COMMUNITY UTILITIES AND SERVICES

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WATER WORKS

EXISTING WATER WORKS

The Town of Waldoboro is situated at the outlet of the Medomak River along the Maine coast. The heavily built-up portion of Waldoboro known as the village is located at a point where the Medomak opens to a large tidal flat.

This built-up portion of Waldoboro is served by the Waldoboro Water Company, a private utility with a district office in Orono, Maine. The original water system was installed during the early 1900's, and it consisted of the basic distribution system and the west well situated off Friendship Street. The company, until 1965, also owned a sewerage system, a great deal of which was laid in the same trench as the water lines. The common trench method of water and sewer pipe construction used in the past is no longer considered good practice in view of the possibility of cross contamination resulting from pipe leaks.

The water system has been expanded from time to time to meet water demands. At present, the system serves the built-up portions of Waldoboro and the Sylvania Electric Products plant, each of which draws approximately half the daily flow. The total average daily water use is 275,000 gallons with the Sylvania Electric Corporation drawing about 140,000. A forecast of water usage by the Sylvania Company indicates that their requirements will increase approximately ten per cent each five years from approximately 29,700,000 gallons for 1965 to about 43,980,000 by 1986.

Sources

There are eight sources of water, of which six are considered reliable from a quantity standpoint. The existing sources are noted below.

Four drilled wells, each with piston force pumps are situated within a distance of approximately 300 yards on high ground off Friendship Street opposite the Sylvania Electric Products Corporation plant. Only three of these wells are in use since one has a yield too low to be of any value as a reliable source. The active wells are 56 feet, 80 feet and 230 feet deep, and the safe daily yields are 16,000 gallons, 5,000 gallons and 10,000 gallons, respectively. These three pumps push water directly into the distribution system, which has an open end up hill from these three wells. This open end pipe determines the maximum head which can be maintained.

A gravel packed well and pump on the West Waldoboro Road adds 32,000 gallons to the system daily. An abandoned quarry hole east of Upper Depot Street provides a significant source of water. According to the water company, this quarry stores approximately 12.5 million gallons of good quality water. Two augmentary sources have been added and can be made tributary to the quarry upon demand. These two sources involve a small stream north of the quarry reservoir and Kalers Pond. Kalers Pond discharges to a small brook which leads to a small dam in the vicinity of Winslow Mills. A 4-inch temporary pipe leads from this dam to a second man-made pond east of Upper Depot Street and approximately 1500 feet north of the quarry. The water from the manmade impoundment is pumped to a series of ditches situated above the

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quarry. The water flows into the quarry from the trenches for storage and use in the system. The trenches serve as settling basins to hold the water in order to enhance settlement of the floc during treatment for color removal. The floc is formed by adding a special chemical and its purpose is to remove color from the water which enters the man-made pond from the small tributary north of the quarry. The water company has collected several samples from Kaler's Pond, as well as from the other water sources and reports the quality from all sources is good, except for the occasional color problem from the tributary to the man-made pond, which usually occurs during the fall.

Treatment

The water which enters the system does not receive complete treatment. Treatment for color is administered during the fall when the tributary north of the quarry is flowing into the man-made reservoir. Chlorination facilities exist at all pumping stations. Fluoridation is not presently administered to the system.

Distribution System

The distribution system consists of wrought, cast iron and cement asbestos pipe ranging from 1 1/2 inches to 6 inches in diameter. Approximately 17,300 feet of 6 inch, 600 feet of 4 inch, 630 feet of 2 inch and 450 feet of 1 1/2 inch pipe, representing a total length of about 3 1/2 miles, make up the distribution system. The majority of these pipes is inadequate in size according to today's standards for fire fighting. The system includes 25 strategically located hydrants for which the town pays a hydrant rental fee to the water company. Water connection service is about 95% metered and billing is on a quarterly basis with a present minimum charge of $9.00 for 1600 cubic feet.

Seven dead-end lines exist, of which four are considered inefficient enough to warrant correction. In many instances dead-end lines cannot easily be avoided due to terrain or economic considerations of service. The four dead-ends in need of elimination are on Main Street, Church Street, Marble Avenue and Pine Street. It is recognized that any private water company has a responsibility to provide its users with reasonable and safe water service. And it should also be recognized that this service must be paid for by the users in reasonable charges to support its operation, maintenance, investment return and programmed development costs. Dead-ends, undersized pipes, uncompleted loops and new water source development are basic items which should receive attention and improvement in Waldoboro. These items should be worked into a programmed improvement schedule on a priority basis covering several years.

