

Pole Hole/Stay Excavation & Backfill

PURPOSE

The purpose of this method statement is to document the safe systems of work for the excavation and backfill of pole and stay holes.

SCOPE

This method statement covers the excavation of pole and stay holes using both hand and mechanical techniques, precautions to be taken when working in the vicinity of live overhead line are also covered.

RESPONSIBILITIES

Staff are responsible for:

- Ensuring that they have an adequate understanding of Electricity Network Solutions (ENS) policies, procedures and associated Risk Assessments and Method Statements and their application.
- Undertaking works in a safe and efficient manner.
- Completing a personal and site risk assessment on arrival at the work site and whenever location or conditions change.
- Their own personal safety and that of their colleagues.
- Checking the safe condition of tools and equipment on a daily basis.
- Ensuring that safety exclusion zones are adhered to.
- Ensuring that Personal Protective Equipment (PPE) is worn at all times on site.

STAFF COMPETENCY

ENS shall assess all staff engaged on this activity as competent to do so. Machine Operators shall possess relevant in date certification. Additionally staff shall possess Distribution Network Operator (DNO) authorisation for the work, particularly for work near live overhead lines.

Where persons are undergoing training they shall be supervised, the level of supervision will depend upon their current experience and ability.

PREPARATION

The following will be completed before site work commences:

- A work pack will be issued containing details of work location and access restrictions, plans of utility equipment in the vicinity of the works, details of hazards identified at the planning stage and details of any electrical permits that may be required.
- Assimilate the work pack contents, note known hazards and locate utility pipes and cables.
- Consideration will be given to safe means of access to and egress from the site within the confines of landowner permissions.
- The need for specialist equipment (eg tracked vehicles) will be considered.
- Risk Assessments will be prepared on a pole by pole basis, using ENS published generic assessments as a guide.

GENERAL CONSIDERATIONS

In addition to the precautions noted in the method statement and associated risk assessments the following should also be noted:

- Making dead, isolating, earthing and where necessary the removal of any adjacent electrical apparatus under the control of approved safety documentation.

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- Work on/over or within pole falling distance of railway property shall not be carried out without Network Rail consent.
- BT lines should be protected from possible damage.
- Permission will be required for work near navigable waterways.

WORK SEQUENCE

1. On arrival at the work location vehicles will be parked off public roads where possible. If it is necessary to park on public roads, all vehicles are to be parked safely and positioned to give the team some protection against traffic flow.
2. Position road signs in accordance with Chapter 8 of New Roads and Street works Act.
3. Ensure correct PPE is being worn, **including reflective jackets**.
4. Check work location is correct and prepare joint team risk assessment.
5. Where overhead lines are identified as a hazard the team will firstly apply the guidance given in HSE publication GS6. Work in close proximity to both live and dead overhead lines must be sanctioned and controlled by an authorized person.
6. Scan work area for pipes and cables. Manhole covers may suggest the presence of drains or non-metallic services. Where HV or LV cables drop down poles particular care must be taken to verify the route within the ground, as cables may be looped or jointed at the base of the pole. Dig trial holes, if necessary, to make absolute identification. Team members to have received instruction in safe digging techniques and the HSE guidance given in publication HSG 47.
7. Bring excavator to site. The team leader will check the inspection certificate of the machine, the operators training certificate, the SWL of the machine and the operation of any check valves and pole handling equipment (eg Roach or Strimech). Excavators and lorry cranes that are to be used in the vicinity of live overhead lines will have suitable earthing attachments points available.

The machine will have a certificate confirming satisfactory earth continuity between earth attachment and load attachment point.

When the person in charge of the work is satisfied that all hazards have been identified and precautions agreed, excavations may begin in accordance with the following principles.

POLE EXCAVATION GENERAL PRINCIPLES

Excavated pits for 'in-line' poles will be dug as near as possible to the line of the route, shown and marked 'A' in figure 1. Where due to site restrictions, this is not possible, pits will be dug at an angle (e.g. direction 'B' or 'C' figure 1). Pole pegs for 'in-line' poles will not be left in positions during and after excavations. Poles will be planted at the correct depth by measuring from scarf marks to ground level.

Pits for 'angle' poles will, where possible, be excavated to bisect the angle of the line as shown in figure 2. Where due to site conditions this scheme of excavation is not possible, pits will be dug at the most convenient angle.

