Section 4: Exercising Command and Control

Section Contents

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Introduction

This document is Section 4 of the New Zealand Fire Service (NZFS) Incident Management – Command and Control Technical Manual.

Exercising Command and Control

4.1 Defining command and control

4.1.1 What is command and control?

To avoid confusion, it is essential that officers have a clear and agreed understanding of operational vocabulary.

The term command and control refers specifically to the systems established within the larger picture of incident management that allow the selected strategy, tactics and associated operational tasking to be carried out effectively.

Control relates to higher-level decision-making, while command refers to the structures required to translate decisions into action.

At level 1 incidents (i.e. where the NZFS is the only agency present), the OIC will exercise both command and control functions. At level 2, where there is a multi agency presence, these functions are separated. Control is exercised by the Incident Controller and the IMT, while command remains within the individual agencies present.

The various emergency response agencies will have devised scalable command systems to cope with the full range of potential incidents within their sphere of responsibility. For the NZFS, this system is the NZFS Command System, which always sits below CIMS and allows the NZFS OIC to command his/her own firefighters while at all times acting under the general control of the CIMS Incident Controller.

This section will describe the NZFS Command System and its manner of implementation.

4.1.2 Factors affecting command and control

All incidents will vary from one another to some degree. Officers must consider the range of variables that are generated by each and every incident, and set up command and control systems capable of dealing with that unique situation. The factors that always affect the 'profile' of an incident (and thus the required command and control systems) are:

- Ground factors
- Incident complexity and scale
- Resources and capacity
- Communications
- Required span of control
- Physical conditions/weather
- Safety issues.

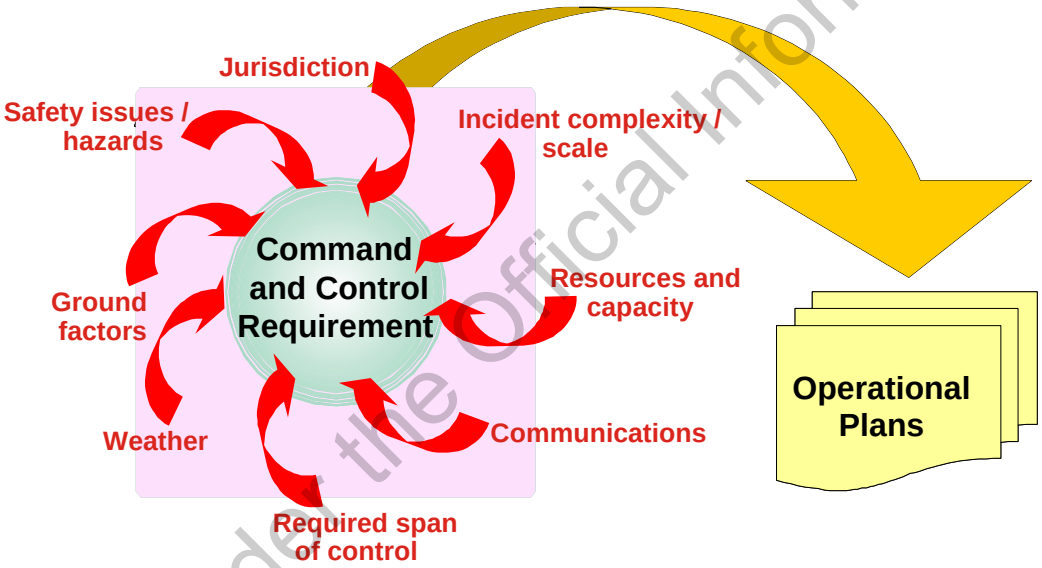


Figure 4.1: Factors affecting command and control

4.1.2.1 Ground factors

These are likely to be more significant at rural/semi-rural locations, but may nevertheless be critical considerations in the urban environment. The principal factors are:

- Distances
- Topography
- Access
- Dead ground.

4.1.2.2 Distances	The distance between the incident and additional resources.
4.1.2.3 Topography	The nature of the terrain at and approaching the incident location.
4.1.2.4 Access	The ease with which resources can approach the incident to an optimum control position.
4.1.2.5 Dead ground	Especially where line of sight is needed for effective command. This may also be an issue for local communications, especially rural fire incidents where intervening high ground may inhibit effective radio communication.

4.1.3 Incident complexity and scale

Complexity relates to the multiplicity of critical issues arising from an incident, and the problems associated with ensuring personnel safety. Scale relates to its actual size – in terms of physical dimensions, level of fire involvement, amount of resource present etc.

Thus a well-involved single site fire burning in a rurally isolated area might be large in scale but essentially simple to deal with.

Conversely, an MVA involving two vehicles on a motorway might be relatively small in scale but complex because one of the vehicles has spilled hazardous chemicals, there are casualties, ongoing threat from heavy traffic etc.

Obviously, a large scale, high complexity incident, with considerable resources in attendance, will require higher levels of both command and control.

4.1.4 Resources and capacity

The availability of firefighting resources, e.g. number of appliances, availability of water or foam stocks etc. affects selection of tactics rather than command and control. Nevertheless, as more personnel arrive and are deployed, the command and control requirement increases proportionately.

The number of personnel on the incident ground is not the only issue. At a NZFS incident the Incident Controller also needs to be aware of their capacity. This has a dual aspect:

- Physical performance and endurance
- Expertise (underpinning knowledge and skills).

4.1.4.1 Physical performance

What can be expected of each crew? Are they fresh or have they arrived direct from another incident? How long have they been at work without a relief? While this will influence tactical decisions as well, it is an issue for command and control because tired firefighters will need additional levels of supervision.

4.1.4.2 Expertise

Once again, Incident Controllers need some understanding of the levels of expertise and experience of arriving crews. They will need to understand not only the environment that they are working in and the inherent dangers, but also their ability to carry out tasks. If there is any doubt about operational ability, additional supervision will be needed.

4.1.5 Communications

Experience has shown that in all fields of emergency response, nothing contributes more to a successful outcome than effective and reliable communications. The more complex the incident, the greater the need for effective communications.

As an incident escalates, the Incident Controller must be aware of the need to escalate communications to deal with it. It is essential that the various command levels and functions be separately channelled to avoid network overload and resulting confusion.

Depending on the type of incident, he/she may need to establish any or all of the following:

- Command (strategic) network
- Tactical network
- Operational networks.

4.1.5.1 Command (strategic) network

The command (strategic) network should link incident control (IMT) operating at the strategic level of decision-making, with the OIC of the various agencies present.

4.1.5.2 Tactical network

The tactical network should link the OIC operating at the tactical level of decision making with his her subcommanders (Sector Commanders in the case of the NZFS).

4.1.5.3 Operational networks

Operational networks should link Sector Commanders with their tasked teams, e.g. BA, Rescue etc.

Figure 4.2 demonstrates this principle. Note that the requirement for 'talking one up, and one down' is built in. It would be bad practice at larger incidents to allow personnel operating at the task level to communicate on the same channel as incident control. This would only encourage confusion and potential 'bogging down' of command.

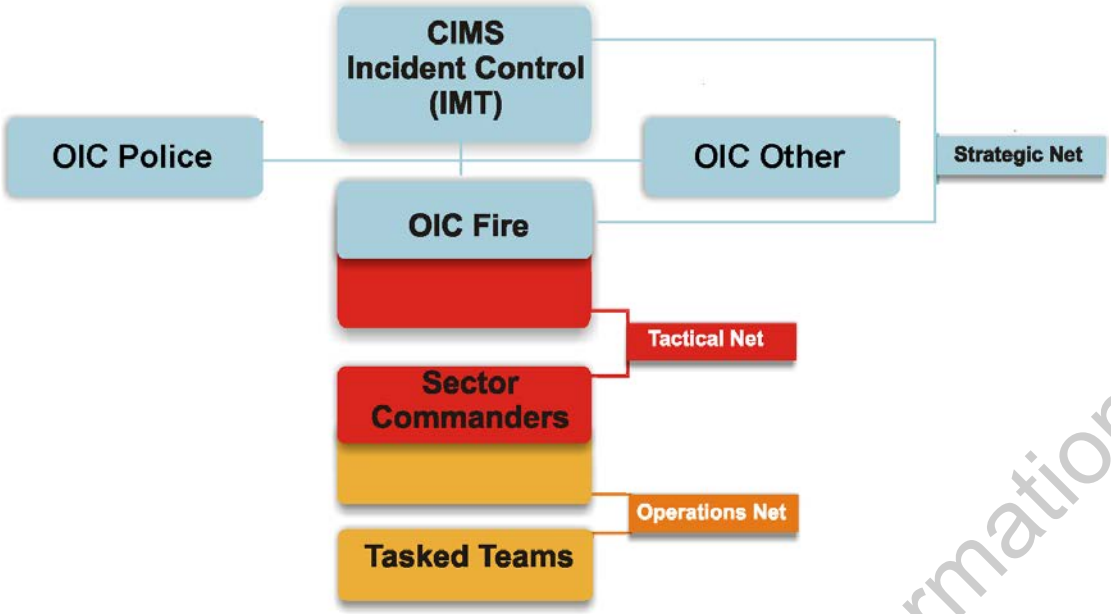


Figure 4.2: Network layer principle
(Source – NZFS 2006)

4.1.6 The build-up of networks, allocation of channels, and inter-operability of equipment needs to be pre-planned as far as possible. All staff need to be trained to a level of competence appropriate to their potential role on the incident ground.

4.1.7 All personnel need to understand that effective communications depend on relaying the right information at the right time.

Efficiency, on the other hand, depends upon clearly relaying information via the most appropriate channel, with the least amount of time on air.

Incident Controllers must also have an established 'belt and braces' communications plan, i.e. a generally understood plan for what to do and what to use should any aspect of the primary system fail (e.g. use of emergency channels, use of incident ground runners etc).

Communications issues are discussed in greater detail in Section 4.4.

4.1.8 Required span of control

Increases in incident scale or complexity will decrease the Incident Controller's ability to maintain effective command and control. Escalation must be met with delegation. It is essential that the Incident Controller focuses constantly on the 'big picture' and does not become bogged down at the tactical or operational level. This means that subordinate commands must be established to take over these lower level responsibilities. These commanders must, in turn, examine their own responsibilities to see whether further delegation is needed.

4.1.9

The general principle here is that no single individual should be expected to manage so many aspects of an incident that he/she cannot give them adequate attention. This translates to a best practice 'span of control' of no more than 1:5 for tactical command roles, with 1:3 direct reports being the optimum. Teams acting in unison (e.g. BA teams, snap rescue teams) can be considered as a single report. The span of control might be greater for less critical roles e.g. logistics.

4.1.10

The basic span of control principle for a simple incident is illustrated below at Figure 4.3. The span of control should be scalable with the nature of the incident. An example of delegating command to maintain effective span of control for a typical three pump incident is shown overleaf at Figure 4.4. An example of typical span of control principles operating for a 3rd/4th alarm is shown at Figure 4.5.

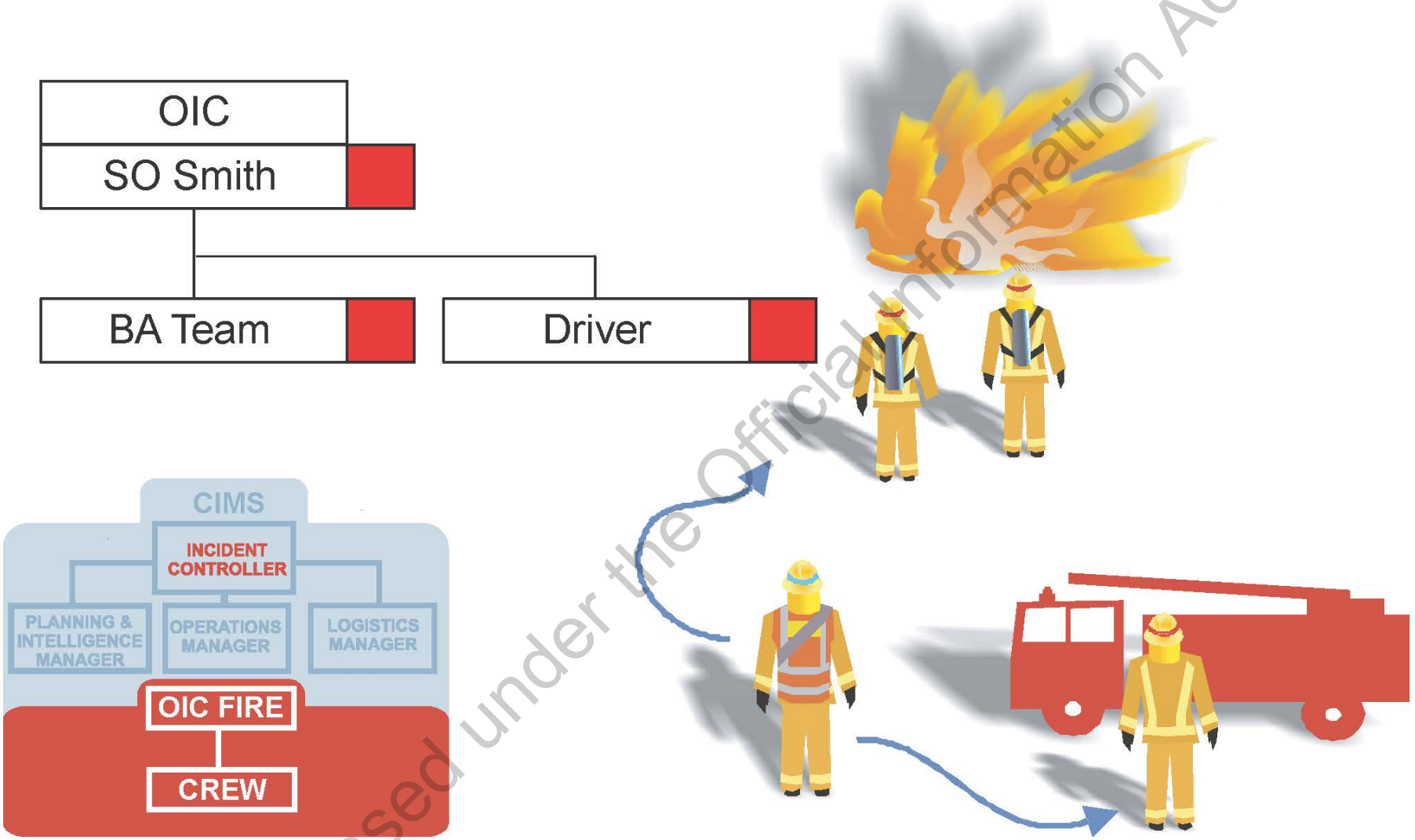


Figure 4.3: Basic span of control principle (1 pump response)
(Source – NZFS 2006)

