| **INSPECTION AND TEST CHECKLIST FOR:**  **Cast In Place Reinforcement Concrete Piles (B59)** |
| --- |
|
|
|
|

| Activity No.# | Description | Requirements / Reference | Acceptance Criteria | Frequency |  | Comments / Attachments / Records |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | **Safety Review** | Project Safety Plan | All site personnel inducted (includes environment and cultural)  Required Safe Work Method Statements completed and signed  Subcontractor’s safety plan/procedure approved | Prior to commencing works |  | SWMS |
| 2 | **Environment** | Project Environment Plan | * Installation of soil erosion and sedimentation controls completed in accordance with Soil and Water Specs. | Prior to commencing works |  | CEMP  EWMS |
| 3 | **Concrete Mix Design** | B80 Cl 3.9.1 | **HOLD POINT: Use of each nominated mix**   * At least 4 weeks prior to the proposed date for use of the concrete mix, submit to the Principal the following:   (a) (i) all details in Clause 3.9.3; or  (ii) mix ID and concrete mix design of a nominated mix from the Register of TfNSW Concrete Mixes  and  (b) a statement stating that the mix conforms to the B80 Specification and is suitable for its intended use | Prior to ordering concrete to site |  | **HOLD POINT**  Mix Design |
| 4 | **Pour method** | B80 Cl 7.5.2 | Submit to the Principal a pour specific method statement detailing at least 2 working days prior to pour  (a) delivery rate;  (b) placement method and rate;  (c) equipment on standby wherever required  At least 4 working hours prior to commencement of placing concrete (unless otherwise permitted by the Principal), submit to the Principal a Certificate of Conformity, endorsed by the Concrete Supervisor, in respect of formwork, reinforcement, embedments and screeding guide rails or height pins. This certificate must be accompanied by verification checklists and other details showing conformity to this Specification. | Prior to concrete placement |  | **HOLD POINT**  Pour Method Statement / Methodology |
| 5 | **Delivery of Prefab. Reinforcement Cages** | B80 Cl 6.6.2 | * Show on the shop drawings the design location(s) of lifting and transport support points for prefabricated support cages, and mark these locations indelibly on the cage during fabrication. Show the lifting requirements on a drawing on durable material, attached to the cage prior to lifting. Conform to B80 Cl 6.5 for welding of load bearing welds * **WITNESS POINT: Assembly, lifting and transport of cages** * At least 2 working days prior to expected date of delivery, submit to the Principal a Certificate of Conformity in respect of load bearing weld sizes and locations, and conformity of finished welds, together with drawings and checklists * Provide marked up shop drawings for the reinforcement as per B80 Cl 6.6.2 | During manufacture of the cages |  | **WITNESS POINT**  Lifting certification |
| 7 | **Program and Personnel** | B59 Cl 3 | * Weekly program to be agreed with principal * Geotech Engineer to determine Pile termination, if *greater than 1.0 meter from the indicative levels shown on the Drawings, must advise the Principal who will review and consider the adjustments.* * Geotechnical Engineer attending the piling works | Prior to commencing piling works on site |  | Geotechnical Engineer qualifications  Weekly Program |
| 8 | **Concrete Grey Cards** | B80 Cl 7.2.2  B80 Cl 7.2.3 | * The Concrete Supervisor must hold a TfNSW Bridgeworks Concreting Grey Card and have suitable and acceptable TAFE (or equivalent) qualifications for the concrete works taking place, and must be present during all stages of the pour until implementation of the curing regime * Pour Crew to have TfNSW Bridgeworks Concreting Grey Card * **HOLD POINT: First concrete pour in the Works** * At least two weeks prior to the first concrete pour, submit to the Principal the names of the personnel who will be involved in the relevant concreting works, which of these personnel hold a Grey Card, as well as corresponding evidence of this. * At least four working hours prior to pouring concrete, provide the Principal with a statement stating that at least half of the personnel who will be involved in the pour hold a Grey Card | Prior to pouring concrete |  | **HOLD POINT**  Nominate and submit Supervisor and their qualifications  B80 Grey Cards |
| 9 | **Proposed Plant and Method** | B59 Cl 3.3  B59 Cl 3.4.1 | * **HOLD POINT: Delivery of piling plant and equipment to the Site** * Submit to the Principal details of the proposed piling equipment and method together with certification, including calculations, by a Chartered Professional Engineer, that proposed piling equipment and working platforms or supports. * The piling equipment must have the capacity to excavate the pile shaft and socket in the founding material to the specified depth and diameter to achieve the design pile resistance, including the capability to excavate an additional pile depth (if required) of either 3 m or 3 pile diameters, whichever is the greater. * Without limiting the requirements of Specification TfNSW G22, prior to bringing any piling equipment or plant to the site, provide drawings and calculations certified by a Chartered Professional Engineer with membership of Engineers Australia practising in the field of geotechnical engineering (or equivalent), verifying that under the proposed set up and site conditions, the proposed piling equipment and working platforms or supports will operate safely. | Prior to commencing piling works on site |  | **HOLD POINT**  Piling equipment specs including piling platform signoff |
