

[REDACTED]
[REDACTED]
[REDACTED]

Dear [REDACTED]

DECISION ON YOUR ACCESS APPLICATION

I refer to your application under section 30 of the *Freedom of Information Act 2016* (FOI Act), received by ACT Health Directorate (ACTHD) on **Monday 7 November 2022**.

The application requested access to:

'ACT Health advice (from 12 September 2018 to present), in response to health concerns for the community of Wreck Bay, Jervis Bay Territory, as a result of their exposure to firefighting foam containing poly- and per-fluoroalkyl chemicals (PFAS).'

I am an Information Officer appointed by the Director-General of ACT Health Directorate (ACTHD) under section 18 of the FOI Act to deal with access applications made under Part 5 of the Act. ACTHD was required to provide a decision on your access application by **Wednesday 28 2022**.

I have identified 19 documents holding the information within scope of your access application. These are outlined in the schedule of documents included at [Attachment A](#) to this decision letter.

Decisions

I have decided to:

- grant full access to three documents; and
- grant partial access to 16 documents.

My access decisions are detailed further in the following statement of reasons and the documents released to you are provided as [Attachment B](#) to this letter.

In reaching my access decision, I have taken the following into account:

- The FOI Act;
- The contents of the documents that fall within the scope of your request;
- The views of relevant third parties; and
- The *Human Rights Act 2004*.

Full Access

I have decided to grant full access to three documents at references 2, 7 and 12.

Partial Access

I have decided to grant partial access to 16 documents at references 1, 3-6, 8-11 and 13-19 that contain information that I consider, on balance to be contrary to the public interest to disclose under the test set out in section 17 of the Act.

Public Interest Factors Favouring Disclosure

The following factors were considered relevant in favour of the disclosure of the documents:

- Schedule 2, 2.1(a)(i) promote open discussion of public affairs and enhance the government's accountability;
- Schedule 2, 2.1(a)(ii) contribute to positive and informed debate on important issues or matters of public interest;
- Schedule 2, 2.1(a)(viii) reveal the reason for a government decision and any background or contextual information that informed the decision; and
- Schedule 2, 2.1(a)(xi) reveal environmental or health risks or measures relating to public health and safety.

Public Interest Factors Favouring Non-Disclosure

The following factors were considered relevant in favour of the non-disclosure of the documents:

- Schedule 2, Schedule 2.2 (a)(ii) prejudice the protection of an individual's right to privacy or any other right under the *Human Rights Act 2004*.

Document 1 is partially comprised of information that is subject to legal professional privilege and therefore taken to be contrary to the public interest to release, under *Schedule 1.2 Information that would be privileged from production or admission into evidence in a legal proceeding on the ground of legal professional privilege*.

All other documents partially disclosed contain personal information of both ACT-Government and non-ACT Government employees' and has not been disclosed as this could reasonably be expected to prejudice the protection of the individual's right to privacy.

On balance, the factors favouring disclosure did not outweigh the factor favouring non-disclosure as the information would not provide any government information pertinent to your request. Therefore, I have determined the information identified is contrary to the public interest and would not advantage the public in disclosing this information.

Charges

Processing charges are not applicable to this request.

Disclosure Log

Under section 28 of the FOI Act, ACTHD maintains an online record of access applications called a disclosure log. The scope of your access application, my decision and documents released to you will be published in the disclosure log not less than three days but not more than 10 days after the date of this decision. Your personal contact details will not be published.

<https://www.health.act.gov.au/about-our-health-system/freedom-information/disclosure-log>.

Ombudsman review

My decision on your access request is a reviewable decision as identified in Schedule 3 of the FOI Act. You have the right to seek Ombudsman review of this outcome under section 73 of the Act within 20 working days from the day that my decision is published in ACT Health's disclosure log, or a longer period allowed by the Ombudsman.

If you wish to request a review of my decision you may write to the Ombudsman at:

The ACT Ombudsman
GPO Box 442
CANBERRA ACT 2601
Via email: ACTFOI@ombudsman.gov.au
Website: ombudsman.act.gov.au

ACT Civil and Administrative Tribunal (ACAT) review

Under section 84 of the Act, if a decision is made under section 82(1) on an Ombudsman review, you may apply to the ACAT for review of the Ombudsman decision. Further information may be obtained from the ACAT at:

ACT Civil and Administrative Tribunal
Level 4, 1 Moore St
GPO Box 370
Canberra City ACT 2601
Telephone: (02) 6207 1740
<http://www.acat.act.gov.au/>

Further assistance

Should you have any queries in relation to your request, please do not hesitate to contact the FOI Coordinator on (02) 5124 9831 or email HealthFOI@act.gov.au.

Yours sincerely



Simon Waters
A/g Executive Branch Manager
Health Protection Services
ACT Health Directorate

22 December 2022

FREEDOM OF INFORMATION SCHEDULE OF DOCUMENTS

Please be aware that under the *Freedom of Information Act 2016*, some of the information provided to you will be released to the public through the ACT Government's Open Access Scheme. The Open Access release status column of the table below indicates what documents are intended for release online through open access.

Personal information or business affairs information will not be made available under this policy. If you think the content of your request would contain such information, please inform the contact officer immediately.

Information about what is published on open access is available online at: <http://www.health.act.gov.au/public-information/consumers/freedom-information>

APPLICANT NAME	WHAT ARE THE PARAMETERS OF THE REQUEST	FILE NUMBER
[REDACTED]	<i>'ACT Health advice (from 12 September 2018 to present), in response to health concerns for the community of Wreck Bay, Jervis Bay Territory, as a result of their exposure to firefighting foam containing poly- and per-fluoroalkyl chemicals (PFAS).'</i>	ACTHDFOI22-23.11

Ref Number	Page Number	Description	Date	Status Decision	Factor	Open Access release status
1.	1 – 42	Email and attachment – JBT advice	02 November 2018	Partial Release	Schedule 1.2 Legal & Schedule 2, 2.2 (a)(ii) Privacy	YES
2.	43 – 44	Email – RE: JBT DSI	05 November 2018	Full Release		YES
3.	45	Email – ACT Comments on DSI	06 November 2018	Partial Release	Schedule 2, 2.2 (a)(ii) Privacy	YES
4.	46 – 48	Email and attachment – RE: JBT – Access Canberra Phone support for signage	09 November 2018	Partial Release	Schedule 2, 2.2 (a)(ii) Privacy	YES
5.	49 – 52	Email – RE: FOR REVIEW AND COMMENT: Jervis Bay PFAS Investigation – Draft Human Health Risk Assessment report – Due COB Monday 19 November 2018	20 November 2018	Partial Release	Schedule 2, 2.2 (a)(ii) Privacy	YES

6.	53 – 54	Email – FW: ACT Government Feedback. Reference 181121 - 001150	29 November 2018	Partial Release	Schedule 2, 2.2 (a)(ii) Privacy	YES
7.	55 – 237	Email and attachment – PFAS Inquiry report	04 December 2018	Full release		YES
8.	238 – 239	Email – FW: Jervis Bay PFAS Investigation – Interim Detailed Site Investigation and Human Health Risk Assessment Reports	24 December 2018	Partial Release	Schedule 2, 2.2 (a)(ii) Privacy	YES
9.	240 – 242	Email – FW: Next steps for Defence’s ongoing JBT investigation	03 January 2019	Partial Release	Schedule 2, 2.2 (a)(ii) Privacy	YES
10.	243 – 249	Email and attachment – FW: Next steps for Defence’s ongoing JBT investigation	16 January 2019	Partial Release	Schedule 2, 2.2 (a)(ii) Privacy	YES
11.	250 – 256	Email and attachments – CMTEDD input to Health reply to Mr Field – Cancer in JBT	13 February 2019	Partial Release	Schedule 2, 2.2 (a)(ii) Privacy	YES
12.	257 – 260	Email and attachment – RE: CMTEDD input to Health reply to Mr Field – Cancer in JBT	28 February 2019	Full Release		YES
13.	261 – 263	Email – RE: Further assistance with Defence’s ongoing JBT PFAS investigation	18 April 2019	Partial Release	Schedule 2, 2.2 (a)(ii) Privacy	YES
14.	264 – 479	Email and attachments – FW: FOR REVIEW AND COMMENT: Jervis Bay PFAS Investigation – Draft PFAS Management Area Plan (PMAP) report – Due COB Wed 12 June 2019	12 June 2019	Partial Release	Schedule 2, 2.2 (a)(ii) Privacy	YES
15.	480 – 482	Email – FW: FOR REVIEW AND COMMENT: Jervis Bay PFAS Investigation – Draft PFAS Management Area Plan (PMAP) report – Due COB Wed 12 June 2019	14 June 2019	Partial Release	Schedule 2, 2.2 (a)(ii) Privacy	YES
16.	483 – 497	Email and attachments – FW: Jervis Bay School Board	21 July 2020	Partial Release	Schedule 2, 2.2 (a)(ii) Privacy	YES
17.	498 – 502	Email – FW: Photon Trial – Creswell (Note attachment is out of scope)	18 February 2021	Partial Release	Schedule 2, 2.2 (a)(ii) Privacy	YES

18.	503 – 510	Email – RE: Photon Trial – Creswell	24 February 2021	Partial Release	Schedule 2, 2.2 (a)(ii) Privacy	YES
19.	511 – 513	Email – FW: Photon Water Trial – RAN SSSSS, Jervis Bay Range Facility	08 June 2021	Partial Release	Schedule 2, 2.2 (a)(ii) Privacy	YES
Total Number of Documents						
19						

From: [Pengilley, Andrew \(Health\)](#)
To: [Clapham, David](#)
Subject: JBT advice [SEC=UNCLASSIFIED]
Date: Friday, 2 November 2018 3:54:00 PM
Attachments: [20180718174046648.pdf](#)

Dr Andrew Pengilley

Public Health Physician | [Population Health](#) | ACT Health Directorate

PH 02 6207 0291 o [REDACTED] E andrew.pengilley@act.gov.au

From: [Pengilley, Andrew \(Health\)](#)
To: [Kelly, Paul \(Health\)](#)
Subject: RE: JBT DSI [SEC=UNCLASSIFIED, DLM=For-Official-Use-Only]
Date: Monday, 5 November 2018 11:37:00 AM
Attachments: [image004.png](#)

Not really. They haven't changed the sampling regimen from what was planned. However we have been very clear with DIRDC that we are not providing further health advice on this unless a) we have a formal arrangement to do so, which would include some costs for expertise and b) we aren't in a position to change our advice unless new data comes to light. The issue is that Defence will conduct a risk assessment based on the probability of exposure, which might be low, whereas we have to provide advice to people intending to undertake particular activities. So a low risk of fishing doesn't mean much to the advice one has to give to someone who has decided to go fishing. Been through that at great length with DIRDC and Defence.

A

From: Kelly, Paul (Health)
Sent: Monday, 5 November 2018 11:33 AM
To: Pengilley, Andrew (Health) <Andrew.Pengilley@act.gov.au>
Subject: RE: JBT DSI [SEC=UNCLASSIFIED, DLM=For-Official-Use-Only]

Did you get a favourable hearing from David on this?

Paul

Dr Paul Kelly

ACT Chief Health Officer

Public Health, Protection and Regulation | **ACT Health**

PH 02 6205 2108 | E paul.kelly@act.gov.au

Paul Kelly - ACT CHO (@PKelly_ACTCHO) on **Twitter**

<http://www.health.act.gov.au/healthy-living/population-health>



From: Pengilley, Andrew (Health)
Sent: Friday, 2 November 2018 2:22 PM
To: Clapham, David <David.Clapham@act.gov.au>
Cc: Stedman, Andrew (Health) <Andrew.Stedman@act.gov.au>; Kelly, Paul (Health) <Paul.Kelly@act.gov.au>
Subject: RE: JBT DSI [SEC=UNCLASSIFIED, DLM=For-Official-Use-Only]

Hi David,

Sorry I didn't get back this morning, but Andrew has helped me locate a copy of the document. I think we should generally make the point

Biota sampling to assess exposure of people to PFAS designed to inform an assessment of risk based likely exposure pathways e.g. the likelihood of fishing in a particular creek may not be sufficient to provide detailed advice to people about their actions e.g. should I start fishing in that creek? I have a fish, should I eat it? If such advice is to be sought then it would be preferable that the biota sampling for species which could be consumed by people include sufficient samples, both in quantity and distribution, to allow a quantitative assessment of PFAS exposure to be performed. Advice regarding this can be sought (and has been provided previously) by NSW EPA.

Regarding the assessment that the lack of sampling does not impact the DSI, that depends on what you intend to say as a result of the DSI. I doesn't impact the ability to detect risk of PFAS exposure, it does affect the ability to useful quantify that risk.

We have, of course, said all this before but I agree that it might be better to be on the record on this one again.

Thanks
Andrew

From: Clapham, David

Sent: Thursday, 1 November 2018 4:36 PM

To: Pengilley, Andrew (Health) <Andrew.Pengilley@act.gov.au>; Stedman, Andrew (Health) <Andrew.Stedman@act.gov.au>

Cc: Engele, Sam <Sam.Engele@act.gov.au>

Subject: JBT DSI [SEC=UNCLASSIFIED, DLM=For-Official-Use-Only]

Dear Andrew

I'm preparing to send a nil response from ACT to Defence on the Detailed Site Investigation.

There are some areas I'd appreciate confirmation of before I do so:

- Are you able to confirm that we are satisfied with the *Summary of the CSM* [Conceptual Site Model] *exposure scenarios that will be progressed to the HHRA or ERA* (Table 14-8, p.311)?
- Given our previous concerns on the insufficient level of testing to allow specific consumption guidance to be developed, is there a comment we want to make on this issue?
 - o Do we have any comment on the uncertainty relating to biota quantities as described in Chapter 15 (p.321)
 - o Do we have comment on the conclusion that "A comprehensive assessment of the potential PFAS exposure pathways within the Investigation Area has been completed."

Thanks, happy to discuss

David

David Clapham | a/g Senior Manager – Infrastructure and Economic Development, Economic and Regional Policy Branch | **Policy & Cabinet Division**

☎ 02 6205 7261 | **Chief Minister, Treasury & Economic Development Directorate** | ACT Government

Level 4, Canberra Nara Centre | GPO Box 158 Canberra ACT 2601 | www.act.gov.au



From: Clapham, David
Sent: Tuesday, 6 November 2018 1:56 PM
To: [REDACTED]
Cc: Chester, Heath; Engele, Sam; Pengilley, Andrew (Health); Stedman, Andrew (Health)
Subject: ACT Comments on DSI [SEC=UNCLASSIFIED, DLM=For-Official-Use-Only]

Dear [REDACTED]
2.2(a)(ii)

Apologies for the delay in providing formal comment on the Detailed Site Investigation Report. ACT has no issues or edits to raise.

As a general comment the ACT observes that the level of biota sampling required to assess the likely exposure of people to PFAS, in order to inform an assessment of risk based on likely exposure pathways – for example the likelihood of fishing in a particular creek – may not be sufficient to answer specific questions about individuals' actions, for example: "should I start fishing in that creek?" or "I have a fish, should I eat it?". If such specific advice is to be sought then it would be preferable that the biota sampling for species which could be consumed by people include sufficient samples, both in quantity and distribution, to allow a quantitative assessment of PFAS exposure to be performed. Advice regarding this can be sought (and has been provided previously) by NSW EPA.

Regards

David

David Clapham | a/g Senior Manager – Infrastructure and Economic Development, Economic and Regional Policy Branch | Policy & Cabinet Division
☎ 02 6205 7261 | Chief Minister, Treasury & Economic Development Directorate | ACT Government
Level 4, Canberra Nara Centre | GPO Box 158 Canberra ACT 2601 | www.act.gov.au



From: [REDACTED]
Sent: Friday, 9 November 2018 9:14 AM
To: Pengilley, Andrew (Health)
Cc: Clapham, David [REDACTED]
Subject: RE: JBT - Access Canberra Phone support for signage [SEC=UNCLASSIFIED, DLM=For-Official-Use-Only] [SEC=UNCLASSIFIED]
Attachments: PFAS health advice for scripting.docx
Importance: High

Dear Dr Pengilley

Further to David's email below and our discussion yesterday, Infrastructure will soon erect signage in the JBT featuring the precautionary advice recommended by the A/g Chief Health Officer. We are also preparing for the possibility that members of the community might call with questions about the signage or the precautionary advice Infrastructure has provided.

We have prepared a short script for use in these discussions, but as we are not a health agency, we seek confirmation that the recommendations made by the A/g Chief Health Officer have not been lost in translation and that our script is an appropriate approach from the health perspective.

Please don't hesitate to let me know if you would like to discuss further.

Kind regards

[REDACTED]
 Director | Jervis Bay Territory Administration
 Territories Division
 Department of Infrastructure, Regional Development and Cities
 GPO Box 594, Canberra ACT 2601

www.infrastructure.gov.au

From: Clapham, David <David.Clapham@act.gov.au>
Sent: Wednesday, 7 November 2018 2:52 PM
To: Pengilley, Andrew (Health) <Andrew.Pengilley@act.gov.au>
Cc: [REDACTED]
Subject: JBT - Access Canberra Phone support for signage [SEC=UNCLASSIFIED, DLM=For-Official-Use-Only]

Dear Andrew

[REDACTED] from DIRDC (copied) is working with Access Canberra to develop a script for Access Canberra phone 2.2(a)(ii) to respond to calls from the community in JBT prompted by warning signs imminently about to be erected. The script adapts the advice ACT Health provided to DIRDC and [REDACTED] is seeking confirmation from ACT Health that the content has survived translation by DIRDC and that it is an 9ule 2.2(a) accurate reflection of our advice from a health perspective. (ii)

If [REDACTED] forwards you the script is ACT Health able to review and provide confirmation or edits/comments to DIRDC. Can you indicate what if any costs are involved? Arrangements between DIRDC and Access Canberra are being finalised now to allow signage to be erected as soon as possible, so at your earliest convenience greatly appreciated. 2.2(a)(ii)

Happy to discuss

David

David Clapham | a/g Senior Manager – Infrastructure and Economic Development, Economic and Regional Policy Branch | **Policy & Cabinet Division**

☎ 02 6205 7261 | **Chief Minister, Treasury & Economic Development Directorate** | ACT Government
Level 4, Canberra Nara Centre | GPO Box 158 Canberra ACT 2601 | www.act.gov.au



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Draft scripting regarding precautionary health advice for JBT

General

The Department of Infrastructure, Regional Development and Cities (Infrastructure) has administrative responsibility for the Jervis Bay Territory (JBT). Various services are delivered in the JBT with the assistance of state and territory governments, including the ACT.

The Department of Defence (Defence) is investigating potential per- and poly-fluoroalkyl substance (PFAS) contamination, stemming from the historical use of liquid fire-fighting foams at the Jervis Bay Range Facility in the JBT. The investigation has found PFAS in surface and ground water.

There is no detectable PFAS in the JBT's potable water.

Infrastructure is not a health agency and has sought the assistance of the ACT Health Directorate to provide advice about appropriate action. While the Defence investigation is ongoing, the A/g ACT Chief Health Officer has recommended that Infrastructure provide precautionary advice to the JBT community and visitors to the JBT.

Summercloud Creek

Based on a recommendation by the A/g ACT Chief Health Officer, as a precaution Infrastructure advises to avoid collecting and eating seafood from this location.

Captain's Lagoon

Based on a recommendation by the A/g ACT Chief Health Officer, as a precaution Infrastructure advises to avoid collecting and eating seafood from this location.

Summercloud Creek

Based on a recommendation by the A/g ACT Chief Health Officer, as a precaution Infrastructure advises to avoid collecting and eating seafood from this location.

Flatrock Creek

Based on a recommendation by the A/g ACT Chief Health Officer, as a precaution Infrastructure advises to avoid collecting and eating seafood from this location.

Mary Creek

In October 2016, on the advice of the ACT Chief Health Officer, the Wreck Bay Aboriginal Community Council closed Mary Creek to human use. Infrastructure advises this precautionary advice remains current at this time. This includes not swimming in, drinking water from or collecting or eating seafood from Mary Creek.

Jervis Bay

Both the A/g ACT Chief Health Officer and NSW EPA have advised that no precautionary advice is required for Jervis Bay at this time. This includes for seafood that might be caught in Jervis Bay.

Possible further health-related concerns

General information about health-related PFAS concerns can be obtained from the Commonwealth Department of Health's hotline: 1800 941 180.

People with specific health-related concerns (for example if someone eats a fish before seeing a precautionary sign) can obtain general health-related PFAS information from the Department of Health Hotline. If people have further concerns they should speak with their general practitioner.

From: Barr, Conrad (Health)
Sent: Tuesday, 20 November 2018 3:49 PM
To: Clapham, David; Stedman, Andrew (Health)
Cc: Pengilley, Andrew (Health)
Subject: RE: FOR REVIEW AND COMMENT: Jervis Bay PFAS Investigation - Draft Human Health Risk Assessment report - Due COB Monday 19 November 2018 [SEC=UNCLASSIFIED]

Hi David

Thanks for the reminder ACT Health have no comments in relation to the HHRA.

Noting the document clearly states its aim is not to provide guidance on dietary advice or land use.

The findings of the risk assessment align with previous HPS advice that Mary Creek poses the greatest health concern as at the upper characterisations represent an elevated risk. Elevated risk also occur for edible invertebrates sourced from Captains lagoon and flat rock creek, and finfish from Captains Lagoon.

Happy to discuss further.