A 398,000 gallon reservoir situated off Friendship Street is connected to the system, providing storage necessary for fire fighting and pressure stability. In addition, the Sylvania Electric Corporation stores approximately 150,000 gallons of water at its plant which, it is understood, can be tapped in case of an emergency. Standby power at the Sylvania company exists to pump this water into the system.

Conclusions

1. The Waldoboro Water Works Company makes water service available to all homes and other establishments in the built-up portion of Waldoboro.
2. Expansion of the water system has not kept pace with existing water demands. It is apparent that the system cannot provide additional water of a significant amount without further development of a water source and means of conveyance to the system.

3. Distribution system pipelines are undersized according to present day standards. However, loop completion and gradual addition of other key lines can greatly improve the system's water carrying capability, especially during peak demand periods.

4. Certain dead-ends exist which should be eliminated by completing connections to form loops.

5. Water and sewer lines were constructed in a common trench by the Waldoboro Water Company. This concept of design is poor from a sanitary standpoint and has been discontinued in recent years.

6. The system appears to receive proper operational and maintenance attention.

PROPOSED WATER WORKS

This report on proposed improvements will attempt to show two basic concepts. The first will involve certain needed line extensions and loop enclosures pertaining to the existing distribution system, and the second involves outer areas which could be served with new systems in the future. The main purpose of the latter concept is to point out that certain rural areas might be served when the population growth creates a practical need.

Ideally, the $2,000.00 to $5,000.00 which an individual home owner invests in the development of a drilled well should go toward the financing of a new central water system, but this does not usually occur. The home owner cannot live without water until a sufficient number of homes have been constructed in his area to warrant a water line extension or a new system. Consequently large sums of money are spent for private systems in which the owner, after incurring the debt, desires to realize a return for his investment.

Because the developed water resources of the water company are currently meeting little more than the daily water demands imposed by residents and industry it is obvious that additional sources must be located, developed, and connected to the system. The gradual population increase of the town, which is certain to be reflected in the village, plus the anticipated increase in water use by the Sylvania Company, indicate the need for development of additional water sources. Coupled with the gradual population and industrial increase is the added demand imposed by water using appliances such as automatic dishwashers, garbage grinders, coolers and automatic washing machines. Based on a predicted 32% population increase in the town from 1965 to 1985 and a total of 47% increase in water needs by the Sylvania Company, the consultant estimated that approximately 440,000 gallons of water per day will be needed by 1985. This daily volume includes a 15% contingency entered to offset any unknown demands. Storage will be needed for 1,000,000 gallons to provide adequate volume for fire protection.
Proposed Modifications to Distribution System

Certain deficiencies exist in the present distribution system. These basic deficiencies are quite obvious since they involve undersized pipes and uncompleted loops. A detailed engineering investigation would be necessary to determine other deficiencies of the system.

The first priority of water line modification should involve the 1,800 feet of 6, 4 and 2 1/4-inch water pipe on Main Street. A new 8-inch line should be installed parallel to the existing pipe, and the hydrants should be converted to feed from this new line. House connections to the existing 6-inch could remain undisturbed, but those connected to the 4 and 2 1/4-inch line should be disconnected and attached to the new 8-inch main to improve water flow into these homes. The advantage of an 8-inch line on Main Street is that a greater quantity of water would be available at the service connection, during periods of peak demand. The static pressure at the upper end of the 2 1/4-inch line is only about 20 psi. This pressure is not adequate to provide needed fire fighting flows especially with the present sized pipe, but with an 8-inch line a greater flow of water could be drawn from the system in case of a fire. A valve should be installed in the 8-inch line at a point approximately 600 feet downhill and west of the "Y" formed by Washington Road and Upper Main Street. The purpose of the valve would be to permit conversion of the upper 600 feet of line to a future high level system in order to increase water pressure for that area. Also, the valve would serve as a connecting link to the high level system should increased pressure and flow be needed in the existing low level system.

Another section of pipe should be installed in the unserved section of Damariscotta Road between the Medomak River and West Waldoboro Road. This section is 1,000 feet long and the new pipe should be 8 or 10 inches in diameter. It represents an important connecting link in the grid system not only to improve water pressure during peak use west of the Medomak River, but to serve as a second means of water service should a break occur in the existing 6-inch line.

