

REPORT

WASTE AUDIT

for

Army Aviation Centre, Oakey

DAMES & MOORE
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135 WICKHAM TERRACE
Brisbane Qld 4000
Tel: 07 3832 3222
Fax: 07 3832 1687
A.C.N. 003 293 696

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Defence Estate Organisation
Regional Estate Centre South Queensland
Oakey Office
Oakey QLD 4401

Attention: Steve Lavery

Dear Sir,

**REPORT
WASTE AUDIT
ARMY AVIATION CENTRE OAKEY**

Please find enclosed a copy of the report entitled “ Waste Audit – Army Aviation Centre Oakey” following your comments received by fax on 21 May.

We will follow up with the environmental officer in Enoggera once the new organisation has been set up.

If any further clarification is required please do not hesitate to contact the undersigned or Elizabeth Kazakoff.

Yours faithfully,
Dames & Moore

James MacDermott
Principal, Environment Group

EXECUTIVE SUMMARY

Dames & Moore was commissioned by the Army Aviation Centre Oakey (AACO) to conduct a waste audit of their facilities located at Oakey, Turkey Hill and Brymaroo. A site investigation was conducted by Mr James MacDermott, Mr Michael Talbot and Ms Elizabeth Kazakoff between the 23 and 25 March 1998.

The purpose of this investigation was to assess current waste management practices at AACO and where appropriate, provide recommendations, including the provision of strategies to achieve more effective and environmentally responsible waste management.

From the waste audit conducted the following conclusions and recommendations have been made:

- The introduction of waste segregation and recycling practices, in particular recycling practices for paper, cardboard, glass, aluminium cans, and plastic bottles is recommended. The implementation of these initiatives will improve environmental performance and will result in a reduction in the overall waste disposed of, thus minimising waste disposal costs.
- The collection of medical waste in fewer bins or on a less frequent basis is recommended, resulting in potential cost savings.
- The development and implementation of waste minimisation strategies is recommended for construction activities to minimise the amount of waste requiring disposal.
- Building contracts should be reviewed to ensure that they reflect appropriate waste management practices.
- The removal of old equipment from the site and the bunding of leaking equipment is recommended to minimise the potential for soil contamination.
- Conducting leachate testing on the solid waste residue generated from the toxic waste treatment plant is recommended to ensure that it is suitable for disposal as general waste. By conducting leachability tests on this waste stream AACO will mitigate any potential liabilities that may arise from the disposal of this waste stream.
- As a result of waste oil being classified as a regulated waste under the Queensland Environmental Protection Act, it is recommended that waste dockets confirming the appropriate collection and disposal of this waste stream be retained on site.
- Contamination investigations should be conducted on old fire training areas to assess the quality of the soil and groundwater.
- Interceptor traps should be regularly inspected to ensure that they are operating effectively, thus minimising the potential for surface water contamination.
- Documentation confirming the cleaning of interceptor traps and the appropriate disposal of interceptor trap residues should be retained on site, as a result of this waste stream being classified as a regulated waste under the Queensland Environmental Protection Act.
- Potentially contaminated creosote waste in the creosote washdown area should be disposed of as a hazardous waste, unless analytical results indicate otherwise.

- Regular checks should be conducted on the OR's grease trap to ensure that it is operating effectively, thus minimising the potential for water contamination.
- The grease trap located at the Officer's mess should be disconnected, as a result of it no longer being used.
- The septic tank located at the Officer's Mess Annex should be connected to the sewer system, if practicable, thus eliminating the requirement for the disposal of this waste stream.
- Documentation verifying the disposal of septic sludges should be retained on site.
- Batteries should be returned to the supplier for appropriate disposal and documentation verifying this disposal practice should be retained on site as a result of batteries being classified as a regulated waste under the Queensland Environmental Protection Act.
- Waste silver compounds generated in the dental surgeries are classed as a regulated waste under the Queensland Environmental Protection Act and therefore documentation verifying the appropriate disposal of this waste stream should be retained on site.
- AACO should obtain the appropriate trade waste permit for the grease trap, in accordance with the requirements of the Sewerage and Water Supply Act, 1949.
- Controls, including ensuring that construction trucks are washed in designated washdown areas, should be enforced to minimise the potential for stormwater contamination.
- It is recommended that a pollutant trap be installed on the stormwater system near re-fuelling area to prevent an accidental spill contaminating stormwaters.
- Water quality monitoring of the effluent from the demineralisation plant should be conducted to determine the type and level of potential contaminants. If contaminant levels are below sewer acceptance criteria, this waste stream should be discharged to the sewer system and the appropriate trade waste permit obtained. If testing results reveal that the water quality of this stream exceeds sewer discharge limits, then the implementation of a preliminary treatment system may be required before discharge to sewer.
- Wastewater discharges from interceptor traps, washbays and workshop areas should be directed to the sewer system, if practicable, in accordance with the requirements of the Sewerage and Water Supply Act, 1949 and the Environmental Protection Act.
- It is recommended that cleaning practices aimed at minimising the amount of wastewater generated, including the use of dry cleaning methods (ie sweeping and vacuuming) be implemented as opposed to hosing down workshop floors.
- Chemical and oil drums should be stored on drip trays or within bunded areas to minimise the potential for an accidental release of chemicals to the stormwater system.
- Hay bales implemented for sediment control in stormwater channels should be monitored on a regular basis to ensure that they are operating effectively.
- Wastes generated at Turkey Hill and Brymaroo should be either removed at time of generation by users or brought to Oakey for appropriate disposal.

A summary of the recommendations made, their priority and an estimated completion cost has been outlined in Table 6.1 of the report.

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**REPORT
WASTE AUDIT
for
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1. INTRODUCTION

Dames & Moore was commissioned by the Army Aviation Centre Oakey (AACO) to conduct a waste audit of their facilities located at Oakey, Turkey Hill and Brymaroo. A site investigation was conducted by Mr James MacDermott, Mr Michael Talbot and Ms Elizabeth Kazakoff between the 23 and 25 March 1998.

The purpose of this investigation was to assess current waste management practices, and where appropriate, provide recommendations, to achieve more effective and environmentally responsible waste management for the facilities located at AACO, Turkey Hill and Brymaroo. A locality plan for these operations is provided in Figure 1.1.

This report is structured to provide an outline of the project's scope of works, (Section 2.0) and an overview of applicable Commonwealth and State legislation which relate to waste management issues at AACO (Section 3.0). Current waste management practices at the Oakey base have been discussed in Section 4.0 and waste management issues relating to Turkey Hill and Brymaroo have been addressed in Section 5.0. Recommendations and conclusions, outlining strategies aimed at improving waste handling and management techniques are provided in Section 6.0 of this report.

2. SCOPE OF WORK

The scope of works conducted for this project, in accordance with Dames & Moore's proposal dated the 29th October 1997 is outlined below:

- an initial meeting between Dames & Moore personnel and AACO staff was held on the 20 November 1997 to enable Dames & Moore staff to familiarise themselves with operations conducted on site and to assist with the preparation of a site specific waste audit questionnaire.
- a Commonwealth, State and Local legislation review applicable to waste management issues was conducted. Existing documentation, including waste management plans were also reviewed during this stage of the project;
- a site specific waste audit questionnaire was developed aimed at determining the type, nature, estimated quantities and disposal practices of waste streams generated on site;
- a site audit was conducted between 23 – 25 March 1998. This involved conducting a site inspection, interviewing appropriate personnel and examining existing water courses, stormwater drains, sewer discharge points and waste disposal practices; and,
- preparation of a waste audit report outlining practical and achievable waste management recommendations.

3. LEGISLATION REVIEW

The Commonwealth and State legislation applicable to waste management and the operations conducted by the Army Aviation Centre Oakey (AACO) are discussed in the following sections.

3.1 COMMONWEALTH

3.1.1 Hazardous Waste (Regulation of Exports and Imports) Act 1989

This Act gives effect to the "*Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal*" (a copy of which forms a Schedule to the Act). It regulates the import and export of hazardous waste by requiring permits to be held for these activities. Hazardous waste is defined to be:

- waste with certain characteristics or within certain categories listed in the Convention;
- household waste; or
- residues arising from the incineration of household residues.

AACO must therefore comply with the requirements of this Act if importing or exporting hazardous wastes, as defined above.