As the pole peg will be moved during excavation, before excavating it will be necessary to provide sighting rods to enable the pole to be correctly positioned in the pit. One method is illustrated in figure 2, position a sighting/ranging rod at the stay peg with another sighting rod on line between pole and stay pegs and exactly 1.5 metres from the pole peg. (This measurement is specific to ensure the correct pole planting position)

Both figures 1 and 2 are shown in Appendix 1.

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For all excavations on farmland care must be taken not to mix topsoil and subsoil. Excavated topsoil is to be set to one side and reinstated on completion.

EXCAVATION & BACKFILLING IN CLOSE PROXIMITY TO LIVE LINES

Within the UK this method is limited to lines up to and including 11,000 volts.

Work may be carried out manually or by suitable tracked or wheeled excavator. The preferred method is by machine.

All staff, including the machine operator, involved in this activity will be trained and have client authorisation.

- The work will be pre-planned and the relevant Network Control informed in the required manner.
- A banksman will be appointed to control operations on site.
- Where a new pole is positioned alongside an old pole, the old pole must be assessed for stability and degree of decay. Fit temporary guys if necessary. If in doubt consult a supervisor.
- Engage excavator height restriction device and prove operation at a safe distance from live lines.
- Configure the excavator for live working, attaching temporary earth leads as shown in Appendix 2.
- Scan work zone for presence of other services as described above.
- The banksman will direct the machine to enter the work zone with dipper arm in transport position. Check temporary earth lead for security.
- All team members must remain within sight of the machine operator. Set up a 10 metre exclusion zone for those directly involved in the task. If necessary erect fencing to exclude farm livestock from the area.
- Commence the excavation progressively with the banksman indicating the required dimensions.
- All members of the team will remain vigilant to the presence of live lines and ensure that safety clearances are maintained at all times. (Required safety clearances will be stated by the client during training procedure.)
- Excavations alongside existing poles will be backfilled promptly. Any other excavation will be covered or protected by barriers if left unattended.

ADDITIONAL PRECAUTIONS FOR HAND DIGGING

Collapsing soil can kill. Excavations may seem clean and self supporting , but the removal of excavated material causes pressure relief and introduces the conditions that may lead to failure and collapse.

The cut backs required for hand excavation and the angles at which various materials will slide are shown in Appendix 3.

The conditions that increase the risk of collapse are:

- Free running granular soils and previously excavated and backfilled areas, clays and particularly wet clays.
- Surface water and rainwater, hot dry weather and vehicle movement close to the excavation (within 4 metres).
- Excavated materials placed too close to the excavation increasing downward pressure.

The following actions will be taken to minimise the risks associated with hand excavation:

- All persons engaged in this activity will be trained to recognise the hazards associated with various ground conditions and the selection of controls to prevent danger.
- Persons carrying out hand excavations are to be accompanied. Both pole and stay pits will be dug as a stepped excavation. This should preclude the need for any person to enter the excavation beyond 1.1 metres.
- There may be a risk of ground contamination in industrial areas. If unusual smells occur or if ground colour changes consult a supervisor.

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- Do not allow engine exhaust fumes to collect in the excavation. Keep liquid gas bottles clear of the excavation.
- Consider the risk of soil collapse when undercutting excavation sides in order to install stay blocks as shown in Appendix 3.

Appropriate control measures are:

- The ground is self supporting and requires no further measures.
- The ground is not self supporting and requires battering back.
- If the ground is not self supporting and battering back is not possible, apply suitable shoring.
- Suitable shoring will include timber shuttering, stout boards or other suitable framework.
- Do not use steel sheets near overhead lines.
- Install shuttering framework from above, to ensure that no person is put at risk by entering the excavation.

BACKFILLING

The key to a quality installation is correct backfill compaction and surface reinstatement.

Pole stability and stay effectiveness are adversely affected by poor back fill compaction. Compaction removes the voids in the soil structure when backfilling, compacting in even layers will achieve optimum results. Water logged soil may be required to be mixed with a stabiliser (eg: Permasoil) or replaced with imported material.

