# Tunnel Boring Machine | SAFE WORK METHOD STATEMENT (SWMS)

**TASK OR ACTIVITY: Tunnel Boring Machine**

| | | | |
|---|---|---|---|
| Business Name: | | ABN: | SWMS# |
| Business Address: | | | |
| Contact Person: | Phone: | Email: | |

## THIS SAFE WORK METHOD STATEMENT IS APPROVED BY THE PCBU OF THE PROJECT

Under the Work Health and Safety Regulation (WHS Regulation), a person conducting a business or undertaking (PCBU) is required to ensure that a safe work method statement (SWMS) is prepared before the proposed work starts.

| | | |
|---|---|---|
| Full Name: | | |
| Signature: | Title: | Date: |

Details of the person(s) responsible for ensuring implementation, monitoring and compliance of the SWMS as well as reviews and modifications of the SWMS.

| | | |
|---|---|---|
| Full Name: | Title: | Phone: |

| ALL PERSONNEL PARTICIPATING IN ANY ACTIVITY ON THIS SWMS MUST HAVE THE FOLLOWING COMMUNICATED | NAME OF ALL RELEVANT PERSONNEL WHO HAVE BEEN CONSULTED AND COMMUNICATED TO IN THE DEVELOPMENT AND APPROVAL OF THIS SWMS |
|---|---|
| Safety meetings or toolbox talks will be scheduled in accordance with legislative requirements to first identify any site hazards, then to communicate those hazards and then to further take steps to either eliminate or control each hazard. | |
| If an incident or a near miss occurs, all work must stop immediately. Depending on the severity of the incident, a meeting will be called with all workers to amend the SWMS if required. The meeting may also be an educational opportunity. | |
| Any changes made to the SWMS after an incident or a near miss must be approved by the Person Conducting Business or Undertaking and communicated to all relevant personnel. | |
| The SWMS must be kept and be available for inspection at least until the work is completed. Where a SWMS is revised, all versions should be kept. If a notifiable incident occurs in relation to which the SWMS relates, then the SWMS must be kept for at least two years from the occurrence of the notifiable incident. | |

| CLIENT OR PRINCIPAL CONTRACTOR DETAILS | |
|---|---|
| Client: | SCOPE OF WORKS |
| Project Name: | |
| Project Address: | |
| Project Manager: | |
| Contact Phone: | |
| Date SWMS supplied to Project Manager: | |

| ANY HIGH-RISK CONSTRUCTION WORK BEING CARRIED OUT | |
|---|---|
| ☐ involves a risk of a person falling more than 2 meters | ☐ is carried out on or near pressurised gas mains or piping |
| ☐ is carried out on a telecommunication tower | ☐ is carried out on or near chemical, fuel or refrigerant lines |
| ☐ involves demolition of an element of a structure that is load-bearing | ☐ is carried out on or near energised electrical installations or services |
| ☐ involves demolition of an element related to the physical integrity of a structure | ☐ is carried out in an area that may have a contaminated or flammable atmosphere |
| ☐ involves, or is likely to involve, disturbing asbestos | ☐ involves tilt-up or precast concrete |
| ☐ involves structural alteration or repair that requires temporary support to prevent collapse | ☐ is carried out on, in or adjacent to a road, railway, shipping lane or other traffic corridor |
| ☐ is carried out in or near a confined space | ☐ is carried out in an area of a workplace where there is any movement of powered mobile plant |
| ☐ is carried out in/near a shaft or trench deeper than or tunnel involving use of explosives | ☐ is carried out in areas with artificial extremes of temperature. |
| ☐ is carried out in or near water or other liquid that involves a risk of drowning. | ☐ involves diving work. |

