



Ground Disturbance Standard
Health & Safety

Woodside Energy Ltd.

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Contents

- 1 Introduction 1**
 - 1.1 Purpose 1
 - 1.2 Scope 1
 - 1.3 Regulatory Requirements 1
 - 1.4 Key Operational Requirements (Golden Safety Rule) 1
 - 1.5 Behavioural Requirements 1
- 2 Ground Disturbance Standard 2
- 3 Standard Requirements 3
- Element 1: Planning 3
 - Notifications, Authorisations and Approvals 3
 - Risk Assessment 3
 - Preparation 4
 - Plans 4
 - Records 4
- Element 2: Competence and Training 5
- Element 3: Inspection and Testing 5
 - Inspection Requirements 5
 - Testing for Hazardous Substances 6
 - Testing for Atmospheric Contaminants 6
- Element 4: Worker Safety 6
 - Spotter 6
 - Ingress and Egress 6
 - Working Near Vehicles and Earth-Moving Plant 7
 - Earth-Moving Plant and Equipment 7
- Element 5: Excavation Stability 8
 - Excavation Activities 8
 - Placement of Spoil 8
 - Hand-work Requirements 8
 - Methods to Control Ground Movement 9
 - Shielding 9
 - Securing Excavations and Trenches 9
- 4 Quality Assurance 10**
- 5 User Feedback 10**
- 6 Reviewing This Standard 10**
- 7 Definitions 11**
- 8 Supporting Documentation 12**
- Appendix 1 Example – Excavation Certificate 13**
- Appendix 2 Example – Excavation Inspection Checklist 14**

1 Introduction

1.1 Purpose

The purpose of this Standard is to define Woodside's minimum requirements for managing ground disturbance risks associated with the activities of Woodside and its Contractors.

1.2 Scope

This Standard shall apply to all activities managed directly by Woodside and all work activities carried out by Woodside employees.

Where a contractor operates a facility dedicated to Woodside then the standard shall apply to:

- All Woodside owned or controlled sites; and
- Non-Woodside owned sites when referenced in the contract.

This Standard shall apply to activities that disturb the ground whether performed manually or using machinery. These activities include digging, clearing, excavation, quarrying, trenching, benching, drilling, pile driving and the driving of picks and stakes. This Standard does not apply to marine works or the use of explosives.

1.3 Regulatory Requirements

As required by Woodside's Health and Safety Policy, the regulatory requirements at a specific location shall be met as a minimum. In the case where regulatory requirements are absent or at a lower level than prescribed in this Standard, the requirements of this Standard shall be met as a minimum.

1.4 Key Operational Requirements (Golden Safety Rule)

The Golden Safety Rule communicates the key requirements of this Standard which are relevant for the control of activities at the work site.

Work that involves man-made ground disturbance shall only proceed if:

- a) A risk assessment of the work site has been completed by a competent person(s).
- b) All underground hazards, including pipelines, electric cables, etc have been identified, located and, if necessary, isolated.

Persons will only enter an excavation after:

- a) The requirement for a Confined Space Entry Permit has been considered in the risk control measures.
- b) Ground movement has been appropriately controlled and collapse is prevented.
- c) Ground and environmental conditions are continuously monitored for change.

1.5 Behavioural Requirements

For the mandatory requirements listed in this Standard to be effective there are critical behaviours that personnel must adhere to. These behaviours are divided into 3 areas of responsibility:

- **Everyone** must learn and use the standards, procedures and rules which apply to them.
- **Supervisors** must visit the worksite regularly to check conformance with the standards and ensure that their team has the skills, experience and training (competence) to complete their tasks.
- **Managers** must demonstrate through their actions their commitment to a safe work place. They must regularly explain safety expectations and ensure that their personnel understand and conform with the standards.

2 Ground Disturbance Standard

The Standard for Ground Disturbance incorporates the Golden Safety Rule. The Standard also describes the additional controls associated with the management of ground disturbance risks including environmental and cultural controls.

The Ground Disturbance Standard consists of the following five (5) elements:

Element 1: Planning

There is a formal process in place for planning and assessing the risks associated with ground disturbance activities.

Element 2: Training and Competency

Persons involved in ground disturbance activities are competent to perform their duties.

Element 3: Inspection and Testing

All excavation activities include an inspection program to confirm ongoing stability of the excavation and the absence of contaminants.

Element 4: Worker Safety

Key controls are in place to ensure the safety of personnel working in and around excavations.