3.1.2 The Intergovernmental Agreement on the Environment (IGAE) 1992

The Intergovernmental Agreement on the Environment (the IGAE) was developed in 1992 between the Commonwealth, States and Territories. The IGAE attempts to define environmental policy and management responsibilities of each level of government, including Local Government.

In some areas, particularly pollution control and waste management, the IGAE sets up procedures which aim to produce common environmental standards and guidelines throughout Australia. Future initiatives in other areas, such as land use policy, are ultimately left in the hands of the States.

One aspect of the IGAE that may affect an organisation is the introduction of an interstate waste tracking system. The system involves the use of a nine docket system, where wastes are transported across state boundaries. The system requires that permission is granted to transport the wastes from the relevant environmental protection authority of both the waste source state and the state where wastes will ultimately be disposed. This act is therefore relevant to Oakey's operations when wastes are being transported interstate.

3.1.3 Ozone Protection Act 1989

This Act prohibits the manufacture, import and export of certain listed ozone depleting substances (which are listed in a Schedule to the Act) unless a licence (granted by the Minister) is held. Licences may contain conditions that may be added to, varied or revoked at any time. A quota system is applied to dealing with these substances. Certain activities in connection with these substances are also restricted, such as manufacturing or importing products that contain the substances and disposal of refrigerants or certain extruded polystyrene packaging and insulation. It is possible to apply for an exemption. The Act may affect AACO to the extent that it may import or export the substances listed in the Schedule.

Following the introduction of this Act, most states have enacted complimentary legislation. A common goal of the Commonwealth and State Acts relating to ozone protection is the phase out of all Ozone Depleting Substances (ODS) by 1 January, 1996.

The Act gives effect to Australia's obligations under the *Vienna Convention for the Protection of the Ozone Layer* and the *Montreal Protocol on Substances that Deplete the Ozone Layer*, copies of which form schedules to the Act. Its aim is to control and reduce the use of ozone depleting substances. Many organisations have air conditioning and refrigeration facilities that contain ozone depleting substances. Therefore this legislation may be relevant. The legislation may also affect AACO where both fixed and portable halon fire fighting equipment is installed.

3.2 QUEENSLAND LEGISLATION

Although the AACO is not required to comply with Queensland State Legislation, the Army aim, where possible, to comply with state laws. The following Queensland legislation is relevant to the activities conducted by the Army Aviation Centre, Oakey:

- Environmental Protection Act 1994;
- Sewerage and Water Supply Act 1949;
- Queensland Contaminated Land Act 1991;
- Building (Flammable and Combustible Liquids) Regulation 1994; and,
- Workplace Health and Safety Act 1995;

A summary of the applicable environmental legislation is provided below.

3.2.1 Environmental Protection Act 1994

The Environmental Protection Act creates a framework for the protection of the environment in Queensland. In order to protect particular segments of the environment, set standards and control certain types of industries, the Act allows for the creation of Environmental Protection Policies (EPPs). EPPs provide specific standards and criteria for air emissions, waste, noise and water as well as specific requirements for industry.

The legislation is supported by the Environmental Protection Regulation 1998, listing environmentally relevant activities that must not be undertaken without a licence or approval. The licensing system covers all areas of environmental control including air, water, noise and waste.

EPP Water

The Environmental Protection (Water) Policy 1997 (EPP Water) is enforced under the Environmental Protection Act. The objective of the EPP for water is to protect the water environment in accordance with the values and principles established in the Environmental Protection Act 1994. Emphasis is placed on conserving water, preventing and minimising the production of waste, recycling waste water and improving the quality of waste water that is released to the environment. Sewage and wastewater, including contaminated stormwater, from industry and urban areas are targeted. The EPP for water enforces on the spot fines for an unauthorised release of oil, chemicals, paint, sewage, pesticides, litter and other contaminants into gutters.

EPP Waste Management

The Draft Environmental Protection (Waste Management) Policy, (EPP) enacted under the Environmental Protection Act, has recently been released however the DoE has advised that it intends to implement the EPP for waste by mid 1998. This policy will outline the waste management principles to be implemented and will provide mechanisms for waste management planning. When this policy is implemented the Environmental Protection (Waste Management) Regulation will also be enforced and will replace the Environmental Protection (Interim Waste) Regulation 1996.

Environmental Protection (Interim Waste) Regulation 1996

The *Environmental Protection (Interim Waste) Regulation 1996 (QLD)* (which commenced on 2 February 1996) outlines requirements for storage, removal and collection of wastes (domestic, commercial and industrial waste types). Part 2, Division 3 of the Regulation is concerned with storage, removal and collection of industrial waste, Part 2, Division 4 is concerned with the disposal of domestic, commercial and industrial waste. AACO's responsibilities under this Regulation are:

- to provide an adequate number and type of waste containers for the safe, efficient and nuisance free storage of industrial waste;
- containers should be kept in a clean condition and in good repair;
- a person controlling any waste recycling reprocessing facility shall make adequate provision for the safe and efficient disposal of all hazardous industrial waste delivered to the facility, and keep records (when required by the Chief executive) in respect of the waste reprocessing facility; and,
- to make adequate provision for the safe and efficient disposal of all hazardous, putrescible, objectionable or liquescent industrial waste.

3.2.2 Sewerage and Water Supply Act 1949

The objective of the Act is to prevent water pollution by the control of discharges through a sewerage system. Local authorities exercise control over discharges to a sewerage system so that final effluent from the system may comply with conditions outlined on issued permits.

This Act affects an organisation where the organisation's facilities discharge wastes to sanitary sewer. A Trade Waste Agreement with the appropriate City Council may be required for such discharges and the organisation would then be obligated to comply with the conditions of the Agreement.

Trade Waste Agreements are issued by the appropriate Local Council for the discharge of liquid wastes to sanitary sewer. The permits generally contain both specific acceptance criteria and general conditions for trade waste discharges to the sewer system. The specific requirements outline acceptable flow rates and concentrations of pollutants. The general conditions specify what self monitoring program a site must undertake and at what minimum interval in addition to meeting the sewer acceptance criteria attached to the permit. Sewer acceptance criteria may be specified for a wide range of pollutants including pH, metals, pesticides, oil and grease, organics, phosphate and nitrogen.

3.2.3 Contaminated Land Act 1991

Under the *Contaminated Land Act 1991 (Qld)* all sites suspected of being contaminated are to be listed on a contaminated sites register and these sites will have to be assessed to determine any health or environmental problems associated with the suspected degree of contamination. On the basis of that assessment, sites are currently being classified into one of a number of categories.

Where the presence of significant contamination is confirmed on a particular site, then a program of remediation, clean-up or site management will be required to be instigated. Under Section 13 (1) of the *Contaminated Land Act*, a person must not cause land to be contaminated. Under Section 17 (2) of the Act, the owner of land must notify the Department of Environment of the existence of contaminated land within 30 days of becoming aware of the contaminated land.

3.2.4 Building (Flammable and Combustible) Liquids Regulation 1994

The storage and handling of flammable and combustible liquids in Queensland is regulated through the Building (Flammable and Combustible) Liquids Regulation 1994, subordinate to the Building Act 1995.

This regulation requires the licensing of premises by local authorities for the storage of flammable and combustible liquids and enacts the provisions of AS1940, the Australian Standard for the storage and handling of flammable and combustible liquids. The full provisions of the standard are required if volumes of material exceed the exemption limits outlined within the standard. The requirements of the Australian Standard include:

- adequate separation distances from storage areas to protected works, house, offices, etc;
- the provision of secondary containment;
- adequate ventilation;
- control of access to the area;
- control of fuel dispensing and loading; and,
- fire protection facilities.

3.2.5 Workplace Health and Safety Act 1995

The storage of specified dangerous goods in Queensland is regulated under Part 37 of the Workplace Health and Safety Regulations 1989-1995, subordinate to the *Workplace Health and Safety Act 1995*.

The main requirements of the regulation are summarised as follows:

- provision of adequate safety equipment;
- effective management of specified dangerous goods;
- provision of Material Safety Data Sheets;
- appropriate labelling of chemical storage containers;
- understanding of risk assessment for chemicals;
- enactment of relevant Australian Standards.

The regulation also specifies exemption limits for the various classes of dangerous goods, below which the legislation does not apply. Storage depots are required to have secondary containment to the volume of either the largest tank, for tank storage or at least 25% of the total storage volume for packaged goods.