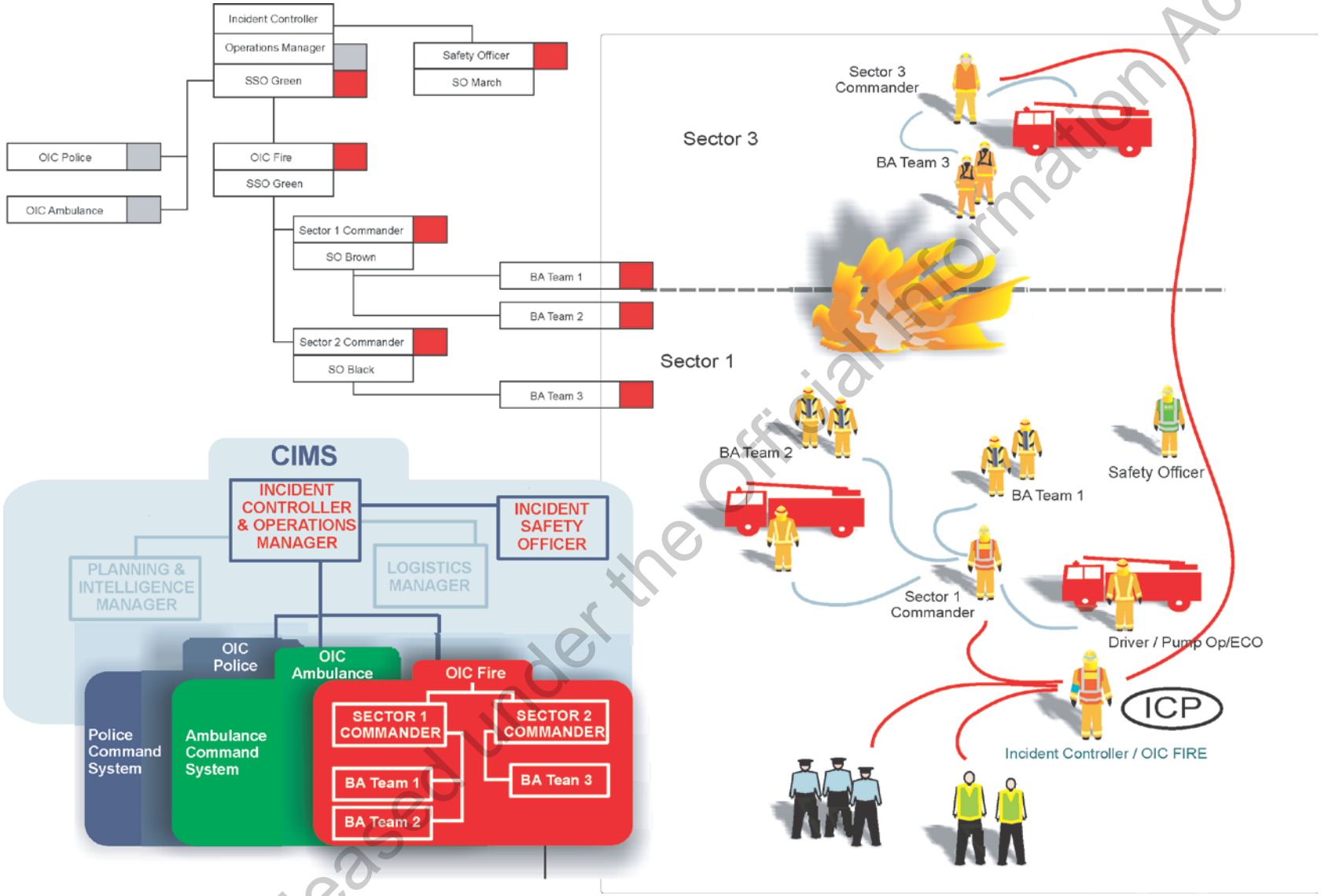


Figure 4.4: Example of span of control principles at work at a three pump response with multi agency support. The NZFS is the lead agency and, therefore, provides the Incident Controller who (in this scenario) is also acting as Operations manager and OIC Fire. He has not activated other CIMS IMT roles.

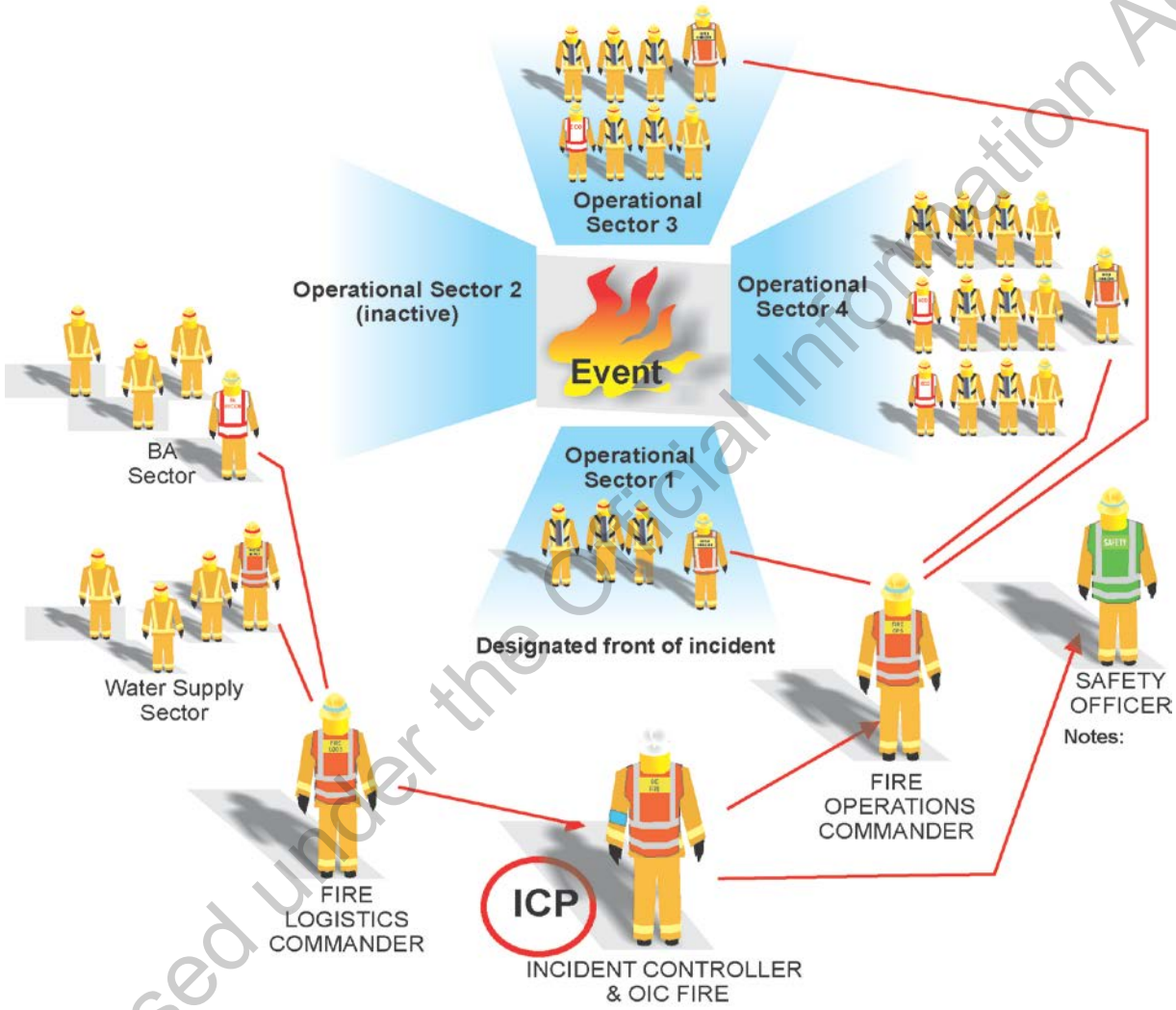


Figure 4.5 (a): Typical command structure with effective span of control at a 3rd/4 alarm incident. Police also attending, therefore OIC Fire assumes the role of Incident Controller (CIMS). Incident is sectorised with operational sector 2 remaining inactive. Main involvement is in sector 4 with potential exposures in sectors 3 and 1. Sector Commanders report to the Fire Ops Commander. Logistical sectors have been established for BA and water supply. These report to the Fire Logs Commander. A Safety Officer is appointed.

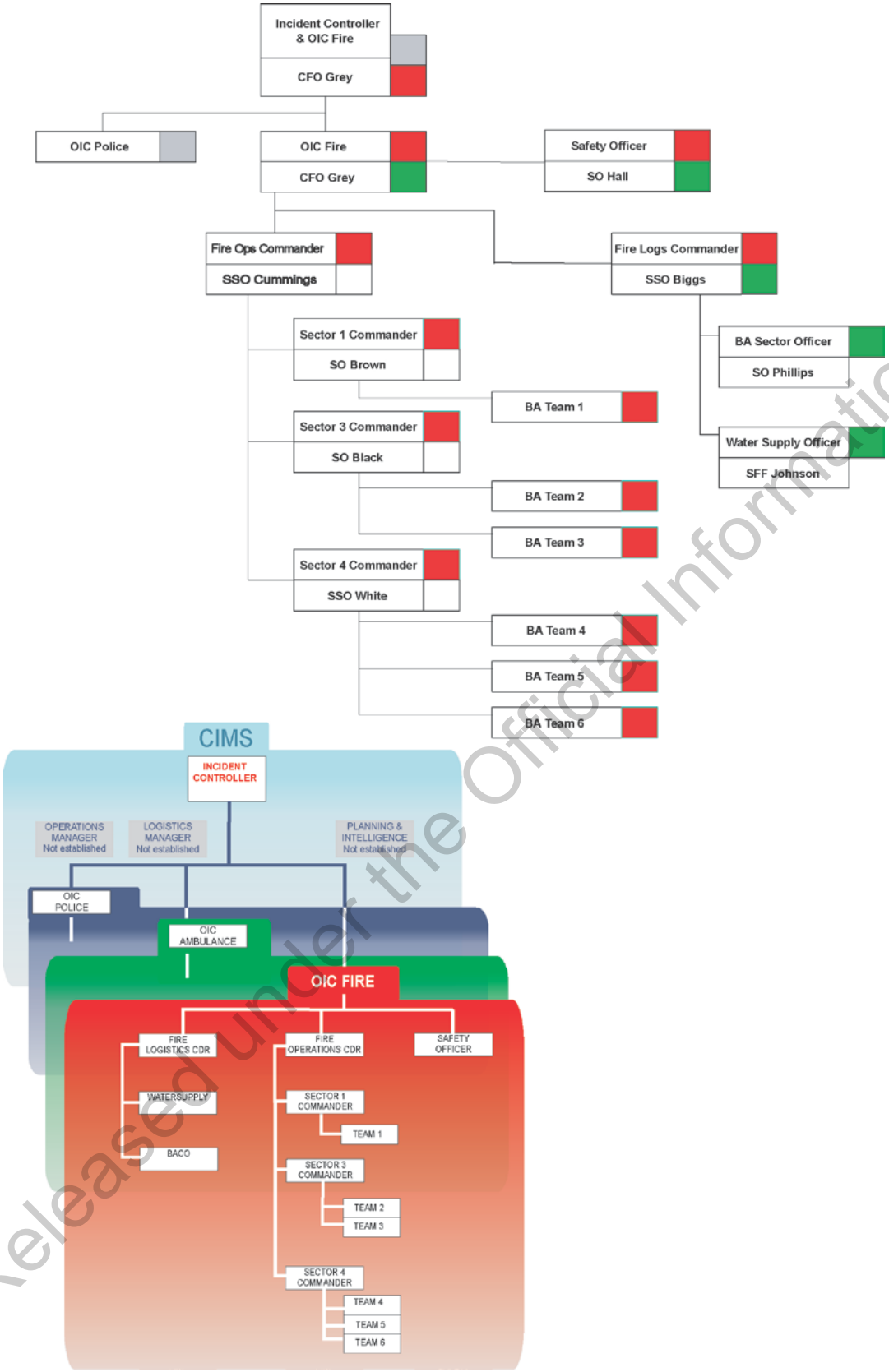


Figure 4.5 (b): Typical command structure with effective span of control at a 3rd/4 alarm incident. Police also attending, therefore OIC Fire assumes the role of Incident Controller (CIMS). Incident is sectorised with operational sector 2 remaining inactive. Main involvement is in sector 4 with potential exposures in sectors 3 and 1. Sector Commanders report to the Fire Ops Commander. Logistical sectors have been established for BA and water supply. These report to the Fire Logs Commander. A Safety Officer is appointed.

