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<p>Scale: 1:50,000</p> <p>Map Projection: Transverse Mercator Horizontal Datum: GDA 1984 Zone: 55N, 96N, 97N, 98E</p>		<p><b>LEGEND</b></p> <p>Investigation Area (dotted line)</p> <p>Perimeter of Environmental Concern - Zone 1 (solid line)</p> <p>Perimeter of Environmental Concern - Zone 2 (dashed line)</p> <p>Waste Storage Facility (hatched area)</p> <p>Waste Storage Area (stippled area)</p> <p>Water Storage/Collection Lines (dashed line)</p> <p>Waste Storage Location (square symbol)</p> <p>Waste Storage Location (circle symbol)</p> <p>Investigation Point (circle symbol)</p> <p>Sampling Location - Zone 1 (circle symbol)</p> <p>Sampling Location - Zone 2 (circle symbol)</p> <p>Sampling Location - Zone 3 (circle symbol)</p>	<p>Department of Defence</p> <p><b>AD</b></p> <p>Areas Of Environmental Concern C &amp; D Sample Locations</p> <p>Job Number: 21-36171 Revision: A Date: 18 May 2018</p>
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<p>Paper Size A3</p> <p>0 20 40 60 80 100</p> <p>Meters</p> <p>Map Projection: Transverse Mercator National Datum: 1958 Spheroid: WGS 84 Datum: 1958 Units: Meter</p>		<p><b>LEGEND</b></p> <p>Investigator Area (Red)</p> <p>Area of Environmental Concern - Closed</p> <p>Water Courses</p> <p>Water Bodies</p> <p>Major Waterways</p> <p>Drainage Areas</p> <p>Minor Waterways / Drainage Lines</p>	<p>Hand Auger Location</p> <p>Soil Bore Location</p> <p>Groundwater Well</p> <p>Soil Test Water &amp; Sediment Sample</p> <p>Existing Groundwater Well (To Be Replaced)</p>	<p>Department of Defence</p> <p><b>Area Of Environmental Concern E Sample Locations</b></p>	<p>Job Number: 21-3017 Revision: A Date: 18 May 2018</p>
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**Figure 1E**

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Figure 1F: Area of Environmental Concern F Sample Locations

Department of Defence

Job Number: 21-20171  
Revision: A  
Date: 18 May 2018

**GHD**

Area of Environmental Concern F  
Sample Locations

Figure 1F

Scale: 1:5000

Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1984  
Grid: GDA 1984 MGA Zone 56

**LEGEND**

- Proposed Area of Concern
- Area of Environmental Concern - Closed
- Area of Environmental Concern - Open
- Watercourse
- Watercourse Wall
- Watercourse Wall - Excavated
- Watercourse Wall - Existing
- Watercourse Wall - Proposed
- Watercourse Wall - Not Found

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Page 524.32  
Scale: 1:5000  
Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1984  
Vertical Datum: MGA 84  
Date: 18 May 2018

**LEGEND**  
Investigation Area Bound  
Jervis Bay Range Facility  
Heritage Register Location  
Water Table & Shallowest Range  
Existing Infrastructure (To be Surveyed)

Department of Defence  
**GND**  
Area Of Environmental Concern H  
Sample Locations