Element 5: Excavation Stability

Controls are in place to maintain excavation stability both during construction and while the excavation is open.

3 Standard Requirements

Element 1: Planning

There is a formal process in place for planning and assessing the risks associated with ground disturbance activities.

Notifications, Authorisations and Approvals

Mandatory Requirements

- 1.1 Prior to commencement of ground disturbance activities, appropriate notifications shall be made to the affected Woodside facility/ project, regulatory agencies, service providers, utility companies or other authorities.
- 1.2 Where applicable, formal approvals shall be obtained according to local legislative requirements.
- 1.3 Where applicable, ground disturbance activities shall meet the requirements of Woodside Standard - *Permit to Work and Woodside Standard - Confined Space Entry* requirements.
- 1.4 Prescribed clearance distances shall be established for each underground service, utility installation, hazard, obstruction and overhead power line located in the vicinity of the work.

Guidance

Each facility/site should establish criteria that specify the circumstances under which an Excavation requires a Permit to Work ie based on risk.

Some countries require formal regulatory approval for land clearing or the disturbance of flora, fauna or areas of cultural significance.

An Excavation Certificate can be applied to supplement existing Permit to Work and Confined Space Entry Permits.

Risk Assessment

Mandatory Requirements

- 1.5 Prior to commencement of ground disturbance activities a risk assessment shall be completed which includes:
 - i Excavation stability;
 - ii Personnel safety;
 - iii Presence of hazardous substances eg gases/fumes/vapours, chemicals, asbestiform materials, hazardous or radioactive waste etc;
 - iv Presence of utilities eg gas, electrical cables/overhead lines, water, compressed air etc;
 - v Interaction of people and machines; and
 - vi Areas of flora, fauna or cultural significance that exist or potentially exist.
- 1.6 Where the risk assessment identifies any areas of flora, fauna or areas of cultural significance, a visual inspection and assessment of the area shall be conducted and a management plan developed in conjunction with the relevant competent personnel.

Mandatory Requirements

Preparation

- 1.7 Known underground services, utility installations, obstructions or other hazards in the vicinity of the work shall be identified and their locations marked on relevant drawings and on the ground.
- 1.8 Where required services and utilities shall be isolated to ensure safe work.
- 1.9 Wherever practicable detection equipment shall be used to identify and confirm the location of underground services and utilities.

Mandatory Requirements

Plans

- 1.10 Prior to the commencement of excavation backfilling operations, 'as-built' surveys shall be conducted to determine co-ordinates and elevations of buried services, facilities and structures.
- 1.11 Information from surveys shall be used to update drawings and plans for:
 - i Any new construction or modifications; and
 - ii Existing underground services, utilities, structures and equipment installations noted during the work, which are not represented accurately on existing drawings.

Mandatory Requirements

Records

- 1.12 Records demonstrating conformance with the requirements of this Standard shall be retained for 12 months as a minimum including excavation inspection checklists (where required by local codes be kept for a minimum of 12 months).
- 1.13 Excavation certificates, permits to work and clearance forms shall be retained for a period of 5 years.

Element 2: Competence and Training

Persons involved in ground disturbance activities are competent to perform their duties.

- Mandatory Requirements**
- 2.1 Personnel shall be certified, licensed or registered as per local legislative requirements.
 - 2.2 Personnel participating in ground disturbance activities shall be competent to perform their duties including those personnel involved in:
 - i Identifying and locating buried services, utilities, hazards and obstructions;
 - ii Evaluating soil conditions and for specifying batter slopes, benching and shoring requirements and systems; and
 - iii Isolating electrical, mechanical and other services and utilities;
 - 2.3 Individuals working as Spotters shall be experienced in excavation work and competent in the following areas:
 - i Ability to identify hazards and understand appropriate controls associated with the excavation;
 - ii Knowledge in the applicable emergency response and rescue plans; and
 - iii Hold a current first aid certificate which includes Cardio Pulmonary Resuscitation (CPR) when working within 3 metres of electrical services.

Guidance When working within 3 metres of buried electrical services or within 8 metres of overhead power lines the risk assessment should consider whether an approved competent electrician (as defined in the *Woodside Standard - Electrical Safety Management*) is required as a spotter.

Element 3: Inspection and Testing

All excavation activities include an inspection program to confirm ongoing stability of the excavation and the absence of contaminants.

