REMEDIAL ACTION PLAN
(RAP)

88 Homebush Road, STRATHFIELD

STRATHFIELD COUNCIL
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1. **INTRODUCTION**

1.1 **General**

EnviroTech Pty. Ltd. was engaged by Sabton and Son to develop this Remediation Action Plan (RAP) for the remediation of contaminated soils at 88 Homebush Road, Strathfield (hereafter referred to as the site). The investigation was conducted in consideration of a proposed development including, proposed demolition of an existing residence and construction of a boarding home facility and follows from recommendations made in previous contamination assessments conducted by Envirotech 2017. The total area is approximately 719 m² (Figure 1).

The remediation strategy described in this RAP has primarily been established based on the findings of a contamination investigations conducted at the site by Envirotech Pty Ltd in June and October 2017.

This RAP outlines procedures for the remediation of the site to a condition suitable for the proposed development. The RAP also provides guidance on how the remedial strategy is to be implemented during construction and relevant occupational and environmental controls to be adopted. The principal objective of this plan was to outline the management techniques and safeguards that should be implemented to ensure the remediation and development are completed in an acceptable manner, preventing any adverse exposure on site contractors and the surrounding environment.

1.2 **Objectives**

The objectives of the investigation were to:

- Set remediation goals that ensure the remediated site will be suitable for the proposed use and will pose no unacceptable risk to the human health or the environment;
- Document the procedures and plans to be implemented to reduce the risk of significant harm to acceptable levels;
- Establish the environmental safeguards required in completing the remediation in an environmentally acceptable manner; and,
- Identify necessary approvals and licenses required by regulatory authorities if required.
The Scope of Work included the following:

- A review of previous investigations and summary of the sites contamination status;
- Details of the preferred remediation strategy, and an outline of the methodology for the implementation of the selected strategy;
- A brief outline of environmental pollution control, community health and safety, and occupational health and safety measures that should be implemented during remedial works; and
- An outline of regulatory approvals and licenses which may be required to adopt the preferred remedial strategy.
### 1.4 Legislative Requirements

The investigation was conducted in accordance with:

- *Guidelines for Consultants Reporting on Contaminated Sites* (NSW EPA, 2000);
- *Assessment of Site Contamination, National Environment Protection Measure* (NEPC, 2013);
- Contaminated Land Management Act (1997), NSW Government, Sydney;
- *Managing Land Contamination: Planning Guidelines, SEPP 55: Remediation of Land* (Department of Urban Affairs and Planning, 1998);
- *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme, 2nd Edition* (NSW EPA, 2006);
- *Waste Classification Guidelines Part 1: Classifying Waste* (DECC, 2009);
- *Guidelines for the Assessment and Management of Groundwater Contamination* (NSW DEC, 2007);
- *Contaminated Sites: Assessing Service Station Sites* (NSW EPA, 1994); and

### 1.5 Proposed Development

The investigation was conducted as part of a development including, proposed demolition of an existing residence and construction of a boarding home facility (Plans provided in Appendix A). The development scenario is therefore consistent with Column A ‘Residential’ in the NEPM 2013.
2. **Contamination Status**

The following reports were prepared specifically for the proposed works and are the principal documents used in the preparation of this RAP:

- Phase 1 Preliminary Environmental Site Assessment, Reference 4894 17, dated 13/06/2017, Envirotech Pty Ltd.

- Phase 2 Environmental Site Assessment, Reference 5391 17, dated 17/10/2017, Envirotech Pty Ltd.

Based on the findings from these investigations lead and Benzo a pyrene was detected resulting in exceedance of the adopted health criterion in soil samples collected across the site.

The preliminary site assessment focused on soil surface samples whilst the phase 2 assessment focused on soils at a greater depth. This was done to attempt to delineate the soil contamination from topsoil’s through to subsoils.

2.1 **Soil Analytical Results**

The analytical investigation of the soil samples showed that contaminants in the following samples exceeded the adopted Site Assessment Criteria for Residential A land use;

- **Phase 1 PSI** - Concentrations of lead and benzo(a)pyrene exceeded the adopted human health assessment criteria in all four (4) representative soil samples. All remaining analyte concentrations were reported to be below the adopted human health assessment criteria for residential land use.

- **Phase 2 ESA** - The soil samples analysed indicated that concentrations of lead and benzo(a)pyrene exceeded the adopted human health assessment criteria in four (4) of the five (5) samples taken at depth. Concentrations of lead, total PAH, TRH F3 and benzo(a)pyrene exceeded the adopted human health assessment criteria in the one surface sample undertaken.
3. **Remediation Options**

3.1 **Overview**

With regard to site remediation, the Environment Protection Authority (EPA) endorses the Policy of the 1992 Australian and New Zealand Environment and Conservation Council (ANZECC) and National Health and Medical Research Council (NHMRC) Guidelines for the Assessment and Management of Contaminated Sites. Furthermore, the threshold concentrations presented in the NSW DECC Second Edition 2006 Guidelines for the NSW Site Auditor Scheme and the National Environment Protection (Assessment of Site Contamination) Measure 2013 (NEPM) are considered as appropriate soil and groundwater clean-up criteria.

