Concealed Services and Excavation

Couple of takeaways

- When planning works, *Dial before you Dig* is essential for identifying Concealed Services.
- Concealed services include electricity, water, gas, communication and other services which are either buried or otherwise hidden from immediate identification.
- Concealed services present a risk to persons, equipment and the community during penetrating activities such as drilling or excavating which may strike the service.
- A Concealed Services Permit is required for all excavations and penetrations.

What is this procedure for?

The purpose of this procedure is:

- To detect concealed services before the commencement of works
- To maintain safety of workers and concealed services and assets during ground-breaking or drilling activities.

Who is responsible?

Asset owner shall request work to be done.

Work planner shall plan and schedule the work.

Hydro Tasmania Group manager shall authorise the work to be done.

PIC or Worker with direct control of work shall:

- Provide the necessary resources to ensure safe systems of work that ensure this procedure is understood, applied, and observed within their area of authority
- Ensure safety of workers following this procedure
- Maintain appropriate records relating to their activities.

Line manager shall:

- Manage and / or control a workplace, within their area of authority
- Ensure this procedure is understood and implemented
- Maintain a hazard and risk register and appropriate signage for their workplace
- Ensure that all persons assigned for the management and execution of work within their area of authority, conduct appropriate risk assessments.

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Workers shall:

- Ensure they act in a manner that does not adversely affect their own health and safety, or that of others
- Ensure they are trained and authorised as Instructed Persons
- Comply with the terms of this procedure
- Immediately report any matter that may affect their own or others' health and safety.

Safety observer shall:

- Be a competent worker specifically instructed and dedicated as an observer on each occasion
- Be appropriately skilled in all respects of safety observation and be fully aware of the potential risks associated with the work.

Drawing administrator shall be responsible for the maintenance and control of Hydro Tasmania group technical plant and apparatus blueprints and plans.

GIS (Geographic Information Systems) administrator shall be responsible for the maintenance and control of Hydro Tasmania group technical GIS data.

WHS team shall:

- Coordinate the WHS risk assessments
- Maintain and review WHS documentation
- Communicate and provide training in the application of WHS processes.

How is the process managed?

Planning

As far as is reasonably practicable, prior to the commencement of any excavation or penetration, the precise location of all concealed services, buried pipe work, structures, foundations, electrical equipment, cabling, or hazardous materials, shall be identified and clearly marked to prevent damage during the work.

Searches/Documentation review

Undertake the following searches/documentation for concealed services until all services are positively located:

1. Review copy of drawings of known concealed services in the area.
2. Regardless of whether dig-site is on Hydro Tasmania Group property or not:
    i. Go to Dial Before You Dig and submit details of dig-site into their online request form (Dial Before You Dig).
    ii. Dial Before You Dig will contact utilities that have known underground assets within the vicinity of the dig-site.

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iii. The utility (or utilities) will respond directly to the requestor by electronic or hard copy means (may be by post) within 48 hours of receipt of the referral, providing detailed location of any known underground services within the vicinity

iv. The utility may decide to send a representative to the site to ensure that any activity avoids damage to their services

v. Allow a minimum of five days prior to proposed work to allow for information to be received.

NOTE: Some insurance companies are now refusing to cover policyholders that do not use Dial Before You Dig and subsequently damage a service.

3. Contact the Asset Owner's representative as part of the work planning process.
4. Arrange inspection of the site by a person visually checking for locations of possible concealed services and looking for the following:
    i. A direct or indirect route between competent the source and the load
    ii. Markers on the surface
    iii. Between stop valves/pits
    iv. Earthing, including the earth mat, cabling and pipes entering the ground
    v. Service pipe work between two buildings
    vi. Conduits, switches, or terminal boxes on the other side of the structure and/or
    vii. Disturbance of ground, slab or wall that suggests presence of concealed service.
    viii. Note: Optical fibre cable may not be able to be detected by a site survey. Identification of this cable on drawings, ensuring that cables coordinates are registered on the Hydro's GIS database and entering the cable as a hazard on the appropriate site workplace registers should ensure that these cables are identified prior to commencing work at a dig site
5. Carry out non-mechanical removal of material to initially identify services.
6. Conduct a survey of the proposed excavation/penetration area using electronic locating devices. There are various types of commercially available locating devices. Note: The best way to eliminate risk is to physically locate the service by non-mechanical removal of material.

