



Te Kaunihera-ā-Rohe o Ngāmotu

New Plymouth District Council

Confined Space Entry

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Table of Contents

1.0	Introduction	3
2.0	Scope	3
3.0	References	4
4.0	Definitions	4
5.0	Responsibilities	6
6.0	Training & competency	7
7.0	Confined Space Conditions for Entry	8
6.1	Hierarchy of controls	9
8.0	Atmospheric Monitoring and Control	9
9.0	Work completion	10
10.0	Appendix	10
	Appendix 1.	11
	Identification of a Confined Space Decision Tree	11
	Appendix 2.	14



1.0 Introduction

Confined Space entry is one of the most high-risk activities undertaken. Entries into a confined space are controlled by a Permit to Work, Confined Space Attachment Certificate and [associated safety checklist](#).

General rules

- a) All entries will have a qualified Safety Observer present at the entry point for the duration of the entry. No safety observer, no entry. The Safety Observer will normally be in overall control for the entry.
- b) All entries will have the atmosphere tested prior to entry for oxygen, flammables, and any toxic materials which may be present and continuously monitored during the entry for oxygen and flammables and for toxics at the frequency specified on the permit.
- c) NO entry for whatever reason if:
OXYGEN is: less than 19.5% or greater than 23.5%
Or FLAMMABLES are: greater than 5% LEL
TOXICS are: greater than 50% of the TWA

All entries require a Rescue Plan and nominated rescue team members must remain onsite throughout the entry.

2.0 Scope

This procedure applies to all persons working for and on behalf of NPDC i.e. workers and Contractors and subcontractors etc.

This procedure must be read in conjunction with the [NPDC Permit to Work Procedure](#).

Worksafe New Zealand accepts AS2865 Confined spaces as the current state of knowledge on confined space entry work. The definition of a Confined Space as per AS 2865:2009 is:

An enclosed or partially enclosed space that is not intended or designed primarily for human occupancy, within which there is a risk of one or more of the following:

- a) *An oxygen concentration outside the safe oxygen range;*
- b) *A concentration of airborne contaminant that may cause impairment, loss of consciousness or asphyxiation;*
- c) *A concentration of airborne contaminant that may cause injury from fire or explosion;*
- d) *Engulfment in a stored free-flowing solid or a rising level of liquid that may cause suffocation or drowning.*

To determine if a space is in fact a confined Space, reference appendix 1 in this document.

Confined Space maps for each treatment plant can be found here:

- [NPWWTP Confined space](#)
- [NPWTP Confined space](#)



3.0 References

- [Health and Safety at Work Act 2015](#)
- [Health and Safety at Work \(General Risk and Workplace Management\) Regulations 2016](#)
- AS 2865-2009 Safe Working in a Confined Space
- [NPDC Permit to Work Procedure](#)
- [Worksafe Guide to confined spaces: planning entry and working safely in a confined space.](#)
- [WTP Confined space mapping](#)
- [WWTP Confined space mapping](#)

4.0 Definitions

Airborne contaminant	Any contaminant present in the air that may be harmful to persons.
Atmospheric monitoring	The continuous measurement of oxygen concentration or airborne contaminants over an uninterrupted period of time.
Atmospheric testing	The measurement of oxygen concentration or airborne contaminants that is not continuous
Breathing Zone	A 300mm imaginary square around the head where the gas detector should be located while entering a confined space. The detector ideally should be attached to the shoulder strap of the harness at the chest area.
Competent person	A person who has, through a combination of training. Education and experience, acquired knowledge and skills enabling that person to perform a specified task correctly.
Confined Space	Worksafe New Zealand accepts AS2865 Confined spaces as the current state of knowledge on confined space entry work. The definition of a Confined Space as per AS 2865:2009 is: <i>An enclosed or partially enclosed space that is not intended or designed primarily for human occupancy, within which there is a risk of one or more of the following:</i> <i>a) An oxygen concentration outside the safe oxygen range;</i> <i>b) A concentration of airborne contaminant that may cause impairment, loss of consciousness or asphyxiation;</i> <i>c) A concentration of airborne contaminant that may cause injury from fire or explosion;</i> <i>d) Engulfment in a stored free-flowing solid or a rising level of liquid that may cause suffocation or drowning.</i>
Confined Space entry attachment certificate	A permit that is issued by a competent person specifying the conditions for entry to work in a confined space.
Contaminant	Any dust, fume, mist vapour, biological matter, gas or other substance, or other substance in liquid or solid form, the presence of which may be harmful to a person.
Engulfment	The immersion or envelopment of a person by a solid or liquid (e.g. grain, sand, water, and other substances in powder or granular form) that is stored within the confined space.