Cheers

Conrad



Conrad Barr | Director
 Health Protection Service | health.act.gov.au
 Phone (02) 6205 4402

From: Clapham, David
Sent: Tuesday, 20 November 2018 10:31 AM
To: Stedman, Andrew (Health) <Andrew.Stedman@act.gov.au>
Cc: Pengilley, Andrew (Health) <Andrew.Pengilley@act.gov.au>; Barr, Conrad (Health) <Conrad.Barr@act.gov.au>
Subject: RE: FOR REVIEW AND COMMENT: Jervis Bay PFAS Investigation - Draft Human Health Risk Assessment report - Due COB Monday 19 November 2018 [SEC=UNCLASSIFIED]

Morning all – comments on the HHRA are now overdue – anything to pass onto Defence?

From: Clapham, David
Sent: Friday, 16 November 2018 1:18 PM
To: Stedman, Andrew (Health) <Andrew.Stedman@act.gov.au>
Cc: Pengilley, Andrew (Health) <Andrew.Pengilley@act.gov.au>; Barr, Conrad (Health) <Conrad.Barr@act.gov.au>; Wijemanne, Naveen (Health) <Naveen.Wijemanne@act.gov.au>
Subject: RE: FOR REVIEW AND COMMENT: Jervis Bay PFAS Investigation - Draft Human Health Risk Assessment report - Due COB Monday 19 November 2018 [SEC=UNCLASSIFIED]

Andrew – I've dropped the folder in the CM TRIM folder where I put the last one - CM2018/5062. Naveen should have access and may be able to facilitate..

From: Stedman, Andrew (Health)
Sent: Friday, 16 November 2018 12:30 PM
To: Clapham, David <David.Clapham@act.gov.au>

Cc: Pengilley, Andrew (Health) <Andrew.Pengilley@act.gov.au>; Barr, Conrad (Health) <Conrad.Barr@act.gov.au>
Subject: RE: FOR REVIEW AND COMMENT: Jervis Bay PFAS Investigation - Draft Human Health Risk Assessment report - Due COB Monday 19 November 2018 [SEC=UNCLASSIFIED]

Hi David,

The link for the document timed out prior to me saving a copy, were you able to request a new link?

Kind regards

Andrew Stedman | Public Health Officer | A/g Manager Environment and Radiation Safety
 Health Protection Service | Public Health, Protection and Regulation | ACT Health
 PH 6205 4404 | MOB [REDACTED] | FAX 6205 1705
 25 Mulley Street, Holbrooks ACT 2611 | Locked Bag 5005, Weston Creek, ACT, 2611
 Email: andrew.stedman@act.gov.au W health.act.gov.au

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On 16 Nov 2018, at 11:39 am, Clapham, David <David.Clapham@act.gov.au> wrote:

'Morning all

I have not received any comments on the HHRA – these are due to Defence on Monday. Please advise your position, including nil comment.

Thanks, happy to discuss

David

David Clapham | a/g Senior Manager – Infrastructure and Economic Development, Economic and Regional Policy Branch | **Policy & Cabinet Division**
 ☎ 02 6205 7261 | **Chief Minister, Treasury & Economic Development Directorate** | ACT Government
 Level 4, Canberra Nara Centre | GPO Box 158 Canberra ACT 2601 | www.act.gov.au
 <image001.jpg>

From: Clapham, David

Sent: Wednesday, 7 November 2018 8:03 AM

To: Pengilley, Andrew (Health) <Andrew.Pengilley@act.gov.au>; Stedman, Andrew (Health) <Andrew.Stedman@act.gov.au>; Chester, Heath <Heath.Chester@act.gov.au>; Sargent, Narelle <Narelle.Sargent@act.gov.au>

Cc: Barr, Conrad (Health) <Conrad.Barr@act.gov.au>; Engele, Sam <Sam.Engele@act.gov.au>

Subject: FW: FOR REVIEW AND COMMENT: Jervis Bay PFAS Investigation - Draft Human Health Risk Assessment report - Due COB Monday 19 November 2018 [SEC=UNCLASSIFIED]

'Morning all

As with our comments on the DSI, I will provide a single ACT response on the HHRA. I am not at work on 19 November so if possible your **comments to me by COB Thursday 15 November** will allow me to collate, clear and provide them to Defence on Friday 16 November.

FYI, the link in the below email will expire at some point soon – I know some people had trouble accessing the DSI.

Please don't hesitate to contact me with any questions or issues.

Best

David Clapham | a/g Senior Manager – Infrastructure and Economic Development, Economic and Regional Policy Branch | **Policy & Cabinet Division**
 ☎ 02 6205 7261 | **Chief Minister, Treasury & Economic Development Directorate** | ACT Government
 Level 4, Canberra Nara Centre | GPO Box 158 Canberra ACT 2601 | www.act.gov.au
 <image001.jpg>

From: [REDACTED]
 Sent: Friday, 2 November 2018 4:41 PM
 To: [REDACTED] Clapham, David
 <David.Clapham@act.gov.au>; Chester, Heath <Heath.Chester@act.gov.au>;
 [REDACTED] Hudson,
 Lyndell (Health) <Lyndell.Hudson@act.gov.au>; [REDACTED]
 Pengilley, Andrew (Health) <Andrew.Pengilley@act.gov.au>
 Subject: FOR REVIEW AND COMMENT: Jervis Bay PFAS Investigation - Draft Human Health Risk Assessment report - Due COB Monday 19 November 2018 [SEC=UNCLASSIFIED]

UNCLASSIFIED

Dear Jervis Bay PFAS Investigation PCG Members

Please find a link to the draft Human Health Risk Assessment report for the Jervis Bay PFAS Investigation for your review and comment prior to finalisation:

<https://ghd.sendthisfile.com/4i0BCc4CrxrJWKOTPFABua6>

Your earliest confirmation that you are able to download the report using the link attached would be appreciated.

Comments must be provided via return email to [REDACTED] by close of business Monday 19 November 2018. Comments received after this date may not be able to be incorporated into the final report. Any issues in meeting this deadline should be flagged with me as soon as possible. Defence will assume a nil response means you do not wish to provide comment on the draft report prior to finalisation.

Defence intends to finalise and publish the Human Health Risk Assessment report on the Jervis Bay PFAS Investigation webpage (<http://www.defence.gov.au/environment/pfas/JervisBay/>) in early December 2018. There will be a face to face community engagement with the release of the Human Health Risk Assessment report. You will be kept informed of the details of this event as they are finalised and your attendance would be welcomed.

If you have any questions regarding this matter please do not hesitate to contact me. I am happy to organise a teleconference with relevant Agencies to discuss the Human Health Risk Assessment approach and findings if that is required and/or would assist in facilitating comments on the report.

Regards

[REDACTED]
(P)roject Director - Environmental Investigations
PFAS Investigation and Management Branch
Department of Defence

(ii)

BP8-1
8 Brindabella Circuit
Brindabella Business Park
PO Box 7925 Canberra BC 2610

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From: Clapham, David
Sent: Thursday, 29 November 2018 2:24 PM
To: [REDACTED]
Cc: (b)Engilley, Andrew (Health); Engele, Sam; Starick, Kate; Emanuel, Jarrod; Dix, Rodney; Rutledge, Geoffrey
Subject: FW: ACT Government Feedback. Reference 181121-001150 [SEC=UNCLASSIFIED]

Dear [REDACTED]
 (i)

I've received the below via Access Canberra. Can you please assist with some words on water supply to Wreck Bay?
 (ii)

Andrew – For your information.

Thanks – happy to discuss

David

David Clapham | a/g Senior Manager – Infrastructure and Economic Development, Economic and Regional Policy Branch | **Policy & Cabinet Division**
 ☎ 02 6205 7261 | **Chief Minister, Treasury & Economic Development Directorate** | ACT Government
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From: Dix, Rodney
Sent: Thursday, 29 November 2018 7:23 AM
To: Clapham, David <David.Clapham@act.gov.au>; Emanuel, Jarrod <Jarrod.Emanuel@act.gov.au>
Subject: FW: ACT Government Feedback. Reference 181121-001150 [SEC=UNCLASSIFIED]

Hi David/Jarrod

Would this be a question you could assist with.

Hi, My name is [REDACTED] I work for the NSW Department of Industry as a Water and Sewerage Treatment Inspector. I have had an enquiry from an Employee (indigenous) of Shoalwater (Shoalhaven Council) about the water supply to the Wreck Bay aboriginal community in Jervis Bay. There are concerns that the cancer rate to the community is very high and that fire fighting foam used in the past has attributed to elevated PFAS levels in the water supply. Could you please let me know who supplies and manages the drinking water supply to the aboriginal community at Wreck Bay on Jervis Bay?

Thanks

Rodney Dix | Manager
 Phone: +61 2 6207 2586 | Fax: +61 2 6207 6084 | Email: rodney.dix@act.gov.au
 Environment Protection | Access Canberra | ACT Government
 Ground Floor – TransACT House | 470 Northbourne Ave Dickson | GPO Box 158 Canberra ACT 2601 | www.environment.act.gov.au

From: Access Canberra Customer Services [<mailto:accesscanberra@act.gov.au>]

Sent: Wednesday, 28 November 2018 4:55 PM

To: Environment Protection <Environment.Protection@act.gov.au>

Subject: ACT Government Feedback. Reference 181121-001150



ACT Government Customer Enquiry

Hello,

You have been identified as a subject matter expert to respond to this customer enquiry. Please use the button below to respond to the customer.

If this feedback is not relevant for you, please select the 'Respond to Agent' option and let us know where it should be sent.

Reference Number: 181121-001150

Customer Name: [REDACTED]

(1)

To view and respond to this enquiry, [click here](#).

Kind regards,
Access Canberra

From: Clapham, David
Sent: Tuesday, 4 December 2018 10:22 AM
To: Pengilley, Andrew (Health)
Cc: Engele, Sam
Subject: PFAS Inquiry report [SEC=UNCLASSIFIED, DLM=For-Official-Use-Only]
Attachments: Report on the Inquiry into the management of PFAS contamination around d....pdf

Dear Andrew – interesting recommendations from the PFAS Inquiry, including:

3.75 The Committee recommends that the Australian Government review its existing advice in relation to the human health effects of PFAS exposure, including to acknowledge the potential links to certain medical conditions.

Thoughts?

David Clapham | a/g Senior Manager – Infrastructure and Economic Development, Economic and Regional Policy Branch | **Policy & Cabinet Division**

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PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

Inquiry into the management of PFAS contamination in and around Defence bases

Joint Standing Committee on Foreign Affairs, Defence and Trade

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ISBN 978-1-74366-909-9 (Printed Version)

ISBN 978-1-74366-910-5 (HTML Version)

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Contents

Foreword	vii
Members	ix
Terms of Reference	xv
Abbreviations	xvii
List of Recommendations	xix

The Report

1	Introduction.....	1
	Conduct of the inquiry	2
	Report structure.....	2
	Context of the inquiry.....	3
	About PFAS	3
	Recognition of PFAS as a pollutant.....	6
	Intergovernmental agreement on PFAS	7
	2016 Senate committee reports.....	8
2	Contamination and remediation	13
	Extent of contamination	13
	Defence investigation and management	14
	Extent of contamination around specific bases.....	20
	Contamination of non-Defence related sites.....	36

	Remediation	38
	The Government's approach to date	41
	Remediation in other jurisdictions	46
	Research into remediation technologies	46
	Continued use of contaminated bore water	48
	Committee comment	50
3	Health advice and testing.....	55
	Concerns about the health effects of PFAS.....	55
	Health advice to affected communities.....	58
	Current Australian advice regarding the health impacts of PFAS	58
	Expert health panel.....	60
	Is Australia's health advice up to date?	63
	Communication of health advice.....	65
	Response from the Government	67
	Blood testing and epidemiological study	68
	Epidemiological study	68
	Voluntary blood testing program.....	69
	Concerns about low participation	72
	Adequacy of current blood testing program to meet its objectives	74
	Other proposed studies.....	75
	Committee comment	76
4	Financial impacts.....	79
	Financial impacts reported by communities	79
	Impacts on businesses	80
	Impacts on individuals.....	81
	Related impacts on the community	87
	Claims for compensation	90
	Class actions	91
	Non-litigated claims	92

	State, territory and local government submissions	92
	Consideration by the Government	94
	Committee comment	97
5	Communication and coordination	101
	Australian Government response to date	101
	Coordination between government agencies.....	103
	The Intergovernmental Agreement.....	105
	Other communication and coordination between governments	107
	State and territory government submissions	108
	Local government submissions.....	113
	Community views	1145
	Communication with local communities, businesses and other stakeholders	116
	The Government's current approach	116
	State, territory and local government views	119
	Notifications to communities	121
	Lack of trust in government information	122
	Community meetings.....	123
	Other communications.....	124
	Committee comment	125
6	Standards and legislation	129
	Environmental and human health standards.....	129
	Health-based guidance values	129
	Food standards.....	131
	Environmental management.....	133
	Measures to regulate and phase out PFAS.....	133
	PFAS regulation in Australia	134
	Current bans and phase-outs	136
	Stakeholder views.....	139

Environmental regulation of Commonwealth land	143
Cross-jurisdictional issues	143
‘Self-regulation’ by Department of Defence.....	145
Response from the Government	147
Committee comment	148
Appendix A. Submissions and Exhibits.....	153
Appendix B. Public hearings.....	157
Appendix C. Correspondence from the Prime Minister received 24 May 2018..	161

List of Tables

Table 2.1	Status of investigation of Defence properties	16
Table 3.1	Estimated 95th percentile for the Australian population, 2011–2012..	70
Table 6.1	Australian health based guidance values for PFAS chemicals.....	130

List of Figures

Figure 2.1	Map of Army Aviation Centre Oakey Management Area.....	22
Figure.2.2	Map of RAAF Base Williamtown Management Area	26
Figure 2.3	Map of RAAF Base Tindal Investigation Area	30

Foreword

The Senate referred the inquiry into the management of PFAS contamination in and around Defence bases to the Joint Standing Committee on Foreign Affairs, Defence and Trade in December 2017. Before deciding how to proceed the Committee sought further information from the Government on its response to PFAS contamination emanating from Defence bases. Upon receiving that information, in a letter from the then Prime Minister, the Hon. Malcolm Turnbull, and in the report of the Independent Expert Health Panel, the Committee established a PFAS Sub-committee to undertake this inquiry.

This report contains significant recommendations with a focus on improving the Government's response to this issue, particularly in relation to the concerns of the affected communities. The Committee has recommended that a Coordinator-General be appointed with the authority and resources necessary to more effectively coordinate the whole of Commonwealth Government effort in respect of PFAS contamination and to ensure a clear and consistent approach to community consultations and to cooperation with state, territory and local governments. The Committee has made recommendations to improve the voluntary blood testing program as a source of longitudinal information on the long term health effects of PFAS exposure and the effectiveness of measures to break PFAS exposure pathways. In many instances, property owners in PFAS contaminated areas have suffered demonstrable and quantifiable financial losses and the Committee has recommended compensation.

This issue has driven many otherwise ordinary citizens to organise, conduct research and develop significant expertise in an effort to be heard. It should not take years of campaigning at this level of effort to adequately address the legitimate concerns of communities of people.

On behalf of all the PFAS Sub-committee members, I would like to thank and pay tribute to the many members of PFAS affected communities across the country who made submissions to the inquiry and who appeared to give evidence at public and in-camera hearings. The hearings at Katherine, Williamtown and Oakey were remarkable for the intensity of the emotion that could not be masked. These communities are hurt and angered by the effects PFAS contamination, and the delays and inadequacies in the response to its discovery, have had on their lives, their families and their communities.

For most citizens, and even expert witnesses, appearing before a parliamentary committee can be a daunting prospect at the best of times. For many of our witnesses it was a particularly distressing experience to explain before strangers how they and their families have been affected by PFAS contamination. I trust that this report honours their effort.

Mr Andrew Laming MP

Chair

PFAS Sub-committee

Members

Joint Standing Committee on Foreign Affairs, Defence and Trade

Chair

Senator the Hon Ian Macdonald	LNP, QLD
<i>(Chair from 11.9.18 to 6.10.18)</i>	
<i>(Chair from 25.10.18)</i>	

Deputy Chair

Mr Nick Champion MP	Wakefield, SA
---------------------	---------------

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Ms Sharon Claydon MP	Newcastle, NSW
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Mr Rowan Ramsey MP	Grey, SA
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Senator Lee Rhiannon (26.7.18 – 10.9.18)	AG, NSW
Mr Bert van Manen (6.2.18 – 13.8.18)	Forde, QLD
Senator Peter Whish-Wilson (9.8.17 – 26.6.18)	AG, TAS

Mr Jason Wood MP (14.9.16 – 15.8.17)

LaTrobe, VIC

Senator Nick Xenophon (12.9.16 – 1.12.16)

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Senator Malarndirri McCarthy ALP, NT

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Nick Champion MP (*ex officio*) Wakefield, SA

Ms Sharon Claydon MP Newcastle, NSW

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Senator Kimberley Kitching ALP, VIC

Senator the Hon Ian Macdonald (*ex officio*) LP, QLD

Senator Claire Moore ALP, QLD

Senator the Hon Lisa Singh ALP, TAS

Ms Meryl Swanson MP Paterson, NSW

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Terms of Reference

The Commonwealth Government's management of per- and polyfluoroalkyl substances (PFAS) contamination in and around Defence bases, with particular reference to:

- a. the extent of contamination in and around Defence bases, including water, soil, other natural assets and built structures;
- b. the response of, and coordination between, agencies of the Commonwealth Government, including, but not limited to, the Department of the Prime Minister and Cabinet, the Department of Health, the Department of the Environment and Energy, the Department of Defence and the Australian Defence Force;
- c. communication and coordination with state and territory governments, local councils, affected local communities and businesses, and other interested stakeholders;
- d. the adequacy of health advice and testing of current and former defence and civilian personnel and members of the public exposed in and around Defence bases identified as potentially affected by contamination;
- e. the adequacy of Commonwealth and state and territory government environmental and human health standards and legislation, and any other relevant legislation;
- f. remediation works at the bases; and
- g. what consideration has been given to understanding and addressing any financial impact to affected businesses and individuals.

Abbreviations

AFFF	Aqueous Film Forming Foam
AFOEM	Australasian Faculty of Occupational and Environmental Medicine
AFPHM	Australasian Faculty of Public Health Medicine
AICS	Australian Inventory of Chemical Substances
ANU	Australian National University
CRG	Community Reference Group
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DSI	Detailed Site Investigation
EPA	Environmental Protection Agency
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ERA	Ecological Risk Assessment
HHRA	Human Health Risk Assessment
IGA	<i>Intergovernmental Agreement on a National Framework for Responding to PFAS Contamination</i>
MFB	Metropolitan Fire and Emergency Services Board

NEMP	<i>PFAS National Environmental Management Plan</i>
NHMRC	National Health and Medical Research Council
NICNAS	National Industrial Chemicals Notification and Assessment Scheme
PFAS	Per- and poly-fluoroalkyl substances
PFHxS	Perfluorohexane sulfonate
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonate
PMAP	PFAS Management Area Plan
POPs	Persistent Organic Pollutants
RAAF	Royal Australian Air Force
RACP	Royal Australasian College of Physicians
Stockholm Convention	Stockholm Convention on Persistent Organic Pollutants

List of Recommendations

Recommendation 1

- 5.76 The Committee recommends that the Australian Government appoint a Coordinator-General to coordinate the national response to the PFAS contamination issue, supported by an appropriately resourced office. The Coordinator-General's role should include:
- ongoing monitoring of PFAS levels in all management areas, using a range of sampling methods, and publish the results as soon as practicable in a publicly accessible format;
 - providing leadership to drive effective, transparent and consistent responses to PFAS contamination at sites across the country;
 - identifying gaps and priorities for investigation and remediation, based on the extent of contamination and risk to human and environmental health in each area;
 - working across portfolios, and with state, territory and local governments, to overcome barriers to cooperation, coordinate actions and to clearly communicate outcomes and advice to the public; and
 - providing a national point of contact and accountability for the Government's response to the PFAS issue, including annual reporting to the Parliament.

Recommendation 2

2.128 The Committee recommends that the Government continue to upscale its investment in the containment of PFAS contamination plumes, and the remediation of contaminated land and water sources. The Coordinator-General (see Recommendation 1) should:

- publish draft remediation and management plans for each investigation area, and seek public input before finalisation;
- continue support for research into remediation technologies, including disposal of contaminated soil and residue from water treatment plants;
- continue to engage with international stakeholders, including past manufacturers of PFAS chemicals, to ensure best practice approaches are taken to the remediation and disposal of PFAS contamination;
- in collaboration with states and territories, review the effectiveness of current advice regarding the use of contaminated bore water for irrigation purposes and to consider whether restrictions should be put in place; and
- ensure a consistent approach to PFAS contamination across non-Commonwealth sites in consultation with state, territory and local governments.

Recommendation 3

3.75 The Committee recommends that the Australian Government review its existing advice in relation to the human health effects of PFAS exposure, including to acknowledge the potential links to certain medical conditions.

Recommendation 4

3.79 The Committee recommends that the Australian Government, as soon as possible, undertake measures to improve participation in the voluntary blood testing program for PFAS. This should include measures to:

- increase community awareness about the purpose and importance of the tests, and the associated epidemiological study;
- simplify the testing process;

- extend the program to be available in additional areas; and
- ensure Australia's testing strategy is comparable to international studies.

Further, the Committee recommends that the Government consider the potential value of blood testing to monitor the effectiveness of measures being used to break PFAS exposure pathways in affected communities. This will necessitate longitudinal analysis of those who have been previously tested and additional tests being made available, after an appropriate period, to persons who have previously been tested.

