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| Document Title  | <b>Subgrade Preparation Procedure</b> |
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| Approved By     | Brendan McKenna                       |
| Position        | Director                              |
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## Purpose

Brendan McKenna Earthmoving is committed to preparing road subgrades safely, efficiently and in accordance with engineering, environmental and quality requirements.

This procedure establishes the requirements for planning, preparing, conditioning and compacting road subgrades to achieve the required pavement foundation while protecting workers, underground services, surrounding infrastructure and the environment.

This procedure supports compliance with the Work Health and Safety Act 2011 (Qld), Work Health and Safety Regulation 2011 (Qld), Environmental Protection Act 1994 (Qld) and Brendan McKenna Earthmoving's Integrated Management System (IMS).

## Scope

This procedure applies to all Brendan McKenna Earthmoving employees and contractors undertaking subgrade preparation at company worksites.

It applies to activities including:

- Survey and set-out.
- Subgrade trimming.
- Scarifying.
- Moisture conditioning.
- Compaction.
- Final trimming.
- Verification of subgrade levels.
- Associated earthmoving plant operations.

## Responsibilities

| Role                                 | Responsibilities                                                                                                                                                                                   |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Director                             | Ensure adequate resources, plant and systems are available to safely undertake subgrade preparation activities.                                                                                    |
| Operations Manager                   | Plan subgrade preparation activities, verify pavement design requirements and ensure this procedure is implemented.                                                                                |
| Supervisors / Site Managers          | Coordinate subgrade preparation, verify compliance with this procedure, monitor safety, quality and environmental controls and ensure work is completed in accordance with project specifications. |
| Health & Safety Representative (HSR) | Participate in worker consultation, assist with hazard identification and support continual improvement of subgrade preparation activities where required.                                         |
| Employees / Plant Operators          | Operate plant safely, comply with this procedure, report hazards and equipment defects and maintain environmental controls.                                                                        |
| Survey Personnel (where required)    | Establish survey control, verify levels and provide survey information to support accurate subgrade construction.                                                                                  |

## Procedure

Brendan McKenna Earthmoving shall ensure all subgrade preparation activities are undertaken using suitable plant, competent personnel and approved engineering controls to achieve a safe, stable and compliant pavement foundation.

Subgrade preparation shall be completed in accordance with approved pavement design, survey control and engineering specifications to achieve the required pavement performance.

## 1. Planning and Site Preparation

Prior to commencing subgrade preparation, personnel shall ensure all planning activities have been completed and the work area has been assessed.

This shall include:

- Completing all required site inductions.
- Participating in the daily pre-start meeting.
- Completing a Personal Risk Assessment (Take 5) where required.
- Reviewing the relevant Safe Work Method Statement (SWMS) where applicable.
- Completing a **Dial Before You Dig (1100) / Before You Dig Australia (BYDA)** enquiry and identifying underground and overhead services in accordance with service plans and site investigations.
- Clearly demarcating and delineating the approved work area.
- Reviewing approved pavement design drawings and confirming the required box depth and finished subgrade levels.
- Confirming the Total Station, grader control system and survey information are available and calibrated.
- Confirming all required plant, rollers, water truck and supporting equipment have been organised prior to commencing work.
- Confirming survey control points, benchmarks and access routes.
- Reporting any discrepancies between approved pavement design, survey information or site conditions to the Site Manager before subgrade preparation commences.

No person shall enter the work area unless authorised by the Site Manager.

Only trained, competent and authorised personnel shall undertake subgrade preparation activities.

## 2. Subgrade Preparation

Subgrade preparation shall be completed in accordance with approved pavement design drawings and project specifications.

The following construction sequence shall be followed:

- Set up the **Total Station** in accordance with the manufacturer's instructions and project survey requirements.
- Connect the grader to the Total Station and bench the grader to within **1 mm**.
- Confirm the correct pavement box depth prior to commencing work.
- Cutline both sides of the roadway with the leading edge positioned approximately **800 mm behind the back of the kerb**.
- Scarify the road box between the cutlines to the full depth of the scarifier tyne.
- Cut the scarified material from one side and windrow it to the opposite side.
- When the full depth of the tyne marks has been reached, return the material while conditioning it with the water truck.
- Repeat the process on the opposite side until the material has been uniformly processed.
- Condition the material to achieve **optimum moisture content** prior to compaction.
- Compact the conditioned material using the flat drum roller until the required density is achieved.
- The grader tyne will generally rip to approximately **150 mm**, with **three to four passes on heavy vibration** normally being sufficient.
- Trim the roadway to build the required crown approximately **30 mm above subgrade level** and complete a further **three passes on heavy vibration**.
- Trim the roadway to approximately **10 mm above subgrade level** and complete a further **three passes on light vibration**.
- Compact the roadway using the **multi-tyred roller** for approximately **10 full passes**.
- Where soft spots are identified, re-scarify the affected area and repeat the conditioning and compaction process.
- Complete the final trim to finished level by removing the remaining **5 mm** with the grader and complete a further **three static passes** using the flat drum roller.

