

Study on improvement project of storm water infiltration facilities in the Kosei treatment district, Otsu city

Whole term

2006.9 ~ 2007.3

(Purpose)

The area suitable to stormwater infiltration in urban areas has been descending with redevelopments of a city center and urbanizations to a suburb in recent years. As a result, in the case of concentrated heavy rain, "Urban inundations" often occur. Previously, countermeasures which include storage pipes and an enhancement of pumping stations were selected. The purpose of countermeasures is speedy stormwater clearance. Countermeasures should be boosted up. Therefore, stormwater storage and infiltration technologies come under the spotlight.

These storm water runoff control measures are effective for pollutant load reduction from non-point source. Additionally, we expect an effect to groundwater recharge and alleviation of heat-island phenomenon. Otsu city government had studied about infiltration potential and introduction effects in Otsu treatment district from 2004 to 2006. The purpose of the study is clarifying advantages of infiltration facilities introduction, exploring potential of stormwater infiltration diffusion project in Kosei treatment district. In addition, the issues were studied along a workflow shown in Figure 1.

(Results)

The results of infiltration effects are shown below.

(1) Outline study on effects of infiltration facilities

I Decreasing effect with infiltration facilities

- With infiltration inlet, a potential of stormwater discharging was elevated by 0.2 mm / h in whole treatment area.
- With both infiltration inlet and trench, a potential was elevated by 1.7 mm / h in whole treatment area.

II Runoff coefficient

- A increment of conversion runoff coefficient with infiltration facilities in whole treatment area was estimated to 0.01 - 0.03.

III Rain intensity

- A increment of conversion rain intensity was estimated to 1.0 - 2.4 mm / h

IV Runoff volume reduction effect

- Peak runoff volume was decreasing from 2.65 m³ / s to 2.52 m³ / s in model treatment area.
- Whole runoff volume was decreasing from 16,214 m³ to 13,272 m³, and infiltration volume was 2,942 m³.

(2) Annual water balance in Kosei treatment are

I Natural infiltration volume will have been decreasing before and since.

II The volume of groundwater has been decreasing by comparison with a volume of the past. However, the decreasing ratio was only 5 % (1,075 x 10³ m³ / y). it could not have large effects on the water balance.

III Without infiltration facilities, a volume of groundwater in the future will have been decreasing by 1,995 x 10³ m³ / y by comparison with past volume, by 920 x 10³ m³ / y by comparison with present. The shrinkage won't have large effect on groundwater.

IV If impermeable areas will scale up, groundwater volume can be kept with infiltration facilities.

(3) Infiltration facilities improvement project in the representative area

We hope runoff control effect with infiltration facilities, but suitable area for infiltration is small.

(4) Need inspection

Some area has need for infiltration facilities, but suitable area in project approvals is relatively small. Therefore, the effect of runoff control should be studied in advance.

(5) The future

Kosei treatment areas don't always have to introduce infiltration facilities, because the effect of runoff control is not large. A few Part of area has large runoff coefficient, it is important to examine an application of infiltration facilities depending on the situation.

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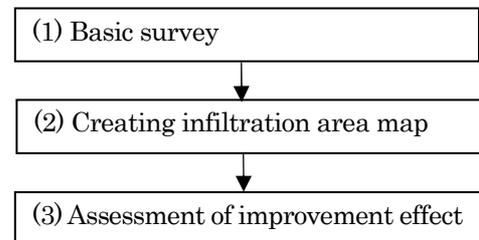


Figure 1 Study workflow

Key words

Stormwater infiltration, Infiltration suitable area map