A new 8-inch line eventually should be installed on Damariscotta Road between Pine and Friendship Streets, continuing along Friendship Street to the 8-inch line from the reservoir. This section of pipe represents 1,900 feet which should be installed parallel with the existing 6-inch pipe. This improvement is desirable from a fire protection standpoint and, if constructed, would improve pressure and flows particularly to the higher elevation areas during the peak demand period.

The Church Street loop should be completed with 850 feet of new 8-inch pipe. Approximately 200 feet would replace existing 4-inch pipe which is not considered adequate for fire flows.

The next recommended improvement involves approximately 1,800 feet of 8-inch pipe to complete the loop from Pine Street to West Waldoboro Road. This is a low priority item, and its construction date will be determined by demand and development in that area. The important consideration is that the loop should be connected back to the system, and at least 8-inch diameter pipe should be used.

About 2,000 feet of 8-inch line should eventually be installed from the existing pumping station on the West Waldoboro Road, in a southerly direction. This would be the extent of
service in a southerly direction on that road with the present gravity system. From that point further south, either a booster pump or separate system would be necessary to provide service due to the higher elevation.

The map entitled "Existing and Future Water Service Areas" represents long range recommendations for future service areas. The various service areas are shown to indicate where further development might be provided with water service from a central system.

A high level system could be established to serve the area northeast of Waldoboro village. This would require a storage tank on top of Willett Hill, probably at the north end, and a water source sufficient to supply that area. A second system of this nature should be connected to the existing system as an emergency or auxiliary supply. A vast area representing approximately 2,300 acres plus extensions on routes 200, 235, Feyler's Corner Road and Castner Road could be served by a high level system in that vicinity.

Another high level system could be installed on the West Waldoboro Road. It would either involve a booster pump drawing from the existing system or a separate water source. A likely location for a storage tank would be Benner Hill. Extension of service to the Winslow Mills area could be made from the existing system, but before any major expansion of service can occur, additional water sources must be located and developed.

The map does not represent an engineering study, but could serve as a basis for preliminary engineering. In the case of Waldoboro, the water company is a private corporation, and any expansion would be accomplished by that company without the benefit of federal grants.

Recommendations

1. The Planning Board should meet with the water company to discuss certain distribution system deficiencies which are discussed in this study.

2. The Planning Board should meet with officials of the water company to advise them of apparent present and future water demands. The Planning Board should be advised of the company's plans for development of additional water which is considered to be a prime matter for action.

3. The Planning Board should keep the water company aware of planned or anticipated residential and industrial development so that central water service can be provided where feasible.

4. New construction of water lines should be installed in separate trenches; complete trench separation of water and sewers must be maintained to provide the highest standard of sanitation.

5. Eight-inch diameter water lines should be a minimum diameter pipe except where short loops of less than 600 feet are involved.
SEWERAGE

EXISTING SYSTEM

Approximately forty years ago the Waldoboro Water Company constructed a limited sewerage system on the east side of the Medomak River. The system is not adequate according to present day design standards. The lack of manholes for maintenance, undersized pipes and the direct discharge of raw sewage to the Medomak River are serious deficiencies in the system which exists today in the Waldoboro village area. Time, experience and research in public health, and general public education in improved sanitation and control of disease are contributing reasons why laws have been enacted to encourage, guide and enforce pollution control efforts in every state in the nation.

The discharge of raw sewage to our streams, lakes and ocean shores is unhealthy, undignified and uneconomical. Man is a carrier of disease, and because of the diversity and vast number of people who contribute waste material to sewage, disease causing organisms are presumed to be present in all sewage.

A serious setback in income to about 200 families occurred a few years ago when state and federal authorities closed the clam flats north of Waltz and Hoffse Points on the estuary. Based on past income normally obtained in this area by people who went clamming in these flats, it was estimated that a loss of approximately $50,000 now occurs annually.

Recognizing the seriousness of water pollution, its adverse economic impact on Waldoboro, and in keeping with state and federal policy of encouraging pollution abatement through local community action, the selectmen of Waldoboro, early in 1963, engaged the engineering firm of Edward C. Jordan Co., Inc. of Portland, Maine to provide a preliminary engineering study on needed sewerage and sewage treatment.

On July 1, 1963, the Town of Waldoboro voted favorably to authorize the legal establishment of the Waldoboro Sewer District, a separate entity to act in matters regarding sewerage and sewage treatment. Positive legislation and town sanction of the district formation thereby authorized a borrowing capacity of $100,000 for sewage works construction. This limit was subsequently amended by legislative action (Chapter 213, Private and Special Laws of First Special Session, January, 1964) raising borrowing capacity to $250,000.