Recommendation 5

4.62 The Committee recommends that the Australian Government assist property owners and businesses in affected areas for demonstrated, quantifiable financial losses associated with PFAS contamination that has emanated from Defence bases. Priority for compensation, including the possibility of buy backs, should in the first instance be given to the most seriously affected residents, including:

- property owners who have suffered losses as a result of being unable to use their land for a specific purpose that it was intended for at the time of purchase;
- persons who invested in land between the time that it was known by the Australian Government to be contaminated and the time of that contamination being made public; and
- businesses and other owners of property in the most highly contaminated areas.

The compensation scheme should be flexible enough to accommodate a variety of individual circumstances.

Acceptance of an offer for compensation in respect of their property's utility or value should not preclude the person from a future claim in relation to any human health effects that may be found, as a result of future research, to be attributable to PFAS exposure.

Recommendation 6

- 4.66 The Committee recommends that the Australian Government make available free, individualised case management and financial counselling services to those affected by PFAS contamination.

Recommendation 7

- 6.69 The Committee recommends that the Australian Government implement legislation and policies to:
- ban nationally the use of, contain, and ultimately safely destroy, long chain PFAS-based firefighting foams (including those containing PFOS, PFOA and PFHxS);
 - place appropriate restrictions on the non-essential use of shorter chain PFAS-based foams; and
 - continue to encourage the use of PFAS-free alternatives wherever possible.

Recommendation 8

- 6.70 The Committee recommends that the Australian Government urgently ratify the listing of PFOS under the Stockholm Convention on Persistent Organic Pollutants.

Further, the Committee recommends that the Government expedite the process for ratification of PFOA and PFHxS in the event that they are listed under the Stockholm Convention in the future.

Recommendation 9

- 6.74 The Committee recommends that the Australian Government initiate an independent review of environmental regulation of Commonwealth land. The review should consider:
- the adequacy of current and proposed arrangements to ensure that responses to contamination events originating on Commonwealth land are given appropriate regulatory oversight;

- possible measures to enhance the regulatory response to contamination events that cross jurisdictional boundaries;
- the relative advantages and disadvantages of establishing a Commonwealth Environmental Protection Agency, or similar body, to regulate Commonwealth lands; and
- possible alternative options to enhance regulatory oversight of Commonwealth land, and contamination events emanating from Commonwealth land.

1. Introduction

1.1 On 7 December 2017, the Senate referred to the Joint Standing Committee on Foreign Affairs, Defence and Trade an inquiry into the Commonwealth Government's management of per- and polyfluoroalkyl substances (PFAS) contamination in and around Defence bases, for inquiry and report by 20 June 2018.

1.2 The terms of reference for the inquiry are:

The Commonwealth Government's management of per- and polyfluoroalkyl substances (PFAS) contamination in and around Defence bases, with particular reference to:

- a. the extent of contamination in and around Defence bases, including water, soil, other natural assets and built structures;
- b. the response of, and coordination between, agencies of the Commonwealth Government, including, but not limited to, the Department of the Prime Minister and Cabinet, the Department of Health, the Department of the Environment and Energy, the Department of Defence and the Australian Defence Force;
- c. communication and coordination with state and territory governments, local councils, affected local communities and businesses, and other interested stakeholders;
- d. the adequacy of health advice and testing of current and former defence and civilian personnel and members of the public exposed in and around Defence bases identified as potentially affected by contamination;
- e. the adequacy of Commonwealth and state and territory government environmental and human health standards and legislation, and any other relevant legislation;

- f. remediation works at the bases; and
 - g. what consideration has been given to understanding and addressing any financial impact to affected businesses and individuals.
- 1.3 The Committee resolved to seek further information from the Prime Minister before resuming consideration of the reference. The Chair wrote to the Prime Minister on 12 February 2018 and the Prime Minister's response was provided on 24 May 2018 (see Appendix C).
- 1.4 The Committee commenced its inquiry on 30 May 2018 and established a new sub-committee for the purpose of the inquiry (the PFAS Sub-Committee).
- 1.5 On 9 May 2018 the Senate agreed to extend the reporting date until 23 August 2018. On 14 August 2018, the Senate agreed to further extend the reporting date until 25 October 2018.

Conduct of the inquiry

- 1.6 The Committee announced the commencement of the inquiry by media release on 30 May 2018 and requested submissions from interested members of the public. Submissions were requested by 6 July 2018.
- 1.7 The Committee received 81 submissions, including 4 supplementary submissions, from a range of government agencies, non-government organisations and individuals. Submissions are available on the Committee's website.¹ A full list of submissions received is also included at Appendix A.
- 1.8 The Committee held four public hearings in Katherine, Williamtown, Oakey and Canberra. Transcripts from these hearings are available on the Committee's website.² A full list of public hearings and witnesses is available at Appendix B.

Report structure

- 1.9 This report is divided into seven chapters:
- The remainder of this chapter briefly introduces PFAS and discusses the context of the inquiry;

¹ <https://www.aph.gov.au/pfas>

² <https://www.aph.gov.au/pfas>

- **Chapter 2** discusses the extent of PFAS contamination in and around Defence bases, and remediation work at the bases (terms of reference a and f);
- **Chapter 3** discusses the adequacy of health advice and testing of defence and civilian personnel and members of the public exposed in and around Defence bases (term of reference d);
- **Chapter 4** discusses the consideration given to understanding and addressing the financial impact on affected businesses and individuals (term of reference g);
- **Chapter 5** discusses the response of, and coordination between, Commonwealth agencies; and communication and coordination with state and territory governments, local councils, affected communities and businesses, and other interested stakeholders (terms of reference b and c); and
- **Chapter 6** discusses the adequacy of Commonwealth and state and territory environmental and human health standards and legislation, and other relevant legislation (term of reference e).

Context of the inquiry

1.10 PFAS contamination has been an issue of increasing community concern in recent years, both in Australian and overseas. In Australia, concerns to date have mainly focused on Defence facilities and their surrounding communities. These include the communities surrounding RAAF Base Williamtown (New South Wales), the Oakey Army Aviation Centre (Queensland) and RAAF Base Tindal (Katherine, Northern Territory). In total, as at September 2018, 26 Defence sites are undergoing or have undergone detailed investigation. However, a wide range of other sites around Australia are known to have experienced PFAS contamination and the extent of this contamination is currently under investigation by various Commonwealth, state and territory authorities.

About PFAS

- 1.11 Per-and polyfluoroalkyl substances (PFAS) is the name given to a group of man-made chemicals used since at least the 1950s for a variety of specialty applications. PFAS can be found in:
- some types of firefighting foams;
 - some industrial processes, such as metal plating and plastics etching;
 - some photo-imaging applications, such as X-ray films;
 - aviation hydraulic fluid;

- the manufacture of some non-stick cookware and other products;
- some fabric, furniture and carpet stain protection applications; and
- some food packaging.³

1.12 Concerns about the impacts of PFAS have particularly arisen due to their stable chemical structure and ability to move through the environment. The *PFAS National Environment Management Plan* states:

PFAS resist physical, chemical and biological degradation, and are very stable. This stability creates a problem: PFAS last for a long time.

... Molecules of PFAS are made up of a chain of carbon atoms flanked by fluorine atoms, with a hydrophilic group at their head. Their high solubility in water means that PFAS readily leach from soil to groundwater, where they can move long distances. When the groundwater reaches the surface, the PFAS will enter creeks, rivers and lakes. There it can become part of the food chain, being transferred from organism to organism.⁴

1.13 While at least 4730 different PFAS-related chemicals are known to exist,⁵ the most well-known and studied examples are:

- perfluorooctane sulfonate (PFOS),
- perfluorooctanoic acid (PFOA), and
- perfluorohexane sulfonate (PFHxS).

1.14 Each of these chemicals has been recognised as being persistent in the environment, bio-accumulative, and toxic in certain species.⁶

³ Department of the Environment and Energy, 'Per- and poly-fluoroalkyl substances (PFASs)', <http://www.environment.gov.au/protection/chemicals-management/pfas> viewed 17 August 2018.

⁴ Heads of EPAs Australia and New Zealand (HEPA), *PFAS National Environmental Management Plan*, January 2018, p. 3.

⁵ Organisation for Economic Co-operation and Development (OECD), 'The OECD releases a new list of PFASs', <http://www.oecd.org/chemicalsafety/portal-perfluorinated-chemicals/> viewed 22 August 2018.

⁶ OECD Environment Directorate, Joint Meeting of the Chemicals Committee and the Working Party on Chemicals, Pesticides and Biotechnology, *Co-operation on existing chemicals: Hazard Assessment of Perfluorooctane Sulfonate (PFOS) and its Salts*, 21 November 2002, p. 2; European Chemicals Agency, *Member State Committee Support Document for Identification of Pentadecafluorooctanoic Acid (PFOA) as a Substance of Very High Concern because of its CMR and PBT properties*, 14 June 2013, pp. 4–6; Persistent Organic Pollutants Review Committee, *Perfluorohexane sulfonic acid (CAS No: 355-46-4, PFHxS), its salts and PFHxS-related compounds: Draft Risk Profile*, June 2018, p. 6.

- 1.15 Firefighting foams (also known as Aqueous Film Forming Foams, or AFFFs) containing PFOS and PFOA as active ingredients were once used extensively, including at Defence bases, due to their effectiveness in fighting liquid fuel fires. PFHxS is also commonly found in the legacy firefighting foam as an impurity in the manufacturing process.⁷
- 1.16 The use of PFAS in an 'environmentally dispersive' manner, in particular due to their presence in firefighting foams, has led to elevated levels at a number of sites around Australia,⁸ including at a number of Defence properties. To a lesser degree, PFAS have also entered the environment through sewerage discharge and the disposal of trade waste and consumer products to landfill.⁹
- 1.17 Due to the long half-life of PFAS and its past widespread use, PFAS are found at low levels in the environment worldwide, including in locations and wildlife far from direct human sources, such as in the polar regions.¹⁰ The Environmental Health Standing Committee (enHealth) of the Australian Health Protection Principal Committee advises:

Because of their widespread use, people in Australia commonly have some PFOS, PFOA and PFHxS in their body. PFOS and PFOA are readily absorbed through the gut, and once these chemicals are in a person's body it takes about two to nine years, depending on the study, before those levels go down by half, even if no more is taken in.¹¹

⁷ Department of Defence, 'What are PFAS?', <http://www.defence.gov.au/Environment/PFAS/PFAS.asp> viewed 17 August 2018.

⁸ Department of the Environment and Energy, *National phase out of PFOS: Ratification of the Stockholm Convention amendment on PFOS – Regulation Impact Statement for consultation*, October 2017, p. 17.

⁹ Department of the Environment and Energy, *National phase out of PFOS: Ratification of the Stockholm Convention amendment on PFOS – Regulation Impact Statement for consultation*, October 2017, p. 23.

¹⁰ Department of the Environment and Energy, *National phase out of PFOS: Ratification of the Stockholm Convention amendment on PFOS – Regulation Impact Statement for consultation*, October 2017, p. 24.

¹¹ Environmental Health Standing Committee (enHealth) of the Australian Health Protection Principal Committee, *enHealth Guidance Statements on per- and poly-fluoroalkyl substances*, updated September 2017, p. 1.

Recognition of PFAS as a pollutant

- 1.18 PFOS is listed under Annex B of the Stockholm Convention on Persistent Organic Pollutants, which requires its use and production to be restricted to only certain acceptable purposes and specific exemptions.¹² Australia has not yet ratified this listing. PFOA and PFHxS are also at varying stages of consideration for listing under the Stockholm Convention.¹³
- 1.19 The European Chemicals Agency lists PFOA as a 'substance of very high concern' due to its persistent, bio-accumulative and toxic characteristics.¹⁴ The European Union has recently introduced measures to regulate the production and use of PFOA due to the 'unacceptable risk to human health and the environment' posed by the chemicals.¹⁵
- 1.20 There are no mandatory restrictions on the use of PFAS in Australia. However, the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) has issued recommendations to industry stakeholders for the phase out of PFAS, and for PFOS and PFOA firefighting products to be restricted to essential use only, and not used for fire training or testing purposes.¹⁶ Queensland and South Australia have also introduced bans on firefighting foams containing PFAS in their jurisdictions.¹⁷
- 1.21 enHealth advises that there is 'currently no consistent evidence that exposure to PFAS causes adverse health effects'. However, due to the

¹² Stockholm Convention, 'The new POPs under the Stockholm Convention', <http://chm.pops.int/TheConvention/ThePOPs/TheNewPOPs/tabid/2511/Default.aspx> viewed 5 September 2018.

¹³ Stockholm Convention, 'Chemicals proposed for listing under the Convention', <http://chm.pops.int/TheConvention/ThePOPs/ChemicalsProposedforListing/tabid/2510/Default.aspx> viewed 5 September 2018.

¹⁴ European Chemicals Agency, *Member State Committee Support Document for Identification of Pentadecafluorooctanoic Acid (PFOA) as a Substance of Very High Concern because of its CMR and PBT properties*, 14 June 2013.

¹⁵ Commission Regulation (EU) 2017/1000 of 13 June 2017, *Official Journal of the European Union*, 150/14–16.

¹⁶ National Industrial Chemicals Notification and Assessment Scheme (NICNAS), Submission 59, pp. 3, 4.

¹⁷ Queensland Government, Department of Environment and Science, *Submission 33*, p. 1; South Australia Environment Protection Agency, 'South Australia bans PFAS', https://www.epa.sa.gov.au/articles/2018/04/16/south_australia_bans_pfas viewed 5 September 2018.

persistence of PFAS in human and the environment, enHealth recommends that human exposure 'be minimised as a precaution'.¹⁸

- 1.22 More recently, an Expert Health Panel for PFAS was established to advise the Australian Government on the potential health impacts associated with PFAS exposure and to identify priority areas for further research. The Panel conducted a review of 20 recently published Australian and international reports and academic reviews that had examined scientific studies on potential human health effects of PFAS exposure. The Expert Panel's report, released in May 2018, while noting the potential links between PFAS exposure and certain health effects identified in previous studies, concluded:

Importantly, there is no current evidence that supports a large impact on a person's health as a result of high levels of PFAS exposure. However, even though the evidence for PFAS exposure and links to health effects is very weak and inconsistent, important health effects for individuals exposed to PFAS cannot be ruled out based on the current evidence.¹⁹

Intergovernmental agreement on PFAS

- 1.23 An *Intergovernmental Agreement on a National Framework for Responding to PFAS Contamination* (the IGA) came into effect in February 2018 in order to 'support collaboration and cooperation between the Commonwealth and the States and Territories to respond consistently and effectively to [PFAS] contamination'. The following key areas for action were agreed to under the IGA:

- adopting a *PFAS Contamination Response Protocol*;
- applying the *PFAS National Environmental Management Plan*;
- implementing the *PFAS Information Sharing, Communication and Engagement Guidelines*;
- applying guidance material agreed by relevant national government expert groups, including:
 - Health Based Guidance Values for PFAS;
 - enHealth Guidance Statements on PFAS;
 - Australian Health Protection Principal Committee PFAS Factsheet;
 - Food Regulation Standing Committee Statement on PFAS and the general food supply;

¹⁸ Environmental Health Standing Committee (enHealth) of the Australian Health Protection Principal Committee, *enHealth Guidance Statements on per- and poly-fluoroalkyl substances*, updated September 2017, p. 1.

¹⁹ *Expert Panel for PFAS: Summary*, p. [2].

- supporting collaboration between agencies and industry stakeholders across jurisdictions; and
- collaborating to advance high quality research into PFAS.²⁰

1.24 The Commonwealth Government's response to the issue is being coordinated by the PFAS Taskforce, which was established in December 2016.

2016 Senate committee reports

1.25 In late 2015, the Senate Foreign Affairs, Defence and Trade References Committee commenced an inquiry into matters related to PFAS contamination at Royal Australian Air Force (RAAF) Base Williamtown and other sites. The terms of reference for the Senate committee's inquiry were similar to the current inquiry, but extended to other Commonwealth, state and territory sites where firefighting foams containing PFAS were used, including non-Defence sites.

1.26 The Senate committee presented Part A of its report in February 2016, focusing on the contamination at and around RAAF Base Williamtown. The Senate committee made eight recommendations:

Recommendation 1 – The committee recommends that Defence immediately review its provision of water and replacement of water infrastructure to affected residents to ensure it is sufficient to meet their needs.

Recommendation 2 – The committee recommends that the Commonwealth Government, with the advice of the NSW Department of Primary Industries, develop an initial compensation package for the commercial fishermen affected by the closures of Fullerton Cove and Tilligerry Creek.

Recommendation 3 – The committee recommend that Defence examine providing additional mental health and counselling support services to those affected by contamination at RAAF Base Williamtown.

Recommendation 4 – The committee recommends that Defence and the NSW Government examine establishing a joint taskforce to coordinate the response of government agencies to the contamination from RAAF Base Williamtown.

Recommendation 5 – The committee recommends the Commonwealth Government commit to voluntarily acquire property and land which is no

²⁰ *Intergovernmental Agreement on a National Framework for Responding to PFAS Contamination*, pp. 6-7.

longer fit for purpose due to PFOS/PFOA contamination from RAAF Base Williamtown.

Recommendation 6 – The committee recommends that if PFOS/PFOA contamination from RAAF Base Williamtown causes permanent or long-term fishing closures, the Commonwealth Government should:

- commit to compensate and purchase the relevant rights of fisherman affected; and
- establish an industry transition program for affected commercial fishermen to assist them relocate or transfer to other industries.

Recommendation 7 – The committee recommends that Defence arrange and fund a program of blood tests for residents in the investigation area on an annual basis.

Recommendation 8 – The committee recommends that Defence release a policy statement to clarify its environmental obligations and responsibilities for contamination which spreads to non-Commonwealth land. In particular, it should clarify the capacity of State and Territory environment regulation to apply to its activities.²¹

1.27 The Government response to Part A of the Senate committee's report was presented in April 2016. The Government agreed with Recommendation 1, 3, and 4, did not agree with Recommendation 7, and 'agreed in part' to Recommendation 8. The Government provided 'interim' responses to Recommendations 2, 5 and 6, pending the results of further investigations and risk assessments. For Recommendation 5, in relation to voluntary property acquisitions, the Government response stated:

The Australian Government will further consider the matter of property acquisition once interim health reference values have been established and a detailed environmental investigation at RAAF Base Williamtown has been concluded. Until these activities are finalised, the Australian Government is not in a position to determine the actual level of risk for existing property use. The Australian Government is committed to the considered investigation of this important issue and will review its response to this recommendation once this information has been established.²²

²¹ Senate Foreign Affairs, Defence and Trade References Committee, *Inquiry into firefighting foam contamination: Part A – RAAF Base Williamtown*, February 2016, pp. xiii–xiv.

²² Australian Government, *Australian Government response to the Senate Foreign Affairs, Defence and Trade References Committee report: Inquiry into firefighting foam contamination Part A – RAAF Base Williamtown*, April 2016.

- 1.28 On 7 May 2018, shortly after the release of the Expert Health Panel's report, the PFAS Taskforce announced by media release that 'based on the knowledge and evidence available at this time, the Australian Government is not considering a land purchase program as a result of PFAS contamination'.²³
- 1.29 In May 2016, the Senate committee presented Part B of its report, focused on the Army Aviation Centre Oakey and other Commonwealth, state and territory sites. The Senate committee made nine recommendations:
- Recommendation 1 – The committee recommends that the Department of Defence recommence and fund a program of blood tests for residents in the Oakey investigation area on an annual basis.
- Recommendation 2 – The committee recommends that the Department of Defence ensure that mental health and counselling support services are provided free of charge to those affected by PFOS/PFOA contamination from Army Aviation Centre Oakey, and that these services continue for as long as they are required by residents.
- Recommendation 3 – The committee recommends that the Commonwealth Government commit to voluntarily acquire property and land which is no longer fit for purpose due to PFOS/PFOA contamination from Army Aviation Centre Oakey. The committee further recommends that the Commonwealth Government assist residents who may wish to relocate to an alternative estate within the local community which is free from contamination.
- Recommendation 4 – The committee recommends that the Government explicitly legislate for the immediate removal and safe disposal of PFOS and PFOA firefighting foams from circulation and storage at all Commonwealth, state and territory facilities in Australia.
- Recommendation 5 – The committee recommends that voluntary blood testing be made available to current and former workers at sites where firefighting foams containing PFOS/PFOA have been used, and current and former residents living in proximity to these sites who may be affected by contamination.
- Recommendation 6 – The committee recommends that the Department of the Environment complete the domestic treaty making process for the ratification of the addition of PFOS as an Annex B restricted substance under the

²³ Department of Environment and Energy, PFAS Taskforce, 'Australian Government support for PFAS management', *Media Release*, 7 May 2018.

Stockholm Convention on Persistent Organic Pollutants before the end of 2016.

Recommendation 7 – The committee recommends that the Commonwealth Government review the *Environment Protection and Biodiversity Conservation Act 1999* and, if necessary, seek to have it amended to enable the Department of the Environment to assume a national leadership role and intervene early should other legacy contamination events emerge on the scale of Williamtown or Oakey, especially when contamination spreads from land controlled by Defence to non-Commonwealth land.

Recommendation 8 – The committee recommends that it continue to monitor the Department of Defence's handling of contamination of its estate and surrounding communities caused by PFOS/PFOA, and report to the Senate on an interim basis as required.

Recommendation 9 – The committee recommends that it continue to monitor the response of, coordination between and measures taken by Commonwealth, state and territory governments to legacy contamination caused by PFOS/PFOA, including the adequacy of environmental and human health standards and legislation.²⁴

- 1.30 At the time of the current inquiry, the Government had not yet provided a response to the recommendations in Part B of the Senate committee's report. In his letter to the Committee of 24 May 2018 (Appendix C), the Prime Minister advised:

The Australian Government is currently finalising its response to the *Senate Inquiry Report part B – Army Aviation Centre Oakey and other Commonwealth, state and territory sites*. I am aware this response is overdue and have urged relevant Ministers to prioritise finalisation.

