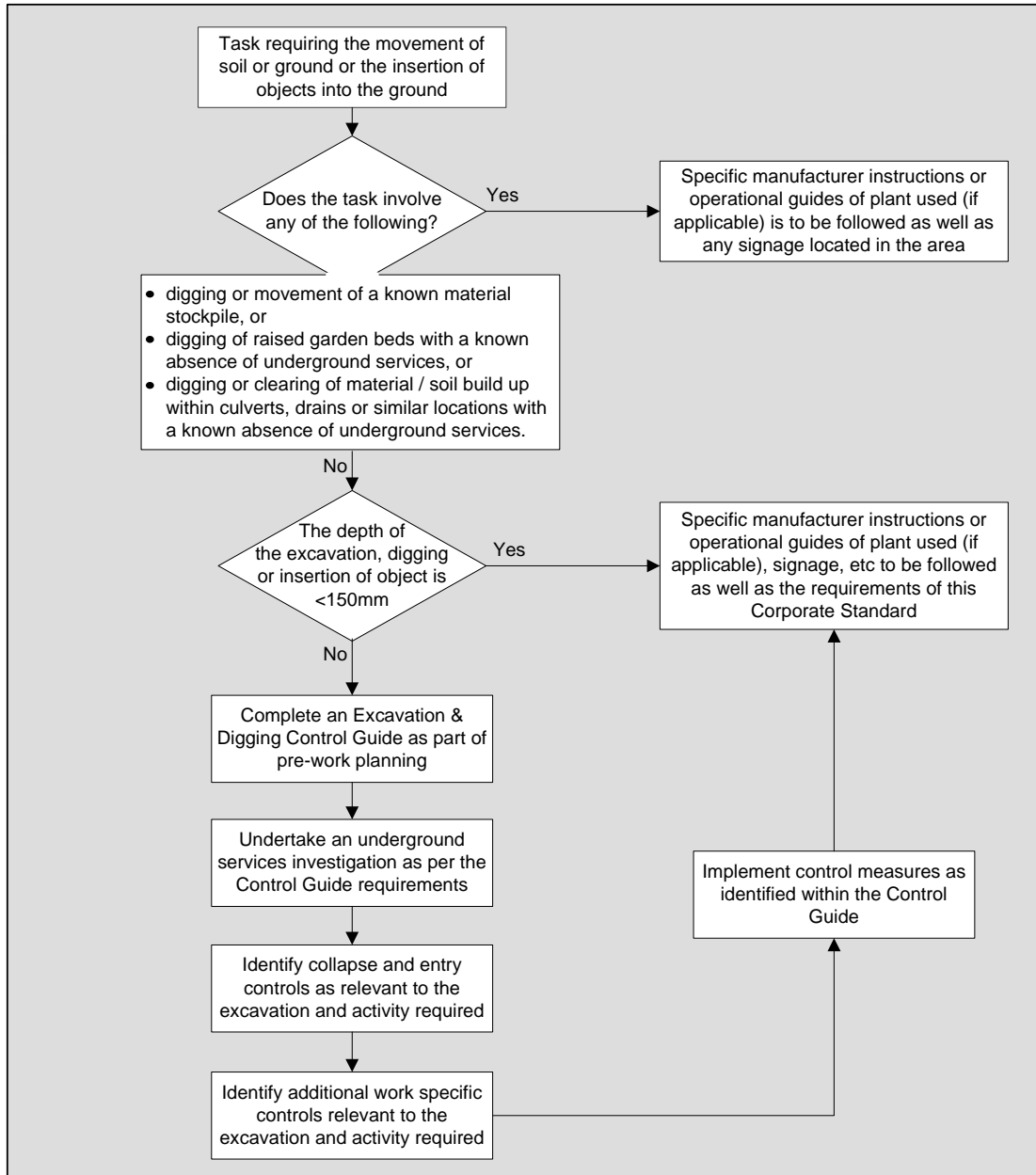


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Functional Flowchart



Objective

To provide a corporate standard that outlines SCL's procedure for managing excavation and digging hazards and the methods by which safe excavation and digging controls are to be implemented.

++ Scope

- + This corporate standard applies to any work location where excavation or digging is required within a SCL operated and/or maintained site or any situation in which an SCL employee or SCL controlled contractor is required to undertake specific excavation or digging tasks.

