FIRE CONTRACTORS GUIDE BOOK

ELECTRICAL

NTFAST Fire Contractors Guide 2011
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1. PREFACE

This information is for fire technicians and electricians working on Class 2 to 9 buildings and relates to the installed fire equipment of electrical nature in the main with a focus on NTFAST connected buildings but is not addressing AS/NZS1668.1, AS2118, AS2419.1 & AS2941 electrical requirements.

The documentation advises on the function of NTFRS Community Safety section and NTFAST technicians’ role in building compliance.

Information related to NTFAST Version 3 (new or V3) for fire contractors working for the first time or with previous experience on NTFAST.

Provided is information related to common issues surrounding installation, FAQs and instructional information.

This documentation is Northern Territory system (NTFAST) specific.

USED TERM
Legacy site – site that was originally connected via the former Torrens system, has miri unit in an NTFAST box external to FIP with 13.8 volt PSU/charger and battery.

ACRONYMS
ACMA  Australian Communication & Media Authority
ASE  Alarm Signalling Equipment (Miri AD2000)
AFA  Automatic Fire Alarm
BOWS  Building occupant warning systems
BCA  Building Code of Australia (or late NCC National Construction Code)
CPR  Cabling Provider Rules
DIN  Digital Input
DOT  Digital Output
ECP  Emergency Call Point (white coloured MCP)
ERA  Emergency Response Area
EWIS  Emergency warning & intercommunication system
FIP  Fire indicator panel
JESCC  Joint Emergency Services Communications Centre
MCP  Manual Call Point (red break glass alarm)
NTES  Northern Territory Emergency Services
NTFAST  Northern Territory Fire Alarm System Transmission
RSSI  Received Signal Strength Indicator
RTU  Radio Telemetry Unit
SOU  Sole occupancy unit
SPL  Sound Pressure Level
PFES  Police, Fire & Emergency Services
V3  Version 3 Software
WAN  Wide Area Network
WIP  Warden Intercom Point
2. REGULATORY ENVIRONMENT OF FIRE EQUIPMENT

The work of fire contractors on AS1670 fire systems and electrical contractors working on AS/NZS 3000 section 7.2 “Safety Services” and other fire related requirements and AS2293.1 “Emergency escape lighting and exit signs for buildings” are covered by the same acts and regulations as other fire related services/systems in the NT being:

- NT Building Act
- NT Fire and Emergency Act
- NT Fire and Emergency Regulations
- Building Code Australia
- Australian Standard (that’s applicable to type of equipment)

**NTFRS Community Safety Section** must first receive application for report from NT licence Building Certifier. A report is compiled on fire equipment requirements and comments for class 2 to 9 base buildings and their fit outs and refits, usually during the design phase and returned to the NT licence Building Certifier.

**NTFRS Community Safety officers** inspect building at a time arranged through the Building Certifier, once all fire safety issues and equipment are checked and found satisfactory the report can be signed off by the inspecting officer and forwarded to the Certifier.

**NT licenced Building Certifiers** are the Authority Having Jurisdiction in the NT and as such have the last say on all matters related to building equipment and services.

**NTFAST Technicians’** role is two fold, primary role is to maintain NTFAST back end and facilitate connection of new sites, and secondary role is to provide technical support to the NTFRS Community Safety officers.

**Fire Technicians** shall install systems to current AS1670.1 & 4 and the BCA where it over rules AS1670 (see section 18 item 10). NTFRS advises to have copies at hand for reference whilst doing installation works just because it is on a drawing doesn’t make it right.

Installers of fire systems are required to be *OPEN* category registered with one of the 5 Cabling Provider Rules Registrars or directly supervise all others working under his registration, this includes the holders of *RESTRICTED* category registration. Cabling Provider Rules (CPRs) are issued by the Australian Communication & Media Authority (ACMA) as covered by the Telecommunications Act 1997.

The installing technician is the one required to complete an Installers Statement as per AS1670.1 normative Appendix F document. “A ‘normative’ Appendix is an integral part of the Standard,”

The statement’s item 11 is where the installing technician certifies that

(a) installation is complete and tested thoroughly
(b) is installed to current requirements of AS 1670.1 or
(c) is installed to attached design specification

Except in regard to the following details........
The (c) should be only selected for system installed as part of a fire engineering solution design, usually this will mean far greater requirements then that of AS1670.1 or system such as those installed in sprinkled building not meant to be equal to AS1670.1 but installed to give occupants earlier warning then the sprinklers will in path of travel to an exit.

The “Except in regard to the following details….” this is an important part to fill out, for you to nominate all items that do not comply with AS1670.1 You’ll find that on a lot jobs that the supplied drawing do not comply with AS1670 and no matter how much you tell the builder they will insist that you install it to the drawings.

Your best advice is to fill out this section in detail and make the Building Certifier and Community Safety Officer aware at the time of inspection or earlier if possible. You will have covered yourself, the Building Certifier and Community Safety Officer will be very unlikely to sign off on the system with anything nominated as not to the Standards. This will probably result in you receiving a work order very promptly to rectify non compliant issues.

3. AUSTRALIAN STANDARDS ON FIRE EQUIPMENT

DETECTION – Fire contractors should be mindful AS1670.1 clause 3.25 …requires that detection be provided throughout all areas of the building; however, where systems are installed to meet the requirements of the BCA, detectors may only be required in certain nominated areas.

Should be equally mindful of Clause 3.26 …“Detectors are not required in the following locations.” as listed (a) to (i)

Specific detection arrangements as well as nominated areas are covered in clause 4 and 5 of Spec E2.2a of the BCA. For example Class 2 may have AS1670.1 detection only “in public corridors and other internal public spaces.”

NTFAST conditions of connection 10 c) “partially protected buildings will not be accepted for connection”, except as above the BCA requires detection in only certain nominated areas or specific detection arrangements.

ELECTRICAL – Electrical contractor should be fully aware of the requirements of AS/NZS 3000 clauses 1.5.2, 1.5.12 and section 7.2 Safety Services in particular at switchboard design phase will save a lot of issues at time of fire inspections.

The following are some of the more salient points of applicable clauses for most typical installations.

AS/NZS 3000 clause 1.5.2 Control and isolation

"...control of safety services shall be arranged so that the control devices are separate from the control of other equipment and are not unintentionally interrupted by the operation of the other equipment."

1.5.12 Protection against the spread of fire
"Protection shall be provided against fire initiated or propagated by components of the electrical installation." This applies particularly to egress and the sterile fire environment required in fire isolate stairwells, ramps and passageways.

Section 7.2 Safety Services which include:

7.2.1.2 Fire- and smoke-control equipment

"(a) Fire hydrant booster pumps."

"(b) Pumps for auto sprinkler systems, water spray or deluge systems "etc.

"(c) Pumps for fire-hose reels, where they are sole means of fire protection...."

"(d) Fire detection and alarm systems."

"(e) Air-handling systems intended to exhaust and control the spread of fire and smoke."

7.2.1.3 Evacuation equipment

"(a) Sound systems and intercom system for emergency purposes."

"(b) Central emergency evacuation lighting systems comply with the AS2293 series."

7.2.1.4 Lifts

7.2.4 Arrangement

Requires that "Main switches for safety services shall—

(a) Be connected on the supply side of all general electrical installation main switches, and ......

Exception

"(c)(iii) Automatic fire detection, alarm and intercom systems or sound and intercom systems for emergency purposes that are—

(A) supplied from the supply side of a distribution board not more than one removed from the main switchboard; and....."

EMERGENCY LIGHTING AND EXIT SIGNS – Electrical contractors installing this equipment should familiarise themselves with AS2293.1 and the requirements for the most common single point systems.

Clause 2.3, 3.2, 4.3 and figure C1 should be fully understood at the time of designing and installing required general and emergency lighting circuit for small installations and especially for the multiple circuits in larger installations and the interrelationships that is required by these clauses.

Understanding the requirements of the above clauses along with clause 2.4 Labelling, clause 2.2.1 that initial commissioning tests be of 2 hours duration and be enter in the required clause 8.3 completed logbook will go along way to making fire inspections by NTFRS Community Safety section go well for the installer.

4. NTFRS OPERATIONAL REQUIREMENTS

ONE STOP SHOP – NTFRS is a relatively small fire service, so first turn out is generally one pumper and four fire fighters, for that reason Community Safety section has input at the design phase of new buildings to achieves a one stop shop of fire equipment.
This has mostly to do with the location of the hydrant/sprinkler booster and sprinkler control valve in close proximity and visible to the FIP/building access on high rise buildings and larger spread out sites. Allowing from when the fire truck first stops the crew can be ready to go to work and provide attack hydrant coverage to all floors or buildings. One stop operation is not possible on legacy sites which have Sub FIPs.

**SUB FIP (conventional)**— As with one stop shop NTFRS is a small fire service, so for the same reason installation of new building that sub FIP off an existing building is prohibited and is also listed under condition of connection to NTFAST 10 b). This is to prevent instances where the pumper truck (appliance) first stops at the NTFAST connected FIP then the crew must get back in the truck and moved a second location.

**NETWORK FIP** – Networked FIP on large sites can only be used if the infrastructure for a one stop shop is provided i.e. appropriately located fire hydrant booster with attack hydrant coverage to all networked buildings.

