**Inspection and test plan – Bored Piles**

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| **Project no.** | | CC-0388 | | | **Project name** | Shoalhaven Area Remediation of Multiple Slips | | | | | **Date** | |  | | **Approved by** |  |
| **ITP no.** | SYM-0388-ITP-003 | | | | **Revision no.** | C | **Revision date** | | 29/05/23 | **Plant and equipment used** | | | |  | | |
| **Site no.** |  | | | | **Location (chainages, detailed description or marked up plan)** | | | | | | |  | | | | |
| **Layer thickness** | | |  | **Estimated qty** | |  | |

Attach Dockets, Certificates and QA Documents to ITP

|  |  | |  |  |  | **Verification or test by** | | | | | **Remarks / record (eg. test frequency, reports, certificates, checklist etc)** |
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|  |  | |  |  |  | **Symal Infrastructure** | | | **Shoalhaven City Council** | |
| **Item no.** | **Activity** | | **Ref docs** | **Acceptance criteria** | **Acceptance** | **Key** | **Resp.** | **Initial/date** | **Key** | **Sign date** |
| **1.0 Preliminaries** | | | | | | | | | | | |
| 1.1 | Documentation | | IFC Drawing | Check that you have the latest site and engineering IFC drawings before starting each task/set of tasks. | Yes  No  N/A | S |  |  |  |  |  |
| 1.2 | Safety measures and plans | | Site Documents/ SWMS | Traffic Control Plan, Safety Plan, Environmental Management Plan, Symal Infrastructure Site Documents, Subcontractor SWMS. | Yes  No  N/A | S |  |  |  |  |  |
| 1.3 | Excavation permit | | Symal Infrastructure GPP | Have services within the works area been identified and a group penetration permit covers the area, is current and signed onto by the works crew? Check underground and overheads services. | ​​☐​ Yes  ​☐​ No  ​  ☐​ N/A | H |  | H |  |  |  |
| 1.4 | Piling Plant and Equipment | | TfNSW B59  Cl 3.3 | Details of the proposed piling equipment and method are submitted with certification. | Yes  No  N/A | H |  |  | H |  |  |
| 1.5 | Steel Reinforcement Material | | IFC Drawing  TfNSW B59  Cl 2.3 | Certification Authority for Reinforcing Steel (ACRS) Certificate Submitted.  Material test certificate Submitted. | Yes  No  N/A | S |  |  | W |  | Steel reinforcement for piles must conform to  Specification TfNSW B80. |
| 1.6 | Concrete Mix Design | | TfNSW B59  Cl 2.2  TfNSW B80 Annexure B80/G | Mix designs have been reviewed by the Superintendent.  Use only self-compacting concrete or high workability concrete conforming to Annexure B80/G of TfNSW B80, as approved by the Principal. | Yes  No  N/A | S |  |  | H |  |  |
| 1.7 | Engineering Certification | | TfNSW B59  Cl 3.4.1 | Drawings and calculations certified by a Chartered Professional Geotechnical  Engineer, verifying that under the proposed set up and site conditions, the proposed piling equipment and working platforms or supports will operate safely. | Yes  No  N/A | S |  |  |  |  |  |
| **2.0 Bored Pile Excavation and Cleaning** | | | | | | | | | | | |
| 2.1 | Set out | | IFC Drawings | Set out the site with adequate recovery pegs and survey markers so that the drilling and/or piling rig can be set up accurately at the specified location and aligned correctly for each pile. | Yes  No  N/A | S |  |  | H |  |  |
| 2.2 | Commencement of excavation of bored pile | | TfNSW B59  Cl 4.1 | Bored pile Set out and any additional borehole required are completed.  Borehole logs are submitted.  If not previously submitted, details of the following:(i) Extent of temporary casing or details of drilling fluids where  proposed for each bored pile.  (ii) Method of placing concrete in the bored pile including size and number of any proposed tremie pipes (refer to Clause 6.5). | Yes  No  N/A | H |  |  | H |  |  |
| 2.3 | Temporary Casings | | TfNSW B59  Cl 4.2 | Drive or sink the temporary casing through any inferior materials, without damaging it, to seal its toe in the founding layer.  Control the alignment of the casing with sufficient accuracy to ensure that the drilling head can be  inserted and withdrawn without fouling against the casing. | Yes  No  N/A | S |  |  |  |  |  |
| 2.4 | Drilling Fluids | | TfNSW B59  Cl 4.3 | The drilling fluid is appropriate for the ground conditions and the groundwater at the site and the  method of bored pile excavation. | Yes  No  N/A | S |  |  |  |  |  |
| 2.5 | Bored Pile Excavation | | TfNSW B59  Cl 4.4 | Record and measure the operating parameters of the drilling rig when excavating the bored pile. | Yes  No  N/A | S |  |  |  |  |  |
| 2.6 | Excavated Spoil | | TfNSW B59  Cl 3.5 | Removal all spoil off site during excavation works.  Submission of methodology for any spoil stockpile and proposed cartage route and drop-off. | Yes  No  N/A | S |  |  |  |  |  |
| 2.7 | Final Pile Toe Level | | TfNSW B59  Cl 4.5.1 | Inspection of the footing material at pile toe level by Symal’s Geotechnical Engineer to ensure rock socket depth is achieved.  Symal’s Geotechnical Engineer directs excavation of a bored pile to a level lower than shown on the Drawings?  Principal accepted the level as the final pile toe level to satisfy design requirement? | Yes  No  N/A  Final Level: | S |  |  | H |  |  |
