UNIVERSITY OF CAMBRIDGE
Department of Engineering

CONSTRUCTION ENGINEERING MASTERS DISSERTATION ABSTRACT

Exploring the role of ground investigation in managing ground risk on infrastructure projects

The management of ground risk is an essential component for the successful delivery of any major construction project. This is of particular importance for infrastructure projects - which are typically long, linear schemes by definition where geotechnical work typically occurs relatively early in the project timeline. Ground investigation is commonly used to qualify the potential risks and determine location-specific conditions for efficient design. Recommendations related to the implementation of ground investigation have been made in the literature; however, the extent to which these are followed at a project level is not well understood.

To explore this, a case-study approach was adopted to investigate two highways schemes, completed during the last ten years within the UK. A mixed-methods approach was used to examine the rationale behind the ground risk management approach adopted, in particular focussing on the timing, scope and adequacy of the ground investigation. This firstly involved surveying those involved from the Client, Contractor and Designer. This was followed by a series of semi-structured interviews with selected individuals to explore trends identified from the survey responses. The findings of the surveys and interviews were used to develop case studies for the projects, allowing key themes to be
identified.

Both case study projects demonstrated that a phased approach to the ground investigation allowed for areas of residually high ground risk to be identified and further targeted. Although both schemes were successfully delivered, the quality of the investigation, access constraints and external pressures impacted the efficiency of the groundwork that was carried out. Unexpected ground conditions and ground behaviour identified during construction was partially attributed to a lack of appropriate ground investigation information. Continuity of key personnel was noted to impact the delivery of the scheme.

The findings of this research have indicated that a phased approach to ground investigation is commonly undertaken. Completing the main ground investigation within the preliminary design phase can allow for this information to be used fully integrated into the design. Undertaking ground investigation during the construction phase was required due to project constraints; however, it is believed that this was agreed as part of the risk management approach to the project. The exploratory nature of this research has also identified a number of other areas that can be explored to better understand the role of ground investigation for construction projects.

Claire Bennett

October 2021