Job Number: 21-20171  
Revision: A  
Date: 18 May 2018

Figure 1H

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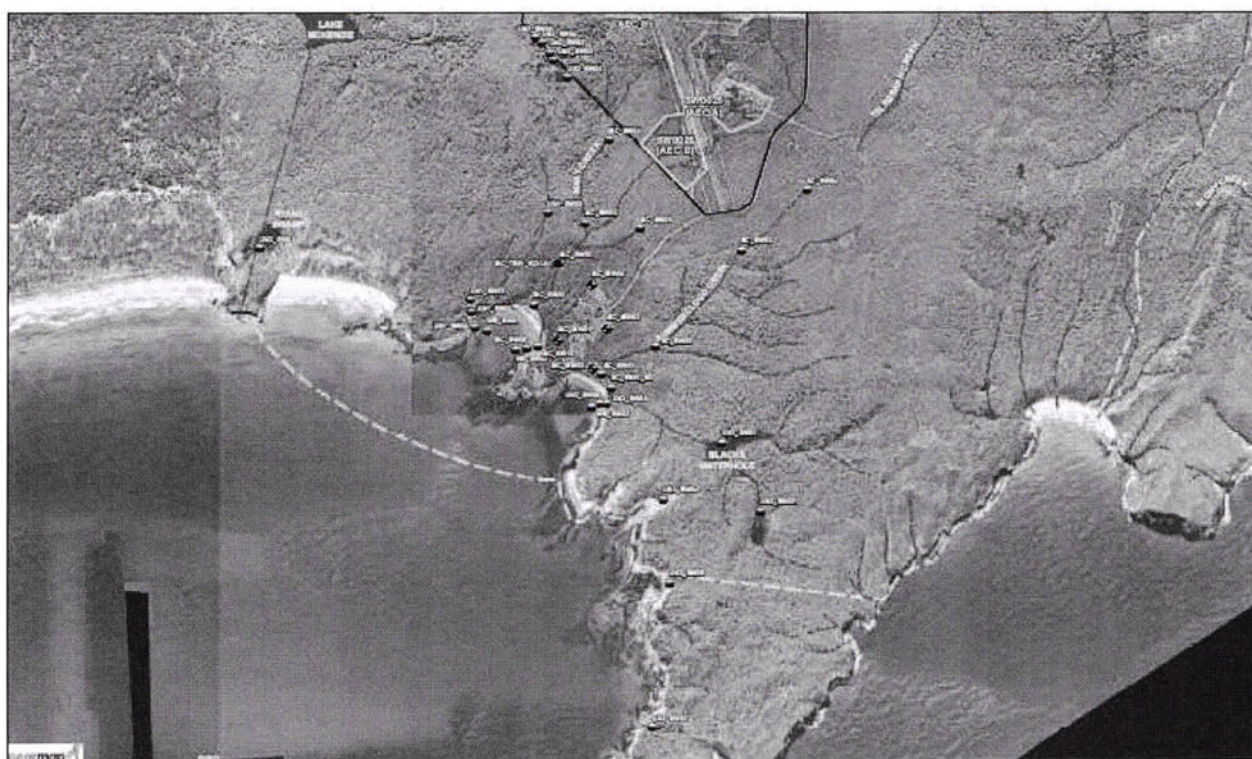
<p>Paper Size A3 0 50 100 200 300 Metres</p> <p>Map Projection: Transverse Mercator National Grid: GDA 94 GDA 94: MGA Zone 56</p>		<p><b>LEGEND</b></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;"> <ul style="list-style-type: none"> <li>Investigation Area Bound</li> <li>Area of Environmental Concern - BAP</li> <li>Area of Environmental Concern - Classified</li> <li>Aviation Range Facility</li> <li>ASD/C</li> <li>Water Bodies</li> </ul> </td> <td style="width: 50%;"> <ul style="list-style-type: none"> <li>Major Waterways</li> <li>Drainage Lines</li> <li>Minor Waterways / Drainage Lines</li> <li>Groundwater Well</li> <li>Surface Water &amp; Sediment Sample</li> <li>Existing Groundwater Well (not Sampling)</li> </ul> </td> </tr> </table>	<ul style="list-style-type: none"> <li>Investigation Area Bound</li> <li>Area of Environmental Concern - BAP</li> <li>Area of Environmental Concern - Classified</li> <li>Aviation Range Facility</li> <li>ASD/C</li> <li>Water Bodies</li> </ul>	<ul style="list-style-type: none"> <li>Major Waterways</li> <li>Drainage Lines</li> <li>Minor Waterways / Drainage Lines</li> <li>Groundwater Well</li> <li>Surface Water &amp; Sediment Sample</li> <li>Existing Groundwater Well (not Sampling)</li> </ul>	<p>Department of Defence</p> <p> Captains Lagoon Sample Locations</p> <p>Job Number: 24-20171 Revision: A Date: 16 May 2018</p> <p style="text-align: right;"><b>Figure 1K</b></p>
<ul style="list-style-type: none"> <li>Investigation Area Bound</li> <li>Area of Environmental Concern - BAP</li> <li>Area of Environmental Concern - Classified</li> <li>Aviation Range Facility</li> <li>ASD/C</li> <li>Water Bodies</li> </ul>	<ul style="list-style-type: none"> <li>Major Waterways</li> <li>Drainage Lines</li> <li>Minor Waterways / Drainage Lines</li> <li>Groundwater Well</li> <li>Surface Water &amp; Sediment Sample</li> <li>Existing Groundwater Well (not Sampling)</li> </ul>				