4. WASTE STREAMS AND MANAGEMENT PRACTICES

The waste streams generated as a result of AACO's operations and the associated current waste management practices are discussed in the following sections. From the site inspection conducted, the main waste streams generated have been categorised as follows:

- solid waste, including:
 - general solid waste;
 - medical waste;
 - construction waste;
 - old equipment and planes; and,
 - toxic waste treatment plant – solid sludge;
- liquid waste, incorporating:
 - waste oil and fuels;
 - interceptor trap residues;
 - grease trap residue; and,
 - septic tank wastes;
- hazardous wastes, including:
 - acids, caustic solutions and solvents;
 - batteries; and,
 - silver and silver compounds;
- sewer discharges;
- air discharges from the following sources;
 - incinerator;
- stormwater discharges, including waters generated from the following sources:
 - stormwater runoff;
 - washbays;
 - demineralisation plant;
 - interceptor traps; and,
 - sediment traps.

A description of current waste management practices for each of these waste streams is discussed in the following sections. Where possible, recommendations aimed at improving waste management practices and reducing potential environmental liabilities are also presented.

4.1 SOLID WASTE

4.1.1 General Solid Waste

Numerous general solid waste streams are produced on site, including those generated from offices and living quarters. The disposal of these waste streams is contracted to JJ Richards. Approximately 6100 m³ of general waste is disposed of from AACO on an annual basis. The location of the general waste bins is illustrated in Figure 4.1 and a summary of the quantities of waste generated are presented in Appendix A.

Limited recycling initiatives appeared to have been implemented regarding the management of this waste stream and a previous paper recycling program was stated to have failed due to lack of participation. Potential recycling opportunities include aluminium cans, glass, plastic, paper and cardboard. Recycling of these waste streams can be achieved through staff involvement projects and the installation of appropriate recycling bins. Dames & Moore recommends that firstly a paper recycling program be re-instigated and an initial training program be implemented to ensure that staff are aware of the recycling system and to educate them on the benefits to be achieved through the introduction of such a system.

Approximately 700 m³ of general waste is generated annually from office buildings. Conservatively assuming that 50% of this waste stream is recyclable, the implementation of waste recycling opportunities has the potential to provide economic advantages, as the amount of general waste requiring disposal will reduce. Improved environmental performance will also be achieved at the site through the implementation of recycling practices.

4.1.2 Medical Waste

Medical waste is generated in doctor and dentist surgeries on site. Minor quantities are also produced from operations conducted by veterinarians on the guard dogs. This waste stream is stored in three appropriately labelled waste disposal bins and is collected by JJ Richards approximately once a week. Medical waste is then disposed of utilising high temperature incineration at the Toowoomba Base Hospital. The appropriate documentation for this waste stream is held on site. Amalgam fillings are retained under water, before collection by the supplier for recycling. This is considered to be an acceptable waste disposal practice.

Waste documentation verifying the disposal of medical waste at the Toowoomba Base Hospital indicated that approximately 1750 kg of medical waste is disposed of on an annual basis. However Oakey base is charged for the weekly collection of three bins, which results in an annual collection capacity of 7800 kg of waste. Potential cost savings could therefore be incurred if the medical waste stream was collected in fewer bins or collected on a less frequent basis. However it should be verified that all waste destruction documentation has been retained by the site.

4.1.3 Construction Wastes

Waste generated from construction activities is currently managed by external contractors. Limited controls by AACO are enforced over the operations conducted by contractors regarding waste disposal practices. To ensure that external contractors are appropriately disposing of waste streams generated it is recommended that waste disposal guidelines be developed and enforced. Building contracts should also be reviewed to ensure that they reflect appropriate waste management practices.

Where possible recycling and waste minimisation strategies should be implemented during the construction phase to minimise the amount of waste requiring disposal. According to the Department of Environment (1994) at least ten percent of construction materials can be recycled. Outlined below are examples of how construction wastes can potentially be reused or recycled:

- tree wastes from site clearing can be chipped and stockpiled for future use in site landscaping and rehabilitation areas;
- soil from excavation work can be stripped in layers, stockpiled and reused for contouring landscaping and rehabilitation;
- recyclable building wastes can be collected separately and re-used or recycled for example:
 - timber from concrete formwork can be recovered and reused;
 - scrap steel and offcuts can be recycled;
 - plastics can be recycled; and,
 - oils can be collected and sent for refining.

The implementation of these strategies before any construction commences on site, will ensure that construction wastes are effectively managed, thus minimising the amount of overall waste disposed of and thus reducing any potential liabilities associated with inappropriate waste disposal methods.

4.1.4 Old Equipment and Planes

Old equipment, including aircraft components are stored at various locations around the site, including the museum. During the site investigation oil staining was noted around the base of some disused equipment, which was situated on unpaved areas. This storage practice has the potential to contaminate the surrounding soil and surface water.

It is therefore recommended that leaking equipment be placed in bunded areas or on drip trays to prevent additional soil contamination occurring. Old planes and equipment should also be removed from the site where possible.

4.1.5 Toxic Waste Treatment Plant – Solid Sludge

The toxic waste treatment plant, operated by Boyd & Keogh is designed to treat liquid wastes generated during paint stripping and repainting operations. This method of dealing with these waste appears to be a suitable economical solution. Clean water generated from this process is then re-used during paint stripping. As a result of this waste liquid treatment process however, a solid residue is produced which requires disposal.

The waste liquid treatment plant is operated on an as required basis and approximately 2 m³ of solid waste residue are generated every two months, resulting in an annual production of 12 m³. This solid waste stream is then disposed of at the local landfill. Leachate testing for this solid waste stream was conducted in July 1991. The results obtained from this initial testing are below the specified municipal landfills allowable leaching contaminant levels, however chromium levels were noted to be 0.42 mg/l and the allowable level is 0.5mg/l. It is therefore recommended that this parameter be closely monitored.

Since the time of the initial leachate analysis however, the type and quantities of waste treated within the treatment plant have altered. It is therefore recommended that leachate testing on the solid residue be conducted to ensure that it is suitable for disposal as general waste. By conducting leachability tests on this waste stream AACO will mitigate any potential liabilities that may arise from the disposal of this waste stream.

4.2 LIQUID WASTE

4.2.1 Waste Oil & Fuels

Waste oil and fuel is generated from workshops, typically from the servicing of vehicles and equipment. Waste fuel is also generated from the fuel farm located on site. The location of underground fuel and oil storage tanks is illustrated in Figure 4.2.

Waste fuel is currently collected and disposed of by Bateman's Oils for recycling. Documentation verifying this waste disposal practice was not sighted during the waste audit. Information obtained during the site investigation indicated that approximately 34,850L of waste fuel and oil was disposed of during the fiscal year 1996/97. As a result of waste oil being classified as a regulated waste under the Queensland Environmental Protection Act, it is recommended that waste dockets confirming the appropriate collection and disposal of this waste stream be retained on site.

Waste oil and fuel has previously been used for fire training purposes. This disposal practice has the potential to have contaminated surrounding soil and waterways. It is therefore recommended that contamination investigations be conducted to assess the quality of the surrounding soil and water in these fire training areas.

4.2.2 Interceptor Traps

Interceptor traps are currently installed on workshop drainage systems, aircraft and vehicle washbays and the fuel farm drainage system. The location of these devices is illustrated in Figure 4.2. These interceptor traps were reported to be cleaned on a monthly basis however the interceptor pit connected to the airside washdown area was noted to be blocked during the site investigation.

It is therefore recommended that interceptor traps be regularly inspected to ensure that they are operating effectively. Conducting these regular inspections will also minimize the potential for contaminating surrounding waterways. Documentation confirming the cleaning of these interceptor traps and the appropriate disposal of interceptor trap residues should also be retained on site, as a result of this waste stream being classified as a regulated waste under the Environmental Protection Act.

A disused creosote washdown area to the east of building D2, was also noted during the site investigation to be linked to an interceptor tank. This tank was inspected during the site visit and was found to hold dirty water likely to contain creosote or related oils. This water should be disposed of as hazardous waste, unless analytical results indicate otherwise.

4.2.3 Grease Traps

Two grease traps are currently located on site, these being located at:

- Officer's mess annex; and,
- The other rank's mess.