BACKFILLING BY HAND

- Assess the stability of the pole and support as required. Crane, excavator arm or temporary guys may provide support. Situations where large excavations have been carried out near the pole, for example to accommodate jointing works, will require special consideration.
- Ensure that excavation is free of water. Place pole in its final position and support as required. Backfill in layers of approximately 100–150mm. Use loose compactable material and ram thoroughly.
- Continue to backfill in 100-150mm layers, ramming each layer. The pole will be plumbed during the backfill operation, whilst it is still supported. Ensure pole top shrouding is clear of conductors if pole has been live line erected.
- Replace top soil and compact.
- Replace turf that may have been removed and compact.
- In locations subject to NRSWA requirements, reinstatement will be carried out by qualified staff to the current code of practice.
- Remove waste from site under the terms of statutory license.
- Make good any surrounding area damaged by work activities. Restore damaged fences, hedges, drains and ditches in accordance with landowner's wishes.

Stay holes should also be backfilled in layers as described above, special care should be taken to avoid displacing the set of the rod or block. Compaction in close proximity to the rod should be carried out using a hand rammer or trench type wacker.

BACK FILLING USING EXCAVATOR BACKACTOR

- Engage and prove operation of height restrictor at a safe distance from live line.
- The excavator will remain attached to temporary earthing leads, if working near a live line.
- The banksman will ensure that he is in full sight of the machine operator, and that other persons are clear of the operating area.
- The excavator back actor bucket is turned up so that it may be used for compacting and ramming, taking care not to mark the pole.
- Backfilling and compaction will be carried out in layers as shown in Appendix 4.

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- Compact the area around pole and kicking block with a hand rammer or trench wacker.

When back filling stay holes it will be necessary to hand ram the area around the rod and the corners of the excavation.