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<p>0 100 200 300 400 Metres</p> <p>Map Projection: Transverse Mercator Reference Datum: GDA 1984 Scale: 1:50,000 MGA Zone 58</p>		<p><b>LEGEND</b></p> <p>Investigation Area Subunit</p> <p>Area of Environmental Concern (AEC)</p> <p>Sample Run Storage Facility</p> <p>Water Bodies</p> <p>Major Waterways</p> <p>Minor Waterways (Drainage Lines)</p> <p>Soil Core Location</p> <p>Investigation Well</p> <p>Surface Water &amp; Sediment Sample</p>	<p>Department of Defence</p> <p> <b>Mary, Summercloud and Unnamed Creeks</b> Sample Locations</p>	<p>Job Number: 21-20171 Revision: A Date: 18 May 2018</p> <p style="text-align: right;"><b>Figure 1M</b></p>
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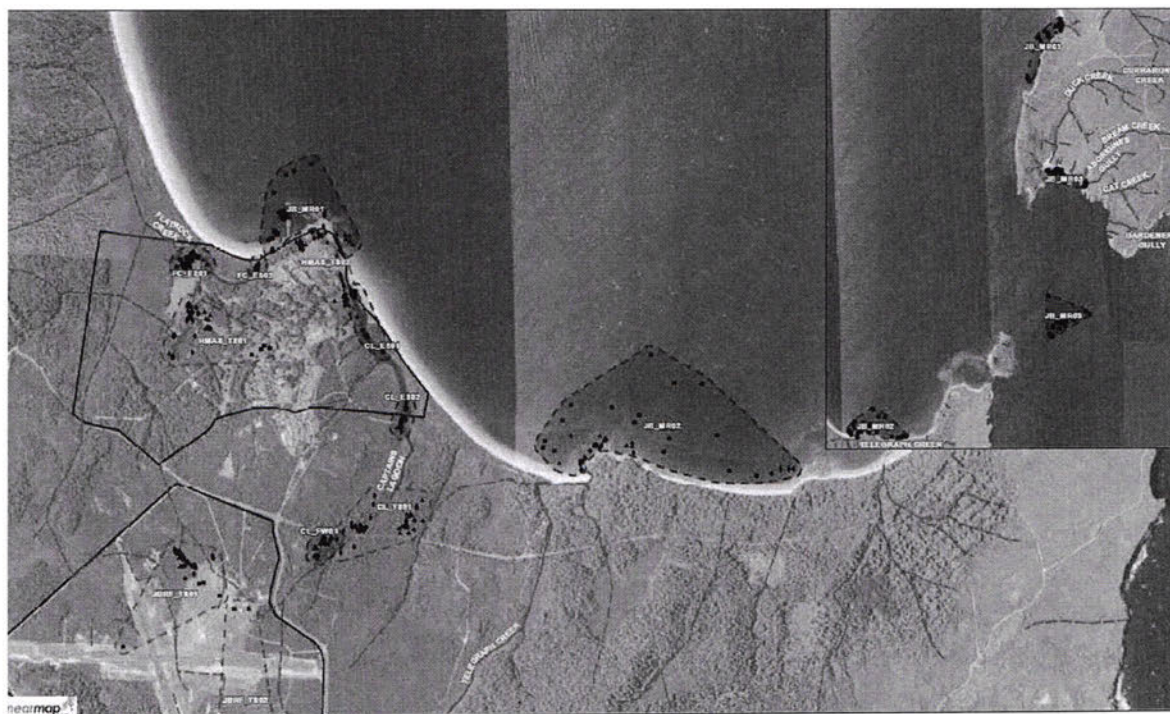
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<p>Page: 01a.12</p> <p>0 100 200 400</p> <p>Meters</p> <p>Map Projection: Transverse Mercator Datum: GDA 1984 Spheroid: GRS 80 Datum Shift: 50m East</p>		<p><b>LEGEND</b></p> <ul style="list-style-type: none"> <li> Investigated Area (Black)</li> <li> Area of Environmental Concern (Grey)</li> <li> Jarvis Bay Range Facility</li> <li> HAFI</li> <li> HAFI Site Area</li> <li> Water Bodies</li> <li> Major Waterways</li> <li> Storage Areas</li> <li> Minor Waterways (Storage) Line</li> <li> Surface Water &amp; Rainwater Storage</li> </ul>	<p>Department of Defence</p>	<p>Job Number: 21-28171                  Revision: A                  Date: 18 May 2010</p>
<p><b>Potable Water Sources Sample Locations</b></p>		<p><b>Figure 1N</b></p>		

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<p>Figure Size A3 0 100 200 300 Metres</p> <p>Map Projection: Transverse Mercator Datum: Geoid 2004 Scale: 1:50,000</p>	<p><b>LEGEND</b></p> <table border="0"> <tr> <td>□ Freshwater and Estuarine Sample Areas</td> <td>▨ Drainage Areas</td> <td>● Soil Sample</td> </tr> <tr> <td>▨ Marine Sample Areas</td> <td>— Major Waterways</td> <td>■ Plant Sample</td> </tr> <tr> <td>▨ Terrestrial Sample Areas</td> <td>— Minor Waterways / Drainage Lines</td> <td></td> </tr> <tr> <td>□ Jervis Bay Range Facility</td> <td>□ 403 Area</td> <td></td> </tr> <tr> <td>□ HMAS Creswell</td> <td>★ Invertebrate Sample</td> <td></td> </tr> <tr> <td>▨ Water Bodies</td> <td>★ Vertebrate Sample</td> <td></td> </tr> </table>	□ Freshwater and Estuarine Sample Areas	▨ Drainage Areas	● Soil Sample	▨ Marine Sample Areas	— Major Waterways	■ Plant Sample	▨ Terrestrial Sample Areas	— Minor Waterways / Drainage Lines		□ Jervis Bay Range Facility	□ 403 Area		□ HMAS Creswell	★ Invertebrate Sample		▨ Water Bodies	★ Vertebrate Sample		<p>Department of Defence</p> <p><b>GHD</b></p> <p>Job Number: 21-28171 Revision: A Date: 18 May 2018</p>
□ Freshwater and Estuarine Sample Areas	▨ Drainage Areas	● Soil Sample																		
▨ Marine Sample Areas	— Major Waterways	■ Plant Sample																		
▨ Terrestrial Sample Areas	— Minor Waterways / Drainage Lines																			
□ Jervis Bay Range Facility	□ 403 Area																			
□ HMAS Creswell	★ Invertebrate Sample																			
▨ Water Bodies	★ Vertebrate Sample																			

**Biota Sample Locations (North) Figure 2A**

Level 18, 133 Castlereagh Street, Sydney, NSW 2000. T 612 9339 7000 F 612 9339 7199 E [enquiries@ghd.com.au](mailto:enquiries@ghd.com.au) W [www.ghd.com.au](http://www.ghd.com.au)

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## Jervis Bay Range Facility and HMAS Creswell Investigation Update

PFAS Investigation and Management Program

### About the Investigation

In January 2017, Defence began a detailed environmental investigation to identify the nature and extent of per- and poly-fluoroalkyl substances (PFAS) both onsite, and around Jervis Bay Range Facility and HMAS Creswell due to the historical use of firefighting foams at the Base.