²⁴ Senate Foreign Affairs, Defence and Trade References Committee, *Firefighting foam contamination: Part B – Army Aviation Centre Oakey and other Commonwealth, state and territory sites*, May 2016, pp. xi–xii.

2. Contamination and remediation

2.1 This chapter addresses the following terms of reference:

(a) the extent of contamination in and around Defence bases, including water, soil, other natural assets and built structures; and

(f) remediation works at the bases.

2.2 The chapter includes:

- a discussion of the overall extent of PFAS contamination in and around Defence bases, including the investigation process followed by the Department of Defence (Defence) and the methods it uses to assess and monitor the extent of contamination at each site;
- a discussion of evidence received by the Committee in relation to contamination in and around specific Defence bases, particularly those at Oakey, Williamtown and Katherine;
- a brief overview of evidence received about contamination at other sites;
- an overview of remediation works undertaken to date in and around Defence bases; and
- the Committee's conclusions and recommendations.

Extent of contamination

2.3 The National Toxics Network summarised the challenge posed by PFAS as follows:

PFAS chemicals cannot and do not break down. They have no environmental degradation mechanisms (eg hydrolysis, photolysis, or biodegradation). PFAS accumulate in the environment and in all living things, including humans. PFAS can damage the endocrine and reproductive system and the immune system of humans and wildlife. While, the focus has been primarily on PFOS,

PFOA and PFHxS, these represent only three of the estimated 4,730 PFAS chemicals in use today. Information on toxic effects and environmental fate exists for only a handful. With the ability of all PFAS to travel via air and water, essentially contaminating the commons, urgent national and international action is warranted and well overdue.¹

- 2.4 The Coalition Against PFAS informed the Committee that Defence had used 3M Lightwater—a firefighting foam containing PFOS, PFHxS and (to a lesser degree) PFOA—since the 1970s.² In 2000, the United States Environmental Protection Agency wrote to the Australian Government to draw attention the long term risks of PFOS to human health and the environment. However, existing stocks of the product continued to be used by Defence until at least 2011.³ The Coalition Against PFAS considered that this usage had been ‘disastrous in the long term’, with contamination plumes modelled to remain present for 100 years or more, in some cases,⁴ and high blood serum levels in affected communities including Oakey, Williamtown and Katherine.⁵

Defence investigation and management

- 2.5 At a public hearing, Defence advised that it had stopped acquiring foam containing PFOS and PFOA (3M Lightwater) from 2004, and phased out its use in preference for an alternative fluorinated foam (Ansulite). Defence also said it had changed its training practices to mainly use water, and noted that when foam was used for training it was collected and taken to a license water treatment facility. While noting it had conducted audits to ensure its remaining stocks of 3M Lightwater were disposed of, Defence could not confirm that it did not hold any more of the product in small amounts.⁶
- 2.6 The Australian Government described the Department of Defence’s PFAS Investigation and Management Program as ‘possibly the largest program of environmental investigations ever conducted in Australia’.⁷ At the time of

¹ National Toxics Network, *Submission 34*, p. 2.

² Coalition Against PFAS, *Submission 40*, pp. 4, 5.

³ Coalition Against PFAS, *Submission 40*, p. 6.

⁴ Coalition Against PFAS, *Submission 40*, p. 6.

⁵ Coalition Against PFAS, *Submission 40*, p. 9.

⁶ Mr Steven Grzeskowiak, Deputy Secretary, Estate and Infrastructure, Department of Defence, *Committee Hansard*, Williamtown, 24 July 2018, pp. 56, 58.

⁷ Australian Government, *Submission 64*, p. 3.

the Government's submission, the total combined size of the investigation areas was approximately 1150 square kilometres, and Defence had spent in excess of \$130 million on the program.⁸

- 2.7 Investigation areas consist of the relevant Defence property, and its vicinity where relevant, in which detailed environmental investigations, including a sampling program, are carried out to assess the location and extent of PFAS contamination. Investigation areas are intended to encompass the plume of PFAS contamination, and an additional buffer area to allow for changes in PFAS migration pathways.⁹
- 2.8 The process for the Government's assessment of site contamination includes three phases:
- **Phase 1 – Preliminary Site Investigation** – undertaken to determine the presence or absence of PFAS. In cases where PFAS is identified, it provides a baseline understanding of source areas, migration pathways and hydrogeology of the area. It includes a review of previous site reports, an inspection of the site, limited sampling (if any) and an examination of past fire-fighting foam use and storage practices. The results of the Preliminary Site Investigation determine whether the investigation should progress to the next phase.
 - **Phase 2 – Detailed Site Investigation (DSI)** – may include extensive sampling, analysis and interpretation of soil, water, plants, animals and other environmental media which may be impacted by PFAS contamination. A Detailed Site Investigation identifies and confirms the areas where legacy AFFF was used (source areas) and how far, and where, it has spread in the environment (migration pathways). The type and quantity of sampling is different for each environmental investigation and is determined by several factors, including the hydrogeology of the investigation area. All Detailed Site Investigations are undertaken by independent environmental consultants and collected samples are sent to laboratories accredited by the National Association of Testing Authorities for testing and analysis, including the Commonwealth's National Measurement Institute, a division of the Department of Industry, Innovation and Science.
 - **Phase 3 – Human Health Risk Assessment (HHRA) and/or Ecological Risk Assessment (ERA)** – conducted if required following the Detailed

⁸ Australian Government, *Submission 64*, p. 3.

⁹ Australian Government, *Submission 63*, p. 3.

Site Investigation. If the results of the Detailed Site Investigation reveal that humans and/or animals in the food chain have the potential to be exposed to the contamination, an assessment will be undertaken into the risk of PFAS contamination to human health, through a Human Health Risk Assessment. An Ecological Risk Assessment may be conducted if the Detailed Site Investigation identifies that sensitive ecological receptors, such as marine life, plants or animals may be affected.¹⁰

- 2.9 At the conclusion of each investigation, Defence will use the findings to develop a **PFAS Management Area Plan (PMAP)** that addresses the elevated risks identified in the detailed investigation and the risk assessment. PMAPs are currently under development for some sites where the investigation phase has concluded. Further, in some circumstances, response actions may be conducted simultaneously with the investigations to reduce the risk of impacts on human health, communities and/or the environment.¹¹

Defence properties under investigation

- 2.10 At the time the Committee's inquiry commenced, the Department of Defence was conducting—or had finished conducting—detailed site investigations for PFAS contamination in and around 23 properties.¹² During the inquiry, the Committee was advised that investigations were commencing at a further three properties.¹³ These 26 properties, and the current status of their investigations, are summarised in the below table. Defence publishes information and publications relating to each investigation area on its website.¹⁴

Table 2.1 Status of investigation of Defence properties

State	Site	Investigation status
NSW	RAAF Base Williamtown	Commenced Sep 2015; multiple DSI reports;

¹⁰ Australian Government, *Submission 63*, pp. 4–5.

¹¹ Australian Government, *Submission 63*, p. 6.

¹² Australian Government, *Submission 63*, p. 3.

¹³ Mr Steven Grzeskowiak, Deputy Secretary, Estate and Infrastructure, Department of Defence, *Committee Hansard*, Williamtown, 24 July 2018, p. 57.

¹⁴ <http://www.defence.gov.au/environment/pfas>

		HHRA Dec 2017; ERA in progress
	HMAS Albatross	Commenced May 2016; DSI Nov 2017; HHRA Jun 2018; ERA in progress
	RAAF Base Richmond	Commenced May 2017; DSI Jun 2018; HHRA and ERA in progress
	RAAF Base Wagga	Commenced May 2017; DSI Jun 2018; HHRA and ERA in progress
	Holsworthy Barracks	Commenced Jun 2017; DSI in progress
	Singleton Military Area	Commenced Jul 2018, DSI in progress
	Blamey Barracks (Kapooka)	Commenced 2017, DSI in progress
Vic.	RAAF Base East Sale	Commenced May 2016; DSI Jun 2017; HHRA/ERA Aug 2018, PMAP Aug 2018
	HMAS Cerberus	Commenced May 2017; DSI in progress; HHRA and ERA not required
	Bandiana Military Area	Commenced Jun 2017, DSI Sep 2018, HHRA and ERA in progress
	RAAF Williams (Laverton)	Commenced 2017, DSI in progress
Qld	Army Aviation Centre Oakey	Commenced Dec 2012; multiple DSI reports; HHRA Dec 2017; ERA in progress
	RAAF Base Townsville	Commenced Mar 2017; DSI May 2018, HHRA and ERA in progress
	RAAF Base Amberley	Commenced Mar 2017; DSI, HHRA and ERA in progress
	Lavarack Barracks	Commenced Oct 2017, DSI in progress
WA	RAAF Base Pearce	Commenced Apr 2016; DSI Jul 2018, HHRA Jul 2018, ERA in progress
	HMAS Stirling	Commenced May 2017, DSI May 2018, ERA in progress, HHRA not required
	RAAF Base Learmonth	Commenced Sep 2017, DSI in progress
	Harold E Holt Area A	Commenced Sep 2017, DSI in progress

	Harold E Holt Area B	Commenced Sep 2017, DSI in progress
	Gingin Satellite Airfield	Commenced Oct 2017, DSI Jul 2018
SA	RAAF Base Edinburgh	Commenced Nov 2016, DSI, HHRA and ERA in progress
ACT	Jervis Bay Range Facility	Commenced Jan 2017, DSI, HHRA and ERA in progress
NT	RAAF Base Tindal	Commenced Mar 2017, DSI Feb 2018 and Sep 2018, HHRA Jun 2018, ERA in progress
	RAAF Base Darwin	Commenced Mar 2017, DSI Feb 2018, HHRA Jun 2018, ERA in progress
	Robertson Barracks	Commenced Jun 2017, DSI Jun 2018, HHRA/ERA Aug 2018

Source: Australian Government, Submission 64, p. 32; www.defence.gov.au/environment/pfas/

- 2.11 The Australian Government advised that the investigations of some sites—including RAAF Base Williamtown and the Army Aviation Centre Oakey—were reaching completion and were transitioning to the PFAS Management Area Plan as part of the ‘Response Management Phase’. Other sites were comparatively early in the process.¹⁵
- 2.12 The Government also noted that while its dataset was ‘not yet complete’, Defence had ‘required significantly condensed timeframes for investigations compared with standard industry practice’. It added:

When Defence commenced its National PFAS Investigation Program, testing capabilities were initially limited, and industry’s level of understanding of PFAS chemicals was still developing. As the program has progressed, testing and analysis capabilities for PFAS continue to improve.¹⁶

Assessing and monitoring the extent of contamination at each site

- 2.13 The Australian Government explained that due to the ‘highly mobile’ nature of PFAS, water is the primary method of PFAS contamination transferring from a source to a receptor, such as a person, animal, plant, eco-system, property or a water body. As such, in addition to soil or water samples at particular locations, it is necessary for the investigations to understand the

¹⁵ Australian Government, *Submission 63*, p. 5.

¹⁶ Australian Government, *Submission 63*, p. 5.

characteristics of soil and rock formations and the distribution and movement of groundwater.¹⁷

2.14 On average, between 500 and 2000 samples are taken during the investigation of an area, depending on the complexity of the investigation. Where samples exceed the applicable screening criteria for the intended land use, or for drinking water, then the sample may be described as contaminated.¹⁸

2.15 The Australian Government noted that the results of sampling often released a 'patchwork of varying levels of contamination'. It summarised the typical results of investigations as follows:

Investigations have revealed the principal sources of PFAS contamination at or in the vicinity of Defence properties are former and current Fire Training Areas, former and current fire stations, aircraft hangars, incident sites where AFFF was deployed, and AFFF storage/decanting facilities. Groundwater, surface water, and stormwater/drainage and sewerage systems have been identified as potential pathways for PFAS contamination, through which PFAS can move from a source area to a receptor.¹⁹

2.16 The Victorian Government noted that any site where there have been regular fire-fighting exercises is likely to have some level of PFAS contamination:

As far as the Victorian Government is aware, all [Department of Defence] sites have undertaken regular fire-fighting activity and therefore all of these sites will have some degree of contamination. However, the extent to which PFAS has migrated from Commonwealth land into surrounding land depends on individual factors, including the concentration of contaminants, their proximity to water tables and the local geology and hydrology.²⁰

2.17 A number of submitters to the inquiry expressed a desire for further environmental monitoring of PFAS levels in affected areas, and for the results of this monitoring to be made publicly available in a timely manner.²¹

¹⁷ Australian Government, *Submission 63*, p. 5.

¹⁸ Australian Government, *Submission 63*, p. 6.

¹⁹ Australian Government, *Submission 63*, p. 6.

²⁰ Victorian Government, *Submission 76*, p. 1.

²¹ For example, Jenny Robinson, *Submission 9*, p. [1]; Justin Hamilton, *Submission 13*, p. [2]; Nicole Smith, *Submission 45*, p. 2 (cover letter); Williamtown and Surrounds Residents Action Group, *Submission 51*, pp. [4, 6]; Mrs Sue Walker, *Committee Hansard*, Williamtown, 24 July 2018, p. 10.

- 2.18 The New South Wales Government recommended that Defence publish ongoing monitoring reports and provide a website that includes 'site by site monitoring data in an accessible format for community members'.²²
- 2.19 The Royal Australasian College of Physicians supported the monitoring of drinking water, soil and food around sites where PFAS contamination is a concern, noting that this can assist with risk communication for concerned communities, as well as assisting population risk assessments and compliance with environmental guidelines and standards.²³
- 2.20 At a public hearing in Williamstown, Defence advised that while it published all the products of its investigations on its website, including summaries to make the information 'digestible', it did not publish the specific readings taken during testing on private properties for privacy reasons.²⁴
- 2.21 Defence also advised that one of the changes it had made in its investigation methodology since 2015 is that, rather than starting investigations at the source of the contamination (i.e. on the base) and gradually working its way out, the 'first thing' it would do is to 'go and look outside a Defence property where we thought there might be contamination and just see what's there, if there's anything there'.²⁵

Extent of contamination around specific bases

- 2.22 The majority of submissions received by the Committee referred to one or more of the following three investigation areas:
- Army Aviation Centre Oakey (Queensland);
 - RAAF Base Williamstown (New South Wales); or
 - RAAF Base Tindal (Northern Territory).

Army Aviation Centre Oakey

- 2.23 In its May 2016 report, the Senate Foreign Affairs, Defence and Trade References Committee summarised the history of use of PFAS firefighting foams at the Army Aviation Centre Oakey and provided a timeline of how

²² New South Wales Government, *Submission 61*, p. 4.

²³ Royal Australasian College of Physicians, *Submission 69*, p. 7.

²⁴ Mr Steven Grzeskowiak, Deputy Secretary, Estate and Infrastructure, Department of Defence, *Committee Hansard*, Williamstown, 24 July 2018, p. 58.

²⁵ Mr Steven Grzeskowiak, Deputy Secretary, Estate and Infrastructure, Department of Defence, *Committee Hansard*, Williamstown, 24 July 2018, p. 57.

the contamination was investigated. It noted that an estimated 1.2 megalitres of PFAS-containing concentrate had been discharged at the base between 1977 and 2003, largely in firefighting drills, resulting in a contaminated area of approximately 24 square kilometres. Initial investigations in 2010, followed by more comprehensive investigations in 2011, identified the presence of PFOS and PFOA in soil and groundwater at the base. Following an initial community information session in December 2012, and limited targeted sampling during 2013, wider scale testing outside the base to determine the extent of the impact occurred from early 2014. In July 2014, Defence publicly advised Toowoomba Regional Council and affected residents to, as a precaution, not drink water from any underground source in the investigation area until further notice.²⁶

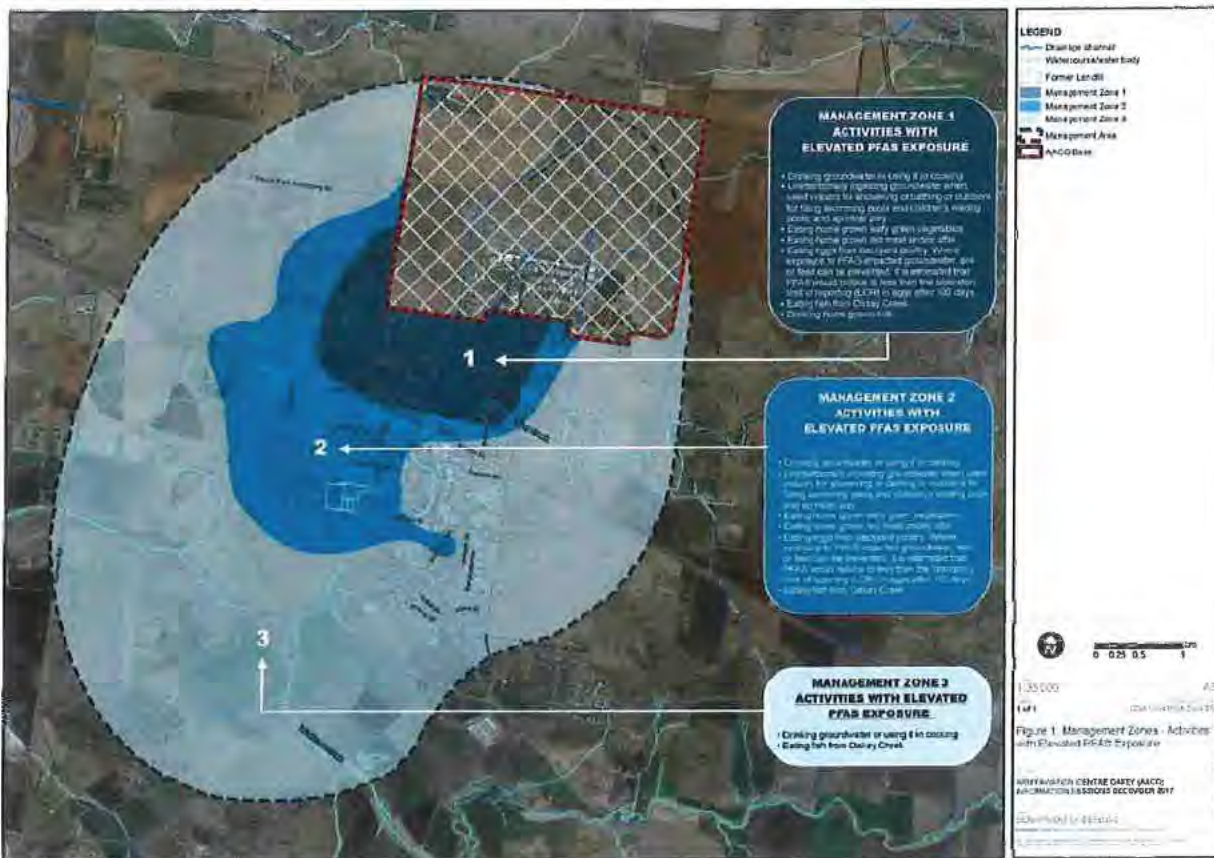
- 2.24 According to the Department of Defence website, Defence is currently in the process of finalising the detailed environmental investigation into PFAS on, and in the vicinity of, Army Aviation Centre Oakey, and the outcomes of the investigation are being used to develop a PFAS Management Area Plan.²⁷ A Human Health Risk Assessment report and an Environmental Site Assessment report were published by Defence in December 2017.²⁸
- 2.25 Oakey Management Area is divided into Management Zones 1, 2 and 3. A map of the management area is provided in Figure 2.1 below.

²⁶ Senate Foreign Affairs, Defence and Trade References Committee, *Firefighting foam contamination: Part B – Army Aviation Centre Oakey and other Commonwealth, state and territory sites*, May 2016, pp. 5–8.

²⁷ Department of Defence, 'Army Aviation Centre Oakey PFAS Investigation', <http://www.defence.gov.au/environment/pfas/oakey/> viewed 21 September 2018.

²⁸ Department of Defence, 'Publications', <http://www.defence.gov.au/environment/pfas/Williamtown/publications.asp> viewed 21 September 2018.

Figure 2.1 Map of Army Aviation Centre Oakey Management Area



Source: Department of Defence

- 2.26 Residents within Management areas 1 and 2 are advised to avoid drinking, using in cooking or unintentionally ingesting groundwater, and to avoid eating home grown leafy green vegetables, eggs from backyard poultry, red meat from home grown cattle or sheep, or fish from Oakey Creek. Residents in Management Zone 1 are additionally advised to avoid drinking home grown milk. Residents in Management Zone 3 are advised to avoid drinking groundwater or using it in cooking, and to avoid eating fish from Oakey Creek.²⁹
- 2.27 At the Oakey public hearing, Toowoomba Regional Council explained to the Committee how the detection of elevated PFAS levels in the groundwater had impacted the town's drinking water supply. Oakey's water had been drawn from nearby bore fields until 1997, at which time a Toowoomba-Oakey pipeline was commissioned (at Defence expense) to improve water quality. The Oakey bore field was then recommissioned in 2008 with the

²⁹ Department of Defence, *Army Aviation Centre Oakey - Stage 2C Environmental Investigation (Fact Sheet)*, December 2017, p. 2.

construction of a reverse osmosis water treatment plant, intended to provide more water security to the town. The new plant was temporarily taken offline in 2012 for unrelated operational reasons, but has not been able to be placed back online since due to the PFAS contamination of the groundwater.³⁰ Recent testing found that, despite some remediation work having been done, the levels of contamination in the bores were 'very similar to what they were a year earlier'.³¹

- 2.28 At the public hearing, Defence told the Committee that, following the initial focus on breaking exposure pathways by providing clean drinking water for people otherwise reliant on groundwater, it was now moving into the longer-term phase of the response:

We're here for the long haul. We very much see ourselves as part of this community. The base has been here for a long time and will be here for a long time. We're moving into remediation activities now. The investigation is essentially complete. We're working on management plans, long-term plans for how we continue to monitor what's happening in the ground and in the surface waters and the decontamination process that we've commenced with water treatment on the base.³²

- 2.29 Defence added that the monitoring wells it had put in place during the investigation would remain in place and continue to be retested into the future.³³ The department elaborated:

Part of the ongoing monitoring plan that we're now entering into will include developing a further improved view of the aquifer. We've built the model over time as we've collected samples and understood the aquifer, how the water circulates, the recharge rates and the PFAS levels and speed of movement. As we continue to develop the ongoing monitoring plan and implement it, the model of the aquifer gets more improved and more refined, particularly in terms of the underground geology and how that might be impacting on water flows.³⁴

³⁰ Mr John Mills, Manager of Water Operations, Toowoomba Regional Council, *Committee Hansard*, Oakey, 17 August 2018, pp. 21–23.

