**Inspection and test plan – Drainage (cast in-situ structures)**

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| **Project no.** | CC0375 | | **Project name** | Hunter Power Project | | | | | | **Date** |  |
| **Symal ITP no.** | | CC0375-ITP-011 | **Revision no.** | 7 | **Revision date** | 21/06/2023 | **Plant and equipment used** | |  | | |
| **UGL ITP no.** | |  | | | | | **SHL ITP no.** |  | | | |
| **Lot no.** | |  | **Location (chainages, detailed description or marked up plan)** | | | | |  | | | |

Attach Dockets, Certificates and QA Documents to ITP

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| Contact Details | | Summary of Requirements | | | Principle Codes / Standards | | Records | |
| **Customer:**  **Construction Manager:**  **Project Engineer:**  **Quality Representative:**  Subcontractors    Surveillance / Inspection Key  **HOLD POINT (H):** Nominated point beyond which work shall not proceed without verified acceptance by nominee.  **WITNESS POINT (W):** Points at which the nominee shall be notified and invited to witness an activity, but further work may proceed without the presence of the nominee.  **REVIEW (R): Verify** by examination of documentary evidence that inspection / tests have been satisfactorily conducted.  **SURVEILLANCE (S): Continuing** evaluation of the status of methods, analysis of records and monitoring of activities on a random basis to ensure quality requirements will be met.  **VISUAL (V): 100**% Visual Inspection of work / item to ensure compliance with code / specification.  **DIMENSIONAL (D): Measurement** of critical dimensions to ensure work / item is within tolerance. | | **Process Qualifications:**  **Traceability:**  Material:  Alloy Verification  Heat Treatment:  Pressure Testing  Consumable:  NDT:  Welder ID:  WPS:  Electrical:  Instruments  **Heat Treatment:**  **Dimensional Control:**  **Testing (NDT):**  **Acceptance Specification:**  **Pressure Testing:**  **Elect. / Instrumentation:**  Notes: | | | **Client Specifications**  HPP-AEC-CIV-GN-GEN-SPT-0161\_0 QUALITY (CONSTRUCTION)  HPP-AEC-CIV-DD-SWS-SPT-1351\_0 STORMWATER DRAINAGE (CONSTRUCTION)  HPP-AEC-CIV-DD-SWS-SPT-1353\_0 PRECAST BOX CULVERTS  HPP-AEC-CIV-GN-GEN-SPT-0319\_0 MINOR CONCRETE WORKS  **Engineering Procedures / WI** | | **(MDR Insert as marked 3 )**   * Inspect Release Certs. * Deviations/Concessions * Material Certificates * Conformance Certificate * Welding Records * Welder Qual. Register * NDT Reports * Report on Repairs * Heat Treatment Records * Dimensional Records * Non-Conformance Rpts * Pressure Test Records * Drawings & Data Sheets * Misc Verification Records * Electrical Test Sheets | |
| Prepared by: | Yash Bhavsar | | Date : 21/06/23 | Approved By: Joshua Fisicaro | | Date : 21/06/23 | |  |