Community Safety advice should be sort prior to expansions, major changes and upgrades of existing NTFAST sites.

### 5. NTFAST OVERVIEW / HISTORY

NTFAST is an acronym for “Northern Territory Fire Alarm System Transmission” and came about as a result of the building of a new fire station in Alice Springs at the same time as Torrens the former system used by the NTFRS become obsolete and the company’s closure.

NTFRS decided to invest in technology that could cope with the Territory’s extremes in particular the wet season and lightning storms and that didn’t involve the frustration of dealing with a third party on NTFRS mission critical system. The first system in Alice Springs was based on AD1000 Miri radio telemetry units (RTUs), the rest of the Territory AD2000 RTUs which were set up so that both the NTFAST and Torrens unit were operational during the rollout period of version 1.73 software now referred to as old.

In 2006 the version 3 (V3) upgrade started, enabling the receipt of more inputs than the original 4 Alarm, Standby, Isolate, Test and RSSI. Now inputs for minor alarms - sprinkler pump running, zone isolate, MCP, door tamper, valve tamper and mains fail are monitored. Feedback is also given to the tester of successful and unsuccessful tests via the V3 brigade switch (also DOT 2). Late 2011 the upgraded was completed.

NTFAST monitoring for alarms and dispatching is all automatic via the RTUs (ASEs) in FIPs to a repeater site and back to the Master AD2006 RTU at the fire stations and can operate stand alone during communication outages. Darwin, Alice Springs and the 5 other Track stations are also monitored via the PFES Wide Area Network (WAN) at Joint Emergency Services Communication Centre (JESCC) by Fire Comms officers (Police Auxiliaries).
6. NTFAST ALICE SPRINGS AND TRACK STATIONS

The systems in these locations are based on single repeater sites each mapped for up to 100 sites with ASP having 2 co-located repeaters. The repeaters locations:

- ASP – atop West gap
- JAB – Fire Station mast
- KTH – Fire Station mast
- NHU – atop Mount Saunders
- TCK – atop Two Tank hill
- YUL – NTES yard mast

7. NTFAST DARWIN

The sites/FIPs in the Darwin region is firstly divided up along the ERAs of the station which is first responder and all sites are given its prefix.

- DWN ERA from No1 Station 32 Iliffe St Woolner
- CAS ERA from No2 Station 25 Abala Rd Marrara
- BER ERA from No11 Station 265 Berrimah Rd Wishart
- PLM ERA from No3 Station 46 Emery Ave Woodroffe
- HDO ERA from No 10 Station 8 Skewes St Humpty Doo

Humpty Doo Station providing daytime coverage with No3 providing coverage outside these hours for site in the HDO ERA.

These 5 ERAs are to be covered by 9 Mini Masters AD2006s 6 are in DWN No1 Station.3 in BER No11 Station. Masters are named for the location of repeater or tower that it’s associated and mapped for up to 200 sites. The repeater locations are

- NT House – atop building
- Marrakai – atop building
- Marrara – Stadium lighting tower
- Casuarina – Police station tower
- RDH – atop building
- Karama – atop water tank
- Berrimah – atop PMC building
- Palmerston – NTES yard tower
- Humpty Doo – atop water tank

8. NTFAST ASE (MIRI AD2000)

The AD2000 shall be installed in the FIP for new and all replacement FIPs. Its power supplied from the FIP’s primary power source via 24 volt to 12 volt converter (rated at 2 amps) that is backed up by the FIP secondary power source (batteries) that comply with requirements of AS1670.1 clauses 3.16.3 & 4 for rating and capacity respectively.

The AD2000 shall be installed as per NTFAST RTU wiring diagram (see section 15 of this doc). Each of the minor inputs DIN 9 to 14 shall be independent of one another i.e. the door switch shall only have effect on DIN 12 the door switch input and is not to be included in the program string of any other minor inputs.

AD2000 of the NTFAST operate 2 different radio modems older units use Trio while all new units use JSLM² and both cause the radio rx LED to function slightly differently. A correctly functioning AD2000 powered up and the aerial connected will have the following LED pattern with FIP/Brigade switch in NORMAL and door open.
For an NTFAST Miri unit the outputs (DOT) and inputs (DIN) functions are:

DOT 1 is battery fail output (only used on legacy sites)
DOT 2 is test output
DOT 4 is link OK output (receiving polling signal from the master only)

DOT 1 and 4 – will normally be ON for legacy sites

NOTE: DOT 1 to 1A is a contact that when the miri power is sensed voltage ≥13 volts the contact closes to charge the battery of legacy site miri. Therefore DOT 1 may be off where the FIP has an integrated miri unit should not be wired in as there is no back up battery. DOT 4 is the LINK OK output which will be on when the miri unit receives valid polling request.

DIN 1 is alarm input (on = normal – off = fire alarm)
DIN 2 is standby (fault) input (on = normal – off = fault/s)
DIN 3 is isolate input (brigade switch isolated forces DIN 1 & 2 on overriding their true status – DIN 1, 2 & 3 on site isolated)
DIN 4 is test input (on site in test for 300 seconds)
DIN 9 is sprinkler pump running input (on = pump running)
DIN 10 is FIP zone isolate input (on = zone isolated)
DIN 11 is MCP input (off = MCP alarm active)
DIN 12 is FIP door switch input (off = door open)
DIN 13 is sprinkler valve tamper input (off = valve closed)
DIN 14 is FIP AC power fail input (off = mains failed)

DIN 1, 2, 11, 13 &14 – will normally be ON with the door open and FIP in normal as represented in the above diagram.

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Above are the Major Inputs and how to read their statuses

### 9. TESTING & WORKING ON SITE

**TESTING** – A new V3 brigade test regime and time of 300 seconds has been set Territory wide on all sites. All references to the old 7 to 10 second test regime switching times are no longer relevant and testers need only follow the below sequence with the knowledge that they have a full 5 minutes to complete a successful test.

**BRIGADE TEST – V3 software RTU**

1. Brigade switch to test – DIN 1 and 4 both on
2. Zone/device in alarm – DIN 4 on only
3. Reset alarm zone/device – DIN 1 and 4 both on
4. Brigade switch to normal

**NOTE:** V3 does provide feedback and switching time is of less importance unless you are trying to switch to quickly, from turning brigade switch to test to when it is displayed on the system computers takes up to 3.5 seconds see below site blocks.

<table>
<thead>
<tr>
<th>DIN</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NORMAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISOLATE</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>ALARM</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>ALARM &amp; STANDBY</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

NTFAST Technicians can provide system familiarisation/test training to technicians and testers as group from your company and individuals if time pressure allows. To meet the requirements of AS1851.8 – 1987 and Supplement 1 – 1990 testers are reminded that legacy site and early transition FIPs that have an NTFAST battery must also be tested/checked. This is done by;

1. Visually check the battery for swelling, cracked terminal seals and terminal corrosion.
2. You shall check charge voltage/PSU output is 13.8 volts with battery knife fuse disconnected.
3. Disconnect the 240 volt knife fuse so that the miri is running off battery recheck battery voltage is above nominal value (12 volts) after 1 minute (see graph below for

Site in NORMAL

Test sequence at 1 & 3 above

Test sequence at 2 above
reference) if voltage drops to 12 volts or below within this time it should be immediately failed and replaced as soon as possible.

4 -note the final battery voltage reading in the logbook as proof of testing and a trend on the health of the battery can be monitored with each monthly test.

5 -once testing has been complete ensure that knife fuses are reinstated

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DISCHARGE TEST OF NEW FULLY CHARGE 7AH 12VOLT BATTERY

The graph above shows NTFAST trend log for a new 7ah battery with the battery cut-off contacts (DOT 1 to DOT 1A see section 15) bypassed. Included for reference when doing the above 1 minute test – a good battery should be of a value well above nominal after 1 minute.

NOTE: Contact between DOT 1 and 1A is closed when the miri input power is sensed to be greater than 13 volts for 1 minute

NOTE: Unserviceable NTFAST batteries are often reason for site having multiple daily link failures as the PSU struggles to provide the miri Transmit power and charge flat/unserviceable battery causing the voltage to briefly drop to the miri CPU reboot value.

DAILY REPORTS

All contractors should be receiving reports that are generated automatically from the system and will have the following email address pfes.backup@pfes.nt.gov.au covering all the sites they are the nominated contractor. The following is how they are set out and the terms used in those reports each line is layout as follows.

Date – Time – Site № – Site Name – Input Descriptor – Active or Inactive Stamp/Code #
Input Descriptors are as follows for MAJOR ALARM STATUSES

Full Code AFA – the site generated an Automatic Fire Alarm
Standby – the site has an FIP fault (Standby a carry over from the Torrens system)
Brigade Isolate – the site has had the NTFAST switch in isolate
Test Successful – the tester has conducted a successful brigade signal test. Code 0
Test Unsuccessful – the tester has conducted an unsuccessful brigade signal test
Link Failure – the RTU has stop working or missed responding to a number of consecutive polls from the Master RTU.