Entrant/person	A competent person/s entering a confined space as a requirement of work or inspection and includes employees of the employer, its contractors and any person required to enter a confined space
Entry (to a confined space)	When a person's head or upper body is within the boundary of the confined space (note inserting an arm for the purpose of atmospheric testing is not considered entry to a confined space).
Entry log	A form, under control of the Safety Observer, which identifies who is in the confined space at any one time by recording who enters and leaves the confined space when these activities occur.
Excavation	May present many if the hazards associated with confined spaces. This is true whether they meet the regulatory definition of a confined space or are only partially enclosed. PI should consider an excavation as a confined space as additional process and equipment may be required.
Explosive limits	Lower Explosive Limit (LEL) The concentration of a flammable contaminant in air below which the propagation of a flame does not occur on contact with an ignition source, i.e. too lean to burn. Upper Explosive Limit (UEL) The concentration of a flammable contaminant in air above which the propagation of a flame does not occur on contact with an ignition source, i.e. too rich to burn.
Human occupancy	Most enclosed or partially enclosed spaces are intended or designed primarily for human occupancy e.g. offices and workshops where adequate ventilation and lighting, safe means of access and egress etc. are provided.
Lock out tag out (LOTO)	The placement of padlock and or tag on an energy isolation device, according to established procedures.
Notifiable work	Under the Worksafe, notification of particular hazardous work, the use of compressed air or other substitutes for respiratory support is notifiable work. When entry into a confined space necessitates the use of respiratory support the requirements for notifying Worksafe shall be adhered to.
Prohibited condition	Any uncontrolled condition that due to the potential outcome of severity shall prohibit any entry or further work from taking place. Examples may include uncontrolled presence of gases or low or excess oxygen levels.
Restricted means of entry or exit	A confined space may or may not have a restricted means of entry or exit. Appropriately sized entry/exit points are important for the safe entry/exit or retrieval of a person(s) in an emergency
Safety observer	A competent and authorised person assigned to remain on the outside of, and in close proximity to, the confined space and capable of being in continuous communication with and if practical, observing those inside. In addition, where necessary, the competent person may operate and monitor equipment for safety of personnel in the confined space and initiate response. The Safety observer/s must not enter the confined space at any time.
Self-Contained breathing apparatus	A portable respirator that supplies oxygen, air or other respirable as a source carried by the user.
TWA	Time weighted average - the average airborne concentration of a particular substance when calculated over a normal eight-hour working day, for a five day working week.



5.0 Responsibilities

In addition to the responsibilities listed in the [NPDC Permit to Work Procedure](#), the specific responsibilities in relation to Confined Space entry are:

Permit Issuer

- Ensure all personnel are trained in confined space entry
- Shall require that entry operations remain consistent with the terms of the entry permit and acceptable entry conditions are maintained.
- Cancel the permit and re-evaluate the confined space entry operation if any of the required provisions are not satisfied or if additional hazards that affect the safety of the entrants become apparent.
- Verify that emergency services and rescue personnel are available and that communication equipment is available for summoning them.
- Assemble and brief the rescue team.
- Ensure that atmospheric testing is carried out as required in the Permit to Work and Confined Space Entry attachment certificate by a qualified and competent person.
- Ensure the appropriate Confined Space Entry documentation Particular Hazardous Work Notification form has been sent to Work Safe.
- Check that the [Confined Space pre start safety checklist](#) has been correctly completed.