The present status regarding construction of the proposed sewage works is as follows: Construction drawings and specifications have been prepared and approved by the local authorities, State of Maine Water Improvement Commission, and the Federal Water Pollution Control Administration. The State has allocated a 30 percent grant based on eligible portions of the system, and the Federal Water Pollution Control Administration has also made a grant offer to the town based on 30 percent of the eligible portions of the proposed system. It is anticipated that an additional grant will be made in the near future through the Economic Development Act which will raise the total federal aid to about 50 percent of the project costs. Combined state and federal aid would then amount to 63 percent of the total project costs. Arrangements have been made for a loan to provide the local share of the costs. All land, easements and rights of way have been obtained and the existing sewerage system has been purchased from the private water company.
The sewage works proposed by the engineer includes a high degree of treatment. It is an aeration system, and if properly operated should provide satisfactory treatment of the sewage. Construction of the proposed sewage works will provide the means for treating wastes which are presently responsible for closing off part of the estuary from clamming operations and swimming.

It should be recognized that the waters of the Medomak River have been classified by the State of Maine establishing the quality of water which is to be maintained. The degree of treatment which has been proposed is quite sufficient to meet existing classification requirements.

The designed sewage works will intercept other pollution sources, within the built-up area of Waldoboro, which discharge to tributaries or directly to the Medomak River. However, pollution which originates outside the district limits will not be intercepted by the proposed system. These outer areas do not warrant sewerage at this time in view of their remoteness to the village.

The Winslow Mills area is not served by a municipal or otherwise central water supply system. The area is also unsewered and domestic wastes are leached into the soil. One industry discharges a treated waste to the Medomak; however, the degree of treatment and whether it is compatible with the present stream classification is not known by the consultant. This matter at Winslow Mills, together with any other industrial discharges to the streams in Waldoboro should be reviewed by the selectmen and state sanitary engineers to insure that adequate treatment of sewage and industrial wastes is provided in all cases.

Conclusions

1. The existing sewage system is inadequate because of undersized sewer pipes, lack of man holes, limited sewer service to the village and the absence of treatment.

2. Considerable time, effort and money has already been spent in the planning, organization, design, financing and development of a pollution abatement program for Waldoboro. Execution of this project will rid the entire area of the most significant sources of pollution.

3. The scope of the proposed sewerage system and degree of treatment is in accord with present day thinking in water quality management.

4. Due to the relative remoteness of the Waldoboro Sewer District with regard to other heavily built-up areas, the consultant considers that the present one plant-one municipality concept is a reasonable approach for Waldoboro.
PROPOSED SEWAGE WORKS

Proposed sewerage and sewage treatment facilities have been designed for Waldoboro by
the Edward C. Jordan Company from Portland, Maine. Grants for this project have been ap-
proved and contracts are being signed for beginning construction in the summer of 1967. This
engineering report indicates additional portions of the town which might be served and added
to the system in construction stages. The map entitled "Proposed Sewage Works" shows the
initial and future construction recommended by the engineers. Distances are approximate and
are limited usually by terrain characteristics.

The design flow of the proposed sewage treatment works is 0.2 million gallons per day
according to the engineering report. The present daily flow is approximately 135,000 gallons,
based on known water use. Therefore, a growth factor of about one-third has been provided.
This extra capacity of 65,000 gallons is based on an estimated 50 to 75 gallon per capita per
day, and would appear to enable an additional 870 to 1,300 persons to be served before plant
modification would theoretically be necessary. Of course any significant industrial waste
volumes would decrease this additional domestic service potential by the extent of the particu-
lar waste.

The proposed sewage treatment plant site is relatively close to the village center. This
means that special diligence on the part of the operator will be necessary to insure that odors
are controlled. The plant is an aeration type facility and therefore more favorable from an
odor standpoint since properly controlled aerobic decomposition does not produce offensive
odors. The engineers propose a full time superintendent to operate the plant. This is good
advice and should be followed. Satisfactory operation and plant maintenance are basic items
which must receive regular attention so that the full benefits of a water pollution control faci-

ilty can be realized. As additional sewers are constructed, thus adding more sewage to the
treatment works, and eventually surpassing the design flow, the plant will require additional
units. It is anticipated that when stage 5 and 6 are contemplated for construction, the plant
will have surpassed its present design capacity and require expansion. Stages 3 and 4 will
add considerable sewage to the plant and will serve a great deal of the presently unbuilt area
which is suitable for residential or industrial development.