Test code # produce from below parameters

Code 2 test unsuccessful
Can happen with no AFA resulting & with an AFA resulting
Code 2 & No AFA - Test position – alarm active – Normal position then alarm reset < 1 sec apart. (i.e. < 1 to 1.5 second depending where in the polling sequence the system is, and data is sent in the same data packet)
Code 2 & an AFA - Test position – alarm active – Normal position (alarm sent) - alarm reset

Code 3 test unsuccessful
Test position - Not alarm active or a non brigade call zone /device selected - Normal position

Code 4 test unsuccessful
Test position - alarm active - alarm reset - Isolate position (No Normal position)

Code 6 test unsuccessful always results in an AFA
Test position - alarm active - Normal position (alarm sent) - Isolate position - alarm reset (alarm subsequently reset while the Brigade switch is in Isolate)
Or - Test position - alarm active - (after 300 sec test timer runs out - alarm sent)

Code 7 test unsuccessful
Test position - Not alarm active or a non brigade call zone /device selected - Isolate position

Input descriptors for MINOR ALARM STATUSES
Sprinkler pump running
FIP Zone Isolate
MCP activated
FIP Door Tamper
Door 2 Tamper (actually valve tampers)
FIP Power Failure
WORKING ON SITE/ SYSTEM IMPAIRMENTS/ FIP REPLACEMENTS

Best practise - for testers upon opening the FIP door, first action shall be Brigade (NTFAST) switch to Test position followed by the alarm steps ending with the transit of Normal position step for 10 seconds, a test LED result shall indicated.

With all other times while the FIP door is open the tester should have the Brigade switch in the Isolate position for all other onsite testing.

Testers TIP: Should your test be going pear shape: During testing of sprinkler systems and the like where there is no FIP, where you believe you may be going to exceed the 300 seconds (5 min) before you can achieve pressure that returns the site out of alarm (DIN 1 on) under test.

1st remove power to the miri (ASE)
2nd normalise the site (continue pumping up until require pressure is reached)
3rd apply power to miri and look for DIN 1 (no DIN 1 remove power instantly you only have a second or 2 before radio starts and attempts to transmit)
4th leave in Test for 10 seconds
5th brigade switch to Normal from Test position.

Result may be a successful or failed test dependent on where in the polling cycle it was when the power is removed and re applied or if it was registered as in link failure on NTFAST in the down time.

Rectification works to pump etc will be needed, before testing again check offline the pumping up time prior to attempting live testing the site.

Best practise – for fire contractor working at or on any FIP the brigade switch should always be in isolate - when working remote from the FIP (especially large sites) the Brigade (NTFAST) switch shall be in Normal position with isolation of zone/s in the area of works should always done.

Should a contractor be working physically within an FIP NTFRS position is that the contractor shall take the ASE (miri) off line (plus any other onsite management issues as required i.e. for hospitals notify engineering and security)

To take a site off line contractor shall 1st switch site to isolate then remove the aerial or 12volt power to miri unit, both is best but if you are working on ASE (miri) input function 12 volt power will need to remain on

Prior to bring a site on line its very important to CYCLE THE POWER off and on, if any alarms (DIN 1 off) were created with the miri RTU off line by removal of it’s aerial only but still powered up, this clears the flash memory of the miri unit of alarms prior to reconnecting aerial.

Off line for short periods 15 to 30 min when reconnecting the contractor should prove that link is re-established by turning the brigade switch to TEST wait at least 10 to15 sec and then return to NORMAL (they will then get back a failed test - flashing test LED - but also proof of the link working) OR just do a full Brigade test - test LED solid for 20 seconds also proof of the link working

Off line for extended periods of an hour or more Contractor shall contact Fire Comms to create a job regarding the site will be in link failure - giving the company name; their name; NTFAST site No/ Name; reason for off line; when expecting to have the site back online - ring Fire Comms back when finished to confirm link is OK and close the job off.

Off line site job created with Fire Comms only covers the site for being off line (in link failure) and dispatching/advising an NTFAST technician to attend the site. The fire contractor is responsible for unwanted alarms transmitted due to poor work practises, Fire Comms officers have no ability to stop alarms, the system automatically dispatches the local fire station and the Fire crew are required turn out
Thorough testing of wiring work done on miri inputs (especially Major inputs) loose connections etc is the responsibility of the fire contractor prior to reconnecting the aerial refer to "Major inputs and how to read their statuses" in section 8
NEVER reconnect an aerial with DIN 1 not illuminated this is best done with brigade switch in the Normal position as Isolate masks DIN 1 & 2 true statuses
The above work practices will reduce NTFRS work load of attending unwanted Alarms created by contractors substantially.

10. NEW CONNECTION TO NTFAST

Connection to NTFAST and allocation of a site number can not be arranged until the receipt of a completed current “NTFAST application for connection” (form is accessible at www.fire.nt.gov.au via NTFAST link) and payment of the application fee.

a) Payment direct to NTFAST Administrator – cash, cheque or credit card - Level 4/71 Smith St (NAB House) Darwin. (Visa or MasterCard only and by phone 89955401)
b) Payment to RTM – in person or by phone 89991606 Quote 16FDCC001 131145 and send copy of receipt to the NTFAST Administrator (Diane Wemyss 89955401 fax 89419597 diane.wemyss@nt.gov.au)

The application should be arranged as early as possible in your project as last minute application may hold up your project.
AD2000 and V3 Brigade switch along with aerials can be purchased from
Miri Technologies
30 Buckingham drive
Wangara 6065 WA
PH (61) 89409 8998 FAX (61) 89409 2992 Web: www.miri.com.au

You should plan on 1 month as minimum after receipt of a paid application and site or block plan, for NTFAST to put back end software and site information in place and a site to be ready to go online. Only a new AD2000 Rev 5 will be accept for new sites, the AD2000 can be programmed with an NTFAST map once the site number is allocated either onsite at the time of final inspection or prior by dropping it off at NTFRS Community Safety located at:
Level 4/71 Smith St (NAB House), Darwin.
Alice Spring the AD2000 can be taken to the fire station and can be programmed remotely by NTFAST techs, call John Oliver on 89516664 to make arrangements.
No site can be placed online until site keys are delivered to the fire station and receipted into key safe of the station which the site will be responded from.
Darwin No1 Station (DWN) 32 Iliffe St Woolner
Casuarina No2 Station (CAS) 25 Abala Rd Marrara
Palmerston No3 Station (PLM) 46 Emery Ave Woodroffe
Berrimah No11 Station (BER) 265 Berrimah Rd Wishart

11. REPLACEMENT OF FIPS

NTFAST connected building fire systems come under numerous categories the most basic being the following three.
1. Required systems – (installed as required by the BCA.)
2. Non-required systems – (installed in excess of a BCA requirement.)
3. NT Government building – (self insured buildings both required and non-required) **Replacing an NTFAST connected FIP of a ‘Required system, Non required system and Government building’ for any reason a Building Certifier **MUST **be engaged as part of the process as per condition of connection item 6.**

Replacing an NTFAST connected FIP needs to involve an NT registered building Certifier, Fire Safety officer from Community Safety and NTFAST tech coming to site (or remotely) and contractor arrange a demonstration/testing of all FIP and NTFAST V3 functions are correct wired as per RTU wiring diagram (for wire colours see section 15) and provide all the AS1670.1 documentation as required by Section 7 and set out Appendix C,E & F for inclusion on the building file and copies for the FIP as per AS1670.1 requirements.

Replacement Fire Panels shall be as with new panels fitted with a V3 brigade switch and all V3 inputs functional, miri unit mounted within it and powered off the panels PSU via 24v to 12v converter card with backup from FIP batteries (see section 15). Zone Block Plans are an integral part of an FIP and are required to be updated/provided at this time especially on the numerous sites that totally lack one or are of a sub standard quality (see section 14).

Detection items 1 to 11 and electrical items 31 & 32 of section 12 inspection checklist shall be checked for current compliance for FIP replacements. Item 11 Strobe will depend on if replacement of the existing bell would be detrimental to the existing occupant warning.

12. INSPECTION CHECKLIST

DETECTION SYSTEM
As stated in section 2 installation of fire detection and BOWS shall be to the current AS1670.1, EWIS to AS1670.4 and AS/ACIF S009 at the inspections the Building Certifier, Community Safety Officers and possibly NTFAST Techs will conduct spot checking of the installation looking at generally the whole system complies with the above standards and/or any fire engineering requirements.

The following is a general list of items that NTFRS would ask the contractor to demonstrate, be looked at or checked.

1. All AS1670.1 clause 7.2 and AS1670.4 clause 6.4 Documentation shall be provided and copies left in the FIP or its document box.

FIP clause 7.2
- ‘As-installed’ drawings [refer Appendix D examples]
- CIE documentation – operators and installation/commissioning manuals
- Commissioning report [refer Appendix E example]
- Installer’s statement [on Appendix F form]
- Logs/Logbooks – [refer clause 4.2 AS1851.8-1987]
- Aspirating system – calculations

EWIS clause 6.4
- ‘As-installed’ drawings
- CIE Documentation – operators and installation/commissioning manuals
- Logs/Logbooks – (with all required information entered, refer clause 6.4.2)
2. FIP as per clause 3.9 – designated entry point and mounting height to clause 3.9.1 – covering doors labelled ‘FIRE PANEL’ and not be lockable to clause 3.9.2 – clearances to clause 3.9.4 or pre approval from Community Safety for lesser clearance spacing.