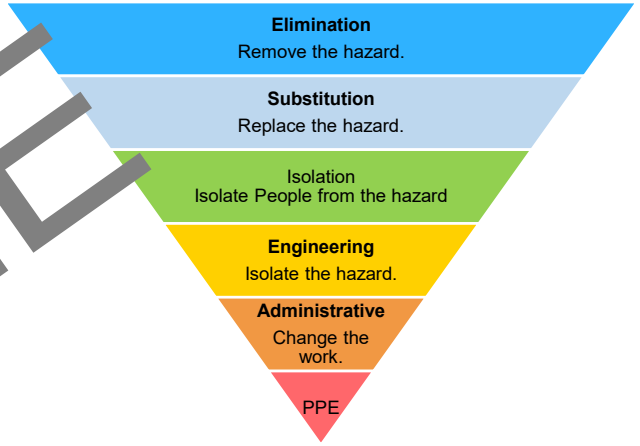
| ANY HIGH-RISK MACHINERY OR EQUIPMENT NEARBY |
|---|
| |

## RISK MATRIX

| LIKELIHOOD | INSIGNIFICANT | MINOR | MODERATE | MAJOR | CATASTROPHIC | SCORE | ACTION |
|---|---|---|---|---|---|---|---|
| ALMOST CERTAIN | 3 HIGH | 3 HIGH | 4 ACUTE | 4 ACUTE | 4 ACUTE | | |
| LIKELY | 2 MODERATE | 3 HIGH | 3 HIGH | 4 ACUTE | 4 ACUTE | 4A ACUTE | DO NOT PROCEE |
| POSSIBLE | 1 LOW | 2 MODERATE | 3 HIGH | 4 ACUTE | 4 ACUTE | 3H HIGH | Review befo work starts. |
| UNLIKELY | 1 LOW | 1 LOW | 2 MODERATE | 3 HIGH | 4 ACUTE | 2M MODERATE | Ensure control measures in place. |
| RARE | 1 LOW | 1 LOW | 2 MODERATE | 3 HIGH | 3 HIGH | 1L LOW | nitor and k records |

**Notes on Hierarchy of Controls:** Elimination methods are the most effective and preferre en co lli a hazard. Substitution is the second most effective method of controlling a hazard. Engineering by isolation is the ost e ve, while Administrative Controls by changing the work is the fourth most effective method. PPE (Personal Protective Eq ment) he least effective method.

HEIRARCHY OF CONTROLS




## PERS NAL P TECTIVE EQUIPMENT (PPE)

**Select the appropriate PPE bov uitable or the equipment used or the job task being performed (if applicable).**

| FOOT PROTECTION | HAND PROTECTION | HEAD PROTECTION | HEARING C ECTION | EY CTION | RESPIRATORY PROTECTION | FACE PROTECTION | HIGH-VIS CLOTHING | PROTECTIVE CLOTHING | FALL PROTECTION | SUN PROTECTION | HAIR/JEWELLERY SECURED |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  |  |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

Other PPE Required:

| Permit or Licenses Requirements | Mandatory Qualifications and Training |
|---|---|
| | |

| JOB STEP | POTENTIAL HAZARDS | IR | CONTROL MEASURES | RR |
|---|---|---|---|---|
| SPECIFIC WORK STEPS | HAZARDS THAT MAY ARISE | INITIAL RISK | SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS | RESIDUAL RISK |
| 1. Preparation | Incorrect setup, equipment failure | 3H | - Ensure all operators are properly trained and certified in the use of Tunnel Boring Machines (TBMs). This reduces the risk of incorrect setup.<br>- Conduct regular machine inspections. Assuring that all machine parts are in working order can prevent a sudden equipment failure.<br>- Implement a thorough pre-operational checklist. This helps to identify any overlooked elements during setup, reducing chances of operation error or machine breakdown.<br>- Establish communication protocols between workers. Clear communication allows any identified risks to be quickly addressed.<br>- Use only high quality TBM equipment. Sub-par equipment could lead to faults or failures which can pose serious safety risks.<br>- Have an expert technician on-site. The immediate presence of someone who understands the machinery inside out means any issues can be addressed promptly, reducing downtime and potential hazards.<br>- Put in place emergency procedures. Prior planning for any unexpected events, such as equipment failure, ensures everyone knows how to react safely and promptly.<br>Incorporate regular breaks for the TBM operators. Fatigue can lead to sloppy setup and operational errors, hence, allowing operators to rest and recover is essential.<br>Insist on personal protective equipment (PPE) usage. Proper usage of PPE like safety helmets, gloves, boots and high-visibility jackets reduce risk of injury during operations.<br>- Schedule regular maintenance and timely replacement of faulty parts. Strict adherence to manufacturer's guide prolongs equipment life and minimises chance of equipment failure.<br>- Appoint qualified personnel to supervise site preparation. Experienced supervisors can spot potential issues before they become problems and guide the setup process to ensure it adheres to best practices. | 2M |
| 2. Mobilisation | Electrocution, trip hazards | 2M | - Routine equipment checks: Ensure all electrically powered machinery is checked for faulty wiring and potential damage before use to prevent electrical hazards.<br>- Training: Provide sufficient training on how to safely operate the Tunnel Boring Machine, focusing on alertness to trip hazards and electrocution prevention.<br>- Personal Protective Equipment (PPE): Staff should wear appropriate PPE at all times, such as non-conductive gloves, safety boots, hard hats, and high-visibility clothing.<br>- Signage: Make sure all potential hazard areas are clearly marked with appropriate signage to alert workers of possible risks.<br>- Enclosed Electrical Sources: All power sources and outlets should be properly enclosed to limit direct contact and reduce the risk of electric shock. | 1L |