³¹ Mr Andrew Murray, Principal Scientist, Toowoomba Regional Council, *Committee Hansard*, Oakey, 17 August 2018, p. 22.

³² Mr Steve Grzeskowiak, Deputy Secretary Estate and Infrastructure, Department of Defence, *Committee Hansard*, Oakey, 17 August 2018, p. 22.

³³ Mr Grzeskowiak, *Committee Hansard*, Oakey, 17 August 2018, p. 28.

³⁴ Mr Chris Birrer, First Assistant Secretary Infrastructure, Department of Defence, *Committee Hansard*, Oakey, 17 August 2018, p. 28.

- 2.30 Residents of Oakey expressed concern to the Committee that there was only limited information released by Defence in relation to the testing of private and government-owned bores, and that private bores appeared to be no longer being tested. However, they referred to evidence that the plume of PFAS contamination was 'getting heavier' and moving to the west-south-west, as predicted.³⁵
- 2.31 Mr Craig Commens, while expressing concern about the possible health effects of PFAS exposure and the impact on property prices, submitted to the Committee that 'hysteria' associated with the PFAS contamination, particularly in certain media outlets, had 'caused Oakey way more problems than the contamination'.³⁶ At the public hearing, Mr Commens said that he and some other residents had organised an 'Oakey Fights Back' rally in response to the negative media.³⁷

RAAF Base Williamtown

- 2.32 The Senate Foreign Affairs, Defence and Trade References Committee presented timeline of events regarding how the extent of PFAS contamination at RAAF Base Williamtown became known in its February 2016 report. This included initial detections by Defence of PFOS and PFOA on the base in December 2011, and elevated levels being detected in surface water leaving the base in March 2012. While several local authorities, including the New South Wales Environment Protection Agency (EPA), the Port Stephens Council and Hunter Water were notified of the off-site detections as early as May 2012, the contamination and recommended precautionary measures were not publicly announced until 3 September 2015.³⁸
- 2.33 According to the Department of Defence website, Defence is currently in the process of finalising the detailed environmental investigation into PFAS on, and in the vicinity of, RAAF Base Williamtown, and the outcomes of the investigation are being used to develop a PFAS Management Area Plan.³⁹

³⁵ Ms Dianne Priddle and Ms Jennifer Spencer, *Committee Hansard*, Oakey, 17 August 2018, pp. 8–9.

³⁶ Mr Craig Commens, *Submission 74*, p. [1].

³⁷ Mr Craig Commens, *Committee Hansard*, Oakey, 17 August 2018, p. 34.

³⁸ Senate Foreign Affairs, Defence and Trade References Committee, *Inquiry into firefighting foam contamination: Part A – RAAF Base Williamtown*, February 2016, pp. 9–15.

³⁹ Department of Defence, 'RAAF Base Williamtown PFAS Investigation', <http://www.defence.gov.au/environment/pfas/Williamtown/Default.asp> viewed 21 September 2018.

An Off-Site Human Health Risk Assessment report and an Environmental Site Assessment report were published by Defence in December 2017.⁴⁰

- 2.34 The Williamstown Management Area is divided into Primary, Secondary and Broader Management Zones. A map of the management area, published by the New South Wales EPA, is provided in Figure 2.2 below.⁴¹
- 2.35 The Coalition Against PFAS noted that the main plume of PFAS contamination emanating from RAAF Base Williamstown is approximately five kilometres long and five kilometres wide. It added that the plumes ‘continue to migrate daily, and are exacerbated by flood events’.⁴² In addition to concerns about human health, the group noted that the PFAS contamination had spread into the Hunter Estuary Wetlands, which are internationally protected under the Ramsar Convention.⁴³
- 2.36 According to the New South Wales Government, the contamination emanating from RAAF Base Williamstown has impacted a community of 600 residents.⁴⁴ The New South Wales EPA recommends that residents within the area follow precautionary advice to minimise their exposure to PFAS chemicals. The advice varies according to each management zone.
- Residents in the Secondary and Broader Management Zones are advised to not use bore water, groundwater or surface water for drinking or cooking, and to avoid swallowing such water when bathing, showering, swimming and paddling. They are advised to avoid eating home grown food produced in the area, including slaughtered meat, eggs, milk, poultry, fruit and vegetables.
 - Residents in the Primary Management Zone are advised that groundwater, bore water and surface water should not be used for *any* purpose, and to not do anything with such water that may lead to

⁴⁰ Department of Defence, ‘Publications’, <http://www.defence.gov.au/environment/pfas/Williamstown/publications.asp> viewed 21 September 2018.

⁴¹ New South Wales Environment Protection Agency, ‘Management Area Map’ <https://www.epa.nsw.gov.au/working-together/community-engagement/community-news/raaf-williamtown-contamination/williamtown-map> viewed 21 September 2018.

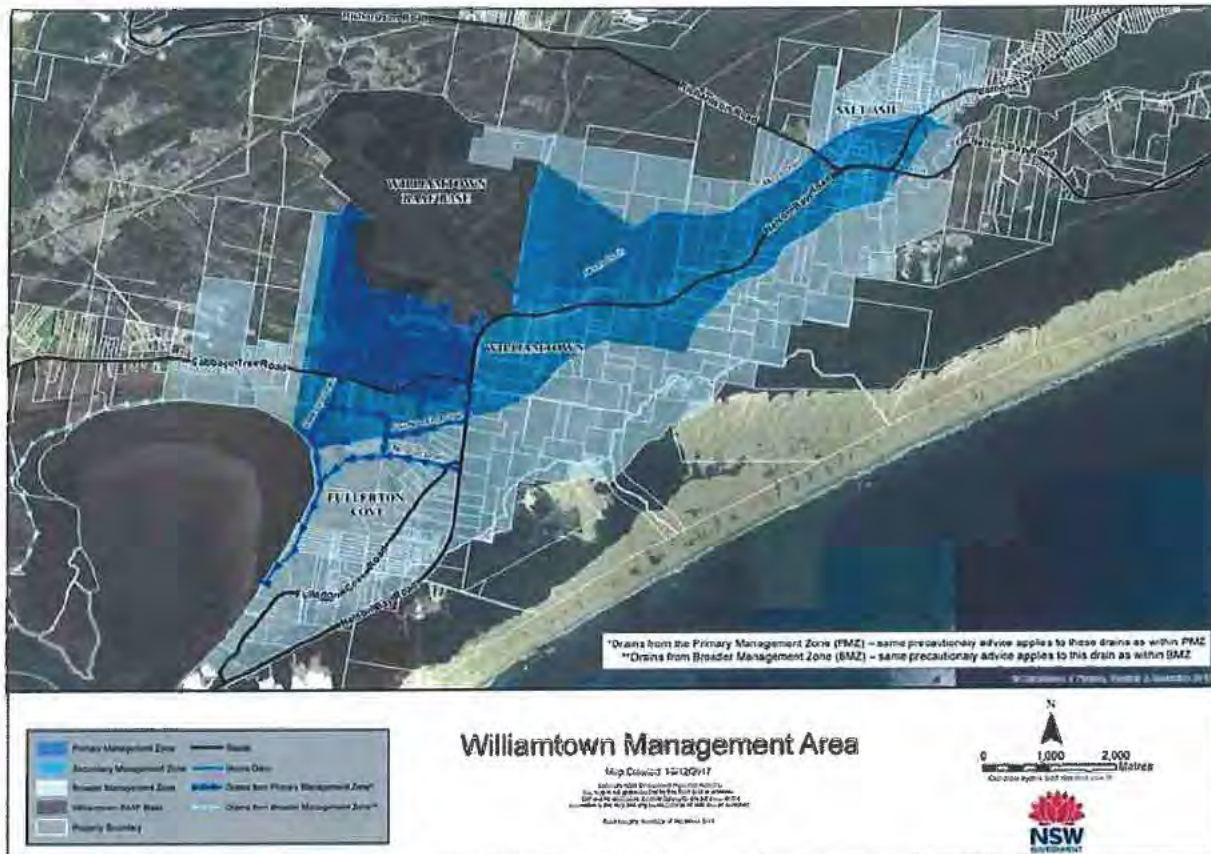
⁴² Coalition Against PFAS, *Submission 40*, p. 9.

⁴³ Coalition Against PFAS, *Submission 40*, p. 13.

⁴⁴ New South Wales Government, *Submission 61*, p. 18.

incidental swallowing. They are advised that home grown food produced in the area should not be consumed.⁴⁵

Figure 2.2 Map of RAAF Base Williamtown Management Area



Source: New South Wales EPA

- 2.37 Port Stephens Council submitted that it was 'difficult to understand' the extent of contamination due to 'results not being communicated in a consistent manner'. It also noted that there was no clear guidance at the start of the investigation as to what constituted contamination, and the related health effects.⁴⁶
- 2.38 The Williamtown and Surrounds Residents Action Group submitted that the nature of the local environment around Williamtown, Salt Ash and Fullerton Cove is 'unique':

⁴⁵ New South Wales Environment Protection Agency, 'Advice to minimise exposure to PFAS' <https://www.epa.nsw.gov.au/working-together/community-engagement/community-news/raaf-williamtown-contamination/williamtown-precautionary-advice> viewed 21 September 2018.

⁴⁶ Port Stephens Council, *Submission 49*, p. 2.

It is all located on top of the once pristine Tomago Sandbed aquifer. The area includes ground water dependent eco systems, a high water table and a high dependency by residents o[n] their bore water supply due to the sandy soils. The area has a documented drain network that has constant interplay with the ground water. This unique setting has provided a platform for the contamination disaster. ... These plumes have created pathways of exposure to both families and livestock, via water, air, soil and dust.⁴⁷

- 2.39 Several submitters told the Committee about the distress that community members had suffered when an expansion to the initial investigation zone was announced in late 2017, taking in significantly more properties that had not previously been given precautionary advice in relation to, for example, consumption of home grown produce.⁴⁸
- 2.40 Justin Hamilton, a community representative living in the Williamstown area, told the Committee that the extent of contamination had still not been defined. He said that Defence had refused requests to conduct soil, drain, air and blood sampling, in addition to water sampling, and cited examples of incorrect information being promulgated that would have benefited from the assistance of the local community.⁴⁹ At a public hearing, Mr Hamilton told the Committee that he had paid for his own testing of water tanks, bores, and the creek and dam on his property that were outside of the original zone in order to prove that the zone was wrong.⁵⁰
- 2.41 Mr Hamilton and fellow resident Lindsay Clout explained to the Committee that there were 'hundreds of kilometres' of interconnected drains on private property that overflow onto properties around Fullerton Cove during rain events that occur at high tide. This results in the contamination spreading across the area and rendering the zones within the management area 'irrelevant'.⁵¹

⁴⁷ Williamstown and Surrounds Residents Action Group, *Submission 51*, p. [2].

⁴⁸ Robyn and Tony Jones, *Submission 8*, p. [1]; Justin Hamilton, *Submission 13*, pp. [5–6]; Port Stephens Council, *Submission 49*, p. 3; Meryl Swanson MP, *Submission 50*, p. [1]; Williamstown and Surrounds Residents Action Group, *Submission 51*, p. [4]; Mr Cain Gorfine, *Committee Hansard*, Williamstown, 24 July 2018, p. 22; Mr Lindsay Clout, *Committee Hansard*, Williamstown, 24 July 2018, pp. 34, 37–38; Mr Brian Byers, *Committee Hansard*, Williamstown, 24 July 2018, p. 47.

⁴⁹ Justin Hamilton, *Submission 13*, pp. [2–3].

⁵⁰ Mr Justin Hamilton, *Committee Hansard*, Williamstown, 24 July 2018, p. 37.

⁵¹ Mr Justin Hamilton and Mr Lindsay Clout, *Committee Hansard*, Williamstown, 24 July 2018, pp. 13–14.

- 2.42 Eileen Clark, of nearby Medowie, expressed concern that PFAS may have contaminated the Tomago Sandbeds, which are an 'integral part' of the region's water supply. She called for a new dam to be built to reduce reliance on the Sandbeds.⁵²
- 2.43 The O'Connell family, long term residents of the area, explained that an expansion to RAAF Base Williamtown in the 1980s had caused stormwater from the base to flow into Moor's Drain, to the east of the base. A new drain and levee system was constructed following a flood event in 1990, which was subsequently modified by the Port Stephens Council to prevent flooding of new subdivisions. The O'Connell family claimed that this action had resulted in PFAS contaminated floodwater being trapped on properties along Nelson Bay Road 'for months on end with nowhere to go', and that Defence had been using these properties as an 'off base retention pond for their PFAS contaminated stormwater runoff for 28 years'.⁵³
- 2.44 Kim-leeanne King wrote to the Committee about how, as children, she had run through bore-water sprinklers at the RAAF base, played in the water in the drains, and enjoyed home grown vegetables watered with bore water. She described an occasion on which RAAF personnel had conducted a demonstration at the Williamtown Public School of using fire fighting foam to extinguish a fire. After the demonstration, children picked up handfuls of excess foam and placed it on their hands and faces. Ms King explained that she had and family had since been 'plagued by health issues', despite never having drunk or smoked.⁵⁴
- 2.45 Robert Goldsack, who was based at RAAF Base Williamtown from approximately 1980 to 1985, wrote that he was 'routinely covered in AFFF foams used by the ADF' during firefighting training exercises and drills. He also claimed that he had seen firefighting crews discarding waste foam material from their tankers into the bush and creeks on the western side of the base. Mr Goldsack noted that he had been chronically sick since his discharge from the RAAF in March 1986, suffering from heart problems and trouble healing from any operation or injury.⁵⁵

⁵² Eileen Clark, *Submission 56*, p. [1].

⁵³ Andrew O'Connell, *Submission 43*, p. [1].

⁵⁴ Kim-leeanne King and Colin King, *Submission 62*, pp. [1-2].

⁵⁵ Robert Goldsack, *Submission 67*, p. 1.

RAAF Base Tindal, Katherine

- 2.46 Elevated levels of PFAS were detected in offsite surface water and groundwater near RAAF Base Tindal as part of a Defence preliminary sampling program that reported in September 2016.⁵⁶
- 2.47 In March 2017, Defence commenced a detailed environmental investigation into the presence of PFAS on and in the vicinity of the site.⁵⁷ An interim Human Health Risk Assessment Report was released in January 2018, followed by a report on the Detailed Site Investigation in February 2018, and a final Human Health Risk Assessment Report in June 2018.⁵⁸
- 2.48 The Detailed Site Investigation Report noted that firefighting foams containing PFAS were 'routinely used for fire training activities, hangar and fuel farm fire suppression system operation and testing, incident response and response equipment testing'. The investigation found that a plume of PFAS contaminated groundwater 'extends across most of the Base and extends off-Base, migrating in a northwesterly direction towards the Township of Katherine'.⁵⁹ The RAAF Base Tindal investigation area is divided into five zones based on water use. A map of the investigation area is provided in Figure 2.3 below.

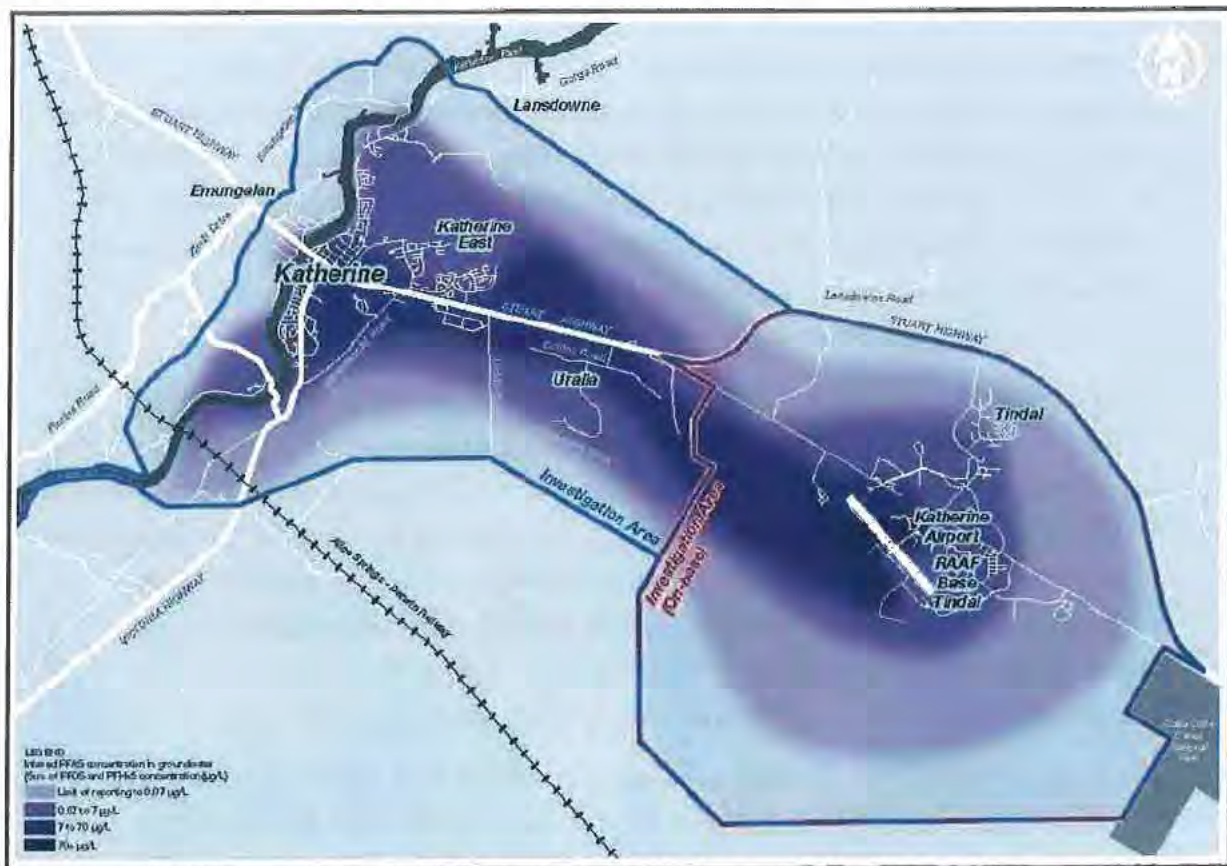
⁵⁶ RAAF Base Tindal Preliminary Sampling Program, September 2016; accessed via Department of Defence, 'Publications', <http://www.defence.gov.au/environment/pfas/Tindal/publications.asp> viewed 23 September 2018.

⁵⁷ Department of Defence, 'RAAF Base Tindal PFAS Investigation', <http://www.defence.gov.au/environment/pfas/Tindal/Default.asp> viewed 23 September 2018.

⁵⁸ Department of Defence, 'Publications', <http://www.defence.gov.au/environment/pfas/Tindal/publications.asp> viewed 23 September 2018.

⁵⁹ RAAF Base Tindal Detailed Site Investigation - Per- and Poly-fluoroalkyl Substances (PFAS) - Executive Summary, February 2018; accessed via Department of Defence, 'Publications', <http://www.defence.gov.au/environment/pfas/Tindal/publications.asp> viewed 23 September 2018.

Figure 2.3 Map of RAAF Base Tindal Investigation Area



Source: Department of Defence

2.49 The Northern Territory Government submitted that routine monitoring had confirmed the presence of PFAS in the groundwater supply for the town of Katherine in 2017. The potential for these PFAS levels to 'spike' above the health based guidance value for drinking water:

... rendered the groundwater supply that provided resilience to Katherine water supply as unusable particularly in times of surface water outages due to seasonal flushing of the Katherine River.⁶⁰

2.50 In August 2017, the Northern Territory Government implemented compulsory water conservation measures to reduce demand. The water conservation measures included alternate day irrigation for households, the removal of watering of hard surfaces, and the identification and repair of leaks. This allowed PFAS contaminated groundwater to be temporarily removed from service during the September to November peak demand period. A pilot water treatment plant was installed in October 2017, which is

⁶⁰ Northern Territory Government, *Submission 70*, p. 5.

