**HOLISTIC METHOD STATEMENT FOR 'STRUCTURAL REHABILATION FOR STONE MASONRY INTERMIEDIATE PIERS OF A711-TONGLAND BRIDGE:**

Introduction:

This 'Method Statement' outlines the necessary structural rehabilitation measures to be undertaken on the Stone Masonry Intermediate Piers i.e. the second pier from the south and north end (refer to GA drawing for detail). The rehabilitation work involves drilling holes into the pier, anchoring using stainless steel bars, filling voids with grout, and building 'Pier Jacketing wall' enhancing the overall structural integrity of the pier.

1. Drilling and Anchoring :
   The initial step of the rehabilitation process involves drilling 40 diameter holes into the Intermediate Pier. These holes are to be positioned at 1.8-meter centres in 3 rows, as specified in the General Arrangement (GA) drawing. After drilling, stainless-steel bars with a 20 diameter from Cintec or equivalent will be inserted into the holes for anchoring. The anchoring process should follow the sequence as recommended by the specialised contractor.

2. Grouting of Anchor Bars :
   Once the anchor bars are securely in place, the voids around the bars will be filled with grout. This step is crucial for ensuring a strong connection between the anchor bars and the masonry, enhancing the overall stability of the pier.

3. Filling Voids and Openings in the Piers:
   To further strengthen the pier, all voids, gaps, and openings within the piers will be filled using hydraulic lime-based grout mortar. This process will not only improve the structural integrity but also prevent any further deterioration of the pier due to the presence of voids.

4. Pier Jacketing Wall Construction:
   A 2-meter-high pier jacketing wall will be constructed around the existing Intermediate Pier. This wall will be built using matching stone and bull-faced ashlar masonry, ensuring that it closely resembles the texture of the existing piers. The purpose of this construction is to provide additional support to the pier and protect it from further damage.

5. Repointing of Piers :
   The final step of the rehabilitation project involves repointing the remaining parts of the piers, including others. Hydraulic lime-based mortar will be used for the repointing work to ensure the long-term durability and structural stability of the entire pier system.

**Conclusion** :

In conclusion, the rehabilitation of the Stone Masonry Intermediate Piers, as outlined in this method statement, aims to address structural issues and strengthen the overall integrity of the piers. This remedial work involves drilling, anchoring, grouting, constructing a pier jacketing wall, and repointing of the piers. The combined efforts will help preserve and enhance the longevity of the piers while maintaining its architectural and structural integrity. Proper planning, execution, and quality control measures should be implemented throughout the project to ensure a successful outcome.

# Generic Method Statement for Drilling & Grouting Cintec Anchors (only)

## DRILLING

Carefully set out the anchor position using a wax crayon or chalk, as per specifications, or as directed by the structural engineer or supervisor.

Using Diamond core bit drill the hole to the specified diameter and required depth of the anchor.

Remove all cores from the Core Barrel

**Wash off all stains immediately**.

## ANCHOR INSERTION

Carefully unpack the anchor and check there has been no damage to the fabric sock during transit.

Immediately prior to insertion wet the anchor completely with clean water, and position the sock evenly along the length of the anchor.

Place the anchor in the Core Barrel and carefully push the anchor in.

## GROUT MIXING

The grout is packed in 25 kg. bags and is mixed with clean cold water.

The normal mixing ratio is 5.5 litres. of water to one 25 kg. bag of grout. One 25kg bag will yield 16litres of fluid grout when mixed.

The 5.5 litres. of water can be increased by 10% (550ml) in hot weather (20°c +) or when the substrate is very dry and porous or the injection process is through very small injection tubes.

Do not increase the water content outside of these parameters as this will considerably weaken the strength of the set grout.

The grout must be mixed as follows :-

Place 5 litres. of clean/cold water into a clean mixing bucket and slowly add approx. 3/4 of one bag of Presstec grout while mixing.

Add a further ½ lt. of water (to make up the required 5.5ltrs.) and the remaining grout.

Continually mix the grout for 4 minutes removing all the dry mixture from the sides of the bucket.

Allow the mixture to stand for 5 minutes, during which the mixture will start to thicken, the amount the mixture thickens will depend on the ambient temperature and the temperature of the dry grout and water.

At this stage some or all of the 10% extra water may be added to achieve a smooth creamy texture with no peaks forming on the surface.

Pour the mixed grout into the pressure pot through the sieve.

Pressurize the pot from 3 bar to 5 bar dependent on the type and length of anchor being installed.

Cut the plastic mastic nozzle to fit the anchors orifice. On anchors with injection tubes, prime the tube with water and cut the mastic nozzle to fit over the injection tube.

Test the grout flow into a suitable bucket. If the grout flow is continuous and of sufficient pressure the anchor can be injected.

Carefully push the nozzle into the anchors orifice or over the injection tube, and position the anchor to the specified depth (minimum 50mm. beyond face of Stonework).

Turn on the control valve and the grout will flow to the rear of the anchor and inflate the sock along the length of the anchor to the front.

Move the anchor in a circular motion to facilitate the grout flow and to ensure the anchor is centred in the borehole upon completion.

At this stage the anchor will be felt to be locking in the bore hole and a grout milk will appear at the front of the anchor (note the colour change in the sock).

Maintain the pressure until the grout milk has stopped flowing and the sock at the front of the anchor cannot be compressed.

Use a sponge or cloth during this process to soak up the excess grout milk and avoid the milk running down the face of the brickwork/stonework.

**Any grout or milk on the wall must be washed off immediately.**

Please note that the anchor is not fully inflated until the grout milk has stopped flowing through the sock. Pressure must be maintained to allow this to be achieved.
With large injection orifices a suitable plug must be placed in the injection port immediately after removing the nozzle.

Eye protection must be worn when mixing and injecting grout