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PFAS Preliminary Site Investigation: RNZAF Base Ohakea

New Zealand Defence Force

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PFAS Preliminary Site Investigation: RNZAF Base Ohakea

Prepared for

New Zealand Defence Force

June 2017

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Limitations:

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Executive Summary

A preliminary site investigation has been undertaken at the Royal New Zealand Air Force (RNZAF) Base Ohakea, to assess the potential for soil and groundwater contamination resulting from current and historic use of products containing per- and poly-fluoroalkyl substances (PFAS).

The investigation has involved a review of historical aerial photographs, Council files, information provided by New Zealand Defence Force (NZDF), interviews with site personnel and a site visit. The main findings are presented below:

- The major source of PFAS at Base Ohakea is aqueous film forming foam (AFFF) used for firefighting. The AFFF used and stored on base for firefighting is primarily Angus Tridol-S. NZDF has confirmed that Tridol-S does contain PFAS including perfluorooctanoic acid (PFOA) (laboratory analysis indicates Tridol-S does not contain perfluorooctanesulfonic acid (PFOS)).
- Historical firefighting training using AFFF at various locations around the site has been identified as the primary source of potential PFAS related contamination. A number of high-use areas have been identified in this investigation where firefighting foam was used in training exercises on a monthly basis. Since 2016, training using Tridol-S AFFF has been undertaken at only one location, the Fire Training Area (FTA).
- The wash down and flushing of fire truck foam system equipment at the Fire Flight complex has been identified as a potential source of AFFF release to stormwater. Wash down and flushing occurred after every training and/or incident in which foam was used and as such this may represent an important source occurring over an extended period of time. Wash water (and residual foam) was collected on a surface of concrete slabs and directed via stormwater sumps to the stormwater network.
- The AFFF used in the hangar deluge systems is understood to be a mix of Ansulite AFC-5A 3% and Ansulite AFC-3MS-C 3%. Ansulite AFC-3MS-C foam has been formulated to contain shorter carbon chain (C6) molecules and does not contain the longer chain C8 compounds PFOS and PFOA. It is understood NZDF are transitioning to this C6 formulation. The Ansulite AFC-5A foam is not a C6 formulation foam, therefore a mix of the two foams will contain C8 compounds.
- AFFF released from the hangar deluge systems (either via un-commanded releases or during the periodic operational testing of the system), may have resulted in the release of PFAS to stormwater and consequent discharge off site. Anecdotal evidence suggests that the diversion system in place designed to collect any AFFF released during an activation of the

deluge system in 1, 2 or 3 Hangars, has not been working as intended. This is either due to leaking at the diversion tank and/or leaks in the stormwater network. There is no indication that the deluge system, cut-off drains and retention pond associated with 3 Squadron Hangar are not working as designed.

- Approximately 14,500 L of Ansulite AFC-5A 3% and Ansulite AFC-3MS-C 3% AFFF is currently stored within the four hangar deluge systems installed at Base Ohakea.
- Approximately 2,000 L of Tridol-S AFFF (stored in two 1,000 L intermediate bulk containers (IBC)) is currently stored within secondary containment at the Fire Flight building. Additional bulk storage of 5,000 L of Tridol-S, Ansulite AFC-5A 3% and Ansulite AFC-3MS-C 3% AFFF is currently stored in IBCs near the incinerator, in an area without adequate secondary containment.
- Based on the current information there is no evidence of other significant sources of PFAS-containing products on site. However, it is acknowledged that although the safety data sheets and manufacturers websites have been consulted, the exact list of ingredients of the hydraulic fluids used on site has not been able to be confirmed. In addition, two historic landfills are located on Base, and although there is currently no evidence to indicate PFAS products have been disposed of at these locations, this cannot be ruled out.
- As result of this investigation, twenty new areas (mostly PFAS specific) have been added to the NZDF Hazardous Activities and Industries List (HAIL) database.

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1.0 Introduction

Pattle Delamore Partners Ltd (PDP) has been engaged by the New Zealand Defence Force (NZDF) to undertake a preliminary site investigation to investigate the potential for soil and groundwater contamination relating to the use of per- and poly-fluoroalkyl substances (PFAS) at the Royal New Zealand Air Force (RNZAF) Base Ohakea (the 'site').

This report provides the detail of the site history information review and a risk assessment in the form of a conceptual site model for the site. The investigation activities and this report have been undertaken in accordance with *'Reporting Templates for Per and poly-fluoroalkyl Substances (PFAS) Investigations on the New Zealand Defence Force Estate'* (PDP, 2016), and in general accordance with the Ministry for the Environment (MfE) *'Contaminated Land Management Guideline No. 1 – Reporting on Contaminated Sites in New Zealand'* (MfE, 2011a), and *'Contaminated Land Management Guideline No. 5 – Site Investigation and Analysis of Soils'* (MfE, 2011b). This report has been prepared under the guidance of, and approved by, a suitably qualified and experienced practitioner (SQEP).

1.1 Objectives

The key project objectives for the investigation were as follows:

- Investigate the history of the site to identify potential sources of, and approximate areas of, contamination relating to PFAS.
- Develop a site wide conceptual site model to help inform future sampling investigations.
- Update the existing hazardous activities and industries list (HAIL) database for the site with the PFAS specific information identified in the site investigation.

1.2 Scope

The scope of work undertaken to achieve the project objectives was as follows:

- Obtain and review readily available information regarding the historical and current uses of the site. The tasks undertaken included:
  - Reviewing information provided by NZDF: historical plans, photographs, environmental reports, incident database records, stormwater as-builts and records of chemicals used stored and disposed of on site (either historically or currently);
  - Reviewing available historical aerial photographs;
  - Reviewing information provided by Manawatu District Council (MDC) as part of a land information memorandum and by Horizons Regional Council (HRC) as part of a contaminated sites enquiry;

- Site inspection by a PDP Geologist;
- Conducting interviews with relevant NZDF personnel and contractors.

- Produce a report detailing the results of the information review and site investigation tasks.

The fire training area (FTA) in the southwest of the site has previously been investigated (PDP, 2015a; PDP, 2015b) and was therefore not included in the current investigation.

Further details on the tasks carried out as part of this scope of works are provided below.

2.0 Site Description

The site is comprised of multiple lots as described in Table 1.

Table 1: Site Description

Legal Description [1]	PT LOTS 1 2 3 DP 7831 LOT 2 DP 12916 LOT 1 DP 4923 LOT 1 DP 14231 SEC 1 SO 495094 LOT 1 DP 21753 SECS 45 57 58 62 64 73-75 PT SECS 2 12 19 20 49 53 55 56 77 CLSD RDS BLK XV RANGITOTO SD (so 3270 20977)

Notes:
1. *Manawatu District Council GIS viewer accessed February 2017 (http://maps.mdc.govt.nz/IntraMaps80/default.htm).*

The site consists of approximately 426 ha of land and is zoned Rural 2 and is designated for Defence Purposes (Aerodrome and Sewage Treatment) under the Manawatu District Plan (operative 2002).

The area surrounding the site is comprised of agricultural and rural residential land uses. Figure 1 shows the location of the site and the key features of Base Ohakea. Figure 2 shows the HAIL areas where PFAS has been used, stored or disposed of identified through this investigation.

2.1 Site Layout

Base Ohakea is a large, operating airforce base with onsite residential dwellings (for adults and children) alongside the buildings and infrastructure associated with the airfield. The majority of the site is composed of the runways and the associated open grassed areas and accessways for aircraft (Figure 1). Located at the edge of the runaway apron to the north are various structures associated with the airbase operations including three large aircraft hangars, the fire flight

complex, the airport terminal and the motor transport yard and fuel tanker storage bay.

In the east of the site is another large aircraft hangar associated with the No. 3 Squadron (SQN) hangar, and the MSS maintenance and repair complex. The bulk fuel storage site is located to the north of No. 3 SQN hangar.

In the north of the site are numerous buildings including offices, residential dwellings for site personnel, recreational facilities and maintenance yards.

Two closed landfills are located on-site, north and west of the runway respectively.

The sewage treatment plant (STP) is located northwest of the main base, between the Base and the Rangitikei River.

2.2 Geology and Hydrogeology

The Geological Map of the Taranaki Area (Townsend et al., 2008) indicates that the site is underlain by Late Pleistocene river deposits; poorly to moderately sorted gravel with minor sand and silt underlying terraces and includes minor fan deposits and loess.

Regional groundwater flow direction is expected to be in a west to southwest direction towards the Rangitikei River and the west coast. Close to the Rangitikei River, local groundwater will be primarily influenced by the river and therefore flow direction is inferred to be towards the Rangitikei River. Therefore local groundwater flow will vary over the site, with a more northwest flow direction inferred in the north of the site and a more west and southwest flow direction inferred in the south of the site.

Investigative boreholes drilled on site, show variable shallow groundwater level across the Base. In the south at the fire training area groundwater was found to be approximately 7 metres below ground level (m bgl). In the north of the site at the bulk fuel farm, previous drilling investigations by GHD and Tonkin & Taylor (T&T) indicated a shallow groundwater layer at 1.1 to 2.9 m bgl (GHD, 2009; T&T, 2014).

Based on the geology, it is possible that variations in groundwater level may be due to discontinuous lenses of low permeability silt and clay layers acting as an aquitard beneath coarser sand and gravel layers.

A groundwater bore search was requested from HRC to determine the number and location of bores within a 3 km radius of the centre of the site. The results of this search are appended (Appendix A).

Many of the bores contained in the HRC database do not have a use listed. For those that do, the primary use in the surrounding area is for stockwater and irrigation, with some use for potable supply. The potable supply for Base Ohakea comes from a shallow bore (11 m deep) located north of the base near the

Rangitikei River (Bore ID 313081, Figure 1). Previous testing of this bore (for an extended suite of 17 PFAS, including PFOS, PFOA, 6:2 FTS and PFHxS) reported PFAS at concentrations substantially below the US EPA (2012) provisional drinking water guidelines (PDP, 2015b) and the updated US EPA (2016) Drinking Water Health Advisory levels. A deeper bore (160 m deep) is located within the site and is used for non-potable supply, in particular for the sprinkler systems (Bore ID 323879, Figure 1). Previous testing of this bore did not identify PFAS above the level of detection (note the limit of detection is lower than the guidelines discussed above).

2.2.1 Sensitivity of the Underlying Aquifer

The sensitivity of the underlying aquifer was assessed in accordance with Section 5.2.3 of the MfE (2011c) guidelines:

- The shallow aquifer beneath the site is not artesian;
- The depth to the first water bearing unit is less than 10 m below the potential contaminant source; and,
- There are records of shallow aquifer use in the vicinity of the site.

In accordance with the guidelines the shallow groundwater is considered to be sensitive with respect to groundwater use. The highly permeable soil supports defining the aquifer as sensitive, as contaminants can easily infiltrate the groundwater table below. Furthermore, PFAS are highly soluble and very mobile so that a plume of PFAS can readily develop in the aquifer, extending away from the source.

2.3 Topography and Hydrology

The regional topography near the Rangitikei River is dominated by a succession of paleo river terraces that step down to the current level of the river. Being located on one of these terraces, the majority of the site is flat; except in the north west of the site where the land slopes steeply to the lower river terrace approximately 8 m below.

The Rangitikei River is approximately 350 m from the northern boundary of the site. The river curves around the location of the Base to be 1 km west of the western boundary of the site. The Makowhai Stream runs along the eastern boundary of the site, eventually discharging to the Rangitikei River. Numerous open drainage ditches run through the airbase, particularly alongside the runways. In the south of the site these drainage ditches discharge in to the Makowhai Stream (see Section 3.3).

3.0 Site Information Review

3.1 Historical Aerial Photographs

A review of the historical and current aerial photographs provided by NZDF and a photograph by LINZ was undertaken and is presented below. It is noted that the electronic versions of the photographs were reviewed, allowing for a greater level of detail to be observed than is evident in the printed versions.

The following aerial photographs were reviewed: 1942, 1958, 1968, 1995, 2010 – 2011. The information obtained from review aerial photographs was limited and therefore, in consultation with NZDF, no further aerial photographs were obtained or reviewed.

Table 2: Historical Aerial Review

1942 Aerial (NZDF)

The 1942 aerial is limited to the north eastern half of the site. In the north, 3 Hangar and 4 Hangar (HL_78_OHA) can be seen along with the barracks and the residential dwellings. The western and northern sections of the runway are present and construction of the southern portion is underway. There are a series of buildings and constructions in the east of the site, near the current location of the bulk fuel farm and the No 3 SQN Hangar. The surrounding land use is agricultural with a number of associated rural residential dwellings.

1958 Aerial (NZDF)

Both the east-west and north-south runways are complete and the south western perimeter road is visible. In the north west of the site the hangars, barracks and residential housing are present, however the building currently housing Fire Flight has not been constructed. Some additional buildings have been constructed in this area since the 1942 aerial, including development of the current contractor's yard. The explosive store houses in the north west of the site are present. There is bare earth visible at the confidence course landfill; however it cannot be confirmed if landfilling is occurring. The rifle range landfill is not evident. The buildings and structures in the north east of the site near SH1 have been removed with the exception of a small complex near the main entrance. It appears that the concrete diversion tank is present; however, this cannot be confirmed due to the quality of the photograph. The old incinerator has not been constructed yet and the FTA in the south west is not present. The waste water treatment plant in the north west of the site has not yet been constructed.

The surrounding land use remains relatively unchanged.

1968 Aerial (NZDF)

In the north of the site, the 1968 aerial is relatively unchanged from the 1958 aerial with the majority of the buildings remaining the same. The Fire Flight building is not present. The diversion tank is present and the incinerator has now been constructed. There is a large circular paved pad in the northwest open area of the runway. This may be used for testing aircraft engines as there is an aircraft on the pad and what appears to be scorch marks on the grassed area around the pad. The grassed area near the incinerator (close to the location of the current gymnasium) is being used to park large 4 engine aeroplanes. There are some construction/earthworks occurring near the eastern end of the rifle range landfill, however the landfill is not present and the area appears to be grassed. There is now a building/structure present at the FTA in the southwest of the site. The waste water treatment plant in the north west of the site is present.

The surrounding land use remains relatively unchanged.

1995 Aerial (NZDF)

In the 1995 aerial the bulk fuel farm is visible in the north east of the site. In the south east of the site there is a small collection of buildings along the perimeter road near the FTA. The Fire Flight complex is now constructed adjacent to the control tower. There are significant earthworks in the vicinity of the rifle range landfill as well as a number of buildings and structures. In the vicinity of the engine run-up pit and the historic incinerator, there are 3 or 4 structures. There appears to be a blackened zone around one of the structures, although the quality of the photograph makes it difficult to determine if this is due to fire training or the incinerator. In the north of the site the majority of the buildings are unchanged from the 1968 aerial. The confidence course landfill is grassed and there is a carpark at the north end. Owing to the poor quality of the photo it is not possible to identify the burn pit that was thought to exist during the late 1980's and early 1990's (see section 3.4.3).

The surrounding land use remains relatively unchanged.

2010-2011 Aerial (LINZ data service)

The 2010/2011 aerial shows the majority of the site much as it is today. In the south west of the site the perimeter road layout has changed so that is runs past the FTA which is now present. The No 3 SQN hangar in the north east of the site has been constructed. The construction of the MSS workshop, helicopter simulator and paint shop has begun, but the buildings are not yet finished. The new Air Movements terminal has not yet been built and 4 Hangar is still present in this location. The gymnasium is present near the incinerator. In the west of the site the rifle range landfill is now a rifle range. Nearby to this, the engine run-up pit has been constructed and there is no evidence of the incinerator that was present in the 1995 aerial.

The surrounding land use remains relatively unchanged.

3.2 Council Property Files

The Land Information Memorandum (LIM) report was obtained from Manawatu District Council. The LIM contained information on consents and permits that were approved for the site. The relevant information is summarised below and is appended (Appendix B).

Number 124976

A building consent was issued on 19/10/2015 to install a sprinkler system to a relocated office inside 3 Hangar. There is no indication that this is an AFFF system.

Number 124299

A building consent was issued on 23/06/2014 for alterations to 1 Hangar. There is no direct reference to the installation of the deluge system.

Number 121333

A building consent was issued on 18/01/2011 for the construction of a new workshop to provide maintenance to the No 3 Squadron Helicopter Fleet (No 3 SQN Hangar) and construction of an aircraft finishing building. There is no direct reference to the installation of the deluge system.

Number 112972

A building consent was issued on 20/03/2003 for alterations to upgrade the fire protection for 2 Hangar and 3 Hangar. There is no direct reference to the installation of the deluge system or the AFFF retention pond.