'now producing up to 1ML/day of PFAS guideline compliant water from the existing PFAS contaminated groundwater source'.⁶¹

- 2.51 The Northern Territory Government advised that another, larger (10 megalitres/day), PFAS groundwater treatment plant had been proposed as part of a 'long term, sustainable and resilient water strategy' to 'future proof the supply and provide for the delivery of safe drinking water'. The estimated cost of this treatment plant was \$11–13 million, and discussions over funding were being held with Defence. Exploration for a new groundwater source was also progressing north of Katherine.⁶²
- 2.52 Nicole Smith, a long term resident of Katherine, noted that RAAF Base Tindal was located directly on top of the Tindal Limestone Aquifer, which had been identified as the 'main sustainable source of water' for the town of Katherine.⁶³ She contended that the extent of contamination in the area 'was not made clear' to all residents, stakeholders, emergency services and Indigenous communities as soon as the information was known to authorities. She also noted that the results of initial tests were not communicated to some property owners for up to six months.⁶⁴
- 2.53 Dr Peter Spafford questioned why governments had not begun monitoring for PFAS, particularly in underground water, at the time the RAAF stopped using PFAS-based firefighting foams in 2004.⁶⁵ Dr Spafford, a general practitioner who conducts PFAS blood tests for Katherine residents, told the Committee that he had been 'amazed by the very high levels of PFAS' in his patients' blood, in particular PFHxS.⁶⁶
- 2.54 Anthony Bartlett, also a Katherine resident, referred to an environmental management plan produced for Defence in 1987 that stated that waste water containing firefighting foams 'must be prevented from entering storm water systems, ponds and ground water except in an emergency'. Mr Bartlett submitted that this report 'highlights the overall evidence that there needed

⁶¹ Northern Territory Government, *Submission 70*, p. 6.

⁶² Northern Territory Government, *Submission 70*, p. 6.

⁶³ Nicole Smith, *Submission 45*, p. 1 (cover letter).

⁶⁴ Nicole Smith, *Submission 45*, p. 1.

⁶⁵ Dr Peter Spafford, *Submission 32*, p. [1].

⁶⁶ Dr Peter Spafford, *Committee Hansard*, Katherine, 29 July 2008, pp. 15, 16, 19.

to be caution and measures to contain the AFFF release into the environment'.⁶⁷ He also referred to:

- a 2002 report which stated that approximately 104 000 litres of waste water containing residual firefighting foams was being released annually into the base's stormwater drain and the evaporation pond;
- a 2005 environmental investigation, and a subsequent 2007 investigation of landfill and burial sites, which documented poor waste disposal practices being undertaken at the base, and
- a 2009 investigation that detected PFOS in drinking water sampled from the base.⁶⁸

- 2.55 Mr Bartlett considered that, combined with the detailed site investigation released in 2018, these reports 'provide damning evidence in the gross negligence in relation to usage and handling of AFFF's on RAAF Base Tindal'.⁶⁹
- 2.56 In relation to the 1987 report, Defence told the Committee that although the report 'did advise against discharging the 3M Lightwater product into drainage systems' for environmental reasons, it had recommended discharge to the sewer as the preferred method of disposal. Defence noted that it was now known that sewage treatment plants were ineffective at removing PFAS, and that other parts of the report had stated that the product was biodegradable, had low toxicity, and its components were 'not considered to be dangerous substances'.⁷⁰
- 2.57 Defence advised that, following the completion of an ecological risk assessment for the RAAF Base Tindal investigation area, it would continue to monitor the long term wells that had been drilled and installed during the investigation process.⁷¹
- 2.58 Water conservation measures remain in place in Katherine, and residents are advised limit their intake of fish from the Katherine River. Residents within the investigation area are advised that they:

⁶⁷ Anthony Bartlett, *Submission 52*, p. [3].

⁶⁸ Anthony Bartlett, *Submission 52*, p. [3-4].

⁶⁹ Anthony Bartlett, *Submission 52*, p. [4].

⁷⁰ Mr Stephen Grzeskowiak, Deputy Secretary, Estate and Infrastructure Group, Department of Defence, *Committee Hansard*, Katherine, 19 July 2018, p. 47.

⁷¹ Mr Grzeskowiak, *Committee Hansard*, Katherine, 19 July 2018, p. 45.

... may wish to manage their consumption of home-grown produce irrigated with bore water to ensure it is balanced with fruit and vegetables from broader sources to manage potential exposure, particularly for young children.⁷²

- 2.59 The Mayor of Katherine, Mrs Fay Miller, described to the Committee how, in 2017, the Katherine public swimming pool was temporarily closed due to the detection of high levels of PFAS:

We were using town water in our pools so we thought that would be perfectly safe. We naturally did testing on that and were absolutely horrified at the reading that came out of there and so we closed the pool.... So we drained it completely and refilled with town water and it was fine.⁷³

- 2.60 Mrs Miller explained that it turn out that one of the pool operators was actually filling the pool with bore water, not town water, and that this situation had now been rectified.⁷⁴

Other Defence bases

- 2.61 A number of submissions addressed the extent of contamination, and the status of current investigations, at other Defence bases around Australia.
- 2.62 In addition to RAAF Base Williamtown, discussed above, the New South Wales Government provided information on PFAS contamination at the six other Defence bases:
- **RAAF Base Wagga** – where PFAS contamination from the base has impacted both surface water and groundwater offsite, and impacts a community of approximately 100 residents.
 - **RAAF Base Richmond** – where PFAS contamination from the base has impacted both surface water and groundwater offsite, and impacts a community of approximately 50 residents.
 - **HMAS Albatross** – where PFAS contamination from the base has impacted both surface water and groundwater offsite, and impacts a community of approximately 50 residents. Contamination from the base has impacted both the Shoalhaven River and Currumbene Creek,

⁷² Northern Territory Government, *KATHERINE - Frequently Asked Questions*, January 2018, p. 7, accessed via 'Fire Fighting Foam (PFAS) Investigation', <https://ntepa.nt.gov.au/waste-pollution/compliance/pfas-investigation#faq> viewed 23 September 2018.

⁷³ Mrs Christina Fay Miller, Mayor of Katherine, Katherine Town Council, *Committee Hansard*, Katherine, 19 July 2018, p. 30.

⁷⁴ Mrs Miller, *Committee Hansard*, Katherine, 19 July 2018, p. 30.

which are popular recreational fishing areas. As a result, the New South Wales Government has released precautionary dietary advice for these two waterways.

- **Holsworthy Army Barracks** – where PFAS contamination from the base has impacted both surface water and groundwater offsite, and impacts a community of approximately 100 residents. A detailed site investigation is currently being undertaken by Defence.
- **Singleton Lone Pine Barracks and Blamey Army Barracks, Kapooka** – where investigations into PFAS contamination began in the second half of 2018.⁷⁵

2.63 In relation to **RAAF Base East Sale**, the Victorian Government advised that that an interim human health and ecological risk assessment had been released in December 2017, following completion of a detailed site investigation in June 2017. A comprehensive human health and ecological risk assessment was in the process of being prepared, including additional work to address data gaps. This report, along with a PFAS Management Area Plan for the site was released on 2 August 2018.⁷⁶ The Victorian Government added that it was aware of PFAS contamination in the Heart Morass and Dowd Morass wetlands, adjacent to RAAF Base East Sale. As a result, the it advised against consumption of ducks, carp and eel taken from these wetlands.⁷⁷

2.64 The Gippsland Lakes, to which the Heart Morass and Dowd Morass wetlands connect, are internationally protected under the Ramsar Convention. The Coalition Against PFAS, noting the 'alarming levels' of PFAS detected in duck, eels and fish, submitted:

Since PFAS biomagnify up the food chain, the real extent of the damage caused in these areas seems likely to be far greater that has been revealed by preliminary testing. There is no data on just how many species have been poisoned.⁷⁸

2.65 The Wetlands Environmental Taskforce Public Fund (the WET Trust), which was established for the acquisition, rehabilitation and maintenance of Australian wetlands, described the Heart Morass, which it acquired in 2004, as its 'showcase property' and a 'jewel in the crown of Victoria's wetlands'.

⁷⁵ New South Wales Government, *Submission 61*, p. 18.

⁷⁶ Victorian Government, *Submission 76*, p. 1.

⁷⁷ Victorian Government, *Submission 76*, p. 1.

⁷⁸ Coalition Against PFAS, *Submission 40*, p. 13.

However, the WET Trust submitted that, due to PFAS contamination caused by stormwater discharge from RAAF Base East Sale, and the detection of PFAS in duck, eel and carp in the area, the commercial value of the property as an asset on the trust's balance sheet had reduced to zero.⁷⁹

- 2.66 In relation to **RAAF Base Williams (Laverton)**, the Victorian Government advised that a preliminary site investigation had recently been completed. A detailed site investigation, including more detailed sampling on-base and in the surrounding region, was expect to commence soon.⁸⁰
- 2.67 In relation to **HMAS Cerberus and Bandiana Military Area**, the Victorian Government advised that preliminary site investigations were underway, and that Defence would prepare and share reports on these investigations with relevant government and regulatory bodies, as well as the community.⁸¹
- 2.68 The Government of South Australia addressed the investigation of PFAS contamination at **RAAF Base Edinburgh** in its submission. It noted that while the South Australian EPA had been provided with only limited information on the extent of PFAS contamination around the base, it had received eight formal notifications in relation to identification of PFAS in groundwater located offsite. It was also aware of sediment, surface and soil sampling being undertaken both on and offsite.⁸²
- 2.69 A submission from Mr George Bury, a former motor transport fitter who worked at **RAAF Base Amberley**, submitted that during the 1970s PFAS was 'used like water as we were told it was no risk to health'. He described how, after servicing, fire vehicles were:

... taken onto the outside grass or in-between the runways to pump foam to check its consistency. The method of checking was to scoop a handful of foam and turn it upside down and check its density and ability to stick to the skin. If a tank had to be drained, it was taken to the fire pit on the eastern side of the base where a cocktail of toxic waste was dumped (including kerosene). The fire pit sat above the edge of a river bank above Warrill Creek and would have overflowed on the dumping of liquids, firefighting practise or rain.⁸³

⁷⁹ Wetlands Environmental Taskforce Public Fund, *Submission 46*, pp. 2–3.

⁸⁰ Victorian Government, *Submission 76*, p. 1.

⁸¹ Victorian Government, *Submission 76*, p. 1.

⁸² Government of South Australia, *Submission 71*, p. 2.

⁸³ Mr George Bury, *Submission 14*, p. [1].

- 2.70 Mr Norman Canton, a long term resident living near **RAAF Base Townsville**, explained that investigations have confirmed that PFAS has travelled widely from the base, assisted by 'seasonal pumping of water off base into the nearby lagoon, to keep the runway serviceable during heavy wet season events'. He noted that although the use of PFAS foams in firefighting and training had been superseded, residues were still present in the soil, water and the food chain, as evidenced in samples taken of flora, fish and crustaceans. He described the lack of testing of birds as an 'important oversight given that birds are the most mobile of any fauna, including humans, and feed off plants and/or species further down the food chain'.⁸⁴
- 2.71 The Bullsbrook Residents and Ratepayers Association told the Committee that PFAS had been found in water from private bores, soil and hen's eggs on private land around **RAAF Base Pearce**, and in dolphins downstream in the Swan River. The Association noted the complex hydrology of the area had meant that the future movement of contamination plumes were unpredictable. It also cautioned that not all private bores in West Bullsbrook had been tested, nor had cattle grazing in the investigation area.⁸⁵

Contamination of non-Defence related sites

- 2.72 Although not within the terms of reference for this inquiry, PFAS contamination is known to have occurred in a range of non-Defence related sites.
- 2.73 Associate Professor Robert Niven of the University of New South Wales emphasised the extent of PFAS contamination in his submission, arguing that the problem was 'highly likely to be far larger than that associated with the Department of Defence'. Associate Professor Niven submitted that soils and groundwaters around the following sites were highly likely to be contaminated:
- every airport or airfield, whether national, state or local;
 - every hydrocarbon fuel refining facility, whether in current operation or which operated in the past;
 - every port facility for the import or export of hydrocarbon fuels;
 - every hydrocarbon fuel storage depot;

⁸⁴ Mr Norman Canton, *Submission 1*, p. [1].

⁸⁵ Bullsbrook Residents and Ratepayers Association, *Submission 78*, pp. 1-2.

- every hydrocarbon fuel pipeline;
- every rail facility for the loading and transport of hydrocarbon fuels, including (quite possibly) all holding yards and rail tracks used for hydrocarbon shipments;
- every road tanker fuel loading facility;
- every chemical manufacturing plant, especially those involving the storage or handling of flammable liquids;
- every chemical storage facility;
- every offshore and onshore oil or gas extraction facility;
- every firefighting training facility, training ground or similar, whether in regular or irregular use;
- every landfill, whether in current operation or now closed, regardless of whether in public or private ownership, or under state or council jurisdiction;
- every wastewater treatment plant, regardless of whether in public or private ownership, or under national, state or council jurisdiction;
- every location at which a large fuel or chemical fire has occurred in the past half-century.⁸⁶

2.74 Wilson Consulting noted that, aside from firefighting foams, 'significant' PFAS contamination was also 'occurring daily' from wastewater treatment plants, landfill leachate and 'dust in our own homes'. Wilson attributed this to use of PFAS chemicals in stain repellent treatments for upholstery, carpets, clothing, glossy magazines, cleaning agents, cosmetics, food packaging, and other applications.⁸⁷

2.75 At a national level, Airservices Australia is conducting detailed PFAS investigations at a number of airports across Australia as part of its National PFAS Management Program.⁸⁸

2.76 Local investigations are also being undertaken by environment protection agencies and fire and rescue services in several states and territories.⁸⁹ For example, the New South Wales EPA is leading investigations focused on

⁸⁶ Associate Professor Robert Niven, School of Engineering and Information Technology, University of New South Wales Canberra, *Submission 38*, pp. 2-3.

⁸⁷ Wilson Consulting, *Submission 16*, pp. 3-4.

⁸⁸ Australian Government, *Submission 64*, p. 3.

⁸⁹ Information about local investigations in each state and territory can be accessed via the PFAS Portal: <https://www.pfas.gov.au> viewed 18 September 2018.

sites where it is likely that large quantities of PFAS have been used, including certain fire and rescue training facilities, regional airports and industrial sites.⁹⁰

- 2.77 It has been reported that, including Defence sites, there are at least 90 sites around Australia where elevated levels of PFAS are being investigated.⁹¹
- 2.78 Bathurst Regional Council submitted that it was seeking acknowledgement from the Commonwealth of its role in operating the Bathurst Regional Airport up to and including 1992, and that PFAS were used by or under the direction of Commonwealth agencies until that time.⁹²
- 2.79 Dr GERALYN McCARRON questioned the limitation of the Committee's inquiry to 'in and around Defence bases', noting that a company had been contracted to dispose of 880 000 litres of PFAS contaminated wastewater from RAAF Base Amberley to be used as 'feedstock' in compost. Dr McCARRON suggested that, as a result, the contamination was 'potentially widely distributed in people's home environments'.⁹³
- 2.80 The National Toxics Network noted that while this inquiry focuses on Defence sites, 'there has been no inquiry into the impacts of PFAS contamination from other important sources, such as airports, wastewater treatment plants and sewerage outfalls'.⁹⁴

Remediation

- 2.81 Many participants in the inquiry expressed concern about the small scale and slow pace of efforts to provide remediation of contaminated land, particularly off-base.⁹⁵ Participants in Katherine, Williamstown and Oakey

⁹⁰ New South Wales Environment Protection Agency, 'The NSW Government PFAS Investigation Program', <https://www.epa.nsw.gov.au/your-environment/contaminated-land/pfas-investigation-program> viewed 27 August 2018.

⁹¹ Carrie Fellner and Patrick Begley 'Toxic Secrets: Where the sites with PFAS contamination are near you', *Sydney Morning Herald*, 17 June 2018, <https://www.smh.com.au/national/nsw/toxic-secrets-where-the-sites-with-pfas-contamination-are-near-you-20180616-p4z1xc.html> viewed 19 September 2018.

⁹² Bathurst Regional Council, *Submission 44*, p. 2.

⁹³ Dr GERALYN McCARRON, *Submission 53*, p. 2.

⁹⁴ National Toxics Network, *Submission 34*, p. 2.

⁹⁵ Lindsay Clout, *Submission 5*, p. 3; Jenny Robinson, *Submission 9*, p. [3]; *Committee Hansard*, Williamstown, 24 July 2018, pp. 1, 3; Justin Hamilton, *Submission 13*, p. [8]; Coalition Against PFAS, *Submission 40*, p. 35; Port Stephens Council, *Submission 49*, p. 8; Williamstown and

also highlighted that there had been no, or limited, progress to date in containing the migration of PFAS emanating from each base.⁹⁶

- 2.82 Mr John Donahoo gave evidence to the Committee that, although costly, it was possible to stop the continued contamination of the Williamstown area. His proposal consisted of three components:
- 1 constructing on-site detention ponds capable of storing rain from a one-in-100 years flood,
 - 2 installing low-head, high-volume submersible pumps that pump water from the detention ponds into the ocean (potentially after being treated), and
 - 3 containing the pollution with the use of polyethylene sheet piling coupled with bentonite slurry and bentonite clay.⁹⁷
- 2.83 Mr Desmond Maslen similarly referred to a remediation plan that had been discussed with Defence in 2015 for all run-off water from RAAF Base Williamstown to be treated and contained through a 'zeolite-activated charcoal' process, but claimed that this was not acted upon due to cost.⁹⁸
- 2.84 At a public hearing in Williamstown, Defence assured the Committee that it 'will be able to stop the contamination in due course but it will take time'. Defence was not able to provide an approximate timeline.⁹⁹ Defence noted, however, that its water treatment plants were intercepting and treating water leaving the base, and that it was now examining options for its 'next

Surrounds Residents Action Group, *Submission 51*, pp. [2, 6]; Lindsay Clout, *Committee Hansard*, Williamstown, 24 July 2018, p. 11; Mr John Donahoo, *Committee Hansard*, Williamstown, 24 July 2018, p. 40.

⁹⁶ For example, Justin Hamilton, *Submission 13*, p. [5]; Nicole Smith, *Submission 45*, p. 1; Anthony Bartlett, *Submission 52*, p. [5]; Andrew O'Connell, *Submission 43*, p. [2]; Port Stephens Council, *Submission 49*, p. 8; Meryl Swanson MP, *Submission 50*, p. [1]; Williamstown and Surrounds Residents Action Group, *Submission 51*, p. [3]; EcoNetwork Port Stephens, *Submission 58*, p. 3; Kim Smith, *Submission 66*, p. 1; Mr Lindsay Clout, *Committee Hansard*, Williamstown, 24 July 2018, p. 11.

⁹⁷ Mr John Donahoo, *Committee Hansard*, Williamstown, 24 July 2018, p. 39.

⁹⁸ Mr Desmond Maslen, *Committee Hansard*, Williamstown, 24 July 2018, p. 47.

⁹⁹ Mr Steven Grzeskowiak, Deputy Secretary, Estate and Infrastructure, Department of Defence, *Committee Hansard*, Williamstown, 24 July 2018, p. 58.

step' to treat and remove contaminant from highly contaminated areas off the base.¹⁰⁰

- 2.85 The Coalition Against PFAS called for the Government to commit to a 'proper, comprehensive remediation plan for each affected site'.¹⁰¹
- 2.86 The Government of South Australia submitted that it had 'limited knowledge' of remediation works, including trials, undertaken at RAAF Base Edinburgh and was 'unclear on the communication of remediation activities'. It submitted:
- Defence's objectives as it relates to remediation goals, endpoints and long term management of PFAS impacts, including potential offsite disposal of PFAS contaminated material, is currently unknown and is of concern to SA EPA.¹⁰²
- 2.87 The Victorian Government submitted that to date, limited remediation had occurred, but that development PFAS Management Area Plans were in progress for the investigation areas at RAAF Base East Sale, RAAF Base Williams (Laverton), HMAS Cerberus, and Bandiana Military Area.¹⁰³
- 2.88 The New South Wales Government noted that there were frustrations within the community about the 'slow pace of work' towards containment and remediation of PFAS contamination, and called for
- Defence to establish and maintain meaningful connections to affected communities over the long term, so that the community's concerns are addressed in an empathetic way; and
 - affected communities to have access to regular and robust monitoring information that demonstrates the level and extent of PFAS contamination in a simple manner.¹⁰⁴
- 2.89 The National Toxics Network wrote that the Australian Government had 'failed to have any PFAS sites remediated or PFAS wastes destroyed' in the past two decades. It argued that this failure had resulted in 'offsite dumping'. It cited examples of 'almost a million litres' of PFAS-

¹⁰⁰ Mr Chris Birrer, First Assistant Secretary, Infrastructure, Department of Defence, *Committee Hansard*, Williamstown, 24 July 2018, p. 62.

¹⁰¹ Coalition Against PFAS, *Submission 40*, p. 41.

¹⁰² Government of South Australia, *Submission 71*, p. [5].

¹⁰³ Victorian Government, *Submission 76*, p. 4.

¹⁰⁴ New South Wales Government, *Submission 61*, pp. 12–13.

contaminated water being used to make NuGrow compost, and reports of Defence 'giving away' out of date foams to 'unsuspecting firefighters'.¹⁰⁵

The Government's approach to date

2.90 The Australian Government submitted that the precautionary principle has been 'key' to Defence's approach to the management of PFAS risks, and that its PFAS Response Management Strategy is:

... consistent with the precautionary principle as set out in the *Environmental Protection and Biodiversity Conservation Act 1999*, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. ...

While there are significant levels of uncertainty around the behaviours of PFAS and its impacts, there is sufficient knowledge to apply the precautionary principle.¹⁰⁶

2.91 The Government explained that Defence is taking a 'tiered approach' to the management of risks identified in detailed environmental investigations, whereby interim response actions are implemented prior to the conclusion of the investigation phase in order to 'avoid or mitigate a significant risk to human health or the environment':

Interim Response Actions may include the provision of alternative water supplies to affected residents and communities, the implementation of water treatment technologies, drain maintenance activities, and management of PFAS source areas in accordance with relevant State and Territory regulations.