4.1.11 Physical conditions/weather

The impact of physical conditions on command and control should never be underestimated. The following factors are particularly important (especially of course for large scale vegetation fires):

- Temperature
- Humidity
- Atmospheric conditions
- Precipitation
- Visibility.

These factors are critical because high temperatures and humidity can increase the rate of fatigue dramatically. This may result in a faster than normal turn around of BA crews etc. More specifically it will increase the need for closer supervision and monitoring of firefighters and perhaps the appointment of a Safety Officer – even if the span of control is manageable.

4.1.12 Safety issues

The chief impact of safety issues will be upon the selection of strategy and tactics. In other words, unsafe strategies or tactics cannot be implemented. However, as the level of potential risk escalates, the Incident Controller must allow for greater levels of localised supervision, which impacts directly on the complexity of the command and control systems.

The Incident Controller responsibility extends to safely handing over the incident site to the owner/owner's representative, other responsible authority, or leaving the site safe from all identified hazards.

4.2 Structuring the incident ground for optimum command and control

4.2.1 Why structure?

Command and control cannot be effectively exercised without a framework understood by everybody contributing to the operational effort. The Incident Controller needs to know that everybody on the incident ground will behave predictably, in accordance with agreed protocols, and using a common operational language. Only then can the Incident Controller be confident that the selected strategy will be effectively and safely translated into the appropriate tactical action.

Furthermore, the Incident Controller has ultimate responsibility for everybody on the incident ground. This requires procedural discipline that can only be guaranteed through rigorous structure.

Obviously, the need for clear structures increases with incident scale and complexity. Since incidents can escalate rapidly, Incident Controllers should seek to anticipate events and put structures in place that can accommodate projected developments and manage additional resources efficiently.

4.2.2 Incident ground facilities

The manner in which the incident ground is organised or 'structured' will depend on the nature of the incident, local topography and the resources available.

A single pump response to a small rubbish fire is unlikely to require any formal structure at all above a crew commander. Required actions will be routine and rapidly executed.

If, the first arriving officer can see that the incident will escalate rapidly in scale and complexity, and additional resources will be needed, then he/she must address the 'big picture' need of incident ground structure. This must be done coincidentally with (or immediately subsequent to) attending to any required immediate actions such as rescue, scene management issues etc. Clearly, the Incident Controller should delegate as much as possible at this stage to free up time and space to anticipate events.

Having 'sized up' the incident and projected its likely development, the Incident Controller must consider which of the following facilities need to be established to enable effective command and control.

4.2.3 The Incident Control Point (ICP)

The ICP is a critical command and control decision. This is the point from which the Incident Controller will manage the whole event. What constitutes an ICP will vary according to incident scale and resources available. Initially the ICP will rove with the Incident Controller as he/she communicates instructions using incident ground radios and/or R/T as a size-up is completed. An ICP may be the first arriving pump, the CFO's car, a convenient building or structure (common, if another agency has the Incident Control) or, with a greater alarm, the dedicated Incident Command Unit (ICU). At smaller incidents the OIC may need to be very mobile as he/she manages the incident dynamically. As a result, the ICP simply moves with the OIC.

When establishing a substantive ICP for a larger scale incident, optimum positioning from the start is essential. Poor positioning may necessitate having to move the ICP, which will of course result in an interruption of command and control. Generally, the position of the ICP should:

- Be clearly visible and clearly identified
- Be easily accessible to incoming and outgoing personnel
- Be located so as to ensure the safety of personnel and resources
- Be located or set up so that access to the incident ground can be controlled
- Be so located that it can expand if required as the incident escalates e.g. multi-agency
- Be located strategically between inner and outer cordons, but in the rear of the Safe Forward Point (see Figure 4.5)
- Be located to provide (if possible) line of sight visibility of the incident.

The principal functions of staff at the ICP are:

- To co-ordinate operations on the incident ground
- To act as the communication centre for the incident ground
- To manage, record and control the arrival and departure of all personnel and resources
- To provide the Incident Controller with required information and data (e.g. water supplies, risk, tactical or emergency plans, and operational resources)
- To develop the Agency Action Plan (AAP).

Note: An ICP with dedicated staffing (not also supervising a crew) may be established at any incident, but must be established (as soon as possible) for any incident beyond a 2nd alarm or where there are more than 5 pumps present.

4.2.4 Zones

Zones have traditionally only been established to assist the management of hazardous materials emergencies. However, other agencies have increasingly established zones as a method of managing safe areas within an incident.

A zone is a designated area on the incident ground in which entry and type of work carried out is categorised according to the level of hazard present and the type of operations required. The incident ground may be organised into commonly three, but sometimes five contiguous zones separated by cordons:

- Hot zone
- Warm zone
- Cold zone
- Traffic Exclusion zone
- Fire and/or rescue zone.

4.2.4.1 Hot zone

'Hot zone' is defined for the purposes of NZFS operations as:

"*An identified area where the risk to people is high and enhanced PPE and/or procedure may be required.*"

Examples of hot zones include:

- The area of contamination identified at a hazmat incident.
  Note: working hazmat incidents normally have designated hot, warm and cold zones with prescribed ppe within those zones. Refer to h1 tm hazmat technical manual
- An identified area of extreme risk (e.g. From falling glass, on the street, beside a high rise fire)
- A weak radiation source within a fire affected industrial building.

4.2.4.2 Warm zone

The 'warm zone' surrounds the hot zone, is the area that presents only a minimal hazard to personnel, and is seen as a transitional area between the hot and cold zones. The warm zone is where decontamination takes place. The outer boundary of the warm zone (the Inner Cordon), should be marked by 'Restricted Area' tape to indicate the potential risk to anyone entering the zone.

4.2.4.3 Cold zone

The 'cold zone' surrounds the warm zone and is encompassed by the Outer Cordon and is the area that presents no imminent hazard to emergency services personnel and equipment. In this area, the management of the incident and the equipment needs of the responders can be supported, such as changing air cylinders and replacing worn or damaged PPE.

4.2.4.4 Traffic exclusion zone

The 'traffic exclusion zone' is an area outside of the 'Outer Cordon', where motor traffic is excluded to enable the free response of emergency vehicles to the incident gateways. Police using roadblocks establish a traffic exclusion zone.

4.2.4.5 Fire and/or rescue zone

A ‘Fire and/or rescue zone’ is defined for the purposes of NZFS operations as:

"*An identified area where NZFS and other permitted agencies are carrying out operations and/or recovery. Prescribed PPE will be required. Zone tape and/or the use of other physical boundaries may be in place.*"

Examples of fire and/or rescue zones include:

- The interior of a house or the floor of a high rise building
- The identified area around a motor vehicle incident
- The identified area around a rural incident.

Note: A ‘Hot zone’ may be located within a ‘Fire and/or rescue zone’.

4.2.5 Cordons

At a HazMat incident a cordon is a physical demarcation of the border between zones.

- Hazard cordon – separates the hot zone from the warm zone (using hot zone tape)
- Inner cordon – separates the hot zone and the warm zone from the cold zone (using restricted area tape)
- Outer cordon – separates the cold zone from the public area (patrolled by Police or Fire Police).

See Figure 4.6.

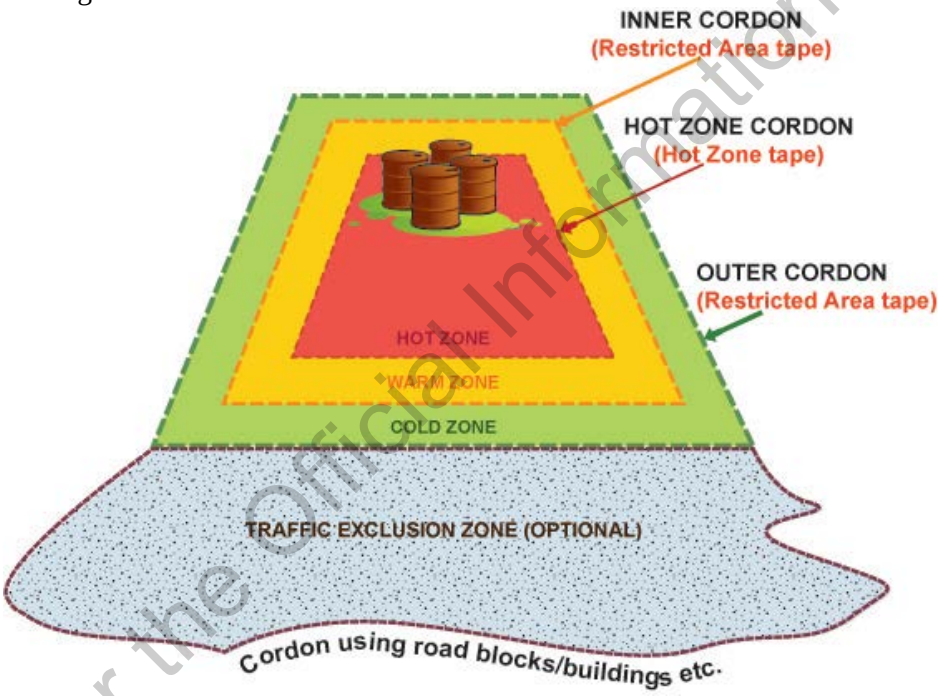


Figure 4.6 – Zones and Cordons
(Source – NZFS 2009)

Cordons may be used more generally to assist the management of other incident types. In these circumstances the inner cordon controls access to the area of ongoing operations adjacent to the incident itself. Hazards, such as falling glass from a high-rise incident or an area of imminent building collapse, may necessitate an area of restricted entry. The area inside the inner cordon will be designated as high risk and the entry will therefore be strictly controlled and monitored.

The Incident Controller should fix the location of inner and outer cordons according to the following criteria:

- Characteristics of the hazardous materials, e.g. volatility, air dispersion properties etc.
- Weather conditions and wind direction
- Quantity of the substance
- Presence of, or potential for, fire outbreak or explosion
- Evacuation needs
- Access for incoming resources
- Requirements for overhaul and clean-up
- A typical zoning structure is illustrated at Figure 4.10.

Whenever there is a risk of members of the public impeding operations or straying into areas of risk, the police should be asked to establish a traffic exclusion cordon outside the outer cordon. This is intended to prevent general traffic from impeding access or operations. See Figure 4.10.

4.2.5.1 Incident entry and exit points

Locations on the outer cordon control access to the incident ground. At large-scale incidents with significant resource flows, entry and exit points may be separated to avoid congestion. Personnel passing through the entry point (possibly from an Assembly Area) would normally be directed to a Safe Forward Point (SFP) or to the Staging Area.

4.2.5.2 Safe forward point (SFP)

A point inside the outer cordon, in the cold zone, designated as a known safe place to which personnel may be directed without perceptible risk. Normally, personnel would be directed here before moving to the ICP for tasking and deployment.

Typically this is the point that Comcens use to direct other services or subject matter experts that have been requested to attend the incident.

It is imperative that Incident Controllers designate an SFP as soon as possible and communicate the location to the Comcen.

4.2.5.3 Assembly Area

A holding point, outside the outer cordon, at which incoming additional resources are directed to form up ready for deployment to the incident ground. This is an important control function. On arrival at the Assembly Area, officers should confirm their availability to the ICP. This is usually established well away from the incident or any potential danger.

4.2.5.4 Staging area

An area within the outer cordon designated as a gathering point for resources before they are forwarded to other areas for operational deployment. Generally, it should meet the following criteria:

- If possible have separate entry and exit routes to avoid confusion, danger or delay
- Be able to expand as the incident escalates.