Number 111119

A building consent was issued on 15/06/2001 for the construction of a concrete slab and drainage. The proposed use is listed as fire training slab and interceptor. There is no indication of the specific location of this structure on the site.

There are two earlier consents that relate to fire water storage tanks and pump room for a sprinkler system, however these are from 2000 (Number 110540) and 1994 (Number 101074), which is known to be prior to the installation of the AFFF hangar deluge systems.

Horizons Regional Council (HRC) was approached for a contaminated site enquiry for Base Ohakea. The enquiry returned the following three entries relating to the Hazardous Activities and Industries List (HAIL (MfE, 2011d):

1) Pukenui Road – HAIL category A2 chemical manufacture, formulation or bulk storage. This is understood to be a site wide category for the bulk storage of chemicals at numerous localities within Base Ohakea.

2) Pukenui Road – HAIL category C3 Training Area Montgomery Watson report dated 27/04/01 Serco Yard (report not seen by PDP). This site

(located in the Contractors Yard in the north west of Base Ohakea) was used as a storage area for drums of coal tar for approximately 28 years until April 2001. As a result of this land use, a volume of waste tar and contaminated soil was removed from the site. The risks to human health and the environment posed by this site are minimal and the site is suitable for commercial/industrial use.

3) Raumai Road – HAIL category C3 training area. RNZAF Base Ohakea - Confidence Course Landfill (S23:122-095), 25m Range Landfill (S23:116-085), Fire Training Facility (S23:130-076), Former Dangerous Goods Store - Serco Yard (S23:125-096), Former Flammable Goods Storage Area - Serco Yard (S23:120-090), Former Coal Tar Storage Area - Serco Yard (S23:125-096), Raumai Air Weapons Range (S23:976-099).

3.3 Previous Environmental Investigations

The NZDF provided three historical site investigations undertaken within the site. The relevant sections of these reports are summarised below:

Assessment of Environmental Effects for Base Ohakea: Discharge of Stormwater, Discharge of Waste Water (URS, 2009)

- Stormwater is discharged off site at 4 locations:
  1) An open farm drain situated across Tangimoana Road directly north of Base Ohakea;
  2) An open farm drain situated to the west of Base Ohakea;
  3) The Ohakea Drain, which runs alongside Frecklington Road to the south of Base Ohakea;
  4) Makowai Stream at the southeast corner of Base Ohakea.

NZDF Hail Investigation Report (GHD, 2014)

- The report identifies nine HAIL activities specifically related to fire training and AFFF storage and use (these are shown on Figure 2, along with additional HAIL areas further discussed in Section 3.4.3). Four of these relate to the hangar deluge systems in 2 and 3 Hangar and No 3 SQN Hangar, including the retention pond used for the release of AFFF from the No 3 SQN Hangar deluge system; these are listed as low to high priority. Two activities are fire training areas (one of which is the FTA previously investigated by PDP); these are both listed as a high priority. One HAIL activity is the storage of equipment used for firefighting which the report states may have resulted in the potential presence of AFFF; this is listed as a low priority. The final two HAIL activities are a waste water sump and the stormwater system in the vicinity of 2 Hangar and relate to an accidental release of AFFF from the deluge system which is

believed to have drained into the stormwater and/or waste water system; these are listed as a high priority.

Ohakea Bulk Fuel Storage Facility – Groundwater Monitoring: PFCs (T&T, 2015)

- One groundwater sample was collected from the up gradient well (BHC, Bore ID 323139, Figure 1) at the bulk fuel storage site and analysed for an extended suite of 17 PFAS. Limits of reporting ranged from 0.5 to 3.0 ng/L. The sample results of this investigation are provided in Appendix C.
- Several PFAS compounds were detected in the sample including PFOS which, for context, was reported at a concentration above the US EPA's preliminary health advisory for drinking water (2012) of 200 ng/L (0.2 ug/L).
- The report recommended additional testing of samples from other wells around the bulk fuel farm as well as investigation into potential sources of PFAS.

Contaminated Site Investigation: RNZAF Base Ohakea Fire Training Area Detailed Site Investigation (PDP, 2015b)

- A work programme of hand augering, test pitting, soil sampling, monitoring well installation and water sampling was undertaken at the FTA located in the southwest of the site (Figure 1).
- Samples were analysed for a range of contaminants including PFAS. Soil samples were found to contain PFAS concentrations below applicable guidelines. These guidelines are designed to protect against human exposure to soil. The guidelines are not protective for leaching into groundwater. Soil concentrations would need to be significantly lower than the soil guidelines (potentially 100-fold lower) to protect against concentrations in groundwater above the drinking water guidelines (Therese Manning, EnRiskS, pers. comm. 10/05/17). At present there are no widely accepted, applicable soil guidelines that are protective for leaching into groundwater.
- Groundwater samples from the four on-site monitoring wells installed during this phase of work contained PFAS concentrations that exceeded the US EPA (2012) provisional drinking water criteria (bore locations are shown on Figure 1). The concentration of PFOS ranged from 0.57 ug/L to 6.56 ug/L, the concentration of PFOA ranged from 0.24 ug/L to 2.39 ug/L and the concentration of Perfluorohexane sulfonate (PFHxS) ranged from 0.13 ug/L to 3.28 ug/L. The sample results of this investigation are provided in Appendix C. A comparison of the results with the updated US EPA (2016) Drinking Water Health Advisory does not change the findings from the report.

- [s. 9(2)(a), 9(2)(b)(ii) and 9(2)(ba)(i)]

- Samples collected from the Base Ohakea drinking supply well (Bore ID 313081) were found to contain PFAS at very low concentrations, substantially below the US EPA (2012) provisional drinking water criteria (and the US EPA (2016) Drinking Water Health Advisory).
- Concentrations of PFAS were detected in stormwater in drains to the east and west of the FTA, and in the Makowhai Stream, at levels that were below the applicable guidelines for ecological receptors. An updated comparison of the results with the draft Australian and New Zealand Water Quality Guidelines (2016) indicates samples collected from the stormwater system comply with the 90% species protection guideline, and the sample from the Makowhai Stream complies with the 95% species protection guideline. These guidelines are designed to protect against direct toxicity to aquatic organisms, the guidelines do not protect against bioaccumulation or secondary toxicity (through food consumption). Whilst there are no widely accepted guidelines designed specifically to protect against bioaccumulation or secondary toxicity such guidelines would be more conservative than those which protect against direct toxicity (such as ANZECC).
- The conceptual site model identified potentially complete pathways for direct contact with PFAS residues via surface soils, surface runoff into surface water bodies, migration off-site via groundwater and abstraction of groundwater from off-site wells. However, an environmental and human health risk assessment concluded that the current risk to all receptors from the PFAS chemical concentrations that were measured in soil, groundwater and surface water was low.
- When the sample results are compared to the recently released Australian Department of Health *Health Based Guidance Values for PFAS for Use in Site Investigations in Australia* (DoH, 2017), [s. 9(2)(a), 9(2)(b)(ii) and 9(2)(ba)(i)] In the New Zealand regulatory framework these guidelines are not currently endorsed by the Ministry of Health as NZ drinking water standards, therefore this comparison is provided as a reference only. [s. 9(2)(a), 9(2)(b)(ii) and 9(2)(ba)(i)]

Ohakea Bulk Fuel Storage Facility – Groundwater Monitoring Report (T&T, 2016)

- Well logs indicate alluvial gravels to a depth of approximately 5 m, underlain by silts and clays. A perched groundwater layer is present at 1 – 1.6 m bgl within the gravel.
- Groundwater flow direction beneath the bulk fuel storage facility was reported to be in a northwest direction (towards the Rangitikei River).

3.4 Information Provided by New Zealand Defence Force

3.4.1 Staff and Contractor Interviews

Prior to the site visit by PDP staff, a series of questionnaires were provided to key personnel from the Fire Flight, Facilities Maintenance, aircraft maintenance and contractors who may have, or currently do use, store or dispose of PFAS containing products.

Collection of the completed questionnaires and additional interviews were undertaken by PDP staff during the site visit on 8 and 9 March 2017. The people interviewed for this report are listed in Table 3.

Table 3: NZDF Personnel and Contractors Interviewed

Name	Position	Unit / Company
[s. 9(2)(a)]	Base Firemaster Ohakea RFS	Fire Flight
[s. 9(2)(a)]	Watch Room Operator	Fire Flight
[s. 9(2)(a)]	Blue Shift Leader Ohakea RFS	Fire Flight
[s. 9(2)(a)]	Site Supervisor	Facilities Management
[s. 9(2)(a)]	Delivery Manager	Facilities Management
[s. 9(2)(a)]	Fleet Support Manager B200	Hawker Pacific NZ Ltd
[s. 9(2)(a)]	Maintenance Support	No 3 Squadron
[s. 9(2)(a)]	FSO(T)	Directorate of Operating Airworthiness
[s. 9(2)(a)]	Environment & Sustainability Manager	Spotless
[s. 9(2)(a)]	Maintenance Support Squadron Warrant Officer	Maintenance Support Squadron
[s. 9(2)(a)]	Base Safety Advisor	Directorate of Air Force Safety and Health
[s. 9(2)(a)]	Manager, Non-Aero Repairs & Disposals	Defence Logistics Command
[s. 9(2)(a)]	Manager, Program Management	Beechcraft Defence
[s. 9(2)(a)]	SNOIC Aviation Fuel	Aviation Fuel Flight
[s. 9(2)(a)]	Technical Support	Directorate of Continued Airworthiness Management
[s. 9(2)(a)]	SEQ1C – Technical Services	Armoury, Directorate of Continued Airworthiness Management

A summary of the key findings from the interviews, site walkover and information provided by NZDF and contractors, is provided below. The completed questionnaires and transcripts of the interviews conducted on site are provided in Appendix D. The responses to the questionnaires were completed by each individual and have not been edited. Site photographs are provided in Appendix E.

3.4.2 Identification of HAIL Sites

Each PFAS specific HAIL site identified through this PSI or prior investigations has been given a unique code in accordance with the *NZDF HAIL Investigation Report & GIS Specifications* (PDP, 2016), e.g. HL_88_OHA Fire training, these are shown on Figure 2.

3.4.3 Firefighting Training and Storage of AFFF

- The main use of PFAS containing products at the site is Angus Tridol-S AFFF used for firefighting. Information supplied by [s. 9(2)(a)] from Chubb New Zealand (Appendix G) states that Chubb, who supply NZDF with AFFF, are transitioning to Ansulite AFC-3MS foam. While this formulation still contains PFAS, these are shorter carbon chain (C6) molecules and therefore do not contain PFOS and PFOA. The Ansulite AFC-5A foam is not a C6 formulation foam.
- Information received from NZDF indicates a total of at least 21,500 L of Tridol-S AFFF is stored on site, however, during the site visit, Ansulite AFC-5A foam and Ansulite AFC-3MS foam were also observed at locations thought to contain only Tridol-S. Based on these site observations and information provided by [s. 9(2)(a)] it is understood that the AFFF used in the hangar deluge systems is Ansulite AFC-5A and Ansulite AFC-3MS, not Tridol-S. Tridol-S is used by Fire Flight. The total volume of AFFF stored in the deluge systems is approximately 14,000 L, however the exact proportion of Ansulite AFC-5A versus the C6 formulated Ansulite AFC-3MS is unknown. The deluge systems are described in more detail in Section 3.4.4 below;
- Other firefighting foams stored at the Fire Flight complex and used on site are Solberg re-healing RF3 Class B foam, as well as the Class A foam Forexpan. Based on the data sheets provided by the manufacturers these foams do not contain PFAS. Information on the firefighting foam used at Base Ohakea is provided in Appendix F.
- Historically, protein based firefighting foam has been stored and used on site. It is currently unknown what brand of protein foam was used and hence whether or not the foam contained PFAS.
- Approximately 5,000 L of AFFF (including Tridol-S, Ansulite AFC-5A and Ansulite AFC-3MS), present in five 1,000 L intermediate bulk containers (IBC), is stored adjacent to the incinerator (HL_126_OHA, Figure 2). This bulk storage does not have any secondary containment and is understood to be for both the Fire Flight and for the replenishment of the hangar deluge systems.

- A further two IBCs potentially containing AFFF are located at the Spotless contractors yard (HL_142_OHA). One of these IBCs is mostly empty; the other is full of an unknown clear liquid with a thick white sediment/sludge in the bottom. The labels on the IBCs list the contents as Ansulite AFC-5A AFFF. [s. 9(2)(a)] eported these have been stored here since the 2012 accidental activation of the 2 Hangar deluge system (Appendix D).
- The three mobile fire vehicles (MFV) (Scania 124C trucks) each hold 800 L of Tridol-S AFFF. Tridol-S used for mobile firefighting purposes is stored at the Fire Flight building in two 1,000 L IBCs within secondary containment (HL_127_OHA). Smaller 20 L containers and hand held fire extinguishers containing Ansulite AFC-5A AFFF are also stored in this location, as well as the Class A and B foams listed above that do not contain PFAS.
- Significant uses of AFFF that have been identified include:
  - Hot fire training in which accelerant was set alight before being extinguished with foam. Currently undertaken using Tridol-S at the FTA (HL_101_OHA), however there is anecdotal evidence of this occurring regularly in the late 1980s and early 1990s at a "burn pit" along the southern perimeter road (HL_64_OHA) and at a location near the run-up pit where a Dakota fuselage was used (HL_138_OHA). This has not been confirmed.
  - Testing of the MFVs foam cannon system. This was carried out monthly and involved activation of the foam cannon for between 3 and 10 seconds. The activity was carried out at multiple locations around the perimeter of the runway (HL_51_OHA; HL_88_OHA; HL_129_OHA; HL_136_OHA; HL_139_OHA; HL_140_OHA; HL_141_OHA Figure 2) and involved driving the vehicle up to the edge of the paved area and firing the foam on to the grass. The foam cannon, or monitor, can direct foam up to a distance of 70 m. A larger foam test was carried out every 6 months. Monthly testing of foam systems was ceased in 2015.
  - On at least one occasion, there is anecdotal evidence (from two Fire Flight officers – refer to Appendix D)) that a foam blanket (approximately 1000 L of PFAS containing foam foam) has been applied within the bunded area of the bulk fuel farm for training (HL_14_OHA). Following application of this blanket the foam was washed through the separator and in to the stormwater system.
  - There is anecdotal evidence (from two Fire Flight officers – refer to Appendix D) that on at least 3 occasions a foam blanket (using PFAS containing foam) was applied at the intersection of the north-south

and west-east runways as a precautionary measure for aircraft landing with a malfunction (e.g. "wheels up" landing) (HL_135_OHA). The aircraft would touch down in the foam blanket to prevent any sparks / ignition.

- At least five confirmed aircraft related incidents have occurred at Ohakea that have involved the use of firefighting foam. Three of the fire incidents used PFAS containing foam. However, at this stage it is unable to be confirmed whether the other two of these incidents involved the use of PFAS containing foam (sites HL_143_OHA and HL_144_OHA).
- Following any incident, fire training or foam testing, the MFVs were washed down and the foam systems were flushed of residual foam. This was typically done in the Fire Flight yard (HL_128_OHA). The area is paved with concrete slabs with all runoff draining to a sump that feeds in to the stormwater system. There are gaps of approximately 2 - 3 cm between the concrete slabs where some seepage of foam chemicals into the ground could occur. There is no separator present. There is no information in the NZDF GIS database relating to the stormwater network in this area; however information provided by [s. 9(2)(a)] (Appendix G) states that the stormwater in this area is directed south to the runway apron before being directed west to the main interceptor. Foam system testing is now conducted at an off-site location and not at Ohakea.

3.4.4 Hangar Deluge Systems

- There is an automatic AFFF cannon deluge system and a foam hose system installed in 2 Hangar (HL_94_OHA) and 3 Hangar (HL_96_OHA), and No. 3 SQN Hangar (HL_102_OHA). There is also a manually operated foam hose system delivered via fire hose in 1 Hangar (HL_103_OHA). Based on information provided by NZDF (email from [s. 9(2)(a)] and [s. 9(2)(a)] dated 14 March 2017, Appendix G) there is 4,921 L of AFFF in the 2 Hangar system and the same amount in the 3 Hangar system. The No. 3 SQN Hangar contains 3,786 L of AFFF and the 1 Hangar system contains 909 L. An email from [s. 9(2)(a)] dated 24 February 2017 indicates the AFFF currently stored in the deluge systems is a mix of Ansulite AFC-5A 3% and Ansulite AFC-3MS-C 3%.
- Associated with the deluge systems, a series of cut-off drains have been installed in each hangar which are designed to capture any discharged foam and direct it to a diversion tank (HL_97_OHA) or, in the case of No 3 SQN Hangar, a retention pond (HL_100_OHA). The current procedure is for this fluid to then be removed and disposed of offsite by Waste Management Technical Services.

