue to improve over time. Permitting approved alternative systems will allow county residents to take advantage of these alternatives where it can clearly be shown that such devices enhance groundwater protection efforts. However, permitting the use of alternative systems is not intended to be growth inducing. Neither does it provide for reinterpretation, modification, or exemption from of any of the County's land use designations or densities, or from County health and safety regulations. The County's fundamental growth management strategy, that urban development occur only inside cities and be served by municipal waste water systems, remains unchanged, as do allowable densities for rural unincorporated development.~~

Policies and Implementation

R-HS 40
Urban land uses shall be located only in cities and served by centralized ~~waste water~~wastewater treatment systems.

R-HS 41
To minimize the likelihood of surface or groundwater contamination, and to avoid the need for urban levels of services and infrastructure, allowable density of development in the rural unincorporated area will be maintained at very low density.

R-HS 42
All new ~~septic~~conventional onsite wastewater treatment systems shall be located only in areas where:
a. there is reasonable assurance that they will function effectively over a long period;
b. they can be designed to have a minimum negative impact on the environment; and
c. they will not contaminate wells, or surface and groundwater supplies.

R-HS 43
~~Septic~~No onsite wastewater treatment system, either conventional or alternative systems, shall ~~not~~ be allowed where site characteristics impede their operation, including:
a. high seasonal groundwater conditions;
b. soils with ~~waste water~~wastewater percolation rates ~~in excess of~~ less than one minute per inch or ~~less~~greater than 120 minutes per inch;
c. limited depth to bedrock; or
d. ~~gradients~~ slopes in excess of 20% without appropriate studies.

R-HS 44
Alternative ~~or specially engineered waste water~~ onsite wastewater treatment systems may be allowed for ~~commercial or industrial~~residential and non-residential uses appropriate for the rural areas, providing:
a. the County has approved a program and ordinances which ensures that the system's long term maintenance, operating, monitoring and ~~liability~~permitting costs are provided for by the owner of the ~~facility;~~ property;

b. the ~~proposed~~ system ~~has a track record of~~ is approved by the Department of Environmental Health demonstrating safe and effective long term operation ~~under conditions similar to those in Santa Clara County; ~~;

c. the ~~proposed~~ system includes adequate measures to prevent malfunction or environmental damage in the event of system or electrical failure, if dependent on electrical power supply for pumps or other equipment;

d. the system is appropriate to the site for which it is proposed;

e. the system is in compliance with all the other pertinent County policies and regulations~~; and f. with~~, as well as Regional Water Quality Control Board waste water discharge requirements~~.~~

~~***R-HS 45***~~

~~Alternative waste water treatment and disposal systems may be allowed for individual residential development only if: a. a traditional septic system adequate to serve the proposed development could be constructed, if needed; b. it can be shown that the alternative system will function more effectively than a septic tank system and be beneficial to the environment; c. the density of the proposed residential development is consistent with the density normally allowed within that property's General Plan land use designation; d. the proposed system has a track record of safe and effective long term operation under conditions similar to those in Santa Clara County; e. the proposed system is in compliance with all other pertinent County policies and regulations; f. the system is appropriate to the site for which it is proposed; g. the proposed system includes adequate measures to prevent environmental damage in the event of system failure, such as discharge of inadequately treated effluent to the land (e.g., surface, lakes, streams, etc.); h. the proposed system will operate in full compliance with Regional Water Quality Control Board waste water discharge requirements; and i. the County has approved a program which ensures that the system's long term maintenance, operating, monitoring and liability costs are provided for by the owner of the facility. Such a program may include, but is not limited to, recorded contractual obligations, permit fees or insurance policies; special permit conditions; and, performance bonds for system replacement.~~

; and,

f. the density or intensity of allowable use is otherwise consistent with the County's General Plan, Zoning Ordinance, and other applicable ordinances and development standards.

R-HS 45

On individual rural parcels where conventional onsite wastewater treatment systems have failed and cannot be replaced or repaired, alternative onsite wastewater treatment systems shall be choice of remedial technology, provided system standards can be met and required permits are obtained.