Inspection Requirements

- Mandatory Requirements**
- 3.1 Ground disturbance activities shall be monitored for changing conditions through inspections by a competent person.
 - 3.2 Inspections shall be conducted on all excavations where there is a risk associated with personnel and/or equipment.
 - 3.3 Inspections shall be conducted:
 - i Before the start of each shift;
 - ii After each rainfall and other event that may alter the stability of the excavation (e.g. freezing temperatures, surface water ingress, etc.);
 - iii When fissures, cracks, sloughing, undercutting, water seepage, bulging at the bottom of the excavation, or other similar conditions occur; and
 - iv When there is any indication of change or movement in adjacent structures.
 - 3.4 Inspections shall be recorded to confirm completion.

Guidance The aim is to confirm that excavations in use or where there is a potential risk to personnel and equipment are inspected; the degree of inspection is proportionate to the hazards and associated risk. A sample inspection form used on hydrocarbon facilities has been attached in Appendix 2.

Testing for Hazardous Substances

Mandatory Requirements 3.5 Where there is a risk of exposure to hazardous substances (eg asbestiform materials, PCB's hazardous waste, etc) testing shall be conducted and appropriate controls implemented.

Testing for Atmospheric Contaminants

Mandatory Requirements 3.6 Where there is a risk associated with atmospheric contaminants eg flammable vapours, toxic fumes, asphyxiating gases or non life-supporting atmospheres, atmospheric testing shall be conducted prior to entry and during the works.

Element 4: Worker Safety

Key controls are in place to ensure the safety of personnel working in and around excavations.

Spotter

Mandatory Requirements 4.1 A Spotter shall be present in the immediate vicinity during all ground disturbance activities:

- i Where there is a risk of contact between earth moving equipment, utilities or services; or
- ii When personnel are present inside the excavation or trench.

4.2 The Spotter shall be able to effectively communicate with all parties involved in the excavation activities and call for emergency assistance.

4.3 Where a Spotter observes a hazardous situation (eg possible collapse, failure of protective systems, gas leak, hazardous substance etc) the work shall be stopped and personnel shall be removed until appropriate corrective actions or precautions have been taken.

Guidance Spotters should not routinely enter the trench or excavation work. Where they are required to enter they should undertake a risk assessment (eg Step Back 5 by 5 or JHA).

Ingress and Egress

Mandatory Requirements 4.4 Suitable ingress and egress shall be provided for excavations where personnel access is required.

4.5 Excavations of 1.0 metres or more in depth shall be provided with fixed means of ingress and egress.

Guidance Shoring timbers or other shoring members should not be used for ingress, egress or as working platforms.

In trenches, ladders or other means of egress should be provided at intervals of not more than 30 metres.

Mandatory Requirements

Working Near Vehicles and Earth-Moving Plant

- 4.6 Personnel working in the vicinity of vehicles or earthmoving plant shall wear vests or other suitable clothing made of high-visibility materials.
- 4.7 No personnel shall be present in the immediate area of an excavation which is being mechanically dug.

Mandatory Requirements

Earth-Moving Plant and Equipment

- 4.8 Earthmoving plant and equipment shall be:
- i Fit for purpose at all times;
 - ii Inspected, maintained and operated in accordance with the manufacturer's specifications and instructions; and
 - iii Equipped with operational safety devices, including:
 - Flashing beacons and/ or whip mounted flags, where applicable;
 - Reversing alarms;
 - Seat belts;
 - Signal horns;
 - Protective enclosure/ cab for operators e.g. Roll Over Protection Systems (ROPS), Falling Object Protection Systems (FOPS) or equivalent;
 - Required safety guards; and
 - Craning/drop valves for hydraulic systems, where applicable.
- 4.9 Plant and equipment used for lifting shall meet the requirements of the *Woodside Standard – Lifting and Hoisting Practise*.

Element 5: Excavation Stability

Controls are in place to maintain excavation stability both during construction and while the excavation is open.

Excavation Activities

Mandatory Requirements

- 5.1 For unsupported trenches, earth-moving plant and equipment, tools, pipes and other heavy materials shall not be placed, stored or operated any closer to the edge of the trench than its depth.
- 5.2 Internal combustion equipment (e.g. vehicles, generators, pumps, etc.) shall not be operated in locations where their exhaust fumes may enter an excavation that is or will be occupied by personnel.
- 5.3 Dewatering operations shall be performed where there is a risk of excess water accumulating in excavations.
- 5.4 Drainage control (e.g. cut-off ditches, bunds, site grading etc) shall be installed to prevent excessive water from entering the excavation.
- 5.5 Adequate illumination and/or warning lights shall be provided, maintained, and operated from sunset to sunrise.