The construction of sewage works facilities in Waldoboro will permit the gradual re-
clamation and re-use of the clam flats.

Following are specific items which should be brought to the attention of the Sewer
District Commission as this major water pollution control facility is constructed and operated.

1. Storm drainage, storm sewers, roof drainage or any other type of surface water
device should not be connected to the sanitary sewerage system. Water of the
type mentioned does not normally require treatment and if conveyed to the treat-
ment facility, valuable plant capacity would be lost.

2. A full time plant operator should be maintained at the treatment works. The oper-
ator should, aside from performance of normal operating procedures, conduct a
constant maintenance program involving equipment, buildings and grounds. Many
times a community's investment is abnormally depreciated because of the lack of a
few thousand dollars for necessary annual maintenance.

3. Any sewer extensions should be at least 8 inches in diameter laid at a grade greater than 0.4 foot drop per 100 horizontal feet. House connections, where installed new, should be 6-inch diameter pipe, and major facilities such as schools or large industries should be served with 8-inch diameter service lines.

4. A policy should be established with regard to the receipt of septic tank sludge. The sewage treatment plant operator is certain to receive requests for discharge of this material into the plant. Septic tank sludge is not compatible with the designed aeration type plant. Consequently, this strong waste should either be buried, or discharged into the sewage treatment plant headworks at a slow rate (say 10 gallons per minute) to avoid an operational and plant effluent quality upset.

5. A daily log should be maintained by the plant operator. This log will serve as a permanent record of daily operational occurrences, test results and special or unusual incidents.

6. Lastly, after the plan has operated for six months, the Planning Board and Board of Sewer Commissioners should request the state and federal governments to make a detailed investigation of the water quality in the tidal estuary with periodic monitoring so that re-opening of the clam flats can occur at the earliest possible safe date.

REFUSE DISPOSAL

Adequate refuse disposal is a municipal responsibility. Due to a rapidly expanding economy, continued population rise and the increased use of expendable cartons and merchandise, large volumes of trash and garbage are produced which must be disposed of properly. Certain industrial solid wastes must be burned under supervision and consequently a safe place is required for this purpose. An open dump is a nuisance to maintain, harbors and serves as a breeding place for flies, rats and other vermin, may be a health hazard and can seriously pollute land and surface water.

There are three basic means of refuse disposal commonly practiced in the United States. They are the open dump, incineration and the sanitary landfill.

The open dump method is practiced in Waldoboro. It is the most common type of refuse disposal in the country, largely because it is simple and inexpensive to operate. However, it is also the least desirable of all the disposal methods. Burning is a common occurrence at almost all open dumps. Unless an attendant is on duty, the burning at an open dump may be uncontrolled and is apt to be dangerous from a forest fire standpoint.

Incineration is a satisfactory means of refuse disposal provided it is operated properly and located in a remote area on the leeward side of the heavily built-up portion of town. This method functions best where a waste load from a population of at least 20,000 people exists. Initial capital outlay and constant operator attention cause this type of facility to be
a relatively expensive operation. Also, if not operated satisfactorily, obnoxious odors may be produced and a fly ash problem can occur. A small landfill operation must be operated in conjunction with the incinerator to bury ashes and rubble. The consultant will not recommend the incinerator type of refuse disposal for Waldoboro in view of the high capital and operational costs and due to the small population of Waldoboro.

The sanitary landfill method of refuse disposal is common throughout the country. It is considered to be a reasonably economical, safe and suitable means of disposing of the solid waste material of a community. Rats, flies and other scavengers are discouraged from the site through the operation technique which involves controlled dumping, spreading, compaction, and soil cover. The incidence of fires will be kept to a minimum, and when a neat site appearance is maintained, people instinctively cooperate by dumping at the appropriate places. Adequate refuse disposal must be provided just as roads, schools and welfare are needed and accepted. The sanitary landfill method of refuse disposal which uses soil to conceal the undesirable features of rubbish is recommended by the consultant as the most satisfactory means of controlling and managing the refuse in Waldoboro.

EXISTING REFUSE DISPOSAL

The present means of refuse disposal is by open dump. This dump is situated about three quarters of a mile east of the center of the village on Upper Main Street (old U.S. Rt. 1) near the railroad. The location of this dump is excellent from two basic standpoints; it is east of the main populace and therefore prevailing westerly winds carry smoke away from the village; and it is close to the heavily populated village as well as being near the geographic center of the town.

