| **INSPECTION AND TEST CHECKLIST FOR:**  **Earthworks UZF (R44)** |
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| Activity No.# | Description | Requirements / Reference | | Acceptance Criteria | | | | | | | Comments / Attachments / Records | | | | Engineer Signoff | |
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| 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 | | | | | | |  | | | |  | |
| 2 | **Environment** | Project Environment Plan  G36 CL 3.1  G38, G40 | | * Installation of soil erosion and sedimentation controls completed in accordance with ESC Plan and EMP, as well as Specification TfNSW G38 * All work undertaken under this Specification must be approved by the Environmental Site Representative (refer TfNSW G36) and comply with Abergeldie’s CEMS and CEMP | | | | | | |  | | | |  | |
| 3 | **Personnel** | R44 Cl 1.8, 1.9 | | Geotechnical Engineer: Engage a Geotechnical Engineer to meet the requirements of TfNSW G1 Clause 19, to undertake or organise for tests, calculations, reports, recommendations etc, where stated in this and other Contract Specifications  Occupational Hygienist: Engage an Occupational Hygienist with an appropriate degree qualification and with a minimum of 5 years’ experience in contaminated land, site assessment and remediation, and also having appropriate accreditation as an occupational hygienist. The Occupational Hygienist must be involved in inspections, tests, reports, assessments and / or recommendations where stated in this Specification. They must be on site:   * Whenever topsoil operations are underway (Cl 2.3) * During advance contamination assessments (Cl 2.3.2), and * At other times as required in this Specification | | | | | | | * Test report | | | |  | |
| 4 | **Existing Site Survey and Setting out** | R44 6.1  R44 6.2 | | Survey to determine surface levels at sufficient locations to determine the volume of compacted imported material placed during works  Set out embankments and transitions zones using pegs, batter profiles or equivalent. Maintain drainage to work area in a manner that prevents ingress of water into materials and ensures controlled run-off and no ponding.   * Plant/Equipment is selected such that constant tracking of the underlying ground does not turn the existing ground into unsuitable material | | | | | | | * + Survey | | | |  | |
| 5 | **Spoil and**  **Waste Classification Testing** | R44 CL2.5  TfNSW G36  R44 CL2.5.2 | | Disposal of Non-contaminated materials:  At Flat batter slopes on embankments, uniform widening of embankments and stockpiling within site  Approved offsite location (If all on-site areas are at capacity)  Disposal of Contaminated materials:  Stockpile and remove offsite any contaminated materials   * Notify the principal at least 24 hour prior to disposal, of proposed method and location of disposing contaminating materials from site. | | | | | | | * + Survey | | | |  | |
| 6 | **Removal of Topsoil** | **R44 CL2.3.1** | | Remove or leave topsoil in place to suit the requirements for earthworks for roadworks, aiming to create a stable formation suitable for the pavement  Geotechnical engineer undertakes inspections of all areas, assessing and recommending the depth of topsoil for each area as a Hold Point  **HOLD POINT**   * At least three working days before your proposed removal of topsoil, provide a recommendation of the proposed depth of topsoil including details of the inspections and other relevant information used to make that recommendation. The proposal must also detail the proposed sub area of topsoil removal (including a plan of that sub area) and a proposed final location of the topsoil once it is removed (either stockpiled within the site or spoiled outside the site) | | | | | | |  | | | |  | |
| 7 | **Removal of Topsoil** | **R44 CL2.3.2** | | Occupational hygienist inspects the topsoil ground surface and document the presence/absence of visible contamination at the ground surface (including asbestos and asbestos containing material) including documenting the likelihood of contamination being present  If asbestos and/or other contamination is identified or considered likely to be present, you are to make proposals for the management/remediation measures for the identified or suspected contamination prior to disturbance or removal of the topsoil  **HOLD POINT**   * At least three working days before your proposed removal of topsoil, provide findings of visible topsoil contamination and/or suspected topsoil contamination including details of the inspections and other relevant information used to make that assessment | | | | | | |  | | | |  | |