| 10 | **Pile Set Out and Additional Boreholes** | B59 Cl 3.7  B59 Cl 4.1  B59 Cl 3.6 | * Set out locations for piles as per the Drawings 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. * **HOLD POINT: Commencement of excavation of pile hole** * Provide the following documents to the Principal:   (a) Certification that pile hole set out (refer Cl 3.6), and additional boreholes (refer Cl 3.7) where required, have been completed  (c) If not previously submitted, details of the following: (i) Extent of sacrificial casing for each pile hole. (ii) Method of placing concrete in the pile hole including size and number of any proposed tremie pipes (refer to Cl 6.5) | Prior to excavation of any pile holes |  | **HOLD POINT**  Pile set out report  Extent of Temporary Casing  Concrete placing statement |
| 11 | **Pile Hole Excavation** | B59 Cl 4.2  B59 Cl 4.3.1  B59 Cl 4.4  B59 Cl 4.5  B59 Cl 4.6  B59 Cl 7 | * If a temporary casing is used, drive or sink the temporary casing through any inferior materials, without damaging it, to seal its toe in the founding layer. Ensure that the casing toe is fully embedded in founding layers on a slope or in ground that is comprised of variable materials. * Excavate into the founding material to obtain a rock socket of the specified depth in rock, of the class of rock or founding material specified in the Drawings. Record and measure the operating parameters of the drilling rig when excavating the first pile hole, and excavate subsequent pile holes with the same parameters and work methods * Where excavation of the pile hole to a level lower than that shown in the Drawings is *recommended* by the Geotechnical Engineer, the Principal will either accept the level reached or direct that excavation be continued to a lower level * clean the pile hole prior to completion of excavation * To verify conformity with Clause 4.5.2, provide equipment to allow the Principal to indirectly examine the pile hole from top to bottom, including the socket base and side. * Tolerances on pile installation must conform to Section 7 of AS 2159, except that the inclination tolerance for vertical piles must not exceed 1%. Demonstrate to the Principal that the inclination tolerances have been achieved. * **HOLD POINT: Acceptance of pile hole** * Notification, *including associated report(s) by your Geotechnical Engineer,* that the pile hole excavation is complete, and documentation verifying that the plan position, size and alignment of the casing, and the pile hole, will result in a pile that conforms to the specified tolerances and other requirements of the Drawings and this Specification * Following acceptance of the pile hole, keep the side and base in a clean and stable condition until such time as the concrete is placed | Prior to placing the cage |  | Methodology  Joint Inspection after completion of Pile drilling  **HOLD POINT**  Geotech Piling Report  Drilling Records |
| 12 | **Inspection of Reinforcement Cage** | B59 Cl 5.1 | * Clean the pile hole and reinforcement cage of all loose and adhering material before and after the reinforcement cage is placed * Place the reinforcement for the piles as per B80 and B59 Specifications. Ensure the reinforcement cage is centralised and that minimum concrete cover is not less than the specified value * **WITNESS POINT: Inspection of reinforcement cage prior to placing into pile hole** * Notify the Principal at least 2 hours prior to proposed time of placement of the reinforcement cage into pile hole. | Prior to pouring concrete |  | **WITNESS POINT**  Pile Cage inspection prior to installation |
| 13 | **Cleaning of Pile Hole and Reinf. Cage** | B59 Cl 5.2  B59 Cl 6.1 | * Place the steel reinforcement and concrete as soon as practicable following final socket cleaning, and within 24 hours of the excavation of the pile hole. Where this is delayed, do not place the steel reinforcement if further cleaning of the pile hole or rock socket is required * **HOLD POINT: Placing steel reinforcement cage in the pile hole** * Submit to the Principal Certification that the pile hole is clean, and that all loose and adhering materials have been cleaned from the reinforcement cage * At the time of concreting, the pile hole side and base must be clean and conform to the parameters specified on the Drawings. | Prior to pouring concrete |  | **HOLD POINT**  Pre Pour Checklist |
