



Seismic surveys on a proposed sewer main route at Goulds Lagoon, Granton

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A series of seismic refraction surveys was conducted along the route of a proposed sewer main around Goulds Lagoon at Granton (519650 mE, 5265100 mN). A twelve-geophone array with two metre geophone spacing was utilised with shotpoints at either end. The results obtained are summarised in Table 1.

Velocities less than 1000 m/sec usually indicate soil-like materials which should be excavated without difficulty using a backhoe. Some trench instability problems might be expected in these materials.

Velocities between 1000 and 1300 m/sec usually indicate extremely weathered rock or weakly lithified sediments. Trench excavations should be achieved using a backhoe. Stability of the trenches should be good overall, but problems may locally arise.

Highly weathered rock and some lithified sediments produce velocities in the range 1300 to 1800 m/sec. These materials might be excavated with difficulty using a backhoe. An excavator might be more productive. Trenches should be reasonably stable.

Velocities between 1800 and 2300 m/sec usually indicate moderately weathered rock which can usually be excavated using an excavator, sometimes requiring the aid of a rock ripper attachment. Planes of weakness which dip into the trenches may cause problems in these materials.

Materials with seismic velocities in excess of 2300 m/sec commonly require the use of rock breakers, rippers and often blasting.

The survey between manholes G and I did not follow the line indicated on the supplied plans, but ran parallel to the property boundary between the house nearest the lagoon and its neighbour. Here, traverse 4 encountered materials significantly different to those interpreted from the contiguous traverse 5. Valley-fill materials (soil materials, traverse 4) are interpreted to be plastered against the *in situ* weathered rock (EW-HW material in traverse 5). Trench stability in the transitional zone between these two materials might be very doubtful.

It is considered that little further useful information would be gained from drilling a series of boreholes.

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Table 1
Results of seismic refraction survey, Goulds Lagoon sewer main route, Granton

Traverse	Nearest manhole	Velocity (m/sec)	Depth (m)	Material	Nearest manhole	Velocity (m/sec)	Depth (m)	Material
1	C	500	1.4	Soil	D	400	1.3	Soil
		770	7.2	Soil like		670	6	Soil like
		2000		SW-MW rock		2000		SW-MW rock
2	D	530	2.4	Soil	E	500	1.5	Soil
		1470	6.3	HW rock		1050	5.5	EW-HW rock
		2000		SW-MW rock		2000		SW-MW rock
3	A	500	1	Soil	B	400	1.1	Soil
		1410	6.3	HW rock		1330	4.8	HW rock
		4000		FR rock		4000		FR rock
4	G	340	5.9	Soil		480	7.8	Soil
		2000		SW-MW rock		2000		SW-MW rock
5		670	1.1	Soil	I	570	1.5	Soil
		1000	8.1	EW-HW rock		1230	7.4	EW-HW rock
		2000		SW-MW rock		2000		SW-MW rock