| JOB STEP | POTENTIAL HAZARDS | IR | CONTROL MEASURES | RR |
|---|---|---|---|---|
| SPECIFIC WORK STEPS | HAZARDS THAT MAY ARISE | INITIAL RISK | SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS | RESIDUAL RISK |
| | | | - Cordon off work area: Isolate the work area using barrier tape or cones to prevent unauthorized personnel from wandering into hazardous zones.<br>- Safe Cable Practices: Cables should always be se ely fastened and out of walkways to prevent tripping incidents.<br>- Scaffolding: Securely install temporary pl rms or scaff ds to provide workers with a safe and even surfaces to operate on, reducing trip hazards<br>- Lighting: Good illumination in the workplace ca revent accide s related to trips and falls.<br>- Clear Communication: Maint open lines of co unicat on site to alert team members promptly about any identified risks<br>- Regular Breaks: ve ad uate b aks to worke s for rest which helps them stay focused and alert.<br>- Spill Manag ent: Clean any liq spil immediately to prevent slipping and tripping hazards.<br>- Site anline Practi good housekeeping habits onsite, keeping equipment neatly stored and work areas n and f m clutter.<br>- Emer nc planni Implement an emergency response plan so that every worker knows what to do in case of ect ution o ip-related injuries. | |
| 3. Excavation | Collapse of ground, dust exposure | 4A | - En re e work area for excavation is properly barricaded and has warning signs placed around it to prevent uthorised access.<br>- efore commencing work, evaluate ground conditions to identify any risks of potential collapse or ins bility.<br>- Conduct regular inspections of the site to assess the stability of excavated areas and mitigate any potential hazards.<br>- Utilise support systems such as shoring, pilling, underpinning or ground improvement techniques where necessary to prevent collapsing of the tunnel during and after excavation.<br>- Create a proper ventilation system within the tunnel to dissipate hazardous dust caused by drilling operations.<br>- Ensure all workers undertaking the excavation process are provided with personal protective equipment such as hard hats, safety goggles, gloves, high visibility vests and appropriate footwear.<br>- Implement an effective dust management plan including wetting down surfaces, using dust extraction systems, and providing respiratory protective equipment if required.<br>- Enforce strict adherence to safe work procedures with workers trained in Tunnel Boring Machine operation.<br>- Pre-plan the excavation process by ensuring there are no utilities or services running through the designated excavation site.<br>- Maintain clear and adequate communication amongst team members regarding the work progress and any potential safety hazards identified.<br>- Carry out regular maintenance checks on Tunnel Boring Machine (TBM) to ensure its safe functionality. | 3H |

| JOB STEP | POTENTIAL HAZARDS | IR | CONTROL MEASURES | RR |
|---|---|---|---|---|
| SPECIFIC WORK STEPS | HAZARDS THAT MAY ARISE | INITIAL RISK | SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS | RESIDUAL RISK |
| | | | - Have an emergency response plan in place, outlining clear evacuation routes and procedures in case of any mishap resulting in the collapse of ground or excessive dust exposure. | |
| 4. Tunnel Boring | Machinery malfunction, noise pollution | 3H | [redacted] | 2M |
| 5. Material Removal | Overexertion, struck by moving objects | 3H | [redacted] | 2M |

