Method Statement

The project comprises the installation of the water intake for a water source heat pump system made up of 3 main components - a protective rock gabion, two pipes to and from the gabion, and a submersible pump within the gabion to supply the water onshore.

Gabion:

Construction of a PVC-coated stainless steel gabion filled with gabion stone to house and protect a submersible electric pump. The modular gabion will be delivered in flat-pack form and installed on site immediately above MLWS (Coordinate 1 above). The gabion will be approximately 1m3, and be anchored to the rock on the foreshore to keep it in place in adverse sea conditions through four reinforced bars if required (25 mm diameter 1 meter long). Holes in the rock will be drilled to a depth of 300 mm to host the bars (using a cordless SDS drill and 32 mm diameter drill bit), which will be held in place with fast-curing marine-grade resin (Sika Anchorfix 2+).

Pipes:

Two 75 mm OD HDPE pipes will be installed along the foreshore from the property to the gabion. Between MHWS and the gabion the pipes will either be buried (where possible) or held in place with marine-grade resin anchors and marine-grade fixing band. The detail of these components is provided in the supporting information document. The frequency of the fixings will be determined by the stability of the rock on the foreshore but every 2-5m is anticipated. For the estimate of deposits in the inter-tidal zone, the maximum expected density of 2m is used.

The bedrock will be manually exposed using spades and shovels to create a trench for burial of the pipe along the approximately 30 m distance. Once the bedrock has been exposed within a depth of 300 mm while still ensuring a constant downward gradient from the land to the gabion, the holes for the resin anchors will be drilled using a cordless SDS drill. Holes for the resin anchors will be 160 mm deep with a 200 mm M8 316 stainless steel threaded bar installed in the resin. The resin will be Sika Anchorfix 2+ suitable for these environments and with a quick curing time. Coated stainless steel banding with M8 holes will hold down the pipes with stainless steel nuts used to hold them in place. Following fixing, the pipes will then be covered over with the excavated material and compacted where possible.

If the bedrock is not exposed within a depth of 300 mm, wooden stakes will be driven into the ground and the stainless-steel banding fixed to these at this depth below the ground surface, before being covered over again with the excavated material.

A 51mm ID PVC water delivery hose will be installed within one of the 75 mm OD HDPE pipes and connected to the pump in the gabion at one end, and the SeaWarm heat exchanger on shore (to deliver the water). The second HDPE pipe will be used to protect the wire-armoured electric cable used to power the submersible pump. Upon installation, the electrical cable will be pulled through the HDPE pipe from the pump to a weatherproof electrical connection onshore. This will enable the pump to be changed without disturbing the fixed pipes if necessary in the future. The water outflow pipe will not be below MHWS and is not included in this application.

Pump:

A submersible pump will be installed within the centre of the gabion and powered by the electrical cable. Standard connections will connect the pump to supply the water. The specified pump is a Walrus PW400AR Seawater pump.

The work will be carried out at low tide to ensure ease of installation and safety of access to the location. It is anticipated that the work will be carried out over multiple tides to provide sufficient curing time.

Deposits continued...

Glass-fibre reinforced bar	25 mm diameter	4 x 1 m length
Stainless steel banding	25 mm wide	20x 250 mm length (number depending on number of fixings required based on rock condition)
316 stainless steel nuts	M8 nuts for stainless steel anchors	40 (based on number of fixings required/rock conditions)