

Detailed Site Investigation - Executive Summary

RAAF Base Richmond - PFAS Investigation

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Executive Summary

Background

AECOM Australia Pty Ltd (AECOM) was engaged by the Department of Defence (Defence) to undertake an Early Works Program and a Detailed Site Investigation (DSI), both of which are reported herein, at the Royal Australian Air Force (RAAF) Base Richmond (the Site) located at Dight Street, Richmond, NSW. The DSI also included the investigation of the surrounding off-Site areas. The Site and the Study Area (SA) are presented on **Figure 1** and **Figure 2** in **Appendix A** respectively.

The first stage of the Project¹ involved desktop studies and the Early Works Program (which included preliminary sampling of groundwater, sediment and surface water) to develop a Preliminary Conceptual Site Model (CSM). The preliminary CSM described potential per- and poly-fluoroalkyl substances (PFAS) sources, PFAS migration pathways and potential human and environmental receptors. The preliminary CSM was then used to inform the development of a Sampling, Analysis and Quality Plan (SAQP) for the DSI. The DSI involved the sampling of groundwater, surface water, soil and sediment both on the Site and within the (SA). The DSI also included the collection of soil characterisation, water quality and hydrogeological data to describe conditions within the SA.

The fieldwork for the DSI was completed between October 2017 and February 2018, with a supplementary groundwater gauging event completed in May 2018. This report presents the outcomes of the Project works completed to date, including the updated CSM. The outcomes of this report will be used to inform the Human Health Risk Assessment (HHRA), Environmental Risk Assessment (ERA) and PFAS Management Area Plan (PMAP), which are currently being developed.

The Site has been an active airbase since 1925 and is currently an important air logistics hub for the Australian Defence Force. As part of typical airbase activities, aqueous film forming foam (AFFF) was used at the Site for fire training and emergency response from around 1976. 3M Lightwater™ was the main AFFF product in use at the Site until approximately 2004, and is known to have contained PFAS, including perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA).

Objectives

The objectives of the DSI were to derive environmental data that will enable:

- Evaluation of the nature of PFAS at source zones on the Site;
- Assess the nature and extent of PFAS impact, and whether background sources not related to the Site may exist and could contribute towards the presence of PFAS off-Site;
- Refine the CSM developed during the EWP.
- Generate data to assist in scoping and planning PFAS management options.

Sources of PFAS Contamination

The DSI identified five key PFAS source zones on the Site – (1) the Former Fire Training Ground; (2) Hangar 54; (3) Former Fuel Farm 1; (4) Fuel Farm 2; and (5) the Sewage Treatment Plant (STP).

Secondary PFAS source zones are likely to have developed where PFAS impacted water has migrated or been concentrated and can leach to groundwater. Locations include: overflows and leakage at the STP and the Trade Waste Plant (TWP), as well as the underground and open drainage networks both on and off-Site.

¹ The Project includes the Early Works Program, Detailed Site Investigation, Human Health Risk Assessment, Environmental Risk Assessment and PFAS Management Area Plan.

Extent of PFAS Contamination

The on-Site PFAS source zones have contributed to a PFAS plume in groundwater of approximately 2 km in length and 5 km in width (refer to **Figure 28** in **Appendix A**).

All major on-Site drainage systems were found to contain concentrations of PFAS greater than the laboratory limit of reporting and/or the adopted assessment criteria, with detections also found at locations where surface water discharges from the Site. These locations include discharge into Rickabys Creek and its tributaries, and Bakers Lagoon.

Ultimately, all surface water discharges into major drainage networks and creeks flowing from the Site towards the Hawkesbury River.

Conceptual Site Model

The CSM has been refined based on the analytical results from multiple media within the SA, the results of the water use surveys and information received from NSW Department of Primary Industry (DPI). Within the SA, surface water bodies are used extensively for irrigation and this pathway has been included in the CSM.

The refined CSM and data generated in the DSI will be used to inform the HHRA and ERA for the Site. The DSI, HHRA and ERA will ultimately inform the scoping and planning of future management options for the Site, which will be detailed in the PMAP.

Potential risks to Human Health and the Environment

Concentrations of PFAS in the samples collected were compared to assessment criteria adopted from guideline values presented in the PFAS National Environmental Management Plan (NEMP). Where concentrations exceed these criteria, further assessment is required to understand whether there is an unacceptable risk to human health and / or the environment.

Next Steps

The HHRA (currently under development) will assess multiple pathways to evaluate the potential human health risks from PFAS exposure to identified receptors within the SA. The HHRA will consider direct contact PFAS exposures through environmental media (e.g. soil, groundwater, surface water, and sediment) as well as secondary exposures via dietary intakes, including both seafood and home-grown plant and animal produce (garden crops, eggs and pasture). This assessment includes a review of toxicological profiles in accordance with the National Environmental Protection Measure (NEPM) process and the PFAS NEMP, and will utilise data from the DSI.

The ERA is currently being developed to assess the potential risks from the identified PFAS compounds to ecological receptors with habitats present within the SA, and the potential for wider ecosystem impacts to result from the accumulation of PFAS in terrestrial and aquatic organisms exposed to PFAS contamination.

Finally, a PMAP will be developed, which will outline actions to manage risks confirmed in the HHRA and ERA. The PMAP will include an Ongoing Monitoring Plan to monitor migration of PFAS in the future.