| JOB STEP | POTENTIAL HAZARDS | IR | CONTROL MEASURES | RR |
|---|---|---|---|---|
| SPECIFIC WORK STEPS | HAZARDS THAT MAY ARISE | INITIAL RISK | SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS | RESIDUAL RISK |
| | | | [redacted] | |
| 6. Safe Access/ Egress | Slips, trips and falls | 2M | [redacted] | 1L |
| 7. Maintenance Work | Inadequate safety measures, mechanical errors | 3H | | 2M |

| JOB STEP | POTENTIAL HAZARDS | IR | CONTROL MEASURES | RR |
|---|---|---|---|---|
| SPECIFIC WORK STEPS | HAZARDS THAT MAY ARISE | INITIAL RISK | SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS | RESIDUAL RISK |
| | | | [redacted] | |
| 8. Emergency Procedures | Panic, insufficient training | 3H | [redacted] | 2M |

| JOB STEP | POTENTIAL HAZARDS | IR | CONTROL MEASURES | RR |
|---|---|---|---|---|
| SPECIFIC WORK STEPS | HAZARDS THAT MAY ARISE | INITIAL RISK | SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS | RESIDUAL RISK |
| | | | [redacted] | |
| 9. Mechanical Lifting | Dropped loads, rigging failure | 4A | [redacted] | 3H |

| JOB STEP | POTENTIAL HAZARDS | IR | CONTROL MEASURES | RR |
|---|---|---|---|---|
| SPECIFIC WORK STEPS | HAZARDS THAT MAY ARISE | INITIAL RISK | SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS | RESIDUAL RISK |
| | | | [redacted] | |
| 10. Shift Changeover | Communication breakdown | 2M | [redacted] | 1L |

| JOB STEP | POTENTIAL HAZARDS | IR | CONTROL MEASURES | RR |
|---|---|---|---|---|
| SPECIFIC WORK STEPS | HAZARDS THAT MAY ARISE | INITIAL RISK | SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS | RESIDUAL RISK |
| | | | [redacted] | |
| 11. Machine Operation | Non-compliance with procedures, unauthorised access | 2M | [redacted] | 1L |
| 12. Breaks/ Meal Times | Poor hygiene practices, allergens | 2M | [redacted] | 1L |

| JOB STEP | POTENTIAL HAZARDS | IR | CONTROL MEASURES | RR |
|---|---|---|---|---|
| SPECIFIC WORK STEPS | HAZARDS THAT MAY ARISE | INITIAL RISK | SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS | RESIDUAL RISK |
| | | | [redacted] | |
| 13. Finishing Work | Inadequate housekeeping, improper storage | 2M | [redacted] | 1L |

| JOB STEP | POTENTIAL HAZARDS | IR | CONTROL MEASURES | RR |
|---|---|---|---|---|
| SPECIFIC WORK STEPS | HAZARDS THAT MAY ARISE | INITIAL RISK | SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS | RESIDUAL RISK |
| | | | [redacted] | |
| 14. Demobilisation | Equipment damage, lax safety standards | 3H | [redacted] | 2M |
| 15. Post-operation Review | Inadequate feedback, overlooked issues | 2M | [redacted] | 1L |

| JOB STEP | POTENTIAL HAZARDS | IR | CONTROL MEASURES | RR |
|---|---|---|---|---|
| SPECIFIC WORK STEPS | HAZARDS THAT MAY ARISE | INITIAL RISK | SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS | RESIDUAL RISK |
| | | | [redacted] | |
| | | | | |
| | | | | |
| | | | | |

## EMERGENCY RESPONSE – CALL 000 FOR EMERGENCIES

Ensure to have an Emergency Management Plan in place as well as adequate numbers of trained first aid staff with easy access to fully stocked first aid kits, rescue equipment, material safety data sheets, adequate access to emergency communication equipment and fire-fighting equipment suitable for all classes of fire and ignition sources.