The location of these grease traps has been illustrated in Figure 4.2. Site personnel indicated that the grease trap connected to the Officer's Mess Annex was no longer in use. The Other Ranks (ORs) mess grease trap is cleaned on a monthly basis by Oakey Septics and the associated disposal documentation was sighted. No information regarding the quantity of grease collected within this grease trap however could be obtained during the site investigation.

Regular checks should be maintained on the grease trap to ensure that it is operating effectively and it is recommended that a formal procedure be developed to ensure that the OR's grease trap is cleaned and maintained on a regular basis, thus minimising the potential for water contamination.

It is also recommended that the grease trap located at the Officer's mess be disconnected, as a result of it no longer being used.

4.2.4 Septic Tanks

One septic tank with a capacity of 4500 L is located on site at the Officer's Mess Annex, Hoenhaus House. This tank was stated to be cleaned on an as required basis by Oakey Septics, however no documentation verifying this was sighted.

In accordance with the principles of best practice it is recommended that this septic tank be connected to the sewer system in the near future, if economically viable, thus eliminating the requirement for the disposal of this waste stream. Documentation verifying the disposal of septic sludges should also be retained.

4.3 HAZARDOUS WASTES

The hazardous waste streams identified during the site investigation included:

- Acid, caustic solutions and solvents;
- Batteries; and
- Silver and silver compounds.

The management of each of these waste streams is further discussed in the following sections.

4.3.1 Acid and Caustic solutions and Solvents

The majority of waste chemicals generated, including paints, thinners, fixers, acids and bases, are currently treated in the on-site treatment plant. This plant is operated by Boyd & Keogh who are responsible for operating the plant and monitoring its performance. The utilisation of this treatment plant is considered to be an environmentally acceptable and cost effective system. However the suitability of the final residue for disposal at a general waste disposal facility should be verified. This issue has been previously addressed in Section 4.1.5.

4.3.2 Batteries

Discarded lead acid batteries are either disposed of in the general waste bin, returned to the Q store, where they are returned to the supplier, or sold at government auction. Site personnel indicated that the waste acid is drained from these batteries and treated in the on-site treatment plant. Magnesium batteries are also retained on site and these were stated to be transported to the base in Victoria for appropriate disposal.

Where possible, batteries should be returned to the supplier for appropriate disposal and documentation verifying this disposal practice retained on site, as a result of batteries being classified as a regulated waste under the Environmental Protection Act.

4.3.3 Silver and Silver Compounds

Waste silver and silver compounds are generated as a result of dental practices and a silver recovery unit is operational in this area. No documentation verifying the disposal of this silver however was noted during the site inspection and no information regarding quantities annually disposed of could be obtained. Waste silver compounds are classed as a regulated waste under the Environmental Protection Act and therefore it is recommended that documentation verifying the appropriate disposal of this waste stream be retained on site.

4.4 AIR DISCHARGES

4.4.1 Incinerator

The incinerator on site is used to destroy confidential documents generated from some of the offices on site. No pollution control equipment is installed on this unit however site personnel indicated that the incinerator was used on an infrequent basis.

In accordance with the requirements of the Environmental Protection Act 1994, the burning of clean paper and cardboard on site requires an approval, however because this unit was operating at the time the Environmental Protection Act was introduced, the appropriate approval will be automatically granted by the Local Council. If any general waste is burnt within this facility however, then an environmental licence will be required from the Department of Environment.

Although the AACO do not have to comply with state legislation, it is recommended that only clean paper and cardboard is burnt within this facility. If additional items are incinerated, in accordance with the principles of best practice, it is recommended that the appropriate environmental licence be obtained. Alternatively the incinerator unit could be decommissioned and confidential documentation disposed of internally by shredding (this method of disposal is already practiced by some divisions on site) or by an external contractor. This would result in minimising the quantity of air pollutants released from the site.

4.5 SEWER DISCHARGES

The main discharges to the sewer system at the AACO include the following:

- toilets, sinks and showers; and,
- wastewaters generated from the cleaning of dog kennels.

Wastewaters generated from toilets, sinks and showers are directed to the sewer system. A grease trap is also installed on the sewer line into which wastewaters generated from the officer's mess are discharged. The management of this solid waste stream is addressed in Section 4.2.3 of the report.

Wastewaters generated in the dog kennels are diverted to the sewer system through the use of a diversion valve. This device also enables stormwaters collected in the area to be directed to the stormwater system.

No other sources of sewer discharges were identified during the site investigation.

In accordance with the Sewerage and Water Supply Act 1949, wastewaters should only be discharged to the sewer system and the appropriate trade waste permit be obtained from the Local Council. Although the army aviation base is exempt from complying with local legislation it is recommended that AACO obtain the appropriate trade waste permit for the grease trap, in accordance with the principles of best practice. Additional grease traps may also need to be installed on the sewer drains of kitchens and canteens around the site.

The Sewerage and Water Supply Act and the Environmental Protection Act also outline that wastewaters should not be discharged to the stormwater drainage system. This includes the discharge of waters generated from washbays and oil interceptor traps. This issue is further addressed in Section 4.6 Stormwater Discharges.

4.6 STORMWATER DISCHARGES

The main stormwater discharges generated on site include the following sources:

- stormwater runoff from paved and grassed areas;
- backwash from the demineralisation plant;
- wastewaters generated from vehicle and aircraft washbays;
- wastewaters discharged from workshops; and,
- sediment traps.

Each of these discharges is discussed in greater detail below.

4.6.1 Stormwater Runoff

Stormwater runoff is generated during storm events and contains contaminants from paved, grassed and roofed areas. Spills that occur on these areas will result in the generation of contaminated runoff. To prevent the contamination of stormwater runoff, any accidental spills that occur on site should be cleaned up immediately and chemical drums should be stored in bunded areas in accordance with the principles of best practice.

During the site investigation it was also noted that stormwater runoff generated from concrete batching operations had affected the stormwater drainage system, with solidified cement observed in grass lined stormwater channels. Controls, including ensuring that trucks are washed in designated washdown areas, should be enforced to minimise the impact to these drains.

Another area of concern identified during the site investigation was a stormwater drainage point, which was noted to be stained with a black substance, however it was unclear what the source of this stain was. It is recommended that further investigations be conducted. This drainage point is identified in Figure 4.3.

The re-fuelling area was also noted to be a potential area of concern during the site investigation. If an accidental fuel release occurred in this area, this spill would discharge directly to the stormwater system. Although no evidence of staining was noted in this area, it is recommended that a pollutant trap be installed on this stormwater drainage system to prevent surface water contamination occurring.

4.6.2 Demineralisation Plant Backwash

A demineralisation plant is located on site. Backwash from this facility is currently discharged into the stormwater system. The volume and frequency of discharge of this waste stream could not be quantified during the site investigation. In accordance with state legislation requirements, this waste stream should not be discharged to the stormwater system as it may potentially contain high levels of dissolved salts and minerals.

It is therefore recommended that water quality monitoring of this stream be conducted to determine the type and level of potential contaminants. If contaminant levels are below sewer acceptance criteria, this waste stream should be discharged to the sewer system and the appropriate trade waste permit obtained. If testing results reveal that the water quality of this stream exceeds sewer discharge limits, then the implementation of a preliminary treatment system will be required before discharge to sewer, as the discharge of potentially toxic materials can inhibit the operation of the sewage treatment plant.

4.6.3 Washdown Bays

Four main washdown bays were identified during the site investigation and the location of these washdown areas is illustrated in Figure 4.2. Waste waters generated from the cleaning of aircraft and vehicles are currently discharged to the stormwater system, although some of these washbays are connected to a oil interceptor. The discharge of these waste waters to the stormwater system however has the potential to contaminate surrounding surface waters.

Although AACO strictly do not have to comply with Queensland Legislation, in accordance with the Sewage and Water Supply Act, wastewaters should not be discharged to the stormwater system. It is recommended that washwaters, where practicable, be released to the sewer system, after passing through the oil interceptor system. This will involve performing diversion works to connect these areas to the sewer system.

4.6.4 Workshop Drainage

Wastewaters generated in internal workshop areas, including washdown waters were reported to discharge to the stormwater system. Drainage from some workshop areas pass through an oil interceptor trap before being discharged.

However, as previously outlined, the discharge of contaminated stormwater and wastewaters to the stormwater system is prohibited under the Sewerage and Water Supply Act and the Environmental Protection Act. It is therefore recommended that these discharges be diverted to the sewer system, where practicable.