- The deluge systems in 2 and 3 Hangar were commissioned in 2004. The deluge system in No. 3 SQN Hangar was installed during construction of the building which was completed in 2011. The manual system in 1 Hangar was installed in 2014.
- Each deluge system was tested for 1 minute upon installation. In addition, for insurance purposes, each system is recommended to be tested every 5 years. At the time of reporting, only the 2 and 3 Hangar systems have been tested for this purpose. The test is required to run for 1 minute. Flow rates used during a 1 minute test are listed below, note these rates are for the 3% AFFF water mix. Based on information from [s. 9(2)(a)] the testing of 2 and 3 Hangars and the No. 3 SQN Hangar systems will use approximately 4,000 L of AFFF (Appendix G):
  - 1 Hangar – manual system 360 L/min
  - 2 Hangar – deluge 11,463 L/min; hose system 500 L/min
  - 3 Hangar – deluge 11,490 L/min; hose system 500 L/min
  - No. 3 SQN Hangar – deluge 10,200 L/min; hose system 480 L/min.
- There have been two recorded accidental activations of the deluge systems, both of which are recorded in the NZDF OHA environmental report database:
  - 3 Hangar (HL_96_OHA), April 2012 – unknown volume of foam discharged from 3 of the 6 cannons. According to environmental report database the foam was collected in the diversion tank and disposed of offsite by Trans Pacific.
  - 2 Hangar (HL_94_OHA), January 2016 - resulted in approximately 100 L of foam being discharged from one cannon on to the hangar floor. Using water, the foam was washed in to the cut-off drains by Fire Flight personnel and collected at diversion tank.
- In addition to the accidental activations, it was reported by [s. 9(2)(a)] (Hawker Pacific – refer to Appendix D) that the foam cannon deluge system in 2 Hangar used to drip fluid from the cannon nozzles requiring buckets to be placed beneath the nozzles. He estimated that each month approximately 4-5 L of fluid was disposed of in to the cut-off drains in the hangar. It is unknown exactly how long this was occurring for.

3.4.5 Stormwater Services

- When the hangar deluge system in 1, 2 or 3 Hangar is activated, a diversion valve automatically closes and diverts all discharge from the cut-off drains to the concrete diversion tank (HL_97_OHA).

- The diversion tank was installed circa 1940 and was originally used as the Base septic tank (email from [s. 9(2)(a)] and GHD 2014 report – refer to Appendix G). The diversion valve and pipe work running to the tank were installed circa 1999-2001 (email from [s. 9(2)(a)]
- There is anecdotal evidence of the diversion system not working as expected. It is understood that after the 2016 accidental activation of the deluge system in 2 Hangar personnel confirmed that the diversion valve had closed before the Fire team washed the foam in to the cut-off drains. However, when the tank was checked it was found to be empty.
- The diversion tank was relined in 2014 after leaks were found in the exterior walls (see photographs provided by [s. 9(2)(a)] Appendix E). It is unknown the amount of time that the tank had been leaking prior to the relining.
- In 2006, SKM undertook a stormwater network condition assessment (SKM, 2006). The report indicated sections of the stormwater network beneath Kororareka Ave that run to the diversion valve were in need of spot repairs and partial relays; the relevant excerpt from the report is provided in Appendix H. It is understood that this section of the network accepts discharge from the cut-off drains installed in 1, 2 and 3 Hangars. The pipework after the diversion valve was not inspected in the SKM assessment. It is currently unknown if the recommended repairs have been carried out.
- The No. 3 SQN Hangar deluge system has a cut-off drain installed which is designed to collect any discharge related to the foam system and direct it to a retention pond (HL_100_OHA) located to the south of the building.
- Every 3 months sediment from the stormwater sumps across the site is extracted via vacuum truck and disposed of at the rear of the Spotless contractors yard in the north of the site (HL_130_OHA). This is currently disposed of directly to the ground surface.

3.4.6 Waste Water Services

- Anecdotal information provided by [s. 9(2)(a)] Spotless Ltd – refer to Appendix D) has suggested that as a result of the 2013 accidental trigger of the 3 Hangar deluge system AFFF was detected in samples collected from the WWTP. At the time of reporting this has not been confirmed.
- Further evidence has suggested that there is some degree of connectivity between the stormwater and waste water services:
  - PDP waste water engineer [s. 9(2)(a)] has conducted several projects relating to the WWTP at Ohakea. [s. 9(2)(a)] commented

that infiltration during rain events resulting in various rates of increased flow at the WWTP is a common issue.

- Recent smoke testing of the waste water services by in-pipe Logistics Limited in 2016 has indicated numerous leaks within the network as well as areas were surface water can infiltrate waste water services due to poorly sealed pipework and gully traps. Relevant excerpts from the smoke testing report are provided in Appendix H, in particular there is a report of smoke exiting waste water lines that run within a stormwater manhole at the Fire Flight building.

3.4.7 Hydraulic Fluids and Aircraft Maintenance

- Aviation hydraulic fluids used and stored on site are Aeroshell 31, Aeroshell 41 and Hydraulic AW 68. A review of available information in the form of safety data sheets (SDS) and manufacturer's websites did not indicate the presence of PFAS in these products (copies of these are provided in Appendix I). However, in many cases if an ingredient is considered a 'trade secret', it is not reported on the SDS. Furthermore, the typical concentration of PFAS added to hydraulic fluids is so small (often less than 0.1%) that it is omitted from SDSs (Stockholm Convention on Persistent Organic Pollutants, 2012).
- Minor amounts of hydraulic fluid are used on base. The approximate annual amount of Aeroshell 31 used on base is < 200 L. The approximate annual amount of Aeroshell 41 used on base is < 150 L. All waste oil is disposed of offsite.
- Electroplating does not take place at Base Ohakea (email from Flt Lt D. Bosher – refer to Appendix G).

3.4.8 PFAS Containing Clothing

- Certain clothing material, particularly those treated with a durable water repellent may contain PFAS. It is understood that the disposal of waste clothing, including uniforms, consisted of the material being incinerated and the ash being removed off site to landfill [s. 9(2)(a)] Spotless). There is no evidence that clothing/uniforms were disposed of at one of the on base landfills, however, this has not been confirmed.

4.0 HAIL Assessment

In accordance with NZDF procedures, the NZDF HAIL database has been updated with the additional HAIL sites identified during this PSI. A total of 20 new HAIL sites relating to PFAS have been added to the database, in addition, five existing HAIL sites have been updated with information gathered during this investigation. The relevant HAIL categories are:

- A2: Chemical manufacture, formulation or bulk storage;
- F1: Airports including fuel storage, workshops, washdown areas, or fire practice areas;
- G5: Waste disposal to land; and
- I: Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.

The location of these sites is shown on Figure 2.

Sites where there were aircraft incidents involving one-off use of firefighting foam have been included under HAIL category I.

5.0 Risk Assessment

5.1 Conceptual Site Model

A risk to human health can only exist if there is a hazard (i.e. a source, for example contaminated soil, dust or water), a receptor (i.e. people) and an exposure pathway linking the hazard and the receptor. An absence of any one of these components means no risk can exist. A conceptual site model (CSM) is designed to identify the hazards, receptors and possible links between these.

A hazard or source may exist in the form of contaminated concrete, soil, sediment, stormwater, waste water, surface water or groundwater resulting from the storage and / or use of PFAS containing products (i.e. AFFF).

The potentially complete exposure pathways that have been identified include:

- Direct contact, either with soil, sediment, stormwater, groundwater or, surface water;
- Runoff from contaminated concrete or soil in to stormwater on-site;
- Infiltration in to groundwater;
- Discharge of stormwater off-site to surface water receptors (Makowhai Stream and Rangitikei River);
- Discharge of treated waste water off-site to drainage subsequently to ground through soakage;
- Groundwater abstraction on-site for drinking water supply and watering residential garden plants; and
- Groundwater abstraction off-site for stock watering, irrigation and potentially drinking water supply.

The receptors of concern include:

- Workers using AFFF containing PFAS (e.g. contractors refilling deluge systems or Fire Flight personnel filling MFVs and training with AFFF).
- Workers who are undertaking any future maintenance or excavation activities via:
  - dermal contact and /or ingestion or inhalation of soils;
  - dermal contact or ingestion of stormwater, surface water groundwater or sediment.
- On-site users of groundwater (including for drinking water and watering of residential garden plants);
- Consumers of produce (plant and/or animal) grown on-site;
- Off-site users of groundwater (including for stock watering and irrigation);
- Consumers of produce (plant and/or animal) grown off-site; and
- Potential environmental receptors include groundwater, surface watercourses (Makowhai Stream and Rangitikei River) and the plants and animals living within these environments.

The pathways are also summarised in the attached CSMs. Flow Chart 1 provides the CSM laid out in a flow chart that identifies sources, pathways and potential receptors. Note that in accordance with PDP (2016) direct exposure of Base personnel to AFFF products is not assessed in the CSM because NZDF will address this exposure as part of its responsibilities under the Health and Safety at Work Act, 2015.

The Ohakea PSI Conceptual Site Model – Profile provides a pictorial cross section of the site and surrounding area, and provides further information on sources, pathways and receptors, particularly subsurface. Figure 3 shows a plan view of the site and surrounding area, and identifies the location and spatial relationship of sources, pathways and receptors (note, due to the plan layout of Figure 3, only some of the sources, pathways and receptors presented in Flow Chart 1 and the Profile CSM are able to be displayed).

5.1.1 CSM Limitations

The information used to inform the CSM has been based on interviews with NZDF personnel and contractors. Some of this anecdotal information has not been confirmed by other means. At present, there is no evidence that other significant sources of PFAS exist on the site.

6.0 Summary and Conclusions

A contaminated site investigation has been undertaken at the RNZAF Base Ohakea, to assess the potential for soil and groundwater contamination resulting from current and historical use of PFAS. The main sources of PFAS are concluded to be:

Firefighting Training

- AFFF used and stored on base (Angus Tridol-S, Ansulite AFC-5A 3% and Ansulite AFC-3MS-C 3%) has been confirmed to contain PFAS.
- Historical firefighting training using AFFF at various locations around the site has been identified as a potential source of contaminants. In particular, a number of high use areas have been identified including anecdotal evidence of a 'burn pit' in which waste oil/fuel was set alight and then extinguished with firefighting foam. Since 2016, training using PFAS containing AFFF has been undertaken at the FTA only.

Cleaning of Firefighting Equipment

- The wash down and flushing of fire truck foam system equipment at the Fire Flight complex has been identified as a potential source of PFAS release to stormwater. Wash down and flushing occurred after every training and/or incident in which foam was used and as such this may represent a significant source occurring over a long period of time.

AFFF Discharge from Deluge Systems to Stormwater

- AFFF released from the hangar deluge systems (either via un-commanded releases or during the periodic operational testing of the system), may have resulted in the release of PFAS to stormwater and consequent discharge off site.
- There is evidence that the diversion system in place designed to collect any AFFF released during an activation of the deluge system in 1, 2 or 3 Hangars, has not been working as intended. This is either due to leaking at the diversion tank (which is known to have been in a poor state of repair until being relined in 2014) and/or leaks in the stormwater network.
- A stormwater network assessment undertaken in 2006 has indicated that parts of the Ohakea Base stormwater network are in a poor state of repair and need of replacement or relaying. This includes some of the pipework running beneath Kororareka Ave from the hangars to the diversion valve.

Stormwater and Waste Water Network

- There is evidence (both anecdotal and reported) to suggest that there is some degree of connectivity between the stormwater and waste water network, particularly around the Fire Flight station. Exactly how much, and therefore how important a pathway this may be, is currently unknown.

Storage of AFFF

- A significant volume of AFFF (5,000 L) is currently stored in IBCs in an area without secondary containment.

Based on the current information there is no evidence of other significant sources of PFAS containing products on site.

As result of this investigation, 20 new areas have been added to the NZDF HAIL database, and five existing HAIL sites have been updated.

7.0 References

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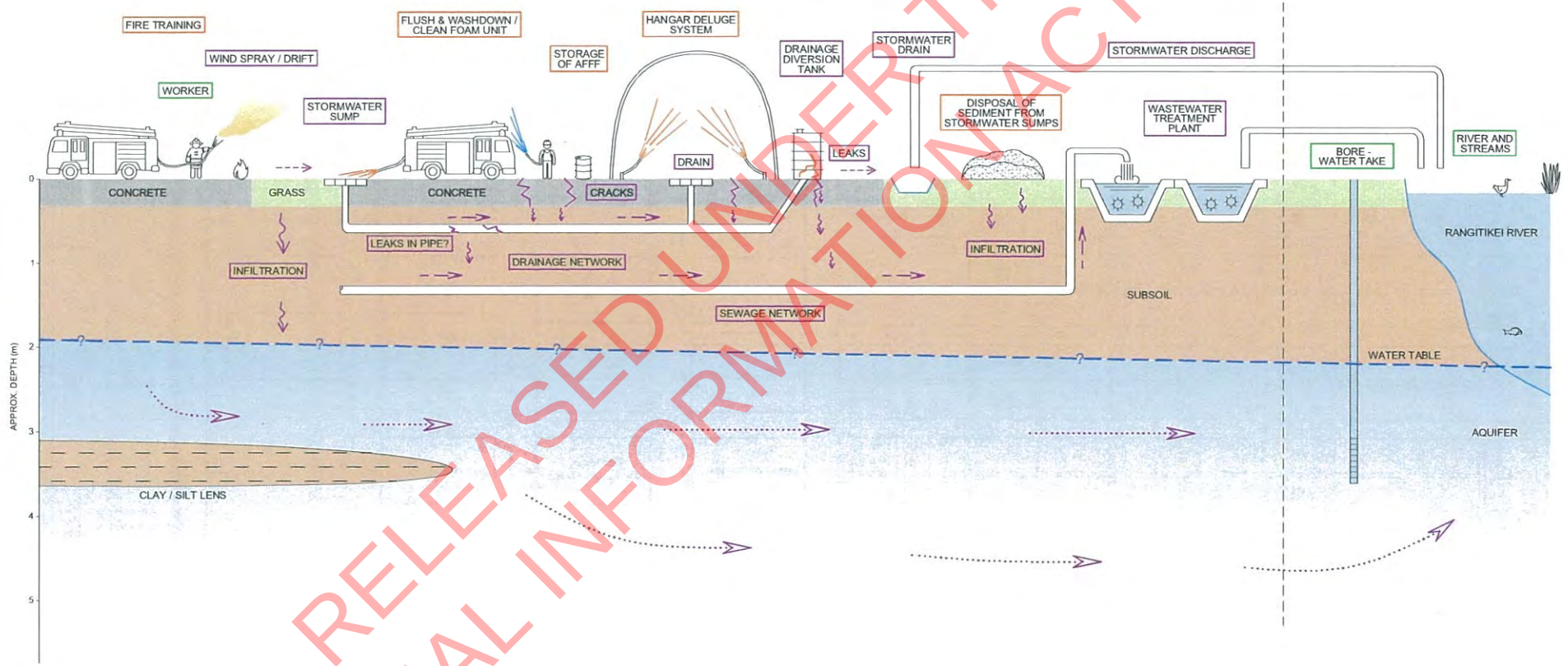
[s. 9(2)(a), 9(2)(b)(ii) and 9(2)(ba)(i)]

[s. 9(2)(a), 9(2)(b)(ii) and 9(2)(ba)(i)]

[s. 9(2)(a), 9(2)(b)(ii) and 9(2)(ba)(i)]



