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|---|--|-----------|------------|-------------|------------|
| Number                                    | WCEF-PD-OHS-040-04   |           |            |             |            |
| Reasons for Creating or Amending Document | Correction of Error or Omission  |           |            |             |            |
| Actual Change Details                     | new version created to fix incorrectly saved PDF in version 4.0<br>Version 4 changes formatting and updated 4.6 and new template |           |            |             |            |
| Version                                   | 5.0.0  | Published | 17/11/2021 | Review Date | 29/09/2023 |

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## 1. Introduction

The purpose of this procedure is to provide guidance on managing the risks associated with identifying, locating and protecting underground services prior to any excavation. This document applies to both WesCEF and non WesCEF personnel.

## 2. Definitions

### 2.1 Excavation Work

Any work involving the removal of soil or rock from a site to form an open face, hole or cavity using tools or machinery. An Excavation Certificate shall be issued with a work permit when the excavation is greater than 150mm in depth.

### 2.2 Competent Person

A person who has acquired through training, qualification or experience, or a combination of these, the knowledge and skill required to perform the specific tasks.

### 2.3 Service Tracing

Use of electronic service locating devices including ground penetrating radar (GPR), sonic locator and cable locator.

### 2.4 Potholing

The practice of digging a test hole to expose underground utilities to ascertain the horizontal and vertical location of the facility.

### 2.5 Excavation Work Area

Area immediately adjacent to the excavation works which may impact the excavation works.

## 3. Responsibilities

### 3.1 Manager

- Providing a safe system of work where persons are not exposed to hazards associated with locating, identifying and exposing underground services.
- Ensuring that information, instruction, training and supervision of all personnel is provided to enable them to safely perform their work.
- Ensuring risk assessments are conducted by competent personnel before the commencement of work and appropriate control measures are selected.

## 3.2 Excavation Authoriser

- Successful completion of RIICCM202E Identify, locate and protect underground services and approved by the Business Unit Manager to authorise excavations.
- Obtaining site services information to assist in the development of the excavation work plan.
- Establishing the location of all underground services.
- Coordinating underground utility locating service providers.
- Ensuring all hazards have been identified and appropriate control measures planned for prior to issuing an Excavation Certificate and commencing an excavation.
- Assisting Accountable Person(s) in planning and executing work associated with underground services and excavations.
- Maintaining site services drawings.

## 3.3 Design Office

- Ensuring all information relating to uncovered subsurface utilities is included onto the relevant drawings, including site services.

## 3.4 Accountable Person (AP) (for Contractors)

- Obtaining details of the proposed excavation and providing this information to the Excavation Authoriser prior to commencing work.
- Establishing where practicable, systems of work which consider the hierarchy of control when determining the requirement to perform excavation work. Ensuring JSA's are developed and approved prior to the commencement of work and checking that required controls are in place when work is being undertaken.
- Ensuring risk assessments are reviewed any time the scope of work changes or the risk increases.
- Ensuring the requirements of this procedure are included during the planning of the task (including maintenance shutdowns) by considering the hierarchy of control for the work being planned and making provision for appropriate controls to be available.

## 3.5 Permit Authoriser

- As defined in Work Permit System ([CSBP-GM-11-031-51](#)), Permit to Work System ([KHP-GM-OHS-070-01](#)) and Permit to Work Procedure ([KHO-PD-OHS-070-01](#)).

## 3.6 Permit Holder

- A Work Permit is obtained from the appropriate area. Refer to the relevant Work Permit System. A Job Safety Analysis is completed and all team members understand the controls to be put in place.
- All work is planned according to engineering requirements /specifications.

## 3.7 Permit Team Members

- Participate in the development of the Job Safety Analysis (JSA) and comply fully with its requirements.
- Do not commence work unless all controls identified on the JSA are in place.
- Review and re-sign the JSA if the scope of work, conditions or risk changes or the task ceases for any reason for an extended period of time and recommences.
- Following the conditions specified in the Work Permit, JSA and associated high risk certificates.

## 3.8 Underground Service Locators

- As a body corporate, being certified as a Dial Before you Dig Service Locator.
- As an individual, being trained and competent in RIICCM202E Identify, locate and protect underground services.

