

CHAPTER 8

PRINCIPLES AND FUNCTIONS OF SEWERAGE AND DRAINAGE

Sewerage recorded history dates back nearly 3,000 years to Babylonian times in the seventh century before Christ. A large sewer constructed to drain the public square of an ancient town, is still in use today. In all modern cities it represents one of the major expenditures of public funds. In discussing the subject of city sewerage is undertaken two general aspects are of importance, namely.

PUBLIC HEALTH ASPECT OF SEWERAGE

The excreta of man constitutes one of the original vehicles of infection. It follows, therefore, that the proper collection and the safe disposal of this waste are essential to the protection of public health sewage contains not only human excreta but an almost infinite variety of waste materials, ranging in quality from inert and harmless to toxic, noxious and infectious. Fresh sewage is relatively free of odor and is light gray in color. Stale sewage, or sewage in which dissolved oxygen has been exhausted, is offensive and ranges in colour from dark gray to black. All sewage, regardless of its origin and whether it be fresh or stale is a potential hazard to public health and to individual as well as community comfort and well being. As such, it must be removed promptly from all premises in which it originates and must be disposed of a manner which is both safe and complete.

WASTE POLLUTION

According to the rapid growth of Bangkok-Thonburi at the present time. It is obviously predicted that the one of the most important problems for this metropolitan area is sewerage and drainage problem after the expansion of the water distribution system to service the entire population has been made, the establishment of sanitary sewage system must be built immediately in order to treat a high discharge of waste water from buildings water sewage. If sewers carried both domestic sewage and storm runoff and discharge into Chao Phraya River without treatment. In the future Chao Phraya River has soon to become nuisance with odor and manaces to public health. We do not have "The pollution Control Commission" to consider the characters and quantities of the waste discharge and their probable effect on beneficial uses of the receiving water. As a guide in determining such a requirement for waste water discharges, the water quality objectives and minimum treatment required must be prepared by the ¹Pollution Control Council, Pacific Northwest Area summarized as follows:-

¹Brown and Cald Well, Metropolitan Seattle Sewerage and Drainage Survey 1956-1958 (Washington: Brown and Cald Well, 1958), p. 205.

1. The minimum treatment requirement for domestic sewage is primary treatment.

2. No sewage or industrial waste shall be discharged into any of the waters of the state that will cause:-

a. Reduction of the dissolved oxygen content to less than five parts per million (5 ppm).

b. Hydrogen-ion concentration (p^H) to be outside of the range of 6.5 to 8.5.

c. Liberation of dissolved gasses, such as carbon dioxide and hydrogen sulphide or any other gases, in insufficient quantities to be harmful to fishes or related forms.

d. Development of fungi or other growth detrimental to stream systems, fishes and related forms, or to health, recreation or industry.

e. Toxic conditions that are deleterious to fishes and related forms or affect the potability of drinking water.

f. Formation of organic or inorganic deposits detrimental to fishes and related forms, or to health, recreation or industry.

g. Discoloration, turbidity, scum, oily slick, floating solids, or the coating of aquatic life with oily films.

h. Temperature to be raised above the range of tolerance of fishes and related forms.

3. In those waters which are used or are reasonably suitable for use as drinking water supplies, shellfish

culture, recreation involving bodily contact with water, or in other instances where water use presents a definite public health hazard by presence of potential presence of disease producing organisms, the bacteriological content of a representative number of samples shall not show the presence of coliform organisms in excess of the following:

Domestic water supply (without treatment other than disinfection and removal of naturally present impurities)
 50 per 100 ml.

Domestic water supply (with treatment equal to coagulation, sedimentation, filtration, disinfection and any necessary additional treatment). 2,000 per 100 ml.

Shellfish culture (median value) 70 per 100 ml.

Recreation involving bodily contact with water
 240 per 100 ml.

SEPERATE VERSUS COMBINED COLLECTION SYSTEMS

The area primarily selected for sewerage and drainage systems in Bangkok recommend to be a separate system. The reasons can be summarized as follows:-

1. In Bangkok-Thonburi metropolitan area, the heavy rainfall of rainy season only. If the combined sewer system will be planned for this area, it is obvious that wet weather flow to dry weather flow will be 150 to 1. consequently the all sewers must have a very large cross-sectional area. Furthermore the cost of construction, maintenances and operations will be prohibitive.

2. The under ground water level is very high if large sewers are used in the system the infiltration will be the factor of objectionable.

3. In engineering standpoints, the construction of sewers in Bangkok-Thonburi metropolitan area has been pointed out in impractically.

4. The existing sewer system can be improved and used as storm sewer. If the separate sewer system is planned, the total cost of construction can be reduced, and it is expected the lower cost will be 30 percents.

5. If separate system is adopted again the total cost will be reduced according to the utilizing of klongs as main drain for storm water.

6. The existing sewers are too small and not sufficient for combined sewer system because the construction and designed do not apply to the engineering principle and it is impossible to improve, system of existing sewers at the present, the direction of flow direct to klongs.

7. Operation cost for combined system would be higher because of many appurtenances and various kinds of manholes.