**Inspection and test plan – Ground Support (Soil nail)**

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| **Project no.** | | CC-0388 | | **Project name** | | Shoalhaven Area Remediation of Multiple Slips | | | | | | **Approved by** |  | |
| **ITP no.** | SYM-0388-ITP-004 | | | **Revision no.** | | B | **Revision date** | 12/05/23 | **Plant and equipment used** | | |  | | |
| **Site no.** |  | | | **Location (chainages, detailed description or marked up plan)** | | | | | |  | | | | |
| **Layer thickness** | | |  | | **Date works commenced** | | |  | | | **Date works completed** | | |  |

Attach Dockets, Certificates and QA Documents to ITP

|  | |  |  |  |  | **Verification of acceptance 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** | **Sign date** | **Key** | **Sign date** |
| **1.0 Preliminaries** | | | | | | | | | | | |
| 1.1 | | Construction Program and Method Statement | TfNSW R64 | Clause 3.1 - TfNSW R64 | Yes  No  N/A | H |  | H |  | Submittals of Construction Program and Method Statement prior to start the activity. | |
| 1.2 | | Mix Design: Soil Nails | TfNSW R64 | Clause .2.27 - TfNSW R64  As per relevant MAR | Yes  No  N/A | H |  | H |  | Cement Grout Mix Design for Soil Nails | |
| 1.3 | | Mix Design: Shotcrete | TfNSW R64  TfNSW R68 | Clause 3.8.1 - TfNSW R68  As per relevant MAR | Yes  No  N/A | H |  | H |  | Exposure Classification B2 shotcrete mix design. | |
| 1.4 | | Material: Soil Nail | TfNSW R64 | Clause 2.1 - TfNSW R64  As per IFC Drawing / MAR | Yes  No  N/A | H |  | H |  | Material Certificates for the structural components. | |
| 1.5 | | Suitability Test: Soil Nail | TfNSW R64 | Clause 5.1 - TfNSW R64  Clause 5.2.1 - TfNSW R64  Clause 5.4 - TfNSW R64  The number of test nails to be assessed by Suitability Test must be the greater of:  (i) the number specified on the Design Documentation drawings; or  (ii) 1% of the permanent nails but not less than 2.  The Suitability test will be considered successful if all of the following are satisfied:  (i) A total creep movement of less than 2 mm between the 6 and 60 minutes readings is measured during Cycle 4; and  (ii) A total creep movement of less than 1mm between the 60 and 180 minutes readings is measured in Cycle 4; and  (iii) The creep rate is linear or decreasing, when plotted against the logarithm of time throughout Cycle 4. | Yes  No  N/A | H |  | H |  | Suitability Test Reports | |
| 1.6 | | Test Equipment | TfNSW R64 | Clause 5.3 - TfNSW R64  Submit NATA Calibration Certificate (issued within 12 month) accompanied by the related calibration curve and tabulated record of hydraulic pressure against jack load.  The identification numbers on the field test equipment must match the identification numbers on the calibration data sheets. | Yes  No  N/A | W |  | W |  | Calibration Certificates for hydraulic jack, pressure gauge and load cell as a set.  Hydraulic jack with a minimum travel of 150 mm.  Dial gauge with a minimum accuracy of 0.01 mm. | |
| **2.0 Operations** | | | | | | | | | | | |
| **2.1** | | Surface Preparation | TfNSW R64 Cl. 3.3 | Witness of exposed slope face after clearing of each section. | Yes  No  N/A | W |  | W |  | Unless otherwise shown on the Drawings or directed by the Principal, construct soil nail slopes in an incremental, “top-down” manner. | |
| **2.2** | | Soil Nail Installation | TfNSW B64 | Clause 3.4 - TfNSW R64 | Yes  No  N/A | W |  | H |  | Drill Record  As-built Drawing  Soil Nail Installation Checklist | |
| **2.3** | | Soil Nail Grouting | TfNSW R64  ASTM C940  ASTM C939  TfNSW T375 | Clause 2.2.7 - TfNSW R64  Clause 3.4.3 - TfNSW R64  Final Bleeding <0.5%  Fluidity <20s  Compressive Strength (7 Days) > 32MPa  Compressive Strength (28 Days) >40MPa @28Days | Yes  No  N/A | W |  | W |  | Grout Record  Compressive Strength Test Report | |