Permit Receiver

- Complete the requirements of the Confined Space Safety checklist.
- Before entry, check to ensure that the permit has been completed properly and a hazard identification has been undertaken in conjunction with the Safety Observer.
- Understand the hazards and controls that are in place for the confined space entry
- Ensure that every person signs on and off of the entry log (being held by the Safety Observer) every time they enter or leave the confined space.
- Maintain communication with the Safety Observer while in the confined space.
- Alert the safety observer if unexpected conditions develop which may pose a danger.

Duties of Authorised entrants

- Work under the control of the Permit Receiver.
- Ensure the proper and safe use of all equipment.
- Accept the authority of the Safety Observer holding the Entry Permit.

Duties of the Safety Observer

Shall have checked the Permit precautions and that the requirements of the Safety Checklist have been completed.

- Ensure Confined Space Entry Attachment certificate, entry permit are correctly completed.



- Discuss the work-scope communication and responses with the Permit Receiver and persons entering the confined space.
- Authorise and control those entering and leaving the confined space using the 'entry log'
- Ensure, without entering the confined space that no personnel remain in the confined space at the conclusion of the day's work
- Regularly verifying the status of those working in the confined space
- Recognise and respond to abnormal conditions inside and outside the confined space and raising the alarm if required.
- Evacuating the confined space if the emergency alarm sounds (except for routine test alarms)
- Isolating services specified in the rescue plan in the event of an emergency.
- Barricading the entry point during breaks and at the end of the work period
- Displaying all permits and certificates at the point of entry
- Ensure all entrants in a confined space are aware of the entry control requirements.
- **Never, under any circumstances, enter the confined space**
- **Having no other duties which interfere with his or her role as a Safety Observer, and never leaving their post while an entry is in progress.**

6.0 Training & competency

Specialised training and competencies are required before an individual is to be assigned a specific PTW operational responsibility. All persons with tasks associated with a confined space shall be trained and assessed as competent to conduct those tasks. Training requirements can be found on the [NPDC Training matrix](#). The specific training for CSE is:

PTW Role	Training	Description
Authorised gas tester	NZQA US3058	Perform gas testing
	NZQA US22510	Operate an atmospheric testing device to determine a suitable atmosphere exists to work safely.
	AND	Be trained in the use of the gas-detector device used during the work permit activity.
Confined space entrant	NZQA US3058	Perform gas testing
	NZQA US22510	Operate an atmospheric testing device to determine a suitable atmosphere exists to work safely.
	NZQA US17599	Plan a confined space entry
	NZQA US18426	Demonstrate knowledge of hazards associated with a confined space.
	NZQA US3272 OR NZQA US25044	Wear and operate breathing apparatus in general emergencies (only if required in the particular work) OR Wear and operate compressed air breathing apparatus in the workplace (only if required in the particular work)
Standby person	NZQA US18426	Demonstrate knowledge of hazards associated with a confined space.



	NZQA US3058	Perform gas testing
	NZQA US25510	Operate an atmospheric testing device to determine a suitable atmosphere exists to work safely.
	NZQA US17596	Safety Observer
	NZQA US3272 OR NZQA US25044	Wear and operate breathing apparatus in general emergencies (only if required in the particular work) OR Wear and operate compressed air breathing apparatus in the workplace (only if required in the particular work)
	AND	Must have knowledge of developing and rehearsing rescue plans

Initial training shall be to the unit standards listed above; however refresher training will be done by competency assessments in accordance with internal procedures for confined space entry. Competency assessments will be conducted on a bi-annual basis.

Unit standard training will be refreshed every 2 years for those who infrequently perform confined space entries.

