MS&L Procedure

PRO-4.5-0001-1-03
Ground Disturbance

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To review changes, refer to the 'Version Summary' at the end of this document.

Contents

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1. Purpose

Whenever bp conducts construction, maintenance, demolition, remediation and other similar work that are typical of our industry, there is the potential for harm to people and the environment and for damage to equipment. This document provides requirements for ground disturbance in support of PRO-4.5-0001-0-01 Control of Work and WPCG-PRO-01 Work Authorisation.

This procedure sets out a required approach to ground disturbance in accordance with bp's Golden Rules of Safely, the requirements of GDP 4.5-0001 Control of Work, Annex 1 and OMS Group Essentials 3.2.1 and 4.5.1.

The document defines the requirements that apply to ground disturbances within ANZ MS&L to protect personnel from injury and property from damage during the ground disturbance or the period an excavation exists on site.
This procedure specifically details the requirements of the following documents:

- Group Defined Practice (GDP); GDP 4.5-0001 2016 Control of Work

2. Scope

The requirement specified in this procedure applies equally to bp employees, contractors and visitors engaged in the ANZ MS&L business.

Specific sites, areas and activities may have more detailed OMS requirements and where these exist the requirements will be specified in local procedures, safe work instructions, manuals, handbooks or specific standards.

3. Terms, Definitions and Abbreviations

Table 1: Terms, Definitions and Abbreviations

Battering	To excavate a hole or build an earth bank so that it forms a batter as a means of preventing the collapse of the sides of an excavation. A batter is formed with sides that are inclined away from the excavation. The angle of repose required to prevent collapse, varies with differences in such factors as the soil type, environmental conditions of exposure and additional loadings e.g. plant.
Benching	To cut an excavation in steps to provide horizontal bearing and sliding resistance as a means of preventing the collapse of the sides of an excavation. Benching is formed with one or a series of horizontal levels or steps, usually with vertical or near vertical surfaces between levels.

Certificates	Certificates are documents that define the core preparations required for work to proceed and do not, by themselves, authorise work to proceed. Certificates can be used to manage focused tasks efficiently which are not sufficiently managed by a typical permit or Work Clearance (e.g. precautions for ground disturbance).
De-energised	Disconnected from all sources of supply but not necessarily isolated, earthed or out of commission.
Electrical Worker	Person or persons engaged in the installation, maintenance, repair and testing of electrical equipment.
Ground disturbance	Work that involves a manmade cut, cavity, trench or depression in the earth's surface formed by earth removal. This includes cutting into hard surfaces such as concrete, driving piles into or by breaking the earth's surface, and/or ground removal.
Isolated	Refer PRO4.5-0001-1-02 Energy Isolation for defection of isolated, and isolation requirements.
Potholing	Using a safe means of exposure (e.g., hand-digging, using a vacuum excavator) to make a hole that confirms the exact location, depth, orientation and size of a line or other underground facility. 'Potholing' is also called 'test-pitting.'
Shoring	The use of timber, steel or other structural material to support an excavation in order to prevent collapse so that construction can proceed.
Simultaneous operations (SIMOPS)	Separate tasks or works that take place at the same time with the potential to impact each other. Also referred to as SIMOPs
Verify	Proving by comparison with an original or with established fact. *Synonyms include establish, substantiate, authenticate, prove, check, test or validate.* *Used when the expectations are that an individual will validate by visual comparison that something has changed or remains the same as the original.*

4. Roles and Responsibilities

The roles and responsibilities associated with this procedure are listed in the following table.

Table 2: Roles and Responsibilities

Planner	The person responsible for planning the ground disturbance work is responsible for ensuring that the Permit Receiver is communicated the requirements of this procedure as part of the planning process prior to work. The planner role is often not a dedicated role and may be fulfilled by Project Manager, Project Engineer, Retail Field coordinator, etc.
Permit Receiver	The Permit Receiver is responsible for: • Ensuring the requirements of the WPCG Work Clearance, WPCG Minimum Controls Checklist and Ground Disturbance Certificate (as applicable) are complied with. • Ensuring the impacted personnel are communicated the effect of the ground disturbance work. This is in addition to the normal risk assessment for the task and any associated Work Permits or Work Clearances (as documented in WPCG-PRO-01 Work Authorisation).
Permit Officer	The Permit Officer is responsible for the issue of a Ground Disturbance Certificate in accordance with this procedure, along with the other

	permits for works associated with the Ground Disturbance as outlined in WPCG-PRO-01 Work Authorisation.
Site Representative	The Site Representative is responsible for communicating to the Permit Officer (work under a Ground Disturbance Certificate) or Permit Receiver (work performed with a WPCG Work Clearance Form supported by a Minimum Controls Checklist for Minor Ground Disturbance) the operations that may affect the Ground Disturbance. They are responsible for ensuring that other parties on site that may be affected by the Ground Disturbance are informed.