+ Definitions

Battering back: Means the process of removing material around a trench or excavation such that the walls are sloped back at an angle rather than vertical.

Note: Refer also to the Section on Controls paragraph 10.

Benching: Means the process of removing material around a trench or excavation such that the walls are stepped or benched back rather than vertical.

Note: Refer also to the Section on Controls paragraph 11.

Buffer board: A board, railing or similar structure that is secured in place adjacent to an excavation that provides a guide to plant operators of the limit that they may approach an edge.

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 who has through a combination of training, education and experience, acquired knowledge and skills enabling that person to perform correctly the specified task.

Note: For the use, installation, inspection, and placement of sheeting or timber shoring for the shoring of a trench the competent person must be a person who –

- (a) Either:
 - (i) has at least 3 years practical experience in trenching work, including the shoring of trenches, and a sound understanding of the technical principles involved in trenching work; or
 - (ii) is a geo-technical engineer; and
- (b) (has acquired, through training, qualifications or experience the knowledge and skills to do the work in a safe way, including –
 - (i) sound knowledge of relevant Australian Standards, Industry Codes of Practices and other relevant legislation; and
 - (ii) sound knowledge of, and competence in, the risk management process for trenching work, including -
- (c) hazard identification and risk assessment for trenching work; and
- (d) measures to control exposure to risks from trenching work, including shoring systems; and
- (e) safe work practices and procedures for trenching; and
- (f) how to plan and prepare trenching work; and
- (g) how to identify the location of underground services; and
- (h) how to identify soil types and other factors that affect the safety of a trench.

Digging: Within the scope of SCL excavation and digging requirements, any activity involving the use of hand tools or the insertion of objects into the ground, (eg driving a picket or boring of holes), whereby earth, rock, sand, soil or other material is moved or displaced at a depth exceeding 150mm.

Note: This 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.

Excavating: within the scope of SCL excavation and digging requirements, any activity that results in a hole in the earth or face of the earth greater than 150mm deep after a material has been moved or removed.

Excavation: within the scope of SCL excavation and digging requirements, a hole in the earth, or face of earth, formed after rock, sand, soil or other material is removed.

Geo-technical Engineer: means a person who –

- (a) is a registered professional engineer under the Professional Engineers Act 1988, and
- (b) holds a professional engineering qualification relevant to geo-technology (including a civil engineer).

Prescribed Information: about an underground service, means the information about the service necessary to safely do excavation work at or near the service, including-

- (a) the location of the service, and
- (b) the type of the service, and
- (c) the depth of the service, and
- (d) for an electrical service – whether the service is or is not live, and
- (e) the restrictions to be followed in doing the work.

Shoring: a system of temporary supports and sheeting material used to maintain the stability of the sides of an excavation.

Trench: an excavation where the maximum depth is more than the minimum width.

Underground Service: a cable, pipe or other thing laid or installed underground for the transmission, transportation or storage of electricity, or a substance, including telephone and gas service lines.

Responsibilities

OH&S Systems Manager

To maintain the currency and accuracy of the Excavation and Digging Corporate Standard reflective of legislative and corporate change.

Station / Site Manager

To monitor the implementation of the Excavation and Digging Corporate Standard and allocate responsibilities and resources to ensure site-specific practices/procedures are developed to satisfy the Corporate Standard.

OIC

To ensure safe assessment, control implementation, contractor management and overall safe excavation and digging practices in accordance with this Corporate Standard and any site-specific file information.

Workers

To comply at all times with the requirements specified within this Corporate Standard and any site-specific procedures.

Hazards

Excavation and trenching literature advises that fatalities have occurred in trenches as shallow as 1.2 metres following a collapse of the excavation sides. This point and the additional risks relating to the excavation of underground services, leaching of dangerous levels of gases from soils and unprotected trenches mean that specific controls must be considered by SCL and contractors while working on site. In relation to excavation work, a safe system must be implemented to control risks to health, safety and the environment arising from items such as, but not limited to:

- + + ▪ underground services,
- + + ▪ adjacent buildings, routes or roads that could become unstable as a result of excavation work,
- + ▪ nearby traffic hazards and hazards that the excavation work may cause for road users,
- the collapse of the excavation,
- objects or persons falling into the excavation;
- + ▪ the placement of excavated material;
- + ▪ a person inhaling or otherwise being exposed to, carbon monoxide or another impurity of the air;
- + ▪ contact with contaminated soil or excavated materials; and
- run-off of soil and materials onto roads and into drains and creek/catchment areas.