| 2.8 | Roughening Sides and Cleaning Bored Pile | | TfNSW B59  Cl 4.5.2 | Roughen the side of the rock socket as specified.  Remove debris and surface smear and expose intact rock over the side and base of the rock socket. | Yes  No  N/A | S |  |  |  |  |  |
| 2.9 | Acceptance of Bored Pile | | TfNSW B59  Cl 4.5.3 | Notification that the bored pile excavation is complete.  Submitted verification documents, verifying that the bored pile has been excavated to the design position, size and level.  De-sanded and re-circulated the drilling fluid before concrete placing, drilling fluid samples are tested to verify conformity from the bottom of the bored pile. | Yes  No  N/A | H |  |  | H |  | Following acceptance of bored pile, keep the bored pile side and base in a clean and stable condition without contamination or softening, until concrete is placed |
| 2.10 | Indirect Examination of Bored Pile | | TfNSW B59  Cl 4.6 | Verify conformity of the depth of each bored pile using a weighted tape at a minimum of three locations of the bored pile. | Yes  No  N/A | S |  |  |  |  |  |
| **3.0 Reinforcement Placing** | | | | | | | | | | | |
| **3.1** | Cage and Bored Pile Inspection | TfNSW B59  Cl 5.1 | | Notify the Principal at least 24 hours prior to proposed time of placement of the reinforcement cage into bored pile. | Yes  No  N/A | W |  |  | W |  |  |
| **3.2** | Placing Steel Reinforcement Cage | TfNSW B59  Cl 5.2 | | Certification that the bored pile is clean, and that all loose and adhering materials have been cleaned from the reinforcement cage. | Yes  No  N/A | H |  |  | H |  | Place the steel reinforcement and concrete within 24 hours of the excavation of the pile hole. |
| **4.0 Concrete Supply and Placing** | | | | | | | | | | | |
| **4.1** | Dewatering | TfNSW B59  Cl 6.3 | | Approval from Principal if dewatering is required. | Before Backfill | S |  |  |  |  |  |
| **4.2** | Concrete Supply | TfNSW B59  Cl 6.4 | | Provide a continuous supply of concrete so that each bored pile is concreted in one uninterrupted operation. | Yes  No  N/A | S |  |  | H |  |  |
| **4.3** | Concrete Placing | TfNSW B59  Cl 6.5  TfNSW B90 Cl 9.2 | | Tremie pipe and hopper are used to place the concrete.  Concrete is placed in a continuous process from the base to above the top of the pile.  Concrete testing for compressive strength at 28 days | Yes  No  N/A | S |  |  |  |  | Carry out placing of concrete on test members when there is uncertainty about the outcome of placing concrete in piles. |
| **4.4** | Tremie | TfNSW B59  Cl 6.6 | | The tremie pipe is rigid and watertight throughout.  Appropriate tremie pipe size.  Appropriate tremie placement procedure as per B59 Cl 6.6. | Yes  No  N/A | S |  |  | W |  |  |
| **4.5** | Concreting Record | TfNSW B59  Cl 6.7 | | The depth of the tremie pipe outlet.  The level of the concrete in the bored pile.  The corresponding volume of concrete placed. | Yes  No  N/A | S |  |  |  |  |  |
| **4.6** | Casing Extraction | TfNSW B59  Cl 6.8 | | Withdraw any temporary casing slowly whilst the concrete is still fluid at close to the original slump.  Maintain a sufficient head of concrete.  Maintain the direction of pull on the temporary casing along the axis of the pile.  Last section of casing not withdrawn until the concreting operation is completed. | Yes  No  N/A | S |  |  |  |  |  |
| **4.7** | Temporary Casings Left in Place | TfNSW B59  Cl 6.9 | | Temporary casings may be left in place when approved by the Principal. | Yes  No  N/A | S |  |  |  |  |  |
| **4.8** | Cut-Off And Clean Up of Top of Pile | IFC Drawings  TfNSW B59  Cl 6.10 | | Concrete and/or casing above the cut-off level is carefully removed without damaging the permanent  work not earlier than 24 hours after completion of placement of concrete.  The top of the pile to be embedded in the substructure is undamaged, sound, free of any laitance and loose material and have a surface roughness profile not less than 3 mm. | Yes  No  N/A | S |  |  |  |  |  |
| **5.0 Conformance Check** | | | | | | | | | | | |
| **5.1** | Tolerances | IFC Drawings | | Tolerances on pile installation must conform to Section 7 of AS 2159.  Inclination tolerance for vertical piles must not exceed 1%. | Yes  No  N/A | S |  |  |  |  |  |

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| Works complete (sign SS) |  | |  | Date works complete | | |  | |
| Site conforms (sign PE) |  | |  | Date site closed | | |  | |
| NCR no. raised |  | |  | Date NCR closed for this site | | |  | |
| **Site acceptance:** | | | | | | | | |
| Symal Infrastructure representative name | |  | | |  | Client representative name | |  |
| Symal Infrastructure representative signature | |  | | |  | Client representative signature | |  |

**Responsibility (resp.) key: PM –** Project Manager**, PE –** Project Engineer**, SE –** Site Engineer**, SS –** Site Supervisor

**Inspection key: W –** Witness, **H –** Hold Point, **S -** Surveillance