5. Methodology

5.1. Risk Assessment for Ground Disturbance work

Work that involves a man-made cut, cavity, trench or depression in the earth's (ground's) surface formed by earth (ground) removal shall not proceed unless a risk assessment has been conducted, which includes:

A. Identifying utility installations and other buried/hidden hazards that may be encountered during the task.

1) To confirm adequate controls are in place, including the identification of services to an appropriate level, a WPCG Minor Ground Disturbance Minimum Controls Checklist or Ground Disturbance Certificate is required for all non-routine Ground Disturbance as per WPCG-PRO-01 Work Authorisation. These documents differ from a Work Permit or Work Clearance in that they only serve to confirm the area of ground is safe to be disturbed prior to commencing work. A Work Permit or Work Clearance for the work is still required in accordance with WPCG-PRO-01 Work Authorisation, including re-endorsement and all other requirements for associated Work Permits (e.g. monitoring and site inspection).
2) Where site plans exist for the work site these shall be reviewed for underground services, pipelines, pipework, tanks and other equipment prior to the commencement of work.
3) Consult *Dial Before You Dig* (beforeUdig in New Zealand), the national referral service for information on underground infrastructure.
4) The risk assessment for the task shall consider the method for underground service investigation required prior to disturbing the ground. All available information relating to underground utilities such as *Dial Before You Dig* (beforeUdig), plans, site as-built plans, are to be made available to the utility locator prior to the commencement of any utility location activities.
5) If services are identified or foreseeable (e.g. due to ambiguous results) in the area then the work area shall be de-energised. All isolations, and any de-energising of electrical services, shall be carried out in accordance with PRO-4.5-0001-1-02 Energy Isolation.
6) In order to confirm location of electrical services (e.g. non energised or shielded cables), where identified in the risk assessment for the task, a competent electrical worker may be required to assist the underground services locator to clip onto correct services.
7) The utility locator shall review all relevant utility information gathered for the site before they proceed to inform the Permit Officer for the Ground Disturbance

Certificate of the utilities in the work area. Any deviations from the plans provided should be documented on the site plan. (Note: at the completion of the ground disturbance activity, any information which demonstrates that the available plans are inaccurate or incomplete should be provided to the bp representative to update site plans).

8) The cable and piping locator should mark out all known services at the site on the ground surface in the work area prior to the commencement of any ground disturbance work. The following colour coding is nominated in AS1345-1995 for this purpose, and should be used unless otherwise specified and agreed by the individual conducting the utility clearance activities.

I. Temporary Survey Markings – Pink

II. Compressed Air – Blue

III. Fire Services- Red

IV. Electrical – Orange

V. Potable Water – Green

VI. Sewer – Black

VII. Gas –Yellow

VIII. Oil-Brown

IX. Steam – Grey

X. Communications - White

9) If services cannot be identified by other techniques and the surface is not covered by concrete or bitumen then non-destructive digging should be used to provide clearance to that area. High pressure water jetting used for non-destructive digging shall have a maximum pressure of 2000 psi. Pressures above this have been shown to be capable of damaging services. If water jetting is not reasonably practicable, potholing should be conducted for this purpose.

10) Overhead power lines near the excavation work should be considered. Specific control measures shall be implemented to prevent contact, including specification of the required separation distance depending upon the voltage, and the use of a spotter if required. Once an assessment of the worksite and the overhead electric lines has been carried out a decision on the approach distance for the proposed work can be made. The approach distances and work zones vary with the voltage of the overhead electric lines and the level of authorisation of each person carrying out the work. Approach distances can vary depending on the voltage and apply to equipment, plant and personnel. Refer to local regulations and Safe Work Australia guides for working in the vicinity of overhead and underground electric lines.