## LEGISLATIVE REFERENCES

RELEVANT LEGISLATION AND CODES OF PRACTICE. DELETE THE LEGISLATIVE REFERENCES FOR ANY STATE THAT ARE NOT APPLICABLE

**Queensland & Australian Capital Territory**
Work Health and Safety Act 2011
Work Health and Safety Regulations 2011
Legislation QLD: https://www.worksafe.qld.gov.au/laws-and-compliance/work-health-and-safety-laws
Codes of Practice QLD: https://www.worksafe.qld.gov.au/laws-and-compliance/codes-of-practice
Legislation ACT: https://www.worksafe.act.gov.au/laws-and-compliance/acts-and-regulations
Codes of Practice ACT: https://www.worksafe.act.gov.au/laws-and-compliance/codes-of-practice

**New South Wales**
Work Health and Safety Act 2011
Work Health and Safety Regulations 2017
Legislation NSW: https://www.safework.nsw.gov.au/legal-obligations/legislation
Codes of Practice NSW: https://www.safework.nsw.gov.au/resource-library/list-of-codes-of-practice

**Northern Territory**
Work Health and Safety (National Uniform Legislation) Act 2011
Work Health and Safety (National Uniform Legislation) Regulations 2011
Legislation NT: https://worksafe.nt.gov.au/laws-and-compliance/workplace-safety-laws
Codes of Practice NT: https://worksafe.nt.gov.au/forms-and-resources/codes-of-practice

**South Australia**
Work Health and Safety Act 2012 (SA)
Work Health and Safety Regulations 2012 (SA)
Legislation for SA: https://www.safework.sa.gov.au/resources/legislation
Codes of Practice for SA: https://www.safework.sa.gov.au/workplaces/codes-of-practice#COPs

**Tasmania**
Work Health and Safety Act 2012
Work Health and Safety (Transitional and Consequential Provisions) Act 2012
Work Health and Safety Regulations 2012
Work Health and Safety (Transitional) Regulations 2012
Legislation for TAS: https://worksafe.tas.gov.au/topics/laws-and-compliance/acts-and-regulations
Codes of Practice for TAS: https://worksafe.tas.gov.au/topics/laws-and-compliance/codes-of-practice

Details of permits, licenses or access required by regulatory bodies (add or delete as required):

- Permits from local council
- Authorisation to commence work
- Any required documents.

**Victoria**
Occupational Health and Safety Act 2004
Occupational Health and Safety Regulations 2017
Legislation VIC: https://www.worksafe.vic.gov.au/occupational-health-and-safety-act-and-regulations
Codes of Practice VIC: https://www.worksafe.vic.gov.au/compliance-codes-and-codes-practice

**Western Australia**
Work Health and Safety Act 2020
Work Health and Safety Regulations 2022
Legislation Western Australia: https://www.commerce.wa.gov.au/worksafe/legislation
Codes of Practice WA: https://www.commerce.wa.gov.au/worksafe/codes-practice

**Safe Work Australia Links**
Law and Regulation (All States): https://www.safeworkaustralia.gov.au/law-and-regulation
Model Codes of Practice: https://www.safeworkaustralia.gov.au/resources-publications/model-codes-of-practice

**Model Codes of Practice**

- Managing noise and preventing hearing loss at work
- Confined spaces
- Labelling of workplace hazardous chemicals
- Managing risks of hazardous chemicals in the workplace
- Welding processes
- First aid in the workplace
- Managing the risk of falls at workplaces
- Hazardous manual tasks
- Managing the risk of falls in housing construction
- Managing electrical risks in the workplace
- Demolition work
- Excavation work
- Work health and safety consultation, cooperation and coordination
- Managing the work environment and facilities
- How to manage work health and safety risks
- Managing risks of plant in the workplace
- Construction work

