Environmental Research, Technology Demonstration and Conference Project

ECF Project:	ECF 2021-156
Project Title:	Feasibility study of using microbially stabilised dredged marine clay as fill materials for sustainable land reclamation in Hong Kong
Principal Investigator:	Dr Kwok Chung Yee Fiona, Department of Civil Engineering, The University of Hong Kong
Total Approved Grant:	$500,000
Duration:	28/12/2022 to 27/12/2024
Project Status/Remarks:	On-going
Project Scope:	Dredged marine clay is a significant source of solid wastes in Hong Kong and is normally dumped in open water which is costly and environmentally unfriendly. Exploring the reusability of the dredged marine clay is meaningful in two aspects, minimising the need of dumping and meanwhile relieving the fill materials shortage situation for large scale reclamation. In this proposal, the feasibility of using stabilised dredged marine clay as fill materials for sustainable reclamation will be thoroughly explored. A new microbially induced struvite precipitation (MISP) method will be adopted, instead of cement, to stabilise the dredged marine clay, which has low carbon emission and is non-energy intensive. The aim is to obtain optimum design mixes, considering the bacterial density, cementation solution concentration, curing duration and medium by carrying out a series of uniaxial compression tests; then oedometer and triaxial tests will be conducted to characterise the compression and shearing behaviour of the stabilised marine clay at the optimum mixes; finally, an examination of microstructure characteristics of the stabilised marine clay will be performed to identify those microscopic parameters of the struvite that govern the macro physical and mechanical responses of the stabilised marine clay.
Summary of the Findings/Outcomes:	To be available upon completion of the project