The investigation will identify whether the use of these foams has resulted in risks to human health or the environment, and will help to develop strategies to minimise exposure, should these be required.

### Investigation update

The first stage of the investigation, the Preliminary Site Investigation (PSI), has been completed with the results provided to the local community in March 2017.

The second stage of the investigation, the Detailed Site Investigation (DSI), started in April 2017 and involves sampling of soil, sediment, surface water (lakes and creeks) and groundwater to collect information and better understand how PFAS moves through the local environment.

The sampling of soil, existing water bores and surface water on the bases has begun. New groundwater monitoring bores are also being installed in the investigation area to assist in gathering samples.

As of October 2017 the following samples have been conducted as part of the DSI:

#### Detailed Site Investigation - Sampling

Onsite Samples	Offsite Samples
<ul style="list-style-type: none"> <li>▪ 251 soil</li> <li>▪ 42 sediment</li> <li>▪ 47 groundwater</li> <li>▪ 47 surface water</li> <li>▪ 28 other (including tanks and drainage)</li> </ul>	<ul style="list-style-type: none"> <li>▪ 14 surface water (Lakes McKenzie and Windermere)</li> <li>▪ 6 other (including potable water tanks)</li> </ul>

Once the DSI is complete, a detailed report including the sampling results will be prepared and provided to the local community, relevant government agencies, and regulatory bodies.

### Summary of the initial findings

The initial findings from the investigation indicate that:

- Soil, sediment, surface water and groundwater onsite have been impacted by PFAS at concentrations above the health-based guidance values.
- Based on surface water runoff and groundwater flows there is a potential for PFAS to have travelled offsite.
- PFAS was not detected in surface water at Lakes McKenzie and Windermere and drinking water tanks at the JBTA water treatment plant..

### Next steps

To accurately understand the movement of PFAS in the environment and possible exposure pathways to PFAS, more sampling will be conducted.

The additional sampling will occur both on and off-site throughout the remainder of the year and in early 2018. The sampling results will continue to build the overall picture of the nature and extent of PFAS on and around Jervis Bay Range Facility and HMAS Creswell.

Based on the investigation findings to date, Defence has commenced a *Human Health and Ecological Risk Assessment* (HHERA) process to better understand the potential risks posed by PFAS to people and the environment.

The HHERA involves a detailed scientific process to analyse the results of sampling conducted during the PSI and DSI. The DSI and HHERA will continue through 2017 and 2018 and will include:

- Additional soil sampling onsite and offsite to work out where identified PFAS has moved to
- Ongoing surface water sampling to understand changes that happen with the seasons/rainfall
- Sampling of land and water based animals and plants including vegetables grown in resident gardens
- Assessing the potential PFAS risk to human health and the environment both onsite and offsite.







### Community Survey

An important process to learn about the possible impacts to human health is to understand how people interact with the local water sources and the environment in general. This includes understanding where people swim, if bore water is used to water vegetable gardens, and the consumption of native plants, fish or other animals grown locally.

In June and July this year, project team members interviewed community members in Jervis Bay and Wreck Bay, asking about current and past practices of eating bush tucker, swimming and fishing.

The results of the surveys have assisted in the development of plans for further investigations, and we wish to thank the local community members that took part.

Results of the community survey are summarised to the right.

### Keeping the community informed

Defence is committed to regularly updating the community throughout the investigation. As well as community information sessions, updates are provided through the project website, direct mail and information sheets as new information becomes available.

### Contact Information

-  **Phone** 1800 987 618
-  **Email** [JervisBay@ghd.com](mailto:JervisBay@ghd.com)
-  **Website** [www.defence.gov.au/environment/PFAS/JervisBay/](http://www.defence.gov.au/environment/PFAS/JervisBay/)
-  **Post** Defence JBTA Environmental Investigations, GHD Stakeholder Engagement Team, Level 15, 133 Castlereagh Street, Sydney NSW 2000

Media enquiries should be directed to Defence Media Operations on (02) 6127 1999 or [media@defence.gov.au](mailto:media@defence.gov.au)

### Community Survey Findings

Type	Key findings
Drinking water	All surveyed used mains-supplied water.
Groundwater	No resident surveyed had groundwater boreholes located on their properties.
Surface water (lakes and creeks)	Water in Lake McKenzie, Lake Windermere, Mary Creek, Blacks Waterhole, Summercloud Creek, and Green Patch Lagoon were used for drinking, cooking, washing and swimming; and Captains Lagoon for swimming. This included historical use.  The primary school collects rain water in tanks to water its vegetable garden.  Fishing across the Booderee National Park occurs mostly frequently in Captains Lagoon, Lake McKenzie, Summercloud Creek and Mary Creek.
Sea water	Swimming in beaches around Jervis Bay and Wreck Bay.  Fishing in all beaches around Jervis Bay and Wreck Bay.
Soil/sediments	Clay has been used on skin, such as for sunscreen, ceremony, and playing. This is from areas including clay pits on Village Road, Bay Road, Summercloud Beach, Mary Beach, and local lagoons.
Land-based animals	No resident surveyed said that they ate animals from the Booderee National Park, however some explained that historically echidna, kangaroo, possum, rabbit and birds had been caught and eaten.
Land-based plants	Plants collected across the Booderee National Park included geebung, berries, lilly pillies, pigfaces, passionfruits, sarsparillas, five corners and others (non-specified).  Some people surveyed reportedly ate a range of home-grown produce.
Freshwater-based animals	Bait fish, yabbies and others (non-specified) were reported as being caught in fresh water and eaten.
Freshwater plants	None were noted as being used.
Ocean fish & shellfish	Pipis, periwinkles, whiting, lobsters, flathead, bream, mullet, squid and others (non-specified) were all caught and eaten.
Ocean-based plants	None were noted as being used.





