Excavation and Digging Procedure

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1 Purpose

This procedure applies to any work location where excavation or digging is required within a PBPL operated and/or maintained site or any situation in which a PBPL employee or PBPL controlled supplier/contractor is required to undertake excavation and digging tasks.

This procedure must be applied in conjunction with the Excavation and Digging Control Form and PBPL's Permit to Work system for all specified excavation tasks (>300 mm depth), in compliance with WHS Regulation 2011 and the Excavation Work Code of Practice 2021.

1.1 Excavation Hazards

In relation to excavation work, a safe system must be implemented to control risks to health, safety and the environment arising from issues such as:

- underground services
- adjacent buildings, routes, or roads that could become unstable as a result of excavation work
- nearby traffic hazards
- hazards to road users
- collapse of an excavation
- objects or people falling into the excavation
- placement of excavated material
- carbon monoxide exposure or other impurity
- contact with contaminated soil or excavated materials
- run-off of soil/materials onto roads, into drains and creek/catchment areas.

2 Scope

This procedure applies to all PBPL employees and work activities across the organisation.

3 Definitions

Term	Definition
Battering back	Removing material around a trench or excavation so that the walls are sloped back at an angle rather than vertical.
Benching	Removing material around a trench or excavation so that the walls are stepped or benched back rather than vertical.
Buffer board	A board, railing, or similar structure secured in place adjacent to an excavation that guides plant operators on the limit they may approach.
Caisson	A structure that provides an underground passageway or a passageway through water.
Cofferdam	A temporary wall erected to exclude water from an area normally under water.
Competent person	A person with training, qualifications, and/or experience enabling them to perform a specified task safely.
Digging	Using hand tools to move earth, rock, sand, or soil at a depth exceeding 300 mm (excluding minor tasks like garden beds or stockpile movement).

4 Planning including Detection and Recording of Underground Service Locations

PBPL is to undertake all necessary investigations regarding excavations and underground services prior to excavation or digging work commencing on-site. This includes:

- reviewing current and controlled site service maps, plans, the Geographical Information System (GIS), and underground service drawings. Evidence of service location must be documented and retained on-site.
- contacting local authorities, PBPL electrical specialists, and other service location record holders, where appropriate. Note: DBYD alone is not sufficient; physical service location (e.g., vacuum excavation or electronic detection) must be undertaken
- undertaking site inspections to identify underground services using site drawings and other visual indicators and where appropriate, an underground cable locator
- Where live electrical or pressurised services are within PBPL-defined distances, isolation by the service owner is mandatory before excavation begins.
- investigating potential environmental effects of the excavation activity and soil run-off paths into drains and catchment areas. Groundwater and weather conditions must be assessed prior to excavation. Where water ingress is possible, implement a dewatering plan. Controls such as silt fences, drain covers, and signage must be in place to prevent soil run-off into drains and catchments
- investigating potential weather conditions that may impact on ground conditions and spoil run off (Note: Spoil and plant setback require 600 mm minimum distance and buffer boards).

Shoring/battering for >0.5 m unless stability confirmed by geotechnical assessment

- Following these investigations, the reports and information relating to all services relevant to the excavation work are to be given to the relevant PBPL supervisor, who instructs all workers and/or

suppliers/contractors involved in the work. This information is to be in writing with records maintained on-site.

Following any PBPL controlled work or Principal Contractor project work involving the modification of existing services or installation of new services, PBPL must ensure existing service drawings and plans are updated and approved.

5 Excavation and Digging Controls

If the excavation or digging task is considered to be a specified high-risk task, prior to the activity being initiated on-site, an Excavation and Digging Control Form, written risk assessment and Permit to Work Form are to be completed by the relevant supervisor as part of the Permit to Work system.

Note:

Specified excavation or digging tasks include any excavation or digging at a depth of >300mm, excluding the following:

- the movement of spoil piles or clearing of drains; or
- reclamation works within established reclamation field zones where services are known not to exist and entry to excavations is not required.

Prior to any excavation work commencing:

- planning and relevant measures are to be taken to ensure the stability of nearby buildings, adjoining structures, routes, roads, and the edges of excavations, relative to the excavation work
- control measures are to be put in place to prevent soil run-off onto roadways and footpaths and into drains, creeks, and other catchment areas. Examples include silt fences, drain covers/sieves and warning signage.
- the ground is to be marked (e.g., pressure paint spray) to indicate safe areas where excavations can be undertaken and to clearly mark in a different way/colour, any services traversing the general excavation area.