R-HS 46

~~Alternative waste water disposal systems intended to serve two or more residences may be allowed only if: a. they comply with all provisions of the preceding policy; and b. there exists an appropriate public entity which has agreed to, and is financially able to, assume full responsibility for the system's long term maintenance, operating, monitoring and liability costs.~~ ~~Implementation Recommendations~~

Conventional, alternative, or other engineered wastewater treatment systems shall not be allowed to serve two or more individual residential properties, except for those circumstances where they are determined to be the only possible solution to an area-wide pattern of onsite wastewater treatment system failures in an area of existing residences on existing legal parcels. In such circumstances, where an existing or expected public health emergency has been determined, and appropriate administrative procedures have been followed, the County may authorize the establishment of a community-serving conventional or other type of wastewater treatment system to remediate the area's pattern of system failure, provided that the use of individual onsite wastewater treatment systems have been evaluated and conclusively found to provide an insufficient remedy.

Implementation Recommendations

R-HS(i) 10

Periodically review land ~~subdivision~~ development and onsite wastewater treatment system ordinance and technical standards for ~~development~~ areas which must rely on ~~septic~~conventional or alternative onsite wastewater systems so as to ensure proper design and functioning, take advantage of improvements in technology and professional practices, to minimize potential for negative environmental impacts, and to maximize the useful life of such systems. (Implementors: County Department of Environmental Health and Department of Planning and Development)

R-HS(i) 11

~~Prevent over development of uses requiring septic systems in areas where groundwater quality has been so impacted as to pose a discernible threat to the long term integrity and safety of underground water supplies.~~Monitor and report the number of new alternative onsite wastewater systems permitted on a periodic basis as part of program implementation and ongoing evaluation of such technologies. . (Implementors: County Department of Environmental Health and Department of Planning and Development)

R-HS(i) 12

Encourage proper use and long term maintenance of ~~septic~~conventional and alternative onsite wastewater treatment systems through educational means and real estate transfer disclosure of property owner responsibilities, including publications and educational programs. (Implementors: County Department of Environmental Health, and Department of Planning and Development)

Strategy #2: Monitor Groundwater Quality

On-going programs to monitor groundwater quality will enhance the likelihood that contaminants will be identified before they enter the aquifers or before substantial damage to water quality ~~is incurred.~~has occurred. . Monitoring programs will also aid local agencies in identifying the source of contaminants and take the appropriate steps to mitigate them.

Long-term monitoring of groundwater quality will enable the County and other agencies to implement programs to protect and enhance water quality in areas threatened by pollution. Understanding the source or cause of water contamination may also enable officials to develop effective remediation ~~methods~~strategies to restore groundwater sources which have been compromised.

~~Whether they are intended to serve a single private residence, a community of homes, or a commercial venture, responsibility for maintaining, monitoring, and financing the operation of alternative waste water systems must be clearly assigned from the onset. Neither the County, the Santa Clara Valley Water District or the RWQCB are in a position to cover these costs.~~

~~**The Lessons of the Past**~~

~~A single home or business served by an alternative waste water system may seem to present a trivial threat to health and safety; however, that threat would be considerably magnified were large numbers of homes or businesses to occur throughout the rural area. In the past, the County has had unfortunate experiences with area-wide septic system failures in rural communities. These have proven to be costly and complex problems to resolve. Such experiences have prompted the County to move very cautiously on any unusual rural area development proposal which might recreate similar conditions in the future.~~

INTER-AGENCY COOPERATION

County staff has established positive working relationships with the staff of the Regional Water Quality Control Board, the Santa Clara Valley Water District, and local water suppliers. This spirit of cooperation makes the work of all these agencies more effective and more productive, thus serving the interests of all county residents. County staff should continue to look for opportunities to enhance these working relationships with the objectives of developing more consistent standards and regulations and ultimately maximizing the productivity of each agency.

Policies and Implementation

R-HS 47
The long-term viability and safety of surface and groundwater supplies countywide shall be protected from contamination to the highest degree feasible.

R-HS 48
To enhance the effectiveness of each agency's efforts to protect local surface and groundwater quality, the County should encourage cooperation between the regional and local water agencies~~.~~ , sharing of information, and appropriate ongoing water quality monitoring efforts.