## Health Based Guidance Values for PFAS FOR USE IN SITE INVESTIGATIONS IN AUSTRALIA

In June 2016, the Department of Health commissioned Food Standards Australia New Zealand (FSANZ) to develop final health based guidance values for perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS), which belong to a group of chemicals known as per- and poly-fluoroalkyl substances (PFAS).

The Department of Health has received FSANZ's *Hazard Assessment Report—PFOS, PFOA and PFHxS* with its recommendations for Australia's final health based guidance values.

The final health based guidance values will be used consistently in undertaking human health risk assessments across Australia. The recommended health based guidance values have replaced the Environmental Health Standing Committee's (enHealth) interim human health reference values.

The final health based guidance values are protective of human health; are a precautionary measure for use when conducting site investigations; and are to assist in providing advice to affected communities on how to minimise exposure to PFAS.

### What is a health based guidance value?

Health based guidance values indicate the amount of a chemical in food or drinking water that a person can consume on a regular basis over a lifetime without any significant risk to health. Health based guidance values can be expressed as a tolerable monthly intake (TMI), a tolerable weekly intake (TWI) or a tolerable daily intake (TDI). The choice of whether a TMI, TWI or TDI is set depends on the nature of the chemical.

Health based guidance values are used by organisations and government agencies to investigate and assess potential human health risks.

### Final health based guidance values for use in site investigations in Australia

FSANZ has recommended final health based guidance values for PFOS and PFOA in the form of a tolerable daily intake. A tolerable daily intake is a level of daily oral exposure over a lifetime that is considered to be without significant health risk for humans.

Based on FSANZ's recommended tolerable daily intake, the Department of Health has calculated revised drinking water quality and recreational water quality values for use in site investigations in Australia.

To determine the drinking and recreational water quality values for site investigations across Australia, the Department of Health used the final tolerable daily intakes for PFOS and PFOA and the methodology described in Chapter 6.3.3 of the National Health and Medical Research Council's *Australian Drinking Water Guidelines*. This approach is consistent with the one used by enHealth in developing the interim values in 2016.

The health based guidance values for use in site investigations in Australia are:

Toxicity reference value	PFOS/PFHxS		PFOA	
	ng	µg	ng	µg
Tolerable daily intake (ng or µg / kg bw/day)	20	0.02	160	0.16
Drinking water quality value (ng or µg /L)	70	0.07	560	0.56
Recreational water quality value (ng or µg /L)	700	0.7	5,600	5.6

Note: bw = body weight, ng = nanograms, µg = micrograms

## How did FSANZ determine the health based guidance values?

The tolerable daily intake for PFOS and PFOA are derived from the results of toxicity studies in laboratory animals. FSANZ concluded that the current available epidemiological data on human health is not suitable to support the derivation of tolerable daily intake levels for PFOS and PFOA.

A pharmacokinetic modelling approach was used to extrapolate data for humans, noting that animal physiology is not the same as human.

For PFHxS, FSANZ concluded that there was not enough toxicological and epidemiological information to justify establishing a tolerable daily intake. However, as a precaution, and for the purposes of site investigations, the PFOS tolerable daily intake should apply to PFHxS. In practice, this means that the level of PFHxS exposure should be added to the level of PFOS exposure; and this combined level be compared to the tolerable daily intake for PFOS.

The tolerable daily intakes include conservative assumptions to ensure the protection of public health.

FSANZ's report and recommended health based guidance values have been nationally and internationally peer reviewed.

## How will the final health based guidance values impact communities affected by PFAS contamination?

Commonwealth agencies and other organisations that conduct site investigations for PFAS contamination can use the health based guidance values to assist in assessing human health risk. Agencies or organisations that have recently conducted human health risk assessments for PFAS contamination may review their assessments and advice based on the final health based guidance values.

Advice on reducing exposure to PFAS will vary with each location so you should follow the most current advice provided by your state or territory government, and if available, the human health risk assessment for your area conducted by the investigating agency.