The dump is unattended and is always open to the public during normal operating conditions. During dry weather when the forest fire danger rating is high, an attendant is stationed at the dump to control and/or report any dangerous spread of fire. During this fire danger period the dump has to be closed during the hours when an attendant is not present. Burning at the Waldoboro dump is common and necessary. Certain industrial waste products placed at the dump must be burned under supervision due to the highly combustible nature of the material.

Sea gulls visit the dump site frequently. These bold birds explore the dump for food, further spreading the garbage and trash over a relatively large area. It is true that these large birds consume a significant portion of the garbage, but they also tend to be carriers of disease wherever they go, be it to a surface water supply or a beach.

The existing dump is covered once or twice a week with fill which has to be hauled in from approximately 1 1/2 miles. This is an inconvenient procedure, but an important one. The dump must receive a face lifting periodically to eliminate undesirable features of decaying open garbage, excessive number of flies and the presence of other scavengers.

The dump site is owned by the town, and represents approximately four and a half acres. A small stream flows along the east side of this facility and the railroad forms the west boundary. It is not known whether the drainage from the dump is detrimental to the small nearby stream. The dump, by virtue of its closeness to the stream, and because the content of the waste material disposed at this refuse point is unknown and could be poisonous or toxic, does present a potential source of pollution. Proof of pollution on a routine check basis would
be difficult to obtain since the majority of the waste material is absorbed by the soil or it evaporates, leaving a solid waste.

Although there are many characteristics concerning this open dump which do not meet text-book or ideal conditions, it does have certain desirable features which should be recognized. Following are certain favorable aspects of the existing dump:

1. Its location is ideal serving the greatest number of residents from a relatively short distance (0.75 mile).

2. Prevailing winds carry the smoke away from the heavily built-up sections of town.

3. By virtue of its existence, the people of Waldoboro have a common refuse disposal point where all of their solid waste items can be placed. Without this dump, back-yard and indiscriminate dumping would occur which would not only clutter the countryside but would produce a health problem.

4. The dump is reasonably well masked from the general view of townspeople.

The consultant does not consider the dump situation critical to the point that it should be immediately abandoned and a sanitary landfill established. But the town should work toward the eventual operation and maintenance of a sanitary landfill operation. The present dump site is estimated to last an additional three years. As this site is used up, a new site should be located, purchased, developed, and the sanitary landfill method of refuse management established.

PROPOSED REFUSE DISPOSAL

The main intent of this section of the report is to set forth considerations which will be encountered when a sanitary landfill operation is installed. The open burning dump located on the east side of the compact area will need to be relocated in the near future. Detailed standards should be carefully studied in order to determine the best location for this essential town function. A specific site is not suggested at this time because considerable time will have to be spent before a decision can be made. Consideration should also be given to the possibility of a cooperative refuse disposal involving one or more adjacent towns.

The consultant will not attempt to select a specific site; rather, a guide to the site selection, establishment, and operation is presented. Site selection is a local matter, and the process is more efficiently performed when carried out by local officials. Sites for operation are sometimes difficult to establish due to the scarcity of available land and to general public opposition. A properly operated landfill, which should incidentally be situated at least a 1,000 feet from habitation unless some other positive natural terrain barrier exists, can be maintained in a manner which will not be offensive to area residents.

People may object to a landfill operation or access road being near their property because of the debris which is apt to be blown from trash trucks. Two basic operational procedures are therefore recognized as necessary to make the landfill method acceptable. Supervised and controlled operation at the refuse site; and strict cover discipline of trash
enroute to the refuse point. The refuse disposal area has to be located within the town unless a contract for out-of-town disposal is entered into with a bordering town. Those who live near the access road have every right to demand a certain diligence on the part of the townspeople to maintain a clean access route. If the route to the landfill becomes cluttered with papers or other items of trash, it should be the town's responsibility to pick up this blown trash. A few fines imposed on owners of vehicles which spread this trash might help to curtail the incidence of blowing trash.

The main purpose of establishing a sanitary landfill as a means of refuse disposal is to improve the health and welfare of the town's citizens and visitors by controlling the spread of disease and to reduce land, water and air pollution.

There are many factors to consider in selecting a suitable site for refuse disposal. Following are important points of consideration together with a brief explanation for each item.