For groundwater, the ANZECC 2000 Guidelines for Fresh and Marine Water Quality have been generally accepted by the NSW EPA as appropriate investigation levels along with criteria outlined in the National Environment Protection (Assessment of Site Contamination) Measure 2013. The NSW EPA Service Station Guidelines also provide reference guidelines. In addition, the NSW EPA 2009 Waste Classification Guidelines have been used as the basis of technical review for the waste disposal options most applicable to the site.

A risk management approach has provided the basic principle of the remediation technologies/methods selected for the Site. This approach is consistent with the strategy outlined in the Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC, 1992) and the National Environment Protection (Assessment of Site Contamination) Measure 2013, which are endorsed by NSW EPA.

A contaminated site, as defined by the NEPM 2013 and the ANZECC 1992, is a site at which hazardous substances occur at concentrations above background levels, and where assessment indicates it poses, or is likely to pose, an immediate or long term hazard to human health or the environment.

Wherever human health is at risk, either on or off-site, or the off-site environment is at risk, a contaminated site should be remediated to the extent necessary in order to minimise such risks in both the short and long terms.

Environmental and Human Health Risk is based on exposure to potential hazards and is defined as:

\[
\text{Risk} = \text{Hazard} \times \text{Exposure}
\]

The elimination of the risk can be achieved by the removal of the hazard and/or the exposure pathway. Remediation is defined as any measure that removes the risk to an acceptable level by negating the hazard or exposure pathway. Therefore, remediation can involve removal of the hazard (i.e. no risk remains) or alternatively, management of the risk by removal of the exposure pathway even if the hazard remains. Exposure pathways to contaminated material can be managed by undertaking a physical action (e.g. erection of a fence, installation of cap, etc.) and/or a management plan, which prevents exposure to contaminants (e.g. use of planning controls, management of site activities etc.).
3.2 Typical Remedial Options Available

Several remedial options were reviewed. The suitability of the remedial options was examined with respect to the requirements of the proposed development, whilst taking into account the provisions of a number of relevant guideline documents, including:


Typical remedial options that may achieve the remedial objectives are identified as:

- Removal of contaminated material to landfill;

- Encapsulation of the contaminated soils by a physical barrier system; or

- On-site treatment and re-use of contaminated material.

3.3 Selection of Preferred Remediation Strategy

Based on an assessment of the options and considering the proposed land-uses and development, the remediation option adopted for the site is excavation to offsite.

- Excavation Offsite

The excavation to offsite is considered the most appropriate remedial strategy for the development area. Off-site disposal of contaminated soil is considered a suitable option for managing human health and environmental impacts from the contaminated materials. Off-site disposal harnesses the excavation of soil, classification of spoil, and disposal to a facility which can legally receive it.
4. **SELECTION OF PREFERRED REMEDIATION STRATEGY**

4.1 **Evaluation of Remediation Options**

A summary of the hierarchical policy for site remediation options (Guidelines for the NSW Site Auditors Scheme NSW DEC 2006) is as follows:

1. On-site treatment of the soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level
2. Off-site treatment of excavated soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site
3. Removal of contaminated soil to an approved site or facility, followed where necessary by replacement with clean fill
4. Consolidation and isolation of the soil on site by containment within a properly designed barrier.

An evaluation of remedial options was considered as follows:

- **Do nothing** – Whereby no remediation is undertaken and impacted soil remains on site. Given the sensitive nature of the proposed development, including residential and commercial uses, this option is not considered suitable;

- **On-site containment** – Given that this option will result in the site recorded on the Register of Contaminated Sites under section 21(A) of the Environmental Protection Act 1997, it is the least preferred option in the hierarchy of remediation options as outlined above. Also the soil is to be excavated for the basement area which doesn’t make containment onsite feasible; and

- **Excavation to offsite** – This remedial strategy involves the complete removal of impacted soil from the site for disposal at an appropriately licensed waste management facility. The advantage of this strategy is that it removes the contaminants and their associated problems from the site. The disadvantage is that it is typically more costly than on-site containment and off-site transport of contaminated soil increases the risk of exposure within the surrounding community.

4.2 **Preferred Remediation Option**

Based on an assessment of the options and considering the proposed land-uses and development, the remediation option adopted for the site is excavation to offsite.