Planning to Excavate or Dig

1. SCL will undertake all necessary investigations regarding excavations and underground services prior to excavation or digging work commencing on site. This includes the requirement to:
 - review current and controlled site service maps, plans, and underground service drawings;
 - contact local authorities and service location record holders, where appropriate;
 - undertake site inspections to identify underground services using site drawings and other visual indicators and where appropriate an underground cable locator;
 - investigate potential environmental effects of the excavation activity and soil run-off paths into drains and catchment areas;
 - investigate potential weather conditions that may impact on ground conditions and spoil run off; and
 - where relevant due to the depth or complex nature of the excavation, organise for a geo-technical engineer to prepare a report with respect to the proposed excavation activities.
2. Following these investigations, the engineer's report(s) and prescribed information relating to all services relevant to the excavation are to be given to the OIC with the requirement for that person to properly instruct any worker or contractor involved in the excavation type work. This information is to be in writing with records maintained on site.

Note: Where specific excavation and digging controls are within the scope of work of an appointed Principal Contractor on site, the Principal Contractor is responsible for achieving the outcomes stated in 6.1 and 6.2 above. SCL may however, undertake consultation and assist the Principal Contractor by providing SCL site-specific information.

Risk Assessment

A work method statement/control guide is to be completed as per the requirements of the [Functional Flowchart](#)

Controls

1. Prior to an excavation or digging activity being initiated on site a [PTW Excavation and Digging Control Guide](#) is to be completed by an OIC as part of the PTW process.
2. Prior to 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.
3. Prior to excavation work commencing, control measures are to be erected and 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.

Note: Consultation between the OIC and SCL Environmental Officers, H&S Officers, etc may need to be undertaken prior to excavation and trenching activities commencing.

4. Prior to excavation work commencing, the ground is to be marked (eg 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.
5. Wherever practicable, controls such as the following are to be erected 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 high barricades or hoardings, and
 - signage ('Danger – Do Not Enter') hung independently or from barriers / hoardings.
6. 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.
7. 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.
8. 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.
9. Non-proprietary shoring is to be designed by a suitably qualified engineer, and installed by trained personnel only after a Competent Person has inspected the trench, assessed the shoring and approved the use of the shoring.

Note: Refer to additional information within the 'Competent Person' definition.

10. 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.
11. 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.
12. All contractors involved in excavation and trenching must ensure as a minimum that a Safety Plan/Work Method Statement is prepared for any work involving excavation work greater than 1.5m deep and that it 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.

Note: This applies to specific work scopes or tasks of contractors that are outside of those managed solely by SCL PTW and Control Guide documentation.

13. All contractors or SCL personnel involved in trenching where personnel 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 contractor, details of the person are to be given to SCL. This Competent Person is to undertake, as a minimum, daily inspections of trenches and excavations and details of these inspections are to be recorded in a [PTW Excavation and Digging Log](#) on site.
14. Covers are to be placed on unattended excavations where practicable on site.
15. Where practicable, barricades and signs are to be used at safe distances from edges to protect unattended excavations that cannot be practically covered. Barricading around an open excavation should encompass spoil piles and earthmoving plant in close proximity to edges where practicable.

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

Note: The intent of this requirement is to ensure that personnel do not work within these potentially hazardous environments in isolation from other workers or personnel who could initiate emergency response.

17. 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.

Note: To a lesser degree, air tools connected into poorly maintained air compressors may also present an exhaust fume hazard, specifically, carbon monoxide.

18. 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.

19. 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 [HB#560737: Falls and Falling Objects](#) are to be implemented.

20. 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.

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.

21. 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.

22. If, during any excavation or digging work activity, a person identifies unstable rock or soil or movement that could place themselves or others at risk, they are to report this issue to the OIC who is to ensure activities are temporarily stopped and/or additional controls are implemented to ensure personnel safety, as deemed appropriate.