OHAKEA - PSI

CONCEPTUAL SITE MODEL - PROFILE

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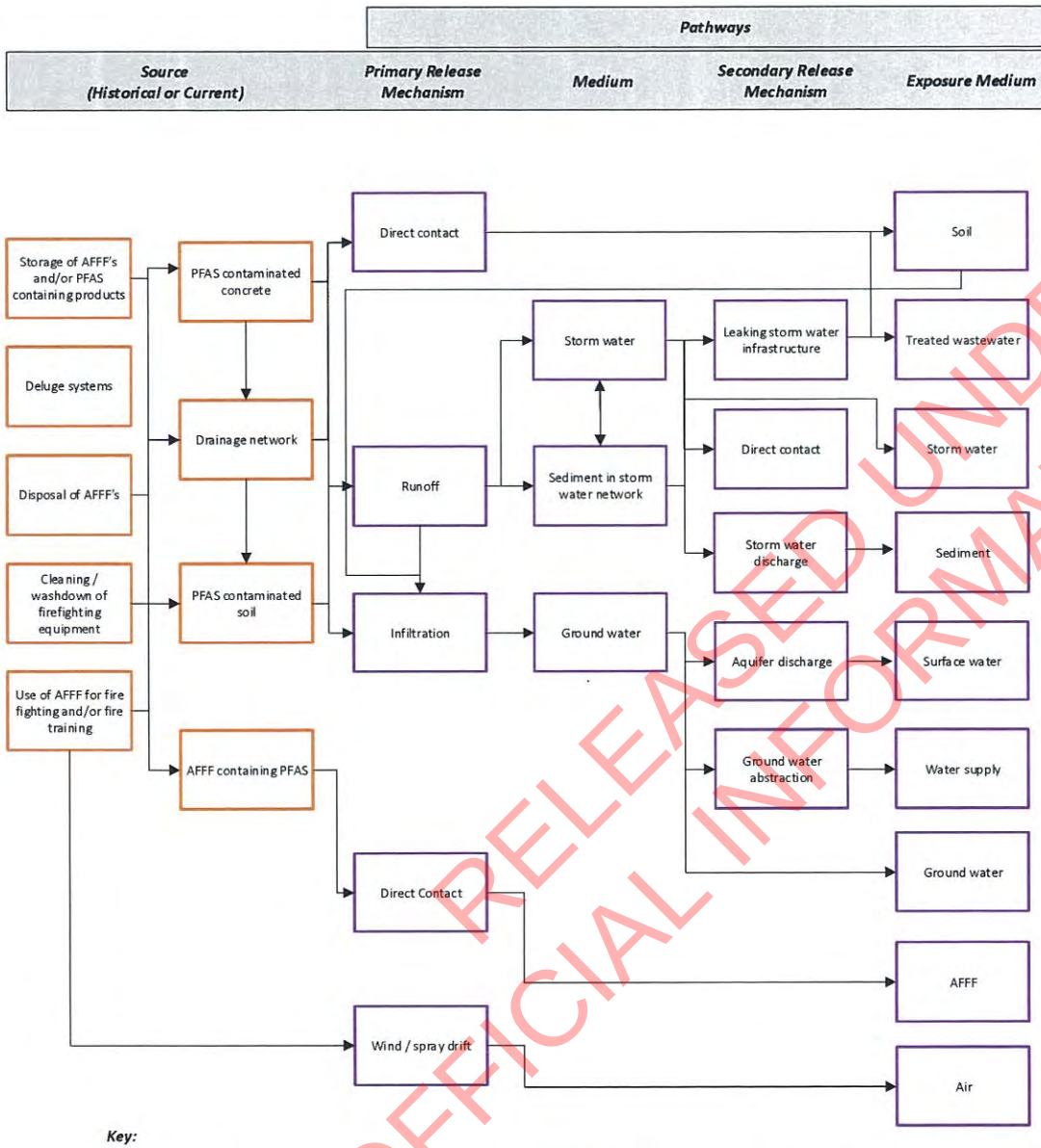
Conceptual Site Model – RNZAF Base Ohakea



Key:

- Potentially Complete Pathway
- Incomplete Pathway
- N/A – Addressed under the Health and Safety at Work Act, 2015

Summary of Potential Receptors										
	Human (Including Agricultural Receptors)								Biota	
	On-Site					Off-Site				
Exposure Route	General Workers	Excavation Workers	Ground and/ or surface water users	Residents	Consumers of plant/animal products	Ground and/ or surface water users	Residents	Consumers of plant/animal products	Terrestrial Ecosystems	Aquatic Ecosystems
Ingestion	■	■							■	■
Dermal Contact	■	■								
Ingestion						■			■	■
Dermal Contact						■				
Ingestion		■								
Dermal Contact		■								
Ingestion		■							■	■
Dermal Contact		■								
Ingestion	■	■	■	■		■	■	■	■	■
Dermal Contact	■	■	■	■		■	■	■		
Ingestion			■	■	■	■	■	■	■	■
Dermal Contact			■	■	■	■	■	■		
Ingestion		■								■
Dermal Contact		■								
Ingestion	N/A									
Dermal Contact	N/A									
Ingestion	N/A	N/A								
Dermal Contact	N/A	N/A								

Appendix A

Groundwater Bore Search

Bore ID	Station Name	NZTM_X	NZTM_Y	Position Source	Elevation	Elevation Source	Depth	Distance	Purpose	Install Date	Owner	Property Street Address	Depth to Water	gwl (masl)	Screen from	Screen to	Status
				Estimated	42	Estimated	4	198									
				Estimated	43	Estimated	17	498									
				Estimated	43	Estimated	3	508									
				GPS	50	Estimated	4.05	608		25/07/2013			1.09	48.91	1.05	4.05	
				GPS	50	Estimated	4.01	639		25/07/2013			1.58	48.42	1.01	4.01	
				GPS	50	Estimated	4.01	658		25/07/2013			1.59	48.41	1.01	4.01	
				Estimated	40	Estimated	9.87	714		1/04/2015			7.34	32.66	5.8	9.87	Decommissioned
				Estimated	40	Estimated	9.79	745		7/04/2015			7.7	32.3	5.8	9.79	Decommissioned
				GPS	40	Estimated	10	770		15/06/2015			6.83	33.17	6	10	
				GPS	40	Estimated	10	777		12/06/2015			7.065	32.935	6	10	
				GPS	50	Estimated	8	803		1/04/2009			2.75	47.25	5.3	7.5	
				GPS	50	Estimated	8	823		4/04/2009					5.5	7.5	
				GPS	50	Estimated	8	837		2/04/2009			2.1	47.9	5.3	7.5	
				GPS	50	Estimated	8	845		3/04/2009			2.75	47.25	5.3	7.5	
				SGPS	41.338	SGPS	7.4	1007		5/07/2001			2.3	39.038	6.4	7.4	
				Estimated	46	Estimated		1018									
				SGPS	50.403	SGPS	135.5	1031		1/12/2000			7.4	43.003	130.6	135.5	
				SGPS	54.256	SGPS	35.6	1058		9/06/1993			13.7	40.556	32.6	35.6	
				GPS	52	Estimated	163.4	1063		17/02/2006			11.4	40.6	148.4	163.4	
				Estimated	42	Estimated	6	1107									
				Estimated	47	Estimated	6	1302									
				Estimated	51	Estimated	13	1405									
				Estimated	37	Estimated	5	1487									
				Estimated	36	Estimated	14	1500									
				Estimated	42	Estimated	6	1524									
				Estimated	39	Estimated		1559									
				SGPS	46.321	SGPS		1572					3	43.321			
				SGPS	46.473	SGPS	43.3	1573		23/07/1985			6.2	40.273			
				Estimated	38	Estimated	24	1578									
				Estimated	43	Estimated	13	1679									
				SGPS	40.44	SGPS	30	1790		1/01/1900							
				SGPS	42.58	SGPS	11	1804									
				Estimated	37	Estimated	14	1876									
				Estimated	38	Estimated	5	1900									
				Estimated	39	Estimated	13	1913									
				Estimated	38	Estimated	9.38	1944		11/06/1985			4.5	33.5			
				Estimated	38	Estimated	6.1	1952		26/06/1985			0.9	37.1			
				Estimated	44.388	Estimated	12.8	1966					0.1	44.288			
				SGPS	38.688	SGPS	10	2040		23/09/1985			3	35.688			
				Estimated	35	Estimated	15.6	2042		27/05/1985			3.9	31.1			
				Estimated	44	Estimated	6	2072									
				Estimated	34	Estimated	6	2080									
				SGPS	40.849	SGPS	11.7	2097		1/07/1994			2.9	37.949	8.7	11.7	
				SGPS	41.717	SGPS	9.5	2120		18/09/1985			3.2	38.517	4.5	9.5	
				Estimated	43	Estimated	12	2144									
				GPS	51.9	GPS	12	2178		12/12/2014			5.9	46	8.5	11.5	
				Estimated	37	Estimated	8	2204									
				Estimated	39.787	Survey	10.4	2204		30/01/1995			3.8	35.987	7.4	10.4	
				Estimated	34	Estimated	55	2212									
				Estimated	36	Estimated	9	2238									
				SGPS	42.266	SGPS	31.6	2247		30/05/2006			1.51	40.756	25.6	31.6	
				SGPS	34.885	SGPS	7.1	2331		3/07/2001			2.7	32.185	6.1	7.1	
				SGPS	40.573	SGPS	12.5	2370		1/10/1994			5.7	34.873			
				Estimated	39	Estimated	10	2388									
				SGPS	34.64	SGPS		2390									
				Estimated	32	Estimated	4	2416									
				Estimated	32	Estimated	7	2450									
				SGPS	39.258	SGPS	40	2464		1/08/1993			0.9	40.158	30	40	
				GPS	41	Estimated	99	2469		1/01/1997			3.8	37.2	89.611	95.7072	
				SGPS	40.673	SGPS	99	2484		20/04/2001			3.8	36.873	85	99	
				Estimated	36	Estimated	9	2504									
				Estimated	36	Estimated	4	2504									
				Estimated	52	Estimated	5.6	2524		12/02/1991			3.8	48.2	4.6	5.6	
				SGPS	43.721	SGPS	32.33	2561		14/05/1998			0.2	43.521	27.33	30.33	
				SGPS	43.721	SGPS	32.33	2561		14/05/1998			0.2	43.521	30.33	32.33	
				Estimated	34	Estimated		2572									
				Estimated	44	Estimated	12	2637									
				Estimated	33	Estimated	6	2691									
				Estimated	33	Estimated		2691									
				SGPS	33.065	SGPS	7.4	2705		5/07/2001			2.1	30.965	6.4	7.4	
				SGPS	35.418	SGPS	57.4	2751		1/09/1995			0.3	35.718	51.4	57.4	

Bore ID	Station Name	NZTM_X	NZTM_Y	Position Source	Elevation	Elevation Source	Depth	Distance	Purpose	Installation Date	Owner	Property Street Address	Depth to Water	gwl (masl)	Screen from	Screen to	Status
				Estimated	34	Estimated	6	2818									
				SGPS	32.808	SGPS	7.1	2839		1/07/2001			2.7	30.108	6.1	7.1	
				Estimated	28	Estimated	15	2843									
				Estimated	30	Estimated	6	2898									
				Estimated	30	Estimated		2898									
				Estimated	50	Estimated	36	2918							33.6	36	
				Estimated	35	Estimated	13.12	2944					4	31			

[s. 9(2)(a), 9(2)(b)(ii) and 9(2)(ba)(i)]

[s. 9(2)(a), 9(2)(b)(ii) and 9(2)(ba)(i)]

Appendix B

Council Property Files

Building Consent No 124976
Section 51 Building Act 2004

The Building

Street Address of building	1 Pukenui Road, Ohakea
Legal description of land where building is located	PT LOT 2 DP 4423
Valuation No	14130 093 00
Building Name	NO 3 Hangar
Location of Building within site/block number	
Level/unit number	1

The Owner

Name of owner	Royal NZ Air Force	First point of contact for communications with the building consent authority:	Royal NZ Air Force
Mailing address	Facilities Management Section Private Bag 11033 Manawatu Mail Centre Palmerston North 4442	Mailing address	Facilities Management Section Private Bag 11033 Manawatu Mail Centre Palmerston North 4442
		Phone number	
		Facsimile Number	
		Email Address	

Building Work

The following building work is authorised by the building consent:

Project: Install Sprinkler System To Relocated Office Inside No 3 Hangar

Intended Use: Commercial

This building consent is issued under section 51 of the Building Act 2004. This building consent does not relieve the owner of the building (or proposed building) of any duty or responsibility under any other Act relating to or affecting the building (or proposed building).

This building consent also does not permit the construction, alteration, demolition, or removal of the building (or proposed building) if that construction, alteration, demolition, or removal would be in breach of any other Act.

This building consent is subject to the following conditions:

Building Act 2004, Section 90

Inspection by Building Consent Authorities

Agents authorised by the building consent authority for the purposes of this section are entitled, at all times during normal working hours or while building work is being done, to inspect

a) Land on which building work is being or is proposed to be carried out; and

b) Building work that has been or is being carried out on or off the building site; and

c) Any building.

Compliance schedule

A compliance schedule is required for the building.

On behalf of **Manawatu District Council**

Date 19 October 2015

Name Phil Lightbourne
Position Advanced Building Officer
MDC Building Services

APPENDIX TO BUILDING CONSENT NO: 124976

INSPECTIONS

THE FOLLOWING INSPECTIONS ARE REQUIRED TO DEMONSTRATE COMPLIANCE

Recording the completion details below is for your record-keeping purposes.

Detail	Date completed	Time	Name/ Signature	Pass/ Fail
1 x COMM - Final				

If you have requested an inspection, do not proceed until you have been given the approval from the building officer.

NOTE: FURTHER INSPECTIONS MAY INCUR ADDITIONAL COST AT TIME OF CODE COMPLIANCE CERTIFICATE ISSUE.

ADVISORY NOTES:

Building

NZ Building Act 2004 Section 45 (4)
No deviation from the Approved Plan is permitted without prior Consent approval. Refer to the Building Act 2004 section 45 (5) for amendment information.

A compliance schedule is required for this building.

SPECIFIED SYSTEMS (ACTIVE) CERTIFICATION
An installer declaration shall be provided to Manawatu District Council for the installation and commissioning of the specified systems in accordance with the standards listed below. The declaration is required
prior to the issue of the Code Compliance Certificate.

SS1: Water sprinkler system Type 6 installed to NZS4541:2013

SS2: Manual warning system Type 4 installed to NZS 4512:2010

CERTIFIED ACCREDITED FIRE ALARM / SPRINKLER INSPECTION
NZ Building Act 2004 Section 94(1)(b)
Proof of certification from an accredited inspection body is required prior to issue of the Code Compliance Certificate to confirm that the fire alarm and sprinkler systems comply with the relevant standard.

Please arrange for an accredited inspection body to carry out the inspection.

NZS 4517:2002
MDC require at completion of the installation an inspection of the Flow Test from the Sprinkler system. A Producer Statement (PS3) is required for the installation of the Sprinkler system before a Code Compliance Certificate is issued.

Code Compliance Certificate
Building Consent No: 124976
Section 95 Building Act 2004

Manawatu District Council, 135 Manchester Street, Private Bag 10 001, Feilding 4743
T (06) 323 0000 F (06) 323 0822 E building@mdc.govt.nz www.mdc.govt.nz
GST No. 52-867-193 OFFICE HOURS 8:00am - 5:00pm Monday to Friday (except Wednesday 9:00am – 5:00pm)

The Owner

Name of Owner	Royal NZ Air Force	Name of contact	Royal NZ Air Force
Mailing Address	Facilities Management Section Private Bag 11033 Manawatu Mail Centre Palmerston North 4442	Mailing address	Facilities Management Section Private Bag 11033 Manawatu Mail Centre Palmerston North 4442

The Building

Street Address of Building	1 Pukenui Road, Ohakea
Legal description	PT LOT 2 DP 4423
Valuation No	14130 093 00
Current, lawfully established use	Commercial
Year first constructed	2010

Building Work

Project Install Sprinkler System To Relocated Office Inside No 3 Hangar

Code Compliance

The building consent authority named below is satisfied, on reasonable grounds, that:

(a) The building work complies with the building consent

On behalf of **Manawatu District Council**

Date 03 June 2016

Name Chris Henry
Position **Team Leader – MDC Building Services**

Building Consent No 124299
Section 51 Building Act 2004

BC
124299

The Owner

Name of owner	Defence Force New Zealand HQ	Name of contact	GHD Ltd
Mailing address	Facilities Management Section Private Bag 11033 Manawatu Mail Centre Palmerston North 4442	Mailing address	Owen Brown PO Box 1746 Wellington 6140

The Building

Street location	1 Pukenui Road, Ohakea
Legal description	SEC 57 XV SO SURVEY DISTRICT RANGITOTO PT SEC 56 XV SO SURVEY DISTRICT RANGITOTO Valuation No: 14130 093 00 14130 093 00

Building Work

The following building work is authorised by the building consent:

Project: Alterations To No 1 Hanger

This building consent is issued under section 51 of the Building Act 2004. This building consent does not relieve the owner of the building (or proposed building) of any duty or responsibility under any other Act relating to or affecting the building (or proposed building).

This building consent also does not permit the construction, alteration, demolition, or removal of the building (or proposed building) if that construction, alteration, demolition, or removal would be in breach of any other Act.

This building consent is subject to the following conditions:

BC

124299

Building Act 2004, Section 90

Inspection by Building Consent Authorities

Agents authorised by the building consent authority for the purposes of this section are entitled, at all times during normal working hours or while building work is being done, to inspect

a) Land on which building work is being or is proposed to be carried out; and

b) Building work that has been or is being carried out on or off the building site; and

c) Any building.