3. Zone Block Plan – shall be done to AS1670.1 clause 3.10,(see section 14 of this doc for NTFRS specifications) and be forward to Community Safety/NTFAST electronically for approval prior to inspection as per conditions of connection 10.a)

4. The LCD descriptors match up with zone block plan and the onsite door/room labels or area names (addressable devices) or just single area names (conventional zones)

5. Warn sys isolate - button functions on any amplified sound system or electronic sounder Stopping sound output

6. All NTFAST requirements met.  
   - Application for connection completed and fee paid.  
   - Site keys deliver to appropriate fire station and signed into key safe.  
   - FIP to be compliant with either AS4428.1 CIE with Fire Fighter Facility or AS7240.2 with built in or separate AS4428.3 Fire Brigade Panel.

   Inputs function correctly wired see section 15 (wiring diagram) of this doc.

   **MAJOR INPUTS**
   - DIN 1 ALARM (white)
   - DIN 2 STDBY (yellow)
   - DIN 3 ISOLATE (blue)
   - DIN 4 TEST (green)

   **MINOR INPUTS**
   - DIN 9 Sprinkler Pump Running (white)
   - DIN 10 Zone Isolate (yellow)
   - DIN 11 MCP (blue)
   - DIN 12 Door Tamper (green)
   - DIN 13 Valve Tamper (purple)
   - DIN 14 Mains Fail (brown)

   **MIRI POWER**
   - 12volts x 2 amps off FIP Bat, wires Red to +ve & Black to –ve and all wire colours as per RTU wiring diagram.
   - FIP Mains power in panel mains cabling - refer item 34
   - RSSI – to required level (replacement FIP equal to or better than existing value)
   - Amalgamating tape on external aerial connector

7. Spot checking of detectors – smoke or thermal testing initiates an alarm and descriptors should make sense with reference to detector location refer 4 above and zone number
   - Smoke detectors with AVF (can also be on rate of rise thermal – A & C type but not B type).
   - VESDA detectors – sensitivity and transit times.
Multisense detectors shall not be installed where photoelectric are specified in all exits, passageways, corridors, hallways, or the like, that are part of a path of travel to an exit & sleeping areas.

Concealed detection and access [refer clause 3.25.4.1]

8. Spot checking of detectors – removal of detector initiates fault and descriptors are as with 7 above.

9. MCP in main entry, most case the FIP MCP will cover this requirement [refer clause 3.15]

10. Ancillary output function as required for the site – Fire door holders, security door releases. Non mandatory in AS1670.1 advisory shutdown of gas and ducted air conditioning. Required AS1668.1 functions FFCP - stair pressure, smoke spill, etc

11. Strobe – functions, is labelled and is visible from main approach.

12. Detection is in all required areas and is of an appropriate type for the area

13. Separate alarm zones as required by clauses 3.12, 3.13, 3.25.3 & 3.25.8 - Suppression systems and associated flow and pressure switches, Air Handling systems and restricted fire service access - lift shafts, electrical switch rooms, comms cupboard and the like.

14. Alarm zone size shall be < 2000m² and ≤ 40 devices maximum for both addressable and conventional zones as per clause 2.4, addressable circuits shall have isolator bases/units on loops so that an open or short circuit shall not disable more than 40 devices and in any case not more than one building as per clause 2.5.

15. Detector spacing and clearances as per clauses 3.25.1 (a)&(b), 3.25.5, section 4 & 5 of AS1670.

16. Non flame propagating conduit and fittings in fire isolated exits refer to clause 16.5 (c) of AS/ACIF 5009

**BOWS (BUILDING OCCUPANT WARNING SYSTEM)**

BCA Spec E2.2a clause 6 - AS1670.1 C3.22 Occupant warning system shall be one of the following:

- A sound system in accordance with AS1670.4
- Electronic sounders or amplified sound system producing the evacuation signal. The evacuation signal shall operate simultaneously throughout the building.

That meets SPL requirements:
- Exceed by a minimum of 10dB(A) the ambient SPL, not < 65dB(A) and not > 105dB(A)
- If intended to arouse sleeping occupants, the SPL shall be 75dB(A) at the bed head, with the doors closed
17. Initiates by the fire detection system and produces evacuation signal (i.e. no alert tone)

18. All required area throughout building achieves the required SPL (see above)

19. Spot check sounders (conventional) and speakers are connected to supervised output for open and short circuit that initiates a fault signal at the FIP. Refer clause 3.22

SSISEP (SOUND SYSTEMS and INTERCOM SYSTEMS for EMERGENCY PURPOSES [formerly EWIS]) BCA E4.9 - shall comply with AS1670.4

SPEAKERS
20. Indicator Panel shall meet the requirements of section 2.1 for (pre approval from Community Safety for lesser clearance spacing)

21. Initiates by the fire detection system or ECP and produces alert signal to all area and cascades in an evacuation sequence appropriate to the site/building

22. ECP (Emergency Call Point) shall be installed adjacent to each WIP and as per clause 4.3.2. An MCP installed at these locations shall meet this requirement.

23. All required area throughout building achieves the required SPL (see above)

24. Spot check speaker lines are connected to monitored output that initiates a fault signal that also brings up fault at the FIP for open and short circuit. Refer to clause 4.3.8 and Table 4.2

25. All speaker cabling that are required to have protection set out in Table 4.1 & Figure 4.1 shall have a minimum rating of WS$1W (120min fire and appropriate mechanical rating)

INTERCOM
26. Each WIP location shall not adversely effect ability of warden to communicate with indicator panel clauses 5.3.1 & 5.3.2

27. Each WIP shall be in appropriately located as listed in clause 5.3.3. and is mounted not < 1200mm and not >1800mm.

28. Each WIP aural call signal shall not < 80 db(A) at 1m distance even when mounted within security enclosure. Refer clause 5.3.7.

29. Each WIP operates as per label / location.

30. Spot check intercom lines are connected to monitored output for open and short circuit at the intercom CIE.

31. All intercom cabling required to have protection shall have a minimum rating of WS$1W (120min fire - refer Table 5.1 & Figure 5.1.)
**ELECTRICAL SYSTEM** to AS/NZ 3000

32. All Safety Services Main Switches arranged so that feed is from supply side of general Main Switch refer AS/NZS3000 clause 7.2.4

33. All Safety Services have labels as required by AS/NZS3000 clause 7.2.6. – e.g. “MAIN SWITCH FIP” and “IN THE EVENT OF FIRE, DO NOT SWITCH OFF”

34. Mains power cable and terminations within the FIP maintains basic protection required AS/NZS 3000 clause 1.5.4 and 3.10.1.1.

35. Non flame propagating equipment /conduit in required egress paths refer to AS/NZS 3000 clauses 1.5.12

**EMERGENCY LIGHTING AND EXIT SIGNS** to AS2293.1

36. Discharge test facility/switch and labelled as per AS2293.1 clause 4.3

37. Sensing of supply failure as required by AS2293.1 clause 2.3.3

38. Labelling of all required circuit breakers as per AS2293.1 clause 2.4 – e.g.
   “WARNING: INTERRUPTING SUPPLY WILL DISCHARGE EMERGENCY LIGHTING BATTERIES.”

39. Meet required specific locations of emergency lighting refer clause 5.4.1

40. Emergency lights shall be spaced to suit their classification refer clause 5.4.2

41. Required Operating and Maintenance manual refer clause 8.2 especially applicable to any of the automated systems and self testing fittings

42. Completed hard-bound logbook with the installers commissioning discharge test for 2 hours duration also entered

43. All exit signs shall be mounted not less than 2 m and not more than 2.7 m refer clause 6.8.1

**13. AERIAL REQUIREMENTS**

NTFAST technician’s advice should be sort prior to you installing any aerial. This may involve an aerial/RSSI (Received Signal Strength Indicator) survey to determine which aerial type what repeater to align aerial to if a yagi is needed and what size.

Your site aerial installation will need to achieve the lowest possible RSSI and at least match the results of any survey conducted by NTFAST technicians. No site can be signed off with RSSI worse than -85db to a new Miri unit (ASE) at an extend range from its repeater, close in sites should achieve far better than this and should be around -65db or better.

The installed aerial system shall have a RF power meter reading of less than 0.1watt reflective with forward power generally in the range of 4 watts. High reflective power readings will generally result from using wrong cable like RG59 (75Ω), poorly
terminated connectors and whip aerial, crushing with cable ties or tight bends/kinks of the coaxial cabling. The coaxial shall be RG58 (50Ω) via SMA104 connector at the Miri unit (ASE) to a maximum cable length of 10 metres to the whip or yagi aerial.

All coaxial cable runs shall be kept as short as possible, coaxial cable runs of greater than 10 metres up to 60 metres will have to use RG213(50Ω) with short 0.5m RG58 fly leads at each end, when connecting the Miri unit to a whip aerial. Only one RG58 fly lead at Miri unit is needed when connecting RG213 to a yagi aerial. Coaxial cable runs greater than 60 metres to 171 metres will have to use LDF 4/50 and their specialty fittings.

<table>
<thead>
<tr>
<th>CABLE TYPE</th>
<th>LOSS RELATIVE TO DISTANCE</th>
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<tr>
<td></td>
<td>1 dB</td>
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<tr>
<td>RG58C/U</td>
<td>2.3m</td>
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<tr>
<td>RG223/U</td>
<td>3.1m</td>
</tr>
<tr>
<td>RG213/U</td>
<td>6.1m</td>
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<tr>
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<td>19m</td>
</tr>
<tr>
<td>LDF5-50A</td>
<td>38m</td>
</tr>
</tbody>
</table>

**ANTENNA PLACEMENT**

Antenna placement is of paramount importance and plays a big part of the antennas and in turn systems performance.