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APPENDIX 1

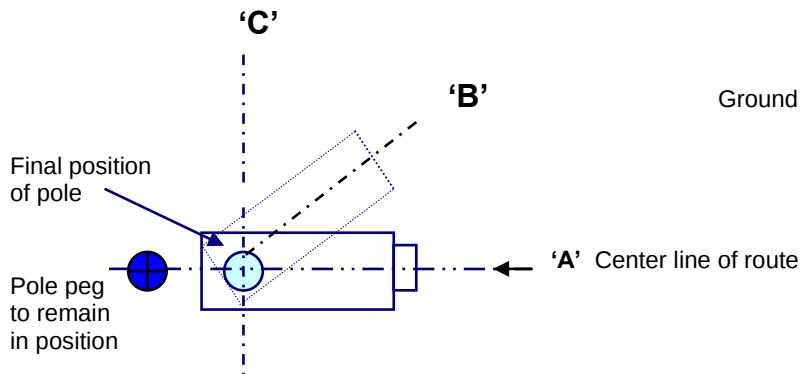


Figure 1- Plan of pit for main or 'angle' pole

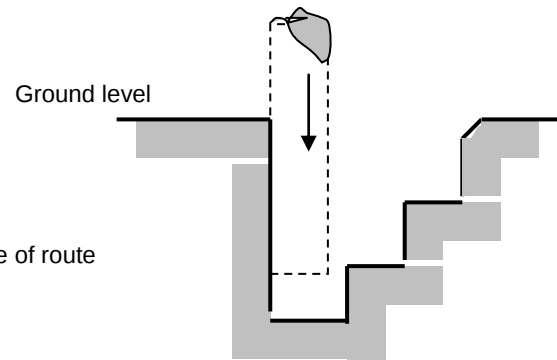


Figure 3 - Section through hand excavated pit

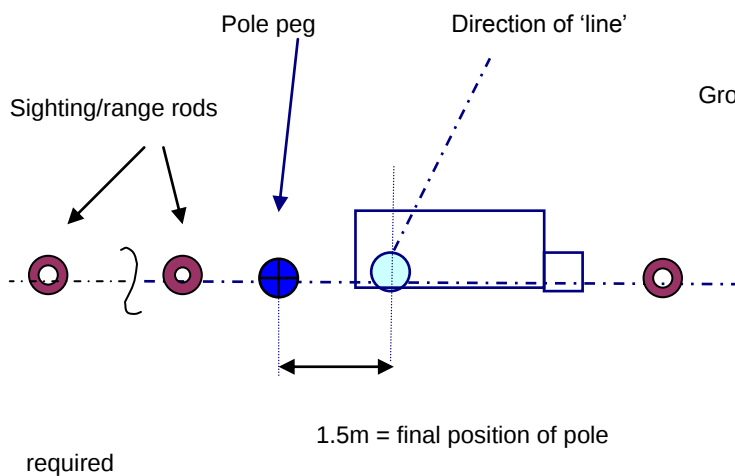


Figure 2 - Plan of pit for 'angle' pole

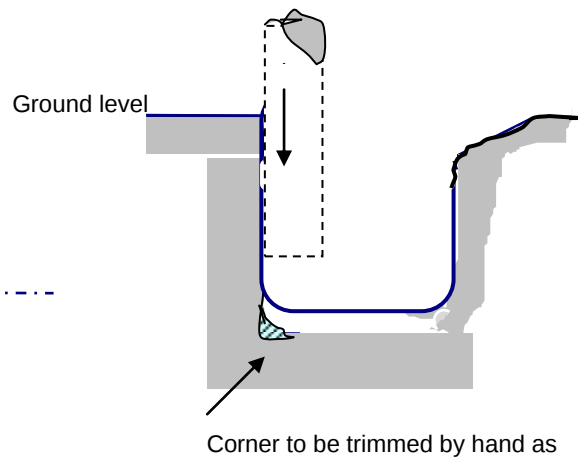
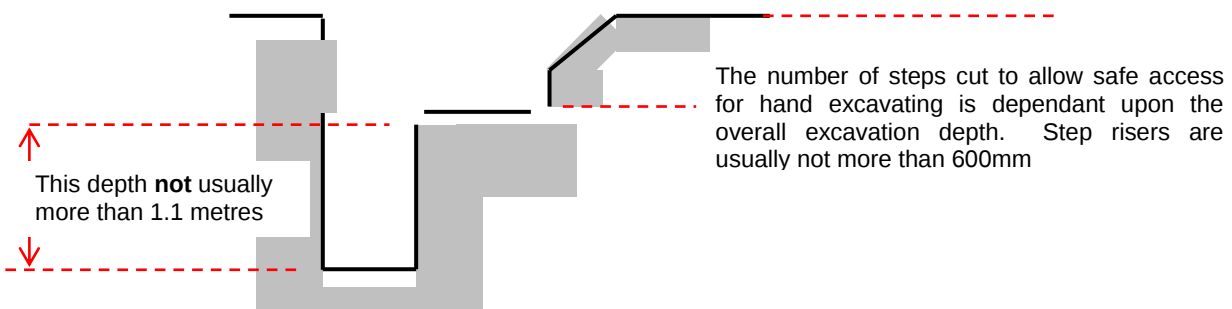


Figure 4 - Section through Mechanically excavated pit

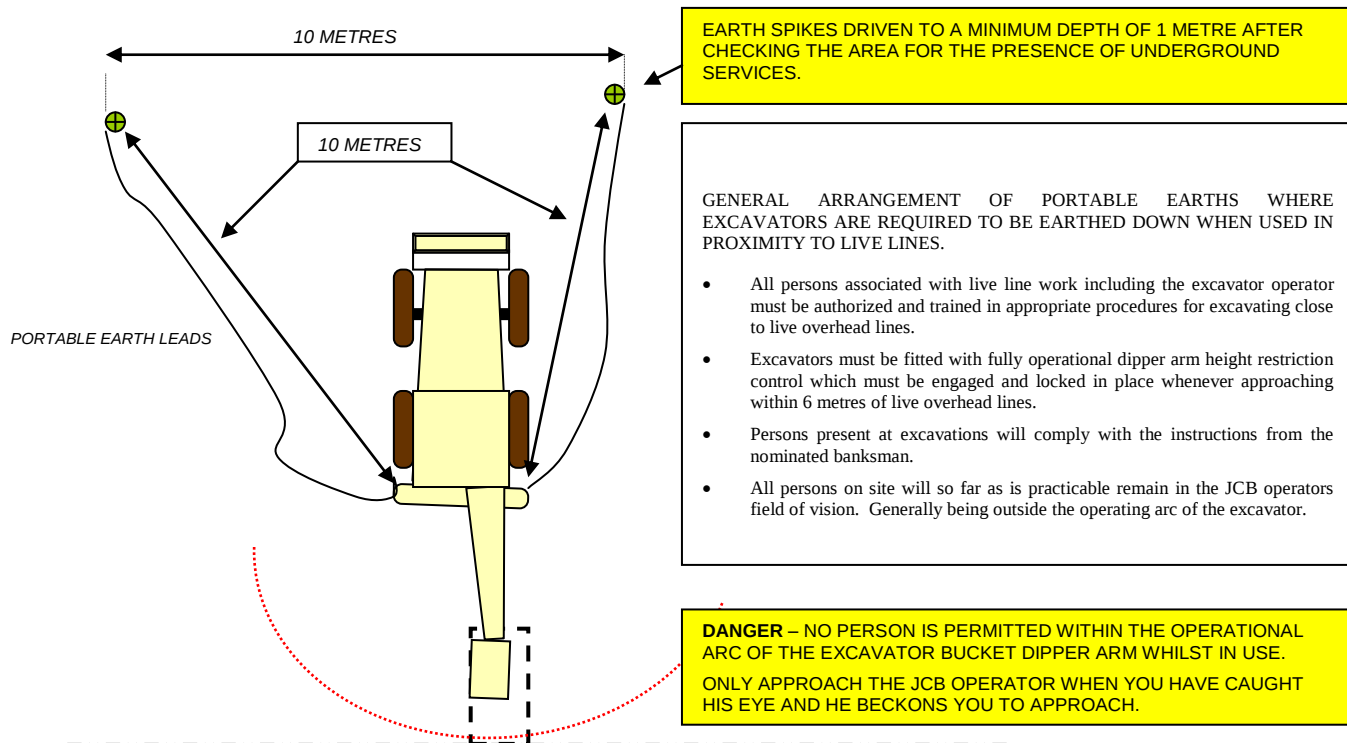
TYPICAL PROFILE OF HAND DUG POLE OR STAY PIT