Topography

The topography will determine the type of landfill to be developed as well as the equipment for operation. A hilly area will require a small or medium sized track-type vehicle with a blade because soil moving distance will be minimal. However, a flat area which incidentally lends itself to efficient landfill operation, would require at least a medium sized tractor with a front end spreader, possibly including jaws. A jaw blade is ideal but not absolutely necessary. Swampland, unless extremely remote, has many undesirable aspects; the most significant is water pollution. A dragline or clamshell is necessary for proper landfill operation in these areas and is of course a relatively expensive type of equipment. At least five feet of soil should exist over the bedrock or hardpan strata to insure that a reasonable operation can be maintained.

Size

A five-year design period is a minimum length of service which should be considered when purchasing land for a sanitary landfill. A longer design life is desirable due to the general difficulty encountered in selecting, buying and developing a site. It is commonly accepted, at least with large efficient landfill operations, that a served population of 10,000 requires a minimum of one acre of land area per year. However, this consultant feels that one acre per year per 2,500 population is a more realistic ratio in this part of the country where population densities are not sufficiently high to warrant the scrupulous operation and layout necessary for a 1 to 10,000 ratio.

On the consultant's basis of 1 acre per 2,500 population, approximately 7 acres would be needed as a minimum purchase on a five year program. However, the consultant recommends that at least 15 to 20 acres be purchased, as a practical matter, and more if possible since a refuse point will always be needed by the municipality and due to the general difficulty of obtaining a site. Known water supply areas should not be encroached upon by a landfill operation. The consultant suggests that a distance of at least 1,000 feet exist between the landfill and any water supply if preliminary geological investigation does not reveal any water bearing soil or underground stream connection.
Haul Distance

Haul distance is important to the people who use the landfill facility. If residents are required to travel great distances, generally over five miles, they will tend to seek other means to dispose of their rubbish. Sometimes these "other means" are nearby water courses, shoulders of public roads, dumps in nearby communities or at private open dumps. Ideally the dump site should be situated on the perimeter of the main population center of town, as is the present arrangement in Waldoboro. Since this is not always feasible or possible, some reasonably close but protected area should be selected which has good all-season access from a well maintained road. Ideally, the majority of townspeople should not be required to travel over 3 miles to the refuse disposal site.

Site and Operational Costs

Land costs continue to rise at an increasing rate in nearly all of the populated areas of the country. That is why the abandoned gravel or borrow pit is often the least expensive site to purchase. An inexpensive site, however, may require construction of an expensive access road and consequently offset any cost advantage. However, construction of an access road, although costly, may be a welcome solution to what can be a frustrating experience in site selection and purchase. Operational costs vary with the efficiency and size of the operation. In Waldoboro, where the population is relatively small, the annual operating cost could run as high as $2.00 to $3.00 per person.

Cover

Cover material should be compactable soil with an adequate amount available at the site. Ideally the soil should include a moderate amount of clay. Other soils are used in landfill operations, but certain of these, such as sand and silt, do not have the tight compactive properties necessary to abate fly propagation. Fly eggs can hatch in fill and emerge five feet through loose sandy soil. Hence, the importance and need for proper soil and adequate compaction are recognized. Reasonable success in fly and rat control can be obtained with daily coverage and compaction with almost any type soil. Silty soils tend to be blown by winds and may produce a dust problem should homes be situated nearby. Water should be available to wet down the site in order to control blowing soil.

Refuse Collection

Rubbish collection is usually considered an asset to a community. It cuts down the individual traffic to and from the refuse point and lessens the spread of rubbish at the site. It keeps citizens from being exposed to a disease laden area and consequently may enhance the overall health of the community. Trash collection drivers learn the habits of landfill operation and therefore augment the operation by adherence to landfill rules. The total number of operating days per week can usually be reduced when the majority of the residents receive collection service. However, there will always be people who desire to carry their own trash to the dump site, and therefore the landfill must be kept open a reasonable number of hours each week. Charges per family for this service by private collectors costs about $.50 per week per family, and collection is weekly.
Site Location

Rarely is the ideal landfill site located for community use. Important considerations include a site located for a good all-season access from a well-maintained route, situated reasonably close to the central region of town. If possible it should be located on the leeward side of the town's heavily built-up areas. The site should be remote from residences since burning of certain highly combustible material will occur regularly. Landfill operations require strict compliance to established rules in order to function in a manner which will not be offensive.