There are two additional types of staging:

- Base staging – at incidents requiring considerable equipment/consumable resources, it is normal practice to assemble and manage these from one location. Equipment may then be deployed to multiple locations on the incident ground as required. This is typically deployed at a high-rise incident.
- Forward staging – the point to which selected equipment and resources are moved for tactical deployment inside the inner cordon. Typically below a Forward Control Point (FCP) at a high rise incident.

4.2.5.5 Entry control point (ECP)

A checkpoint from which the entry to the most dangerous areas of the incident can be rigorously controlled. Most often this applies to the mandatory use of breathing apparatus by firefighters before moving to deal directly with the incident.

4.2.5.6 Forward control point (FCP)

A point immediately adjacent to the event where final checks and task briefings can occur prior to deploying through the Entry Control Officer. Most often established for high rise incidents. See Figure 4.9.

4.2.5.7 Signage

Once designated, all the areas/cordons referred to above must be clearly signed to avoid any possible confusion.

4.2.5.8 Not always needed

It is seldom necessary to establish all of the above incident ground components. Only the most complex incidents require them. Nevertheless it is essential that officers understand their intended purpose so that they can be established with speed and confidence if required.

The principle, as always, is to ‘keep it simple’. As an exception, an inner cordon must always be established for a hazardous materials incident.

The need for simplicity must be set against the need for control and discipline. Control can only be guaranteed if personnel access and depart from the incident via an established route that includes the ICP.

On the larger scale incident ground, discipline can only be guaranteed if;

- arriving resources are assembled at an Assembly Area (AA)
- called forward to a Staging Area (SA) or Safe Forward Point (SFP)
- tasked at the ICP
- equipped with additional equipment if necessary, at a SA and moved to a Forward Control Point (FCP) close to the event for final deployment.

Given these essentials, it is easy to see that many of these structural components will be indispensable for managing larger incidents.

4.2.5.9 Examples

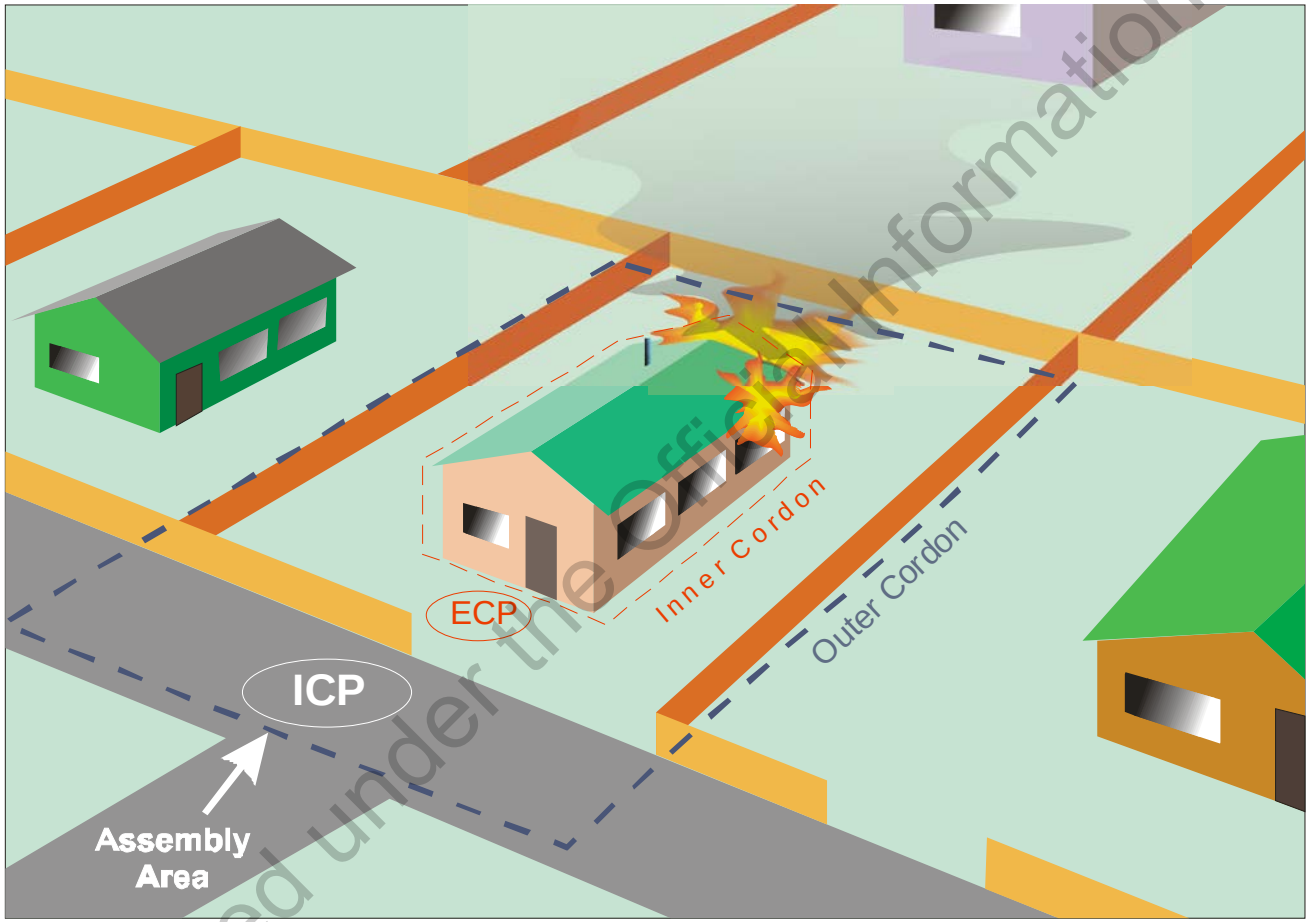


Figure 4.7: A typical (but not prescriptive) NZFSCS incident ground structure for a relatively simple 1st/2nd alarm incident
(Source – NZFS 2006)

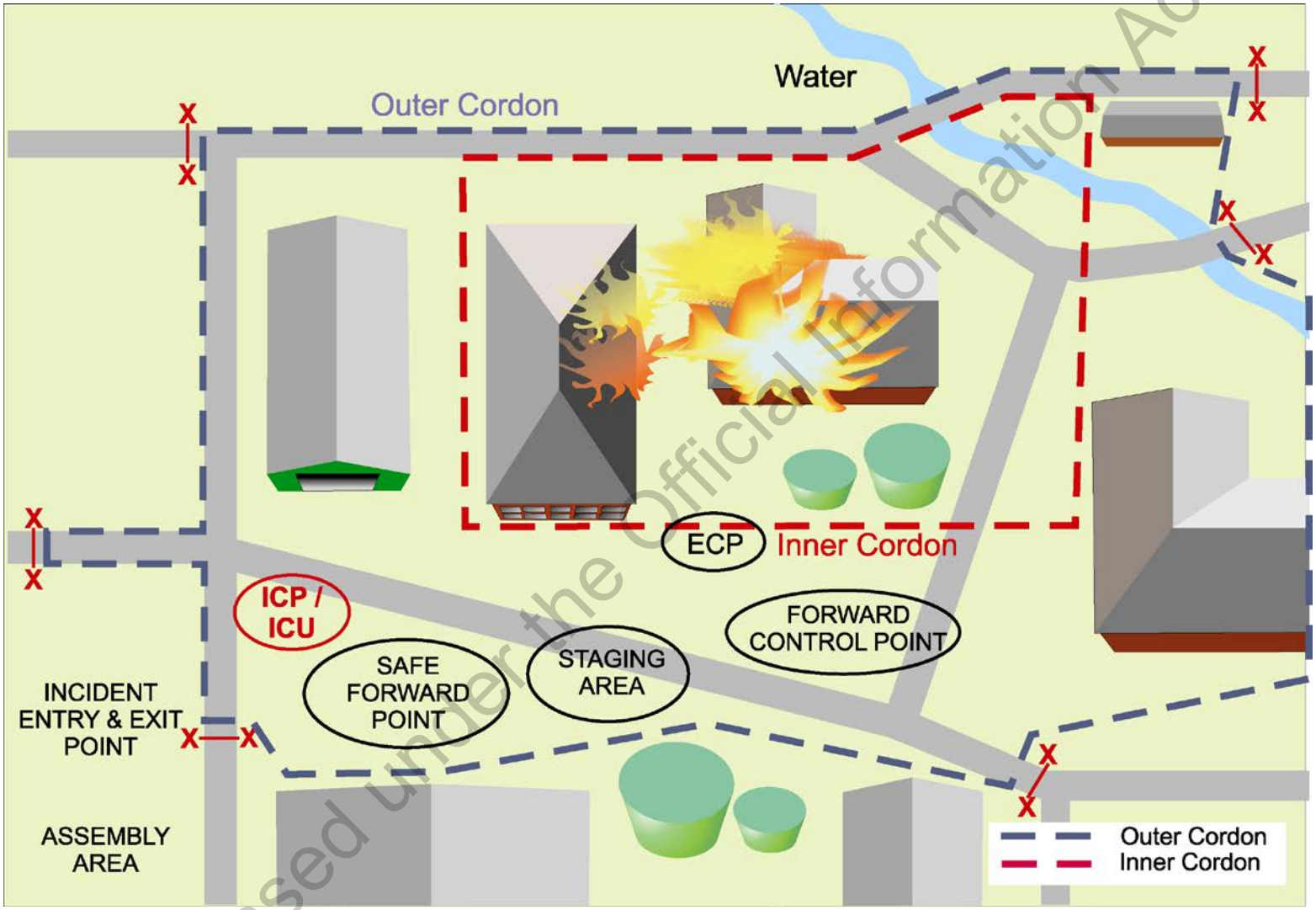


Figure 4.8 A typical (but not prescriptive) NZFSCS incident ground structure for a 3rd/4th alarm and greater

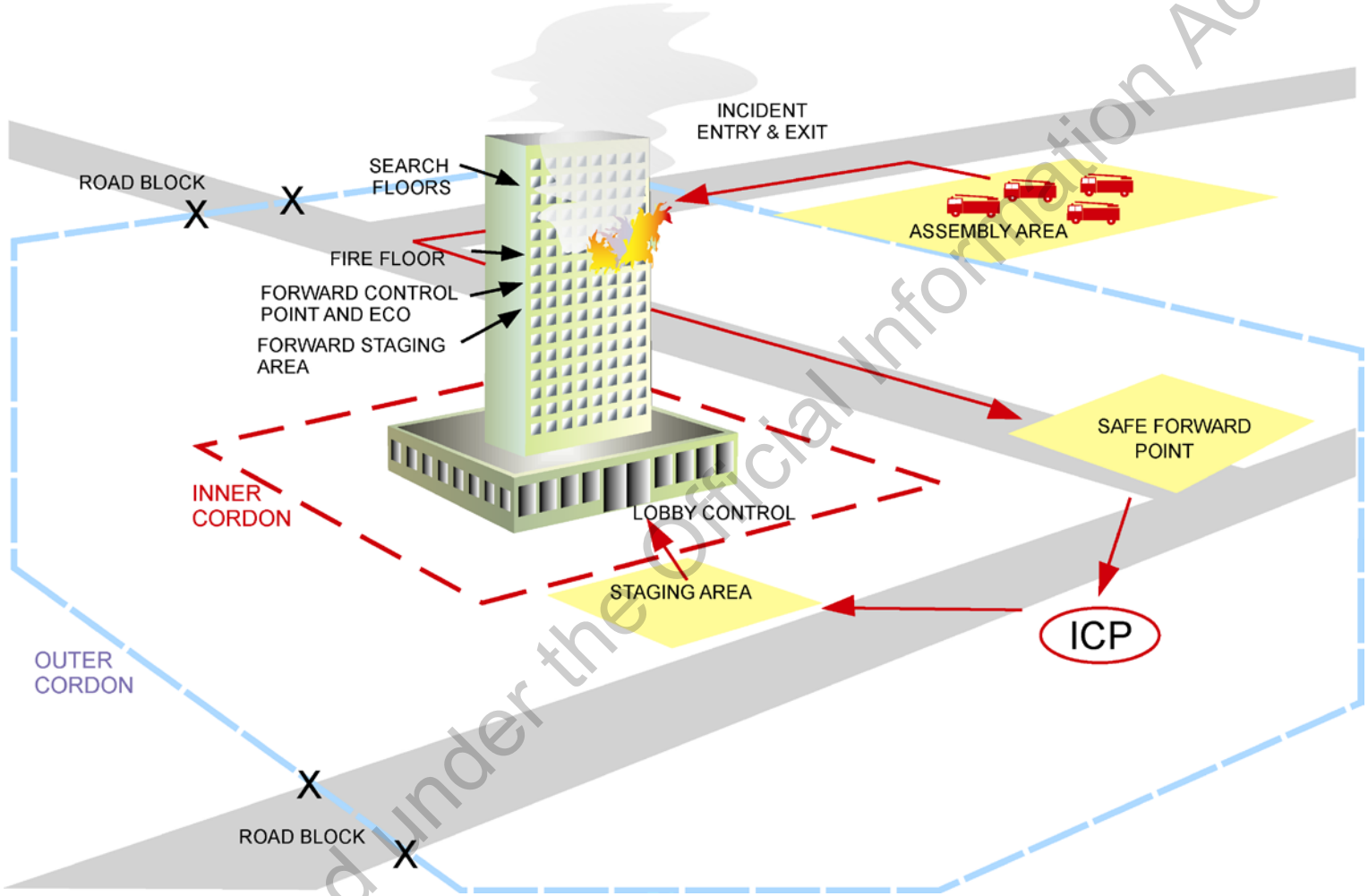


Figure 4.9: A typical incident ground structure for a significant high-rise fire
(Source – NZFS 2006)