|  | |  | |  |  |  | **Verification of acceptance by** | | | | | | **Remarks / record (eg. test frequency, reports, certificates, checklist etc)** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  | |  |  |  | **Symal** | | **UGL** | | **SHL** | |
| **Item no.** | | **Activity** | | **Ref docs** | **Acceptance criteria** | **Acceptance** | **Key** | **Sign date** | **Key** | **Sign date** | **Key** | **Sign date** |
| **1.0 Preliminaries** | | | | | | | | | | | | | | |
| **1.1** | | Documentation | | Issued drawings / Site copy drawings | Check that you have the latest site and engineering drawings BEFORE starting each task/set of tasks. | Yes  No  N/A | S |  | S |  | S |  |  | |
| **1.2** | | Lot Traceability | | Spec. 0161 Quality [Cl 7.3] | Prepare a lot map for traceability of the work area | Yes  No  N/A | S |  | S |  | S |  | Lot map | |
| **1.3** | | Set out | | Spec. 1351 Stormwater Drainage [Cl 2.2] | Setout pits to the location and levels on the drawings. This shall be presented for inspection by the superintendent. | Yes  No  N/A | S |  | S |  | S |  |  | |
| **2.0 Excavation and bedding** | | | | | | | | | | | | | | |
| **2.1** | | Excavation | | Spec. 1351 Stormwater Drainage [Cl 2.3] | Excavate to the depth nominated on the drawings and remove any loose material at the base.  Ensure excavation is carried out to a width which will not impede external formwork. | Yes  No  N/A | S |  | S |  | S |  |  | |
| **2.2** | | Unsuitable Material | | Spec. 1351 Stormwater Drainage [Cl 2.3] | Any Unsuitable Material to be removed to the depth as directed by the Superintendent  **HOLD POINT** | Yes  No  N/A | **H** |  | **H** |  | **H** |  |  | |
| **2.3** | | Compaction - Foundation | | Spec. 1351 Stormwater Drainage [Cl 2.5] | Foundation (including any unsuitable replacement) to be compacted to a relative compaction of 95% to a depth of 150mm below foundation level | Yes  No  N/A | S |  | S |  | S |  | Test reports | |
| **2.4** | | Foundation Inspection | | Spec. 1354 Stormwater Drainage Structures [Cl 3.6] | Foundation to be inspected by the Superintendent prior to placing blinding  **HOLD POINT** | Yes  No  N/A | **H** |  | **H** |  | **H** |  |  | |
| **2.5** | | Blinding | | Spec. 1354 Stormwater Drainage Structures [Cl 3.6] | Blinding (15MPa) for Reinforced Concrete Bases to be a 50mm thick mass concrete layer.  Unreinforced bases can be poured directly on the earth | Yes  No  N/A | S |  | S |  | S |  |  | |
| **3.0 Cast in-situ structures** | | | | | | | | | | | | | | |
| **3.1** | | Formwork (Base) | | Spec. 0319  Minor Concrete Works [Cl 4.3]  Drawings | Formwork installed as per drawings and adequately supported.  Completed formwork to be inspected by the Superintendent prior to concrete placement  **HOLD POINT**  **Before Placing Concrete** | Yes  No  N/A | **H** |  | **H** |  | **H** |  | Pre-pour inspection | |
| **3.2** | | Steel reinforcement (Base) | | Spec. 0319  Minor Concrete Works [Cl 4.5]  Drawings | Reinforcement installed as per drawings, ensuring sufficient lap length and cover is achieved on all bars.  Concrete pre-pour inspection complete.  **HOLD POINT**  **Before Placing Concrete** | Yes  No  N/A | **H** |  | **H** |  | **H** |  | Pre-pour inspection | |
| **3.3** | | Formwork (Walls) | | Spec. 0319  Minor Concrete Works [Cl 4.3]  Drawings | Formwork installed as per drawings and adequately supported.  Completed formwork to be inspected by the Superintendent prior to concrete placement.  **HOLD POINT**  **Before Placing Concrete** | Yes  No  N/A | **H** |  | **H** |  | **H** |  | Pre-pour inspection | |
| **3.4** | | Steel reinforcement (Walls) | | Spec. 0319  Minor Concrete Works [Cl 4.5]  Drawings | Reinforcement installed as per drawings, ensuring sufficient lap length and cover is achieved on all bars.  Concrete pre-pour inspection complete.  **HOLD POINT**  **Before Placing Concrete** | Yes  No  N/A | **H** |  | **H** |  | **H** |  | Pre-pour inspection | |
| **3.5** | | Pit & Pipe Connections | | Spec. 1354 Stormwater Drainage Structures [Cl 3.3] | Inlet and outlet pipes to be integrally cast into pit walls and the joint waterproofed as per design requirements. | Yes  No  N/A | S |  | S |  | S |  |  | |
