

## A Case Study of Rainfall Derived Inflow/Infiltration in a Separate Sewer System in Gwangju, Korea

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**Abstract :** The separate sewer system is that collects the wastewater as a sewer pipe and rainfall as a stormwater pipe separately, and then sewage is treated in the wastewater treatment plant, the stormwater is discharged to rivers or lakes through stormwater drainage pipes. Unfortunately, even for separate sewer systems, it is not possible to prevent Rainfall Driven Inflow/Infiltration(RDII) completely to the sewer pipe. Even if the sewerage line is renovated, there is an ineluctable RDII due to the combined sewer system in the house or the difficulty of sewage maintenance in private areas. The basic statistical analysis was performed using environmental data including rainfall, sewage, water qualities and groundwater level in the strict of Gwangju in South Korea. During rainfall in the target area, RDII showed an increased rate of 13.4 ~ 53.0% compared to that of a clear day and showed a rapid hydrograph response of 0.3 ~ 3.0 hr. As a result of water quality analysis, BOD5 concentration decreased by 17.3 % and salinity concentration decreased by 8.8 % at the representative spot in the project area compared to the sunny day during rainfall. In contrast to the seasonal fluctuation range of 0.38 m ~ 0.55 m in groundwater in Gwangju area and 0.58 m ~ 0.78 m in monthly fluctuation range, while the difference between groundwater level and the depth of sewer pipe laying was 2.70 m on average, which is larger than the range of fluctuation. Comprehensively, it can be concluded that the increasing of flowrate at sewer line is due to not infiltration water caused by groundwater level rise, construction failure, cracking due to joint failure or conduit deterioration, rainfall was directly inflowed into the sewer line rapidly. Acknowledgements: This work was supported by the 'Climate Technology Development and Application' research project (#K07731) through a grant provided by GIST in 2017.

**Keywords :** ground water, rainfall, rainfall driven inflow/infiltration, separate sewer system

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