When choosing antenna locations the aim is to find the largest path of unobstructed space and locate the antennas within that space. It is important to locate antennas as high as possible and definitely clear of any moving obstructions.

Where possible it is important to avoid mounting antennas:

1. Against or adjacent to steel structures.
2. In an area which will have constant intermittent obstructions - people walking past, vehicles driving past etc. That is, mount antennas well above such moving obstructions.
3. Near any electrical equipment.
4. Near metal beams, structures etc.
5. Inside any metal enclosures, tin sheds / warehouses etc. - Note meshed wire fences act like a “brick wall” to RF transmissions.
6. Away from guard rails or support beams.
7. Above any pipe work or corrugated iron roofs.

Whip aerials shall be mounted on J pole or bracket clear of a wall by 150 to 200 mm where clear line of sight can be established. Both whip and yagi aerials need to be mounted as high as possible where there is no clear line of sight, it shall be mounted
clear of roof by at least 1m or at the height as determined by NTFAST technician aerial survey which shall also nominate which repeater for alignment of yagi aerial. All external coaxial connector junctions shall be seal from the weather with electrical amalgamating tape. All whip aerials shall be trim to NTFAST using inline VSWR meter or cutting chart centre frequency length of 265mm and terminated as per RF Industries CD50 and CD51 installation sheet over the page. New FIP have earth fault sensing and will require insulating of aerial mount to avoid earth fault when aerial is connected. This can easiest achieved by splitting 150 mm of 25 mm conduit and placing over mounting pole prior to aerial clamping bracket.

COAXIAL CONNECTOR AERIAL ARRANGEMENTS LESS THAN 10METRES

SMA104 → RG58 → CD50 or 51 whip

Aerial system components less than 10 m
SMA104 – RG58 – CD50

SMA104 – RG58 – N89 – YAGI or N15

COAXIAL CONNECTOR AERIAL ARRANGEMENTS GREATER THAN 10METRES

SMA104 → RG58 → N30 – N07 or N114

Aerial system components greater than 10 m
SMA104 – RG58 – N30 – N07 – RG213 – N07 – N30 – CD50 or or or
N98 – N114 N114 – N98

SMA104 – RG58 – N30 – N07 – RG213 – N07 – YAGI or or or
N98 N114 N114

Use the following web page for N Series connector data sheets.
Installation

CD50 and CD51 Series Mopole™ Antenna

The CD50 and CD51 Series Antenna is an end fed dipole (Mopole) which is ground plane independent. The antenna has a high impedance matching circuit which is enclosed in a high impact ABS housing. The CD50 uses a tapered 17-7PH stainless steel radiating section and the CD51 a PVC enclosed copper braid element. In the feed design the terminated RG58 forms part of the high impedance matching circuit and no D.C. continuity exists between the centre conductor of the cable and the radiating element and a short exists from the cable shield to the radiating element.

To Terminate The Antenna:
1. Remove approximately 50mm of the outer PVC jacket of the RG58 cable.
2. Trim the exposed cable braid shield so that approximately 10-15mm remains showing.
3. Fold the remaining braid shield back over the outer PVC jacket of the cable as shown.
4. Trim the exposed inner conductor, complete with insulation to the EXACT length shown below.
5. Screw the prepared cable into the coil housing until the cable 'bottoms'. The cable is now terminated. No soldering of the conductors is necessary. Please note the D.C. continuity checks above.
6. Trim whip top to frequency using an inline VSWR meter. (Chart below serves as an accurate guide if cable preparation is correct).

RG58C/U CABLE
450-520 MHz

Cutting Chart

TRIM FOR OUR BAND CENTRE

NOTE: Although the antennas when tuned track very closely with the cutting chart provided, this chart should be used as a guide only and the antenna should be tuned for the desired operational band centre.
Installation

CD90 Series Cabling Instructions

1. Insert cable assembly through to top of base.
2. Remove outer jacket of cable to length shown. (see Figure 1)
3. Bunch braid by sliding it down towards base and remove all but amount shown using scissors or sharp side cutters. (see Figure 2)
4. Flatten braid out so as to form it into a circle. Remove inner dielectric by the amount shown and tin conductors. (see Figure 3)
5. Place teflon washer on top of the braid.
6. Apply Loctite 262 to base thread where shown.
7. Slide top assembly over the inner conductors and screw down tightly until top and bottom meet. (see Figure 4)
8. Inner conductor should now appear out of the top of the whip bolt.
9. Solder inner conductor at top of bolt.
10. Screw on whip top.
Installation

Phasemaster
CSW24 & CSW14 Antennas

PLEASE NOTE:

a) The Phasemaster antenna range is designed for use only with UHF antenna bases such as RF Industries Models MB10, MB12 (or electrical equivalents) or with the RF Industries CD80 Series Elevated Feed Antennas.

b) This chart is an approximate cutting guide only. It will ensure a match of less than 1.5:1 at the operating frequency. For optimum match at the operational frequency, tune the whip on the vehicle using a power meter or VSWR meter.

While trimming can be done RF Industries advise that with this aerial no great gain will be achieved already has a minimal VSWR curve.
14. ZONE BLOCK PLANS

Zone block plans are where the Fire Service first interfaces with the locations installed fire system, as such is an integral part of the FIP (and all replacement/升级s of an FIP), is important they are a clear concise sign that directs where assets need to be deployed in the event of a fire. As the name states should be a diagram of installation divided into its distinct areas/zones for both addressable and conventional detection to the limits set out in clause 2.4 and all other separate alarm zone requirements of AS1670.1 see clauses 3.12, 3.13, 3.25.3 & 3.25.8. All NTFAST connected FIPs under condition of connection 10a) “A block diagram of the building shall be provided to the satisfaction of the NTFRS.”

Main points for a workable ZBP and the order of the NTFRS reviewing process
1 - Orientation - Fire fighter standing at the FIP the ZBP matches the building
2 - FIP location - clearly defined (YOU ARE HERE or the like)
3 - Zone Areas and Labels - shall be clearly defined and legible for fire fighter looking at it through a BA mask and using a torch (flashlight)
4 - Working info - at the very least stair locations - major access doors and corridors/passageways can also be useful for Fire Fighters to navigate within more complex buildings.
5 - First responders Notice in full
All other items are required to be consistent are help info that is mainly useful to fire fighters after initial first response and house keeping of these documents

The zone block plan shall be mounted on the FIP or within the clearance space either side provide for in clause 3.9.4 or above.

As per AS1670.1 Clause 3.10 ZONE BLOCK PLAN
“A block plan of the installation, with the position of the FIP clearly indicated,...”
- To meet the above NTFRS expect to see the words ‘YOU ARE HERE’ or the like with an arrow pointing to the FIP, FBP, Mimic, RP as appropriate in a text size large enough to draw attention quickly or contrasting colour/s can also help (red is often used that works well)

“...shall be securely mounted adjacent to the FIP, mimic panel, repeater panel and fire brigade panel.”
- This statement is self evident but to make it clear blutac and sticky tape doesn’t count as securely. To meet the above NTFRS expect the use of screws in all four corners or a quality double sided tape running along all four sides of the diagram.

“The block plan shall be in the form of a permanent diagram that is water resistant and fade resistant, and shall include:“
- NTFRS obvious preference are the Zone Block Plans done by sign-writers etched, engraved or the printed vinyl laminated direct to acrylic/Perspex. NTFRS understands the convenience of paper printing especially prior to final inspection were items may be found that would require changes to be done, but to comply with above and due to the number of ZBP that were to go to sign-writers for making up and the site has the temporary ZBP still in situ weeks and months later. NTFRS will be looking to see that as a minimum - A
paper printed block plan thermally laminated and behind protective cover (Perspex etc) or in a frame screwed to the wall is the minimum to cover the above requirements.

“(a) the layout of the building in which the fire alarm system is installed;”
- Minimum of a ground floor plan view for multistorey buildings where the upper floors are covered by only one or two zones of area detection with tower arrangement to show upper storey zones see high rise example 1 & 2. Low rise with larger floor areas that vary greatly between storeys (split level etc) may need a plan view for each floor.

“(b) the area covered by each zone;”
- To meet the above NTFRS expects plan view/s dissected into the various zones by the use of thick border lines(fig 1) around the boundary of the zones or dissecting lines(fig 3) or by using colours(fig 2) or varying crosshatching/patterns(fig 4) to define the various zones limits. Each zone shall have label as appropriate i.e. “ZONE # or ZN # or Z #” minimum 3mm text written on the zone with only 1 icon for each device type that make up the zone adjacent to or under the label, individual icon for each device will tend to be illegible and just be adding clutter. Dual risk zones would therefore have 2 labels per zone each with their appropriate icons.

Small zones may need to have zone label and icons in suitable location with an arrow to the zone. Single device zones for in duct detectors etc (re clauses 3.12, 3.13, 3.25.3 & 3.25.8) the icon shall be located on the plan view in their actual location or with an arrow to actual location and zone labelled and zone named for area of coverage on the FIP or in the program and can be also added the ZBP were it doesn’t add to make the overall ZBP cluttered (see ZONE 23 in example diagrams on following pages).