The possibility of a joint landfill operation with bordering towns should be considered when the landfill method is adopted. A cooperative venture could be economically favorable with the possible side effect of a more satisfactorily operated facility. The refuse point might therefore be situated in another town, which might be advantageous if a local site was impossible or too expensive to obtain.

Operational Considerations

A sanitary landfill operation, to be successful, should be guided by the following general rules of operation:

1. A snow fence, or other similar type fence should surround the working area. This provision will help keep blowing papers from escaping to nearby private property, will remind people of the site limits, and will add to the appearance of the area.

2. An attendant should remain at the site during the open hours. He should also serve as tractor operator when cover and compaction are required at the end of the day.

3. The landfill should be open at least on Monday, Wednesday, Friday and Saturday. However, experience and demand will help determine which days it should be kept open.

4. Each day's rubbish should be covered with six to eight inches of compacted soil to discourage fly and animal attraction to the garbage. After a complete trench or section has been filled, a two-foot layer of soil should be placed and compacted to thoroughly seal the cell. A site layout plan should be kept up to date as the operation progresses.

5. A small shed should be provided to house equipment and provide shelter for the attendant during severe inclement weather.

6. It is desirable to include water service to the landfill site as an added means of fire and dust control. Compaction is also enhanced when water is used with the soil. In many instances municipal water service is not available; however, even a small private supply would be beneficial for extinguishing small fires, controlling dust and for other operational needs.
7. Special dumping areas should be designated by signs to control specific types of refuse dumping. For instance, tree stumps and old lumber should be maintained at one location for it may be necessary to burn them; old refrigerators, car bodies and similar items should be dumped at another separate point at the site; stones, waste soil, old plaster and concrete materials should also be placed at a separate point; and general household trash and garbage should be directed to the main fill and compaction area. Poisons and harmful chemicals should be disposed of in accordance with the State Water Improvement Commission recommendations and should not be received at the landfill site on a regular basis. Dead animals can be buried at the landfill if sufficient land area exists. However, any extra work required by the operator should be paid for by the person responsible for the waste. Segregation of the waste should be encouraged; however, it should be administered with a common sense attitude and should not cause undue or meticulous refuse separation at the site.

8. Out-of-town residents should not be accommodated unless they are temporarily renting or living within the town. Unless the operator knows everyone in town, some means of easy identification should be provided. However, in a community the size of Waldoboro, the right to the use of the site would not appear to be a problem.

9. The active dumping point at the landfill should be restricted to a trench or marked area 20 or 30 feet in width to minimize the effort of cover and compaction. Signs and fences help direct people to the correct disposal point.

10. A slope of at least 0.5% (6 inch drop per 100 feet horizontal distance) should be maintained on the driving area to enhance drainage and to reduce the mud problem where vehicular travel occurs.

11. The general public should not be allowed to rummage the area for salvage material. This tends to become a nuisance and hindrance to normal landfill operation and may result in injuries from hazardous material. Occasionally, however, the salvage privilege is granted to the operator as a job incentive.

12. The area should be planned, mapped and staked out to insure that maximum use will be made of the available land.

Conclusions

1. The existing open dump is generally unsatisfactory from a health, water pollution and aesthetic standpoint.

2. Rats, flies, sea gulls and other vermin tend to thrive on the garbage which is discarded at the dump.

3. The existing dump is reasonably well isolated from surrounding trees because of the railroad, brook, upper Main Street access road and a swampy area.

4. The existing dump is relatively inexpensive to operate.
5. The dump is well located with respect to the majority of the town's population.

6. The dump site represents a relatively small area of only 4 to 5 acres. It is estimated that 3 years of use remain at this site.

Recommendations

The consultant submits the following recommendations regarding refuse disposal for Waldoboro. It is hereby recommended:

1. That the existing dump site and manner of operation be continued until the present site is exhausted, estimated to last 3 more years.

2. That the sanitary landfill concept of refuse disposal be adopted when the present site is no longer useful.

3. That the Selectmen and Planning Board select one or two suitable sites and seek voter approval for the purchase of one for the purpose of a future landfill operation. Considerations for site selection are included in this report.

4. That immediately after a new landfill facility is in operation extermination of rats and other vermin at the municipal dump site be carried out. The discontinued dump should receive two feet of fill over the active area after extermination to further guard against animal infiltration. A rugged metal sign reading "DO NOT DUMP HERE, per order of the Selectmen of Waldoboro", should be installed at the old site to discourage continued dumping.

5. That operation of the new landfill include an attendant to be present during the open hours to enforce regulations and to maintain the grounds.