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### *Further information*

For further information regarding health based guidance values and the Department of Health's response to PFAS contamination, please visit the Department of Health website ([health.gov.au/pfas](http://health.gov.au/pfas))

Alternatively you can contact the Department of Health by phone on 1800 941 180 or by email: [health.PFAS@health.gov.au](mailto:health.PFAS@health.gov.au)

# Volume 2 - Certificate of Analysis

**JERVIS BAY RANGE FACILITY AND HMAS CRESWELL ENVIRONMENTAL  
INVESTIGATION - SOIL/SEDIMENT/SURFACE WATER/GROUNDWATER AND  
BIOTA TEST RESULTS UP TO 11 MAY 2018**

**Certificate of Analysis – [Redacted] – [WBL&BNP] - [2017 - 11 May 2018]**

*Records Note*

*Redacted - CoA's of results provided as separate Volume 2*

*Redacted CoA's removed all non 403 land results*

*Redacted CoA's results identified in Tables 1 - 12*

**White, Sarah-Jane (Health)**

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**From:** [REDACTED]@ghd.com>  
**Sent:** Friday, 22 June 2018 8:32 AM  
**To:** Clapham, David  
**Cc:** PFASIM Jervis Bay  
**Subject:** FW: WBACC presentation - may 22  
**Attachments:** 22May18 WBACCmeeting PFAS presentation.pdf

Hi David,

As requested at PCG meeting 15, attached is a copy of the digital presentation that was presented to WBACC board.

Please note the attached presentation was utilised during the meeting to assist the discussion and not distributed.

In the email to follow I will attach an extract of the Results Letter that was provided to WBACC digitally and in hard copy.

Regards,

[REDACTED]

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**Defence PFAS  
environmental  
investigations  
Booderee National Park and  
Wreck Bay 403 lands**

**Initial discussions  
on early findings  
with WBACC**

**22 May 2018**

**GHD**

[Redacted]  
[Redacted]  
[Redacted]

**Defence**

[Redacted] - [Redacted] HMAS Creswell  
[Redacted] - [Redacted] HMAS Creswell  
[Redacted] - [Redacted] - Environment Investigations

For discussion only  
Not for distribution

# Today's presentation

- These are results to 11 May 2018
- Approx 60% complete, no wet weather results
- No conclusions, just raw data
- Key finding - no detections in the drinking water supply
- 26 June we will share remainder of findings
- DRAFT Detailed Site Investigation and HHERA expected August 2018

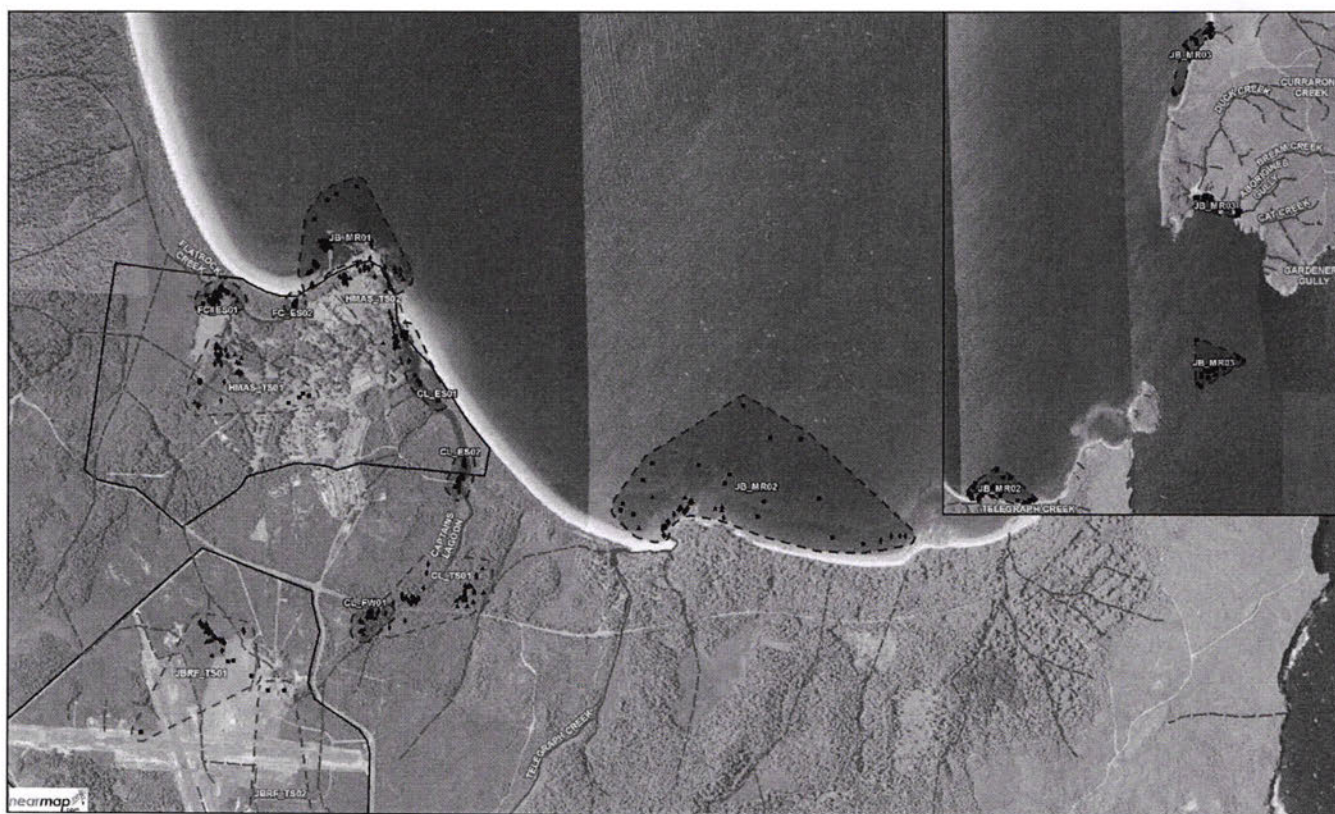


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# Investigation – biota sampling - North