An as installed drawing (which is required to be supply in the FIP) or the full detection design drawing doesn’t work as a zone block plan, as any diagram with every input device shown just adds clutter and doesn’t always provide a clearly defined zone and on larger sites are invariably illegible. Extremely large sites may opt for a zone table of detection icons to reduce clutter icons on the actual zone that will tend to be smaller for extremely large sites.

High rise buildings need only a ground floor plan that shows at least fire stair and a block tower/table of zones and there icons for each level/floor as most high rise building only have one or two zones per level (examples on following pages)

“(c) fire brigade panel;”
- Can be omitted for FIP to AS4428.1 with a Fire Fighter Facility. For AS7240 (international standard) panels a Fire Brigade Panel shall be compliant with AS4428.3 – 2010 as part of the FIP or in a separate location and shown on the Zone Block Plans as required see above.

“(d) the location of the FIP and all SIP, mimics and repeater panels;”
- This subclause is self evident.
Bordered zones (fig 1)

Coloured zones (fig 2)

Dissected zones (fig 3)

Patterned zones (fig 4)
CIVITAS
LOT 6848 HARRY CHAN AVE.

IN CASE OF FIRE, CALL '000'
TO ENSURE FIRE SERVICES RESPONSE

MAXION PTY LTD. • 0414 908 215
ORIGINAL INSTALLATION • JULY 2009
REV -01
High rise example 2
The above examples show 2 Zone Block Plans to represent tower buildings were most levels are the same and only have one detection and one wet zone.
“(e) the year of original installation and the date of the latest revision to the block plan;”

- The year of original installation, followed by date/year of modification, additions of zones, FIP upgrades etc you are installing and should read like “4/2011 FIP replaced” or “4/2011 zone # added” as this is original installation date for that part of the installation. – often the original installation can be taken as the year of built date on the original FIP or most building will have a dedication plaque with the date the building was open. The date of latest revision to the block plan for each update or change submitted for NTFRS approval.

For first submission to NTFRS Community Safety shall have a distinct identifier:– e.g. “Revision/Version 0” or “1 - 30/5/11.”

If change/s are required the resubmitted plan’s identifier shall increase numerically:– e.g. “Rev. 1 - 4/6/11” or “Ver. 2 - 4/6/11.”

“(f) the location of any other CIE, including sound systems and intercom systems for emergency purposes;”

“(g) the location of the fire fan control panel;”

- Both these subclauses should be only needed when the equipment is not located within or adjacent to the FIP all other cases the icon/symbol for the FIP can be seen as having met these requirements.

“(h) the location of any fire suppression system controls;”

- Sprinkler and clean agent (gaseous extinguishants) control valve locations.

“(i) notice advising, ‘In the event of a fire ring ‘000’ to ensure fire service response’

- This subclause is self evident. Shall be as quoted and the “to ensure fire service response” not be dropped as is commonly done which is the whole reason for the notice on monitored sites. Unmonitored will need it as an instruction if there is a fire.

“The block plan shall be displayed in correct orientation of the building.”

- This subclause should be self evident but is the most common mistake made when block plans are produced. You must start with the mounting location this should generally be on the same wall as the FIP and in the space that clause 3.9.4 and Figure 3.1 require. Drawing shall be so that standing in front of the FIP walls and items above the FIP will be in front of you, walls and items below the FIP are behind you, left of FIP is to your left, the right of FIP is to your right.

NTFRS requires Zone block plans to include site name/location this may include ‘Fire or Zone Block Plan’ and the address.

NTFRS requires Zone block plans to also include NORTH arrow/symbol this can be to show actual North or aligned with a project North end of the site and any direction descriptors associated with the FIP LCDisplay.

NTFRS requires Zone block plans to also include a LEGEND of actuating device icons used in the diagram, the Normative FIRE ALARM SYMBOLS in Appendix D should be the basis of symbols to be used in your legend.
ZONE BLOCK PLAN CHECKLIST
A completed copy of this checklist is to be submitted with Zone Block Plan via email, checking off items with reference to Section 14 for more detail. They need to be submitted as early as possible in your project, while we will endeavour to turn around approval/changes reply email as soon as possible it may take up to a month or more (refer to Section 10 New Connection to NTFAST). Leaving submitting to the day of inspection and expecting a turn around instant approval will only see review added to the end of the existing queue once received electronically, an initial review by the installer/tester for accuracy should raise chances of early approval.

This checklist and ZBP shall be sent to all: davidm.williams@nt.gov.au; steve.vitnell@nt.gov.au; fire.safety@pfes.nt.gov.au;

(Version of ZBP for Mimic panel/s, repeater panel/s and separate FBP as per clause 3.10 shall also be produced)

☐. Zone Block Plan has been reviewed by installer/annual tester for accuracy.
☐. Plan view/s orientated to mounting position.
☐. Zone areas clearly defined and meet all requirements of clause 2.4.
☐. Zone labelled at ≥3mm text size.
☐. Device icons adjacent to zone labels – one per detection type that make up zone.
☐. FIP location clearly defined (YOU ARE HERE or the like).
☐. Building features. - At the very least stair locations and access ; – Major access doors, corridors/passageways within the more complex buildings.
☐. First responders Notice in full - ‘IN THE EVENT OF A FIRE RING ‘000’ TO ENSURE FIRE SERVICE RESPONSE’.
☐. Original installation date(year), along with chronology of major changes and additions.
☐. Revision number on drawing (incrementing for each resubmission)

NTFRS specific requirements
☐. Site Name/Location
☐. North symbol
☐. Legend of symbols used in this block plan.

When installed items
☐. The location of any SIP, DGP, FBP, repeater and Mimic panels
☐. The location of EWIS and FFCP when remote from the FIP
☐. The location of fire suppression controls – Sprinkler or Gas systems

NOTES:
BRIGADE TEST PROCEDURE – V3 software RTU

Ensure that the "LINK OK" LED is on.

1. Turn the Brigade switch to "TEST" position – DIN 1 and 4 both on.
2. Activate a zone/device into alarm on the FIP – DIN 4 on only.
3. Reset the alarm zone/device – DIN 1 and 4 both on.
4. Return the brigade switch to "NORMAL" position.

Observe the "TEST" LED.

TEST SUCCESSFUL – "TEST" LED will be on solid for 20 seconds.

TEST FAILURE - "TEST" LED will flash at approximately 1Hz for 20 seconds.

NOTE: Test timers are now 300 seconds Territory wide there is no limit to the time spend at each step 1 to 4 just that the test needs to be completed within 5 minute window and not move to quickly through the steps see section 9 for more information.
### NTFAST Fire Contractors Guide 2011

#### DIN RTU Inputs

<table>
<thead>
<tr>
<th>DIN</th>
<th>RTU Inputs</th>
<th>Description</th>
<th>Normal State</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>FIP Fire Alarm</td>
<td>ON</td>
</tr>
<tr>
<td>2</td>
<td>S</td>
<td>FIP Standby Warning</td>
<td>ON</td>
</tr>
<tr>
<td>3</td>
<td>I</td>
<td>FIP General Isolation</td>
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</tr>
<tr>
<td>4</td>
<td>T</td>
<td>FIP Station Test</td>
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<td>MCP</td>
<td>Manual Call Point</td>
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<tr>
<td>12</td>
<td>T1</td>
<td>Tamper 1 (Fire Indicator Panel door)</td>
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<td>13</td>
<td>T2</td>
<td>Tamper 2 (Sprinkler Tamper Valves installed)</td>
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<td>14</td>
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<td></td>
</tr>
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</table>

#### DOT RTU Outputs

<table>
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<tr>
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<th>RTU Outputs</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Alarm 1 Test Successful</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Alarm 2 Test Successful</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Poling/Enabled</td>
</tr>
</tbody>
</table>

### Antenna Information

1. If the antenna coax cable run is no greater than 10m then RG 58 coax may be used.
2. If the antenna coax cable run is greater than 10m then RG 213 coax must be used in this event special terminators and reducers shall be required.
3. If a standard dipole whip is to be used then the antenna end must be terminated per the instructions supplied with each antenna.
4. If a YAGI antenna is to be deployed it must be aligned correctly in the direction of the assigned repeater station.
5. Any antennas installed shall be mounted on a bracket at least a metre off the roof.
16. NTFAST CONDITIONS OF CONNECTION

As set out on the application for connection to NTFAST

1. Any sprinkler/alarm system monitored by the Northern Territory Fire and Rescue Service (NTFRS) must comply with the Australian Standard in force at the time of connection, which relates to the particular system.

2. The client shall provide the NTFRS with a report in the form of a completion certificate or installer’s statement for all relevant system/s issued by the contractor and maintain the system/s in good working order in accordance with the provisions of the Building Code of Australia (BCA) and relevant Australian Standards.

3. The client shall, in the first year pay a connection fee of $### plus GST ($##) totalling $### and the remaining portion of the annual monitoring fee within time frames set after receipt of a bill. Thereafter, an annual monitoring fee of $#### plus GST ($###) totalling $#### is a debt due and payable on the first day of July in each and every year during which the connection is maintained. These fees are subject to periodic increases as applied to the Revenue Units Act.(check website for current $ figures or application form as they change 1st July annually)

4. The client shall pay all fees levied for attendances at unwanted alarm activations, where either a waiver application has not been submitted within the required 30 days from date of invoice or a waiver application has been declined by NTFRS.