| **3.6** | | Concrete supply and placement | | Spec. 0319  Minor Concrete Works [Cl 4.8, 4.9, 4.10, 4.11]  Drawings | Concrete strength of cast in-situ units shall be min. Grade **N32** or as otherwise stated on drawings.  Ensure the temperature of freshly mixed concrete is maintained in between 5°C and 35°C. Ensure elapsed time between batching and discharge of the mix complies with the below table.    Concrete placed in layers ≤ 300mm thick and adequately vibrated avoiding over-vibration.  Design slump shall not exceed 75mm unless shown otherwise on the drawings. | Yes  No  N/A | S |  | S |  | S |  | Delivery dockets | |
| **3.7** | | Concrete sampling | | Spec. 0319  Minor Concrete Works [Cl 4.2] | The nominal rate of sampling shall be taken:   1. Compressive strength: One set per pour or as otherwise directed by the Superintendent; 2. Slump: One per batch of concrete | Yes  No  N/A | S |  | S |  | S |  | Concrete pour record | |
| **3.8** | | Concrete testing | | Drawings | Average compressive strength at 28 days meets minimum design requirements  Slump within tolerances specified in AS 1379    *Testing to be in a NATA accredited test facility* | Yes  No  N/A | S |  | S |  | S |  | Test reports | |
| **3.9** | | Curing | | Spec. 0319  Minor Concrete Works [Cl 4.13] | From completion of finishing; cure continuously with either curing compound, wet curing or form retention until 15MPa is achieved unless directed otherwise by the superintendent | Yes  No  N/A | S |  | S |  | S |  |  | |
| **4.0 Finishing Works and Backfilling** | | | | | | | | | | | | | | |
| **4.1** | | Access Covers & Grates | | Spec. 1354 Stormwater Drainage Structures [Cl 3.3] | Access covers, grates and frames to be installed as per AS 3996 | Yes  No  N/A | S |  | S |  | S |  |  | |
| **4.2** | | Step Irons | | Spec. 1354 Stormwater Drainage Structures [Cl 3.3] | Pits deeper than 600 to be fitted with galvanised plastic-coated step irons as per AS1657 | Yes  No  N/A | S |  | S |  | S |  |  | |
| **4.3** | | Pit Jointing | | Spec. 1354 Stormwater Drainage Structures [Cl 3.5] | Provide a 10mm isolation joint in between precast pits and any abutting concrete pavement, kerb and gutter or concrete structure | Yes  No  N/A | S |  | S |  | S |  |  | |
| **4.4** | | Structure Backfill | | Spec. 1354 Stormwater Drainage Structures [Cl 3.7]  Spec. 1112 Earthworks [Cl 4.10] | Backfill shall not commence until the compressive strength of concrete has reached at least 15MPa unless otherwise approved by the superintendent. (Wingwalls shall have no backfill placed until 21 days after casting)  Drainage Structures to be backfilled in 150mm thick layers for a horizontal distance of one third of the height of the structure.  Backfill to be Select fill for material within 1.5m of pavement and General Fill below 1.5m deep.  Select backfill material to be a granular material with a maximum particle size of 50mm and a PI between 2 & 12  **HOLD POINT** | Yes  No  N/A | **H** |  | **W** |  | **W** |  | Material Test Report | |
| **4.5** | | Compaction - Backfill | | Spec. 1112 Earthworks [Cl 4.13] | Minimum relative compaction requirements for backfill against pits to be:   * 92% for general fill * 97% for select fill | Yes  No  N/A | S |  | S |  | S |  | Test reports | |
| **4.6** | | Moisture Content | | Spec. 1352 Pipe Drainage [Cl 5.4] | Moisture Content for Backfill material to be within 60% to 95% OMC unless otherwise approved by Superintendent | Yes  No  N/A | S |  | S |  | S |  | Test reports | |
| **5.0 Conformance check** | | | | | | | | | | | | | | |
| **5.1** | | Survey Report | | Spec. 0161 Quality [Cl 3.13] | An as-built survey of the drainage system been completed to ensure all structures are within construction tolerances.  Plan: +/- 200mm  Level: +/- 20mm  **HOLD POINT** | ☐ Yes ☐ No ☐ N/A | **H** |  | **W** |  | **W** |  | Survey report | |
| **5.2** | | Acceptance and closure of non-conforming items | | Spec. 0161 Quality [Cl 3.8] | NCRs to be opened for non-conforming items and closed prior to closing construction lot. **HOLD POINT** | ☐ Yes ☐ No ☐ N/A | **H** |  | **H** |  | **H** |  |  | |
|  |  | | **Comments**: | | | | | | | | | | |  |
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| **Lot acceptance:**   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Acceptance of works:** | | | | |  | | | Symal Infrastructure representative name |  |  | Symal Infrastructure representative signature |  | Date |  | | UGL representative name |  |  | UGL representative signature |  | Date |  | | SHL representative name |  |  | SHL representative signature |  | Date |  | |

