**APPLICATION OF SHALLOW SHEAR-WAVE REFLECTION PROFILING FOR GEOTECHNICAL INVESTIGATIONS: A CASE STUDY**

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Prior to the submission of a construction tender, a geophysical scope was undertaken over a floodplain. The construction tender addresses the construction of a road viaduct over the floodplain. From a prior geotechnical borehole drilling campaign, a variable bedrock profile with sediment depths of up to ~70m was identified. Within this sediment profile were various stiff sediment lenses which is potentially conducive to alternate pile design which would have implications for the construction design and cost.

The conforming tender scope prescribed explosive source, compressional wave (P-wave) seismic reflection. Given the floodplain setting, it was anticipated that a shallow water table resulting in a high (~1500 m/s) P-wave velocity for the saturated sediments would have resulted in little meaningful velocity information for the sediments. Additionally, the P-wave ground roll for shallower sections of the investigation would have possibly obscured meaningful reflections. Furthermore, there was possible value in resolving sediment structure in this geological setting. With these factors considered, GBG proposed an alternative vibration seismic source. Subsequently, GBG trialled both explosive source and a vibration source, in a Shear-Wave (S-wave) configuration.

The trial results showed the S-wave vibration source was effective in resolving the bedrock as well as sediment lenses. Also, due to the higher frequency S-wave waveforms, the resolution of sediment reflectors was improved. The trial enabled refinement of collection parameters which optimised the final application as well as allowed for efficiencies in collection time frames.

In addition to meaningful reflectors derived from the results, S-wave interval velocities were derived from the S-wave refractors. Furthermore, Multi-Channel Analysis of Surface Waves (MASW) soundings were conducted over existing borehole locations. Borehole data was overlaid onto the sections, as well as Standard Penetration Test (SPT) results. The combined datasets showed good correlation.