| 8 | **Topsoil Stockpiling** | R44 CL2.3.4  R44 CL2.6  R44 1.6  R44/A A2.1  G71 | | Locate stockpiles at areas nominated by the drawings or specifications and in accordance with Roads and Maritime (2015) Stockpile Site Management Guideline. Note that Dubbo Regional Council Waste Facility cannot accept Nickel contaminated materials.  Surface joint survey to be carried out at each topsoil stockpile location before start stockpiling with the client.  Topsoil stockpiles must:   * Be free from weeds, subsoil, other excavated materials, contaminated materials, refuse, clay lumps and stones, timber or other rubbish. * Be trimmed to a height not exceeding 2m and batter slope ≥ 2H: 1V. * Have batters track rolled or stabilised by other means acceptable to the Principal * Be seeded with a sterile cover crop in accordance with R178. Seeding to be carried out progressively within seven days of completion of each 500 m2 of exposed batter face * Be less than 1000m3 each | | | | | | | **NOTE: ALL TOPSOIL TO BE SPOILED AND DISPOSED OF AT A LICENCED RECEIVING FACILITY OR AT ANOTHER TFNSW PROJECT** | | | |  | |
| 9 | **Survey after Removal of Topsoil** | R44 CL2.3.5  R44/A A1  G71 CL 2.10.2  G71 Cl 2.10.1 | | Determine surface levels in each cutting and embankment at sufficient locations after removing topsoil to determine volume of excavation for general earthworks and the volume of unsuitable material  **HOLD POINT**  Submit a completed Survey Report of the existing surface levels, and a notification that the position and extent of all cuttings and embankments shown on the Drawings, and any cut/fill transitions, using pegs and batter profiles or equivalent, prior to commencement of construction.     * Joint survey for surface at each topsoil stockpile location before commencing stockpiling and Surface after stripping of topsoil. | | | | | | |  | | | |  | |
| 10 | **Unsuitable Material** | R44 CL1.6  R44 CL2.4.1  R44 CL.2.4.5  R44/A A1  TfNSW G71 | | After stripping, earthworks processes are held to allow inspection by Geotechnical engineer initially and then by the Principal. Where unsuitable material is found, Geotechnical engineer must assess the extent of unsuitable material and make that assessment report available to the Principal including any supporting information. The Principal will consider the assessment and instruct you regarding the requirement for any removal of unsuitable material.  Where unsuitable material is found, such unsuitable material must be excavated to the extent directed by the Principal  **HOLD POINT**  Notification that unsuitable material has been removed as directed  Joint survey before and after removal of unsuitable material, survey in accordance with Specification TfNSW G71 to determine the surface levels at sufficient locations to later determine the volume of unsuitable material removed.   * Prior to releasing the Hold Point, the Principal will inspect the excavation and may direct removal of further material as unsuitable material prior to authorising the release of the Hold Point | | | | | | | Only applicable if unsuitable material is found, otherwise not appliable | | | |  | |
| 11 | **ACM – On-Site Encapsulation Plan** | R44 Cl 2.5.2.1 | | **HOLD POINT: On-Site Encapsulation of Asbestos Contaminated Material**   * Submit an Asbestos Management Sub-Plan (AMSP), including the Remediation Action Plan and details of proposed encapsulation and proposed locations at least 4 weeks prior to on-site encapsulation of ACM. | | | | | | |  | | | |  | |
| 12 | **ACM – Excavation of ACM** | R44 Cl 2.5.2.1 | | **HOLD POINT: Excavation of Asbestos Contaminated Material**   * At least 24 hours prior to excavation, submit details of: each proposed location and method of encapsulation, air monitoring and dust suppression methodology for management and treatment of ACM, if a borrow pit option is proposed, submit a report from the hydrogeologist confirming and certifying the suitability of the locations and the design and drainage system(s) required | | | | | | |  | | | |  | |