5. On payment of the connection fee, the NTFRS will ensure connection of the sprinkler/alarm system to the monitoring equipment and maintain connection between the site monitored and the monitoring system.

6. The client shall arrange with the NTFRS for the provision of keys to the monitored site to be held at the relevant fire station that would normally respond to the monitored site, the client will ensure current keys are provided to the NTFRS upon any key changes occurring. This condition may be waived in cases where the NTFRS is guaranteed free access at all times in the event of an alarm.

7. The client agrees to notify the NTFRS prior to any alteration or addition to the alarm system, or if the use, occupancy or maintenance contractor of the building changes. Any replacement/refurbishment of Fire Indicator Panels will require the involvement of a registered NT Building Certifier.

8. The client agrees that they will not tamper with, activate or de-activate any signalling device connected with the fire alarm monitoring system including the isolation of any part of the system and understand that they may be subject of an on the spot fine under the NTFRS Fire and Emergency Act.
9. The client agrees that the fire sprinkler/alarm system WILL be maintained in accordance with Australian Standards and may be subject to disconnection from the monitoring system and understands that the Insurance Council of Australia may be notified along with the occupants of the building should the system be found to be in a state of disrepair. The NTFRS reserves the right to enter any premises monitored to inspect the premises for compliance.

10. The client agrees to ensure that a recognised Fire Alarm Contractor is engaged to ensure appropriate response to system faults on a 24 hour basis when notified by the NTFRS either verbally or by NTFAST automated email reports.

11. The client shall comply with special conditions as detailed below -;
   a) A block diagram of the building shall be provided to the satisfaction of the NTFRS.
   b) Each building on a site must be separately connected to the alarm monitoring system via individual NTFAST Telemetry modules.
   c) Partially protected buildings will not be accepted for connection.
   d) 12 volt DC supply for NTFAST shall be connected though the battery backup side of the Fire Indicator Panel via a 24V D/C to 12V D/C regulator. This shall be installed inside the Fire Indicator Panel with a 2 Amp rating.

12. The client understands the NTFRS will not be held liable for any loss, cost of damage, incurred by the client or any person claiming through him, as might arise from the operation or failure of the monitoring system, whether that loss, cost or damage arises from the negligence of the NTFRS or for any other reason. The client shall wholly indemnify the NTFRS for all claims as may be made by other persons claiming loss as a consequence of the operation or failure of the monitoring system connected to the clients premises.

13. The client has read and will comply with the information as provided at – www.fire.nt.gov.au click on NTFAST.

14. THE NORTHERN TERRITORY FIRE AND RESCUE SERVICE RESERVES THE RIGHT TO REFUSE AN APPLICATION FOR CONNECTION AND ALSO RESERVES THE RIGHT TO TERMINATE OR DISCONNECT ANY SITE MONITORED SHOULD THE CONDITIONS OF THIS AGREEMENT NOT BE COMPLIED WITH.
17. OCCUPANT WARNING TONES

For all systems installed to comply with AS1670.1 clause 3.22 shall have amplifier tone generator or sounder/sounder bases set to output evacuation tone only as specified in ISO 8201 on alarm activation. The evacuation signal shall consist of the temporal pattern shown below with the frequencies that are the default in Australia. Other signals may be more appropriate for use where the ambient noise will mask the signal.

![Evacuation tone - ISO 8201]

For all systems installed to comply with AS1670.4 section 4 shall be programmed to produce Alert tone as specified in ISO 7731 throughout the installation on alarm activation (subject AS1670.4 C4.3.3) and be replaced by the evacuation tone at the prescribed time from initiation in a logical cascade sequence as set by a building emergency management plan (AS3745) or fire engineering. In a tower building this will nearly always be the alarm floor in evacuation after the prescribed time. Two floors above and one below shall go into evacuation at the end of 2 x prescribed time, with the 2 up 1 down sequence continuing with each multiple of prescribed time period elapsing.

This sequence is important because it is tied up with the buildings fire stairwell pressurisation design capacity to maintain the required environment within the fire stairwell.

![Alert tone - ISO 7731]
18. FAQs & COMMON ISSUES

1 – **NTFRS position on AVF** and NTFRS Policy № 1 all NTFAST connected systems shall have all smoke detectors set to AVF you shall beware of the requirements AS1670.1 clause 3.3 that doesn't allow certain listed device types to be set to AVF this can become an issue when installing smoke detectors and non AVF equipment / devices (MCPs) on conventional zones.

2 – **Detector minimum clear space.** All detectors are to be mounted so that a clear space of 300 mm radius, to 600 mm deep shall be maintained from each detector. This requirement is only exempted for detectors installed to meet clauses 3.25.5 Cupboards and 3.25.12 Vertical shafts and openings.

3 – **NTFRS position on concealed and roof space detection** is that of the guidance of Appendix A clause A2, heat detectors should be used as they reduce unwanted alarms, have a greater resistance to adverse environmental conditions which are found in these spaces. The suggested detection devices:

"(g) **Roof spaces**–aspirating or heat with high temperature duty and rate of rise operation."

"(h) **Concealed spaces**–aspirating or heat with normal temperature duty and rate of rise operation."

Aspirating detection is also an option in adverse environmental conditions as these detection systems incorporate sophisticated filters and /or electronic dust rejection but cost is usually a limiting factor.

The unwanted alarms that result from installing point type smoke detector in these areas will be borne by building owners 12 to 18 months from installation completion, as resulting in multiple unwanted alarms each charged @ $808. There is also the
potential extra risk to NT Community and the NTFRS assets having unnecessary movements at high speed.

4 – **Changes to installed fire system**, as with section 11 installed fire systems fall under 2 categories all ‘required systems’ will require Building Certifiers approval of changes and appropriate documentation.

Changes to ‘Non-required systems’ connected to NTFAST need to comply with AS1670.1 as a condition of connection to NTFAST and the appropriate documentation.

As an example changing detectors from smoke to thermal would need Certifier approval and sound reasons, *like location is near kitchen or kitchenette*. The following issues also need to be taken into consideration.

- Maximum spacing between thermals are tighter than for smoke detectors see sections 4 & 5 AS1670.1
- Photoelectric smoke detectors “…shall be installed in all sleeping areas.” refer clause 3.25.1 AS1670.1
- Photoelectric smoke detectors “…shall be installed in all exits, passageways, corridors, hallways or the like” refer clause 3.25.1 AS1670.1
- It is BCA or Fire Engineering required smoke detector between sleeping areas and the rest of an SOU/hotel room (this is a real problem in studio apartments and hotel rooms with kitchenettes that do not have cooking exhaust extraction systems)

5 – **NTFRS position on Alterations to existing installations** is that of AS1670.1 and 3.4 is the clause needed to be applied. It requires that “alterations to existing installations shall be thoroughly designed, installed and tested……” any thoroughly designed installation shall be to AS1670.1 and clause 3.25.1 is the starting point for detector selection/location. Clause 3.25.1 requires that detection be provided throughout all areas of the building except where the BCA deems otherwise, this same clause specifies photoelectric smoke detectors “……shall be installed in all sleeping areas.” Also “……shall be installed in all exits, passageways, corridors, hallways, or the like, that are part of a path of travel to an exit.”

Appendix. A - **GUIDANCE FOR THE SELECTION OF DETECTORS**
States “The fire detection and alarm system should operate before the escape routes become smoke logged to such an extent that occupants will have difficulty finding their way out of the building” and gives recommendations of the selection of detectors and list typical areas, including suggested detection devices.

6 – **The two different warning systems BOWS and EWIS** that are installed along with or as part of an AS1670.1: Fire

**BOWS** – Building Occupant Warning System is the standard warning system of AS1670.1 and is covered by clause 3.22 this type of warning shall go straight into evacuation tone only (see section 17), maybe by electronic sounders, or amplified sound system (with or without verbal message).

**EWIS** – Emergency Warning & Intercommunication System is the warning system / equipment installed in building over 25m and other BCA required classes of buildings are covered in AS1670.4: Section 4 Sound systems and Section 5 Intercom systems. Most easily identified by the Warden Intercom Point (WIP) handsets (red phones).

This type of occupant warning system involves a sequence of escalating stages. Upon alarm activation the system goes through alert tone first (from 0 up to 10 min
see AS1670.4 C4.3.3) throughout the whole building (alert gives signal for fire / floor wardens to man their WIPs), after a period usually around 2 min though. The systems sequence and times may be specifically designed by a Fire Engineer or the Buildings Emergency Management Plan. The Cascaded sequences are based around the required stairwell pressurisations ability to maintain the required positive pressure that allows for only three levels with open doors, the following is the most common sequence. Fire alarm initiates alert tone to all floors/areas (allowing wardens to man their WIPs). After the first prescribed time period system escalates so that the alarm floor goes into evacuation after a further period shall escalate again so that 2 floors above and 1 below the fire floor go into evacuation this should continue 2 up 1 down after each further periods until all floors are in evacuation EWIS allows for trained chief warden to take control of the evacuation and even stop it should a warden investigation find that a false alarm has occurred - they just can’t touch the FIP or FIP section of a combined panel.