7.0 Confined Space Conditions for Entry

All Confined Space entries shall be managed under the NPDC PTW system.

- A **confined space entry certificate** must be used in conjunction with the permit to provide a high level of detail on the controls to be put in place to manage the activity. The certificate authorises entry in to the confined space for visual inspection, cold work or hot work. This includes a detailed written hazard identification and risk assessment that must be conducted that specifies in detail the entry conditions, controls and precautions and the emergency and rescue plan – see below for further detail.
- **Emergency response procedures:** for all works undertaken, emergency response procedures need consideration should controls fail, or due to unforeseen circumstances beyond our control. Consider all credible emergencies and have a response plan in place that identifies required actions and resources , this could include but is not limited to; identifying a first aider, identifying location of first aid kit and other resources, having breathing apparatus (with at least 15 minutes of breathable air), evacuating the area, calling for emergency services.
- **Rescue plan:** A rescue plan is to be established prior to the commencement of work and be rehearsed as far as is practicable without undue risk to personnel, to the extent that it provides confidence in its effectiveness, all those named in the rescue plan must be involved in the practice.
- **Notification to Worksafe:** Is required for the confined space entry if it is ‘Work in which a person breathes compressed air, or a respiratory medium other than air’.

6.1 Hierarchy of controls

Eliminate the risk

Always, as a first step, check to see if the work can be done with equipment from outside the confined space. The golden rule is: Don’t go in if you don’t have to.

NPDC Document Management ECM: 8504993	Approved By: David Langford	Rev: 1	Rev Date: September 2023
			Page 8 of 14



Isolate the hazard

Isolate contaminants and moving parts prior to entry of the confined space. Prevent accidental introduction of materials (e.g. steam, water or bulk materials, through piping, ducts, vents etc.). Isolate the confined space and surrounding work area from non-essential personnel.

- **Lock out tag out:** De-energize, lockout or tag out plant or machinery, Refer to [NPDC isolation procedure](#)
- **Purging:** this refers to the displacement of contaminants from an area, vessel or confined space by displacement with air, inert gases or water.

Engineering and administrative controls

- **Gas testing and monitoring:** Conduct gas testing to ensure hazards have been removed and the atmosphere is within acceptable limits (see above). Continuous monitoring is required, including provisions for fixed location detectors and personal gas detectors.
- **Ventilation:** Occurs after flammable vapours, toxic vapours and gases, dusts, fumes or mists have been displaced or diluted by the outside atmosphere. This is also referred to as degassing. This means allowing flammable and hazardous gases and vapour vent to outside the confined space and fresh air to get inside a tank to maintain an atmosphere within acceptable limits.
Natural ventilation is preferred but takes more time than forced ventilation (i.e. using fans and extractors) or purging.

Appropriate PPE

PPE should be combined with other control measures to control the risk. This should include items such as safety helmet, gloves, hearing protection, safety harness and lifeline.

If the space can't be fully ventilated, or if the work will contaminate the atmosphere (e.g. hot work, painting, sludge removal) use a suitable breathing apparatus or supplied air respirator for entry.

8.0 Atmospheric Monitoring and Control

Atmospheric (gas/toxicity) testing must be conducted for all Hot Work and Confined Space Entry and test results recorded on the Gas Testing section of the Permit to Work form.

- An Authorised Gas Tester (AGT) who has been trained and assessed as competent will carry out the gas testing.
- Where temperature level (hot, cold, humidity) is identified as a hazard this must be tested and recorded prior to and continuously monitored during entry. Specific controls must be identified and implemented to ensure the wellbeing of entrants.

Use of Gas detectors

- Gas detectors must be calibrated as per the manufacturer's instructions or every 6 months.
- Gas detectors shall be bump tested before use and results recorded. Any gas detectors that have failed bump test must be removed from service.

Frequency of testing

- Initial gas testing of the confined space must be performed from outside by the AGT prior to worker entry.