At the conclusion of the investigation phase for a site, a comprehensive PFAS Management Area Plan (PMAP) may be developed to respond to any elevated risks identified in the DSI report or a HHRA/ERA. The PMAP for each site will be site-specific and may include remediation actions, depending on the characteristics of the site. Several PMAPs are currently under development.¹⁰⁷

Alternative water supplies

2.92 Defence has provided alternative drinking water to properties otherwise reliant on contaminated bores in the areas surrounding the Army Aviation

¹⁰⁵ National Toxics Network, *Submission 34*, p. 9.

¹⁰⁶ Australian Government, *Submission 63*, p. 21.

¹⁰⁷ Australian Government, *Submission 63*, p. 23.

Centre Oakey, and RAAF Bases Williamtown, Tindal and Pearce. The Government explained:

Where possible, eligible residents are connected to reticulated town water, ensuring a long-term supply of safe water. Until the installation of water infrastructure is complete, residents are provided sufficient alternative water (bottled or tank) to meet the domestic requirements of the property.¹⁰⁸

2.93 To date, this has involved Defence:

- funding approximately 350 properties to be connected to town water in the area surrounding RAAF Base Williamtown, and paying the annual service fee and usage charges for three years;
- connecting 40 properties to town water in the Oakey management area, and paying the annual service fee and usage charges for three years;
- providing rainwater tanks to 63 affected properties in the Katherine region, and paying for these tanks to be topped up at Defence expense for a period for three years; and
- providing 130 properties surrounding RAAF Base Pearce with bottled water. Any further decisions regarding the provision of a sustainable source of water for these residents will follow after the completion of the Human Health Risk Assessment for that area.¹⁰⁹

2.94 The Williamtown and Surrounds Residents Action Group submitted that an issue had arisen in relation to water connections being laid using poly pipes, through which PFAS chemicals can penetrate. The group said that it was awaiting information on what would be done to with these pipes to 'make sure that the town water supply is safe from the groundwater contamination'.¹¹⁰

Water treatment plants

2.95 Water treatment plants are one option available to Defence for managing the risk of groundwater, surface water, and stormwater and drainage systems as potential pathways for PFAS contamination in water supplies. At the time of the Government's submission, Defence had installed:

- three water treatment plants at RAAF Base Williamtown;
- one water treatment plant at the Army Aviation Centre Oakey;

¹⁰⁸ Australian Government, *Submission 63*, p. 24.

¹⁰⁹ Australian Government, *Submission 63*, pp. 24–25.

¹¹⁰ Williamtown and Surrounds Residents Action Group, *Submission 51*, p. [5].

- one water treatment plant at Katherine to treat bore water to drinking standard as a supplement to the town's water supply;
 - water treatment plants to remediate PFAS contaminated water generated from construction or redevelopment projects, including at RAAF Bases Amberley and Williamtown, and Lavarack Barracks.¹¹¹
- 2.96 Defence was also undertaking contract negotiations for additional water treatment plants at RAAF Bases Edinburgh, Tindal and Williamtown; and had released tender documentation concerning the further remediation of Lake Cochran, Williamtown.¹¹²
- 2.97 At the public hearing in Katherine, Defence advised that it was signing contracts for two more water treatment plants to be placed in a highly contaminated area on RAAF Base Tindal. This was in addition to the existing (1 megalitre) treatment being used to treat bore water to be PFAS-free and mixed into the town water supply.¹¹³ Although the Katherine town water supply was regarded as 'safe to drink' due to the level of PFAS being within international standards,¹¹⁴ several residents of Katherine told the Committee that they continued to buy bottled drinking water at their own expense.¹¹⁵ Others expressed scepticism about the effectiveness of drawing water from the aquifer, treating it and reinjecting it back into the aquifer,¹¹⁶ or questioned whether water that was designated 'safe' was actually safe for residents with already elevated levels of PFAS in their blood.¹¹⁷ Defence, however, advised that PFAS was only present in Katherine's water supply in 'very, very low amounts ... almost at the limit of detection', and that Power

¹¹¹ Australian Government, *Submission 63*, p. 25.

¹¹² Australian Government, *Submission 63*, p. 25.

¹¹³ Mr Stephen Grzeskowiak, Deputy Secretary, Estate and Infrastructure Group, Department of Defence, *Committee Hansard*, Katherine, 19 July 2018, p. 44.

¹¹⁴ Mrs Sandra Nelson (private capacity), *Committee Hansard*, Katherine, 19 July 2018, p. 26; Mr Stephen Grzeskowiak, Deputy Secretary, Estate and Infrastructure Group, Department of Defence, *Committee Hansard*, Katherine, 19 July 2018, p. 44.

¹¹⁵ Alena Beznoska, *Submission 37*, p. [1]; Nicole Smith, *Submission 45*, p. 2 (cover letter); Ms Marguerite Smith, *Committee Hansard*, Katherine, 19 July 2018, p. 35; Mrs Jennifer Trew, *Committee Hansard*, Katherine, 19 July 2018, p. 39.

¹¹⁶ Mr Anthony Bartlett, *Committee Hansard*, Katherine, 19 July 2018, p. 39.

¹¹⁷ Nicole Smith, *Submission 45*, p. 1 (cover letter).

and Water Corporation was doing tests weekly or monthly for PFAS chemicals, with the results published on its website.¹¹⁸

- 2.98 In Oakey, Defence advised that it would be installing additional water treatment plants, but noted the practical limitations on what could be achieved:

[O]nce these chemicals are in an aquifer or out and about they become fairly dilute and therefore you have to clean a huge volume of water. ... We're targeting the high-concentration zones because that's where you get the best value for removing the maximum amount of PFAS from the environment.

... My personal view is that it's unrealistic to expect that every molecule of PFAS that has been put in the ground can be removed; that is unrealistic. The question is working with the environmental experts and the like and the various environmental protection agencies on how much we should do and how much we need to do, and that's still an evolving matter.¹¹⁹

- 2.99 Lindsay Clout, a resident of Fullerton Cove in the Williamstown investigation area, told the Committee that during a major rain event (which could occur up to three times a year), the water treatment plant at Lake Cochran could not keep up with the inflow and was turned off, 'allowing untreated contaminated water to leave the base and continue to contaminate our community'. He added that Defence's action to stop contamination leaving the base through Moor's Drain – which flows towards communities east of the base – was 'miniscule' to date. He noted that the 'new technology filtration plant' set up on Moor's Drain was a 'demonstration plant that can only treat 1.2 litres per second' and, even with an intended upgrade, would 'only deal with one of the three drains discharging water from the base into the [Moor's] Drain system'.¹²⁰

- 2.100 Mrs Kim Smith characterised water treatment plants as the 'newest of the stall tactics from Defence', querying their effectiveness and claiming that they only operated during business hours and did not operate on public holidays or during rain. She also raised concerns about the residue left

¹¹⁸ Mr Stephen Grzeskowiak, Deputy Secretary, Estate and Infrastructure Group, Department of Defence, *Committee Hansard*, Katherine, 19 July 2018, p. 44.

¹¹⁹ Mr Grzeskowiak, *Committee Hansard*, Oakey, 17 August 2018, pp. 27, 28.

¹²⁰ Lindsay Clout, *Submission 5*, p. 4.

behind after water has been treated, which she said were being stored in 'metre-by-metre containers' on the RAAF Base Williamtown.¹²¹

- 2.101 At the public hearing in Williamtown, Defence advised that it was treating 'the majority' of surface water flowing off the base, but confirmed that some untreated water would flow during heavy rain events.¹²² Defence also confirmed that it was storing residue on the base, in the form of granular activated carbon from its original water treatment plant (which had since been replaced with a plant using resin-based technology).¹²³
- 2.102 Defence advised that underground water was a 'much more challenging' issue than surface water. Based on advice from experts, it had started to 'remove water from the ground there, treat it, then put it back into the ground'.¹²⁴

Removal of soil source areas

- 2.103 To reduce the migration of PFAS in surface and groundwater, Defence has:
- excavated approximately 200mm of sediment from approximately three kilometres of open drains at Williamtown;
 - removed and disposed of 12 000 cubic metres of contaminated soil at Army Aviation Centre Oakey; and
 - stockpiled soil associated with construction redevelopment projects.¹²⁵
- 2.104 At the public hearing in Katherine, Defence explained that existing technologies for the treatment of soil were limited:

There is no machine or process you can buy in the world today that can clean soil. We've looked, we've been to the market, we've sought expressions of interest and we've got some companies now that we're starting to do some trials with. There is a range of techniques which involve injecting chemicals into the soil to lock the PFAS in place. We're very nervous about using techniques like that, unless they're fully understood. ... We've got a trial running at one of our bases, which will commence at the end of the year, for a process that has great potential for taking PFAS from soil, but it's still in the experimental stage. ... We talk to defence departments and other players in Europe and America. They look at what we're doing. They're doing similar

¹²¹ Mrs Kim Smith, *Committee Hansard*, Williamtown, 24 July 2018, p. 48.

¹²² Mr Grzeskowiak, *Committee Hansard*, Williamtown, 24 July 2018, p. 54.

¹²³ Mr Grzeskowiak, *Committee Hansard*, Williamtown, 24 July 2018, p. 55.

¹²⁴ Mr Grzeskowiak, *Committee Hansard*, Williamtown, 24 July 2018, p. 54.

¹²⁵ Australian Government, *Submission 63*, p. 26.

things. We're trying to use the best knowledge we can to get on top of this in terms of our responsibility to clean this up as best we can. But I wouldn't want to leave anybody with the impression that it will be a quick and easy process. It will take a while.¹²⁶

2.105 In Williamstown, Defence advised that, along with residue from its original water treatment plant, soil that had been removed from drains was being stockpiled in plastic containers on the base due to the lack of an 'off-the-shelf' solution for cleansing it of PFAS.¹²⁷

Remediation in other jurisdictions

2.106 In its submission, Victoria's Metropolitan Fire and Emergency Services Board (MFB) described the process it had undertaken to test and decontaminate its firefighting fleet. This included:

- testing of the fleet, which identified that the majority of trucks were heavily contaminated with PFAS, due to persistent residues from the previous use of fluorinated firefighting foam concentrates;
- a truck decontamination process overseen by two independent environmental consulting firms, resulting in more than 75 per cent of the fleet being decontaminated to below accepted thresholds; and
- the cleaning of 4689 lengths of firefighting hose.¹²⁸

2.107 MFB noted that it was actively assisting other agencies, including Defence, to 'either advise or provided similar decontamination processes for their respective firefighting appliances'.¹²⁹

Research into remediation technologies

2.108 The Australian Government's submission noted that there are currently limited proved remediation technologies available in relation to PFAS.¹³⁰

2.109 Defence has financially supported research into remediation technology and, as at June 2018, had funded eight research activities valued at approximately \$1.7 million, which included a new soil washing technology trial. Since November 2017, Defence has also issued requests for information to the

¹²⁶ Mr Grzeskowiak, *Committee Hansard*, Katherine, 19 July 2018, p. 44.

¹²⁷ Mr Grzeskowiak, *Committee Hansard*, Williamstown, 24 July 2018, p. 55.

¹²⁸ Metropolitan Fire and Emergency Services Board, *Submission 73*, p. 9.

¹²⁹ Metropolitan Fire and Emergency Services Board, *Submission 73*, p. 9.

¹³⁰ Australian Government, *Submission 63*, p. 26.

market calling for industry input on technologies for treating PFAS contaminated water and soil.¹³¹

2.110 Separately, the Australian Research Council-administered Special Research Initiative on PFAS provides more than \$13 million to:

... support the development of innovative technologies to investigate and remediate PFAS contaminated areas, including soil and other solid contaminated debris, groundwater, waterways and marine systems.¹³²

2.111 The first round of the initiative was announced in August 2018, with successful research projects including:

- \$999 082 to researchers at Deakin University to create a waste-to-resource remediation strategy for PFAS contamination, including inexpensive and effective treatment of PFAS-contaminated sites and a mechanism to turn waste products into valuable resources.
- \$880 187 to researchers at the University of Queensland to develop a self-contained and portable system for the onsite destruction of PFAS at contaminated sites.
- \$940 000 to researchers at the University of Newcastle to develop new technology to allow for the catalytic destruction of PFAS reactions at elevated temperatures.
- \$1 103 883 to researchers at The University of New South Wales for a new treatment technology to defluorinate PFAS in contaminated water.¹³³

2.112 The Commonwealth Scientific and Industrial Research Organisation (CSIRO) advised the Committee that its research had targeted knowledge gaps that would 'assist in the definition of the risk profile of PFAS and for its treatment', including 'extensive studies across a range of soil types to quantify how mobile PFAS is in soils and groundwater'. CSIRO noted:

Recent research and development by CSIRO and others has challenged and changed traditional understanding regarding these issues. This understanding underpins the risk profile of PFAS to environmental and human health, and its migration rate and treatability. Developing cost-effective approaches to

¹³¹ Australian Government, *Submission 63*, pp. 26–27.

¹³² Australian Government, *Submission 63*, p. 27.

¹³³ Senator the Hon Simon Birmingham, Minister for Education and Training; Senator the Hon Marise Payne, Minister for Defence; Hon Melissa Price MP, Assistant Minister for the Environment, 'Australia's leading research minds to tackle PFAS', *Media Release*, 10 August 2018.

manage and remediate affected environments will depend on such information.¹³⁴

- 2.113 CSIRO advised that it had conducted research into future treatment and remediation technology options for PFAS, including testing the effectiveness of encapsulation and destructive technologies. CSIRO was also developing predictive models of PFAS behaviours in soils and groundwater, which would allow for 'an assessment of the longevity of the threat of PFAS, the migration of plumes of PFAS in groundwater and the design of remedial and management efforts'.¹³⁵
- 2.114 At a hearing in Canberra, CSIRO advised that while there had been a 'lot of focus' removing PFAS from groundwater, there had been 'very little' focus on soil, which was the 'source term' for the contamination. CSIRO considered that strategies for immobilising, removing or destroying the source term to prevent contamination of ground water should be a 'high priority research area'.¹³⁶ CSIRO also emphasised the value of coordination mechanisms in order to focus research efforts on the most important areas of science and the knowledge gaps.¹³⁷

Continued use of contaminated bore water

- 2.115 Several residents of Katherine expressed concern that, since there were no restrictions on the use of contaminated bores in the area for irrigation and agriculture, the continued use of bore water was further contaminating soils and adding to exposure pathways.¹³⁸ Dr Peter Spafford, for example, submitted:

Contaminated bore water has been used, and continues to be used, for irrigation both on private properties and government/council land (schools, parks, etc.). This has resulted in ground water contamination to be brought back to the surface, spread widely and seeping back into the ground. This therefore contaminates new ground, effectively increases the load of contamination and further increases the likelihood of persistence in the

¹³⁴ CSIRO, *Submission 39*, pp. 1-2.

¹³⁵ CSIRO, *Submission 39*, p. 2.

¹³⁶ Dr Paul Bertsch, Science Director, Land and Water, Commonwealth Scientific and Industrial Research Organisation, *Committee Hansard*, Canberra, 14 September 2018, p. 20.

¹³⁷ Dr Bertsch, *Committee Hansard*, Canberra, 14 September 2018, p. 21.

¹³⁸ Dr Peter Spafford, *Submission 32*, pp. 1, 2; *Committee Hansard*, Katherine, 19 July 2018, p. 16; Anthony Bartlett, *Submission 52*, p. [2], Nicole Smith, *Submission 45*, pp. 1; 11; Marguerite Smith, *Committee Hansard*, Katherine, 19 July 2018, p. 35.

environment. This issue appears to have been overlooked as bore water can still be freely used.¹³⁹

- 2.116 Mrs Fay Miller, Mayor of Katherine, told the Committee that the continued use of bore water for irrigation of public spaces, such as parks and sports fields, had been discussed at length by the Council. However, she noted that the Council had a responsibility to provide 'good grassed areas for children to play on', and that the advice was that the contamination was minimal:

You'd probably have to eat the grass and keep eating the grass for a while for it to have any effect on you. What do you do? Let the town go brown and not do anything about it? No. Our responsibility is to provide good reserves and good parks for our town. We have the belief that we are certainly not contaminating our parks.¹⁴⁰

- 2.117 In Oakey, the Toowoomba Regional Council advised that it was not using bore water for irrigation of parks, showgrounds or other sites controlled by the Council. These sites had been connected to the town's reticulated water supply. However, the Council was not aware and had not taken any steps to determine whether private residents were using private bores for irrigation.¹⁴¹ Residents of Oakey, however, confirmed that they had not been told to stop using private bores and that such bores were still being used for irrigation.¹⁴²

- 2.118 At its Canberra hearing, the Department of the Environment and Energy advised that the regulation of bores was 'a state and territory issue' in which the Commonwealth had no jurisdictional or regulatory role.¹⁴³ The Department also highlighted that the *PFAS National Environmental Management Plan* provided guidance to jurisdictions in relation to identifying risks of potential contamination and 'what the potential exposure or draw-out points are, including things like bores and surface

¹³⁹ Dr Peter Spafford, *Submission 32*, p. 1.

¹⁴⁰ Mrs Christina Fay Miller, Mayor of Katherine, Katherine Town Council, *Committee Hansard*, Katherine, 19 July 2018, p. 31.

¹⁴¹ Mr Damian Platts, General Manager, Water and Waste Services, Toowoomba Regional Council, *Committee Hansard*, Oakey, 17 August 2018, pp. 26–27.

¹⁴² Mr Lester Schmidt and Mr David Jefferis, *Committee Hansard*, Oakey, 17 August 2018, pp. 26–27.

¹⁴³ Mr James Tregurtha, First Assistant Secretary, Environment Standards Division, Department of the Environment and Energy, *Committee Hansard*, Canberra, 14 September 2018, p. 31.

water'.¹⁴⁴ However, the Department acknowledged that there was a potential risk in relation to:

... whether the environmental management guidance that has already been given to those jurisdictions has been effectively provided to the water regulator within that jurisdiction, who would be the responsible party for providing ongoing advice to users of water in that manner.¹⁴⁵

- 2.119 The Department undertook to investigate the matter further, noting that it had constituted forums with states and territories which it used to ensure that 'issues and exposures pathways ... are identified and effectively managed within those jurisdictions'.¹⁴⁶

Committee comment

- 2.120 While this inquiry is focused on PFAS contamination at, and around, Defence bases, the issue is clearly a national problem that is not limited to a single portfolio, and crosses a range of industries and jurisdictional boundaries. The effectiveness of the coordination of the response to this national issue is discussed in Chapter 5.
- 2.121 Many communities around Defence bases have been significantly affected by PFAS contamination, including the communities of Oakey, Williamtown and Katherine. The Committee notes that it has taken some time for Defence to grasp the extent of contamination in each area, and adjustments to management zones have continued to be made. The Committee received evidence of instances where community members with local knowledge of the area could have assisted Defence to more quickly understand the full extent of contamination, but that these community members felt 'ignored'. The Committee encourages Defence to improve its community engagement in future to ensure that community members with particular expertise are listened to.
- 2.122 It is clear that past delays in the communication of information to residents have contributed to the ongoing frustration of community members. While much progress has been made in this area, there is a need to continue to improve transparency to assure communities that they are being kept up to

¹⁴⁴ Mr Andrew McGee, Assistant Secretary, Chemicals Management Branch, Department of the Environment and Energy, *Committee Hansard*, Canberra, 14 September 2018, p. 32.

¹⁴⁵ Mr Tregurtha, *Committee Hansard*, Canberra, 14 September 2018, p. 33.

¹⁴⁶ Mr Tregurtha, *Committee Hansard*, Canberra, 14 September 2018, p. 33.

date with the latest information known to the authorities. The Committee welcomes Defence's commitment to publishing the outcomes of investigations as soon as possible after they are finalised. The Committee also welcomes Defence's commitment to the long term monitoring and management of PFAS contamination emanating from its bases. While the Committee understands that the sampling results cannot always be made public due to privacy concerns, these concerns will not apply in all instances (for example, in relation to sampling on public land or where a landowner consents to their results being published). The Committee recommends that, in order to improve public assurance, Defence commit to publishing results as soon as practicable where there are no such concerns.

- 2.123 Remediation of PFAS contamination at, and around, bases will be a long term challenge for the Australian Government. The priority to date has, rightly, been on breaking exposure pathways for affected communities. A range of precautionary measures have been put in place, including dietary advice and the provision of alternative drinking water, to ensure the most likely exposure pathways are broken. However, the risk of exposure will only be completely eliminated when the PFAS contamination is contained, and ultimately removed from, each base and the communities surrounding them.
- 2.124 The Committee understands the frustration of community members who highlighted that, despite Defence having knowledge of contamination leaving the base for a number of years, there has been little progress to date in remediating contamination land, or even stopping the ongoing contamination. While the Committee appreciates the enormity of the task, containment and remediation will need to become the priority for the Australian Government over the coming years.
- 2.125 The Committee is pleased to hear that investigations in some areas have progressed to point where long term management strategies are being finalised. The Committee encourages Defence to seek public input into these strategies, prior to their finalisation. The Committee also notes Defence's progress to date, in particular in relation to water treatment plants to reduce the amount of contaminated surface water from leaving bases, and to reduce contamination in groundwater. It is important that these efforts continue to be upscaled to the point where the spread of contamination ceases, and begins to reverse. The Committee recognises that sustained investment over the long term will be required to achieve this.