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APPENDIX 2



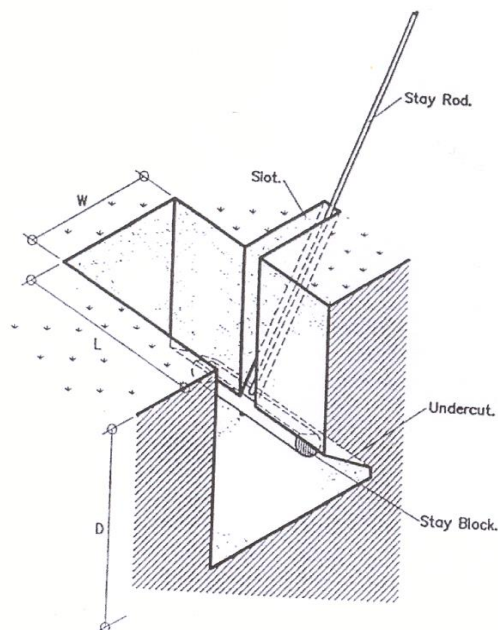
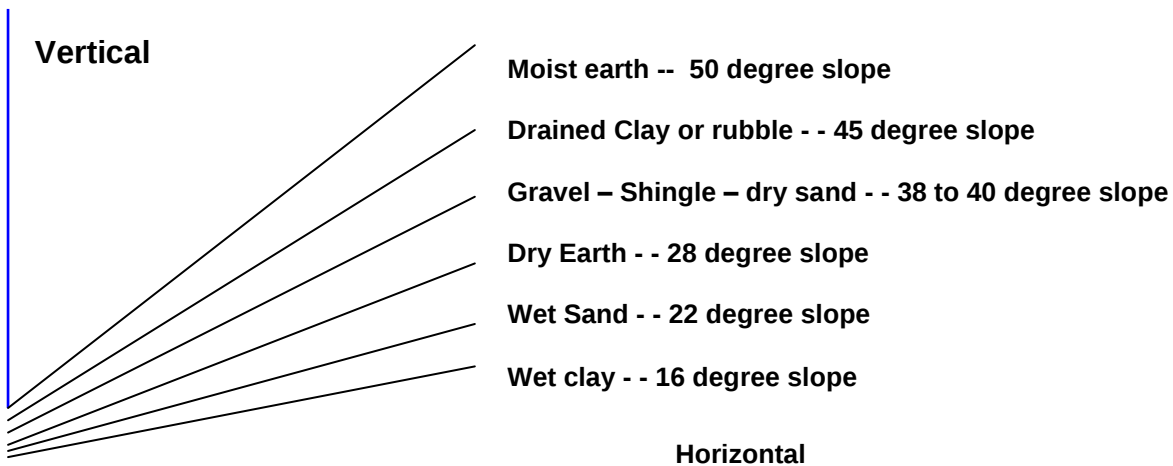
ALL PERSONS MUST BE FORWARD OF THIS LINE WHILST EXCAVATING IS IN PROGRESS.