Endorsements - The following items will need to be addressed prior to the issue of the Code Compliance Certificate:

Building

NZ Building Act 2004 Section 45 (5)
No deviation from the Approved Plan is Permitted without prior Consent approval. Refer to the Building Act 2004 section 45 (5) for amendment information.

NZ Building Act 2004 Section 45 (5)
No deviation from the Approved Plan is Permitted without prior Consent approval. Refer to the Building Act 2004 section 45 (5) for amendment information.

FIRE EVACUATION SCHEME: Fire Service Act 1975 Section 21A
This building may require provision to be made for an evacuation scheme under section 21A of the Fire Service Act 1975. Information in relation to this may be obtained from the NZ Fire Service, Central Fire Station, Cook Street, PN, or by going to the NZ Fire Service web site on: *www.fire.org.nz/evacuation_advice/evac_schemes.htm*

ENGINEERS OBSERVATIONS:
NZ Building Code Clause B1
The design engineer or their approved representative shall be engaged to inspect the following specific design elements during construction:

- Foundations.
- Floor slab.
- Structural steel.

A Producer Statement Construction Review (PS4) shall be provided to MDC, verifying the inspection/s have been undertaken and passed by the engineer prior to the issue of the Code Compliance Certificate.

SPECIFIED SYSTEMS (ACTIVE) CERTIFICATION
Certification demonstrating compliance with the standards listed below shall be provided to Manawatu District Council for the installation and commissioning of these specified systems prior to the issue of the Code Compliance Certificate:
SS1 - Water sprinkler system.(NZS 4541)
SS2 - Automatic fire alarm system (NZS 4512:2010)
SS4 - Emergency lighting system (AS/NZS 2293)
SS9 - Heating, Ventilating & Air-conditioning [HVAC] (AS 1668)
SS14 - Emergency power systems (for, or signs relating to, a specified systems 1 - 13) (NZS 4512)

BC
124299

The Compliance Schedule must contain the following specified systems and comply with the performance standards for those systems required by the building code:
SS1 Automatic systems for fire suppression
SS2 Automatic or manual emergency warning systems
SS4 Emergency lighting systems
SS9 Mechanical ventilation or air conditioning systems
SS14 Emergency power systems for, or signs relating to, a specified system in any of specified systems 1 to 13
SS14/2 & SS 15/4 Signs
SS15 Other fire safety systems or features

CERTIFIED ACCREDITED FIRE ALARM INSPECTION.
NZ Building Act 2004 section 92(5)
Proof of certification from an accredited inspection body is required, to confirm that the fire alarm systems comply with C/AS1 and NZS 4512.
Please contact one of the following accredited inspection services to allow enough time for them to carry out their inspection and ensure the proof of certification will not hold up the issuing of the Code Compliance Certificate:

- Fire Protection Inspection Services Ltd (FPIS)
- Building and fire safety Ltd
- ISIS Building Inspections Ltd
-

SPRINKLER SYSTEM CERTIFICATION

- Verifire Ltd
- AON Sprinkler Certification

An installers declaration is required for the installation of window wetting sprinkler system

Plumbing and Drainage

NZ Building Act 2004 Section 45 (5)
No deviation from the Approved Plan is Permitted without prior Consent approval. Refer to the Building Act 2004 section 45 (5) for amendment information.

PLUMBERS ACT:
The Plumbers Gasfitters and Drain layers Act 1976 requires that only Registered Drain layers may undertake drainage work and that only Craftsman Plumbers may undertake plumbing work.

All stormwater is to be piped to an approved outfall.

An 'as built' drainage plan is to be supplied prior to the issue of the Code Compliance Certificate.

An installers declaration is required for the installation of window wetting sprinkler system

BC

124299

The following inspections are mandatory. Failure to notify the Manawatu District Council Building Services section of any of the required inspections will result in a Notice to Fix being issued.

Recording the completion details below is for your record-keeping purposes.

Detail	Date completed	Time	Name/ Signature	Pass/ Fail	
1 x COMM - Foundation/Pads/Ground Beams					
1 x COMM - Concrete Slab	28 7 14		BC	PASS	
1 x COMM - Structural Concrete & Masonr	28/8/14		☒	Pass	Amended date Required/site Inspections
4 x Drainage					
1 x COMM - Preline	28/8/14		☒	Pass	
1 x COMM - Postline					
1 x COMM - Final - Plumbing					
1 x COMM - Final					

Note: Further inspections will incur additional cost at time of Code Compliance Certificate issue.

If you have requested an inspection, do not proceed until you have been given the approval from the building officer.

Compliance schedule

A compliance schedule is required for the building.
The Compliance Schedule must contain the following specified systems and comply with the performance standards for those systems required by the building code:

- SS1 Automatic systems for fire suppression
- SS2 Automatic or manual emergency warning systems
- SS4 Emergency lighting systems
- SS9 Mechanical ventilation or air conditioning systems
- SS14 Emergency power systems for, or signs relating to, a specified system in any of specified systems 1 to 13
- SS14/2 & SS 15/4 Signs
- SS15 Other fire safety systems or features

On behalf of **Manawatu District Council**

Date 23 June 2014

Name Chris Henry
Position Team Leader – MDC Building Services

Manawatu District Council

135 Manchester Street
Private Bag 10-001
FEILDING
Phone (06) 323 0000
Fax (06) 323 8711

PROJECT INFORMATION MEMORANDUM

Section 31, Building Act 1991

P.I.M. No. 112972	Date Received 18-Mar-2003	Date Actioned 20-Mar-2003

APPLICANT / CONTACT

Applicant Name
Royal NZ Air Force

Address Accounts Payable (82060)
P O Box 84-042
Westgate
AUCKLAND 1001

Telephone No

Contact Name
Wormald - Private Bag

Address
New Lynn, Auckland
ATT: Jason Dyer

Contact Phone No 09 826 1736

Contact Fax No

PROPERTY

Street Location
10 Pukenui

Legal Description
BASE PROPER - ADMIN RES ETC

Valuation No 14130 / 09300A

PROJECT

Description of Project
Upgrade Fire Protection for Hangars 2 & 3

Proposed Use
Hangars

Intended Life >50

Project Classification
SMALL WORK

Project Types
Alterations, repairs, extensions and resiting.

No of Stages 1

Producer Statement

Approximate Value $50,000.00

This Project Information Memorandum includes all information known to this authority and is issued in accordance with the Building Act 1991.
This project information memorandum is:

- ☑ Confirmation that the proposed building work may be undertaken, subject to the provisions of the Building Act 1991 and any requirements of the building consent
  - ☐ Not yet applied for
  - ☑ No. 112972/1 attached
- ☐ Notification that other authorisations must be obtained before a building consent will be issued.
- ☐ Notification that the proposed building work may not be undertaken because a necessary authorisation has been refused.

Signed for and on behalf of the Manawatu District Council	Name Building Officer
Position	**Date** 20-Mar-2003 **Time** 09:55 AM

ManawatuDistrictCouncil

Building Consent No 121333 / 1

Section 51 Building Act 2004

The Owner

Name of owner	Defence Force New Zealand Hq	Name of contact	Defence Force New Zealand HQ
Mailing address	Facilities Management Section, Private Bag 11033, Manawatu Mail Centre, PALMERSTON NORTH 4442	Mailing address	Facilities Management Section, Private Bag 11033, Manawatu Mail Centre, PALMERSTON NORTH 4442
Phone No	(06) 351 5677	Phone No	(06) 351 5677

The Building

Street location	Pukenui Rd
Legal description	LOT 1 DP 21753 SECS 45 57 58 64 73-75 PT SECS 12 19 20 49 53 55 56 77 CLSD RD BLK XV RANGITOTO SD- SECS 73 74 SUBJ TO POWER CABLE EASEMENT - GAZ 88-3025 89-28 90-590 90-4514 - 96-984 - OHAKEA AERODROME - FILE 7861/13 - LOT 1 SUBJ TO & INT IN R/W 96-984 Level/unit number: 1 Valuation No: 14130 / 09300

Building Work

The following building work is authorised by the building consent:

Project: Construct a New Workshop Faciltiy to Provide Maintenance Support to the No 3 Squadron Helicopter Fleet and other Aircraft on Base. Construction of an Aircraft Finishing Building. Construct Building to House the Centralised Compressed Air Supply Equip

This building consent is issued under section 51 of the Building Act 2004. This building consent does not relieve the owner of the building (or proposed building) of any duty or responsibility under any other Act relating to or affecting the building (or proposed building).

135 Manchester Street, Private Bag 10001, Feilding 4743, New Zealand
Telephone: 06 323 0000, Facsimile: 06 323 0822
Email: public@mdc.govt.nz Webpage: www.mdc.govt.nz

Manawatu
Young Heart, Easy Living

This building consent also does not permit the construction, alteration, demolition, or removal of the building (or proposed building) if that construction, alteration, demolition, or removal would be in breach of any other Act.

This building consent is subject to the following conditions:

Building Act 2004, Section 90

Inspection by Building Consent Authorities

Agents authorised by the building consent authority for the purposes of this section are entitled, at all times during normal working hours or while building work is being done, to inspect

a) Land on which building work is being or is proposed to be carried out; and

a) Building work that has been or is being carried out on or off the building site; and

b) Any building.

Endorsements - The following items will need to be addressed prior to the issue of the Code Compliance Certificate:

General Information

For information regarding Power, Gas or Telecom services you are advised to contact the respective utility providers.

Planning

District Plan status: Permitted activity.

The project complies with the requirements of the District Plan.

This property is zoned Rural 2 under the Manawatu District Plan

The property is designated D44 for defence purposed. An Outline Plan of Works (OP7202) was granted on 14/02/08 and covers this complex.

Plumbing and Drainage

The Plumbers, Gasfitters and Drainlayers Act 2006 requires that only certifying drainlayers may undertake drainage work and that only certifying plumbers may undertake plumbing work.

Assets

If, during work being carried out on this project, any damage occurs to the road reserve or its environs, repairs and/reinstatement is to be made to the satisfaction of Council within 24 hours of the damage occuring.

If this this not done, Council will make good any damage and forward and account to you detailing all costs incurred.

To avoid any misunderstanding, the road reserve is the full width of the road between property boundaries and includes the carriageway, footpaths, berms also all pipes, drains, signage, street furniture (fire hydrants etc) any ornamental planting.

There are no Council utilities schemes in this area.

The property should have an approved Motor Vehicle Crossing. If one does not exist, a new crossing will need to be constructed to Council standards. If there is an existing crossing it shall be upgraded, as necessary, to meet Council's current standards.

Building

FIRE EVACUATION SCHEME:

Fire Service Act 1975 Section 21A

This building will require provision to be made for an evacuation scheme under section 21A of the Fire Service Act 1975. Information in relation to this may be obtained from the NZ Fire Service, Central Fire Station, Cook Street, PN, or by going to the NZ Fire Service web site on:

www.fire.org.nz/evacuation_advice/evac_schemes.htm

The proposed building is intended to be used for the purposes specified in Schedule 2 of The Building Act 2004 and therefore must comply with section 118 and the provisions of the building code that relate to providing for persons with disabilities to have access to buildings and to facilities within buildings.

SPECIFIED SYSTEMS

A Producer Statement - Construction Review (PS4) demonstrating compliance with the provisions of the Building Act and following standards shall be provided to the Manawatu District Council, for the installation and commissioning of the following systems, prior to the issue of the Code Compliance Certificate:

- Fire Sprinkler system. (NZS 4541)
- Fire Alarm system. (NZS 4512)
- Emergency lighting system. (AS/NZS 2293)
- Illuminated Exit signs. (AS/NZS 2293)
- Heating, Ventilating & Air-conditioning [HVAC] (NZS 4303 & AS/NZS 3666:part 1)
- Auto Doors.
- Automatic back flow prevention (AS 2845)

INSTALLERS CERTIFICATIONS SUPPLIED

CERTIFIED ACCREDITED FIRE ALARM INSPECTION.

NZ Building Act 2004 Section 92(5)

Proof of certification from an accredited inspection body is required, to confirm that the fire alarm systems comply with C/AS1 and NZS 4512.

Please contact one of the following accredited inspection services to allow enough time for them to carry out their inspection and ensure the proof of certification will not hold up the issuing of the Code Compliance Certificate:

- Fire Protection Inspection Services Ltd (FPIS)
- Building and fire safety Ltd
- ISIS Building Inspections Ltd

ENGINEERS OBSERVATIONS:

NZ Building Code Clause B1

The design engineer or their approved representative shall be engaged to inspect the following specific design elements during construction:

- Foundations.
- Pads.
- Floor slab. Section A1 2-6-11 C.D. Plans
- Structural concrete / Tilt slabs.
- Joints / junctions.
- Structural steel.
- Passive fire safety systems

A Producer Statement Construction Review (PS4) shall be provided to MDC, verifying the inspection/s have been undertaken and passed by the engineer prior to the issue of the Code Compliance Certificate.

A Compliance Schedule is required for this building

The following inspections are mandatory. Failure to notify the Manawatu District Council Building Services section of any of the required inspections will result in a Notice to Fix being issued.

Recording the completion details below is for your record-keeping purposes.

	Detail	Date completed	Time	Name/ Signature	Pass/ Fail
AFS	COMM - Foundation/Pads/Ground Beams	22 2 11	JH.	Pass	
AFS	COMM - Foundation/Pads/Ground Beams	28 2 11	GD	Pass	
AFS	COMM - Foundation/Pads/Ground Beams	7 3 11	GD	Pass	
	COMM - Foundation/Pads/Ground Beams				
	COMM - Foundation/Pads/Ground Beams				
	COMM - Foundation/Pads/Ground Beams				
	COMM - Foundation/Pads/Ground Beams				
	COMM - Foundation/Pads/Ground Beams				
MSS	COMM - Foundation/Pads/Ground Beams	18 3 11	GD	Pass	
MSS	COMM - Foundation/Pads/Ground Beams	2 2 11	GD	Pass	
MSS	COMM - Foundation/Pads/Ground Beams	4 2 11	GD	Pass	
MSS	COMM - Foundation/Pads/Ground Beams	9 2 11	BC	Pass	
MSS	COMM - Foundation/Pads/Ground Beams	14 2 11	B.C	Pass	
MSS	COMM - Foundation/Pads/Ground Beams	22 2 11	JH	Pass	
MSS	COMM - Foundation/Pads/Ground Beams	25 2 11	J.H	Pass	
MSD	COMM - Structural Concerte & Masonry	23 2 11	G.D	Pass	
MSS	COMM - Structural Concerte & Masonry	~~30 3 11~~ 30 3 11	~~GD~~ GD.	~~Pass~~ Pass	
	COMM - Structural Concerte & Masonry				
	COMM - Structural Concerte & Masonry				
	COMM - Structural Concerte & Masonry				
	COMM - Drainage	28-2-11	1.30	WF	Pass
	COMM - Drainage	6-12-11	2.30	WF	Pass
	COMM - Drainage	21-2-11	9.30	WF	Pass
		30-3-11	11am	WF	Pass
		11-4-11	2pm	WF	Pass
		3-10-11	1.15	WF	Pass

COMM - Drainage	Drainage	24-6-11	11.15	WP Pass
COMM - Drainage	23-8-11 2pm	28-4-11	11am	WP Pass
COMM - Drainage		5-5-11	11 am	WP Pass
COMM - Drainage		13-5-11	10 am	WP Pass
COMM - Concrete Slab	Drainage	18-5-11	10.30	WP Pass
		24-5-11	2pm	WP Pass
COMM - Concrete Slab	- Compressed Air Plant Room 13-9-11 GD Pass			
COMM - Concrete Slab	- Plant Room 23-9-11 GD Pass			
COMM - Concrete Slab	- Upper Plant Room Floor 29-9-11 GD Pass			
COMM - Concrete Slab				
COMM - Concrete Slab				
COMM - Concrete Slab				
COMM - Concrete Slab				
COMM - Concrete Slab				
COMM - Concrete Slab				
COMM - Concrete Slab				
COMM - Underfloor/Preslab Soil/Drain/Waste		9-3-11	2.18	
COMM - Underfloor/Preslab Soil/Drain/Waste		10-5-11	2.pm	WP Pass
COMM - Underfloor/Preslab Soil/Drain/Waste		20-9-11	1.30pm	WP Pass
		27-5-11	9.30	WP Pass
COMM - Underfloor/Preslab Soil/Drain/Waste		8-6-11	10.30	WP Pass
		13-6-11	8.30	WP Pass
COMM - Framing		22-6-11	11am	WP Pass
COMM - Framing				
COMM - Framing				
COMM - Preline				
COMM - Cavity				
COMM - Postline				
COMM - Postline				
COMM - Postline				
COMM - Preline - Plumbing				

COMM - Preline - Plumbing 28-8-11 1:15 ws Pass

COMM - Preline - Plumbing

COMM - Final

COMM- Final Plumbing

Note: Further inspections will incur additional cost at time of Code Compliance Certificate issue.