Cleaning practices aimed at minimising the amount of wastewater generated should therefore be implemented. This would include the use of dry cleaning methods (ie sweeping and vacuuming) as opposed to hosing down workshop floors. All chemical and oil storage drums should be stored on drip trays or within bunded areas to minimise the potential for an accidental release of chemicals to the stormwater system.

4.6.5 Sediment Traps

Sediment traps, which consist of hay bales, have been installed in the main stormwater channels that flowed through the construction area. During the site inspection however, these hay bales had been washed away. The release of sediments from the construction area to stormwater channels has the potential to impact the surrounding environment. It is therefore recommended that these hay bales be monitored on a regular basis to ensure that they are operating effectively and should be replaced on a regular basis.

5. AACO'S ADDITIONAL FACILITIES

5.1 TURKEY HILL

A radar installation currently exists at Turkey Hill. Due to the nature of the facility, a limited quantity of waste is generated.

The installation is generally unmanned and the sources of wastes are limited to the following :

- sewer waste;
- air conditioning coolants; and
- maintenance wastes (such as oils and paints).

The sewer waste is directed to a septic tank, which is periodically cleaned by a subcontractor. No significant issues were identified with this operation based on the restricted use and location of the facility. A subcontracted company (Asset Services) maintains the air conditioning system and if coolant waste is generated then it is taken offsite.

Maintenance waste including oils and paints should be removed from the site and taken to the Oakey base for appropriate disposal. From discussions at the base and from observations made during the visit of the installation, it appears that some wastes are disposed of on the side of the hill. It is recommended that this practice be stopped.

5.2 BRYMAROO

A grassed airstrip is located at Brymaroo, which is operated by AACO and a topographic map of this site is illustrated in Figure 5.1.

As with Turkey Hill there are limited waste issues associated with the running of this operation. Brymaroo comprises a kitchen building, a toilet block, an empty temporary office, a refuelling facility and an essentially empty shed. The kitchen area is probably used a maximum of 4 times a year. The refuelling facility has been installed very recently and has not been used.

The installation is generally unmanned and the sources of wastes are limited to the following :

- sewer waste;
- kitchen waste;
- general waste; and
- other waste materials.

The toilet block and the kitchen are linked to separate septic tanks and as both are relatively new (within 18 months) neither have been emptied or cleaned since their installation. If required the

pumping out of the septic tanks would be arranged by Business Management Services. General waste is removed from the site by the users. No general waste was observed during the visit. During the visit some materials at Brymaroo appeared to be redundant and should be removed for recycling or disposal. This concerns the following items:

- five drums of kerosene, stored in the open;
- 16 empty drums stored near an old interceptor trap, which was an area possibly used previously for fuel loading; and
- approximately 100 tyres in the shed.

There were several drums of diesel fuel or petrol, which were for use either for the fire water pump generator or for the refuelling facility. These were generally not stored in secondary containment and although they were observed to be in a good condition, over time their condition will deteriorate. It is recommended that the diesel and petrol drums be stored on secondary containment trays or similar.

The new refuelling facility is within a bunded area, which is linked to a triple interceptor if there was a release from the bund. During operation of the facility the bund would be closed off.

6. RECOMMENDATIONS

From the waste audit of the Army Aviation Centre located at Oakey, the following recommendations, aimed at improving environmental performance at the site, have been outlined below:

- The introduction of waste segregation and recycling practices, in particular recycling practices for paper, cardboard, glass, aluminium cans, and plastic bottles is recommended. The implementation of these initiatives will improve environmental performance and will result in a reduction in the overall waste disposed of, thus minimising waste disposal costs.
- The collection of medical waste in fewer bins or on a less frequent basis is recommended, resulting in potential cost savings.
- The development and implementation of waste minimisation strategies is recommended for construction activities to minimise the amount of waste requiring disposal.
- Building contracts should be reviewed to ensure that they reflect appropriate waste management practices.
- The removal of old equipment from the site and the bunding of leaking equipment is recommended to minimise the potential for soil contamination.
- Conducting leachate testing on the solid waste residue generated from the toxic waste treatment plant is recommended to ensure that it is suitable for disposal as general waste. By conducting leachability tests on this waste stream AACO will mitigate any potential liabilities that may arise from the disposal of this waste stream.
- As a result of waste oil being classified as a regulated waste under the Queensland Environmental Protection Act, it is recommended that waste dockets confirming the appropriate collection and disposal of this waste stream be retained on site.
- Contamination investigations should be conducted on old fire training areas to assess the quality of the soil and groundwater.
- Interceptor traps should be regularly inspected to ensure that they are operating effectively, thus minimising the potential for surface water contamination.
- Documentation confirming the cleaning of interceptor traps and the appropriate disposal of interceptor trap residues should be retained on site, as a result of this waste stream being classified as a regulated waste under the Queensland Environmental Protection Act.
- Potentially contaminated creosote waste in the creosote washdown area should be disposed of as a hazardous waste, unless analytical results indicate otherwise.
- Regular checks should be conducted on the OR's grease trap to ensure that it is operating effectively, thus minimising the potential for water contamination.
- The grease trap located at the Officer's mess should be disconnected, as a result of it no longer being used.
- The septic tank located at the Officer's Mess Annex should be connected to the sewer system, if practicable, thus eliminating the requirement for the disposal of this waste stream.
- Documentation verifying the disposal of septic sludges should be retained on site.

- Batteries should be returned to the supplier for appropriate disposal and documentation verifying this disposal practice should be retained on site as a result of batteries being classified as a regulated waste under the Queensland Environmental Protection Act.
- Waste silver compounds generated in the dental surgeries are classed as a regulated waste under the Queensland Environmental Protection Act and therefore documentation verifying the appropriate disposal of this waste stream should be retained on site.
- AACO should obtain the appropriate trade waste permit for the grease trap, in accordance with the requirements of the Sewerage and Water Supply Act, 1949.
- Controls, including ensuring that construction trucks are washed in designated washdown areas, should be enforced to minimise the potential for stormwater contamination.
- It is recommended that a pollutant trap be installed on the stormwater system near re-fuelling area to prevent an accidental spill contaminating stormwaters.
- Water quality monitoring of the effluent from the demineralisation plant should be conducted to determine the type and level of potential contaminants. If contaminant levels are below sewer acceptance criteria, this waste stream should be discharged to the sewer system and the appropriate trade waste permit obtained. If testing results reveal that the water quality of this stream exceeds sewer discharge limits, then the implementation of a preliminary treatment system may be required before discharge to sewer.
- Wastewater discharges from interceptor traps, washbays and workshop areas should be directed to the sewer system, if practicable, in accordance with the requirements of the Sewerage and Water Supply Act, 1949 and the Environmental Protection Act.
- It is recommended that cleaning practices aimed at minimising the amount of wastewater generated, including the use of dry cleaning methods (ie sweeping and vacuuming) be implemented as opposed to hosing down workshop floors.
- Chemical and oil drums should be stored on drip trays or within bunded areas to minimise the potential for an accidental release of chemicals to the stormwater system.
- Hay bales implemented for sediment control in stormwater channels should be monitored on a regular basis to ensure that they are operating effectively.
- Wastes generated at Turkey Hill and Brymaroo should be either removed at time of generation by users or brought to Oakey for appropriate disposal.

Each of these recommendations has been prioritised and an estimated timeframe for completion and cost estimate has also been provided. This information has been summarised in Table 6.1 below. The prioritisation of these recommendations will enable AACO to effectively manage the recommendations suggested and will ensure that the most significant environmental issues are initially addressed.

