

Study on design of storm water infiltration facility (infiltration facility at Chiba city)

Whole term

1997.12-1998.3

(Purpose)

In urban areas the progression of urbanization is often accompanied by emergence of new problems such as increased runoff volume and shorter traveling time at the drainage basin owing to the increase in impervious areas (e.g., roofs and paved roads). Recently, the North drainage district No.1 in Chiba City is often flooded because of these problems.

During the rainy season, the Watauchi Pond in Chiba Park suffers from severe water pollution as it receives overflow from the district having combined sewer system.

The objective of this research is to investigate the contribution of the infiltration facilities to reduction in runoff volume in this district of about 140 ha.

To begin with, a map showing suitable locations for infiltration facilities was prepared following “The technical manual for rainwater infiltration facility (Feb 1997)”. The evaluation of the effect of infiltration facilities in storm water runoff reduction followed the estimation of design infiltration volume.

(Result)

1. Baseline data compilation

The detailed storm water drainage plan and existing drainage capacity of the North drainage district No.1 were outlined in a report comprising of some figures and tables.

2. Pinpointing appropriate locations for infiltration facilities

Data about geographical characteristics, geological conditions and groundwater levels at this district was collected. Maps showing the geographical characteristics, the geological formation of the area, and the ground water levels were obtained. A map showing suitable locations for infiltration facilities was prepared based on the aforementioned information. The selected locations were each then ranked, in view of their suitability, on a scale of 0-5.

3. Evaluation of the capacity of each infiltration facility

The ranking of the infiltration facilities was performed according to their capacities based on the actual infiltration tests conducted at Roppou District in 1995 and 1996.

4. Standards for installation of infiltration facilities

Standards for installing infiltration inlets were established.

5. Estimation of number of infiltration units

The required number of infiltration facilities and their infiltration capacity were calculated.

6. Calculation of total storm water runoff volume

The amount of storm water runoff was calculated by using the modified RRL method.

7. Evaluation of storm water runoff reduction effect

Installation of infiltration facilities appeared to bring about several improvements. It was estimated that installation of the infiltration facilities would realize 20% reduction in maximum volume of runoff. A corresponding reduction in the runoff coefficient from 0.7 to 0.6 would be achieved. Fifty overflow events would be controlled during the recent 31 years and critical rainfall intensity will be enhanced from 25 mm/hr to 30 mm/hr thanks to infiltration.

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Keywords

Storm water infiltration facilities, map showing appropriate points for infiltration, Modified RRL method