**Inspection Checklist Report**

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| **Project no.** | CC0375 | **Project name** | Hunter Power Project | | **Date** |  |
| **Symal ITP no.** | CC0375-ITP-11 | | | | | |
| **UGL ITP no.** | 3200-0663-HPP-QA-ITP-012 | | **SHL ITP no.** | | HPP-UGL-QUA-GN-GEN-ITP-0012 | |
| **Symal Lot no.** |  | | | | **Symal Sub Lot no.** |  |
| **Location (chainages, detailed description or marked up plan)** | | | |  | | |

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|  | | **Verify of acceptance by** | | | | | | | | | **Remarks / records** |
|  | | **Symal** | | | **UGL** | | | **SHL** | | |
| **ID No.** | **Activity to be verified** | **ITP Step No.** | **Items conforms?** | | | **NCR / Test Report No.** | | **Key** | | **Sign Date** | **Key** | | **Sign Date** | **Key** | | **Sign Date** |  | |
| Yes | No | NA |
| **Preliminaries** | | | | | | | | | | | | | | | | | | |
| 1. | Documentation | 1.1 |  |  |  |  | | S | |  | S | |  | S | |  |  | |
| 2. | Lot Traceability | 1.2 |  |  |  |  | | S | |  | S | |  | S | |  | Lot map | |
| 3. | Set Out | 1.3 |  |  |  |  | | S | |  | S | |  | S | |  |  | |
| **Excavation and Bedding** | | | | | | | | | | | | | | | | | | |
| 4. | Excavation | 2.1 |  |  |  |  | | S | |  | S | |  | S | |  |  | |
| 5. | Unsuitable Material  **HOLD POINT** | 2.2 |  |  |  |  | | **H** | |  | **H** | |  | **H** | |  |  | |
| 6. | Compaction - Foundation | 2.3 |  |  |  |  | | S | |  | S | |  | S | |  | Test reports | |
| 7. | Foundation Inspection  **HOLD POINT** | 2.4 |  |  |  |  | | **H** | |  | **H** | |  | **H** | |  |  | |
| 8. | Blinding | 2.5 |  |  |  |  | | S | |  | S | |  | S | |  |  | |
| **Cast In-situ Structures** | | | | | | | | | | | | | | | | | | |
| 9. | Formwork (Base)  **HOLD POINT** | 3.1 |  |  |  |  | | **H** | |  | **H** | |  | **H** | |  | Pre-pour inspection | |
| 10. | Steel (Base) reinforcement  **HOLD POINT** | 3.2 |  |  |  |  | | **H** | |  | **H** | |  | **H** | |  | Pre-pour inspection | |
| 11. | Formwork (Wall)  **HOLD POINT** | 3.3 |  |  |  |  | | **H** | |  | **H** | |  | **H** | |  | Pre-pour inspection | |
| 12. | Steel (Wall) reinforcement  **HOLD POINT** | 3.4 |  |  |  |  | | **H** | |  | **H** | |  | **H** | |  | Pre-pour inspection | |
| 13. | Pit & Pipe Connection | 3.5 |  |  |  |  | | S | |  | S | |  | S | |  |  | |
| 14 | Concrete supply and placement | 3.6 |  |  |  |  | | S | |  | S | | S |  | |  | Delivery dockets | |
| 15. | Concrete sampling | 3.7 |  |  |  |  | | S | |  | S | |  | S | |  | Concrete pour record | |
| 16. | Concrete testing | 3.8 |  |  |  |  | | S | |  | S | |  | S | |  | Test reports | |
| 17. | Curing | 3.9 |  |  |  |  | | S | |  | S | |  | S | |  |  | |
| **Finishing Works and Backfilling** | | | | | | | | | | | | | | | | | | |
| 18. | Access Covers & Grates | 4.1 |  |  |  |  | | S | |  | S | |  | S | |  |  | |
| 19. | Step irons | 4.2 |  |  |  |  | | S | |  | S | |  | S | |  |  | |
| 20. | Pit Jointing | 4.3 |  |  |  |  | | S | |  | S | |  | S | |  |  | |
| 21. | Structures Backfill  **HOLD POINT** | 4.4 |  |  |  |  | | **H** | |  | **W** | |  | **W** | |  |  | |
| 22. | Compaction - Backfill | 4.5 |  |  |  |  | | S | |  | S | |  | S | |  | Test reports | |
| 23. | Moisture Content | 4.6 |  |  |  |  | | S | |  | S | |  | S | |  |  | |
| **Conformance Check** | | | | | | | | | | | | | | | | | | |
| 24. | Survey Report  **HOLD POINT** | 5.1 |  |  |  |  | | **H** | |  | **W** | |  | **W** | |  | Survey reports | |
| 25. | Acceptance and closure of non-conforming items | 5.2 |  |  |  |  | | **H** | |  | **H** | |  | **H** | |  |  | |

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| I certify that this Lot conforms to the requirements of the design and specifications; that all associated NCRs have been closed out: and all survey, conformance testing and inspections have been undertaken in accordance with the specified requirements. | | | | |
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| **Symal Representative** |  | **Signature** |  | **Date** |
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| **UGL Representative** |  | **Signature** |  | **Date** |
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| **SHL Representative** |  | **Signature** |  | **Date** |
| **Comments:** | | | | |
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