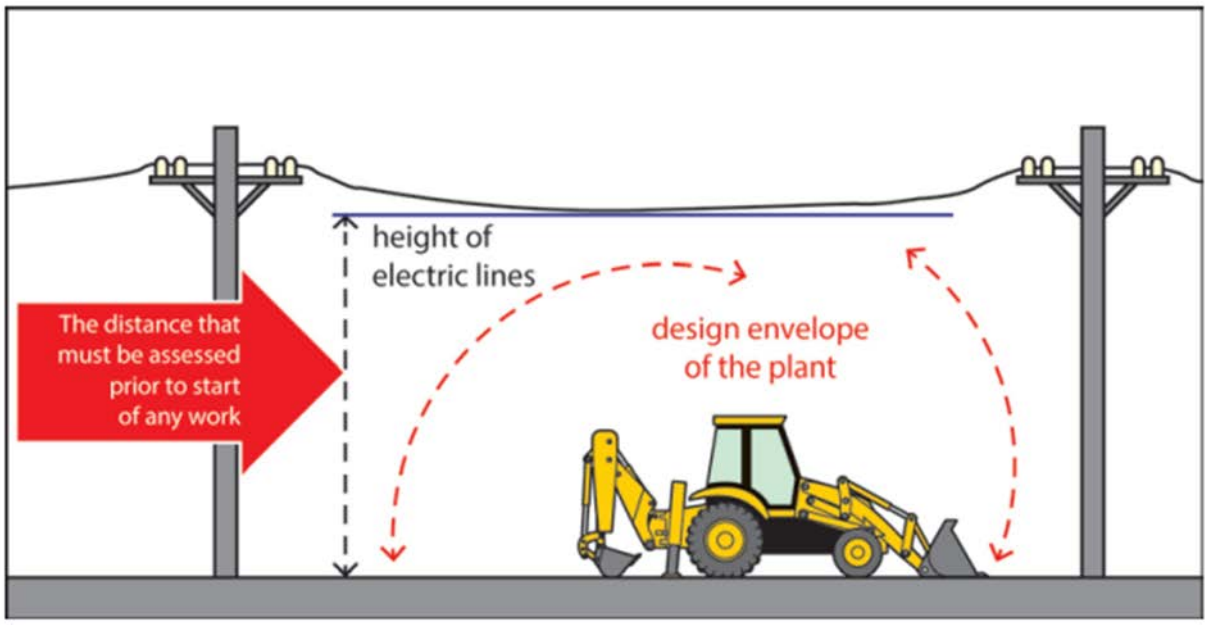

Figure 1: Assessment of distances where overhead electrical lines are identified as a hazard.

11) Review the site asbestos register and consider in the risk assessment for the task the potential for asbestos to be in the soil or adjacent buildings that may be disturbed. PRO-3.4-0000-0-02 MS&L Asbestos Management Procedure shall be complied with for the management of asbestos identified.

B. Identifying ground type, groundwater and environmental conditions to assess the potential for soil collapse or cave in:

1) Ground type

The risk assessment for the task may identify the need for soil sample tests prior to works, and assessment of the potential migration of dust / contaminated spoil. The following external documents provide guidance:

i. AS 3798 Guidelines on earthworks for commercial and residential development

ii. Classification of Soils for Excavations OSHA

2) Groundwater

The following external documents provide guidance:

i. AS 3798 Guidelines on earthworks for commercial and residential development

ii. Classification of Soils for Excavations OSHA (link)

3) Environmental conditions

The risk assessment for the task should consider weather conditions, both current and forecasts which may affect environmental conditions, water ingress, localized flooding, and soil condition.

C. Controlling the risks associated with unauthorised site entry and inadvertent falling into the excavation by people or animals, by the use of physical barriers and warning signs:

1) In the risk assessment consideration should be given to secured fencing and additional barricading at excavation perimeter with warning signage or physical security if required.

2) Excavations greater than 1.5 metres shall receive battering, benching or shoring prior to entry. Shoring may also be required for work that requires access of personnel or placement of loads within a distance of the edge equal to the depth of the excavation, depending on the potential consequence of collapse. This should be considered in the risk assessment and is required, as a minimum, if there is a risk for harm to personnel.

D. Assessing the potential development of an oxygen deficient or hazardous atmosphere within the excavation; and determining whether the excavation should be classified as a confined space. Consult PRO-4.5-0001-1-04 Confined Space Entry and WPCG-PRO-01 Work Authorisation for the definition of a confined space and the requirements to control entry to confined spaces including permit requirements.

5.2. Permissions for Ground Disturbance work

Correct 3rd party consents shall be obtained when the following may be impacted by the ground disturbance:

5.2.1. Impacting Public or 3rd Party Utilities

Public utilities such as electricity, gas, telecoms, water, stormwater, sewage, etc. may exist on work sites.

a. Site plans, where they exist for the work site, shall be reviewed prior to the commencement of work.

b. Consult *Dial Before You Dig* (*beforeUdig* in New Zealand) consulted in advance of work to identify public and 3rd party utilities and their Work Clearance requirements.

c. Determine the appropriate underground site service investigation required to identify and located 3rd party underground services that may be present prior to commencement of work. Refer to section 5.1 A. for minimum requirements.

d. Applicable permits shall be obtained for work in Licensed Energy Corridors or Port Authorities

e. Approved Traffic Management plans issued from Road Authorities should be obtained where required.