**Excavation Offsite**

The proposed development is to include basement car parking which is within the area were soil contamination was found. The excavation to offsite is considered to be the most appropriate remedial strategy for the development area. The soils even without the contamination were to be excavated and disposed offsite. Off-site disposal of contaminated soil is considered a suitable option for managing human health and environmental impacts from the contaminated materials.
Off-site disposal harnesses the excavation of soil, classification of spoil, and disposal to a facility which can legally receive it.

The EPA permits disposal of contaminated material subject to an approved landfill. The DECC Waste Classification Guidelines (2009) document sets out the methodology for assessing and classifying wastes to be disposed to landfill. Essentially, wastes are classified into General Solid (Non-putrescible), General Solid (Putrescible), General Solid – Special Waste Asbestos, General Solid – Restricted Waste and Hazardous Waste.

The selection of an appropriate landfill will normally depend largely upon the results of classification of the wastes. It is sometimes necessary for heavily contaminated soils to be pretreated prior to disposal, to reduce the concentrations or minimise the mobility of the contaminants. Special criteria are sometimes applicable to certain categories of waste. Contaminants covered by Chemical Control Orders have restrictions placed on their handling and disposal.

5. **IMPLEMENTATION OF SELECTED REMEDIAL STRATEGY**

5.1 **Roles and Responsibilities**

   - Principal and Principals Representative

   The Principal, Chris Suh, is responsible for the environmental performance of the proposed remediation works, including implementation of acceptable environmental controls.

   - Principal Contractor and Site Manager

   The Principal Contractor (referred to herein as the Contractor) is anticipated to be the party responsible for the day-to-day implementation of this RAP and shall fulfil the responsibilities of the Principal Contractor as defined by SafeWork NSW.

5.2 **Remediation Process**

1. Once demolition of the existing residence has been undertaken by suitably licensed removalists;

2. All existing general waste on the site is to be removed and disposed as General Solid Waste including asphalt at a suitably licensed waste disposal facility (tickets retained for proof);

3. Wherever possible non-hazardous materials should be recycled;

4. Soil contamination identified on the site should be scraped and excavated typically to and 1,000 mm laterally beyond the impacted area by licensed contractors. Onsite treatment of the soils may be needed before disposed offsite;

5. The scraped soil surface should be visibly clean residual clay (no remaining fill);

6. Fill materials should be removed from site by licensed contractors. Unless tested and proven otherwise, the material will be disposed at a licensed facility as potentially Hazardous Waste (tickets retained for proof);

7. If the material is transported interstate it must be tracked and monitored using a NSW EPA approved tracking waste system;
5.3 Occupational Health and Safety (OHS):

- All transport of waste and disposal of materials must be conducted in accordance with the requirements of the POEO Act;
- Removal of waste materials from the site shall only be carried out by suitably licensed contractors holding consent and/or approvals to dispose of the waste materials per the assigned waste classification;
- Hazardous building materials and asbestos containing soils are to be safely disposed at a facility licensed to receive such waste with receipts retained for proof of safe and appropriate disposal.

5.4 Validation Goals/Implementation

- The validation goals are to have no contaminated soils remaining on the site;
- A validation certificate must be provided by a suitably qualified occupational hygienist, environmental scientist or equivalent person;
- Validation will involve a validation soil sampling and laboratory analysis regime as per follows
  - At least 6 sample from the base of the excavated area, additional discretionary samples if necessary;
- Each validation samples retrieved will be analysed for the contaminates of concern, these being lead and benzoapyrene.

6. ENVIRONMENTAL MANAGEMENT PLAN

6.1 Introduction

A major component of the remedial works shall involve the installation and maintenance of an Environmental Management Plan (EMP). The EMP will provide details of the environmental protection and pollution control measures to be implemented during the operational phase of the remedial works. The pollution control measures have the objective of removing/minimizing any adverse impact on the surrounding environment.

In the following sections, outlines have been presented of the various pollution control measures that would be implemented during most elements of the remedial works. These form the basis of the Environmental Management Plan that should be read in conjunction with this document.

6.2 Site Fencing

Reasonable measures need to be taken to ensure the site boundary remains secure during all remedial site works. Secure temporary fencing is required to be in place for the duration of site works with gates secured and locked outside of site operating hours to prevent unauthorized access.
6.3 Erosion Sediment Control Plan

An erosion and sediment control plan will be prepared for the site. Erosion and run-off control measures will be implemented during all elements of remedial works. Typically, these measures will be designed to prevent the transport of pollutants (including sediments) out of the remediation area (including the designated stockpile areas) via surface run-off. Such measures typically include:

- Minimizing disturbed areas;
- Sediment control fencing;
- Stabilized site access points;
- Strict excavation times tables; and
- Prompt rehabilitation of disturbed areas.

