

Business Procedure

Excavation and Penetration Document Number – OHS-PROC-126

This document applies to the following sites:

All Sites	<input type="checkbox"/>			
Rockhampton Office	<input type="checkbox"/>	Brisbane Office	<input type="checkbox"/>	Tarong Site <input checked="" type="checkbox"/>
Barron Gorge Hydro PS	<input checked="" type="checkbox"/>	Kareeya Hydro PS	<input checked="" type="checkbox"/>	Mica Creek PS <input checked="" type="checkbox"/>
Koombooloomba Hydro PS	<input checked="" type="checkbox"/>	Swanbank PS	<input checked="" type="checkbox"/>	Mackay Gas Turbine <input checked="" type="checkbox"/>
Wivenhoe Small Hydro PS	<input type="checkbox"/>	Stanwell PS	<input checked="" type="checkbox"/>	Meandu Mine <input type="checkbox"/>

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Doc No:OHS-PROC-126 Revision No: 0 Revision Date: 14.08.2014 Page: 1 of 9

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1.0 Purpose

This Business Procedure defines Stanwell's minimum mandatory requirements for managing risks associated with excavation and penetration activities.

2.0 Scope

This Business Procedure applies throughout Stanwell, all its sites and all activities under Stanwell's control. It applies to all Stanwell employees and contractors, including visitors to Stanwell workplaces.

3.0 Actions

It must be ensured that, where practicable, the need to conduct excavation and penetration has been eliminated through design and planning. Where elimination is not possible, excavation and penetration techniques that minimise the potential for harm must be selected.

It must be ensured that:

- all personnel conducting excavation or penetration activities are trained and competent; and
- excavation and penetration work is risk assessed to identify potential hazards and make sure suitable risk control measures are in place.

Excavation and penetration risks must be controlled through the application of the hierarchy of controls to achieve the highest level of protection that is reasonably practicable in the circumstances.

3.1 Safe Systems of Work Requirements

The safe system of work must be implemented for all excavations with a depth of 150mm or greater, or where damaging energies have been identified, for example, essential services.

The safe system of work must be implemented for all penetrations where the penetrating item (e.g. drill bit) will insert to a depth greater than the thickness of the primary surface (i.e. in to a cavity).

Excavation does not include the digging or movement of material stockpiles such as coal and topsoil, the digging of raised garden beds, cleaning of culverts around drains to the natural ground shape, etc.

A Land Disturbance Permit may be required for some of the above identified activities. **Business Procedure: Land Disturbance** must be implemented where there is a risk of land disturbance, or where an activity involves any of the following:

- disturbance/exposure of land surface;
- disturbance/clearing of vegetation;
- work in a water course;
- construction or demolition; or
- change in land use.

Where there is a risk of penetrating asbestos containing material, **Business Procedure: Asbestos Management** must be implemented.

Where there is a risk of coming into contact with live electrical components, **Business Procedure: Electrical Safety** must be implemented.

Where there is a risk of falling, **Business Procedure: Work at Height** must be implemented.

Where an excavation has the potential to meet the definition of a confined space **Business Procedure: Confined Space** must be implemented.

As part of the safe work system, a risk assessment must be performed. As a minimum, this assessment must cover the hazards identified in *Appendix B Excavation and Penetration Hazards*.

Where the safe work system is not used to perform excavation / penetration as per the above requirements, a risk assessment is to be documented and approved by site management.

For specific details regarding WMSs, refer to **Business Procedure: HS Hazard Management**.

3.1.1 Site Survey

A documented survey of the work area before must be undertaken before excavation and penetration work begins. This survey must identify:

- any services that may be affected;
- the location, depth, size and capacity/rating of any pipes, cables or plant associated with the services;
- any adjacent buildings or structures that may be affected; and
- any restrictions on work activities imposed by the owner of a service.

It must be ensured that all information identified during the survey is communicated to the people performing the work before work commences.

Prior to excavation or penetration work commencing, where applicable, the ground / wall / other area is to be marked (e.g. pressure paint spray, tape) to indicate safe areas where excavation and penetration can be undertaken and to clearly mark in a different way / colour, any services traversing the area.

3.1.2 Emergency Response

It must be ensured that there is an emergency response plan in place to deal with excavation or penetration incidents, for example:

- ground slip;
- flooding;
- gas leaks;
- the rescue of workers in the event of an emergency, for example, rescue from an excavation;
- contact with essential / electrical services.

Specific requirements for emergency procedures and plans are detailed in **Business Procedure: Emergency Response Framework**.