## 4. Plan

### 4.1 Excavation Request

The Accountable Person (AP) shall obtain details of the proposed excavation including accurate location, width, length and depth. The AP shall mark the proposed excavation on aerial photography, drawings or described by referencing nearby known locations. This information is to be provided to the Excavation Authoriser prior to commencing work.

### 4.2 Excavation Work Area

The excavation work area shall extend at least 5m beyond the edge of the excavation after taking into account any edge protections such as battering or benching. The excavation work area is to be marked on all excavation location documents as well as in the field prior to any subsurface utility location works.

### 4.3 Identifying Subsurface Utilities

The Excavation Authoriser shall review the details of the proposed excavation and check site drawings for utilities within the excavation work area. All utilities within the excavation work

area shall be positively identified using the methods and classifications in accordance with AS5488 – classification of subsurface utility information (SUI).

| Subsurface Inspection Class | Requirements  | Horizontal Accuracy | Vertical Accuracy |
|-----------------------------|---|---------------------|-------------------|
| D                           | Review drawings, anecdotal evidence                                   | Indicative          | Indicative        |
| C                           | Class D + visible evidence (above ground markers, pits, hydrants etc) | 500mm               | Unconfirmed       |
| B                           | Service tracing (GPR, cable locator, sonic locator)                   | 300mm               | 500mm             |
| A                           | Potholing   | 50mm                | 50mm              |

Where a service falls within 2m of the proposed excavation, the service shall be identified by potholing in accordance with [Section 5](#) or alternatively the excavation must be completed using non- destructive excavation techniques.

Suitably qualified external ground penetrating radar service locating providers may be engaged to provide this service.

## 4.4 Field Marking of Utilities

Known or suspected hazardous or critical services shall be fully identified using hard controls such as marking, barricading or labelling.

- All utilities located within the excavation work area are to be marked on site with crayon, paint, pegs or PVC pipe markers with colours that match the site sketch and any files lodged in the final Excavation Certificate. Services shall be colour marked as per [Appendix 1](#). Erroneous marks should be removed or covered. Paint markings shall be at less than 10m intervals on linear runs and at all changes in direction for all services.
- Indicative depths shall be painted at less than 30m intervals and at all changes in depth for all utilities.
- Utilities information shall be marked at start and finish of the service run and less than 50m intervals and include:
  - Services ownership e.g. Telstra, Water Corp, Western Power, BHP, BOC, Air Liquide, CSBP.
  - Cable type and size e.g. Optic fibre, High Voltage, Main Cable, SSI cable, Communication cable or Signal Feed cable.
  - Pipe construction type and size where information is available i.e. RCP 450mm at start of run.
  - Additional information regarding assets i.e. HPGM high pressure gas main.
- PVC pipe markers used to identify pot holing locations should include the following information.

- Date
- Location company
- Utility type / size
- Depth to utility (mark at ground level)
- Ribbon or paint colour to match service type.



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**Note:** A bright green boundary string is to be used to clearly identify the excavation work area in which all services have been located. This string must be labelled as Class B or Class D to indicate the quality level of each search.

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## 4.5 Tracing Utilities

Utilities are to be traced to a logical end point or far enough past the extent of the excavation work area to ensure the utility does not return inside the excavation work area. If a logical end point is not found on a utility this must be brought to the attention of the AP for further action.

## 4.6 Uncovering Electrical Utilities

Where electrical services are present within the excavation work area, in accordance with [Section 4.2](#), a watchperson who has electrical qualifications must be present to identify the services.

## 4.7 Services that Cannot be Located

When a service is believed to be within the excavation work area, although cannot be located, a TBRA shall be conducted to determine the excavation plan or the excavation shall be conducted entirely by non-destructive excavation (NDE) methods.

## 4.8 Documenting the Excavation Plan

Each service identified within the excavation work area shall be documented on the excavation plan along with the distance from the excavation, the method used to determine

the location and the risk assessment of the excavation in relation to the service. This excavation plan forms part of the Excavation Certificate.

## 5. Pothole

Prior to any potholing, the excavation plan must be understood. Electronic methods and ground penetrating radar may be required to confirm the location of any underground services and the required safe Minimum Approach Distance (MAD). It is necessary to pothole to determine the accuracy of any non-invasive methods.