## SIGNATORIES OF THE SAFE WORK METHOD STATEMENT

The signed and dated personnel listed below have cooperated in the consultation and development of this Safe Work Method Statement which has been approved by the Person/s Conducting a Business or Undertaking (PCBU). In signing this Safe Work Method Statement each individual acknowledges and confirms that they have read this SWMS in full, having raised any questions for items on this Safe Work Method Statement that require clarification, and confirms that they are competent, skilled and knowledgeable for the task assigned to them. Every person acknowledges that they have received the relevant training and qualifications where required, before carrying out any work contained in this Safe Work Method Statement. By signing this Safe Work Method Statement each individual agrees to work safely, to follow any safe work instructions which are provided, and agrees to use all Personal Protective Equipment where appropriate.

| Worker Name | Signature | Date |
|---|---|---|
| | | |
| | | |
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## SAFE WORK METHOD STATEMENT MONITORING AND REVIEW

**The SWMS must be reviewed regularly** to make sure it remains effective and must be reviewed (and revised if necessary) if relevant control measures are revised. The review process should be carried out in consultation with workers (including contractors and sub-contractors) who may be affected by the operation of the SWMS and their health and safety representatives who represented that work group at the workplace.

When the SWMS has been revised the PCBU must ensure that all persons involved with the work are advised that a revision has been made and how they can access the revised SWMS, including all persons who will need to change a work procedure or system as a result of the review are advised of the changes in a way that will enable them to implement their duties consistently with the revised SWMS. All workers that will be involved in the work must be provided with the relevant information and instruction that will assist them to understand and implement the revised SWMS.

**The SWMS must be monitored regularly** for the effectiveness of ensuring hazard controls are effective in reducing the risk of incidents, keeping the workplace safe for all personnel. The person responsible for monitoring the effectiveness of the Safe Work Method Statement should employ a multi-faceted approach which includes but is not limited to:

1. Spot Checks.
2. Consultation with workers, contractors and sub-contractors.
3. Internal audits on a continual basis.

An approach of continuous improvement, promptly recording inconsistencies or deficiencies, followed up by immediate corrective action and consultation with all relevant personnel ensures that the PCBU is consistently developing ever-improving systems of safe work principles.

| REVIEW NUMBER | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| NAME | | | | | | | |
| INITIALS | | | | | | | |
| DATE | | | | | | | |

## SAFE WORK METHOD STATEMENT REVIEW CHECKLIST

This Safe Work Method Statement Review Checklist is to be followed and used upon initial development of the SWMS to help ensure that all steps have been adequately taken before work commences. Think of this document as an internal audit review checklist before commencing work, and may form part of a Toolbox Talk (safety meeting) and may be used as an opportunity for education and training.

| ITEMS WHICH MUST BE INCLUDED IN THE SWMS | COMPLETED | COMMENTS |
|---|---|---|
| The company details have been entered, including the project name and address. | ☒ | |
| All relevant personnel consulted during the development of the SWMS. | ☒ | |
| Name, signature, position and date signed of the person approving the SWMS. | ☐ | |
| Specific personnel and qualifications, experience is noted in the SWMS. | ☒ | |
| Provides a step-by-step process of tasks required to carry out the activity or task. | ☒ | |
| Adequate risk assessment of any identified hazards has been completed. | ☒ | |
| Foreseeable hazards are identified and documented for each step. | ☒ | |
| Any hazards listed in any site risk assessments have been added to the SWMS. | ☒ | |
| SWMS initial risk (IR) column as well as residual risk (RR) column completed. | ☒ | |
| Check control measures added to the SWMS are the most effective selection | ☒ | |
| Responsible person is assigned and listed on the SWMS for the implementation of control measures. | ☒ | |
| Permit or licenses requirements specified, such as Hot Work, Electrical Work, Work at Heights etc. | ☒ | |
| SWMS identifies plant and equipment to be used | ☒ | |
| Details of inspection checks required for any equipment listed are noted on the SWMS. | ☒ | |
| Describes any mandatory qualifications, experience, training or skills required to perform the work. | ☒ | |
| Applicable personal protective equipment is selected on the SWMS. | ☒ | |
| Reflects and documents any legislative references and/or Australian Standards. | ☒ | |
| Identifies any hazardous substances used with specific control measures in line with any SDS. | ☒ | |

| | | | |
|---|---|---|---|
| **REVIEWED BY** | | **DATE REVIEWED** | |
| **SIGNATURE** | | **DATE COMPLETED** | |