Table 6.1 Summary of Recommendations

Serial Number	Issue	Recommendation	Cost Estimate	Timeframe for Completion	Appropriate Contract or and Contact Details	Priority
Oakey Base Waste Management Recommendations						
SOLID WASTE						
SOW-1	General Waste	Introduce waste minimisation strategies, including the recycling of bottles, glass, paper, cardboard and aluminium cans.	Potential cost savings	One Year	Busby EL & Busby Ph 321 003 Australian Paper Recycling Ph 331 331	Low
SOW-2		Develop and implement awareness programs aimed at educating staff about recycling programs.	\$4000 – Development and implementation of plans	One Year	Dames & Moore Ph (07) 3832 3222	Low
SOW-3	Medical Waste	Reduce the number of bins, or the frequency of collection of medical waste bins. This will potentially result in a reduction in waste disposal fees for this waste stream.	Potential cost savings	One Year	Internal	Low
SOW-4	Construction Waste	Develop and implement a waste management plan for construction wastes.	\$2000 – Development and Implementation of Plan	One Year	Dames & Moore (07) 3832 3222	Low
SOW-5		Review of building contracts to reflect appropriate waste management practices.	\$1000 – Review of contract conditions	One Year	Dames & Moore (07) 3832 3222	Low
SOW-6	Old Equipment and Planes	Leaking equipment should be stored on drip trays or within bunded areas to prevent potential contamination.	\$1500 for provision of bunding and spill control equipment	Six Months	Internal	Medium
SOW-7		Old planes and associated components should be removed from site, where practicable.	\$2000 – For co-ordination of removal of equipment	One Year	Internal	Low

Table 6.1 Summary of Recommendations

Serial Number	Issue	Recommendation	Cost Estimate	Timeframe for Completion	Appropriate Contract or and Contact Details	Priority
SOLID WASTE						
SOW-8	Toxic Waste Treatment Plant – Solid Sludge	Perform a leachate analysis on solid paint residue to ensure that disposal with general waste is an acceptable disposal method.	\$1500 – Cost likely to be incurred by Boyd & Keogh	Three Months	Boyd Keogh Ph(02) 9948 7730 ALS – Brisbane Ph (07) 3242 7222	High
LIQUID WASTE						
LIW-1	Waste Oils and Fuels	Retain appropriate waste documentation.	Not Applicable – Internal Cost	Six Months	Internal	Medium
LIW-2	Interceptor Residues	Procedures outlining regular maintenance and residue disposal should be developed	\$5000 or Internal Cost	Six Months	Internal or Dames & Moore (07) 3832 3222	Medium
LIW-3		Potentially contaminated creosote waste in the creosote washdown area should be disposed of as a hazardous waste, unless analytical results indicate otherwise.	\$2000 for disposal of waste	Three Months	Theiss Environmental Ph(07) 3288 7344	High
LIW-4	Grease Trap Residues	Develop and implement procedures for regular maintenance and inspections of grease trap.	\$1000	Six Months	Dames & Moore Ph (07) 3832 3222	Medium
LIW-5	Septic Tank Wastes	Connect to sewer system if practicable.	\$8,000	One Year	Plumber Or Internal	Low
LIW-6		Retain documentation verifying disposal of septic sludges on site	Not Applicable – Internal Cost	Six Months	Internal	Medium
HAZARDOUS WASTE						
HAW-1	Acid, Caustic & Solvents	NA	NA	NA	NA	NA
HAW-2	Batteries	Return batteries to supplier and retain waste documentation.	Not Applicable – Internal Cost	Six Months	Internal	Medium
HAW-3	Silver & Silver Compounds	Retain appropriate waste collection and disposal documentation	Not Applicable – Internal Cost	Six Months	Internal	Medium

Table 6.1 Summary of Recommendations

Serial Number	Issue	Recommendation	Cost Estimate	Timeframe for Completion	Appropriate Contract or and Contact Details	Priority
AIR DISCHARGES						
AIR-1	Incinerator	Decommission incinerator and dispose of confidential documents by shredding or external contractors.	Internal cost to decommission unit or for shredding. \$1000 for collection of documents	Three Months	Internal or Confidential Industries Ph 33 2940 (Disposal of confidential documents)	High
SEWER DISCHARGES						
SED-1	Wastewaters	Obtain appropriate trade waste permit from local council.	\$3000 – Preparation of application and associated fees	Six Months	Local Council	Medium
STORMWATER DISCHARGES						
STD-1	Stormwater Runoff	Periodic inspections of stormwater drains should be conducted and practices to minimize stormwater impacts, including bunding of chemicals should be implemented.	\$2000	Three Months	Internal	High
STD-2		Install a pollutant trap on stormwater system near re-fuelling area to prevent stormwater contamination.	\$5,000	Six Months	Multi Engineering Ph (07) 3274 1988	Medium
STD-3	Demineralisation Plant	Conduct wastewater sampling analysis on backwash generated from demineralisation plant	\$2,000	One Year	ALS Ph (07) 3243 7222	Low
STD-4	Washbays	Connect washbays to sewer system, if practicable, in accordance with local council requirements.	\$50,000	Six Months	Jondaryan Shire Council Ph 911 388 Plumber	High
STD-5	Workshop Drainage	Implement dry cleaning techniques at site.	Not Applicable – Internal Cost	Three Months	Internal	Medium
STD-6	Sediment Trap	Haybales should be regularly inspected and maintained to ensure that they are operating effectively	Not Applicable – Internal Cost	Three Months	Internal	Medium

Table 6.1 Summary of Recommendations

Serial Number	Issue	Recommendation	Cost Estimate	Timeframe for Completion	Appropriate Contract or and Contact Details	Priority
TURKEY HILL WASTE MANAGEMENT RECOMMENDATIONS						
THW-1	Maintenance Waste	Waste generated during maintenance activities should be removed from site and disposed of at Oakey or via another appropriate method.	Minimal	Immediately	Internal	Medium
BRYMAROO WASTE MANAGEMENT RECOMMENDATIONS						
BRW-1	Redundant materials	Drums of fuel, empty drums and tyres should be recycled or removed and disposed of.	\$2,000	Three Months	Internal	Medium

LIMITATIONS OF REPORT

We have prepared this report for the use of the Army Aviation Centre Oakey (AACO) in accordance with generally accepted consulting practice. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has not been prepared for the use by parties other than the client, the owner and their respective consulting advisors. It may not contain sufficient information for purposes of other parties or for other uses.

It is recommended that any plans and specifications prepared by others and relating to the content of this report or amendments to the original plans and specifications be reviewed by Dames & Moore to verify that the intent of our recommendations is properly reflected in the design.

APPENDIX A

Annual Waste Quantities

Other Notes:

Oakey Township and agricultural activities heavily reliant upon underwater groundwater sources

Sewerage system reported in 1996 to be at full capacity

Studies into the upgrading of Oakey water supply and treatment plant and waste disposal facilities to eliminate the possibility of waste contamination were underway in 1995

Contaminants and nutrients from the base facilities should not pass into the natural groundwater system either directly or via the storm (surface) water drainage system.

Other Information Required:

Kinhill 1991, Army Pollution Audit, Department of Defence, Canberra

Sinclair Knight 1994, Waste Management Strategy for Army in South East Queensland; Draft Report, Department of Defence, Bris.

- Stormwater Management Plans
- Sewage Drainage Plans
- List of Chemicals stored on site
- Copies of environmental licenses/permits/approvals/consents applicable to the sites operation
- Asbestos register
- Specific location details of UST's
- Specific location of Triple Interceptors
- Triple Interceptor Effluent Information (Volumes and cleaning procedures)
- More information is required on toxic and prescribed wastes
- Site Based map of on-site spoil areas
- Figure 11.1 Potential Contamination Buried stores Sites
- Collection areas of toxic and hazardous particulate matter for disposal under contract was not documented neither was the amount / type of substances collected

Limited information was available on Turkey Hill and Brymaroo

Waste Management Audit for Army Aviation Centre Oakey (AACO)

Waste

Waste Stream	Sources	Further Explanation	Current Disposal Methods	Disposal Company	Amount Generated	Our Recommendations	Recommendations to check if implemented
General Garbage	General Garbage collection sites: A4 - Dog Section A32 - Fuel Farm B35-Q Store B21- Mech. Shop B14 - Guard Room B2 - Workshops/ Stores B4 B10 - Fire Station B11 - Printing shop C1- store and canteen C2 C10 C28 C29 C33 B39 - Warehouse and Gym C20 C22 - Sheet Metal Hanger B40 - RAMS Maintenance School B34	<ul style="list-style-type: none"> • These general garbage disposal sites have been marked on the map • A4, B34 W/bin is collected three times a week • Guard room w/bin is collected twice weekly • B30, C1, B38, C47, A21 is collected daily • the larger bins are collected weekly • number of bins: w/bin = 13 1*4m = 16 1*2m = 3 1*1m = 4 1*3m = 4 2*4m = 3 wet bins = 17 	<ul style="list-style-type: none"> • Garbage contractors • Recycling of Aluminium cans and paper • Garbage grinders in Mess' 	J.J Richards & Sons	Average weekly waste quantities 96/97: Bulk containers - 202m ³ Mobile garbage Bins - 38.25 m ³	<ul style="list-style-type: none"> • Reduce the use of garbage grinders in the Mess' to reduce transfer of this waste to the wastewater system 	<ul style="list-style-type: none"> • Minimise waste generation and maximise recycling by implementing recycling systems and waste minimisation systems • Implement controls of what is deposited in the waste containers • Have facilities for collection of recyclable materials • Provide training in waste minimisation and recycling