**If the material cannot be conditioned to achieve the required standard, subgrade replacement may be required in accordance with project specifications.**

Personnel shall continually monitor:

- Survey accuracy.
- Moisture content.
- Ground conditions.
- Plant interaction.
- Compaction quality.
- Soft spots.
- Underground services.
- Environmental controls.
- Weather conditions during conditioning and compaction.

Any unsafe condition or non-conformance shall be reported immediately to the Site Manager.

### 3. Plant and Equipment Operations

Subgrade preparation shall be completed using suitable plant and equipment appropriate for the work activity.

Plant and equipment that may be utilised includes:

- Grader
- Flat Drum Roller
- Multi-Tyred Roller
- Water Truck
- Total Station Survey Equipment

All operators shall hold the appropriate licences, competencies or verified training applicable to the plant or equipment being operated.

The Operations Manager or delegated Supervisor shall ensure operator competencies have been verified prior to commencing work.

Validation of Competency records shall be retained with the operator's training records in accordance with company requirements.

Operators and ground personnel shall maintain continual awareness of surrounding personnel, mobile plant, changing ground conditions and exclusion zones throughout subgrade preparation activities.

### 4. Quality, Compaction and Environmental Controls

Subgrade preparation shall be completed in a manner that achieves the required pavement strength, compaction and finished surface while protecting the surrounding environment.

This shall include:

- Verifying the completed subgrade achieves the required levels, crown and pavement box depth in accordance with the approved design.
- Confirming the material has reached optimum moisture content before final compaction.
- Completing the specified heavy vibration, light vibration and static rolling sequence to achieve the required compaction.
- Inspecting the completed subgrade for soft spots, rutting, segregation, ponding or other defects.
- Re-scarifying, reconditioning and recompacting any areas that do not achieve the required standard.
- Where the material cannot be conditioned to achieve the required standard, undertaking **subgrade replacement** in accordance with project specifications and the direction of the Site Manager.
- Maintaining erosion and sediment controls throughout the duration of the works.
- Preventing unnecessary disturbance outside the approved work area.
- Reporting environmental incidents, spills or failures of environmental controls immediately to the Site Manager.
- Leaving the work area in a clean, safe and compliant condition.

### 5. Documentation and Completion

Subgrade preparation activities shall be documented in accordance with company requirements to demonstrate compliance with engineering specifications, quality requirements and the Integrated Management System.

This shall include:

- Completing Pre-start Inspections for all plant and equipment used.
- Completing a Personal Risk Assessment (Take 5) through the MCK Group App where available.
- Completing paper versions of the Pre-start Inspection and Personal Risk Assessment where mobile coverage is unavailable and forwarding completed records once adequate signal is available.
- Completing a Job Hazard Analysis (JHA) where activities fall outside the scope of this procedure or additional risks have been identified.
- Recording survey verification, level checks, compaction testing and quality control results in accordance with project requirements.
- Reporting hazards, incidents, near misses and equipment defects in accordance with company procedures.
- Confirming the completed subgrade complies with the approved pavement design, project specifications and quality requirements before leaving the work area.

## Records

The following records may be retained where relevant to subgrade preparation activities.

| Record                             | Responsibility                  | Retention Location                          |
|------------------------------------|---------------------------------|---------------------------------------------|
| Personal Risk Assessments (Take 5) | Employees and Contractors       | MCK Group App / Site Records                |
| Plant Pre-start Inspection Records | Plant Operators                 | Plant Records                               |
| Validation of Competency Records   | Operations Manager              | Training Records                            |
| Survey Verification Records        | Survey Personnel / Site Manager | Project Records                             |
| Compaction Test Results            | Site Manager / Supervisor       | Project Quality Records                     |
| Construction Inspection Records    | Supervisors                     | Inspection & Audit Register                 |
| Incident and Hazard Reports        | Employees and Supervisors       | Incident Records                            |
| Corrective Actions                 | Operations Manager              | Incident / NCR / Corrective Action Register |

## Related Information

- HS-PR-001 Risk Assessment Procedure
- HS-PR-003 Personal Risk Assessment (Take 5) Procedure
- HS-PR-005 Incident Investigation & Reporting Procedure
- OP-PR-018 Spill Response & Management Procedure
- HS-SWMS-006 Operating Mobile Plant
- HS-SWMS-005 Working in or around Trenches & Excavation
- Environmental Management Plan (where applicable)
- Environmental Aspects & Impacts Register
- Inspection & Audit Register
- Training & Competency Register
- Incident / NCR / Corrective Action Register
- MCK Group App
- Before You Dig Australia (BYDA)
- Work Health and Safety Act 2011 (Qld)
- Work Health and Safety Regulation 2011 (Qld)
- Environmental Protection Act 1994 (Qld)

## Review and Revision

This procedure shall be reviewed every two years or earlier following legislative changes, organisational changes, incidents, audit findings, changes to work practices or identified improvement opportunities.