If you have requested an inspection, do not proceed until you have been given the approval from the building officer.

Signature Bryan Clark

Position Advanced Building Officer

On behalf of **Manawatu District Council** Date 18 January 2011

ManawatuDistrictCouncil

Code Compliance Certificate – Consent No 121333 / 1
Section 95 Building Act 2004

The Owner

Name of owner	Defence Force New Zealand HQ	Name of contact	Defence Force New Zealand HQ
Mailing address	Facilities Management Section, Private Bag 11033, Manawatu Mail Centre, PALMERSTON NORTH 4442	Mailing address	Facilities Management Section, Private Bag 11033, Manawatu Mail Centre, PALMERSTON NORTH 4442
Phone No	(06) 351 5677	Phone No	(06) 351 5677

The Building

Street location	Pukenui Rd
Legal description	LOT 1 DP 21753 SECS 45 57 58 64 73-75 PT SECS 12 19 20 49 53 55 56 77 CLSD RD BLK XV RANGITOTO SD- SECS 73 74 SUBJ TO POWER CABLE EASEMENT - GAZ 88-3025 89-28 90-590 90-4514 - 96-984 - OHAKEA AERODROME - FILE 7861/13 - LOT 1 SUBJ TO & INT IN R/W 96-984
Valuation No	Level/unit number: 1 Valuation No: 14130 / 09300
Current, lawfully established use	Workshop
Year first constructed	2011

Building Work

Construct A New Workshop Faciltiy To Provide Maintenance Support To The No 3 Squadron Helicopter Fleet And Other Aircraft On Base. Construction Of An Aircraft Finishing Building. Construct Building To House The Centralised Compressed Air Supply Equip

Code Compliance

The building consent authority named below is satisfied, on reasonable grounds, that:

135 Manchester Street, Private Bag 10001, Feilding 4743, New Zealand
Telephone: 06 323 0000, Facsimile: 06 323 0822
Email: public@mdc.govt.nz Webpage: www.mdc.govt.nz

Manawatu
Young Heart, Easy Living

(a) The building work complies with the building consent ; and

(b) The specified systems in the building are capable of performing to the performance standards set out in the building consent.

Attachment

Compliance Schedule

On behalf of **Manawatu District Council**

Date 8 July 2013

Name Chris Henry
Position Team Leader – MDC Building Services

PROPERTY MEMORANDA

There are no Town Planning requirements.

Plumbing and/or Drainage work is to comply with the N.Z Building Code 1992

There are no Environmental Health requirements.

The building is to comply with the Building Act 1991.

There are no known General Bylaw Implications to this application

Engineering: No requirements.

Manawatu District Council

135 Manchester Street
Private Bag 10-001
FEILDING
Phone (06) 323 0000
Fax (06) 323 8711

BUILDING CONSENT NO. 112972 / 1

Section 35, Building Act 1991

Issued in accordance with Project Information Memorandum No 112972

APPLICANT / CONTACT

Applicant Name
Royal NZ Air Force

Address
Accounts Payable (82060)
P O Box 84-042
Westgate
AUCKLAND 1001

Telephone No

Contact Name
Wormald - Private Bag

Address
New Lynn, Auckland
ATT: Jason Dyer

Contact Phone No 09 826 1736

Contact Fax No

PROPERTY

Street Location
10 Pukenui

Legal Description
BASE PROPER - ADMIN RES ETC

Valuation Roll No 14130 / 09300A

STAGE DETAILS

Stage Number 1

Description of Stage
Upgrade Fire Protection for Hangars 2 & 3

Building Type Aircraft and Airport Hangar

Detailed Use
Hangars

Intended Life >50

Stage Classification
SMALL WORK

Stage Type
Alterations, repairs, extensions and resiting.

No of Units 1

No of Storey 1

Floor Area 0 sq metres

Designer

Value of Stage $50,000.00

This building permit is a consent under the Building Act 1991 to undertake building work in accordance with the attached plans and specifications so as to comply with the provisions of the Building Code. It does not affect any duty or responsibility under any other Act nor permit any breach of any other Act. This building consent is issued subject to any endorsements specified in the attached pages.....headed consent endorsements.....

Signed for and on behalf of the Manawatu District Council	Name Building Officer
Position	**Date** 20-Mar-2003 **Time** 09:56 AM

Manawatu District Council

135 Manchester Street
Private Bag 10-001
FEILDING
Phone (06) 323 0000
Fax (06) 323 8711

PROJECT INFORMATION MEMORANDUM

Section 31, Building Act 1991

P.I.M. No. 111119	Date Received 14-Jun-2001	Date Actioned 15-Jun-2001

APPLICANT / CONTACT

Applicant Name
Royal NZ Air Force

Address Accounts Payable (82060)
P O Box 84-042
Westgate
AUCKLAND 1001

Telephone No 3515 177

Contact Name
RNZAF Base Ohakea

Address
Private Bag 11 033
PALMERSTON NORTH

Contact Phone No 3515 177
Contact Fax No 3515 179

PROPERTY

Street Location
Pukenui Rd

Legal Description
BASE PROPER - ADMIN RES ETC

Valuation No 14130 / 09300A

PROJECT

Description of Project
Construction of a concrete slab and drainage

Proposed Use
Fire training slab and interceptor

Intended Life >50

Project Classification
SMALL WORK

Project Types
Foundations only.

No of Stages 1

Producer Statement

Approximate Value $17,000.00

This Project Information Memorandum includes all information known to this authority and is issued in accordance with the Building Act 1991.
This project information memorandum is:

- ☑ Confirmation that the proposed building work may be undertaken, subject to the provisions of the Building Act 1991 and any requirements of the building consent
  - ☐ Not yet applied for
  - ☑ No. 111119 attached
- ☐ Notification that other authorisations must be obtained before a building consent will be issued.
- ☐ Notification that the proposed building work may not be undertaken because a necessary authorisation has been refused.

Signed for and on behalf of the Manawatu District Council	Name Building Officer
Position	**Date** 15-Jun-2001 **Time** 12:47 PM

PROPERTY MEMORANDA

Engineering: No requirements.

There are no known General Bylaw Implications to this application

There are no Environmental Health requirements.

There are no Town Planning requirements.

The building is to comply with the Building Act 1991.

Plumbing and/or Drainage work is to comply with the N.Z Building Code 1992

All stormwater to be piped to an approved outlet

Manawatu District Council

135 Manchester Street
Private Bag 10-001
FEILDING
Phone (06) 323 0000
Fax (06) 323 8711

BUILDING CONSENT NO. 111119 / 1

Section 35, Building Act 1991
Issued in accordance with Project Information Memorandum No 111119

APPLICANT / CONTACT

Applicant Name
Royal NZ Air Force

Address
Accounts Payable (82060)
P O Box 84-042
Westgate
AUCKLAND 1001

Telephone No 3515 177

Contact Name
RNZAF Base Ohakea

Address
Private Bag 11 033
PALMERSTON NORTH

Contact Phone No 3515 177
Contact Fax No 3515 179

PROPERTY

Street Location
Pukenui Rd

Legal Description
BASE PROPER - ADMIN RES ETC

Valuation Roll No 14130 / 09300A

STAGE DETAILS

Stage Number 1

Description of Stage
Construction of a concrete slab and drainage

Building Type Administration Building

Detailed Use
Fire training slab and interceptor

Intended Life >50

Stage Classification
SMALL WORK

Stage Type
Foundations only.

No of Units 1

No of Storey 1

Floor Area 100 sq metres

Designer Belchambers Architects

Value of Stage $17,000.00

This building permit is a consent under the Building Act 1991 to undertake building work in accordance with the attached plans and specifications so as to comply with the provisions of the Building Code. It does not affect any duty or responsibility under any other Act nor permit any breach of any other Act. This building consent is issued subject to any endorsements specified in the attached pages.....headed consent endorsements.....

Signed for and on behalf of the Manawatu District Council	Name Building Officer
Position	**Date** 15-Jun-2001 **Time** 12:51 PM

Manawatu District Council

CODE COMPLIANCE CERTIFICATE

Issued in accordance with Section 43(3) of the Building Act 1991. Page 1 of 1

APPLICANT/CONTACT

Applicant Name Royal NZ Air Force

Address Accounts Payable (82060)
P O Box 84-042
Westgate
AUCKLAND 1001

Telephone No 3515 177

Contact Name RNZAF Base Ohakea

Address Private Bag 11 033
PALMERSTON NORTH

Contact Phone No 3515 177

Contact Fax No 3515 179

PROPERTY

Street Location
Pukenui Rd

Legal Description
BASE PROPER - ADMIN RES ETC

Valuation Roll No 14130 09300A

STAGE DETAILS

Building Consent No 111119

Stage Number 1

Description of Stage Construction of a concrete slab and drainage

Building Type Administration Building

Detailed Use Fire training slab and interceptor

Intended Life >50 **Years**

Brief Desc SMALL WORK

Stage Type Foundations only.

No of Units 1

No of Storeys 1

Floor Area 100 **Sq. Metres**

Designer Belchambers Architects

Value of Stage 17000

This is a final code compliance certificate issued in respect of all of the building work under the above consent. It is subject to any condition specified in the attached "Conditions of Code Compliance Certificate".

Signed for and on behalf of the Manawatu District Council

Name Building Officer

Position

Date 18 SEP 2002 **Time** 09:23

Manawatu District Council

135 Manchester Street
Private Bag 10-001
FEILDING
Phone (06) 323 0000
Fax (06) 323 8711

PROJECT INFORMATION MEMORANDUM

Section 31, Building Act 1991

P.I.M. No. 110540	**Date Received** 30-Nov-2000	**Date Actioned** 30-Nov-2000

APPLICANT / CONTACT

Applicant Name
Defence Force New Zealand HQ

Address Private Bag
WELLINGTON

Telephone No

Contact Name
Total Fire Protection

Address
PO Box 4224
AUCKLAND

Contact Phone No 09 4144077
Contact Fax No 09 4144099

PROPERTY

Street Location
Pukenui Rd

Legal Description
BASE PROPER - ADMIN RES ETC

Valuation No 14130 / 09300A

PROJECT

Description of Project
Fire Water Storage tank

Proposed Use
Industrial Storage

Intended Life 0

Project Classification
SMALL WORK

Project Types
Alterations, repairs, extensions and resiting.

No of Stages 1

Producer Statement

Approximate Valu $71,000.00

This Project Information Memorandum includes all information known to this authority and is issued in accordance with the Building Act 1991.
This project information memorandum is:

- [x] Confirmation that the proposed building work may be undertaken, subject to the provisions of the Building Act 1991 and any requirements of the building consent
  - Not yet applied for ☐
  - No. 110540/1 attached ☑
- [ ] Notification that other authorisations must be obtained before a building a consent will be issued.
- [ ] Notification that the proposed building work may not be undertaken because a necessary authorisation has been refused.

Signed for and on behalf of the Manawatu District Council	Name Graeme Duncan
Position Building Officer	**Date** 30-Nov-2000 **Time** 12:40 PM

PROPERTY MEMORANDA

OPERATIONS: No requirements.

There are no known General Bylaw Implications to this application

There are no Environmental Health requirements.

There are no Town Planning requirements.

The building is to comply with the Building Act 1991.

Manawatu District Council

135 Manchester Street
Private Bag 10-001
FEILDING
Phone (06) 323 0000
Fax (06) 323 8711

BUILDING CONSENT NO. 110540 / 1

Section 35, Building Act 1991
Issued in accordance with Project Information Memorandum No 110540

APPLICANT / CONTACT

Applicant Name
Defence Force New Zealand HQ

Address Private Bag
WELLINGTON

Telephone No

Contact Name
Total Fire Protection

Address
PO Box 4224
AUCKLAND

Contact Phone No 09 4144077
Contact Fax No 09 4144099

PROPERTY

Street Location
Pukenui Rd

Legal Description
BASE PROPER - ADMIN RES ETC

Valuation Roll No 14130 / 09300A

STAGE DETAILS

Stage Number 1

Description of Stage
Fire Water Storage tank

Building Type Dwelling (Additions)

Detailed Use
Industrial Storage

Intended Life 0

Stage Classification
SMALL WORK

Stage Type
Alterations, repairs, extensions and resiting.

No of Units 1

No of Storey 1

Floor Area 0 sq metres

Designer Aburn Industries

Value of Stage $71,000.00

This building permit is a consent under the Building Act 1991 to undertake building work in accordance with the attached plans and specifications so as to comply with the provisions of the Building Code. It does not affect any duty or responsibility under any other Act nor permit any breach of any other Act. This building consent is issued subject to any endorsements specified in the attached pages.....headed consent endorsements.....

Signed for and on behalf of the Manawatu District Council	Name Graeme Duncan
Position Building Officer	**Date** 30-Nov-2000 **Time** 12:40 PM

Manawatu District Council

CODE COMPLIANCE CERTIFICATE

Issued in accordance with Section 43(3) of the Building Act 1991.

APPLICANT/CONTACT

Applicant Name Defence Force New Zealand HQ

Address Private Bag
WELLINGTON

Telephone No

Contact Name Total Fire Protection

Address PO Box 4224
AUCKLAND

Contact Phone No 09 4144077

Contact Fax No 09 4144099

PROPERTY

Street Location
Pukenui Rd

Legal Description
BASE PROPER - ADMIN RES ETC

Valuation Roll No 14130 09300A

STAGE DETAILS

Building Consent No 110540

Stage Number 1

Description of Stage Fire Water Storage tank

Building Type Dwelling (Additions)

Detailed Use Industrial Storage

Intended Life 0 **Years**

Brief Desc SMALL WORK

Stage Type Alterations, repairs, extensions and resiting.

No of Units 1

No of Storeys 1

Floor Area 0 **Sq. Metres**

Designer Aburn Industries

Value of Stage 71000

This is a final code compliance certificate issued in respect of all of the building work under the above consent. It is subject to any condition specified in the attached "Conditions of Code Compliance Certificate".

Signed for and on behalf of the Manawatu District Council

Position Building Officer

Name Graeme Duncan

Date 24 JAN 2001 **Time** 13:43

Manawatu District Council

135 Manchester Street
Private Bag 10-001
FEILDING
Phone (06) 323 0000
Fax (06) 323 8711

PROJECT INFORMATION MEMORANDUM

Section 31, Building Act 1991

P.I.M. No. 101074	Date Rec'd 10-Aug-199	Date Act'd 12-Aug-1994

APPLICANT/CONTACT

Applicant Name: R N Z A F Base Ohakea

Address:
Base Commander
Private Bag
PALMERSTON NORTH

Telephone No: 357-5424

Contact Name: Wormald NZ Ltd

Address:
P O Box 38800
Petone - Attn: J Rose
Contact Phone No: 569-4636
Contact Fax No: 358-6959

PROPERTY

Street Location:
Pukenui Rd
OHAKEA

Legal Description:
BASE PROPER - ADMIN RES ETC

Valuation Roll No: 14130 09300A

PROJECT

Description of Project: Water storage tank & Pump room for Sprinkler System

Proposed Use:
Water Storage tank & Pump room for Sprinkler System

Intended Life: >50 years
Project Classification:
ACCESSORY BUILDINGS

Project Types:

Alterations, repairs, extensions and resiting.

Number of Stages: 1
Producer Statement: does not exist

Approximate Value: $ 29025

This Project Information Memorandum includes all information known to this authority and is issued in accordance with the Building act 1991.
This project information memorandum is:

- ☐ Confirmation that the proposed building work may be undertaken, subject to the provisions of the Building Act 1991 and any requirements of the building consent
  Not yet applied for ☐ No:..... attached ☐
- ☐ Notification that other authorisations must be obtained before a building consent will be issued.
- ☐ Notification that the proposed building work may not be undertaken because a necessary authorisation has been refused.

Signed for and on behalf of the Manawatu District Council	Name Walter Wilkins
Position Senior Building Officer	**Date** 12-Aug-1994 **Time** 10:07 am

PROPERTY MEMORANDA

There are no Town Planning requirements.

ENGINEERING: No requirements.

CONSTRUCTION to comply to NZ BUILDING ACT 1991.

HEALTH - NO requirements.

There are no applicable Plumbing and Drainage requirements.