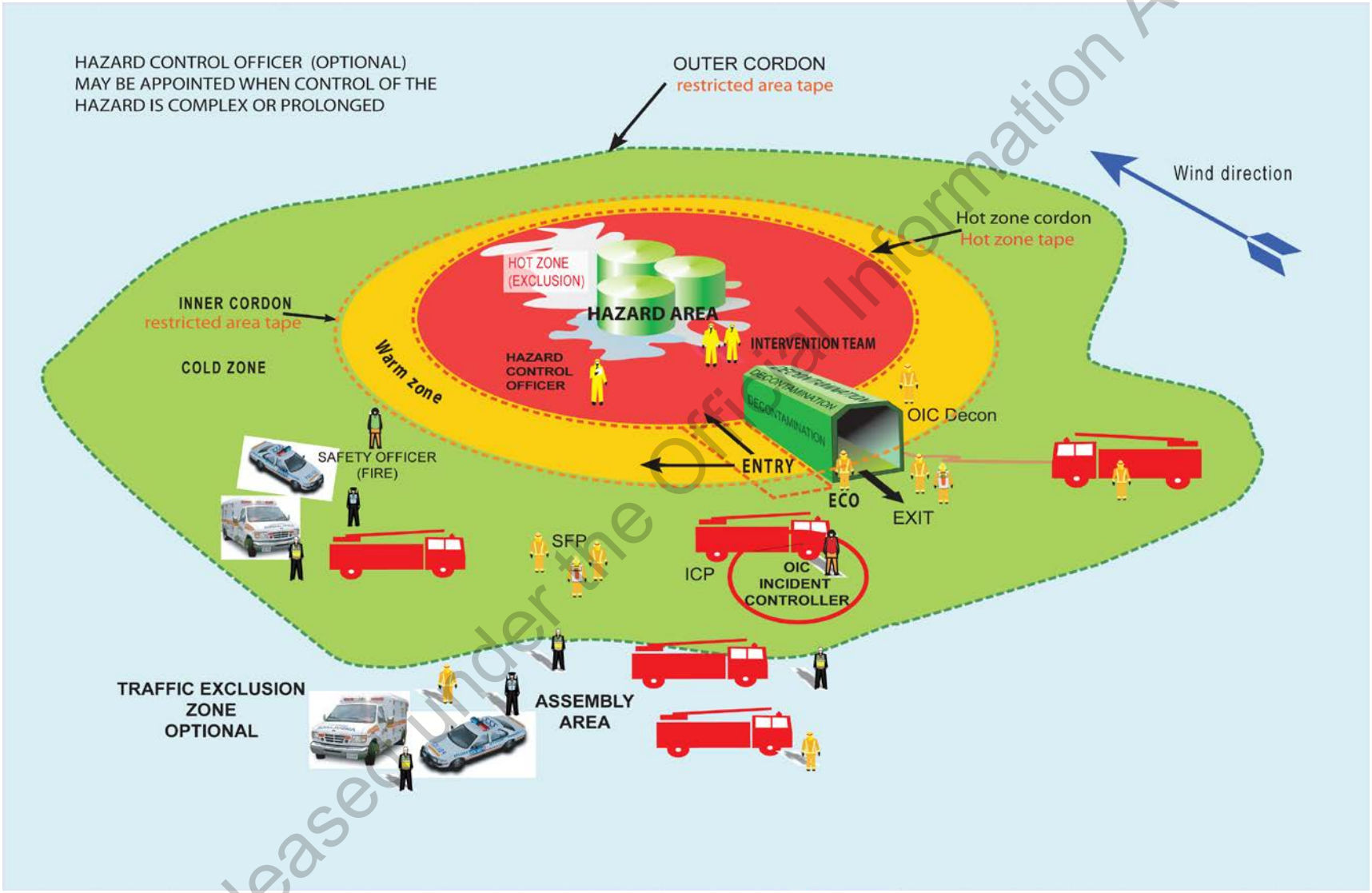


Figure 4.10: A typical incident ground structure for a significant hazardous substance incident
(Source - NZFS 2009)

4.3 Command appointments under NZFSCS

4.3.1 Key appointments

As an incident escalates in scale and complexity, the OIC Fire may appoint personnel to a wide range of roles in order to optimise command and control. In practice however, the majority of incidents will require no more than three roles to be deployed for successful management. These are:

- OIC Fire – may also be acting as the Incident Controller in a CIMS environment
- Sector Commanders
- Safety Officer (mandatory when there are more than 16 persons committed to an incident).

The main responsibilities of each are outlined below.

4.3.2 Responsibilities

All incidents that the NZFS attends must have a designated OIC Fire, regardless of whether the NZFS is the lead agency (in which case the OIC Fire may have a duel role of Incident Commander). This will initially be the first arriving officer. In certain circumstances he/she may be replaced by a more senior officer (or by a more junior officer when scaling down).

4.3.3 The OIC

The OIC's main responsibilities are:

- To assume control of NZFS personnel – i.e. to make it clear to all personnel that he/she has accepted responsibility for the command and direction of all NZFS personnel at the incident
- To set up an appropriate NZFS command structure – i.e. to appoint appropriate personnel to take charge of all the NZFS functions required to deal with the incident successfully
- The structure put in place should allow for manageable spans of control.

  Note: As an incident grows in complexity, assistants may need to be appointed to the various command roles.

4.3.3 The OIC continued

- To size-up the incident and make appropriate early judgements about required resources. It is essential to 'get ahead of the incident' as quickly as possible by projecting incident development and calling for the resources needed to manage the incident that you will be dealing with – not the one you are dealing with now
- To delegate required immediate actions e.g. rescue, scene management etc. that have arisen from initial size-up. If possible do not become involved at the 'hands-on' level here – your responsibility is to manage all NZFS involvement
- To select appropriate aim and strategy, i.e. to develop the NZFS AAP and focus on what eventual outcome is needed (aim) and what approach will achieve that aim for you (strategy)
- To select appropriate tactics i.e. the best methods to carry out your selected strategy. For larger scale incidents the selection of Tactics is developed by the NZFS Management Team (an agency management team)
- To apply dynamic risk assessment (Safe Person Concept). This needs to be done on an ongoing basis but is critical when deciding on tactics
- To create the fire AAP. For smaller scale incidents this will be done mentally and not formally documented. With greater alarms (3rd alarm upwards) OICs should create a written plan using the tools illustrated in Section 3. The AAP should not be regarded as fixed. Circumstances will change and plans may need to be adapted. For the larger incident it is important to keep the written AAP updated. This task can be delegated to support personnel at the ICP
- To ensure that effective communications are established and maintained with all parts of the incident ground and also the Comcen
- To allocate/task incoming resources. This is essential for a 'balanced' approach to any conflicting priorities. It also ensures disciplined deployment and accurate location updates, e.g. via the T card system. For details of the T card system see Section 3 and Annex A to this manual
- To ensure the general well-being and safety of all personnel e.g. by taking adequate steps to provide relief, re-hydration, feeding etc. as required. These will be delegated responsibilities but the OIC should nevertheless check that these things are being properly dealt with
- To hand over command in a professional manner when required. This could be to a more senior officer from your Fire District or any officer representing the Regional Commander; to another officer from your Fire District by agreement, or to a junior officer when scaling down etc.

In some of the latter circumstances this implies that a CIMS command and control regime will replace NZFSCS. In fact, CIMS command and control principles are in place at all incidents, and since NZFSCS is a microcosm of CIMS structures it remains intact within CIMS (as do the command systems of other agencies). In these circumstances the NZFS OIC retains command of NZFS personnel but is no longer responsible for strategic level decision-making.

4.3.4 Incident Controller and OIC Fire (combined role)

If an incident that falls within NZFS jurisdiction escalates to a level requiring multi-agency response, the OIC also has the role of Incident Controller taking on the higher-level responsibility of control for all agencies present. He/she may then choose to delegate all agency operations control (not Command) to an Operations Manager within the CIMS IMT. In these circumstances another NZFS Officer would normally be appointed as the OIC Fire to exercise direct command over NZFS personnel deployed on the incident ground.

Logistical sectors:

- Establishing the sector as directed and implement appropriate subordinate command structures as required
- Establishing and maintain effective communications with the OIC/ICP
- Supporting the implementation of the tactical plan by anticipating and meeting operational requirements according to sector designation e.g. water, foam, BA recommissioning etc.
- Liaising effectively with other sector commanders and other command appointees as required.

4.3.5 The Safety Officer

Incident Controllers must always regard the safety of all personnel on the incident ground as being of paramount importance. Consequently, no matter how straightforward the incident may appear to be, he/she must use the techniques of dynamic risk analysis (Safe Person Concept) on an ongoing basis. This technique is dealt with fully in Section 5.

Bearing in mind the potential workload of the Incident Controller, a dedicated Safety Officer must be appointed once the number of personnel committed at an incident exceeds 16. This is a mandatory appointment.

A dedicated Safety Officer must also be appointed when:

- Hazardous substances are involved and a hot zone is established.

  Note: this is in addition to the Hazard Control Officer who operates in the hot zone
- Live fire training is being undertaken
- Personnel are operating in unusual/unfamiliar circumstances, e.g. silo rescue, cave rescue, cliff rescue, white water rescue, trench collapse, etc.
- The NZFS is not the lead agency and a Safety Officer is required specifically for NZFS operations.

The main responsibilities of the appointed Safety Officer are:

- To familiarise him/herself with the adopted AAP and the tactics required by it
- To observe ongoing operations and to inform the OIC Fire of any event, changing circumstance or tactic that might jeopardise the safety of deployed personnel, or members of the public
- To take immediate action, when required, to halt obviously unsafe operations or practices and to inform the OIC Fire immediately of the action taken
- To identify and recommend appropriate control measures.

The role of the Safety Officer is dealt with in greater detail in Section 5.

4.3.6 Other mandatory appointments

The OIC must appoint personnel to certain other roles once designated criteria are met.

- Entry Control Officer (ECO) – must be appointed for stage 1 BA
- BA Control Officer (BACO) – must be appointed when there are more than 2 ECOs deployed or when there are more than 5 BA teams deployed.

4.3.7 Discretionary appointments

As an incident grows, the 'chain of command' is likely to grow with it. According to specific incident requirements (rather than fixed criteria) the OIC may appoint personnel to any of the following roles:

- Fire Operations Commander
- Fire Logistics Commander
- Fire Planning and Intelligence
- Sector Commanders
- Safety Officer (Fire) – mandatory in certain circumstances (see 4.3.5 above)
- Water Supply Officer
- Water Relay Officer
- BA Recommissioning Officer
- Decontamination Officer
- Decontamination Crew
- Hazard Control Officer
- Salvage Officer
- Lobby Control Officer
- Control Point Officer
- Information Officer
- Staging Area Officer
- Foam Supply Officer
- Liaison Officer (Fire)
- Ventilation Officer
- Safe Forward Point Officer.

4.3.8 Role identification

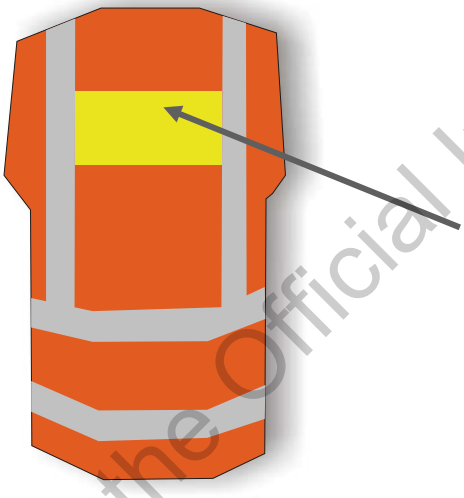
It is essential that individuals assigned to specific command and control functions are readily identifiable. This is particularly crucial at larger incidents where personnel may not know each other.

Clear identification is also very valuable to personnel from other agencies who would not necessarily be familiar with NZFS protocols and systems.

Identification jerkins for the various roles are shown overleaf. Many will use the same base jerkin with an interchangeable role label.