Guidance

Earthmoving equipment conducting excavations can work closer to the edge if a geotechnical assessment has shown that the ground is able to support the load.

Placement of Spoil

Mandatory Requirements

- 5.6 Excavated spoil shall be placed away from the edge of the excavation, to ensure that it does not pose any additional risk.

Guidance

Spoil should be placed outside a 45 degree slope line passing through the near toe of the excavation or at a distance no less than one third the depth of the excavation from the edge of the excavation whichever is greater.

Where spoil is to be stockpiled adjacent to an excavation, the stability should be checked for the resulting surcharge load.

Hand-work Requirements

Mandatory Requirements

- 5.7 Any work within 1 metre of any buried service shall be done using hand tools.
- 5.8 Excavation within sand bedded services or utilities shall be performed manually.

Guidance

Compressed air equipment that is used to remove soil from buried services or utilities should only be used where it has been specifically approved for this application.

Mandatory Requirements

Methods to Control Ground Movement

- 5.9 Batters, benching or shoring shall be used to prevent the collapse of excavations and trenches.
- 5.10 All excavation or trench faces deeper than 1.2 metres shall be stabilised, unless they have been assessed by a competent person to be self-supporting.
- 5.11 The batters, benching or shoring used to support excavations or trenches shall be designed and installed by competent personnel.
- 5.12 Excavations and trenches shall not be undertaken to depths that are likely to affect the stability of adjacent foundations or structures unless controls are in place to ensure stability of the excavation and adjacent structure.
- 5.13 Shoring and other support systems shall be approved by a professional engineer for excavations and trenches that are:
- i More than six metres deep;
 - ii Likely to undermine or affect the stability of adjacent foundations or structures.
- 5.14 Shoring and other supports shall only be removed after all personnel have left the excavation or trench.
- 5.15 Where a shield is used in preference to shoring, personnel shall not remain in the shield while it is being moved.

Guidance

Shielding

Shields (also called portable trench boxes, sliding trench shields and safety cages etc) may be used to protect personnel instead of shoring. These devices are maintained and used in accordance with the manufacturer's instructions.

When in use, the shield is firmly secured to the ground or the space between the shield and the excavation face backfilled to prevent lateral movement.

Mandatory Requirements

Securing Excavations and Trenches

- 5.16 Suitable barricades/fences/beams and appropriate signage shall be installed around excavations to control access and manage the risk of:
- i Personnel falling into the excavation;
 - ii Equipment, tools or supplies falling into the excavation;
 - iii Personnel being struck by falling objects or moving equipment;
 - iv Vehicles falling or driving into the excavation.
- 5.17 Where surface crossing of excavations or trenches are required:
- i Vehicle crossings shall be designed by and installed under the supervision of a competent person; and
 - ii Walkways or pedestrian bridges shall meet local legislative requirements for fixed platforms and walkways.

4 Quality Assurance

Quality Assurance of this Standard shall be undertaken in accordance with the requirements of the Woodside Health and Safety Sub-Process.

5 User Feedback

Users of the Standard are encouraged to report any mistakes or confusing entries, or to provide suggestions for improvement by contacting the Standard Custodian.

6 Reviewing This Standard

This Standard shall be reviewed by the Standard Custodian at a minimum on a three yearly basis.

7 Definitions


Definitions that are critical to the understanding of this Standard are provided in the tables below.

Term	Meaning
Battering (Sloping)	A method of preventing the collapse of an excavation or trench, achieved by excavating to form sides (faces) that are inclined away from the bottom of the excavation.
Benching	A method of preventing the collapse of an excavation or trench, achieved by excavating the sides (faces) to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.
Collapse	The separation of a mass of soil or rock material from the face of an excavation or trench, and its sudden movement into the excavation.
Earthmoving Plant	Excavators, backhoes, front-end loaders, dump trucks, etc. that an individual sits on or rides in when performing digging, excavating, trenching, soil transporting or other earthmoving activities.
Excavation	Any man-made cut, cavity, trench or depression in an earth surface which is formed by spoil removal.
Face	The exposed side of an excavation or trench.
Ground Disturbance Activities	Activities that move the ground, whether performed manually or using machinery. These activities include but are not limited to digging, excavation, quarrying, trenching, benching, drilling, pile driving and the driving of picks and stakes. For purposes of this Standard, ground disturbance does not include marine works, exploration activities, and the use of explosives.
Shields (Trench Boxes)	Portable metal boxes fitted with lifting points that enable them to be lowered into an excavation or trench to protect workers from collapses and similar incidents.
Shoring	An engineered structure or system, using hydraulic, mechanical and/or timber components, that supports the sides of an excavation and which is designed to prevent the collapse of an excavation or trench.
Spoil	Material removed during the construction of an excavation or trench.
Spotter	A person who is engaged in observing excavation activities to monitor activities, identify potential hazards and raise the alarm should an incident occur.
Surcharge	Vertical load in the vicinity of an excavation or trench, resulting from the placement and/or location of spoil, vehicles, plant and equipment, tools, structures or activities that may affect excavation stability.
Trench	A long, narrow (in relation to length), open excavation made below the surface of the ground and in which the horizontal width across the top is less than twice the vertical depth of the deeper side. A trench is a type of excavation.
Underpinning	The process of stabilising adjacent foundations, walls or other structures that may be affected by an excavation or that may have an impact on an excavation. It is a procedure in which the foundation is physically reinforced, and is conducted under the direction of a competent person.