- Potholing is not permitted with a mechanical excavator.
- Potholing can be carried out with a hand shovel or by vacuum extraction. Water jetting while vacuuming has the potential to damage buried assets. Water pressure is to be limited to 1500 psi (100 bar) to avoid damage.
- Potholing is to be carried out for identified assets. As not all asset owners are registered with Dial Before You Dig, safe digging practices should be implemented.
  - at every location where an existing utility crosses the proposed excavation or drilling including the installation of poles and stay wires
  - at spacings determined by risk assessment for all existing utilities running parallel to the proposed excavation or drilling to fully determine the alignment and depth of the existing services
  - to locate existing utilities within 2m of the start and finish locations of any excavation or drilling and at every excavation required for drilling entry and exit points
  - safe MAD and exclusion zones noted by each utility within the Dial Before You Dig plans and notes
- Always visually sight the service or utility.
- When working in areas that have a hard surface such as concrete, bitumen or any other non-moveable surface marking the location of existing utilities can be completed with non-permanent spray paint.
- It is recommended that visual markers be placed above the pothole position. White PVC pipe or a white stake directly over the existing service to record the depth, alignment and direction is widely used for this purpose. If you are unable to install the marker directly over the existing utility and you need to offset the marker, then you shall install 2 pegs as offsets and record the offset on the pegs. Black marking pen is to be used to record the depths of existing services in mm. Please note that the depth and position markings recorded on PVC pipe or stakes is for information only and must be confirmed by potholing.
- If you are unable to locate the service, contact the utility provider and your supervisor and do NOT proceed with any drilling or excavation.

Excavations are not permitted within:

- 15m of a high pressure gas main without prior consultation and approval from the relevant gas asset owner.
- 3m of Water Corporation water mains greater than 300mm (unless they are Asbestos Cement, or Reinforced Concrete, if they are either of these materials then an Asset Damage Risk Assessment (ADRA) is required). Any size sewer pressure main requires an ADRA if within 3m of it.
- Electrical reticulation approach distances provided with requested Dial Before You Dig package and information available from utility website.
- 3m of any a service owned by an external entity not listed above, without prior written approval of the service owner.

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*Note: Potholing on the Dampier Bunbury Natural Pipeline (DBP) Corridor is only permitted by WA State Government written approval and carried out under DBP supervision.*

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## 6. Protect

It is important to protect and support exposed utilities. Check the soil type or presence of other objects that could damage services and take protective action as required. Consider the need for barricading.

## 7. Proceed

Only once you have planned, potholed and put protective measures in place for underground utilities, you can proceed with an excavation as per WesCEF Excavation Procedure ([WCEF-PD-OHS-040-05](#)).

## 8. Deviations to Procedure

Deviations to procedure may be required for emergency situations. Any deviations must be approved in writing by the Business Unit Production Manager or equivalent.



## 9. References

Work Permit System ([CSBP-GM-11-031-51](#)).

Permit to Work Procedure ([KHO-PD-OHS-070-0](#))

Permit to Work System ([KHP-GM-OHS-070-01](#))

Job Safety Analysis ([CSBP-GM-11-031-23](#))

Job Safety Analysis ([KH-SF-OHS-050-02](#))

WesCEF Excavation ([WCEF-PD-OHS-040-05](#))











Occupational Safety and Health Act 1984

Occupational Safety and Health Regulations 1996

AS 5488-2013 Classification of Subsurface Utility Information (SUI)

## 10. Appendix 1 – Standard Colours for Marking

The following colours should be used in both the field and on location plans as per Table B2 AS5488-2013.

| Subsurface Utility Type          | Colour  | Code |
|----------------------------------|---|------|
| Communications                   |    | C    |
| Drainage (stormwater/ raw water) |    | D    |
| Electricity                      |    | E    |
| Fire service                     |    | F    |
| Gas                              |   | G    |
| Petroleum products               |  | P    |
| Recycled Water                   |  | R    |
| Sewer                            |  | S    |
| Unidentified services            |  | U    |
| Water (potable)                  |  | W    |

In addition to the standard colours for marking, the following services may also be identified as per:

- Cadastral boundaries– Black
- Text – Preferably black with a white halo otherwise Black or White
- Utilities related to other external entities – Orange
- Optic fibre – Pink or Purple
- Reticulation and unknown services - Black
- Other features – can be any colour as long as it is clearly indicated in the legend of the plot.