| **2.4** | | Soil Nail Acceptance Test | TfNSW R64 | Clause 5.1 - TfNSW R64  Clause 5.2.2 - TfNSW R64  Clause 5.4 - TfNSW R64  A total of 3% of permanent nails must be subjected to Acceptance Test.  The acceptance test will be considered successful if all of the following are satisfied:  (a) A total creep movement of less than 2 mm between the 6 and 60 minutes readings is measured in Creep Test hold period; and  (b) A total creep movement of less than 1 mm between the 60 and 180 minutes readings is measured in Creep Test hold period; and  (c) The creep rate is linear or decreasing, when plotted against the logarithm of time throughout Creep Test hold period. | Yes  No  N/A | H |  | H |  | Acceptance Test Report | |
| **2.5** | | Slope Preparation | TfNSW R64 CL. 6.2  TfNSW R68 CL. 4.2 | Inspection and approval of surface preparation for mesh placement and shotcreting. | Yes  No  N/A | W |  | W |  |  | |
| 2.6 | | Horizontal Drains Installation | TfNSW R40 | Clause 3 - TfNSW R40  Clause 4 - TfNSW R40  As per IFC Drawing | Yes  No  N/A | W |  |  |  | Horizontal Drains Installation Record  Horizontal Drainage Installation Checklist  As-built Drawing | |
| 2.7 | | Sl72 Galvanised Mesh | IFC Drawings | Steel reinforcement SL72 2N12 1200mm long is centrally located in both direction at each soil nail. | Yes  No  N/A | W |  | W |  |  | |
| 2.8 | | Grassroot Mattress | IFC Drawings  Manufacturer's Specification | Grass roots erosion control geotextile matting (or equivalent) is correctly installed.  Mat reinforcement pins are corrected installed. | Yes  No  N/A | W |  | W |  | Shall be installed as per IFC Drawings / Manufacturer's Specification. | |
| **2.9** | | Preparation for Shotcrete Placement | TfNSW R68 | Clause 4 - TfNSW R68  Protect the drainage system against contamination to ensure proper functioning.  Steel mesh support anchor bars are correctly installed.  Firmly fix steel reinforcement to prevent movement and vibration while the shotcrete is being applied. | Yes  No  N/A | W |  | W |  | Shotcrete Inspection Checklist | |
| **2.10** | | Shotcrete Application | TfNSW R68 | Clause 7 - TfNSW R68  Apply shotcrete in two successive layers of 50mm (and not exceeding 75 mm) thickness for a total of 100mm and with adequate adhesion to the surface or previous layers of shotcrete to prevent slumping or sagging.  Shotcrete must not cover or impair the function of slotted pipe drain or strip drain outlets which protrude through the shotcrete layer. | Yes  No  N/A | W |  |  |  | Pouring Record | |
| **2.11** | | Shotcrete Test | TfNSW R68 | 6.4.4 TfNSW R64  In accordance with mix design | Yes  No  N/A | W |  |  |  | Concrete Test Report | |
| **2.12** | | Steel Wire Mesh installation | IFC Drawing | Steel wire mesh (TECCO® or other equivalent). Shall be installed as per IFC Drawings. | Yes  No  N/A | W |  |  |  | Mesh Installation Checklist | |
| **2.13** | | Surface Excavation | TfNSW R64 – 3.3 | 3.3 – TfNSW R64  As per IFC Drawing | Yes  No  N/A | W |  |  |  | Earthworks Record | |
| **3.0 Post Operations** | | | | | | | | | | | |
| **3.1** | | Review of the Site | IFC Drawing | Completeness of the documentation | Yes  No  N/A | W |  |  |  |  | |
|  | **Comments**: | | | | | | | | | |  |
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| **Site acceptance:** | | | | |
| Symal Infrastructure representative name |  |  | Shoalhaven City Council representative name |  |
| Symal Infrastructure representative signature |  |  | Shoalhaven City Council representative signature |  |

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