3.2 Work Environment Requirements

3.2.1 Excavation Barricading and Signage

The following actions must occur:

- install barriers around the perimeter of all excavations, unless the erection of the barrier is impracticable or no person is likely to be in the vicinity of the excavation site;
- barriers must be at least 900mm high and must not be installed closer than one metre to the edge unless approved by a competent person (i.e. geotechnical engineer);
- secure and clearly sign entry points to excavations when work is suspended and the site unmanned; and
- assess the stability of the excavation if using heavy barricading.

Where unattended excavations are to be left open, the following actions must occur:

- provide adequate barriers to avoid danger to pedestrians and vehicles; and
- provide suitable lighting and reflective signage

Barricading and signage must be used in accordance with **Business Procedure: Barricading and Signage**.

3.2.2 Adjacent Buildings or Structures

Any excavation that is below the level of the footing of any structure including retaining walls or penetration that could affect the stability of the structure must be assessed by a competent person.

Work must not commence until controls are implemented to prevent the collapse or partial collapse of any potential affected building or structure.

Adjacent buildings or structures around the excavation or penetration site must not be adversely affected by vibration or concussion caused during work.

Excavation work must be carried out in a way that does not cause flooding or water ingress / inundation to any adjacent building.

3.3 Plant and Equipment Requirements

It must be ensured that all plant and equipment used for excavation and penetration work is suitable for the intended purpose, meets legislative and relevant Australian Standard requirements and is fit for purpose.

Refer to **Business Procedure: Powered Mobile Plant** for information regarding the use of plant for excavation work.

3.4 Environmental Controls

It must be ensured that impacts to the atmosphere, land or water are prevented or minimised by implementing appropriate controls regarding:

- erosion and sedimentation;
- dust excursions;
- stockpiling or disposal of excavated soil; and
- backfilling or rehabilitation of excavation area.

3.5 Safe Work Practice Requirements

It must be ensured that:

- no person works alone in an excavation >1.5m deep;
- if working in an excavation >1.5m deep, the following must apply;
 - a trained, competent and dedicated standby person is assigned to continuously monitor the work area;
 - the standby person should preferably be in visual contact with the work team;
 - standby personnel must be outside the zone of influence;
- excavation work stops immediately if any unexpected underground structure or service is encountered;
- no loads are lifted above personnel working in excavations; and
- toe boards are installed around deep excavations where risk assessment identifies a risk from falling objects.

3.5.1 Inspections

It must be ensured that a competent person conducts a documented inspection of open excavation work areas:

- before the start of each shift; and
- whenever site conditions change, for example, heavy rain.

As a minimum, this inspection must cover:

- potential stability in the work area, including excessive edge loading;
- the adequacy of the working space and access and egress for personnel in the excavation;
- the adequacy of supports and barriers;
- the soil condition;
- risks posed to adjacent work; and

- effectiveness of environmental controls

3.5.2 Ground Support

It must be ensured that the risk of collapse has been controlled in all excavations greater than 1.5m deep or where a risk assessment has identified a risk of injury due to collapse.

Where entry is required to an excavation greater than 1.5m, it must be benched, battered or shored unless a competent person, i.e. geotechnical engineer, confirms in writing that there is no risk of collapse.

When benching or battering the walls of an excavation, an angle of repose of 45 degrees must not be exceeded unless designed by a competent person, i.e. geotechnical engineer, and certified in writing.

Shoring must be designed by a competent person, i.e. engineer.

Where supports are used the design must consider:

- soil classification;
- depth of excavation;
- water content of the soil;
- weather impacts on site conditions; and
- adjacent operations.

It must be ensured that all methods of ground support are designed in accordance with acceptable engineering principles and technical standards.

3.5.3 Access

It must be ensured that:

- Excavations have a safe means of entry and exit. For trenches that are at least 1.5m deep where access to and from the trench is by ladder, ladders must be installed at least every nine (9) metres of the length of the trench where workers will be.
- Emergency services can access the work area in the event of an emergency.

3.5.4 Waterlogged Ground

It must be ensured that a competent person assesses any water in excavations to determine the need for controls.

3.5.5 Working near existing essential services

It must be ensured that existing essential services are exposed by a safe method, for example hand digging, potholing, or by reviewing drawings. Mechanical plant must not be used within 0.5m of live services.

It must be ensured that:

- damaged services are reported as soon as possible; and
- work only commences near the service once a competent person has declared it safe.

Where existing services have been identified, It must be ensured that prior to work commencing, control measures are implemented to eliminate contact, this may include isolation of the services for the duration of the work.

3.5.6 Loads Near Excavations

Plant, vehicles, storage of materials, including excavated material, or any other heavy loads must not be located within 1000mm of the edge of the excavation and in the Zone of Influence.

A competent person must determine the Zone of Influence around each excavation.

3.5.7 Installing Services

It must be ensured that where services are buried underground that the services are to be filled with appropriate material, for example sand, and appropriate colour coded tape is used in accordance with AS/NZS 2648 Underground marking tape.