Concealed services permit

No excavation/penetration shall be performed on site before an approved Concealed Services Permit has been issued.

SWMS shall be prepared by the work group where work is carried out near or in excavation greater than 1.5 metres.

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Trenching

For more detailed trenching requirements refer to excavation codes of practice.

No-one in attendance

When no one is in attendance, secure covers are to be used to cover the trench to prevent persons falling into an excavation where the depth is two metres or more. Access to trench or shaft openings may be controlled by using a secure cover that is lockable and accessible only by competent persons. An alternative means is to use a suitable guard rail and toe-board with gate for access and supporting the sides by steel frames or sets of timber. In special cases support can also be provided by installing precast concrete or steel liners.

Preventing machinery getting too close

To prevent machinery getting closer than the distance equal to 1.5 times the height of the excavation, webbing barricade firmly supported by star pickets shall be installed at the appropriate distance from the excavation perimeter as based on a documented risk assessment.

Excavating by mechanical means

When excavating by mechanical means, a **Safety Observer** shall be present, to oversee trenching activities, and to be alert to:

- Any pipes/cables that have been partially exposed
- Trench collapse
- Personal risk and to be able to stop activities immediately.

Methods for removal of materials

The following removal of material methods shall be used

- Outside one metre of a 'positive service location' (i.e. by exposure or using an electronic location device) of a concealed Service, 'mechanical removal of material' can proceed
- Within one metre of a 'positive service location' of a concealed service, only 'non-mechanical removal of material' shall be used.

Service depth and/or multiple services

The depth of services and presence of multiple services in the same trench shall be determined.

Isolation of services

Where possible all underground assets must be isolated during ground-breaking activities. Where isolations are not used, the asset and appropriate mitigation actions must be stipulated within the Take 5 and SWMS. Some examples of other mitigation measures are covered in execution of ground-breaking activities.

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Marking of underground assets

As part of the preparation of the identification of concealed services, it is critical to ensure that no workers are exposed to any risk of injury and/or the corporation is not exposed to financial risk. A review of relevant drawings shall be conducted to determine the existence, and precise location, of all concealed services, buried pipe work, structures, foundations, and electrical cabling in the vicinity of the proposed work perimeter. A marked-up drawing of the proposed excavation/penetration shall be attached to assist the review process and be made available on Site.

Once a service is identified, the ground shall be marked with a coloured line to indicate conductors, cables and pipelines using a clearly visible spray paint.

The required colours are displayed opposite in the colour chart.

Power conductors	Orange
Telecommunications cables	Yellow
Stormwater, drainage	Green
Water	Blue
Sewer	Red
Limits of approach for mechanical and non – mechanical removal of material	Silver
Gas main – contact the local gas distributor to arrange for a site inspection and clearance to proceed	

Table: colours used to mark underground assets

The PIC or equivalent team leader in charge of the work will complete the request for permit and planning details of the Concealed Services Permit (see - Concealed Services Permit) and submit it to the nominated **Authorised Issuing Officer (AIO)** before the planned commencement of the excavation work.

The PIC or equivalent team leader shall, in conjunction with the **AIO**, review the location of the proposed work perimeter, and check all relevant drawings to identify concealed services.

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Following the review of drawings, identification and marking of any additional concealed services, the AIO will list any special conditions necessary for the safe performance of the work. Such conditions may include, but are not limited to:

- Hand digging to locate and secure services
- The isolation of electrical services
- The requirement to have additional supervisory, or specialist, worker's present
- Not using invasive digging equipment
- Substituting bucket teeth with a scraping blade
- The requirement for inspections of the excavation/penetration before and during the performance of the work and/or
- The existence of potential contamination e.g. asbestos, high-pressure liquids. Compliance with the conditions listed on the permit is a condition of issue and acceptance of the permit.

The AIO in consultation with the PIC or equivalent team leader will record any 'Conditions of Permit Issue'.

The AIO shall then issue the permit.

The PIC or equivalent team leader for the work shall sign and accept the Permit and ensure that the work is completed in accordance with any conditions listed on the permit. The PIC or equivalent team leader in charge of the work will explain the conditions of the permit to all workers performing the work in the initial work party and those that join later.