B30 - Other Ranks Mess B36 B37 B38 B44 - APDS C41 C47 - Mess and Kitchen/Bar D1 - Ground Maintenance B46 B45 - HQ Building B42 - Common Room A21 - Officers Mess and Kitchen/Bar and Hoenhaus House Airport Terminal							
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Waste Stream	Sources	Further Explanation	Current Disposal Methods	Disposal Company	Amount Generated	Our Recommendations	Recommendations to check if implemented
Paper, Cardboard and Packaging	Potential Sites for the production of this waste stream are generally administrative areas A3 - Dog Admin A34 - Fuel Farm B6 - Fire Station B12 - HQ B14 - Guard House B20, B21 - Transport Office B26, B27 C6 C21 C26 C33		<ul style="list-style-type: none"> • Shredding of paper for landscaping • Reuse of computer paper for other purposes • Classified information is shredded and incinerated 		Said to be minimal (RAC, 1996)	<ul style="list-style-type: none"> • Continue current recycling practices • Provide paper recycling bins in all Administration areas • Recycle as apposed to incinerate classified shredded paper 	<ul style="list-style-type: none"> • Provide training and education toward waste paper minimisation and paper recycling

Waste Stream	Sources	Further Explanation	Current Disposal Methods	Disposal Company	Amount Generated	Our Recommendations	Recommendations to check if implemented
Waste Fuels	Waste fuel storage location: Fuel Farm Potential Sites for production of this waste stream: C29 B7 Tarmac A22, C27, C28, C30, C50 A33 B1, B2 C1, C8 C3, C4, C5 C7 C22 C61 Fire Training area	<ul style="list-style-type: none"> • Potential for waste fuel spills in carport areas • Potential for waste fuel storage tanks to be leaking • Potential for contaminated fuel used in the fire training area to contaminate soil and groundwater • Also see Site Contamination Table - 'Fire Training Area'. 	<ul style="list-style-type: none"> • Used in fire training area • Disposed of via other recycling establishments 	Oil and Fuel Salvaging, Eagle Farm	Approx 14,000 L removed 96/97	<ul style="list-style-type: none"> • Ensure all waste fuel is collected and stored for recycling • Ensure waste fuel storage tanks are frequently monitored and maintained • Ensure grease traps in stormwater systems are adequately maintained • Document all waste fuel disposal and recycling systems 	<ul style="list-style-type: none"> • Check to see that the field storage of oil and petroleum product containers has discontinued (Obj. 1 EMP, 1996) • Ensure fuel spill procedures are well known and implemented

Waste Stream	Sources	Further Explanation	Current Disposal Methods	Disposal Company	Amount Generated	Our Recommendations	Recommendations to check if implemented
Waste oils and other hydrocarbons	<p>Waste oil tank locations and quantities collected during 96/97:</p> <ul style="list-style-type: none"> • C2 = 10, 000L • Tarmac = 3000L • C29 = 2500L • C27(Transport Section)=4000L • Vehicle Maintenance Shop = 1350L <p>Potential Sites for production of this waste stream: B7 A32 Tarmac B1, B2 C1, C8 C3, C4, C5 C7 C22, C27, C28, C29 C30, C50 C37 C61, C2</p>	<ul style="list-style-type: none"> • Most waste oil is generated as a result of servicing of vehicles and equipment, however some oil is collected in oil separation units at vehicle wash points • Potential for oil spills in carport areas • Potential for waste oil storage tanks to be leaking • The waste oil operator is to provide the contract manager with dockets showing the quantities of oil removed counter signed by a unit manager 	<ul style="list-style-type: none"> • Collected in storage tanks for collection by recycling companies • Solvents in component cleaning facilities are replaced by contractors when required 	<p>Bateman Oil Recycling, Toowoomba and Oil and Fuel Salvaging, Eagle Farm</p>	<p>Approx 20,850 L removed 96 / 97</p>	<ul style="list-style-type: none"> • Ensure all waste oil is collected and stored for recycling • Ensure grease traps in stormwater systems are adequately maintained • The location of vehicle wash points should be identified • The location of oil separation units should be identified • Ensure waste oil storage tanks are frequently monitored and maintained • Document all waste oil disposal and recycling systems 	<ul style="list-style-type: none"> • Ensure oil spill procedures are well known and implemented

Waste Stream	Sources	Further Explanation	Current Disposal Methods	Disposal Company	Amount Generated	Our Recommendations	Recommendations to check if implemented
Toxic and Prescribed Wastes							
Triple Interceptor Effluent	Potential Sites for Triple Interceptors to be located (These sites were not documented in the ¹ EMP or RAC), C61 C1 C29 C30 C1, B3, C8, C22 C27, C28 C3, C4, C5 A32, A33	<ul style="list-style-type: none"> Required in areas to separate wash down and cleaning water of aircraft and vehicles Required in areas to separate oil and fuel spilled in the tarmac, carpark, oil and fuel storage areas and workshops areas 	<ul style="list-style-type: none"> Disposed of by contractor 	Not available	The amount of this waste generated was not sighted in the available documentation along with the frequency of cleaning and maintenance of interceptors.	<ul style="list-style-type: none"> Identify the location of these interceptors Ensure interceptors are frequently checked and maintained 	
Grease Trap Effluent	Grease traps are said to be located at: A21 Offices Mess Annex B30 Other Ranks Mess	.	Disposed of by contractor monthly or as required	Oakey Septics	90 000 L during 96/97	<ul style="list-style-type: none"> Ensure all grease traps are frequently checked and maintained Install a grease trap in B33 - the Kitchen/Dining area Install grease 	

¹ EMP - Environment Management Plan 'Sinclair Knight Merz' 1996
RAC - Resource Assessment Study 'Sinclair Knight Merz' 1996

						traps in the various canteens (B38, C42, C1) depending on what food is made available <ul style="list-style-type: none"> • Install grease traps at the Sergeants Mess (C47) 	
Septic Tank Cleaning Service	A21- Hoenhaus House		Disposed of by contractor	Oakey Septics	No data available		
Acids and Caustic Solution	Workshops: No specific data available				No data available		
Lead Compounds	Workshops: No specific data available				No data available		
Mercury Compounds	Workshops: No specific data available				No data available		
Paints, Sludges, Residues	Workshops Potential Sites for release of this waste stream: C10, C11, C12, C13		Contractors	Not available	The amount of this waste generated was not available in the available documentation.	<ul style="list-style-type: none"> • Document the disposal of this waste stream. 	
Reactive Demands	Workshops: No specific data available				No data available		
Silver and Silver Compounds	Workshops: No specific data available				No data available		

Waste Stream	Sources	Further Explanation	Current Disposal Methods	Disposal Company	Amount Generated	Our Recommendations	Recommendations to check if implemented
Residues from Water Treatment Plants	<ul style="list-style-type: none"> • Demineralisation Plants for helicopter wash down and cleaning and fire tanker storage water • Water Softeners for the Mess' and Vehicle Services Complex and other locations 		Stormwater system or sewer system		Data not available		
Portable Toilet Service	<ul style="list-style-type: none"> • Required to supplement permanent toilet facilities that become inoperable • May be required during courses and exercises 			17 portable toilets were contracted during 96/97			

