include considerable Federal aid. A Government publication [4] attributes to storm sewer construction about 10 percent of the length of all pipe used for sewers. Since the pipe sizes required for storm sewers are usually larger than the sizes required for sanitary sewers, the costs of constructing storm sewers is greater than for sanitary sewers. Although available statistical information is not complete, analysis of Government reports [5] shows that capital outlays by all units of local government in the United States for all types of sewerage, including sewage treatment plants, are expended. Seventy-three percent by cities and 27 percent by all other units of local government.

State and local governments and agencies also expend a large amount of funds in urban and rural areas for drainage facilities required for arterial streets and highways. The funds for such construction, however, are usually obtained from highway appropriations and, therefore, are considered to be a part of the cost of highway and street construction, rather than a cost of sewer construction. Approximately 7½ percent of such capital expenditures is attributed to drainage requirements other than bridges.[6] These will be State, county, and city expenditures provided largely from State and Federal highway funds, supplemented with local government funds.

Local governments and agencies also expend funds for the construction of airport drainage facilities. Although such expenditures are appreciable, such drainage facilities are generally provided by funds appropriated for airport construction, or are provided by revenues from airport operations. Therefore, these are not considered here as a part of storm sewer expenditures.

2. SOURCES OF FINANCING

Federal aid grant assistance has certainly been a substantial source of funds in the financing of urban storm sewers. However, the bulk of the funds has been from local sources. Such local financing has been accomplished, primarily, through tax exempt municipal bonds, special assessments, and appropriations from general tax resources. Therefore, the sufficiency of available funds from each of these sources in a specific local governmental unit is not only dependent upon the tax rate but also upon the level of assessment of property within the jurisdictional boundaries. Government publications report that about 45 percent of all municipal revenue in the United States is obtained from property taxes.

Responses from 627 units of local government regarding the financing of capital storm sewer improvement reveal that the major financing sources are as indicated in table VI. Although this table shows the number and percentage of respondent agencies which use the specified methods of financing, this is not necessarily an indication of the dollar amounts provided from these sources. It is improbable that the larger areawide projects are financed through appropriations from the general tax fund; such projects would most often be dependent upon

[4] U.S. Business and Defense Services Administration. "Regional Requirements for Sewer Pipe in Sewerage utilities," prepared by K. L. Kollar and A. F. Volonte. Government Printing Office, Washington, D.C. 20402, February 1966. 20 pp.

[5] U.S. Bureau of the Census. "Government Finances in 1963-64." Government Printing Office, Washington, D.C. 20402, 1965. 58 pages. Series G-GF 64, No. 1.

[6] Herr, Lester A. "The Place of Hydraulics in Highway Engineering"; presented at the Fifth Annual Highway and Street Conference, Stillwater, Okla., Feb. 22-24, 1966. 13 pages. Apply to: Author, Chief, Hydraulics Branch, U.S. Bureau of Public Roads, Washington, D.C.