There are no known General Bylaws Implications to this application,

Manawatu District Council

135 Manchester Street
Private Bag 10-001
FEILDING
Phone (06) 323 0000
Fax (06) 323 8711

BUILDING CONSENT NO 101074/1

Section 35, Building Act 1991
Issued in accordance with Project Information Memorandum No 101074

APPLICANT/CONTACT

Applicant Name R N Z A F Base Ohakea

Address
Base Commander
Private Bag
PALMERSTON NORTH

Telephone No 357-5424

Contact Name Wormald NZ Ltd

Address

Contact Phone No 569-4636
Contact Fax No 358-6959

PROPERTY

Street Location
Pukenui Rd
OHAKEA

Legal Description
BASE PROPER - ADMIN RES ETC

Valuation Roll No 14130 09300A

STAGE DETAILS

Stage Number 1
Description of Stage Water storage tank & Pump room for Sprinkler System

Building Type Storage tank

Detailed Use
Water Storage tank & Pump room for Sprinkler System

Intended Life >50 years
Stage Classification
ACCESSORY BUILDINGS

Stage Type Alterations, repairs, extensions and resiting.
No of Units 1
No of Storeys 1
Floor Area sq metres

Designer
Value of Stage $ 29025

This building permit is a consent under the Building Act 1991 to undertake building work in accordance with the attached plans and specifications so as to comply with the provisions of the Building Code. It does not affect any duty or responsibility under any other Act nor permit any breach of any other Act.
This building consent is issued subject to any endorsements specified in the attached pages..... headed consent endorsements.....

Signed for and on behalf of the Manawatu District Council	Name Graeme Duncan
Position Building Officer	Date 12-Aug-1994 Time 10:08 am

Manawatu District Council

135 Manchester Street
Private Bag 10-001
FEILDING
Phone (06) 323 0000
Fax (06) 323 8711

CODE COMPLIANCE CERTIFICATE

Issued in accordance with Section 43(3) of the Building Act 1991.

APPLICANT/CONTACT

Applicant Name R N Z A F Base Ohakea

Address
Base Commander
Private Bag
PALMERSTON NORTH

Telephone No 357-5424

Contact Name Wormald NZ Ltd

Address
P O Box 38800
Petone - Attn: J Rose
Contact Phone No 569-4636
Contact Fax No 358-6959

PROPERTY

Street Location
Pukenui Rd
OHAKEA

Legal Description
BASE PROPER - ADMIN RES ETC

Valuation Roll No 14130 09300A

STAGE DETAILS

Building Consent Number 101074
Stage Number 1
Description of Stage Water storage tank & Pump room for Sprinkler System

Building Type Storage tank

Detailed Use
Water Storage tank & Pump room for Sprinkler System

Intended Life >50 years
Stage Classification
ACCESSORY BUILDINGS

Stage Type Alterations, repairs, extensions and resiting.
No of Units 1
No of Storeys 1
Floor Area sq metres

Designer
Value of Stage $ 29025

This is a final code compliance certificate issued in respect of all of the building work under the above building consent. It is subject to any conditions specified in the attached **"Conditions of Code Compliance Certificate".**

Signed for and on behalf of the Manawatu District Council	W.E. Wilkins **Name** Walter Wilkins
Position Senior Building Officer	**Date** 2-Jun-1995 **Time** 10:53 am

James Conway

From: Nerena Rhodes
Sent: Wednesday, 15 February 2017 8:55 a.m.
To: James Conway
Subject: FW: Site contamination enquiry (++23470++)

FYI

From: Hail Enquiries [mailto:Hail.Enquiries@horizons.govt.nz]
Sent: Tuesday, 14 February 2017 4:31 p.m.
To: Nerena Rhodes
Cc: robert.rose@horizons.govt.nz
Subject: Site contamination enquiry (++23470++)

Hi We have three HAIL entries. The third identifies eight sites one of which was identified in the previous entry

1- Pukenui Road A2 Chemical manufacture, formulation or bulk storage

2- Pukenui Road C3 Trainning Area Montgomery Watson report dated 27/04/01 Serco Yard

This site was used as a storage area for drums of tar for approximately 28 years until April 2001. As a result of this land use, a volume of waste tar and contaminated soil was removed from the site. Subsequent investigation of the site has indicated that residual petroleum hydrocarbon contamination is minimal. The risks to human health and the environment posed by this site are minimal and the site is suitable for commercial/industrial use.

3 Raumai Road C3 Trainning area

RNZAF Base Ohakea - Confidence Course Landfill (S23:122-095), 25m Range Landfill (S23:116-085), Fire Training Facility (S23:130-076), Former Dangerous Goods Store - Serco Yard (S23:125-096), Former Flammable Goods Storage Area - Serco Yard (S23:120-090), Former Coal Tar Storage Area - Serco Yard (S23:125-096), Raumai Air Weapons Range (S23:976-099)

Hope this helps

Regards

Contaminated Land Enquiries
HAIL.enquiries@horizons.govt.nz
Tel: 0508 800 800 | Cell: 021 247 7341

Appendix C

Tabulated PFAS Results from Previous Investigations

Table C-1: Groundwater Sample Results [1]

Sample ID	BHC	Duplicate 2	% RPD [2]	US EPA Drinking Water Health Advisories [3]
Sample Site Location	BHC	Duplicate of BHC		
Laboratory ID	15-132064-1	15-132064-2		
Sampling Date	21/09/2015	21/09/2015		Potable
Perfluoronated Compounds				
Perfluorooctane sulfonate (PFOS)	0.31	0.31	0%	0.07 [4]
Perfluorooctanoic acid (PFOA)	0.019	0.019	0%	
6:2 Fluorotelomer sulfonate (6:2 FtS)	0.013	0.012	8%	NGV
8:2 Fluorotelomer sulfonate (8:2 FtS)	0.0069	0.00640	8%	NGV
Perfluorobutanesulfonic acid (PFBS)	0.014	0.015	7%	NGV
Perfluorohexanesulfonic acid (PFHxS)	0.19	0.20	5%	NGV
Perfluorohexanoic acid (PFHxA)	0.050	0.052	4%	NGV
Perfluoroheptanoic acid (PFHpA)	0.011	0.011	0%	NGV
Perfluorononanoic acid (PFNA)	0.0024	0.0021	13%	NGV

Notes:

1. All results are from *Ohakea Bulk Fuel Stroage Facility Groundwater Monitoring: PFCs* report prepared by T&T for NZDF, 2015. Results are in µg/L.
2. RPD = Relative Percent Difference.
3. US EPA PFOA and PFOS Drinking Water Health Advisories (see https://www.epa.gov/sites/production/files/2016-05/documents/2016-12361.pdf).
4. Screening level applies to the sum of PFOS and PFOA.

0.31 Value exceeds the US EPA Drinking Water Advisories.

Table 11: Soil Analysis Results - Perfluorinated Compounds

Perfluorinated Compounds in Soil[1]									
Sample Name	HA1 0.2	HA2 0.1	HA3 0.2	HA4 0.2	TP2 0.1	TP2 0.4	TP8 0.1	TP8 0.8	EPA SOILS[2,3]
Laboratory Reference	ES1503901-001	ES1503901-002	ES1503901-003	ES1503901-004	ES1503901-005	ES1503901-006	ES1503901-007	ES1503901-008	
Sample Location	HA1	HA2	HA3	HA4	TP2	TP2	TP8	TP8	
Soil Type	Silt	Sand	Silt	Silt	Silt	Silt	Silt	Sand	
EP231: Perfluorinated Compounds									
Perfluorooctane sulfonate (PFOS)	0.0688	0.0442	0.0250	0.0036	0.0195	<0.0005	0.0110	<0.0005	6
Perfluorooctanoic acid (PFOA)	0.023	0.0337	0.0194	0.0011	0.0079	0.0009	0.0017	<0.0005	16
6:2 Fluorotelomer sulfonate (6:2 FtS)	0.346	0.604	0.376	0.046	0.024	<0.005	0.006	0.006	NGV
8:2 Fluorotelomer sulfonate (8:2 FtS)	0.183	0.304	0.287	<0.001	<0.001	<0.001	<0.001	<0.001	NGV
Perfluorooctane sulfonamide (PFOSA)	0.0094	0.0145	0.0048	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	NGV
N-Methyl-heptadecafluorooctane sulfonamide (N-Me-FOSA)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NGV
N-Ethyl-heptadecafluorooctane sulfonamide (N-Et-FOSA)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NGV
N-Methyl-heptadecafluorooctane sulfonamidoethanol (N-Me-FOSE)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NGV
N-Ethyl-heptadecafluorooctane sulfonamidoethanol (N-Et-FOSE)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NGV
Perfluorobutane sulfonate (PFBS)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NGV
Perfluorohexane sulfonate (PFHxS)	0.0032	0.0008	<0.0002	0.0006	0.0004	0.0003	0.0003	<0.0002	NGV
Perfluorodecane sulfonate (PFDcS)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NGV
Perfluorohexanoic acid (PFHxA)	0.0274	0.0239	0.0416	0.0090	0.0121	0.0044	0.0130	0.00360	NGV
Perfluoroheptanoic acid (PFHpA)	0.0121	0.0119	0.0108	0.0045	0.0088	0.0010	0.0093	<0.0002	NGV
Perfluorononanoic acid (PFNA)	0.0207	0.0298	0.0068	0.0011	0.0036	<0.0002	0.0028	<0.0002	NGV
Perfluorodecanoic acid (PFDcA)	0.0067	0.0089	0.0042	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NGV
Perfluoroundecanoic acid (PFUnA)	0.0030	0.0038	0.0017	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	NGV
Perfluorododecanoic acid (PFDoA)	0.0011	0.0014	0.0008	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NGV
Perfluorotridecanoic acid (PFTriA)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NGV
Perfluorotetradecanoic acid (PFTeA)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NGV

Notes :
1. Results in mg/kg.
2. Residential Soil Screening Levels for Perfluorooctanoic Acid (PFOA) and Perfluorooctyl Sulfonate (PFOS) sourced from US EPA (2009) (no commercial/industrial levels available).
3. NGV = No Guideline value provided in US EPA 2009.

Table 14: Groundwater Sampling Results - Perfluorinated Compounds

Perfluorinated Compounds in Groundwater [1]							
Sample Name	MW1 - 03	MW1 - 04	MW2 - 03	MW2 - 04	MW3 - 01	MW4 - 01	Provisional Drinking Water Guidelines [2]
Laboratory Reference	ES1520453-001	ES1526105-004	ES1520453-003	ES1526105-005	ES1526105-006	ES1526105-007	
Location	MW1	MW1	MW2	MW2	MW3	MW4	
Date	16/04/2015	9/07/2015	16/04/2015	9/07/2015	9/07/2015	9/07/2015	
EP231: Perfluorinated Compounds							
Perfluorooctane sulfonate (PFOS)	0.57	0.69	5.69	6.56	1.52	3.02	0.2 [3]
Perfluorooctanoic acid (PFOA)	0.29	0.24	1.21	0.97	2.39	0.54	0.4 [3]
6:2 Fluorotelomer sulfonate (6:2 FtS)	7.2	11.7	9.8	14.2	6.3	5.6	295 [4]
8:2 Fluorotelomer sulfonate (8:2 FtS)	<0.1	<0.1	0.1	0.2	<0.1	<0.1	NGV
Perfluorooctane sulfonamide (PFOSA)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NGV
N-Methyl-heptadecafluorooctane sulfonamide (N-Me-FOSA)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NGV
N-Ethyl-heptadecafluorooctane sulfonamide (N-Et-FOSA)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NGV
N-Methyl-heptadecafluorooctane sulfonamidoethanol (N-Me-FOSE)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NGV
N-Ethyl-heptadecafluorooctane sulfonamidoethanol (N-Et-FOSE)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NGV
Perfluorobutane sulfonate (PFBS)	0.04	0.04	0.12	0.11	<0.02	0.05	7 [5]
Perfluorohexane sulfonate (PFHxS)	0.45	0.61	2.84	3.28	0.13	1.35	NGV
Perfluorodecane sulfonate (PFDcS)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NGV
Perfluorohexanoic acid (PFHxA)	1.17	5.25	1.32	9.23	3.39	2.09	NGV
Perfluoroheptanoic acid (PFHpA)	0.38	1.09	0.66	2.87	1.32	0.71	NGV
Perfluorononanoic acid (PFNA)	0.07	0.09	0.70	0.73	0.10	0.32	NGV
Perfluorodecanoic acid (PFDcA)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NGV
Perfluoroundecanoic acid (PFUnA)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NGV
Perfluorododecanoic acid (PFDoA)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NGV
Perfluorotridecanoic acid (PFTriA)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NGV
Perfluorotetradecanoic acid (PFTeA)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NGV

Perfluorinated Compounds in Groundwater [1]							
Sample Name	WS1	WS1	WS2-1	WS2-2	WS3-1	WS3-2	Provisional Drinking Water Guidelines [2]
Laboratory Reference	15-59870-1	15-79658-1	ES1526917-001	15-87353-1	ES1526917-002	15-87353-2	
Location	Farm Bore	Farm Bore	Drinking Supply Well	Drinking Supply Well	Backup Supply Well	Backup Supply Well	
Date	28/05/2015	9/07/2015	24/07/2015	24/07/2015	24/07/2015	24/07/2015	
EP231: Perfluorinated Compounds							
Perfluorooctane sulfonate (PFOS)	0.0026 [6]	0.0029 [6]	< 0.02	0.00076	< 0.02	< 0.0005	0.2 [3]
Perfluorooctanoic acid (PFOA)	0.0066	0.01	< 0.02	0.0015	< 0.02	< 0.001	0.4 [3]
4:2 Fluorotelomer sulfonate (4:2 FtS)	0.0012	0.0012	-	< 0.001	-	< 0.001	NGV
6:2 Fluorotelomer sulfonate (6:2 FtS)	0.035	0.075	< 0.1	< 0.003	< 0.1	< 0.003	295 [4]
8:2 Fluorotelomer sulfonate (8:2 FtS)	< 0.002	<0.002	< 0.1	< 0.002	< 0.1	< 0.002	NGV
Perfluorooctane sulfonamide (PFOSA)	<0.001	<0.001	< 0.02	< 0.001	< 0.02	< 0.001	NGV
N-Methyl-heptadecafluorooctane sulfonamide (N-Me-FOSA)	<0.003	<0.003	< 0.5	< 0.003	< 0.5	< 0.003	NGV
N-Ethyl-heptadecafluorooctane sulfonamide (N-Et-FOSA)	<0.002	<0.002	< 0.05	< 0.002	< 0.05	< 0.002	NGV
N-Methyl-heptadecafluorooctane sulfonamidoethanol (N-Me-FOSE)	-	-	< 0.5	-	< 0.5	-	NGV
N-Ethyl-heptadecafluorooctane sulfonamidoethanol (N-Et-FOSE)	-	-	< 0.5	-	< 0.5	-	NGV
Perfluorobutane sulfonate (PFBS)	0.016	0.02	< 0.02	0.0011	< 0.02	< 0.0005	7 [5]
Perfluorohexane sulfonate (PFHxS)	0.067	0.083	< 0.02	0.0035	< 0.02	< 0.0005	NGV
Perfluorodecane sulfonate (PFDcS)	<0.002	<0.002	< 0.02	< 0.002	< 0.02	< 0.002	NGV
Perfluorohexanoic acid (PFHxA)	0.047	0.05	< 0.02	0.0043	< 0.02	< 0.0005	NGV
Perfluoroheptanoic acid (PFHpA)	0.011	0.014	< 0.02	0.0018	< 0.02	< 0.0005	NGV
Perfluorononanoic acid (PFNA)	0.0017	0.0026	< 0.02	< 0.001	< 0.02	< 0.001	NGV
Perfluorodecanoic acid (PFDcA)	<0.001	<0.001	< 0.02	< 0.001	< 0.02	< 0.001	NGV
Perfluoroundecanoic acid (PFUnA)	<0.001	<0.001	< 0.05	< 0.001	< 0.05	< 0.001	NGV
Perfluorododecanoic acid (PFDoA)	<0.001	<0.001	< 0.05	< 0.001	< 0.05	< 0.001	NGV
Perfluorotridecanoic acid (PFTriA)	-	-	< 0.05	-	< 0.05	-	NGV
Perfluorotetradecanoic acid (PFTeA)	-	-	< 0.5	-	< 0.5	-	NGV

Notes:

1. Results in ug/L.
2. NGV = No guideline value.
3. Provisional short term guidelines for potable drinking water sourced from US EPA (2012).
4. Screening value obtained from Jarman et al (2014).
5. Drinking water health risk limit for PFBS sourced from Minnesota Department of Health (MDH, date unknown).
6. Estimated Result. See Appendix F for details.