| 15 | **Test Member** | B80 Cl 5.3  B59 Cl 6.2 | * Produce test members if directed by the Principal, to demonstrate the suitability of the concrete mix for the Works, and the suitability of the work methods. * Where test members are required, design and construct them in accordance with AS 3610.1 for test panels. The method of construction must effectively simulate the formwork, reinforcement layout and concreting operations to be applied in the works themselves * If the test member does not meet the design requirements, discuss further actions with the Client prior to making any changes to the work methods, or casting any additional test members * **WITNESS POINT: Placement of concrete for the test member (if required)** * Provide at least two working days’ notice, in writing, of the proposed placement of concrete for the test member. Thereafter, give the Principal the opportunity to inspect the constructed test member | Prior to pouring subsequent piles |  | **WITNESS POINT**  Proposed Time and location to inspect test member (Prior/Post) |
| 16 | **Pouring of Concrete** | B59 Cl 6.3  B59 Cl 6.4  B59 Cl 6.5  B59 Cl 6.6  B59 Cl 6.7 | * The pile hole may only be dewatered where practical and subject to the Principal’s approval * Provide a continuous supply of concrete, such that each pile hole is concrete in one uninterrupted operation. All concrete placed must have the nominated workability of the approved concrete mix, at the time of placement in the pile hole * Unless specified otherwise, place the concrete as per TfNSW Specification B80 * In the event of nonconforming B80 concrete, pursue the avenues provided in the B80 ITP * Use a tremie pipe and hopper to place the concrete. The tremie pipe must be rigid and watertight throughout. Tape a steel plate to the bottom end of the tremie pipe or similar, prior to placing concrete, and select a suitable tremie size and concrete pump (if needed) * Place the concrete in a continuous process from the base to above the top of the pile, in a manner and consistency such that pockets of air, water or ground materials are not entrapped in the concrete, and the concrete cover completely consists of sound concrete * During concreting, maintain a record of the depth of the tremie pipe outlet against the level of the concrete in the pile hole, and the corresponding volume of concrete placed. * During concreting, lift the tremie pipe progressively as the concrete level rises, but at all times keeping the bottom end of the tremie pipe a minimum of 2 m below the top surface of the concrete until sound concrete appears at a minimum of 400 mm above the pile cut-off level, to avoid defective concrete at or below cut-off level. * Retain other relevant records, such as concrete pour dockets and records | During the pours |  | Concrete pour dockets and records  Concrete test results |
| 18 | **Cut Off and Clean Up** | B59 Cl 6.10 | * Carefully remove any concrete and/or casing above the cut-off level without damaging the permanent work, no earlier than 24 hours after completion of placement of concrete * The top of the pile must be undamaged, sound, free of any laitance and loose material, and have a surface roughness profile not less than 3mm. Where the concrete below cut-off level is cracked or defective, cut away and repair the pile in consultation with the Principal * Keep the reinforcement protruding from the top of the pile clean and protected from damage | Following completion of pouring |  | As builts |
| 19 | **Installation Tolerances** | B59 Cl 7 | * Tolerances on pile installation must conform to Section 7 of AS 2159, with the exception that the inclination tolerance for vertical piles must not exceed 1%. * Demonstrate to the Principal that the inclination tolerances have been achieved | Upon completion of works |  | Survey reports or Drilling Records |
| 20 | **Identified Records - Cores** | B59 3.7 | * ***Cores and your Geotechnical Engineer’s interpretive findings*** | **NOTE: All “Identified Records” items (Item 20 through to 29) need to have their 3 normal options (Pass / Fail / N/A) changed to say (Yes / No / N/A) instead** |  |  |
| 21 | **Identified Records – Piling Records** | B59 4.5.3 | * ***Piling records, signed by Piling Supervisor, verifying conformity of the pile hole upon completion of its excavation*** |  |  |
| 22 | **Identified Records – Pile Hole Examination** | B59 4.6 | * ***Results of pile hole examination*** |  |  |
| 23 | **Identified Records – Pour Details** | B59 6.7 | * ***Records of tremie outlet depth, concrete level in the pile hole and volume of concrete placed during concreting*** |  |  |
| 24 | **Identified Records – Pile Integrity Testing** | B59 8.1, 8.2 | * ***Pile integrity testing results*** |  |  |
| 25 | **Identified Records – Pile Load Testing** | B59 8.3, 8.4 | * ***Pile load testing results*** |  |  |
| 26 | **Identified Records – Nominated Mixes** | B80 3.9 | * ***Submission of nominated mixes*** |  |  |
| 27 | **Identified Records – Variation from Mixes** | B80 3.9.4 | * ***Variations from nominated mixes*** |  |  |
| 28 | **Identified Records – CoC (Formwork + Reinforcement)** | B80 7.5.1 | * ***Certificate of Conformity in respect of formwork, reinforcement, embedments and other relevant details or precast concrete members cast at off site locations*** |  |  |
| 29 | **Identified Records – CoC (Curing Compound)** | B80 8.2.3 | * ***Certificate of Conformity of curing compound*** |  |  |

(Lot closeout / lot verification sections etc)