| 13 | **Contractor Arranged Borrow Areas** | R44 2.7.3 | | * Provide copies of all approvals and consents to Principal at least 5 working days prior to commencing work at these borrow areas. | | | | | | |  | | | |  | |
| 14 | **Foundation Treatments – Embankment and Cutting** | R44 CL3.1  R44 CL3.2  R44 CL3.3  R44 Cl 3.4 | | After preparation of the foundation area, present the area for inspection by the principal prior to placing pavement materials  Geotechnical engineer to assess the required test method or methods, organise tests and carry out inspections of all foundations and confirm and or/ assess which foundation treatments and their extents are required. Provide the results of all tests and assessments and the proposed foundation treatments to the Principal, issued as a Hold Point.        **SUBMIT HOLD POINT FOR EITHER EMBANKMENTS OR CUTTINGS, SUBJECT TO RELATIVE HEIGHT OF EXISTING SURFACE VS DESIGN HEIGHTS**    **HOLD POINT (EMBANKMENTS / CLAUSE 3.2)**  Submission of:  Survey report,  Notification of completion of clearing operations;  In areas other than beneath Shallow Embankments, notification that:  topsoil has been removed in accordance with Cl 2.3; or  grasses have been flattened/mowed if shown on the Drawings or specified;  In areas beneath Shallow Embankments:   * notification that topsoil has been removed and surface excavated in accordance with Cl 3.5.1; and * CBR (10 days), *CBR (swell)* and PI test results, required if in accordance with Cl 3.5.1   *Details of tests, inspections, assessment and any recommended foundation treatment(s) and extents proposed by Geotechnical Engineer*  **HOLD POINT (CUTTINGS / CLAUSE 3.4)**  Submission of:  Notification of completion of excavation to:   * Designed Floor Level, or Foundation Level, as appropriate; and * Depth specified for Cut / Fill Transition Zone (refer to Clause 3.5)   CBR (10 days), *CBR (swell)* and PI test results  *Details of tests, inspections, assessment and any recommended foundation treatment(s) and extents proposed by Geotechnical Engineer*   * (The submission must be concurrent with the submission for any adjoining Shallow Embankment foundation required by the Hold Point in Clause 3.2) | | | | | | |  | | | |  | |
| 15 | **Cuttings in Rock** | R44 CL 4.2. | | Clean cut batters in rock with slopes > 1H:1V with compressed air when excavation to the level of each bench is complete. The Principal is to assess the batter’s stability when all loose, unstable materials are removed and joints are exposed.  Geotechnical Engineer is to undertake inspections and arrange any required tests of all cleaned batter and bench/floor surfaces, as well as assess their stability and recommend treatments for the Principal’s approval.  **HOLD POINT**   * Present the clean batter/ bench and associated assessment and any alternate proposals by Geotechnical Engineer for geotechnical inspection and consideration of proposals by the Principal, before excavation below bench level for slopes > 1H: 1V can proceed. | | | | | | |  | | | |  | |
| 16 | **Batter Tolerances in Cuttings** | R44 CL4.3. | |  | | | | | | |  | | | |  | |
| 17 | **Embankment Batter Tolerances** | R44 CL 5.4 Table R44.8 | |  | | | | | | |  | | | |  | |
| 18 | **Delivery of Site Won and Imported Material for Upper Zone of Formation Material - UZF** | R44 6.1.1 | | **HOLD POINT**  Submission of proposed source locations, quantities and type of material and verification of conformity  If imported, verification that all possible sources and stockpiles of material have been exhausted.  Before placing imported upper zone material in any formation, carry out a survey in accordance with TfNSW G71 to determine the surface levels at sufficient locations to later determine the volume of compacted imported material placed in the works. | | | | | | |  | | | |  | |
| 19 | **Delivery of Site Won and Imported Material for verges** | R44 6.2 | | **HOLD POINT**  Submission of proposed source locations, quantities and type of material and verification of conformity   * If imported, verification that all possible sources and stockpiles of material have been exhausted. | | | | | | |  | | | |  | |