Wherever practicable, controls such as the following are to be put in place to exclude entry to any excavation or trench where the public or workers not involved in the activity may be at risk due to its location and accessibility:

- 900mm minimum high barricades or hoardings
- signage (‘Danger – Do Not Enter’) hung independently or from barriers / hoardings.

All excavations and trenches over 1.5 metres in depth, are to be approved by a competent person and where entry is required, are to be either shored, battered back or benched unless a geo-technical engineer confirms in writing it is stable.

For excavations greater than 1.5m requiring entry, a competent person is to undertake as a minimum, daily inspections of trenches and excavations prior to entry. Details of these inspections are to be recorded.

All excavations and trenches less than 1.5 metres in depth with unstable rock or soil and where access is required shall be shored, battered back or benched in a manner approved by a competent person.

Installation and removal of shoring is to take place from outside the trench in accordance with the requirements of the shoring manufacturer or engineer where relevant.

Non-proprietary shoring is to be designed by a suitably qualified engineer and installed by trained people only after a competent person has inspected the trench, assessed the shoring and approved the use of the shoring.

Battering is to be at an angle of 45° or less to the horizontal and start no higher than 1.5 metres above the bottom of the trench or excavation, unless a geo-technical engineer has approved a greater batter angle in writing.

Each bench cut into the side of the excavation or trench must be no higher than it is wide and step dimensions are to be no greater than 1.5 metres unless a geo-technical engineer has approved a greater height or dimension in writing.

All suppliers/contractors or PBPL people involved in trenching where people require access into the trench must ensure that the work is carried out under the direct supervision of a competent person. In the case of a supplier/contractor, details of the person are to be given to PBPL. This competent person is to undertake, as a minimum, daily inspections of trenches and excavations and details of these inspections are to be recorded.

Covers are to be placed on unattended excavations where practicable.

Where practicable, barricades and signs are to be used at safe distances from edges (at least 2m back) to protect unattended excavations that cannot be practically covered. Barricading around an open excavation should encompass spoil piles and earthmoving plant in close proximity, but not closer than 600mm, to edges where practicable.

No person is to work alone in an excavation or trench that is greater than 1.5 metres deep.

Machinery is not to be located in or near excavations and trenches where exhaust fumes may contaminate below ground atmospheres that workers are required to access.

A safe means of access and egress is to be provided into excavations and trenches requiring access. Where a trench cannot simply be walked into by workers, ladders providing a safe access and egress are to be placed in every 9-metre length of trench where workers are required to work. Ladders should also extend at least one meter above the edge of the trench.

Where a person may fall greater than 2m into an excavation or a lesser height where a significant injury would be likely, working at height controls as per the Working at Heights Procedure, are to be implemented.

Mobile plant, materials and spoil are to be kept at least 600mm from the sides of a trench or excavation or at distances that ensures they do not endanger a person below.

Groundwater and weather conditions must be assessed prior to excavation. Where water ingress is possible, implement a dewatering plan. Controls such as silt fences, drain covers, and signage must be in place to prevent soil run-off into drains and catchments

Note:

Buffer boards or rails may be positioned adjacent to the edges of excavations to provide a warning to mobile plant operators who may be required to position plant in close proximity to the edge or for frequent loading and unloading tasks.

Where caissons and/or cofferdams are used, they are to be of a sound construction, secured in position to prevent movement and consist of a safe means of access.

If, during any excavation or digging work activity, a person identifies unstable rock or soil or movement that could place themself or others at risk, they need to immediately inform the relevant supervisor (who will ensure activities are temporarily stopped and/or additional controls are implemented).

Atmospheric testing is required for excavations >1.5 m or where contamination is suspected. If a safe atmosphere cannot be assured, classify as confined space and apply Confined Space Control Form under the Permit to Work system.

Where new underground services are located on-site or where the path of an underground service is modified in any way, the following measures are to be implemented to provide future warning to those who may excavate or dig in the area:

- the new services are to be entrenched in or filled in with sand, and
- colour coded marker tape and/or wire is to be located approximately 200mm above the service.

The underground services are to be identified via the marker tape/wire colours and requirements as detailed in Appendix 1.

On completion of all excavation work that has involved the installation or modification of site services, updates of all site service drawings to 'As Built' status is to take place as coordinated by the supervisor involved with the work activities.

6 Supervising Suppliers/Contractors

Where suppliers/contractors are procured to undertake specific on-site work involving excavation and digging, PBPL supervisors are to provide all relevant prescribed information about underground services to the suppliers/contractors prior to work commencing.

