Environmental Research, Technology Demonstration and Conference Project

ECF Project:	ECF 2021-119
Project Title:	Climate-resilient planning and design for coastal stormwater drainage systems
Principal Investigator:	Dr Wang Shuo, Department of Land Surveying and Geo-Informatics, The Hong Kong Polytechnic University
Total Approved Grant:	$490,600
Duration:	1/7/2022 to 30/6/2024
Project Status/Remarks:	On-going
Project Scope:	Extreme rainfall, storm surges, and local sea levels are the most dominant factors that affect the design of coastal stormwater drainage systems. According to long-term observations in Hong Kong, extreme rainfall and typhoon-induced storm surges are becoming more frequent and local sea level is rising under a warming climate. Therefore, this project aims to construct the dependence structure of extreme rainfall, storm surges, and local sea levels using vine copulas and to develop a joint projection of extreme rainfall and sea-level changes under different climate change scenarios, using a novel ensemble machine learning framework and hydroclimatic modelling techniques. The outcomes of this project will enable design considerations of rainfall and sea level due to climate change. The projection of rainfall increase percentage and sea level rise will provide reference to the respective design rainfall intensities/synthetic rainstorm profiles and design extreme sea levels in Hong Kong. Quantifying the interacting effects of extreme rainfall increase, storm surge intensification, and sea level rise will help relevant government departments to examine the adequacy of existing drainage systems in the context of climate change and to develop climate-resilient design standards and guidelines.
Summary of the Findings/Outcomes:	To be available upon completion of the project