The Concealed Services Permit shall be displayed at the location of the work or be in possession of a person at the job site, always.

The approval and issue of the Concealed Services Permit is to ensure that no concealed Services are damaged during the excavation. It does not detail the safe method of performing the task. These shall be covered in the Take 5 or standard work instruction.

Execution of ground-breaking activities

The Concealed Services Permit and Take 5 or SWMS shall give warning of all known hazards and any uncertainties over the hazards that might be present. Exploratory digs shall be carefully specified.

Risk of exposure to a hazard

Where a risk assessment indicates there is a risk of exposure to a hazard from a service, then that service should be isolated, locked and tagged out. If this is not reasonably practicable, use:

- Earth leakage circuit breakers on power leads
- Double insulated electrical tools
- Electrically rated protective gloves
- Electrically rated footwear
- Rubber mats as identified by the risk assessment.

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Penetration of a Building Surface

Any penetration of a building surface shall adopt these principles:

- Determine if penetration can be avoided
- Penetrate no deeper than is required to do the job
- Check drill holes frequently for signs of obstructing materials, such as wire fragments
- If you hit an obstruction, stop, and investigate
- If penetration location or work requirements change, ensure that the Concealed Services Permit is reviewed with the AIO, and that potential Hazards are evaluated
- Drill pilot holes
- Ensure that the proper drilling or cutting equipment is prescribed for the job
- Once concealed services have been located, they shall be marked using the colour chart
- Ensure workers are competent to use electronic devices to detect concealed services
- Never rely on the actuation of electrical circuit breakers as a safety barrier for Workers
- When procedures or work plans appear to be inconsistent with actual conditions, stop work and notify the PIC or equivalent team leader.

Excavation/Penetration Hazards

Excavation/penetration presents a range of Hazards, including but not limited to:

7. Damage to buried electric cables, pipes, or equipment
8. Damage to structures or foundations
9. Accumulation of liquids or vapours, which might lead to flooding, explosion, asphyxiation, or harm to the health of Workers
10. Caving-in due to inadequate shoring, or to super-loading around the edges of the excavation
11. Subsidence of adjacent areas
12. Workers or objects falling into the workings
13. Confined Spaces
14. Dust
15. Loss of continuity of supply
16. Struck by plant.

How is the process reviewed?

It is essential that up-to-date records be maintained, during the project, of any services or facilities that are to be covered. Upon completion of the excavation/penetration, and prior to the backfilling of any trench where services have been laid, the PIC or equivalent team leader of the work

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shall contact the AIO, and provide for that location, a marked-up drawing of all installed services. A copy of these marked up drawings shall be provided to the Hydro Tasmania Group position responsible for GIS Administration. The Asset location will then be incorporated into the appropriate GIS layer to assist with future Dial Before You Dig referrals. The AIO may wish to inspect the excavation prior to approving backfill on the Concealed Services Permit. The AIO shall then complete the approval to backfill of the Permit.

Backfilling requirements are:

- Large masses of fill shall not be placed in such a way to cause damage to an underground service
- Backfill beneath and around an underground service shall be properly compacted in accordance with generally accepted engineering practice
- Heavy loads and excessive force shall not be imposed on any exposed underground service at any time during backfilling operations.

Marker post for identification of Underground Services

As well as up to date records being maintained, it may be identified as part of a project or as a result of inadvertent digging up of underground services that they be clearly signposted and marked. Where this is identified the following markers shall be considered. As Hydro Tasmania Group have a number of services that may require marking e.g. fibre optic, power, communications, water etc., the following sticker and post has been made as a general warning and indication that services are in the area and that Hydro Tasmania Group, as a member of Dial Before You Dig should be contacted directly or indirectly through Dial Before You Dig.

Sticker 85mmx125mm

courtesy of "Euro Signs"

Steel Dura-Post www.post.com.au

Figure: Sample Hydro Tasmania stickers and posts indicating Hydro Tasmania services are located nearby

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What records are needed?

- Concealed Services Permit
- Concealed Services Checklist
- Environmental Impact Assessment if required

The AIO will collect the originals of the above records and arrange for them to be stored with the work order or project documentation. Changes to services shall be marked up on a drawing by the PIC or equivalent team leader and submitted to the Hydro Tasmania group position responsible for drawing management by the AIO.