| 20 | **Relative Compaction Conformity Criteria** | Table R44.10  R44 A5  TfNSW Q6 CL L3.1 | | All compaction testing for the aforementioned layers in accordance with TfNSW Q6 Specification.  Minimum Testing Frequency CL L3.1   |  |  | | --- | --- | | **Rel. Compaction (%)** | | | *Layers replacing unsuitable material.* | ***95.0*** | | *Material layers placed up to underside of SMZ (incl. Shallow Embank., Cut/Fill Transition)*  *Entire area on the floor of cuttings* | ***98.0*** | | **Moisture Content:***All Earthworks Materials* ***=  60 - 90 %*** | | | | | | | | | * + Compaction test results | | | |  | |
| 21 | **Construction of each trial section of rock fill** | R44 CL 7.5 | | **WITNESS POINT: Construction of each trial section of rock fill**   * Notification of the place, date and time of construction of the trial section, at least 3 working days prior to commencement, with details i) to vi) | | | | | | |  | | | |  | |
| 22 | **Construction of remaining section of rock fill** | R44 CL 7.5 | | **HOLD POINT: Construction of remaining sections of rock fill**   * Verification, including test results, of conformity of each trial section including details of the proposed compaction procedure, any test results and survey reports. | | | | | | |  | | | |  | |
| 23 | **Deflection Testing – Proof Rolling** | R44 CL 7.6.1  R44 A4/A4 | | **WITNESS POINT:**  All surfaces within 1.5m of underside of SMZ must be capable of withstanding proof rolling  Carry out proof rolling in accordance with Test Method TfNSW T198 of embankment lots and other surfaces within 1.5m of the underside of the Selected Material Zone.  All proof rolling is to be carried out under the supervision of the contractor’s Geotechnical Engineer who must also provide written verification of compliance, or recommendations for other action as required  The tests must not exhibit visible deformation, rutting, or yielding and/or show signs of distress of instability  In the event of a failed proof roll, rework or recompact the affected area prior to reinspection. Rework the foundation of the lot if reworking is unsuccessful.   * Carry out proof rolling of all lots affected by rain or lots which have exceeded 7 days since last proof rolling, including any lots which have previously been proof rolled. | | | | | | |  | | | |  | |
| 24 | **Benkelman Beam** | R44 CL 7.6.2  R44 A4/A4 | | Where specified in Annexure R44/A4, conduct deflection testing using the Benkelman Beam in accordance with Test Method TfNSW T199.   * Underside of SMZ * Top of SMZ   Where no SMZ is specified, conduct Benkelman Beam testing of the formation at the level of the underside of pavement  Carry out deflection testing by Benkelman Beam within 3 days of taking samples for compaction testing and moisture conformity testing of the material, or such longer period as approved by the Principal due to adverse weather conditions  All Benkelman Beam testing is to be carried out under the supervision of the contractor’s Geotechnical Engineer who must also provide written verification of compliance, or recommendations for other action as required  In the event of a failed Benkelman Beam, confirm next steps with Geotechnical Engineer prior to making any changes to the lot being tested   * **WITNESS POINT:** Notification to the Principal of the time, date and location of Benkelman Beam testing and results. | | | | | | | Where specified in Annexure R44/A4 | | | |  | |
| 25 | **Finalising Layer Prior to Placing SMZ** | R44 7.6.2 | | **HOLD POINT: Placing each Lot of SMZ, or each Lot of pavement where there is no Selected Material Zone.**   * Submit deflection test results, Survey Report of the finished surface and verification of conformity of each lot of formation. | | | | | | |  | | | |  | |
| 26 | **Level Control**  **(Subgrade survey conformance)** | R44 CL 7.7  Table R44.11 | | * Where SMZ is be sealed, conform SMZ thickness , surface levels and surface deviation in according with TfNSW R71 clauses 8.5 (b), 8.6 ( b) and 8.7 respectively. * Ensure conformance of the finished surface levels of the floors of transitions, earthworks layers and zones, and verges are within the Tolerances specified: | | | | | | |  | | | |  | |
| **REVIEW BY PROJECT ENGINEER** | | | | | | | | | | | | | | | | |
| Any non-conformances? | | | YES | | NO | | Nos: | | | Closed Out | | | YES | | | NO |
| Other QA details – NCRs, CARs, Identified Records etc | | |  | | | | | | | | | | | | | |
| All work has been satisfactorily completed | | | | | | YES | | | NO | | | | | | | |
| Name | | | | | | | | Signature | | | | Date | |  | | |