7 – **Wiring of BOWS circuits** are all required to be monitored 3.22 “(a).....The fire alarm system shall monitor the sound system for fault signals required by AS 1670.4.” “The signal path to electronic sounders or speakers shall be supervised for open and short circuit conditions.” Where new additions of sounders or speakers are installed fault monitoring will be witnessed at inspection (see section 12). For new works connected to an old FIP (non monitored output) wiring shall be done so that monitoring could be achieved when the FIP is upgraded i.e. a daisy chain is maintained or circuit runs all the way back to the FIP (no star connections in field wiring) the required “as installed” drawing shall show the sounder/s or speaker/s to which new additions are connected.

8 – **Maintenance and testing** for fire detection systems in the NT is required to AS1851.8 – 1987 and Supplement 1 - 1990 and not the 2005 release, the BCA references this required standard and other maintenance standards in Appendix I - Northern Territory specific section.

9 – **Guards on detectors**, AS1670.1 clause 3.25.1 requires that the location of a detector be such that (b)“A clear space of at least 300 mm radius, to a depth of 600 mm, shall be maintained from the detector or sampling point.” (c) “Indicators shall be visible from the path of normal entry to the area.” The following is advice regarding guards over detectors from CSIRO ActivFire one of the main conformity testing body in Australia for detectors.

1. Currently smoke detectors are evaluated/verified and certified to the conformance requirements of AS 1603.2 or AS 7240.7 (Australian detector standards).
2. The technical requirements and test methods of Australian detector standards differ to those applied by US agencies such as UL (Standard for Safety UL 268).
3. Consequently, with reference to the “Damage Stopper”, US evaluations (testing and results) do not correlate with the requirements Australian detector standards.
4. Were certification sought for the “Damage Stopper”, each specified smoke detector proposed for fitment with the device would need to be evaluated to the relevant sensitivity test methods of Australian detector standards to verify...
that the “entry impedance” of the “stopper” did not result in detection of smoke at a level less than the minimum requirements of the standards.

10 – **Class of building.** AS1670.1 clause 3.25.1 allows that the BCA (NCC) overrules it when it comes to certain classes of buildings see Spec E2.2a for full details, the most common is clause 2 allows for smoke alarms or detectors systems or a combination.

"4(c) In a Class 2 or 3 building or Class 4 part of a building smoke detectors must be installed—

(i) within each sole-occupancy unit, located in accordance with the requirements for smoke alarms in Clause 3(c)(i) [smoke alarm locations]; and

(ii) in a building not protected with a sprinkler system, in public corridors and other internal public spaces.”

11 – **Sloping ceiling surfaces & roofs.** AS1670.1 clauses 4.1.3 and 5.1.3 covers the requirements for heat and smoke detectors respectively. Both require that “detectors shall be installed between 500mm and 1500mm from the apex...” Planning detection zone layout shall best be achieved by start with the initial at the correct distance from apex and spacing appropriately from this row. Clause 1.4.25 defines Sloping surfaces as “Any surface, roof or ceiling with a slope greater than 1 in 20.”

Clause 4.1.1 requires that heat detector sensing element be between 15mm and 100mm of ceiling or roof where roof purlins inhibit free flow of heat detector may be installed on underside of purlins provided the element is less than 350mm below roof.

Clause 5.1.1 requires that the opening to the sensing element for ceiling-mounted point-type detectors shall be not less than 25mm and normally not more than 300mm below the ceiling, roof or apex.

12 – **High concealed and roof space detection.** The NTFRS position on this these detectors is that full AS1670.1 requirements still apply and there is no exemption to the application for this required detection from clause 3.25.1 (b); A clear space of at least 300mm radius, to a depth of 600m, shall be maintained from the detector or sampling point. This includes any bracket and cabling (loop, circuit and remote indicator) associated with the detector.

and 4.1.1; Each detector shall be installed so that no part of the sensing element is less than 15mm or more than 100mm below the ceiling or roof. Where roof purlins inhibit the free flow of heat to the detector, the detector may be installed on the purlin provided the sensing element is no further than 350mm from the roof. This requires that detectors be mounted on the roof/ceiling (often done by attaching to detector to mesh/chicken wire) or alternatively screwed to the under side of roof purlins the most usual approach.

Below is one bracket arrangement that complies with all AS1670.1 requirements that can be lower to ceiling grid or a required clause 3.25.4.1 Access for maintenance point for replacement/servicing works.
Materials used in above photo available from hardware store
1 – Carinya MABA6221 Make-a-bracket Angle 20x20x600 long (1mm)
   (Cut in half 300mm minimum required)
2 – Carinya MA 0019 Make-a-bracket bracket 100x100x20 2mm thick
   (straightened to 135°)
3 – 2 pop rivets 4.8 mm (joining items 1&2 through last 2 holes)
4 – Zenith WLB0420 50mm 14mm diameter eye bolts
   (extra nuts and washers)
5 – 2mm wire rope galvanised (laced through holes in brackets and looped
   through eye bolts as per below diagram)
13 – Services in fire-isolated stairways, passageways and ramps. BCA D2.7 limits types of services that can be installed required fire-isolated exits. **Installed detection wiring** AS1670.1 clause 3.24.1 requires wiring to AS/ACIF S009 requirements who’s clause 16.5 (c) prohibits to use flame-propagating conduit and fitting as per AS/NZS 2053.1 therefore steel conduit and fittings are permitted. **Installed Lighting** and other electrical services as allowed by BCA D2.7 are prohibited by clauses 1.5.12 & 3.9.9.3 (c) of AS/NZS 3000 to use equipment that contributes to or propagate a fire, therefore steel conduit and fittings required.

Example full metal batten with metal grill and surface steel conduit (no PVC) **AS/NZS 2053.1 section 11 RESISTANCE TO BURNING**

Metal conduits and fittings are classified as non-flame propagating and need not be tested. Non-metal and composite conduits and fittings may be classified as non-flame propagating, if they pass the test of Appendix E.”

14 – Fire Indicator Panel location shall comply with all the various requirements of Section 3.9 AS1670.1 some of points you need to be clear on are it shall.

1 – Be within the designated building entry point or fire control room (c 3.9.1 in full) an FIP remote from the designated building entry point shall have a mimic panel, repeater panel or fire brigade panel installed at the designated building entry point (c3.9.3)

2 – Full clearance shall be maintained even with covering doors (c 3.9.4 & fig 3.1).

3 – Covering door/s shall have the ‘FIRE PANEL’ label at 50 mm letter size and a means of overcoming any sound level attenuation by this door/s and not be lockable (c3.9.2)
19. UNWANTED ALARMS

There is a load of information regarding what the subscriber needs to follow for the waiver process on the website [www.fire.nt.gov.au](http://www.fire.nt.gov.au). Beyond that is information on what fire contractors can do to help subscriber with a waiver application.

First and foremost fire contractor and tester need to read and understand the section 9 part titled 'WORKING ON SITE / SYSTEM IMPAIRMENTS/FIP REPLACEMENTS', following these instructional best practises will ensure that fire contractors themselves never create an unwanted alarm.

Some unwanted alarms will always be a fact of life for the NTFRS though Fire Contractors can have a large influence in reducing them. Since the introduction of unwanted alarm charges the NTFRS has seen some substantial reduction in number from sites that have put the effort into reducing them.

All detectors have a limited life which greatly influenced by the environmental condition of their installation, most manufacturer nominate 10 year of in service life as a maximum. Once you have an alarm in an area NTFRS data shows others often follow this may be in the range of a few weeks to some months.
What is often overlooked is what AS1851.8 requires also as part of annual testing, see below extracts

3.3(b) Visually inspect all detectors and sampling points for any condition which is likely to adversely affect their operation, such as excessive deposition of dust or coating of paint.

3.3(d) Detectors and sampling points that fail to operate shall be clearly marked and reported in the logbook.

NOTE: Depending on the environment detectors and filters in sampling systems may require cleaning or replacement at periodic intervals.

3.3(l) Record the results of all yearly maintenance procedures in the logbooks, including details of detectors and sampling points that do not pass the visual inspection or fail to operate satisfactorily, and notify the owner or his agent of any deficiencies within the installation.

This is where the Fire Contractor can be of value to your client and the NTFRS.

The unwanted alarm waiver process – through the waiver committee looks for evidence of a mitigation strategy of your client for reducing future alarms, especially for activation without apparent cause, the NTFRS knows this is usually due to aged or dirty detectors.

Waivers requested based on the replacement of the detector that caused the unwanted alarm with the claim of testing to the required standard will not fly as a mitigation strategy.

Waivers requested with evidence of the fire contractor’s attendances relatively promptly to replace the offending detector and reinstate the system followed with replacement of some others in the zone or area of similar condition that is their age or physical condition. For ant/insect or gecko infestations the application of pest control measures, sealing cable entry holes, etc. (*Ant powder on the back of detector before reseating keeps both ants and geckos at bay.*)

The mitigation works have a 30 day window from receipt of unwanted alarm charges being sent out to submit a request for waiver.

In general when waiver committee has received request for waiver showing evidence in the form of a Fire contractor invoice/s related to the AFA that also includes details of mitigation works a waiver has been granted.