4.3.9 Red/orange jerkins – yellow patch

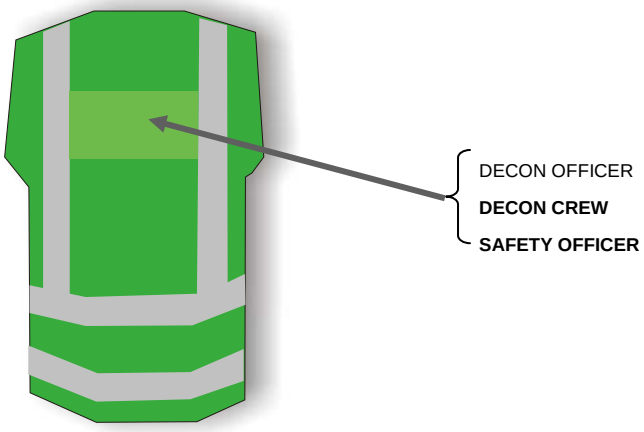
The following roles are identified by their title printed on a fluorescent yellow patch on a red/orange jerkin.



- **OIC FIRE**
- **FIRE OPERATIONS COMMANDER**
- **FIRE LOGISTICS COMMANDER**
- **FIRE PLANNING AND INTELLIGENCE**
- **SECTOR COMMANDER**
- **SALVAGE OFFICER**
- **WATER RELAY OFFICER**
- **WATER SUPPLY OFFICER**
- **LOBBY CONTROL OFFICER**
- **HAZARD CONTROL OFFICER**
- **CONTROL POINT OFFICER**
- **VENTILATION OFFICER**
- **INFORMATION OFFICER**
- **SAFE FORWARD POINT OFFICER**
- **STAGING OFFICER**
- **FOAM SUPPLY OFFICER**
- **LIASON OFFICER**

4.3.10 Green jerkins

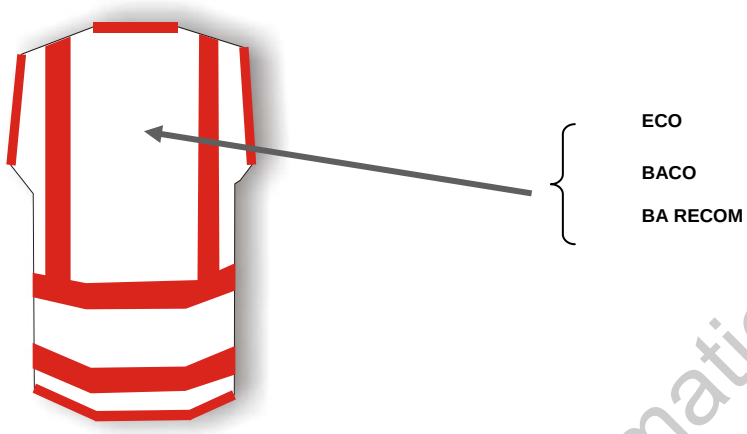
The following roles are identified by their title printed in white lettering directly on to a green jerkin.



- DECON OFFICER
- **DECON CREW**
- **SAFETY OFFICER**

4.3.11 White jerkins

The following roles are identified by their title printed directly in red lettering on to a white jerkin.



4.4 Incident ground communications (IGC)

4.4.1 Communication – the engine of command and control

There are numerous factors that impact upon successful command and control on the incident ground (see Figure 4.1). The most significant of these will be the effectiveness of communication systems and protocols.

Even the most professional Incident Controller will fail if commands and requests cannot be efficiently transmitted and information efficiently received.

It is useful to think of the incident ground communication system as the 'engine room' of incident management – nothing happens without it, and the smoother the engine runs the smoother the journey will be.

It is vital that all officers and firefighters understand how the communication system is structured and, as far as possible, adhere to the protocols that ensure it functions properly. The notes that follow refer to an ideal situation. Lack of resources or local conditions may mean this ideal is not always obtainable.

4.4.2 The structure of incident ground communication systems

Communications must be set up in a manner that will limit the potential for overload and confusion. The system should also support the concept of limited span of control. The Incident Controller and subordinate commanders should not be distracted by constant radio traffic that is not relevant to their level of command. Neither should they be required to wait for a channel to clear in order to issue instructions. Overload can only be avoided through discipline and structure. These are achieved by the practice of 'layering' command networks and, for larger scale incidents establishing independent nets or 'fenced areas' within layers.

In simple terms, the principle of layering links communications to the established concepts of strategic, tactical and operations command levels. Although this linkage does not really become clearly defined until an incident escalates to significant proportions. Nevertheless, the principle applies even on the smaller stage. At a single pump incident the strategic, tactical and operations layer effectively become compressed into one and generally one radio channel will suffice. However, as more resources are deployed and the incident ground becomes structurally more complex, it is essential to separate out the layers to maintain spans of control and effective communication.

Figure 4.11 illustrates 'layering' of communications at a typical incident, e.g. 2nd alarm. The OIC would have access to other channels e.g. for communication with other agencies on the scene. For the sake of clarity only fire channels are documented.

4.4.3 Dual radio/2 channel system

Separation of layers can be achieved by changing channels – but this can be frustrating. The command team (in the case of Figure 4.11 this is the OIC and his/her Sector Commanders + Safety Officer) also need to monitor at least two channels on a constant basis so changing channels is undesirable. Consequently, the command team members should be issued with two radios: one to monitor the layer above and another for the layer below. Thus in Figure 4.11 only the OIC communicates with the Comcen (via the ICP). He/she communicates with the Sector Commanders via one portable radio.

To deal with this incident, three operational sectors (1, 3 and 4) have been established. A Safety Officer has been appointed. Sector Commanders can communicate with the OIC (1 up) and with their sector BA teams (1 down). BA teams communicate only 1 up with their Sector Commander. The Safety Officer communicates with the OIC and all Sector Commanders. This structure is shown on the Comms Plan inset at Figure 4.11.

Note: Figure 4.11 shows an inactive sector, i.e. one that does not require a Sector Commander because (perhaps) there is no activity in that sector. However, it is still relevant to refer to that location by the sector description even though it is not established.

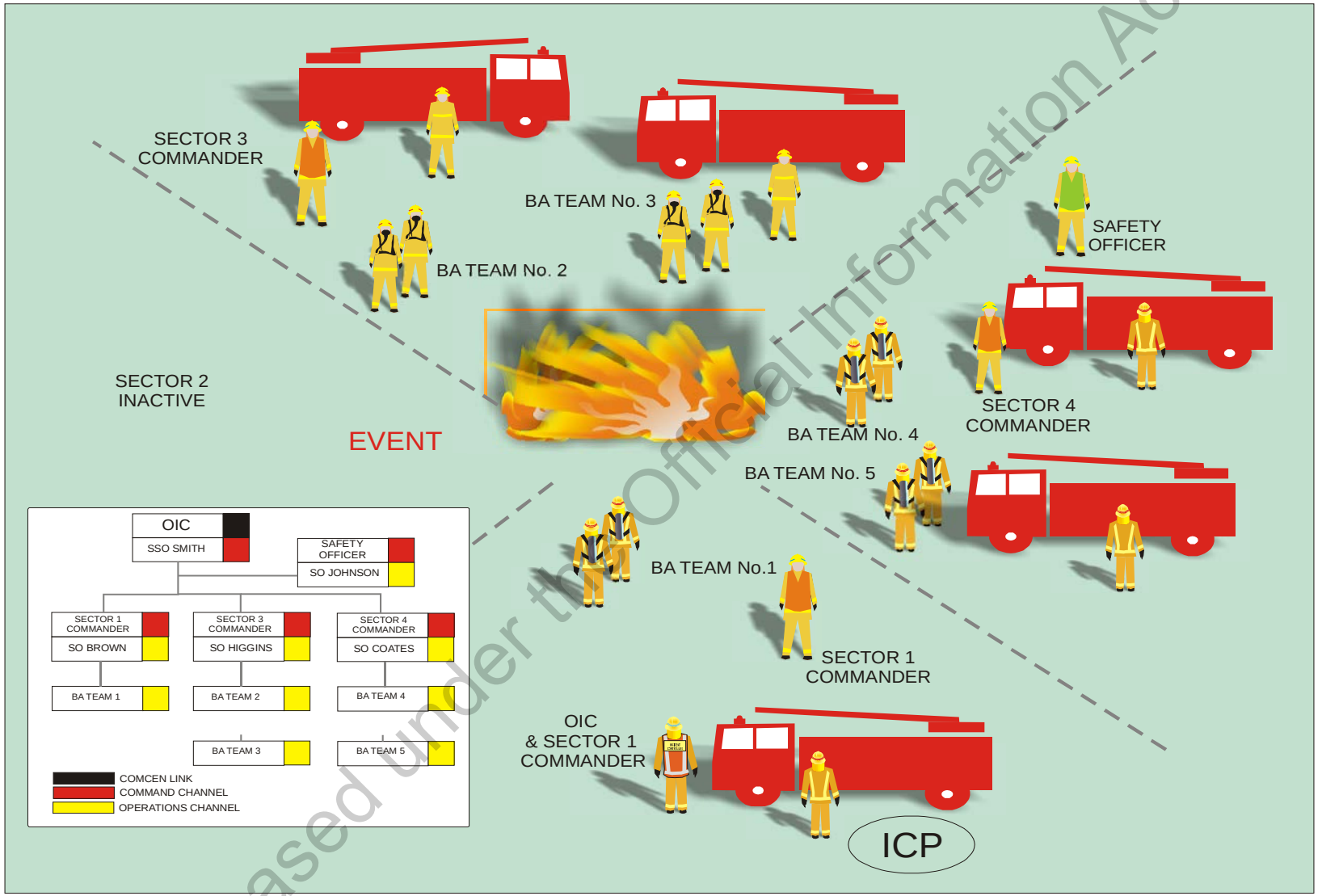


Figure 4.11: Layering principle for incident ground communications by using the two channel system
(Source – NZFS 2006)

4.4.3 Dual radio/2 channel system continued

With an incident such as this, the OIC needs to focus on overall strategy and tactics. This would be very difficult to do if he/she had to constantly monitor communications at the operations level, e.g. the BA teams. The OIC should not become involved with close-quarter tactics or the direction of the BA teams – that is the responsibility of the appointed Sector Commanders.

4.4.4 Larger scale incidents

As an incident escalates, the communication system must match its requirements. However, while the system may be more complex, it should still be based on the principle of layering. Increasing complexity can be effectively handled through the 'fencing off' of independent areas within the strategic, tactical and operational layers.

Figure 4.12 shows the principles of layering and fencing of communications at work with a larger scale incident. In this particular scenario the NZFS is the lead agency, but Police and Ambulance personnel are in attendance. The OIC therefore assumes the role of Incident Controller (CIMS), but has chosen to retain the role of OIC Fire. The fire is both complex and large scale. Consequently the command structure reflects this. In this instance the Incident Controller has appointed the following CIMS roles:

- Operations Manager
- Logistics Manager
- Safety Adviser.

The Operations and Logistics Managers have appointed a number of subordinate commands to support the proposed strategy and tactics.

The command structure at larger scale incidents will vary considerably according to strategic and tactical needs. The communications plan will also vary. The principles of layering and fencing off should however always be adhered to as far as possible. The critical issue is that of effective command – this cannot be achieved if the channels are confused and congested.

When large numbers of personnel are committed to operational sectors it may be advisable to allocate separate channels to each sector. This might apply for instance to the scenario in Figure 4.12 overleaf.

4.4.5 Communication plans – need for local procedures and pre-planning

It is important that Incident Controllers establish a communications plan for all incidents. In practice this will be extremely simple at 1st/2nd alarm level. Nevertheless it is essential that all personnel on the incident ground understand and adhere to established protocols.

For all incidents at 3rd alarm and above, a diagrammatic communications plan should be posted at the ICP and all incoming resources briefed on its requirements.

Note: The communications plan is embedded into the organisation structure by colour coding for each channel attached to each organisational position.