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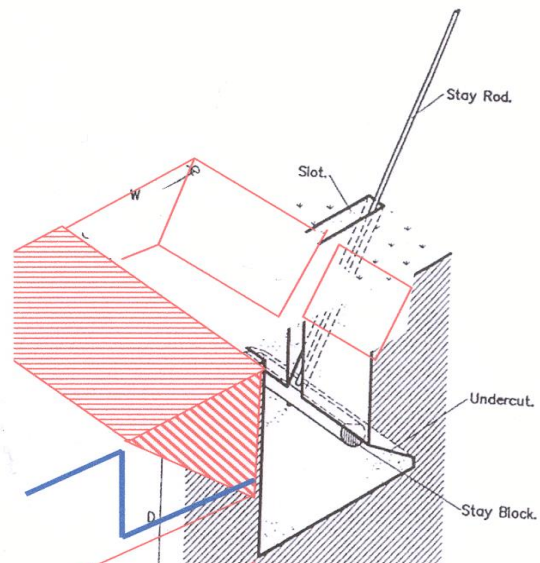
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APPENDIX 3

Angles of repose:- Angle at which certain materials will slide when unsupported.



Stay pit dug in self supporting ground by mechanical excavator not intended for entry by persons.



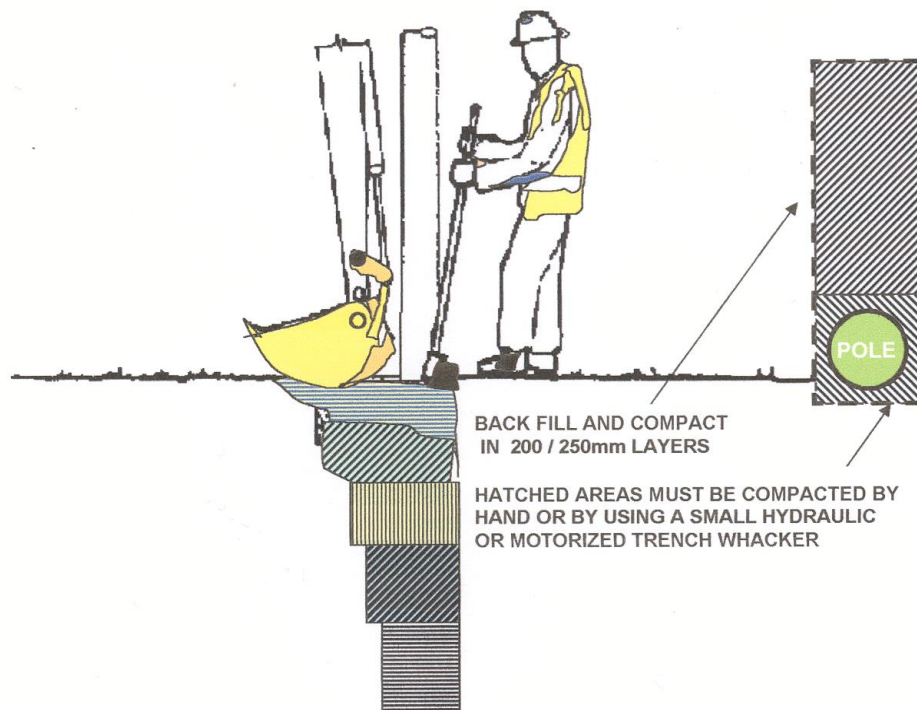
Unsupported depth not greater than 1.1 metres, where persons enter to work and the ground is not self supporting

Pit dug by hand with sides battered back for entry by a person (Poles or stays). **Blue line indicates step cut as a preferred alternative to battering back to provide a working platform to prevent overreaching whilst hand digging**

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APPENDIX 4



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REVISION HISTORY

Draft Prepared	George Fisher	9 th June 2007
Approved	Aidan Gunning	12 th June 2007
Reviewed	George Fisher	24 th January 2008
Reformatted	Billy George	27 th November 2008