Excavation Requirements

Introduction

WorkSafe NZ defines working at Excavation work as work involving the removal of soil or rock from a site to form an open face, hole or cavity, using tools, machinery or explosives.

Excavations in most circumstances are considered high-risk, which can result in serious injuries such as death to not only the person working, but others in the vicinity.

Scope

This document applies to all persons working for and on behalf of Auckland Airport, it summarises the expectations from the Health and Safety at Work Act 2015 & supporting regulations, guidance issued by WorkSafe NZ and Auckland Airport's Safety Management System (SMS).

For more details on excavations and ground penetrations please refer to relevant legislation, regulations, guidance and components of Auckland Airport's SMS.

Definitions

Term	Definition
Battering	Sloping of the face, side or wall of an excavation to prevent the collapse of the excavation.
Benching	Horizontal stepping of the face, side or wall of an excavation to prevent the collapse of the excavation.
Open excavation	An excavation in open ground and can vary in shape and size.
Pit excavation	Usually four-sided and deeper than the narrowest horizontal dimension at the surface.
Potholing	Small excavation or inspection hole to find underground services.
Shaft	A vertical or inclined way or opening from the surface downwards or from any underground working, the dimensions of which (apart from the perimeter) are less than its depth.
Shields	A steel or metal structure with two vertical side plates permanently braced apart by cross frames or struts designed to resist pressure from the walls of a trench. Shields do not ensure ground stability but protect workers from ground collapse, by preventing collapsing material falling onto them.
Shoring	Prevents collapse by maintaining positive pressure on the sides of the excavation, protecting workers.

Term	Definition
Spoil	Waste material brought up during the course of an excavation.
Trenches	A long narrow excavation which is deeper than it is wide, and open to the surface along its length.
Zone of influence	The volume of soil around the excavation where actions may influence the excavations stability or where the exaction may influence the stability of any nearby structure.

1. Hazard/Risk Identification

Hazard	Consequence
1.1. **Person falling into excavation**	Falls from any height have the potential for serious injury or death.
1.2. **Object falling into excavation**	Plant, machinery or equipment can fall into an excavation causing serious injuries, fatalities or damage to the fallen object.
1.3. **Collapse of excavation**	Can cause serious injury or death from crushing to any person in an excavation.
1.4. **Hazardous substances present in excavation**	The presence of hazardous substances in the air can lead to asphyxia, unconsciousness or death. They can also contribute to a fire or explosion in an excavation.
1.5. **Striking underground services**	Can cause serious injury or death to multiple persons in the vicinity of the excavation. Could disrupt services and impact the operations of the airport.
1.6. **Other hazard**	Other hazards that aren't specific to excavations need to be identified prior to works being commenced. Other hazards that could have a negative impact on workers or other people need to be controlled. These hazards could include environmental conditions (incl. weather), proximity to overhead services, traffic, vibration and noise etc.

2. Safe System of Work

All Excavations or ground penetrations deeper than 300mm require a permit to be issued by AIAL Permit Office (Permit.Office@aucklandairport.co.nz). Note that excavations of any depth, as well as any work (even if no excavation is involved) within 6m of the gas pipeline or fuel pipeline require a permit to work and consent from the relevant Pipeline Manager.

To be issued a Permit, the Permit Issuer must be supplied with the relevant supporting documentation:

- Permit to work application
- Rescue/recovery plan
- Ground Penetration Certificate (GPC), issued by AIAL Ground Penetration Office (Ground.Penetration@aucklandairport.co.nz)
- JSA or SOP for the Excavation Work

- Site location

Close Approach Consent (sometimes called Close Proximity Permit) is also required from utility owners if working within the specified proximity of underground or overhead services (refer Vector close approach consents).

BeforeUdig plans may also be referred. This will be advised in the GPC Process.

3. Auckland Airport Excavation and Ground Penetration Controls

3.1. Any excavation **1.5m or greater**, that has a **depth greater that horizontal width** is required to be notified to **WorkSafe NZ** as **Particular Hazardous Work**;

3.2. Prior to works commencing an **assessment** needs to be undertaken to determine whether the **soil** requiring excavation is **contaminated**;

3.3. All **underground hazards** (pipelines, electric cables, services etc) have been **identified**, **located** and if necessary **isolated**; protocols to be in place for unexpected discovery of contaminated ground during works;

3.4. A **Safety Watch** must be assigned to the excavation if underground hazards are identified;

3.5. Consideration should be given to **expose underground services** using **water or air vacuums**; Once underground services are exposed, mechanical digging can occur up to 500mm of within the underground services (with a safety stand-over (sometimes also called a service stand-over) present.