Concentration Exceeds Provisional Drinking Water Guidelines

Table 17: Interceptor and Surface Water Sampling Results - Perfluorinated Compounds

Perfluorinated Compounds in Surface Water [1]						
Sample Name	INT 1 [2]	SW1-1	SW1-2	SW2	SW3	Aquatic Guidelines [3]
Laboratory Reference	ES1503901-009	15-59870-2	15-79658-3	15-103120-1	15-103120-2	
Location	Interceptor	West Drain	West Drain	East Drain	Stream	
Date	10/02/2015	28/05/2015	9/07/2015	19/08/2015	19/08/2015	
EP231: Perfluorinated Compounds						
Perfluorooctane sulfonate (PFOS)	0.48	0.4	0.19	0.0049	0.035	0.61 [4]
Perfluorooctanoic acid (PFOA)	8.25	0.085	0.091	0.017	0.013	2,900 [5]
4:2 Fluorotelomer sulfonate (4:2 FtS)	-	0.002	<0.001	<0.001	<0.001	NGV
6:2 Fluorotelomer sulfonate (6:2 FtS)	698	0.28	0.15	0.0062 [6]	0.037 [6]	NGV
8:2 Fluorotelomer sulfonate (8:2 FtS)	9.1	<0.002	<0.002	0.0096	0.0023 [6]	NGV
Perfluorooctane sulfonamide (PFOSA)	0.03	<0.001	<0.001	<0.001	<0.001	NGV
N-Methyl-heptadecafluorooctane sulfonamide (N-Me-FOSA)	<0.5	<0.003	<0.003	<0.003	<0.003	NGV
N-Ethyl-heptadecafluorooctane sulfonamide (N-Et-FOSA)	<0.05	<0.002	<0.002	<0.002	<0.002	NGV
N-Methyl-heptadecafluorooctane sulfonamidoethanol (N-Me-FOSE)	< 0.5	-	-	-	-	NGV
N-Ethyl-heptadecafluorooctane sulfonamidoethanol (N-Et-FOSE)	< 0.5	-	-	-	-	NGV
Perfluorobutane sulfonate (PFBS)	<0.02	0.014	0.009	0.00094	0.0025	24,000 [7]
Perfluorohexane sulfonate (PFHxS)	<0.02	0.18	0.12	0.0065	0.04	NGV
Perfluorodecane sulfonate (PFDcS)	<0.02	<0.002	<0.002	<0.002	<0.002	NGV
Perfluorohexanoic acid (PFHxA)	13.2	0.14	0.081	0.015	0.052	NGV
Perfluoroheptanoic acid (PFHpA)	1.07	0.089	0.068	0.014	0.017	NGV
Perfluorononanoic acid (PFNA)	2.73	0.048	0.049	0.0075	0.0068	NGV
Perfluorodecanoic acid (PFDcA)	0.59	<0.001	<0.001	<0.001	<0.001	NGV
Perfluoroundecanoic acid (PFUnA)	<0.05	<0.001	<0.001	<0.001	<0.001	NGV
Perfluorododecanoic acid (PFDoA)	<0.05	<0.001	<0.001	<0.001	<0.001	NGV
Perfluorotridecanoic acid (PFTriA)	< 0.05	-	-	-	-	NGV
Perfluorotetradecanoic acid (PFTeA)	< 0.5	-	-	-	-	NGV

Notes:
1. Results in µg/L.
2. INT 1 is from surface water that drains to groundwater soakage pit.
3. NGV = No guideline value.
4. Predicted No Effect Concentration (95% ecosystem protection) ($PNEC_{0.05}$). Sourced from Qi et al (2011).
5. Secondary Continuous Criterion for PFOA sourced from Giesy et al (2010a).
6. Estimated Result. See Appendix F for details.
7. Secondary Continuous Concentration for PFBS sourced from Giesy et al (2010b).

Table 18: QA/QC Water Sampling Results - Perfluorinated Compounds

	Perfluorinated Compounds in Water[1]						
Sample Name	MW1-04	MWA	MWC	MWD			
Lab Numbers	ES1526105-004	ES1526105-001	ES1526105-003	15-79658-2			
Date	9/07/2015	9/07/2015	9/07/2015	9/07/2015	%RPD (MW1-04 and MWC)	%RPD (MWC and MWD)	**Provisional Drinking Water Guidelines[2]**
Location	MW1	Control water	MW1-04 Duplicate	MWC Duplicate			
Laboratory of Analysis	ALS Labs	AsureQuality Labs	ALS Labs	AsureQuality Labs			
EP231: Perfluorinated Compounds							
Perfluorooctane sulfonate (PFOS)	0.69	<0.02	0.53	0.29	26%	59%	0.2 [3]
Perfluorooctanoic acid (PFOA)	0.24	<0.02	0.37	0.25	43%	39%	0.4 [3]
6:2 Fluorotelomer sulfonate (6:2 FtS)	11.7	<0.1	9.9	11	17%	11%	295 [4]
8:2 Fluorotelomer sulfonate (8:2 FtS)	<0.1	<0.1	<0.1	<0.02	-	-	NGV
Perfluorooctane sulfonamide (PFOSA)	<0.02	<0.02	<0.02	<0.01	-	-	NGV
N-Methyl-heptadecafluorooctane sulfonamide (N-Me-FOSA)	<0.5	<0.5	<0.5	<0.03	-	-	NGV
N-Ethyl-heptadecafluorooctane sulfonamide (N-Et-FOSA)	<0.05	<0.05	<0.05	<0.02	-	-	NGV
N-Methyl-heptadecafluorooctane sulfonamidoethanol (N-Me-FOSE)	<0.5	<0.5	<0.5	-	-	-	NGV
N-Ethyl-heptadecafluorooctane sulfonamidoethanol (N-Et-FOSE)	<0.5	<0.5	<0.5	-	-	-	NGV
Perfluorobutane sulfonate (PFBS)	0.04	<0.02	0.04	0.05	0%	22%	7 [5]
Perfluorohexane sulfonate (PFHxS)	0.61	<0.02	0.62	0.37	2%	51%	NGV
Perfluorodecane sulfonate (PFDcS)	<0.02	<0.02	<0.02	<0.02	-	-	NGV
Perfluorohexanoic acid (PFHxA)	5.25	<0.02	5.25	4.4	0%	18%	NGV
Perfluoroheptanoic acid (PFHpA)	1.09	<0.02	1.06	0.91	3%	15%	NGV
Perfluorononanoic acid (PFNA)	0.09	<0.02	0.07	0.052	25%	30%	NGV
Perfluorodecanoic acid (PFDcA)	<0.02	<0.02	<0.02	<0.01	-	-	NGV
Perfluoroundecanoic acid (PFUnA)	<0.05	<0.05	<0.05	<0.01	-	-	NGV
Perfluorododecanoic acid (PFDoA)	<0.05	<0.05	<0.05	<0.01	-	-	NGV
Perfluorotridecanoic acid (PFTriA)	<0.05	<0.05	<0.05	-	-	-	NGV
Perfluorotetradecanoic acid (PFTeA)	<0.5	<0.5	<0.5	-	-	-	NGV

Notes:
1. Results in ug/L.
2. NGV = No guideline value.
3. Provisional short term guidelines sourced from US EPA (2012).
4. Screening value obtained from Jarman et al (2014).
5. Drinking water health risk limit for PFBS sourced from Minnesota Department of Health (MDH, date unknown).

Exceeds Provisional Drinking Water Guidelines

Appendix D

Site Personnel Interviews

Pattle Delamore Partners Ltd (PDP) has been engaged by New Zealand Defence Force (NZDF) to investigate the potential use, storage and disposal of a group of chemicals called Per- and Polyfluoroalkyl Substances (PFAS). These chemicals are present in a variety of substances including some aircraft hydraulic fluids, Aqueous Film Forming Foams (AFFF) and some chemicals used in metal plating processes and photographic processing.

As part of the investigation PDP will interview personnel at Ohakea to understand how these chemicals may be being used, both historically and currently. The interview questionnaire has been provided to you in advance so that you may gather any necessary information in advance of the interview. Please bring this questionnaire with you to the interview.

Please contact [s. 9(2)(a)] Environmental Services, NZDF[s. 9(2)(a)] if you have any questions.

Thank you for your time.

RNZAF Base Ohakea Airforce Fire Flight Personnel Interview:		
	Name	[s. 9(2)(a)]
	Position Title	Watch Room Operator
	Length of time in the Position	3 years
	Previous Position	SGT. Flight SGT. Rescue Fire.
	Association with the Site	1989-1994
	Contact Details	Ohakea Rescue Fire ex.[s. 9(2)(k)]
	Date of Interview	05/03/17
1.	Briefly describe the activities undertaken at Fire Flight that involve the use of hazardous chemicals.	Continuation training
2.	Briefly describe the activities historically undertaken at Fire Flight that involved the use of hazardous chemicals (if different from above).	As above

3.	Please provide the name of any firefighting foams that are used, or have been used in the past.	AFFF protein foam Late 70's and early 80's, 1981 basically phased out (FFFP's) AFFF used more in late 80's to early 90's
4.	Please provide an approximate frequency of fire training and describe the locations where fire training is conducted. Please identify how frequently fire training is conducted in each location and whether firefighting foam is used in that location.	3 or 4 times in a working week All locations indicated on airfield map
5.	Please provide an approximate annual volume of firefighting foam used both in training and responding to incidents.	?

6.	Please provide the names of <u>other fluids</u> used in firefighting operations (including training) e.g. cleaning fluids.	AV Gas AV TUR Turps Oil based paints Lead based paints Methyl acetate You would need to get a manifest from the paint shop going back to the 70's, 80's, 90's.
7.	Please identify the <u>current</u> location(s) of any storage of firefighting foam (including in drums, storage sheds, indoors or outdoors).	Not answered

8.	Please identify the historic location(s) of any storage of firefighting foam (including in drums, storage sheds, indoors or outdoors).	Not answered
9.	Please identify how firefighting foam is transported around the base.	Not answered
10.	Please identify any current location(s) where cleaning and maintenance of firefighting equipment, including vehicles, is conducted.	Not answered

11.	Please identify any historic location(s) where cleaning and maintenance of firefighting equipment, including vehicles, has occurred.	Not answered
12.	Please describe how and where waste and/or excess fluids associated with firefighting are currently disposed of.	Not answered

13.	Please describe how and where waste and/or excess fluids associated with firefighting were disposed of historically.	Not answered
14.	Please describe any spills or leaks of firefighting foam or fluids that have occurred on site (including location, substance(s), approximate volume, action taken, and ultimate fate of spilled/leaked fluid).	Not answered

15.	Please describe any fire incidents that have occurred on site. In particular any incidents where firefighting foam was used, (including via a sprinkler or deluge system).	Not answered
16.	Are you aware of any historic incidents or accidents (including burial or dumping of waste) that may have resulted in the release of or the use of firefighting foam?	Not answered

Pattle Delamore Partners Ltd (PDP) has been engaged by New Zealand Defence Force (NZDF) to investigate the potential use, storage and disposal of a group of chemicals called Per- and Polyfluoroalkyl Substances (PFAS). These chemicals are present in a variety of substances including some aircraft hydraulic fluids, Aqueous Film Forming Foams (AFFF) and some chemicals used in metal plating processes and photographic processing.

As part of the investigation PDP will interview personnel at Ohakea to understand how these chemicals may be being used, both historically and currently. The interview questionnaire has been provided to you in advance so that you may gather any necessary information in advance of the interview. Please bring this questionnaire with you to the interview.

Please contact [s. 9(2)(a)] Environmental Services, NZDF on [s. 9(2)(a)] if you have any questions.

Thank you for your time.

RNZAF Base Ohakea Airforce Fire Flight Personnel Interview:		
	Name	[s. 9(2)(a)]
	Position Title	Blue shift leader Ohakea Fire Station
	Length of time in the Position	9 years
	Previous Position	6 years
	Association with the Site	Fire Fighter Royal Base Ohakea
	Contact Details	[s. 9(2)(a) and 9(2)(k)]
	Date of Interview	05/03/17
1.	Briefly describe the activities undertaken at Fire Flight that involve the use of hazardous chemicals.	Fire Fighting activities - AFFF foam / Dry powder chemicals Cleaning vehicles and servicing equipment - Degreases / oils / detergents / CRC etc..
2.	Briefly describe the activities historically undertaken at Fire Flight that involved the use of hazardous chemicals (if different from above).	The use of BCF Extinguishers during firefighting activities Training -> Burning of oils/fuels and chemicals

3.	Please provide the name of any firefighting foams that are used, or have been used in the past.	AFFF FFFP Blood and bone A class rural foams
4.	Please provide an approximate frequency of fire training and describe the locations where fire training is conducted. Please identify how frequently fire training is conducted in each location and whether firefighting foam is used in that location.	Foam tests were carried out on the monthly inspections with a large foam test carried out on a 6 monthly rotation. Tests were carried out in multiple locations - Training area/grassed areas of the perimeter Road / Threshold 33. - Fire station
5.	Please provide an approximate annual volume of firefighting foam used both in training and responding to incidents.	I'm not sure. I couldn't answer that effectively.

6.	Please provide the names of other fluids used in firefighting operations (including training) e.g. cleaning fluids.	Degreasers Detergents Oils and sprays I couldn't give you all the names, I can only remember some brand names, e.g. CRC, 40/40 oil etc..
7.	Please identify the current location(s) of any storage of firefighting foam (including in drums, storage sheds, indoors or outdoors).	At the rear of the fire station we have a supply of AFFF and A class foam They are stored on the lean too on self-contained pallet

8.	Please identify the historic location(s) of any storage of firefighting foam (including in drums, storage sheds, indoors or outdoors).	We had an old container at the back of the fire station between the lean too and the apron
9.	Please identify how firefighting foam is transported around the base.	Drums / containers / trucks
10.	Please identify any current location(s) where cleaning and maintenance of firefighting equipment, including vehicles, is conducted.	M.T. Fire station

11.	Please identify any historic location(s) where cleaning and maintenance of firefighting equipment, including vehicles, has occurred.	M.T. / Fire Station / Training area
12.	Please describe how and where waste and/or excess fluids associated with firefighting are currently disposed of.	Due to current HSNO regulations waste fuels and oils are dumped into the correct receptacles

13.	Please describe how and where waste and/or excess fluids associated with firefighting were disposed of historically.	Drums / drains / burnt
14.	Please describe any spills or leaks of firefighting foam or fluids that have occurred on site (including location, substance(s), approximate volume, action taken, and ultimate fate of spilled/leaked fluid).	3 Hanger sprinkler system had a major leak – cleaned up foam with spill kits Spilt foam small amounts whilst filling tanks. Diluted, then flushed down drains

15.	Please describe any fire incidents that have occurred on site. In particular any incidents where firefighting foam was used, (including via a sprinkler or deluge system).	3 Hanger foam deluge system activated 2 hanger foam deluge system Leak/spill HTU foam system tests Foam blankets laid on runways. A4 crash southern perimeter, road foam used CT4 crash Raumai, foam used
16.	Are you aware of any historic incidents or accidents (including burial or dumping of waste) that may have resulted in the release of or the use of firefighting foam?	Our training area??

Pattle Delamore Partners Ltd (PDP) has been engaged by New Zealand Defence Force (NZDF) to investigate the potential use, storage and disposal of a group of chemicals called Per- and Polyfluoroalkyl Substances (PFAS). These chemicals are present in a variety of substances including some aircraft hydraulic fluids, Aqueous Film Forming Foams (AFFF) and some chemicals used in metal plating processes and photographic processing.

As part of the investigation PDP will interview personnel at Ohakea to understand how these chemicals may be being used, both historically and currently. The interview questionnaire has been provided to you in advance so that you may gather any necessary information in advance of the interview. Please bring this questionnaire with you to the interview.

Please contact [s. 9(2)(a)] Environmental Services, NZDF on [s. 9(2)(a)] if you have any questions.

Thank you for your time.

RNZAF Base Ohakea Airforce Fire Flight Personnel Interview:		
	Name	F/S [s. 9(2)(a)]
	Position Title	Base Firemaster Ohakea RFS
	Length of time in the Position	11 months
	Previous Position	Fire Fighter Ohakea RFS
	Association with the Site	Since 1989
	Contact Details	[s. 9(2)(k)]
	Date of Interview	08/03/17
1.	Briefly describe the activities undertaken at Fire Flight that involve the use of hazardous chemicals.	Vehicle foam system testing, foam application training, crash response exercises. Foams including protein and AFFF
2.	Briefly describe the activities historically undertaken at Fire Flight that involved the use of hazardous chemicals (if different from above).	Waste fuels burned at the old training area as hot fire training exercises

3.	Please provide the name of any firefighting foams that are used, or have been used in the past.	Protein and AFFF
4.	Please provide an approximate frequency of fire training and describe the locations where fire training is conducted. Please identify how frequently fire training is conducted in each location and whether firefighting foam is used in that location.	Monthly foam checks (10 sec foam activation). Training crash exercises approx. annually
5.	Please provide an approximate annual volume of firefighting foam used both in training and responding to incidents.	Approx. 200 litres