

SECTION 8
SEWAGE AND WASTE DISPOSAL

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SECTION 8

SEWAGE AND WASTE DISPOSAL

801 PROVISION OF SEWERAGE FACILITIES

801.1 General

- a) Every building intended for human habitation, or in which human beings are to be employed shall be designed to provide for a sewerage system of drainage to a septic tank or more efficient treatment facility of a design to be approved by the Ministry of Health.
- b) The developer must provide a system or systems to fully satisfy the need for sewage collection, treatment and disposal of effluent and sludge. The system(s) proposed must direct special attention to the use of topography, the layout of the development, roadways, and the location of treatment plants and outfalls. Sewage flows of 80% of the average daily water consumption rates given in Section 7 should be provided for.
- c) **Sewage and liquid waste disposal facilities shall be designed and constructed in accordance with the Water and Sewerage Regulations and with the Public Health (Sewage and Disposal of Liquid Industrial Waste Works) Regulations.**

802 NEEDS OF TOTAL DEVELOPMENT

Where the development is phased, the system proposed for sewage and waste water disposal must address the needs of the total development to ensure an orderly solution to those problems.

803 DEVELOPER TO MEET TOTAL COST OF THE WORK

The total cost of the work associated with the development of the sewerage system shall be payable by the developer.

804 ENVIRONMENTAL FACTORS

- (a) All systems shall be located and constructed so that with proper maintenance the systems will function in a sanitary manner, do not create sanitary nuisance or health hazards and do not endanger the safety and water quality of fresh ground water lens or domestic water supply.
- (b) Arrangements for the management and treatment of sewage and waste water shall take into account the topographical

conditions, environmental factors, the proposed use of the land inside and outside of the development, and the relative locations of the sea, surface waters and ground water sources.

- (c) **The use of effluent for any purpose must be approved by the Ministry of Health.**

805 PERCOLATION TESTS

- a) Percolation tests shall be carried out if required by the Authority whenever it is planned to use absorption pits or septic tanks with soakaways or land drains to dispose of the sewage. The approval of the Authority for the use of such systems will depend on the percolation rates found. Percolation criteria for soakaways are given in Table F-3 of Section F of the Building Guidelines.
- b) The percolation criteria to be used in determining whether soakaways can be efficient in a given area must be based on the rate of absorption of liquid waste and the area of the absorption surface. In general, soils with absorption rates of less than 1" in 30 minutes are unsuitable for soakaways.

806 CONSULTATION PRIOR TO SUBMISSION

Plans for the treatment system proposed be developed in consultation with the Ministry of Health and the Director prior to formal submission of the plans for approval.

807 EMERGENCY POWER FACILITIES

Subject to the provision of the Electricity Ordinance in force and unless specifically exempted by the Authority, all treatment plant and pumping stations shall be provided with an alternate source of electricity to allow continuity of operation during power failure.

808 EFFLUENT QUALITY

The quality of the effluent after treatment shall satisfy the following criteria of the Ministry of Health.

809 RE-USE OF THE EFFLUENT

- a) Treatment of the effluent from an activated sludge plant or from an intermittent sand filter with the appropriate chlorine dosage will reduce the B.O.D to reasonably acceptable proportions for disposal into tile drains, for re-use in gardens or

water closets or for disposal into a properly designed sea outfall depending the policy of the Government

- b) The re-use of effluent offers significant advantages where conservation of water is important. However such effluent must be treated to reduce both suspended solids and the B.coli bacteria to an acceptable standard.
- c) **The Ministry of Health must approve the plans for re-use of effluent.**