8 Supporting Documentation

Type	Title	Location (CDC No. or reference)
Process	Woodside Health and Safety Sub Process Description	W2000AG2714217
Standard	Woodside Standard - Permit to Work	W1000AF2662536
	Woodside Standard - Electrical Safety Management	W1000AF3194712
	Woodside Standard - Confined Space Entry	W1000AF2662541
	Woodside Standard – Lifting and Hoisting Practise	W1000AF2572510
Guideline	WorkSafe - Western Australia Commission Excavation – Code of Practice	DRIMS#3316582 or West Australian - Code of Practice - Excavation

Appendix 1 Example – Excavation Certificate

No. _____		EXCAVATION CERTIFICATE (Shall be raised only in conjunction with a Work Permit)			
A - PLANNING	Work Permit No: _____		Work Permit Holder: _____		Date _____
	Work Party (names of personnel or contractor): _____				Dept _____
	Specific Work Location (e.g. tank, vessel, line, unit, etc): _____				
	Details of Work (be specific): _____				
B – IDENTIFY SERVICES & UTILITIES	Reference Dwgs reviewed (copies to accompany this certificate): _____				
	Services, utilities, hazards & obstructions identified: _____				
	Service providers & utility companies notified/consulted: _____				
	External approvals received: _____				
	Sketch (show location of known underground services, utilities, hazards & obstructions, including overhead electrical service): _____				
C – SPECIFY ADD'L REQMT'S	Services/utilities to be isolated: _____				
	Minimum clearance distances for services and utilities: _____				
	Exploratory excavation requirements/methods/tools: _____				
	Spotter reqmt's (e.g. licensed electrician?): _____				
	Battering, benching, shoring and/or shielding planned: _____				
	PPE: _____				
	Confined space/atmospheric testing (Y/N): _____				
	Documented inspections required (Y/N): _____				
D - APPROVAL	I have checked the site and reviewed available layout drawings, and I certify that all known services, utilities, hazards and obstructions have been identified and located. Where required, external service providers and utility companies have been notified and all required external approvals have been received. The planned excavation can be carried out, using the following equipment/tools and under the following conditions:				
	Equipment/Tools: _____		Conditions: _____		
	Prepared by Signature: _____		Approved by Signature: _____		

Appendix 2 Example – Excavation Inspection Checklist

EXCAVATION INSPECTION CHECKLIST					
Facility _____ Dept _____			Date _____		
Work Location _____			Wk Permit # _____		
Work Description _____					
Time of Inspection					
Inspected By (Initials)					
Weather					
No Rain					
No Freezing / Other					
Surface Conditions					
No Surface Cracks					
Spoils Away from Edge					
Equip / Mats Away from Edge					
No Sources of Vibration					
Barricading in Place					
Lighting in Place					
Walkways and Bridges					
Sloping, Benching or Shoring					
Compliance with Design					
In Place and Functioning					
No Movement or Deflection					
Excavation					
Adequate Access and Egress					
Stairs, Ladders and Ramps					
Dewatering / No Standing Water					
No Known Build Up of Gases					
Compliance with Permits, Procedures and Job Requirements					
Permit to Work					
Confined Space Permit					
Excavation Permit / Certificate					
Isolation, Lockout / Tag out, etc.					
PPE					
Spotter in Place					
Competency Requirements					
Vehicles, Equipment and Tools					
Fit for Purpose					
Maintained and Inspected					
Safety Features in Place					
Summary of Corrective Actions Taken _____				✓ = OK	
_____				✗ = NOT OK	