5.2.2. Impacting Local Government Authorities

a. Impacts to parks or Roadways may require Local council approval.

b. Consult local Environmental regulations for the transportation and disposal of spoil and ground water.

c. Local requirements to notify the respective regulatory authority of your intention to excavate shall be complied with. Requirements at time of issue of this procedure are identified in Table 3 below.

State / Territory	Authority	Notification Required	Comments
ACT	Work Safe ACT	N	
New South Wales	Work Cover Authority of NSW	N	
Northern Territory	NT Work Safe	N	
Queensland	Workplace Health & Safety Queensland	N	
South Australia	Safe Work SA	Y	24 hours prior to commencement of excavation >1.5m deep
Tasmania	Workplace Standards Tasmania	N	
Victoria	Safe Work Victoria	Y	3 days prior to commencement of excavation >1.5m deep
Western Australia	Work Safe WA	N	
New Zealand	Worksafe NZ	Y	At least 24 hours prior to commencement of excavation > 1.5m deep, where excavation is deeper than it is wide Where excavated face is more than 5m deep and batter of face is steeper than 1 horizontal to 2 vertical

Table 3: Summary of notification requirements for ground disturbance work

5.2.3. Impacting the Surrounding Community

Consider in the risk assessment if surrounding communities may be impacted and mitigations that may be needed such as traffic management, alternative access, and communications that may be required.

5.3. Communication for Ground Disturbance work

Communication and co-ordination shall be established to confirm the safety of impacted personnel as follows:

a. All personnel shall sign to acknowledge that they have read, understand and shall comply with the requirements of the risk assessment and any Work Permits required for the work, including requirements of WPCG-PRO-01 Work Authorisation.

b. The Work Permits, procedure or associated risk assessment for the task shall specify the appropriate means of communication for the task and co-ordination of personnel, e.g. the agreed communication method between the operator of plant (e.g. excavator) and spotter.

c. Communication to impacted personnel of the effect of ground disturbance work shall be conducted by the person responsible for the works.

5.4. Accessing Excavations

Personnel shall not be allowed to enter a trench or excavation unless:

A. The applicable Work Permit of Work Clearance has been issued.

1) Consult PRO-4.5-0001-1-04 Confined Space Entry and WPCG-PRO-01 Work Authorisation for the definition of a confined space and the entry requirements. If the trench or excavation is deemed to be a confined space, a Confined Space Entry Certificate is required for all entry.
2) A Work Permit or Work Clearance for the work in the trench or excavation may be required by WPCG-PRO-01 Work Authorisation (e.g. Work Permit with a Hot Work Certificate for hot work in an excavation in a hazardous area). This Permit or Work Clearance requirement is irrespective of the determination of the work site as a confined space.

B. The trench or excavation has been safely battered, benched, shored or protected by an engineered trench shield.

1) The risk assessment for the task shall consider battering, benching, shoring or trench shields that may be required. The following external documents provide guidance:
    i. AS3798 Guidance for Earth Works
    ii. AS4744.1 Steel Shoring and Trench Lining
    iii. AS5047 Hydraulic Shoring and Trench Lining
    iv. NZ ACOP for excavations and shafts for foundations
    v. A means of safe entry and exit shall be provided, e.g. benching, ladder.

5.5. Inspection and Documentation of Ground Disturbance work

5.5.1. Daily Inspections

A competent employee shall inspect the following items prior to the start of work each day and record on the Ground Disturbance Certificate:

A. Excavations and the adjacent areas for potential cave-ins.

1) Equipment positioned away from the edge of the excavation. As a rule of thumb the distance from the edge of the excavation is recommended to be at least equal to the depth of the excavation to prevent collapse. This is subject to condition of the soil; type of shoring, sloping and benching in place; and type of equipment.
2) Further guidance is available from AS 3798 Guidelines on earthworks for commercial and residential developments.
3) If the depth of the ground disturbance is >1.2 metres, the site must be inspected by a Competent Person (Permit Officer or Permit Receiver) at the time intervals specified on the front page of Ground Disturbance Certificate, to ensure that the ground disturbance is not a safety hazard during periods that work is not being carried out.

B. Failures of protective systems and equipment.

1) Guidance is available from AS4744.1 Steel Shoring and Trench Lining and AS5047 Hydraulic shoring and Trench Lining Equipment.

C. Hazardous atmospheres.

1) Gas testing is required prior to work conducted under Hot Work Certificates or Confined Space Entry Certificates in accordance with PRO-4.5-0001-1-04 Confined Space Entry and WPCG-PRO-01 Work Authorisation.
2) The potential for occupational exposures to hazardous substances should be considered as part of the risk assessment for the task, and appropriate control measures implemented.