810

CHOICE OF TREATMENT SYSTEM

- a) The choice of an appropriate sewage system for a building or group of buildings depends on the amount of sewage to be treated and the economics of the treatment process. The Ministry of Health and the Water and Sewerage Authority must approve the choice of the sewage system proposed by the applicant.
- b) It can be seen from Table 8-1 that for large systems and where there are no special requirements such as disposal of hazardous substances, nuclear waste and the like, the **conventional activated sludge treatment** preceded and followed by plain sedimentation will provide a significant reduction in B.O.D., suspended solids and B. coli.
- c) **Intermittent sand filtration** will yield slightly better results. About 98% of the B.Coli bacteria is removed along with 90% to 95% of the suspended solids.
- d) **Chlorination of raw sewage** does not remove suspended solids but removes 90% to 95% of B.coli bacteria.
- e) The use of **chemical precipitation** (mixing chemicals such as ferric chloride with the sewage) removes 70% to 90% of the suspended solids and 40% to 80% of the B.coli bacteria.
- f) **Settling tanks** required to accommodate the sewage from developments with flows of more than one million gallons per day (more than 15,000 persons) would have to be about 12,000 cubic feet and about 1,500 square feet for a retention period of 2 hours and an overflow rate of 800 gallons per sq.ft. per day. Design information for such systems is available in manufacturer's manuals.
- g) The capacity of **sand filters** for treating the discharge of septic tanks which would collect household waste is estimated at 50,000 gallons per acre. For a population of 20,000 the area of the sand filter would be about 20 - 30 acres depending on the calculated daily sewage flow.

Table 8-1

Approximate Efficiencies of Sewage Systems and Plants*

Treatment, operation or process	Percent removal		
	B.O.D.	Suspended solids	B. coli, (coliform)
Fine screening	5 - 10	2 - 20	10 - 20
Chlorination of raw or settled sewage	15 - 30	-	90 - 95
Plain sedimentation	25 - 40	40 - 70	25 - 75
High rate trickling filtration preceded and followed by plain sedimentation	65 - 95	65 - 92	80 - 85
Low-rate trickling sedimentation preceded and followed by plain sedimentation	80 - 95	70 - 92	90 - 95
Conventional activated sludge treatment preceded and followed by plain sedimentation	75 - 95	85 - 95	90 - 98
Intermittent sand filtration	90 - 95	85 - 95	95 - 98
Chlorination of biologically treated sewage	-	-	98 - 99

* From Data Book for Civil Engineers, Third Edition - Elwyn E. Seelye

811 SEWAGE TREATMENT PLANTS

811.1 General Requirements

- a) The design and construction of all treatment plans including package plants and septic tanks and disposal facilities shall be in accordance with the Public Health Regulations and with the Water and Sewerage Authority Regulations.
- b) Complete data on the proposed treatment system must accompany all applications including:
 - (i) Engineer's Report
 - (ii) Prints of drawings
 - (iii) Specifications of equipment
 - (iv) Data sheet giving full details of design loading ie: flows, hydraulic loading and organic loading.
 - (v) Maintenance schedule.
 - (vi) Method of disposal of effluent

- b) Facilities should be provided for the removal of grit and debris prior to the influent entering a pumping station or treatment plant. All pumps should be equipped with strainers capable of removing solids greater than provided for in the design of downstream processes.
- c) The plant as designed must be capable of treating sewage to produce an effluent to the standards required by the Ministry of Health
- d) Sewage may be discharged into a septic tank linked with a biological filter or with land drains or soakaway pit provided that:
 - i) If the system is connected to a proprietary tank or disposal system discharging an effluent approved by the Ministry of Health such effluent may be discharged directly from such tank or system and recycled for use as approved by the Ministry of Health.
 - ii) If the system is connected to a septic tank the effluent must be discharged into land drains or soakaway pits constructed in accordance with the requirements of the Ministry of Health.
- e) **Construction of cess pits may not be approved by the Ministry of Health.**

811.2

Approval of Plans

Detailed plans and technical data will be reviewed by the Ministry of Health. Approval of the Authority for the installation of the sewage treatment system will be given only if all of the technical data supplied by the owner is satisfactory, and if satisfactory arrangements have been made for the maintenance and repair of the system. The Authority shall require that stand-by systems for major components such as power plant be supplied and maintained.