- The gas test should be taken as close as practicable to the time of commencement of the work or entry.
- When work ceases for more than 30 minutes, the atmosphere in the confined space shall be retested before re-entry or recommencement of work.

Continuous monitoring

With a view to best practice – continuous monitoring will be the default requirement for gas testing for confined space entries.

- The gas monitor is to be worn by the entrant in the breathing zone.
- Refer to the JSA confined space checklist for gas monitor checks and use.

9.0 Work completion

Temporary closure of a confined space

Where work being undertaken in a confined space is temporary stopped to allow for the confined space entrants to have a refreshment break or similar and the confined space Safety Observer is also going to leave the area then the entrance to the confined space must be labelled “strictly no entrance confined space closed” and if practicable be taped off. The confined space must be retested by the Permit Issuer or a delegated authorised as tester to confirm absence of vapours before work commences.

Work Completion

Once entry operations covered by the permit to work have been completed the following is required:

- All personnel and equipment are cleared from the confined space and all entrants are signed off the permit.
- The space is free of contaminants and the work area is left in a clean condition. The PI must inspect the work area then check the permit and sign off completion of the permit, accepting the work has been completed, the space has been left in a satisfactory and clean condition, all other associated documentation is returned with isolations reinstated.
- The PTW, confined space certificate and associated documentation must be retained for 3 years to facilitate audit and review of the permit system.

10.0 Appendix

1. Identification of a confined space (below)
2. Emergency evacuation procedure
3. Injured person recovery procedure

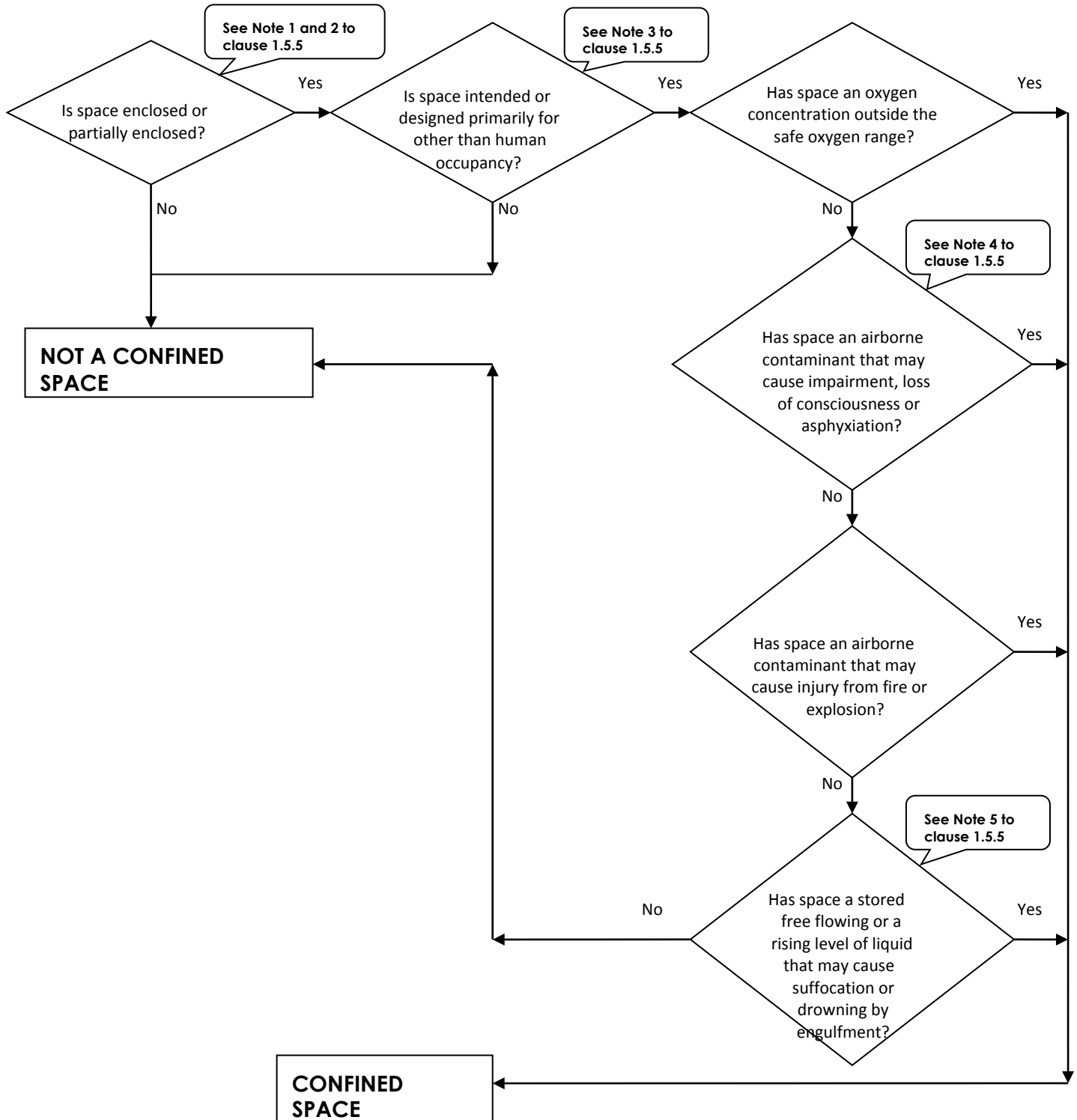
NPDC Document Management ECM: 8504993	Approved By: David Langford	Rev: 1	Rev Date: September 2023
			Page 10 of 14