<p>Plot Size A3 0 125 250 500 Metres</p> <p>Map Projection: Transverse Mercator Horizontal Datum: GDA 1984 Grid SGA 1984 WGA 2004 58</p>		<p><b>LEGEND</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Freshwater and Estuarine Sample Areas</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px dashed black; margin-right: 5px;"></span> Marine Sample Areas</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px dotted black; margin-right: 5px;"></span> Terrestrial Sample Areas</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Jarvis Bay Range Facility</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> HMAS Creswell</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Water Bodies</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Drainage Areas</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Major Waterways / Drainage Lines</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Minor Waterways / Drainage Lines</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> 403 Area</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Invertebrate Sample</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Vertebrate Sample</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Soil Sample</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Plant Sample</li> </ul>	<p>Department of Defence</p>	<p>Job Number   21-06171 Revision   A Date   16 May 2016</p>
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Biota Sample Locations (North) **Figure 2A**

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# Investigation – biota sampling - South



Paper Size A3

0 125 250 500

Metres

Map Projection: Transverse Mercator  
 Australian Datum: GDA 1984  
 Grid: GDA 1984 MGA Zone 58

**LEGEND**

- Freshwater and Estuarine Sample Areas
- Marine Sample Areas
- Terrestrial Sample Areas
- Jervis Bay Range Facility
- Water Bodies
- Drainage Areas
- Major Waterways
- Minor Waterways / Drainage Lines
- 400 Area
- Invertebrate Sample
- Vertebrate Sample
- Scot Sample
- ▲ Plant Sample

Department of Defence

Job Number: 21-26171  
 Revision: A  
 Date: 15 May 2018

Biota Sample Locations (South) **Figure 2B**

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# Investigation

## Health Based Guidance values

Health based guidance values (NEMP)	PFOS + PFHxS	PFOA
Drinking water quality value	0.07 (µg /L)	0.56 (µg /L)
Recreational water quality value	0.7 (µg /L)	5.6 (µg /L)
Residential soil quality value	0.009 (mg/kg)	0.1
Public Open Space soil quality value	1 (mg/kg)	10 (mg/kg)
Sediment quality value	N/A	N/A
<b>Interim Human Health Reference Value</b> Food Standards Australia and New Zealand <b>(FSANZ) - Proposed Trigger Points</b>		
Finfish	5.2 (µg /kg)	41 (µg /kg)
Crustaceans and Molluscs	65 (µg /kg)	520 (µg /kg)
Fruit	0.6 (µg /kg)	5.1 (µg /kg)
Vegetables	1.1 (µg /kg)	8.8 (µg /kg)

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# Investigation results to 11 May 2018

## PFAS - raw data

Sample type	Booderee National Park	Number of detections	Number of detections above guideline values	Wreck Bay Lands	Number of detections	Number of detections above guideline values
Sediment	32	12	0	22	8	0
Soil	11	5	0	11	6	0
Surface Water	46	19	6	24	21	4
Groundwater	11	6	2	3	2	0
Biota (plants and animals)	172	5	1	130 (MC 89 / SC 41)	85 (MC 78 / SC 7)	66 (MC 63 / SC 3)
Marine Water	9	1	0	-	-	-



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# Investigation results to 11 May 2018

## other contaminants – Discussion notes

For petroleum hydrocarbons, heavy metals including lead, others that may have been used on Base. Results from 403 lands, Lakes Windermere & McKenzie. No hydrocarbons found.

- No detections of any tested chemicals have been found in the drinking water
- Several samples (groundwater/surface water) have concentrations of **arsenic** above the drinking water guidelines. Likely naturally occurring and a reflection of background concentrations. 4 or 5 exceedances scattered across Jervis Bay Territory.
- **Sulphate** concentrations are above the drinking water guidelines for roughly a quarter of analysed surface water/groundwater (predominantly in surface water) samples. These exceedances are considered to be background concentrations.
- **Nickel** concentrations from three wells at Captain's Lagoon were above the drinking water guidelines
- **All other contaminants** (excluding PFAS) were below the drinking water guidelines for the surface water/ groundwater samples analysed.
- **All contaminants** (excluding PFAS) were below adopted guidelines for the soil samples analysed.



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# Discussion

## **What do the results mean?**

The results show some detections of PFAS in the Wreck Bay lands and Booderee NP. The results are compared with the FSANZ guidelines to help inform the Human Health and Environmental Risk Assessment (HHERA). The HHERA recommends any intervention or ongoing management.

## **Are there health risks to the community?**

According to recent government-issued advice there is no link between health issues and exposure to PFAS. However we understand that the community remains worried. As recently as early May the NSW EPA issued advice around Currumbene Creek regarding how much fish is safe to eat (refer notice). Given these recent results on your lands, the ACT EPA and ACT Health, in collaboration with the NSW EPA, may issue advice on this matter.

## **How can we share this information with the local Wreck Bay Community without creating unnecessary alarm?**

We would be happy to coordinate another BBQ/meeting to share the results in consultation with ACT Government EPA/Health so there is opportunity to ask health questions.