3.6. Service stand-over personnel may be required for works close to essential / critical services, and if so this will be highlighted in the GPC;

3.7. If the Underground assets have not been able to be located in the expected area, work should stop and the Asset Engineer and Area Authority contacted for further direction. This may need to result in the PTW being temporarily suspended until a new plan is formatted and agreed, and then reflected in either an amendment to the PTW or a new PTW.

3.8. Any **equipment** (including machinery and plant) being used must be checked and **functioning properly**;

3.9. All excavations must be **fenced off** with **appropriate signage** to prevent the **unauthorised access** from the public, these fences must:
- Have a secure supportive top and bottom rail;
- Have the top rail located at a minimum of 1m above ground level. Only if there is an aircraft-operational requirement preventing a 1m height, a top-rail height of between 600mm and 1m may be approved provided acceptable mitigation measures for such an exception are listed in a JSA or acceptable equivalent;
- Have the bottom rail located a maximum of 100mm above ground level;
- Be continuous around the excavation;

3.10. A **competent person** must make an assessment as to the best way to **control the risk of collapse** either through **benching** and/or **battering**, **shoring** or **trench shields**. Consideration needs to be given to the:
- Soil type;
- Soil moisture content;
- Planned height of the excavated face;
- Any surcharge loads acting on the excavated face;

3.11. If **shoring** for an excavation is **designed to carry extra loads** (soil, vehicles and spoil) than there must be **1m between the excavation and loads**; the loading allowed for needs to be specified in a method statement / JSA so it can be controlled;

3.12. If **shoring** for an excavation is only **designed to carry soil loads**, then **extra loads** (vehicles, spoil, etc) must be a **minimum of 1m outside the zone of influence**; Zone of influence to be clearly defined by shoring designer;

3.13. A **competent person** must **regularly inspect** the soil condition and the state of control for **signs of ground collapse**;

3.14. There must be a **safe means of access** to the excavation;
- Up to 1.5m deep, provide ladder, stairway or ramp access and egress;

- 1.5m or deeper, provide ladder or stairway ramp access and egress;

3.15. There must be controls in place to **prevent workers from falling** into an excavation;

3.16. All **mobile plant** used must be **fit for purpose** and in **good working order**;

3.17. Mobile plant **must not operate or travel near the edge** of an excavation unless **shoring can support such loads**;

3.18. Where practicable, an **exclusion zone** must be set up around mobile plant, if not practicable there must be a **spotter in the immediate area** of the mobile plant. The spotter must be in **constant contact** with the mobile plant operator;

3.19. All mobile plant must meet **WorkSafe NZ's ACOP for Operator Protective Structures on Self-Propelled Mobile Mechanical Plant**;

3.20. Mobile plant must **not work within 4m of overhead services**, unless they have received a **close proximity permit** from the service owner;

3.21. Excavator operators must ensure that the **quick hitch is in good working order** and the **safety pin is securely in place** or the **automatic system has engaged correctly**;

3.22. Adequate controls need to be put in place if there is the **potential that water can collect in an excavation**.

4. Excavations Within 6 Metres of a Fuel or Gas Pipeline

4.1. Any excavation or penetration occurring within 6 metres of any fuel or gas pipeline must be notified to the relevant Pipeline Manager:

- The fuel pipeline (Wiri to Airport - "WAP") that enters the Auckland Airport Precinct at Puhinui Road and travels to the JUHI facility at Cyril Kay Road is owned by the Wiri Oil Services Ltd (WOSL) Joint Venture. The relevant party to contact is B4UDIG – 0800 248 344

- The Fuel Hydrant System (FHS) that runs from the JUHI Bulk Storage to the international apron is owned by Auckland Airport and operated by JUHI. The Auckland Airport Pipeline Manager can be contacted at Pipeline.Manager@aucklandairport.co.nz.

- The majority of the gas network fed within the Auckland Airport Precinct is owned by Vector Gas, with the exception of three sections owned by Auckland Airport being the Puhinui Bridge Gas line and the two downstream sections from the main meter sets located at International Terminal Building (refer gas network ownership map below). The relevant party to contact for the Vector owned sections is B4UDIG - 0800 248 344. For works around the Auckland Airport owned sections contact Pipeline.Manager@aucklandairport.co.nz.

- The fuel and gas pipelines are shown on the maps overleaf.

4.2. The relevant Pipeline Manager must be informed of any work activities within 6 metres of the Hydrant or JUHI network or gas pipeline (whether or not excavation is occurring). Depending on the nature of the planned work this may trigger a requirement to notify the Regulator under the Health & Safety in Employment (Pipelines) Regulations 1999 and/ or an internal AIAL Management of Change process. Email Pipeline.Manager@aucklandairport.co.nz

4.3. Note that **horizontal directional drilling** must be taken into account when calculating whether any excavation or penetration is within 6 metres of any fuel pipeline.