23. Where an OIC identifies during the work planning and control guide process that a trench or excavation may contain, or has the potential to contain an unsafe atmosphere, specific controls are to be implemented to maintain a safe atmosphere with atmospheric checks made as deemed appropriate. Refer also to the [HB#560715: Confined Space](#) for detail regarding atmospheric testing / monitoring protocols. Where a safe atmosphere cannot be ensured, confined space controls are to be implemented.

24. Where new underground services are located on site, on landowner controlled areas, 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.

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

26. 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 SCL's OIC involved with the work activities.

Landowner Specific Issues

1. Where applicable, due to the type and location of the SCL site, management personnel are to undertake consultation with landowners and neighbours to inform them of potential excavation and digging hazards.
2. These hazards may be due to underground electrical and other services established in landowner areas to service the SCL site. Some of these services are not buried very deep, (ie contact may occur as shallow as 300mm) and as such, may be easily contacted by landowners. Of particular note, information is to be provided and consultation is to occur for landowner excavation and digging activities such as:
 - tree planting;
 - hammering star pickets or wooden stakes into the ground;
 - inserting objects into the ground as part of tarp and tent erection for specific on-site functions;
 - digging and preparing a garden;
 - grading of an easement; and
 - boring post holes.
3. Consultation as referred to above is to include the following:
 - preparing and distributing uncomplicated, easy to read guidelines regarding the services in the landowners' areas and precautions that SCL would like them to take,
 - providing landowners with contact details of a site SCL representative who they can contact prior to excavating or digging, and
 - meeting with landowners and undertaking inspections to discuss their proposed work, identify excavation and digging locations, depths and precautions to be taken.
4. Where deemed appropriate due to the nature of the landowner excavation or digging activity, an SCL representative may undertake the excavation and digging control guide process to assist in the assessment of the work.

Site Specific Management of Excavation and Digging Works

1. In accordance with this Corporate Standard for Excavation and Digging, each production site or SCL site where excavation and digging activities are to be undertaken is to develop a site-specific Excavation and Digging File.
2. The site-specific Excavation and Digging File is to contain, but not be limited to, the following components:
 - contact details of underground service locators (ie. 'Dial before you Dig', etc);
 - contact details for the local council authority;
 - contact details of the service owners or authorities where the site is situated; (ie water, gas, electricity, telecommunications, sewerage and stormwater, etc);
 - contact listing of key landowners or neighbours that may need to be consulted prior to excavation and digging activities commencing;
 - contact details (where applicable) of any regularly used and approved contractors that may be procured to undertake various excavation or major earthmoving tasks at the site;
 - contact details of service locators or providers of service locating equipment;
 - detailed process of how SCL owned service location equipment (where applicable) is to be inspected, tested, maintained, marked and calibrated as required on site;
 - detailed reference listing and process for the storage, review and update of site service location maps/plans;
 - requirements as to how on-site excavation and digging documentation (ie control guides, service checks, contractor work method statements, etc) are to be filed and maintained;
 - detailed allocation of responsibility for the monitoring of specific excavation and digging processes as detailed within this corporate standard and site-specific excavation and digging file.

- + + 3. Site-specific excavation and digging files developed by the sites may contain additional information to that previously described and sites are not restricted with respect to the amount of detail or incorporation of additional site-specific information that may be included within the file.

Contractor Management

- + 1. Where contractors are procured to undertake specific on-site work involving excavation and digging, SCL OICs are to provide all relevant prescribed information about underground services to the contractors prior to work commencing.
- + 2. Where contractors are procured to undertake specific on-site work involving excavation and digging, SCL OICs are to request and 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;
 - request training and competency evidence of all those contracted workers who will be involved in the work and those operating earthmoving machinery (ie. copies of current certificates, etc);
 - details of a competent person who will be directly involved in the supervision of the work and inspection of the excavation where the OIC will not fill this role;
 - request earthmoving machinery inspection and maintenance details (ie. registers/log books/inspection records, etc).
- 3. The OIC is to provide the contractor with details of SCL's Excavation and Digging Documentation and associated forms.
- 4. The SCL OIC is to monitor the contractor's methods of work and the implementation of the proposed controls to ensure that SCL standards for managing excavation and digging activities are achieved.
- 5. Contractor excavation and digging documentation, surveys and other records are to be maintained on site in job files for future reference.