Appendix 1.

Identification of a Confined Space Decision Tree

(Reference: **AS/NZS 2865** Confined Spaces para3.2.1 Figure 1 Identification of a Confined Space)





NOTES:

1. *Enclosed or partially enclosed spaces that may meet the definition criteria for a confined space are —*
 - (a) *storage tanks, tank cars, process vessels, boilers, pressure vessels, silos and other tank-like compartments;*
 - (b) *pipes, sewers, shafts, degreaser and sullage pits, ducts and similar structures; and*
 - (c) *any shipboard spaces entered through a small hatchway or entry point, cargo tanks, cellular double bottom tanks, duct keels, ballast and oil tanks, and void spaces.*

2. *A confined space may or may not have restricted means of entry and exit. Appropriately sized entry and exit points are important for the safe entry and exit or retrieval of a person(s) in an emergency. However, a restricted means of entry or exit is not a consideration in identifying an enclosed or partially enclosed space as a confined space.*
 1. *Most enclosed or partially enclosed spaces are intended or designed primarily for human occupancy, e.g. offices and workshops where adequate ventilation and lighting, safe means of access and egress, etc. are provided. From time to time they may have atmospheric hazards produced by task-related activities such as welding. Such task-related hazards are not covered by this Standard and other safety systems apply.*

 2. *Some enclosed or partially enclosed spaces have atmospheric contaminants that are harmful to persons but are designed for persons to occupy, e.g. abrasive blasting or spray painting booths. Enclosed or partially enclosed spaces that are intended or designed primarily for human occupation and have systems such as gaseous fire extinguishing systems (see AS 4214) or inert gas systems for beverage dispensing (see AS 5034) installed, are not confined spaces. In such cases, other safety systems such as relevant legislation, Standards or Codes of Practice apply.*