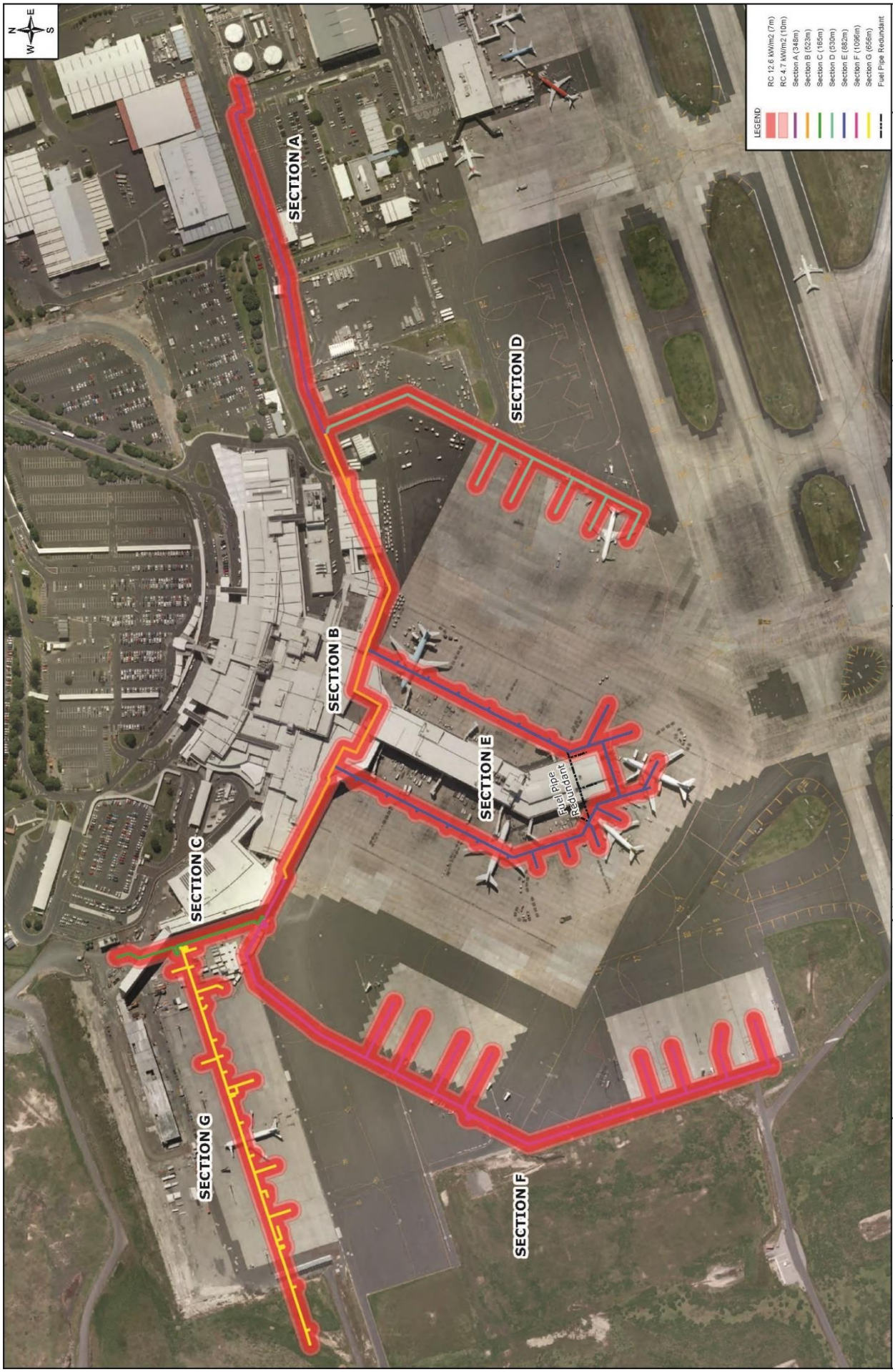
4.4. For Auckland Airport owned fuel or gas pipelines, SOP-U-008 Excavating Near Fuel & Gas Pipelines" and "SOP-U-007 Fuel and Gas Stand over" must be followed.

4.5. Complex excavations (as defined by SOP-U-008) must be approved by way of KDM.

4.6. In any emergency affecting the fuel or gas pipelines, the relevant Pipeline Manager must be notified as soon as practicable.

Gas Pipelines

Fuel Pipeline and Fuel Hydrant System


N
E
S
W
LEGEND
RC 12.6 kW/m2 (7m)
RC 4.7 kW/m2 (10m)
Section A (348m)
Section B (523m)
Section C (165m)
Section D (530m)
Section E (882m)
Section F (1096m)
Section G (656m)
Fuel Pipe Redundant
SECTION A
SECTION B
SECTION C
SECTION D
SECTION E
SECTION F
SECTION G
Fuel Pipe Redundant