~~**Implementation Recommendations**~~

Implementation Recommendations

R-HS(i) 13
~~Form an ad hoc task force with representatives from the appropriate~~ Collaborate among County departments and ~~other~~ state and local agencies to ~~review~~ensure current surface and groundwater

monitoring ~~requirements~~complies with applicable state laws and ~~procedures, and recommend actions for improved effectiveness.~~standards regarding onsite wastewater treatment systems, including AB885. (Implementors: County Dept. of Environmental Health, Dept. of Public Health, Regional Water Quality Control ~~Board, the~~Boards, Santa Clara Valley Water District~~, and other state and local water agencies~~)

R-HS(i) 14

~~The County should initiate efforts to coordinate the groundwater monitoring programs and in establishing consistency among their policies, regulations, standards, and enforcement procedures implemented by the local and regional water agencies. (Implementors: Regional Water Quality Control Board, the Santa Clara Valley Water District, and other state and local water agencies)~~

Maintain and enhance

~~***R-HS(i) 15***~~

~~Support~~ agency efforts to develop or convert to GIS digital format all data relating to soil and groundwater characteristics which ~~impact~~affect the ~~efficient~~ operation of ~~septic~~conventional or alternative onsite wastewater treatment systems. (Implementors: County Department of Environmental Health and Department of Planning and Development) ~~***R-HS (i)16*** Maintain low cost laboratory access for well water testing. (Implementors: County Department of Environmental Health)~~

R-HS (i)15 Offer low cost laboratory access for groundwater and well-water testing. (Implementors: County Public Health Laboratory)

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Note: the "sidebars" that follow containing more detailed explanatory information are those found on p. P-34 and pp. P-40-41 of the current section.

Conventional Onsite Wastewater Treatment Systems

The typical conventional onsite wastewater treatment system consists of a 1,500 gallon tank and a series of drain lines (leach lines). Sanitary wastes from a residence or other use drain into the tank, where solid material settles to the bottom, and other materials, such as grease or oils that are lighter than water, float to the surface. The mass of solids is retained and stored in the tank, where microbes decompose it and reduce its volume. The non-degradable residues that accumulate over time must be periodically removed by pumping, usually once every 3-5 years. The effluent drains through the outlet of the tank into the drain lines, where it undergoes further treatment by microbes and filtration as it percolates through the soil. The area occupied by the drain lines is also referred to as a leach field.

The drain lines are configured and constructed according to regulations and standards in a series of parallel lines down slope from the tank, making up the drain field. The actual length of drain lines, their depth, the amount of separation required between them, and the number of lines depends on the amount of wastewater generated by the use, the nature of the soils, and the slope of the land.

Each drain line consists of a level trench which is at 18-36 inches wide and 3-8 feet in depth. At least 12 inches of clean drain rock is placed in the bottom of the trench, and a 4 inch diameter perforated drain pipe is placed on top of the rock, with an additional 2 inches of drain rock added over the pipe. Filter fabric is placed over the rock and pipe assembly to prevent soil from clogging the rock or the trench bottom, and at least 12 inches of earthen fill is placed on top of the paper or fabric. There is flexibility in the design and configuration of a drainfield, given site-specific constraints and the technology and materials to be used.

When design specifications are met, the system should be capable of accommodating the maximum volumes of effluent expected to be generated from the residence or other land use, and the microorganisms in the leach field and soil should provide effective treatment and removal of wastes from the effluent.

The County maintains stringent standards for percolation rates and for all aspects of drain field design, construction and location on a building site in order to assure that (a) effluent is adequately treated; (b) that groundwater basins are not contaminated; (c) that the effluent does not contaminate the ground surface or surface waters; and that (d) effluent introduced into sloping areas does not result in slope instability or failure. Areas with high water tables, unsuitable percolation rates, or unstable geology are considered unsuitable for development with conventional onsite wastewater treatment systems, and permits are not granted for use of conventional onsite wastewater treatment systems under those conditions. However, such parcels may be able to utilize a form of alternative wastewater treatment technology. [see sidebar on Alternative OWTS]

For conventional systems, the County further requires that dual leaching systems be installed, each of which is 100% of the total size required to serve the use. A diversion valve is installed so that the flow of effluent may be directed from one field to the other. This allows each field to “rest” while the other field is in use. During this resting period, the microbes that tend to accumulate and clog the soil have time to decompose. The result is that the field recovers much of its ability to effectively treat and dispose of the effluent.