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# Discussion

## **Are there any immediate actions needed?**

We know that the community is aware that Mary Creek is contaminated and members of the community haven't been regularly consuming food from this estuary. As a precaution, you could remind people to limit their intake of flora / fauna / drinking water from these areas, until we have completed the Human Health and Environmental Risk Assessment (HHERA), which will recommend intervention and/or management actions. Also, any subsequent advice from the ACT Government may guide actions.

## **How will this contamination be addressed?**

When the Detailed Site investigation is finished, and the HHERA published with its recommendations, Defence will be developing a PFAS Management Area Plan. Defence is in the process of developing these for some of their other sites. Defence will liaise with WBACC Board on the PMAP prior to implementing.



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## Next steps

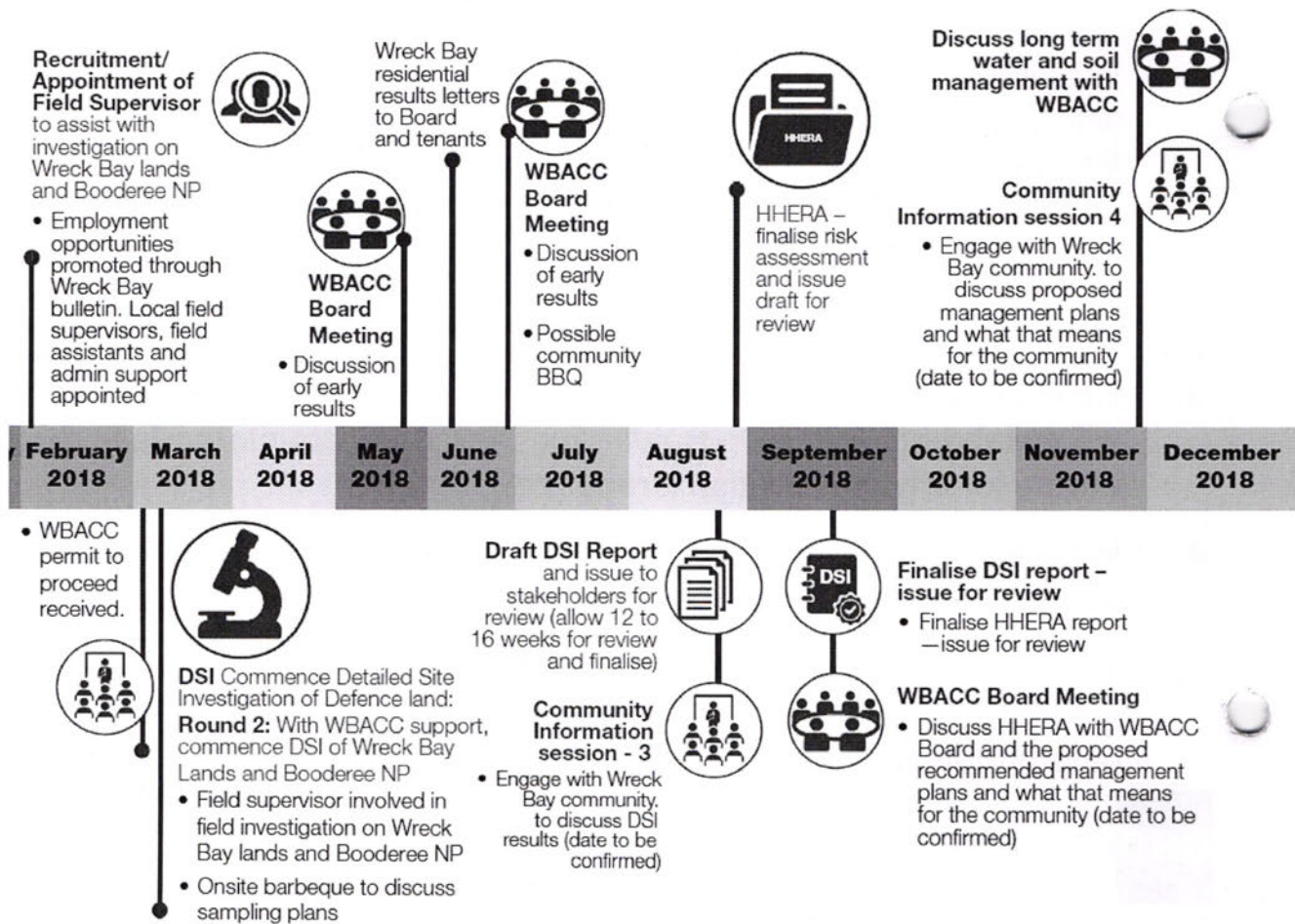
1. We will compile the results from the **residential sampling** and share these with you prior to June 26.  
*We will also hand deliver to Wreck Bay residents (with assistance) prior to June 26.*
2. We will compile the remaining investigation results from 403 Lands and Booderee NP and share them with you on 26 June.
3. Defence will meet with ACT EPA to discuss results. We expect ACT EPA will collaborate with ACT Health and their NSW counterparts to develop advice for any intervention if required.
4. In collaboration with WBACC, discuss results with community at a barbecue following 26 June Board meeting if Board deems appropriate.
5. We will develop the Detailed Site Investigation Report (a compilation of all results) and a Human Health and Environmental Risk Assessment (interpretation of all results and recommendations).



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# Project consultation timeline – added activities



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