5.5.2. Event Triggered Inspections

Inspections shall also be required after natural or man-made events, such as heavy rainfall, which may introduce new hazards.

A. The risk assessment for the task shall be reviewed and the work site shall be inspected after major natural or man-made events (e.g. large earthquake in the area, site emergency on work not associated with this task or heavy rainfall that has resulted in localized flooding or impact to the soil).

B. If controls have been compromised or additional measures are deemed necessary to make the task safe to continue, then work shall not proceed. The Permit Officer for the Ground Disturbance Certificate shall be informed.

C. If an incident occurs associated with the ground disturbance works, all work shall cease and the site incident reporting and response processes shall be followed. Prior to recommencement of work the Ground Disturbance Certificate and any associated Work Permits shall be re-endorsed by the Permit Officer upon confirmation that the risk assessments and Work Permits effectively control the site to prevent further incident.

6. Verification

The key process steps outlined in this procedure shall be included in a Self-Verification Programme.

Refer to PRO-8.2-0001-0-01 MS&L Self Verification Procedure for further details to developing self-verification protocols.

7. Associated Documents

7.1. Documents

The following associated documents:

- Have been referenced in this procedure.
- Should be considered in understanding and applying the instructions provided in this procedure.

Table 4: Reference documents

Document Name	Document No	Document Location
Group Defined Practice - Control of Work	GDP 4.5-0001_2016	OMS Library
Asbestos Management Procedure	PRO-3.4-0000-0-02	Controlled Document Register
Control of Work	PRO-4.5-0001-0-01	Control of work webpage
Energy Isolation	PRO-4.5-0001-1-02	Control of work webpage
Confined Space Entry	PRO-4.5-0001-1-04	Control of work webpage
WPCG Work Authorisation	WPCG-PRO-01	WPCG website
MS&L Self Verification Procedure	PRO-8.2-0001-0-01	Controlled Document Register

7.2. Standards & Codes of Practice

The following Standards & Codes of Practice may be used as guidance for safe and compliant ground disturbance, and shall be complied with in jurisdictions in which they have legal effect with the relevant regulator for the work site.

Table 5: Standards & Codes of Practice

Document Name	Document No	Document Location
Classification of Soils for Excavations	OSHA Method ID-194	OSHA website
Identification of the contents of pipes, conduits and ducts	AS1345-1995	SAI Global website
Edge Protection	AS 1657 - 1992	SAI Global website
Guidelines on earthworks for commercial and residential developments	AS 3798	SAI Global website
Steel Shoring and Trench Lining	AS 4744.1	SAI Global website
Hydraulic Shoring and Trench Lining Equipment	AS 5047	SAI Global website
Safe Work Australia Code of Practice - Excavation Work		Safe Work Australia website
Safe Work Australia Code of Practice – Confined Spaces		Safe Work Australia website
Safe Work Australia Code of Practice - Managing the Risks of Plant in the Workplace		Safe Work Australia website
NZ ACOP for excavations and shafts for foundations		Worksafe NZ website

Worksafe Western Australia Excavation Code of Practice 2005		Worksafe WA codes of practice website

7.3. Records

The risk assessment for the task shall be displayed at the work site whilst work is being conducted.

If the ground disturbance is subject to a Work Permit, the Work Permit and documentation associated shall be displayed and retained in accordance with WPCG-PRO-01 Work Authorisation.

8. External References

This procedure was prepared with reference to relevant legislation/regulations including but not limited to, relevant Acts, Regulations, Australian Standards and industry codes and practices.

Details of current legislation/regulations can be provided by the HSSE Team on request.

9. Version Summary

The table below provides a summary of version history of this procedure.

Table 6: Document Version Summary

Version	Prepared by	Description of Change	Date	MoC
1	Adrian Connolly	Document created - Initial document	14 Nov 2014	
2	Adrian Connolly	Changes to formatting to improve readability and clarity. Change to requirements for underground service location (Section 5.a.3. through 5.a.6.) - Service locator is no longer mandatory for all ground disturbance work. Removal or previous table 1, inclusion of Work Instructions in new Table 1 (old Table 2) and removal of TRA requirements (refer to TRAT)	24 May 2016	
3	Adrian Connolly	Update to incorporate changes from implementation of WPCG Minimum Control Checklist	15 Oct 2017	11374
4	Adrian Connolly	Update to implement WPCG-PRO-01 Work Authorisation	22 Aug 2018	11449
5	Adrian Connolly	Update to links in document, updated BP to bp	06 Sep 2020	11733

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