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Abstract

ASSESSMENT OF URBAN COMBINED SEWER
OVERFLOW SYSTEM IN MACAO PENINSULA

by

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At present, the problem associated with the existing foul carrier system arises during high tide and storm conditions. When the sea level is high, runoff is prevented from discharging via the storm outfalls. This results in backing up of the combined sewer overflow (CSO) system and inundation of the foul carrier system. During storm and high tide conditions, it is believed that the foul carrier system is conveying a significant amount of storm water and seawater to the Macao Waste Water Treatment Plant (MWWTP). This is evident from the large existing rising main, observed inside the wet well of the existing pumping station. Its size appears much larger than would be required for intercepted dry weather flow alone. On the other hand, part of the municipal wastewater collected by the combined sewers is being discharged to the estuary prior to treatment under dry weather.

This thesis is to investigate the current situation of urban sewer system in Macao including separate and combined pipe sewer systems as well as sewer pump stations around the shoreline of the peninsula and to propose some strategic ideas to improve the situation. Deficiencies of the overflow system of combine sewer pipe networks in the peninsula have been observed through analysis of operation of the sewer pump stations, which include: direct discharge of municipal wastewater into the sea at some outfalls in Inner Harbor; tidal backflow occurring in Inner Harbor due to high tides; and the Macao wastewater treatment plant being overloaded due to storm water intrusion to the combined sewer system. It has been found that the high tide backflow of sea water may cause more serious problem than the storm water intrusion.

To overcome the deficiencies of urban combined sewer system of Macao peninsula, the so-called dynamic or real time control strategy has been recommended, and further rehabilitation of existing combined sewer system should be carried out.