- 2.126 The Committee also welcomes the investments that have been made to date in research into remediation technologies. This should be continued. The Committee notes that there is much to be learned, in particular in relation to the remediation of contaminated soil, and the disposal of soil and water treatment residue that has been removed from the environment. Australia is not alone in facing these challenges, and the Committee encourages the Government to continue to work with international stakeholders to ensure best practice approaches are taken. International companies, such as 3M, who have been responsible for the past production of PFAS chemicals, bear a particular responsibility to assist with the remediation of PFAS contamination. The Committee encourages the Government to request the assistance of such companies in the remediation of PFAS contaminated areas, including the disposal of contaminated waste.
- 2.127 During the inquiry, the Committee noted varying practices regarding the extent of the use of contaminated bore water for irrigation purposes. While all three sites visited by the Committee had precautionary advice in place recommending against the drinking of bore water in the most affected areas, bore water is still being used by local government in at least one area (Katherine) for watering parks and sports fields, and there do not appear to be any restrictions placed on the use of private bores by state and territory regulatory authorities at any site. The Committee recognises that any restrictions on the use of bore water would be a state and territory responsibility, and that the need for restrictions may vary from site to site. However, the Committee was not assured that sufficient consideration has been given as to the extent to which unrestricted use of bore water is contributing to the spread of PFAS contamination to areas that would otherwise be unaffected. The lack of restrictions may also contribute to unanticipated exposure pathways, for example, by children playing under or even drinking from sprinklers. The Committee recommends that this matter be given further consideration at a national level.

Recommendation 2

- 2.128 **The Committee recommends that the Government continue to upscale its investment in the containment of PFAS contamination plumes, and the remediation of contaminated land and water sources. The Coordinator-General (see Recommendation 1) should:**
- **publish draft remediation and management plans for each investigation area, and seek public input before finalisation;**

- continue support for research into remediation technologies, including disposal of contaminated soil and residue from water treatment plants;
- continue to engage with international stakeholders, including past manufacturers of PFAS chemicals, to ensure best practice approaches are taken to the remediation and disposal of PFAS contamination;
- in collaboration with states and territories, review the effectiveness of current advice regarding the use of contaminated bore water for irrigation purposes and to consider whether restrictions should be put in place; and
- ensure a consistent approach to PFAS contamination across non-Commonwealth sites in consultation with state, territory and local governments.

3. Health advice and testing

3.1 This chapter addresses the following term of reference:

(d) the adequacy of health advice and testing of current and former defence and civilian personnel and members of the public exposed in and around Defence bases identified as potentially affected by contamination.

3.2 The chapter includes:

- an overview of concerns about the possible health effects of PFAS exposure;
- an overview of the current health advice and findings of the Expert Health Panel for PFAS;
- a discussion of concerns about the adequacy of the current health advice and suggestions for improvement; and
- a discussion about the Government's voluntary blood testing program for PFAS, and the associated epidemiological study;
- the Committee's conclusions and recommendations.

Concerns about the health effects of PFAS

3.3 Although the evidence has largely been inconsistent, exposure to PFAS has been associated with certain medical conditions in some overseas studies. A 2013 'synthesis paper' published by the Organisation for Economic Development and Co-operation and the United Nations Environment Program summarised the potential adverse effects of PFAS chemicals on humans as follows:

High levels of PFOS and PFOA are toxic for reproduction and development of the fetus (such as reducing birth weight and lowering semen quality) and are potentially carcinogenic in animal tests. In addition, 8:2 fluorotelomer phosphate diesters (8:2 PAPs), 8:2 FTOH, and PFOA show endocrine effects in

different in vitro and in vivo tests. Furthermore, a study with 656 children has demonstrated that elevated exposures to PFOA and PFOS are associated with reduced humoral immune response to routine childhood immunizations in children aged five and seven years.

In addition to toxicity studies, a large epidemiological study of 69,000 persons – the C8-science panel – found probable links between elevated PFOA blood levels and the following diseases: high cholesterol (hypercholesteremia), ulcerative colitis, thyroid diseases, testicular cancer, kidney cancer, preeclampsia, and elevated blood pressure during pregnancy.¹

3.4 In 2016, 'following evaluation of human epidemiological studies', the German Human Biomonitoring Commission rated human health effects in the following areas as 'well proven, relevant, and significantly associated with exposure to PFOA and/or PFOS':

- 1 Fertility and pregnancy - Time to wanted pregnancy-Waiting period for pregnancies >1 year -gestosis and gestational diabetes
- 2 Weight of newborns at birth
- 3 Lipid metabolism
- 4 Immunity after vaccination, immunological development
- 5 Hormonal development, age at puberty/menarche
- 6 Thyroid metabolism
- 7 Onset of menopause.²

3.5 The United States United States Environmental Protection Agency provides the following advice to the public:

There is evidence that exposure to PFAS can lead to adverse human health effects. ... Studies indicate that PFOA and PFOS can cause reproductive and developmental, liver and kidney, and immunological effects in laboratory animals. Both chemicals have caused tumors in animal studies. The most consistent findings from human epidemiology studies are increased cholesterol levels among exposed populations, with more limited findings related to:

¹ Organisation for Economic Development and Co-operation (OECD) and United Nations Environment Program (UNEP), *Synthesis paper on per- and polyfluorinated chemicals (PFCs)*, 2013, p. 25.

² Announcement of the German Environment Agency (UBA) (2016), HBM I values for Perfluorooctanoic acid (PFOA) and Perfluorooctanesulfonic acid (PFOS) in blood plasma, cited by Royal Australasian College of Physicians, *Submission 69*, p. 3.

- infant birth weights,
- effects on the immune system,
- cancer (for PFOA), and
- thyroid hormone disruption (for PFOS).³

3.6 As a result of this evidence, many community members in contaminated areas expressed a high degree of anxiety about the possible health effects of their PFAS exposure. Examples of some of the comments received by the Committee are provided in Box 3.1 below.

Box 3.1 Community concerns about PFAS health effects

My wife and I had several miscarriages before resorting to IVF in Adelaide. I have genuine concerns for my health and that of my wife and now 2-year-old daughter. I keep my fingers crossed that my daughter's tiny little organs have not been exposed to PFAS. This is a fear that I live with every day. Her heart is barely the size of her fist and kidneys smaller than the palm of her hand. It wouldn't take much PFAS to damage her vital organs, although the information we are working with is limited, the balance of probability is that this has done some damage and may limit her quality of life.⁴

The added stress that this brought to our family life has been at times intolerable, to the extent where all of my children have questioned whether these chemicals will kill them. This is not a concern any child should have to ask their parents about.⁵

There seems to be very little accurate advice regarding the health aspect of this contamination in Oakey. Whilst being advised not to consume food or water from the contaminated zone, no-one seems to be able to say definitively what the chemical already in our body can do.

Let me tell you that does not feel good at all. I worry about this every day.⁶

My bore has extremely high levels of PFAS, as does my blood. The various reports that have come out make reference to the numerous ways that we can ingest PFAS by washing, swimming etc but they never make any reference to the likely effect to people who drink the contaminated bore water. We went straight on to town water in 2014 when we learnt of the problem. With a house

³ United States Environmental Protection Agency, 'Basic Information on PFAS', <https://www.epa.gov/pfas/basic-information-pfas> viewed 17 August 2018.

⁴ *Submission 11* (name withheld).

⁵ Anthony Bartlett, *Submission 52*, p. [2].

⁶ *Submission 41* (name withheld), p. [3].

full of teenage children, we lived on bore water not knowing about the contamination until we found out in 2014 and I worry about any long-term health effects (for my children especially).⁷

In 2016 we gave birth to our first child and the full concern of the impact of this contamination really hit home. Although there is no conclusive evidence that these chemicals cause adverse health effects, the existing research which I have seen is consistent with our pregnancy and birth – these being developmental (low birth weight, laryngomalacia and skeletal effects) and pregnancy-induced hypertension. Obviously these things can occur in any pregnancy, but statistically we were at low risk, the skeletal hypermobility is unusual, and to have the collection is worrying.⁸

I worry what health affects the contamination will have on my children that lived there in the past, my young grandchildren that come and visit me and of course any health concerns I may have. I suffer from anxiety, depression and stress due to the worry. I have sleepless nights, there are days I cannot face anything and return to bed, there are days where I feel I have had enough and do not want to go on. How can I continue?⁹

Our daughter and son in law felt compelled to move away from the area when she became pregnant due to the risks involved. After hearing about contamination in the blood levels of babies in the area it wasn't a risk we were prepared to take.¹⁰

- 3.7 Concern about the possible long term health effects of PFAS, in conjunction with other factors, was identified as a major contributor to poor mental health experienced by many residents of contaminated areas. This is discussed further in Chapter 4.

Health advice to affected communities

Current Australian advice regarding the health impacts of PFAS

- 3.8 The Environmental Health Standing Committee of the Australian Health Protection Principal Committee (enHealth) provides the following general advice concerning the health impacts from exposure to PFAS:

⁷ Craig Commens, *Submission 74*, p. [1].

⁸ Mr Nathaniel Roberts, *Submission 24*, p. [1].

⁹ Margaret Cuskelly, *Submission 35*, p. [1].

¹⁰ Julienne and Brian Curry, *Submission 47*, p. [2].

There is currently no consistent evidence that exposure to PFAS causes adverse human health effects.

Because these chemicals persist in humans and the environment, enHealth recommends that human exposure to these chemicals is minimised as a precaution.¹¹

3.9 Underpinning this guidance, which forms the basis of the Government's advice to the public, enHealth explains:

Because the human body is slow to rid itself of PFAS, continued exposure to these chemicals can result in accumulation in the body. Due to the potential for accumulation, and while uncertainty around their potential to cause human adverse health effects remains, it is prudent to reduce exposure to PFAS as far as is practicable. This means that action needs to be taken to address the exposure source or possible routes of exposure. Determination of exposure is best achieved through a full human health risk assessment that examines all routes of exposure.¹²

3.10 The Australian Government's submission summarised the current status of research into the health effects of PFAS exposure as follows:

Some human health studies have found associations between exposure to these chemicals and health effects and others have not. In addition, the studies that found associations were not able to determine with certainty that the health effects were caused by the chemical being studied or other factors, such as smoking. More research is required before definitive statements can be made on causality or risk.¹³

3.11 The Department of Health has established a *PFAS Health Information Service*, including a 1800 number and email address for general enquiries.¹⁴ The Department has also participated in community consultations in affected areas in order to:

¹¹ Environmental Health Standing Committee (enHealth) of the Australian Health Protection Principal Committee, *enHealth Guidance Statements on per- and poly-fluoroalkyl substances*, updated September 2017, p. 3.

¹² Environmental Health Standing Committee (enHealth) of the Australian Health Protection Principal Committee, *enHealth Guidance Statements on per- and poly-fluoroalkyl substances*, updated September 2017, p. 2.

¹³ Australian Government, *Submission 64*, p. 13.

¹⁴ Australian Government, *Submission 64*, p. 16.

... provide advice to communities and help inform them of the current evidence related to health effects and exposure as well as programs and services, administered by the Department of Health, that are available.¹⁵

- 3.12 Site-specific precautionary advice in relation to each investigation area (such as water use and dietary advice) is provided by state and territory local government authorities (see Chapter 2) and through community consultation mechanisms (see Chapter 5).

Expert health panel

- 3.13 An Expert Health Panel for PFAS was established by the Government in December 2016 to 'provide independent advice to the Government on potential health impacts of PFAS exposure and to identify priority areas for future research'.¹⁶ The panel was chaired by Professor Nick Buckley of the University of Sydney, and comprised panellists with expertise in the fields of environmental health, toxicology, epidemiology and/or public health.¹⁷
- 3.14 According to its report, the Expert Health Panel undertook a 'comprehensive review of recent literature reviews regarding Australian and international evidence on potential human health effects of PFAS exposure'. It noted:
- In order to provide final advice by February 2018, the Panel focussed on identifying and reviewing the *latest* systematic reviews of human epidemiological studies and (inter)national authority/intergovernmental/governmental reviews and reports on potential human health effects of PFAS exposure. This challenging timeframe was set to balance the need for well-informed expert advice on the possible effects of PFAS on human health, and the need for timely advice for the [National Health and Medical Research Council] and affected communities.¹⁸
- 3.15 The Expert Health Panel also conducted a public consultation process in order to 'inform the Panel of the communities' concerns regarding PFAS and their health, as well as their view on priorities for future research'.¹⁹

¹⁵ Australian Government, *Submission 64*, p. 16.

¹⁶ Australian Government, *Submission 64*, p. 13.

¹⁷ Department of Health, 'Expert Health Panel for PFAS Report', <http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-pfas-expert-panel.htm> viewed 13 September 2018.

¹⁸ *Expert Health Panel for Per-and Poly-Fluoroalkyl Substances (PFAS)*, March 2018, pp. 1–2.

¹⁹ *Expert Health Panel for Per-and Poly-Fluoroalkyl Substances (PFAS)*, March 2018, p. 2.

- 3.16 The Expert Health Panel's summary of its findings in relation to the health effects associated with PFAS exposure is contained Box 3.2 below.
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Box 3.2

Although the evidence on health effects associated with PFAS exposure is limited, the current reviews of health and scientific research provide fairly consistent reports of associations with several health outcomes, in particular: increased cholesterol, increased uric acid, reduced kidney function, altered markers of immunological response, levels of thyroid and sex hormone levels, later menarche and earlier menopause, and lower birth weight. Differences between those with the highest and lowest exposures are generally small, with the highest groups generally still being within the normal ranges for the whole population. There is mostly limited or no evidence for an association with human disease accompanying these observed differences. There is no current evidence that supports a large impact on an individual's health. In particular, there is no current evidence that suggests an increase in overall cancer risk. The main concerning signal for life-threatening human disease is an association with an increased risk of two uncommon cancers (testicular and kidney). These associations in one cohort were possibly due to chance and have yet to be confirmed in other studies. However, because the evidence is very weak and inconsistent in many respects, some degree of important health effects for individuals exposed to PFAS cannot be ruled out based on the current evidence.

Source: Expert Health Panel for Per-and Poly-Fluoroalkyl Substances (PFAS), March 2018, p. 3.

- 3.17 The Expert Health Panel cautioned that the published evidence was mostly based on studies in just seven cohorts, which have generated 'hundreds of publications'. It considered that there is a 'high risk that bias or confounding is affecting most of the results reported'. The Panel explained:

There are very large numbers of comparisons being done in many studies, such that the risk of random variation in exposures and outcomes being interpreted as real associations is greatly increased. This is compounded by the fact that there are multiple PFAS, and other environmental or occupational hazards, so that there may be interacting toxic effects, and it is hard to isolate the association with one or two analysed compounds. Many of the biochemical and disease associations may be explainable by confounding or

reverse causation. Many studies had limited power to detect important associations.²⁰

3.18 The Expert Health Panel provided the following advice to the Government:

Our advice to the Minister in regards to public health is that the evidence does not support any specific biochemical or disease screening, or health interventions, for highly exposed groups (except for research purposes). Decisions to regulate or avoid specific PFAS chemicals should continue to be largely based on evidence of persistence and accumulation; they should not need to also be justified by strong evidence of adverse health effects.²¹

3.19 The Australian Government submitted that the Expert Health Panel's findings support the existing enHealth advice that there is 'no consistent evidence' that exposure to PFAS causes adverse human health effects. It added:

The Panel's report should reassure communities that they are being provided with up to date and independent advice on the potential health effects of PFAS exposure.²²

3.20 However, some participants in the inquiry criticised aspects of the Expert Health Panel's review.²³ For example, the Williamstown and Surrounds Residents Action Group criticised the Panel's public consultation process and considered that the report 'did not present as an independent report', particularly due to the Government's announcement on the same day as the report's release that it was not considering property buy backs.²⁴

3.21 The Coalition Against PFAS told the Committee that the Expert Health Panel report 'was unnecessarily rushed and opaque, adopted the wrong methodology, and had little to no scientific value'. The group particularly criticised the level of community consultation, the lack of distinguishing

²⁰ *Expert Health Panel for Per-and Poly-Fluoroalkyl Substances (PFAS)*, March 2018, p. 3.

²¹ *Expert Health Panel for Per-and Poly-Fluoroalkyl Substances (PFAS)*, March 2018, p. 3.

²² Australian Government, *Submission 64*, p. 14.

²³ For example, Jenny Robinson, *Submission 9*, p. [1]; Coalition Against PFAS, *Submission 40*, pp. 26-31; Friends of the Earth Brisbane, *Submission 48*, p. 1; Meryl Swanson MP, *Submission 50*, pp. [2-3s]; Williamstown and Surrounds Residents Action Group, *Submission 51*, pp. [4, 5]; EcoNetwork Port Stephens, *Submission 58*, p. 3; Mr Lindsay Clout, *Committee Hansard*, Williamstown, 24 July 2018, p. 17-18; Mr Cain Gorfine, *Committee Hansard*, Williamstown, 24 July 2018, p. 23.

²⁴ Williamstown and Surrounds Residents Action Group, *Submission 51*, p. [5].

between independent studies and those sponsored by industry, and the exclusion of the 'C8 Science Panel' report on a study of blood samples taken from 69 000 people over seven years, which had found 'probable links' to a number of health conditions. It concluded that the results reported by the Expert Health Panel were 'unreliable'.²⁵

- 3.22 The New South Wales Government supported the Expert Health Panel's finding that further research was required to address the insufficient evidence on possible adverse health outcomes. It recommended:

Given these substances persist in the environment for a long period of time it is important to take actions to minimise exposure. The response to PFAS should continue to emphasise messaging regarding minimising exposure, rather than focus on the lack of evidence of health impacts.²⁶

Is Australia's health advice up to date?

- 3.23 The Committee noted that many participants in the inquiry considered the current Australian health advice to be not consistent or up to date with research linking PFAS exposure to a range of diseases²⁷ and the Committee supports the application of the precautionary principle in this case. In particular, many participants pointed out that overseas bodies had appeared to place a greater emphasis than Australia on the potential adverse health effects of exposure to PFAS.²⁸
- 3.24 Dr Geralyn McCarron argued that the current Australian advice was 'based on denial of health harms' and was 'out of step with both the precautionary principle and the body of evidence linking PFAS to impairment of human health':

²⁵ Coalition Against PFAS, *Submission 40*, pp. 26–31.

²⁶ New South Wales Government, *Submission 61*, p. 13.

²⁷ Jenny Robinson, *Submission 9*, pp. 3–4; Nicole Smith, *Submission 45*, p. 7; Dr Andrew Jeremijenko, *Submission 29*, p. [3]; Williamtown and Surrounds Residents Action Group, *Submission 51*, pp. [3–4, 5]; Eileen Clark, *Submission 56*, p. [1]; Ms Kate Washington MP, *Submission 65*, pp. [3–4]; Kim Smith, *Submission 66*, p. 2; Mrs Sue Walker, *Committee Hansard*, Williamtown, 24 July 2018, p. 8; Mr Lindsay Clout, *Committee Hansard*, Williamtown, 24 July 2018, pp. 12, 17.

²⁸ For example, Jenny Robinson, *Submission 9*, pp. 3–4; Coalition Against PFAS, *Submission 40*, p. 20; Dr Geralyn McCarron, *Submission 53*, p. 1; Royal Australasian College of Physicians, *Submission 69*, p. 3; Mrs Sue Walker, *Committee Hansard*, Williamtown, 24 July 2018, p. 8; Ms Dianne Priddle, *Committee Hansard*, Oakey, 17 August 2018, p. 5; Kate Washington MP, *Submission 65*, p. [1]; Mr Brian Byers, *Committee Hansard*, Williamtown, 24 July 2018, p. 47.

The risks to human health, denied by the Australian Government are acknowledged by the US, Germany, Britain, and the International Agency on Research on Cancer (IARC). Acknowledged health risks of exposure in humans include testicular and kidney cancer, immune impairment, thyroid disorders, impaired fertility, pregnancy induced hypertension and preeclampsia, and altered liver function.²⁹

- 3.25 The National Toxics Network submitted that, based on the ‘overwhelming evidence from independent published scientific research and developed countries regulatory assessments’, the Government’s current health advice is ‘both ill-informed and scientifically unsound’.³⁰
- 3.26 Friends of the Earth Brisbane pointed to a recent review by the United States Agency for Toxic Substances and Disease Registry, which it said suggested that ‘the impacts of PFAS may be far greater than previously predicted and at much lower doses than previously calculated’. The Group called for the Government to ‘acknowledge the wide acceptance of potential health impacts and review all guidelines in light of this recent scientific review’.³¹
- 3.27 The Royal Australasian College of Physicians (RACP)—in a submission led by the Australasian Faculty of Occupational and Environmental Medicine (AFOEM) Policy and Advocacy Committee—also contrasted the Australian advice with advice provided overseas.³² The RACP recommended that the Government’s current health advice be ‘updated to refer to the identified possible health effects outlined in the findings of the Expert Health Panel and the conclusions of international agencies’.³³
- 3.28 Dr Andrew Jeremijenko, a Brisbane-based specialist in occupational and environmental medicine, described the current health advice as ‘inadequate’. He endorsed the previously expressed views of the AFOEM and the Australasian Faculty of Public Health Medicine (AFPHEM) that that the existing enHealth advice, as currently worded, was ‘highly problematic’ in that it:

... does not adequately address the entire body of evidence demonstrating the association of PFAS with adverse human health effects; is inconsistent with the

²⁹ Dr Geralyn McCarron, *Submission 53*, p. 1.

³⁰ National Toxics Network, *Submission 34*, p. 7..

³¹ Friends of the Earth Brisbane, *Submission 48*, p. 2.

³² Royal Australasian College of Physicians, *Submission 69*, p. 3.

³³ Royal Australasian College of Physicians, *Submission 69*, pp. 4, 7.