6.4 Dust Control Plan

Dust generation should be kept to that absolute minimum. Dust control measures will be implemented to ensure that dust generated from the site is controlled within acceptable levels. These control measures will be developed considering the site conditions in each remediation area, and are likely to include (but not necessarily be limited) to the following:

- All vehicles leaving the site will be hosed down to remove any potentially contaminated dust;
- A water cart or equivalent will be utilized on-site to keep vehicle paths and areas of site work damp to minimise dust generation;
- Access to water sprays shall be available to water down excavation / loading areas;
- Plastic sheeting shall be available to cover excavation faces and stockpiles.

6.5 Health and Safety

A Work Health and Safety (WHS) plan is an essential part of all remediation projects, to ensure the health and safety of all personnel working on or visiting the site. All remediation work would be undertaken in accordance with the provisions set out by the Work Health and Safety Act (2011) and associated Regulations 2011, and any other regulations or directions set out by regulatory authorities.

- Prior to commencing any remediation works, a specific WHS Plan would be prepared by the Remediation Contractor covering the following minimum aspects:
  - Method statements;
  - Identification of the remediation area and exclusion zones;
  - Induction of personnel;
  - Personal protective equipment (PPE);
  - Hazard identification / locations;
- Identification of contaminants of concern and their physical and toxicological properties;
- Description of exposure pathways and personal protection requirements;
- Location of all underground/aboveground services;
- Details of specific work practice procedures to be followed within the designated contaminated areas;
- Monitoring protocols to identify a potentially hazardous practice;
- Emergency information; and,
- Incident reporting.

### 6.6 Onsite Stockpiles

Stockpiles should be managed to minimise the risk of dust generation, erosion and leaching. The measures required to achieve this will depend on the materials in the stockpile and the length of time the stockpile is to remain on site, but should include:

- Restrict the height of stockpiles to reduce dust generation;
- Construct erosion, sediment and runoff control measures;
- Cover stockpiles of contaminated soils to be left on site no more than 24 hours;
- Keep temporary stockpiles moist, by using water spray where required.
7. **CONCLUSION**

The Site can be made suitable for the intended land-use through remedial action as part of the redevelopment works in accordance with State Environmental Planning Policy No.55 Managing Land Contamination: Planning Guidelines SEPP 55.

In conclusion, the RAP:

- Has been developed in a manner consistent with current industry practice;
- Has selected a preferred remediation strategy based on the site-specific issues and currently available technologies that will allow the site to be made suitable for the intended land use;
- Has presented an outline of the Environmental Management Plan (EMP) and associated contingency plans to ensure the environment is appropriately protected during the proposed works;
- Has presented an information and consultation program to ensure the stakeholders are informed of the works as they proceed; and,
- Has outlined the means of validation of the completed works and ongoing management.
8. REFERENCES

- **Australian and New Zealand Guidelines for the Management of Contaminated Sites, 1992, Australian and New Zealand Environment and Conservation Council and National Health and Medical Research Council (ANZECC/NHMRC 1992).**

- **Contaminated Sites: Sampling Design Guidelines 1995, NSW Environment Protection Authority (NSW EPA 1995).**

- **Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites, 2011, NSW Environment Protection Authority (NSW EPA 2011).**

- **Contaminated Sites: Guidelines for the NSW Site Auditor Scheme, 2nd Edition, 2006.**

- **Contaminated Sites: Guidelines for the Assessment and Management of Groundwater Contamination (NSW DEC 2007).**

- **Guidelines for the Assessment, Remediation and Management of Asbestos: Contaminated Sites in Western Australia, May 2009.**

- **National Environment Protection (Assessment of Site Contamination) Measure 2013 (NEPM).**

- **Contaminated Land Management Act (1997), NSW Government, Sydney, NSW.**

- **Waste Classification Guidelines, NSW DECCW 2009**

9. LIMITATIONS

The information contained within this report have been prepared exclusively for the client. Envirotech has carried out the investigation with a degree of care and skill ordinarily exercised in similar investigations by reputable members of the environmental industry in Australia. No other warranty, expressed or implied, is made or intended. This report is to be read in its entirety including attachments and appendixes and should not read in individual sections.

A third party should not rely upon the information prior to making an assessment that the scope of work conducted meets their specific needs. Envirotech cannot be held liable for third party reliance on this document.

The sub-surface environment can vary greatly across an individual site. The conclusions presented in this report are based on limited investigation of conditions at specific sampling locations chosen to be as representative as possible under the given circumstances. However, it is possible that this investigation may not have encountered all areas of contamination at the site due to the limited sampling and testing program undertaken.

Envirotech’s professional opinions are based upon its professional judgment, experience, training and results from analytical data. In some cases further testing and analysis may be required, thus producing different results and/or opinions. Envirotech has limited its investigation to the scope agreed upon with its client.
APPENDIX A: DEVELOPMENT PLANS