Waste Stream	Sources	Further Explanation	Current Disposal Methods	Disposal Company	Amount Generated	Our Recommendations	Recommendations to check if implemented
Wastewater	Generated from both the normal domestic and industrial wastes		Oakey Sewage Treatment Plant under an agreement by Jondaryan Shire Council			<ul style="list-style-type: none"> Monitoring of wastewater quality and quantity should occur regularly (testing currently said to be minimal) 	<ul style="list-style-type: none"> Has the tradewaste agreement been formalised (the annual cost will be based on both conc. and vol. waste) Minimise level of industrial wastewater discharge to the sewer Eliminate potential toxic waste streams to the wastewater system
Medical / Dental Wastes	B36	<ul style="list-style-type: none"> soiled wound dressing syringes, needles, other sharps blood and blood products human tissue disposable gowns, gloves etc 	<ul style="list-style-type: none"> Linen - cleaned under contract Contaminated Waste - incinerated at Toowoomba Base Hospital Amalgam filings - recycled by supplier 	Carpenteria Transport Pty Ltd	150 kg/wk (50kg * 3) of general medical waste	<ul style="list-style-type: none"> Document and control disposal of medical wastes 	

Waste Stream	Sources	Further Explanation	Current Disposal Methods	Disposal Company	Amount Generated	Our Recommendations	Recommendations to check if implemented
Construction Materials			<ul style="list-style-type: none"> Removed by contractors for disposal off site or in on site spoil areas 		<ul style="list-style-type: none"> The amount of construction material disposed on site was not documented. The location of spoil areas was not documented 	<ul style="list-style-type: none"> Disposal of material on site should be documented Materials with potential to contaminate groundwater water or soil should be disposed of in adequately banded areas 	
Old vehicle and aircraft components		<ul style="list-style-type: none"> Source of contamination of both land and water 				<ul style="list-style-type: none"> Maintain documentation of all onsite waste disposal operations 	<ul style="list-style-type: none"> Remove all unnecessary vehicles and aircraft from the fire fighting area

Sanitary Napkin Disposal Units	Sites were Sanitary Napkin Disposal Units are located: B45 B8 - ATC/Fire Services B13 - Duty Room B36 - Medical /Dental C20 C26 - Transport A21 C47, B34, B38 B39, B37, D2 C41, A3, C43 C10, C1/C2 C29, B6 B12 B43 B11 B46 B26 B27 B14 - Canteen B3 B21 - Ground Support Group B25 - B35 - Maintenance Engineering Agency	Total of 49 Units	SDU's are serviced and containers are replaced once a month	Ladysan			
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Contaminated Sites:

Contaminated Site	Contaminates	Our Recommendations	Recommendations to check if implemented
Fire training area (West of Taxiway B north of Taxi Way Bravo)	<ul style="list-style-type: none"> • Temporary stockpiles of road base, 200 L fuel drums and bituminous materials with stockpiles open to natural surface water system • Spills of contaminated fuel from both drum storage and from the fire area itself • No systems to prevent contamination of surrounding soil • Burning of waste material (tyres etc.), however burning of waste material has now ceased 		<ul style="list-style-type: none"> • Redevelop the fire training facility and remediate the existing site (remove stockpiles) • Inspect area after each training session and where necessary remove any contaminated water from the site • Provide drainage bunds for the site • Have the stockpiles been removed to an off site land fill • Has the field storage of all chemical, oil, petroleum product containers been prohibited
Area surrounding the fire station (B9)	<ul style="list-style-type: none"> • Foam (from fire engine tanks) is often spilled onto pavement areas • Some foam and residue is also discharged to pavement areas during cleaning operations 	<ul style="list-style-type: none"> • Provide bunds around these paved areas to minimise groundwater and soil contamination 	
Spoil disposal areas	Listed as a contaminated site RAC pg 10 however specific information was not available	See construction materials	See construction materials

Contaminated Site	Contaminates	Our Recommendations	Recommendations to check if implemented
Old desalination tanks	Listed as a contaminated site, RAC pg. 10 however no further information was available		
Stormwater Drainage	<ul style="list-style-type: none"> Listed as a contaminated site in RAC pg. 10 however no stormwater drainage maps were sighted Possible contaminants can be found in Stormwater Emissions Table 	<ul style="list-style-type: none"> Survey and quantify all existing drains and grassed waterways with an up to date base map of existing infrastructure Regularly inspect drainage system to detect contamination 	<ul style="list-style-type: none"> Implement procedures to minimise the level of pollutants in stormwater flow by use of alternative disposal systems Monitor flow quality and environmental water quality to detect environmental harm
Buried stores, UXO's, equipment (batteries etc)	<ul style="list-style-type: none"> Records of bore water quality show high levels of heavy metals following rainfall Potential to contaminate groundwater system Currently the extent and location of buried materials is unknown and poorly documented 	<ul style="list-style-type: none"> Figure 11.1 - Potential Contamination Buried Stores Sites which details locations of potential buried stores was not sighted 	<ul style="list-style-type: none"> Investigate and determine the locations of buried equipment and determine the associated potential for contamination of the environment (inspect old records and photographs and carry out seismic surveys at likely burial sites) Based on these investigations remedial measures should be carried out as necessary
MAAF (Museum) (C41)	<ul style="list-style-type: none"> Listed as a contaminated site, RAC pg. 10 however no further information was not available .Possibly due 		

	to storage of old aircraft and vehicles		
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Contaminated Site	Contaminates	Our Recommendations	Recommendations to check if implemented
Vehicle and aircraft cleaning facilities	Wash-down water	<ul style="list-style-type: none"> • Ensure triple interceptor traps are adequately maintained • Carry out vehicle and aircraft cleaning and maintenance in bunded areas 	
Disposal areas of materials used in aircraft repair and maintenance	<ul style="list-style-type: none"> • Potential for the disposal of toxic or hazardous materials • Potential for contaminated stormwater runoff from such disposal sites 		<ul style="list-style-type: none"> • Investigate and determine the locations of disposal and determine the associated potential for contamination of the environment (inspect old records and photographs and carry out seismic surveys at likely disposal sites) • Based on these investigations remedial measures should be carried out as necessary • Maintain documentation of on-site waste disposal operations
Disposal of waste materials and equipment, including old aircraft, buildings and spare parts.	<ul style="list-style-type: none"> • Potential for contaminated stormwater runoff 		<ul style="list-style-type: none"> • Investigate and determine the associated potential for contamination of the environment • Based on these investigations remedial

			<p>measures should be carried out as necessary</p> <ul style="list-style-type: none"> • Maintain documentation of on-site waste disposal operations
Toxic and hazardous goods storage areas	<ul style="list-style-type: none"> • Spillage of toxic or hazardous substances • Disposals systems are in place however these may not be adequate 	<ul style="list-style-type: none"> • Storage areas should be frequently checked • Spill clean up procedures should be implemented 	
Chemical Sprays	<ul style="list-style-type: none"> • No investigations have been carried out to determine the past use of chemical sprays 		<ul style="list-style-type: none"> • Determine the past use of chemicals and their environmental effects
Area surrounding the vehicle fuelling facility and aircraft fuelling facility (at the Northern end of the apron area)	fuel and oil	<ul style="list-style-type: none"> • Provide and maintain interceptor traps 	<ul style="list-style-type: none"> • Reduce extent of spillage areas by installing spill stations in all aircraft and vehicle service areas • Provision of adequate fuel and oil spill clean up procedures • Remediate contamination caused by spillage
Old POL (Petroleum, Oils and Lubricants) Building (B7)	fuel, oil and lubricants		<ul style="list-style-type: none"> • Remediate contamination caused by spillage

Contaminated Site	Contaminates	Our Recommendations	Recommendations to check if implemented
POL storage spills	fuel, oil and lubricants		<ul style="list-style-type: none"> • Provision of adequate fuel and oil storage systems • Provision of adequate fuel and oil spill clean up procedures
Underground fuel and waste oil tanks		<ul style="list-style-type: none"> • Ensure that the UST's are maintained in a manner that either reduces the potential to leak or if a leak does occur it is identified and corrected 	<ul style="list-style-type: none"> • Provision of adequate waste fuel and oil storage systems • Provision of adequate waste fuel and oil spill clean up procedures • Remediate contamination caused by spillage
Fuel farm (A32, A33)	<ul style="list-style-type: none"> • Fuel and oil spillage's from fuel storage facilities (tanks, drums) and transport • Fuel tank facilities and fuel tanker parking areas are bunded however some old tanks and drums are not stored in bunded areas and there is evidence of contamination in some areas due to spillage of fuel and oils 		<ul style="list-style-type: none"> • Provision of adequate fuel and oil storage systems • Provision of adequate fuel and oil spill clean up procedures • Remediate contamination caused by spillage