Where suppliers/contractors are procured to undertake specific on-site work involving excavation and digging, PBPL supervisors are to review the following information:

- a Safety Plan/Work Method Statement for any work involving excavation work greater than 1.5m deep that identifies and details controls for excavation collapse, falling objects, being struck by machinery, falling into the excavation, and inhaling or being exposed to impurities in the air etc.
- request evidence of competency of all contracted workers who will be involved in the work and those operating earthmoving machinery (i.e., copies of current certificates / licences, etc.)
- details of a competent person who will be directly involved in the supervision of the work and inspection of the excavation where the PBPL supervisor will not fill this role
- request earthmoving machinery inspection and maintenance details (i.e., registers/logbooks/inspection records etc.).

Suppliers/contractors must obtain a Permit to Work before commencing specified excavation or digging tasks on-site. Prior to access preparations or work commencing on-site the PBPL supervisor is to provide the supplier/contractor with details of:

- Excavation and Digging Procedure
- Excavation and Digging Control Form, Permit to Work Form
- Identity of relevant PBPL authorised persons.

The PBPL supervisor is to monitor the supplier/contractor's methods of work and the implementation of the proposed controls to ensure that PBPL standards for managing excavation and digging activities are achieved.

Following excavation work, completed Risk Assessment and Permit to Work documentation is to be returned to the PBPL authorised person.

7 Training Needs

The following should be used as a guide to determine training needs:

Training Type	Target Group
PBPL Excavation and Digging System Awareness Training	People who undertake basic excavation activities such as: ☑ Low depth digging tasks that do not require the use of earthmoving plant; and ☑ Fence erection or other minor excavation at depths exceeding 300mm but less than 1.5m.
Occupation training and competency assessment	People are required to operate and have a licence for earthmoving plant, including: ☑ Dozers, graders, scrapers; and ☑ Excavators, front-end loaders, backhoes, rollers skid steer loaders, with an engine capacity of more than 2 litres.

8 References

- Queensland Work Health & Safety Regulation 2011, Part 17
- Professional Engineers Act 1988
- AS 1345 Identification of the Contents of Pipes, Conduits and Ducts
- AS 2700 Colour Standards for General Purposes
- AS/NZS 2648.1 Underground Marking Tape – Part 1: Non-Detectable Tape

Excavating	Any activity that results in a hole in the earth greater than 300 mm deep after material has been moved or removed.
Excavation	A hole in the earth formed after rock, sand, soil, or other material is removed.
Prescribed Information	Information about an underground service necessary to safely do excavation work, including location, type, depth, and restrictions.
Shoring	A system of temporary supports and sheeting material used to maintain the stability of excavation sides.
Trench	An excavation where the maximum depth is more than the minimum width.
Underground Service	A cable, pipe, or other thing installed underground for transmission, transportation, or storage of electricity or substances.

9 Non-Compliance

Breaches of this procedure may result in disciplinary action being initiated in accordance with PBPL's Code of Conduct.

10 Appendix 1

10.1 Underground Service Identification Colours (from AS/NZS 2648.1 – Table 1)

Underground Service	Tape Colour
Electricity	**Orange**
Gas	**Yellow**
Water	**Green**
Communications	**White**
Fire-fighting	**Red**
Sewerage	**Cream**
Reclaimed Water	**Purple**

Note 1: *Colours for other underground services need to be of a bright colour. Guidance may be obtained from AS 1345 and AS 2700.*

Note 2: *The use of canary yellow to identify pipelines containing gases is adopted in AS/NZS 2648.1, as this is the colour commonly used in Australia to identify gas pipes by gas supply authorities and users. It should be noted however, that AS 1345 specifies a colour of light beige for this purpose, this being the internationally agreed colour.*

Note 3: Marker tape/wire must be installed approximately 200 mm above services, colour-coded per AS/NZS 2648.1. Minimum tape width 75 mm with warning text repeated every 1 m

10.2 Additional Underground Service Marking Tape Requirements (from 2648.1)

Detection	Wire lines or traces may also be located with marker tape to enable easy service detection as well as a visual marker to identify service location.
Tape Width	The minimum nominal width is to be 75mm. Preferred nominal widths are 100mm and 150mm.
Marking	Warning lettering printed in the tape is to be black in colour and of a minimum size of 25mm. The text is to be repeated at intervals of not more than 1m.
Tear Resistance	Longitudinal direction – not less than 3.0 N. Transverse direction – not less than 3.5 N.
Note: *Additional requirements in relation to tape properties are included within AS/NZS 2648.1.*	