Proper care of conventional OWTS requires that (a) the leachfields are alternated annually to provide the proper “rest” period; (b) excessive water usage, such as that caused by interior plumbing leaks or excessive irrigation over the drain field, is avoided; and (c) that the septic tank is pumped every 3-5 years as needed. The sparing use of household chemicals and the installation of water saving devices, such as low flow shower heads and toilets, will also extend the life of the system, as well as improve performance.

In conclusion, adherence to County regulations and proper routine maintenance should ensure that conventional onsite wastewater treatment systems can continue to be relied upon to serve the wastewater disposal needs of most of the land uses allowed within the rural unincorporated areas.

Alternative Systems for Onsite Wastewater Disposal

Alternative onsite wastewater treatment systems include supplemental treatment systems and various types of dispersal methods used in place of or as a variation of a conventional gravity leaching trench located on a parcel. The most common types of supplemental treatment are intermittent and recirculating sand filters and various types of proprietary systems, including media filters and aerobic treatment units. Alternative dispersal methods include shallow pressure distribution trenches, mound systems, at-grade systems, raised sand beds, and subsurface drip dispersal. Compared to conventional on-site systems, alternative systems generally have additional mechanical and electrical equipment (such as pumps, blowers, timers, alarms, etc.), that increase the need for inspection and maintenance. Some, but not all, alternative systems can provide a means of reducing the total footprint of an on-site wastewater treatment system where suitable land area is a significant constraint.

The County's Onsite Wastewater Treatment Systems ordinance permits alternative systems authorized by the Director of Environmental Health for the repair or upgrading of any existing on-site system and for new construction on any legally created parcel where: (a) it is determined that sewage cannot be disposed of in a sanitary manner by a conventional septic tank–disposal field system; or (b) the Director determines that an alternative system would provide equal or greater protection to public health and the environment than a conventional septic tank-disposal field system. Types of alternative systems permitted are limited to those identified in the Onsite Systems Manual for which siting and design standards have been adopted. All alternative systems can only be installed by a contractor licensed by the State Contractors License Board qualified to install OWTS. Final approval of alternative system proposals are at the discretion of the Director in cases where a serious question is raised concerning public health hazards or water quality degradation which may result from the proposed installation. This allows the Director to exercise additional discretion on the side of caution in special cases.

Community Wastewater Treatment Systems

Another type of wastewater treatment system, more similar to a centralized sanitary sewage treatment facility, is a "Community Wastewater Treatment System." These are sometimes referred to as a "small engineered" waste water system or "package treatment plant," which is designed to serve larger groups of residences or non-residential uses, as opposed to an on-site system designed to serve a single residence or other non-residential use. Most "package treatment plants" are usually designed to handle more than 2,500 gallons of effluent per day (roughly equivalent to the output of five single family homes) and are considerably more costly and complex than the conventional or alternative onsite wastewater systems designed to serve an individual property. Due to their complexity, engineered or "package" systems are regulated by the State and may require oversight by a state-certified wastewater treatment facility operator.

Unlike large-scale, municipally operated sewage plants, engineered or "package" plants are typically privately financed and maintained through a form of special district, such as a community services district. They may also employ a range of water treatment technologies other than those normally found at municipal facilities. Unlike on-site septic systems, package treatment plants are directly regulated by the Regional Water Quality Control Boards, which issue waste discharge permits per state requirements (WDRs). In Santa Clara County, particularly for rural unincorporated areas, policies strictly limit the use of such package or engineered systems to situations remedying areawide failures of onsite wastewater treatment systems on existing residentially developed parcels, to ensure consistency with overall countywide land use and development policies. Otherwise, on a case-by-case basis, where all other land use and development policies are met, a non-residential use may be approved for utilization of a small engineered system, where conventional or alternative onsite systems are constrained or may not prove as effective or long-lasting as necessary.