Adequate Equipment

- 1. If, during any excavation or digging work activity, a worker or OIC identifies a faulty or unsafe item of plant, shoring, barrier, etc, activities that are placing personnel at risk are to be temporarily stopped until the equipment is repaired, replaced or otherwise deemed safe to re-use, prior to the activity recommencing.
- 2. All barriers, covers, signage, etc required to be used as per Control Guides are to be inspected, deemed fit for safe use and deemed to be safely in place by the OIC prior to and during all excavation and digging activities.

Training and Competency

- 1. All persons involved with excavation and digging, including OICs, plant operators, and those entering excavations are to be deemed competent to perform the various excavation and digging planning roles and work activities.
- 2. All persons operating excavators and earth moving machinery are to also possess the appropriate licences/certification for the specific plant items that they are to be operating on site.

Note: Refer also to [HB#560126: Safety Training Attendance](#), for further information regarding training requirements.

++ Review

- + This Corporate Standard is reviewed every 3 years and on an as needs basis (e.g. following legislative change, new information, relevant incident, etc.).

+ Links and References

- + QLD Workplace Health and Safety Regulation 2008, Part 20
- + VIC Code of Practice: Safety Precautions in Trenching Operations - 1998
- + WA Occupational Safety and Health Regulations 1996, Part 3, Division 9, Subdivision 6
- + WA Code of Practice: Excavation 2005
- + SA Occupational Health, Safety and Welfare Regulations 1995, Division 5.5
- + NSW Occupational Health and Safety Regulations 2001, Part 8.5
- + NSW Code of Practice: Excavation - 2000
- + NT Work Health (Occupational Health and Safety) Regulations, Division 3

- + Professional Engineers Act 2002
- + 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

[HBIRDPRO-#659518-Barricading and Restricted Access](#)

[HB#560737: Falls and Falling Objects](#)

[HB#560715: Confined Space](#)

[HB#560126: Safety Training Attendance](#)

[PTW Excavation and Digging Control Guide](#)

[PTW Excavation and Digging Log](#)

Attachments

[Attachment 1: Underground Marking Tape](#)

[Attachment 2: Audit Checklist](#)

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Attachment 1: Underground Masking Tape
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: Identification colours for other underground services should be of a bright colour. Guidance may be obtained from AS 1345 and AS 2700.

Note 2: The use of the colour 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.

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.
<i>Note: Additional requirements in relation to tape properties are included within AS/NZS 2648.1.</i>	

Amd Date 04/01/08

Attachment 2: Audit Checklist

Item	Status			Action Required	Responsible Person	Completed (Insert Date & Initials)
General Requirements						
Prescribed information regarding underground services, inclusive of engineer's reports as relevant, are provided to contractors undertaking excavation and digging works.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
Excavation and Digging Control Guides have been completed for appropriate tasks as defined (excavation and digging to a depth exceeding 150mm).	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
Specific Excavation and Digging Controls						
Non-proprietary shoring used on site as a collapse control has been designed by a suitable qualified engineer.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
A work method statement / safety plan is obtained from all contractors involved in excavation tasks deeper than 1.5m where the contractor is in control of the works.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
Excavation Logs are completed for all work scopes where personnel enter an excavation deeper than 1.5m.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
Colour coded marker tape is available on site as per <i>Attachment 1</i> so that new / modified services can be marked accordingly.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
Site service drawings / maps have been updated subsequent to service installations / modifications.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			

Corporate Standard

Excavation and Digging PTW

HB#560720

Amd Date 04/01/08

Item	Status			Action Required	Responsible Person	Completed (Insert Date & Initials)
An excavation and digging file is maintained on site with relevant content as prescribed in <i>Section 9</i> .	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
Training and Competency of Personnel						
Certification details for earth and load shifting equipment operators maintained as per corporate training and record keeping requirements.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
High energy, high impact (HEHI) – Excavation and Digging Training delivered to relevant workers and recorded.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
Contractor Management						
Certification details for earth and load shifting equipment operators verified and recorded prior to work commencing.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
Contractor documentation contains sufficient information regarding personnel, plant, work methods and completed work / service locations.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			

Other / Further Details: _____

Signature of Person Conducting Inspection: _____

Copies Provided to: _____
 (Print First & Last Names)