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

Underground essential services colour coding based on AS/NZS 2648.1:1995

It must be ensured that site service drawings/maps are updated to identify the installation or modification to any services.

3.6 Training and Competency Requirements

It must be ensured that all personnel involved in excavation and penetration work are trained and competent as per Stanwell's requirements.

4.0 References (Including Information Services)

Source	Reference
Legislation	<ul style="list-style-type: none"> Queensland Work Health and Safety Regulation 2011, Part 6.3 Queensland Excavation Work Code of Practice 2013 Queensland Environmental Protection Act 1994.
Australian Standards	<ul style="list-style-type: none"> AS/NZS 2648.1:1995 Underground marking tape
Business Standard	<ul style="list-style-type: none"> Training and Competency
Business Procedure	<ul style="list-style-type: none"> Barricading and Signage Confined Space Emergency Response Framework HS Hazard Management Powered Mobile Plant Work at Height ENV-PROC-01 Land Clearance and Disturbance (Tarong PS and Meandu Mine) HB1433904 Land Disturbance (Stanwell PS, Kareeya PS, Barron Gorge PS, Mackay GT) Land Disturbance – SW-QP-9/439 (Swanbank) Cultural Heritage Land Clearance and Disturbance Permit (T-1514) (Tarong)
Stay Safe	<ul style="list-style-type: none"> Excavation and Penetration
Tools	<ul style="list-style-type: none"> Nil

5.0 Definitions

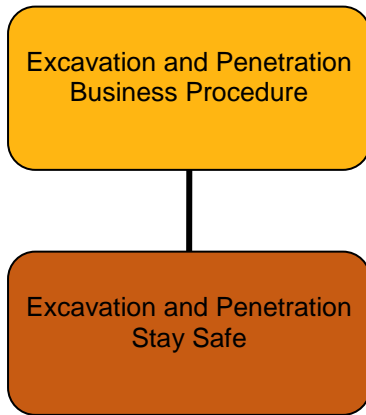
Term	Meaning
Battering	To form the face or side or wall of an excavation to an angle, usually less than the natural angle of repose, to prevent earth slippage.
Benching	The horizontal stepping of the face, side, or wall of an excavation.
Competent Person	A person who has, through a combination of training, education and experience, acquired knowledge and skills enabling that person to perform correctly the specified task.
Excavation	A hole in the earth or face of the earth.
Excavation Work	Work to make an excavation or fill or partly fill an excavation.
Land Disturbance	Land Disturbance includes: <ul style="list-style-type: none"> • Earth/ground disturbance - any activity that will break the direct surface including but not limited to tracked wheel vehicle movements, post hole digging, excavation works, stockpiling activity e.g. stockpiling of soil or vegetation, grading. Excludes rubber tyre vehicle movements. • Vegetation Disturbance - trimming, clearing of vegetation. • Work in the beds or banks of a water course. • Construction/demolition of infrastructure. • Change in land use.
Penetration	Any process that breaks a surface, for example, wall, ceiling, electrical panel, any service or similar by drilling, coring, sawing, cutting, screwing, nailing, jackhammering. Any activity that penetrates the integral surface of a building or structure including walls, floors and ceilings.
Zone of Influence	The volume of soil around the excavation affected by any external load, for example, vehicles, plant, excavated material.

6.0 Revision History

Rev. No.	Rev. Date	Revision Description	Author	Endorse/Check	Approved. By
0	14.08.14	Document created to reflect corporate wide process	J.Paull	T.Hooper	I.Gilbar

4 Appendices

Appendix A Excavation Document Flowchart



Appendix B Excavation and Penetration Hazards

- Essential services – including gas, water, sewerage, telecommunications, electricity, chemicals and field or refrigerant in pipes or lines.
- The fall or dislodgement of earth or rock.
- Falls from one level to another.
- Falling objects.
- Hazardous dusts, e.g. from dry cutting and drilling.
- Inappropriate placement of excavated materials, plant or other loads.
- Instability of any adjoining structure caused by the excavation or penetration.
- Any previous disturbance of the ground including previous excavation.
- Instability of the excavation due to persons or plant working adjacent to the excavation.
- The presence of or possible inrush of water or other liquid.
- The presence of contaminated soil.
- The presence of asbestos containing material.
- Hazardous manual tasks.
- Hazardous atmosphere in an excavation.
- Vibration or noise.
- Overhead essential services, for example, powerlines, and ground mounted essential services, for example, transformers, gas and water meters.
- The presence of acid sulphate soil.
- The presence and transportation of weeds.
- Rainfall and run off leading to surface or groundwater contamination.
- Rainfall and run off leading to erosion, sedimentation, siltation and land contamination.
- The presence and disturbance of cultural heritage artefacts.