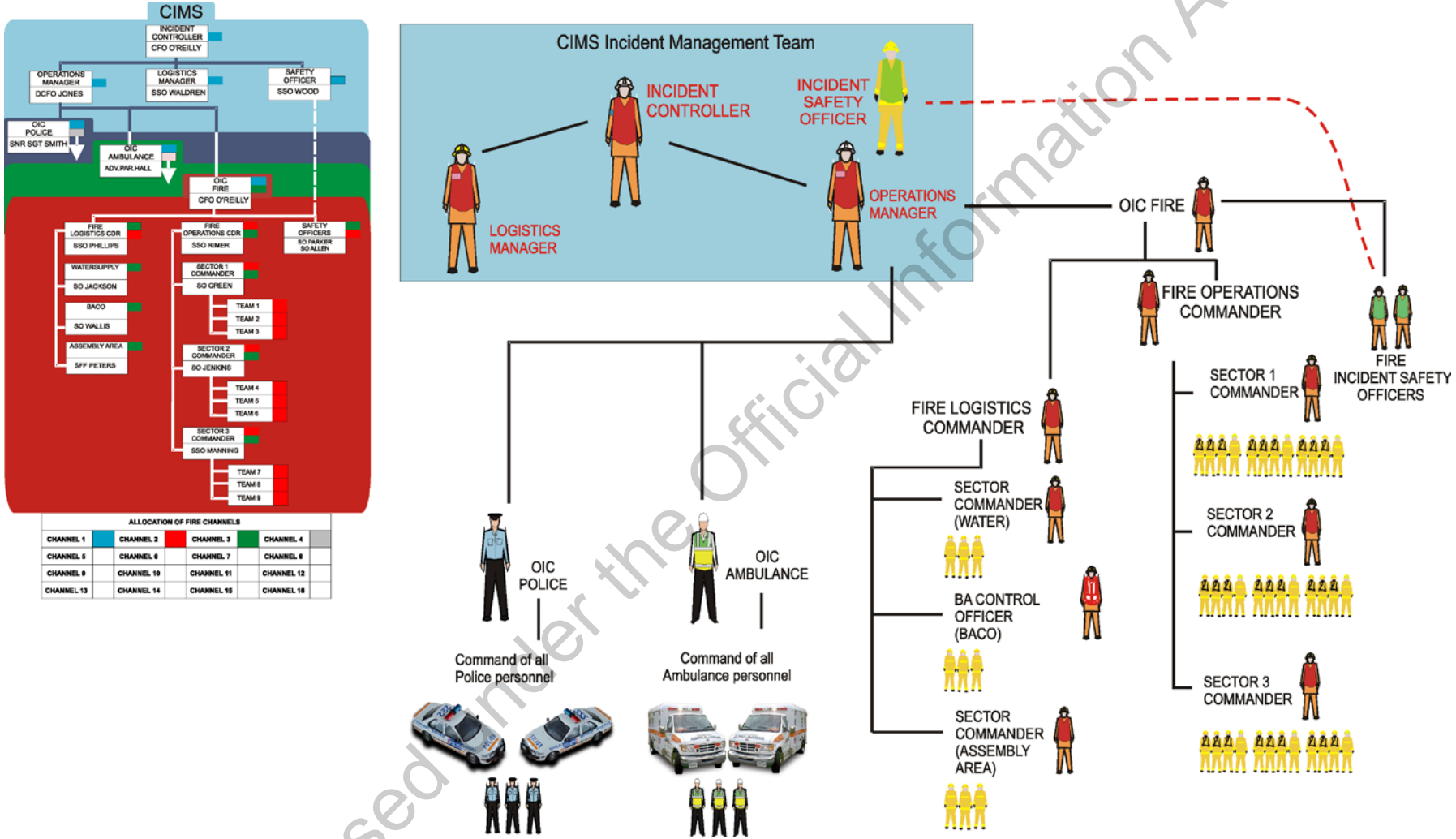


Figure 4.12: Example 3rd/4th alarm scenario command structure with Fire as lead agency
(Source – NZFS 2006)

4.4.5 Communication plans – need for local procedures and pre-planning continued

At present both UHF and VHF radio systems are used in accordance with local needs. In addition, arrangements for communication with other agencies vary between regions. These circumstances make the development of a standardised communications plan difficult if not impossible. Brigades must ensure that they have well thought out local procedures for communications that will meet all contingencies. This is an aspect of risk and operational planning and should involve all likely responding agencies.

In practice, most communication needs can be foreseen and pre-planned for established channel allocation etc. Protocols should be agreed and practised locally with all primary agencies.

4.4.6 Support personnel at the ICP

The OIC Fire is in place to provide continuous command and control – not to operate a radio. At a small-scale incident he/she will be able to handle communications directly while at the same time performing the command and control function. However, the complexities of larger-scale incidents would make this very difficult, if not impossible. In any case it is bad practice.

It is important therefore that any communication is directed to the 'one-up' position in the organisation structure, even when it is known that the same person is filling many roles (i.e. Sector Commander 1 to Fire Operations Commander or Fire Operations Commander to OIC Fire).

If an ICP is established or an ICU is available, the Incident Controller should appoint suitable personnel to provide support and assist with handling communications. At the very least, support personnel should:

- Be familiar with the way in which incident grounds and command communications are structured
- Be familiar with NZFS communications protocols
- Be able to chart a communications diagram for the incident action plan (IAP)
- Be familiar with and able to use NZFS recording systems e.g. T Cards
- Have sufficient experience to prioritise messages for the Incident Controller's attention
- Have sufficient experience to deal independently with (directly or indirectly) the range of messages to the ICP that actually fall outside the immediate command line. For example: arrivals of additional resources, requests for directions to incident ground facilities, incoming information from other agencies in attendance or from the general public, requests for access to incident control e.g. media, other agencies etc.
- Be able to record messages effectively in salient point format.

4.4.7 Sitreps

There are two principle forms of Situation Reports (SitRep). The Comcen SitRep using HAULET and the Incident Ground SitRep using SHURTS.

4.4.7.1 Comcen SitReps

This SitRep is commonly used to provide information from the incident ground to the Comcen.

Generally the first SitRep to the Comcen will take the form of HAULET:

- **H**eight (floors)
- **A**rea (length x breadth)
- **U**sed as
- **L**ocation of fire
- **E**quipment in use
- **T**actical mode

Subsequent SitReps are used to provide updates as the incident progresses. These may be in a shortened format, e.g. equipment in use changes or tactical mode changes.

For more information on the Comcen SitRep see the Operational Instruction E2 *Communication Equipment* on FireNet.

4.4.7.2 Incident ground SitReps

The Incident Ground Situation Report (IG/SitRep), sometimes known as an Incident Ground Broadcast, is quite distinct from a SitRep transmitted from the incident ground to the Comcen.

4.4.7.3

An IG SitRep is intended to provide incident ground personnel with a description of the command structure in place, the current status of the incident and the actions being taken to deal with it. It is also used to signal any requirement for additional resources and any hazards encountered.

4.4.7.4

The level of detail required in each IG SitRep will depend on the complexity and scale of the incident and the particular context in which the SitRep is being provided. It is however based on a standard template and is communicated in a standard format. For example:

- A comprehensive IG SitRep would be required at an incident where the level of risk to firefighter safety is high, or where the incident is complex in nature and personnel need to have an overall appreciation of events
- A simple and less formal IG SitRep may suffice at a smaller incident. When it is obvious that all NZFS personnel are fully aware of the situation and no hazards are reported, a SitRep may not be required at all.

4.4.7.5 The IG SitRep is transmitted at appropriate times during an incident with an emphasis on the developing period soon after arrival. This time is likely to be the period of maximum confusion as crews arrive and are deployed in an environment with limited information available. As information comes to hand a further SitRep can be broadcast, perhaps indicating to crews the urgency of a particular aspect of operations, or to advise of newly identified hazards.

The IG SitRep broadcast message should be preceded by an alerting message (e.g. 'Stand by for an Incident Ground SitRep') indicating that an IG SitRep will follow. This allows for urgent radio traffic to clear and for crews to stand by for the report.

4.4.8 Other SitReps

Situation reports will be needed in other circumstances besides the incident ground broadcast. While the format of the report will remain essentially the same, the level of detail and particular emphasis will vary according to need.

4.4.8.1 The Change of Command SitRep

An officer taking over command will obviously need to be briefed on the situation from the officer handing over. This should be done using the standard format to ensure completeness. This SitRep is sometimes referred to as a HOTO (hand-over/take-over) report or briefing. This report is likely to be focussed on incident development and the details of crew deployments.

4.4.8.2 Sector SitRep

The sector SitRep refers specifically to the update from a Sector Commander to the Fire Operations Commander. This report will obviously be focussed on more local developments and requirements.

4.4.9 SitRep format

To ensure completeness and a standardised vocabulary, the acronym SHURTS is used to structure SitReps of all kinds. The acronym expands as shown in Figure 4.13 below.

S	Size up	Summary of information gathered through the size-up process
H	Hazards	Hazards identified and recorded (in the FAP) as requiring treatment and communication to personnel working in the hazard area. Also describes the Control Measure
U	Using	Currently using – a description of resources deployed and tasks allocated, usually captured on either the electronic or manual FAP systems
R	Requirements	Requirements – description of additional resources needed and the tasks that will be assigned to them. This forms the 'wish list' in the planning backwards process
T	Tactics	A description of the predominant tactical options and Mode being deployed – This also includes the progress being made using the standard terminology of Retreating/Holding/Advancing
S	Structure	A description of the command structure established to date to deal with the incident

Figure 4.13: Standardised SitRep format through the SHURTS acronym
(Source – NZFS 2007)

4.9.10 Example of a comprehensive IG SitRep

SHURTS	*I.G. SitRep*
SIZE UP	The Current Situation at this Incident is: Height – A building of 2 floors About 30m x 30m Used as a Fire Station Location of Fire is top floor right There are no Persons reported
HAZARDS	Hazards and Control measures are: LPG Cylinders on ground floor. CM = Cooling
USING	This is a 3rd Alarm. Brigade currently Using: 4 x LPD Ventilation Search and Rescue in progress
REQUIREMENTS	Brigade Requirements are: Ventilation on top floor Search and Rescue on Top floor Covering LPD in Sector Two
TACTICS	Tactics are predominately: Offensive/Defensive Interior/Exterior attack The Incident progress is: Retreating/Holding/Advancing (Making progress)
STRUCTURE	Command Structure is: NZFS is Lead Agency Incident Controller: CFO Smith OIC Fire: CFO Smith Fire Operations: DCFO Jones Fire Logistics: DCFO Black Sector One: (Front) SSO Green Sector Two: (Side) SSO White (Ver: IGSR:1.3)

Figure 4.14: Example of a comprehensive IG SitRep

4.4.11 Simple incident ground SitRep

Shown below at Figure 4.15 is an example of a brief incident ground SitRep using the same SHURTS format for a simple fire incident.

SHURTS	*I.G. SitRep*
SIZE UP	The Current Situation at this Incident is: Fire on top floor of private dwelling
HAZARDS	Hazards and Control measures are: No hazards
USING	This is a 3rd Alarm. Brigade currently Using: 1 x LPD Search and Rescue in progress
REQUIREMENTS	Brigade Requirements are: Ventilation on top floor
TACTICS	Tactics are predominately: Offensive/Defensive Interior/Exterior attack The Incident progress is: Retreating/Holding/Advancing (Making progress)
STRUCTURE	Command Structure is: OIC Fire: SSO Smith (Ver: IGSR:1.3)

Figure 4.15: Simple incident ground SitRep using SHURTS

4.4.12 Sector SitRep

Figure 4.16 shows an example of a Sector SitRep using the SHURTS format for a simple fire incident.

Note that the section referring to 'Using' is used by the OIC Fire to determine what resources are being utilised already, while the section referring to 'Requirements' forms the wish list in the planning backwards process described earlier in this manual.

SHURTS	*SECTOR Strep*
SIZE UP	The Current Situation in Sector 3 is: Well involved fire in conference room at Grid Ref C8 and C9 There are No Persons reported
HAZARDS	Hazards & Control measures are: (Hazard, Control & Measure) LPG Cylinder at Grid Ref D9 CM = LPD Cooling
USING	This Sector is currently Using: 1 x LPD using Offensive Interior Attack 1 x HPD using Offensive Interior Attack
REQUIREMENTS	My Sector Requirements are: 1 x Unsupported Search and Rescue Team 1 x Ventilation Team
TACTICS	Sector Tactics are predominately: Offensive/Defensive Interior/Exterior attack The Incident progress is: Retreating/Holding/Advancing (Making progress)
STRUCTURE	Sector Command Structure is: Sector Commander Green Sector Command Point at: Top floor stairs (Ver: IGSR:1.3)

Figure 4.16: Sector SitRep (Sector level) using SHURTS

4.5 Handover

4.5.1 Who to handover to

At the end of an incident the OIC Fire will hand over to an external party.

If the appropriate party is available, the OIC Fire ensures handover to:

- an agency:
  - Police
  - Department of Labour (Workplace; injury, electrical/gas ignition and/or HazMat)
  - Electricity Safety Service (non-workplace; electrical/gas ignition)
  - Local Authority (public areas), OR
- owner, owner's agent, occupier, or insurance representative.

4.5.2 Handover contents

When conducting the handover the OIC Fire should include:

1. Briefing the handover party of (in writing when practicable):
   - the incident's likely remaining hazards, such as:
     - irrespirable or toxic atmospheres (CO, asbestos, fire by-products, etc)
     - unsafe structures (floor, stairs, roofs, etc)
   - Security arrangements for the scene
   - Any special instructions, e.g. protecting evidence.
2. Collecting details for:
   - the incident report
   - charging for services.

For major incidents, handover details are recorded and form part of the AAP/IAP.

4.5.3 Handover without the appropriate party

If the appropriate party is not available for handover after everypracticable effort to contact them, the OIC Fire must ensure:

1. The scene is left as secure as is practicable from:
    - hazards
    - damage
    - unauthorised entry.
2. A notice is displayed at the building or property entrance, if practicable, listing any remaining hazards.

4.5.4 More information

For more information about handovers see the Operation Instruction M1 SOP *Command and Control* on FireNet.

4.6 Calling up: the greater alarm system

4.6.1 Rationale

It is essential that senior managers are able to respond to escalating emergencies in a planned and standardised manner. It is equally important for Comcen staff to share a common understanding of resource deployment with their operational colleagues.

A nationally standardised method of calling for additional resources is available in the form of the greater alarm system. This system sets out the standard resources to be allocated (according to availability) from 1st alarm to 5th alarm – but allows for the use of pre-determined attendances (PDAs) for particular risks.