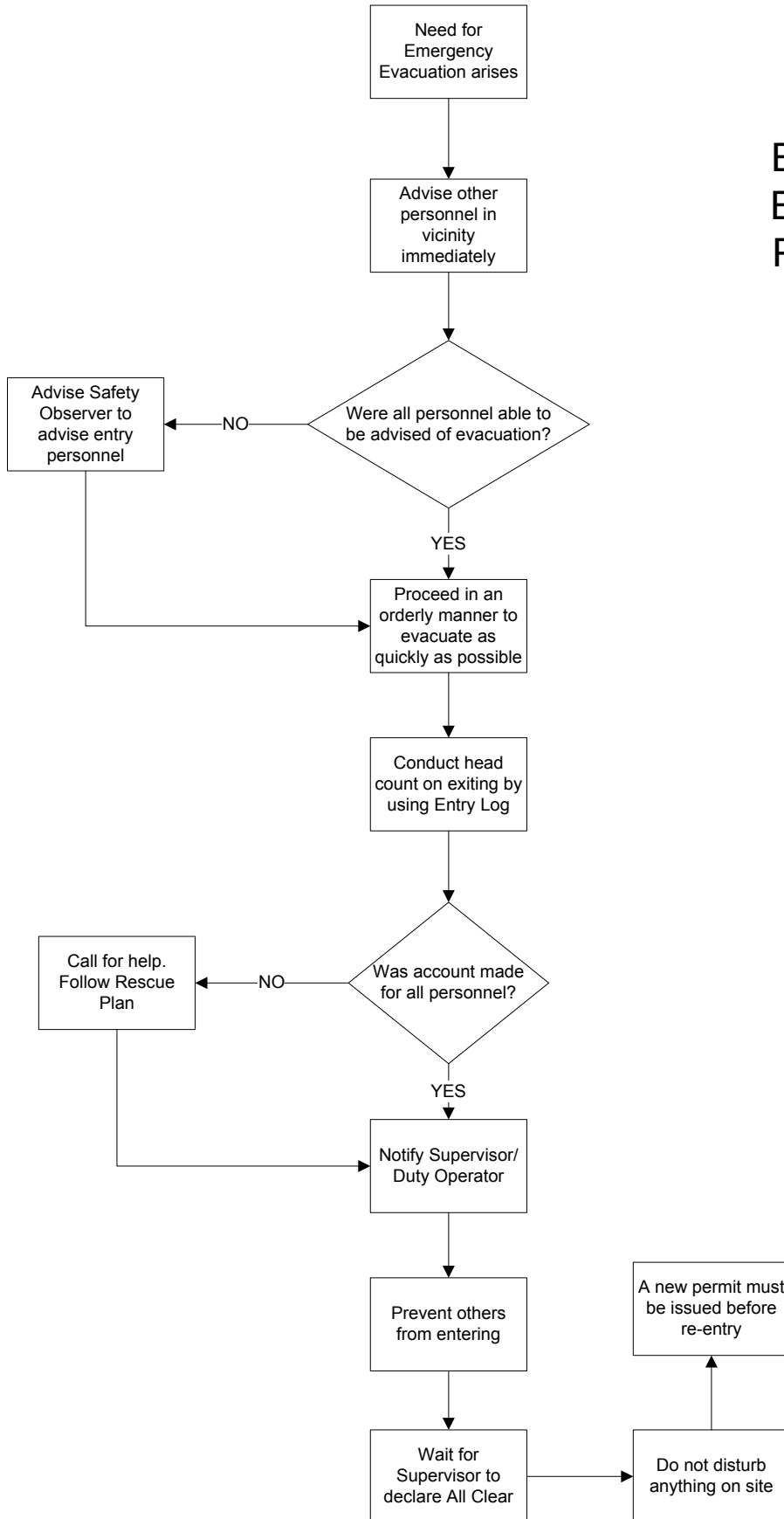
 3. *A rising level of a liquid in an enclosed or partially enclosed space may cause engulfment through the inability of a person to readily exit the space. Drowning in a reservoir, dam or tank where the level of liquid is static is not considered to be drowning from engulfment.*

NPDC Document Management ECM: 8504993	Approved By: David Langford	Rev: 1	Rev Date: September 2023
			Page 12 of 14



Appendix 2.

EMERGENCY EVACUATION PROCEDURE





Appendix 3.

INJURED PERSON RECOVERY PROCEDURE