4.7 Operational planning

4.7.1 Relevance to command and control

The Approve Deploy Review Improve (ADRI) principle (see section 1) demands that we should do as much as possible to ensure successful incident management at the 'approach' stage. Clearly, the ability to take rapid and effective command of a situation will be greatly enhanced by familiarity and pre-planning.

Probably the most significant command and control factors to be addressed by planning will be ground conditions, communication issues and of course potential safety issues. Operational plans also provide key information in relation to the location and availability of water and services.

4.7.2 Critical information

While there are (as yet) no standard templates for operational plans, operational needs dictate that there are certain standard criteria that are critical to effective operational planning. These are:

- Pre-determined attendance/deployment – a careful consideration of the most appropriate response to the particular location for successive alarm levels
- Hazard identification – listing of all known hazards with their site locations, together with any significant notes relating to their management
- Exposures – identification of property, facilities etc that are likely to be affected by an incident at the site, together with any notes relating to their protection
- Building construction – details of dimensions, construction method and materials, noting any potential hazards
- Safety features present and operational – identification, description and location of installed safety/protection systems
- Evacuation plans – notes on any operative scheme
- Water supply – location of hydrants, tanks, pools etc.
- Sketch map – this should be drawn as accurately as possible, particularly in terms of the location of buildings, their relative size and position in relation to significant features.

The sketch map should also clearly indicate the location of hydrants and other utilities. Standard symbols are available in SMS.

4.7.3 Rapid location

At larger sites it is useful to apply a simple overlay grid system to assist with locating specific buildings, entrances, equipment, hazards etc. This is particularly true when out of District resources are responded since they may be entirely unfamiliar with the site layout.

Examples of a two-page operational plan are provided overleaf for a school (Figures 4.17 (a and b) and a chemical plant (Figures 4.18 (a and b).

OPERATIONAL 1480/05

Common Place	Sunnybrae Normal School	**Review Date**
Address	36 SUNNYBRAE ROAD	29 Jul 2006
Suburb, City	SUNNYBRAE, NORTH SHORE CITY	

Critical Information

Deployment

1st	**2 Pumps**	**2nd**	**2 Pumps, 1 ICU**
3rd	**3 Pumps, 2 Aerials, 1 Bat, 1 Canteen**	**4th**	**3 Pumps, 1 Aerial**
5th	**3 Pumps**		

Hazards

Quantity: 200 KG C8 **UNSI:** 1017 **Chemical Name:** Chlorine

Exposures /Sectorisation

Building Construction

Construction Timber frame unprotected (normal housing)
Est. Height 3-7 metres **Floors** 1 **Basements** 0 **Area of One Floor** 625

Safety Features

Other Alarm: Type – 02 Manual fire alarm (self monitored)
Other Alarm: Type – 23 Security system - Heat/Smoke
Fire Hydrant System/Riser None

Evacuation Plan

Operative Scheme

Notes

Water supply: 15 l/s school car park
Supplementary water: 351/s Sunnybrae Road
Access to rear classrooms via path at the end of Ellen Avenue

Figure 4.17(a): Example of an operational plan: page 1 layout for Sunnybrae School
(Source NZFS 2006)

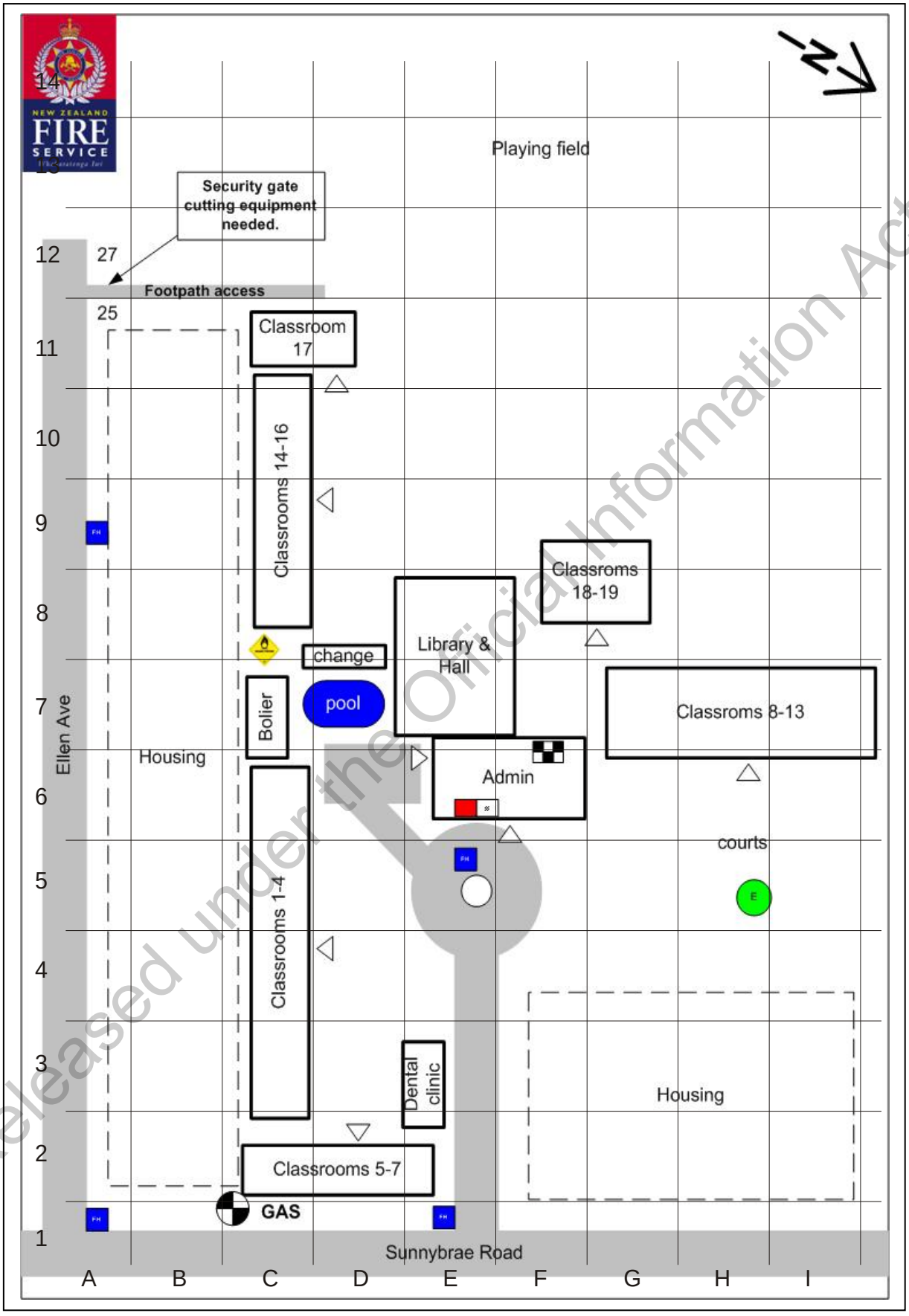


Figure 4.17(b): Example of an operational plan: page 2 layout for Sunnybrae School
(Source NZFS 2006)

OPERATIONAL PLAN 1480/10

Common Place Chemcolour Industries NZ
Address 24-26 POLAND ROAD
Suburb, City GLENFIELD, NORTH SHORE CITY

Review Date 29 Jul 2007

Critical Information

Floor drains connected to underground tank of only 4500 litre capacity. Firefighting water may cause overflow. Ensure sewer isolation valve closed

Deployment

1st 2 Pumps
2nd 2 Pumps, 1 ICU, 1 Haz
3rd 3 Pumps, 2 Aerials, 1 Bat, 1 Canteen
4th 3 Pumps, 1Aerial
5th 3 Pumps

Hazards

Quantity: 20 tonnes **UNSI:** 1738 **Chemical Name:** BENZYL CHLORIDE GRID REF H/8
Quantity: 12 tonnes **UNSI:** 1221 **Chemical Name:** ISOPROPYLAMINE GRID REF C/6
Quantity: 2 tonnes **UNSI:** 1431 **Chemical Name:** SODIUM METHYLATE GRID REF D/9
H1 – Transformers
Large quantities of toxic and flammable chemicals in high rack storage in chemical store at laboratory

Exposures / Sectorisation

Consider down wind evacuation
Internal fire doors separate flammable liquid storage area

Building Construction

Construction Block walls, Steel roof, wooden upper floor
Est. Height 3-7 metres **No. of Floors** 2 **Basements** 0 **Area of One Floor** 1000

Safety Features

PFA: 110057 THERMAL/SMOKE PANEL: FRONT OF SOUTH WING OF BUILDING
Fire Hydrant System / Riser None
Service isolation points as shown over leaf

Evacuation Plan

Operative Scheme Assembly area- outside Dodsons Autoparts

Notes

Water supply: 40 l/s on Poland Road
Supplementary water 60l/s on Hillside Road
Insufficient bunds at building openings to contain firefighting water runoff
High rack storage

Figure 4.18(a): Operational plan page 1 layout for ChemColour Industries (example)
(Source NZFS 2006)

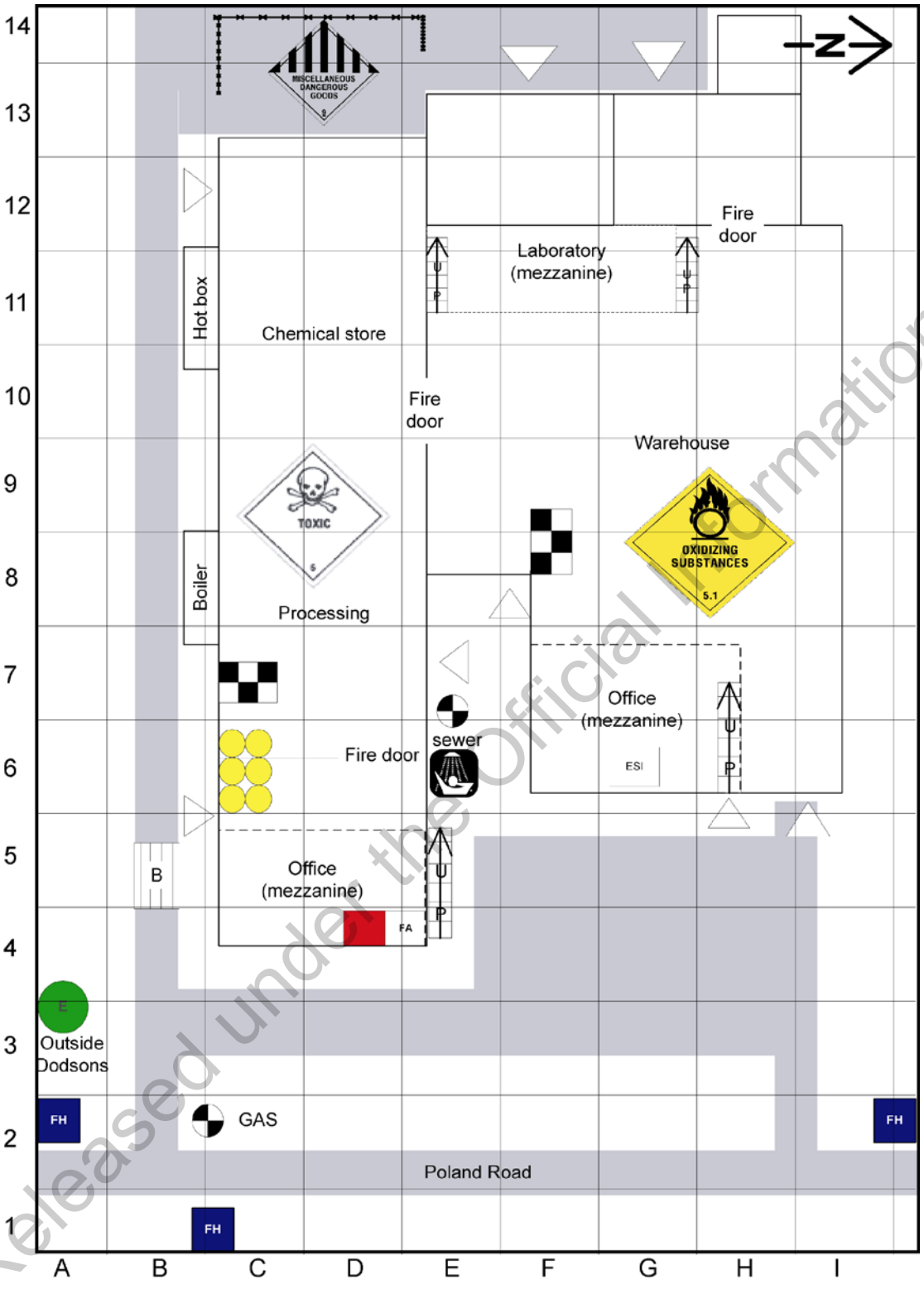


Figure 4.18(b): Operational plan page 2 layout for ChemColour Industries (example)
(Source – NZFS 2006)