DEVINE BELMONT ESTATES PTY LIMITED

DECONTAMINATION

s78B(2) - Personal Informatio

PROPERTY

RTI DL RELEASE - EHP

HOI0070
MAY 1990

HOLLINGSWORTH DAMES & MOORE

135 Wickham Terrace
Brisbane Qld 4004
Australia
Ph: (07) 832 3222

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
2.0	SCOPE OF WORK	2
3.0	INITIAL INVESTIGATION	3
3.1	Site Decription	3
3.2	Site History	4
3.3	Facility Description	4
3.4	Materials/Chemical Inventory	5
3.5	Underground Storage Tanks	6
3.6	Drainage	6
3.7	Geology & Hydrogeology	6
4.0	FIELD WORK	7
4.1	Preliminary	7
5.0	CHEMICAL ANALYSIS AND QUALITY ASSURANCE	10
6.0	ANALYTICAL RESULTS	12
6.1	Arsenic in Soil	12
7.0	ARSENIC – ACCEPTABLE LEVELS	15
7.1	Toxicology	15
7.2	Soil Contamination	16
8.0	REMEDIATION	19

LIST OF TABLES

		Page
TABLE 1	Supply of Arsenic to Property 1986 to 1989	5

RTI DL RELEASE - EHP

EXECUTIVE SUMMARY

PURPOSE

This report has been prepared to determine the extent of contamination and to identify suitable clean-up remediation options for properties bordered by Cribb Rd, Scrub Rd and Bulimba Creek at Belmont and bordering Tones Rd and Bulimba Creek at Mt Gravatt East. The three properties (identified as Sections B C and D in Figure 1) are currently owned by s78 s78B(2) - Personal Information

CONCLUSION

A portion of Section B was determined to be contaminated with arsenic. Removal of the arsenic contaminated material is both economical and practicable.

INTRODUCTION

The report describes an investigation carried out by Hollingsworth Dames & Moore on the properties (designated Sections B, C and D) owned by the s78B(2) - Pe family at the corner of Cribb and Scrub Roads, Belmont. The properties are described as follows:

Section B: Lot 2 on RP 33402 and Lot 298 on S312H
(Original Portions 297 & 298)
Parish of Tingalpa
County of Stanley

Section C: Lot 308 on S3124
(Original Portion 308)
Parish of Tingalpa
County of Stanley

Section D: Lot 2 on RP 107694, Lots 6-10, 12 and 13
on RP 13387 and Lot 511 on M33104
(Original Portions IV and 268)
Parish of Bulimba
County of Stanley

INVESTIGATION

The investigation was conducted to assess the presence of contamination, particularly arsenic, and to determine an effective clean up/remediation strategy. The specification of clean up/remediation details and procedures, supervision of clean up/remediation, and validation were outside the scope of this investigation.

RTI DL RELEASE - EHP

A portion of the property (Section B in Figure 1) was known to have been used for treating both cattle and sheep hides. Contamination of the property by arsenic was suspected. The areal extent and depth of any contamination was not known.

Preliminary investigations, comprising a property history and field survey, were carried out on all three Sections of the property to determine if contamination was likely to be present. Laboratory testing including analyses for heavy metal, pesticides and hydrocarbons was also undertaken.

On Section B were sheds and ponds which were known to have been used in the treatment of both cattle and sheep hides. The sheds have been removed and agreement has been reached with the Brisbane City Council to empty the ponds into the Bulimba Creek sewerage main.

The preliminary investigations concluded that parts of Section B were contaminated with arsenic. No contamination was found on Sections C and D.

DETAILED SURVEY

To determine the extent of contamination on Section B a more detailed survey, comprising a historical review of operating practices and comprehensive field sampling and testing of soil and water, were carried out. This work followed protocols and procedures developed by Hollingsworth Dames & Moore and used successfully at other sites.

Background levels of arsenic of 1 mg/kg to 15 mg/kg were present in the sandy soil of the floodplain and up to 10 mg/kg in the clayey topsoil of the property. A review of International and other Australian state standards and guidelines was undertaken. This review of recognised acceptance criteria indicated that a clean-up level of 50 mg/kg of arsenic would be conservative. Adoption of the clean-up level of 50 mg/kg enabled delineation of areas requiring remediation.

From the investigations, arsenic contamination was located over some 4 hectares. Samples taken over varying depths revealed that arsenic contamination tended to be confined to the top 100 mm to 200 mm of the soil profile. Areas where there was surface runoff tended to be contaminated to a greater depth indicating that the arsenic may have been deposited with eroded and deposited sediment. In these runoff areas it will be necessary to treat/remove the top 500 mm of soil.

The total amount of soil to be treated/removed has been estimated at 15,000 m^3. The average concentration of arsenic in the soil to be treated/removed is approximately 80 mg/kg. Leachability tests conducted on the soil revealed that the leachate concentrations were generally less than 0.1 mg/l except for samples representing isolated areas containing high levels of arsenic. However as these areas are relatively small it is considered that they would have little impact in the average concentration of arsenic in the leachate which would be less than 0.1 mg/l.

The presence of other heavy metals, pesticides and petroleum was investigated.

Only minor surface contamination from fuel oil was present. As this surface contamination is within the envelope of arsenic contamination, this material requires no special consideration as it will be treated/removed with the arsenic contaminated soil.

RTI DE RELEASE-EHP

REMEDIATION

Treatment, disposal on-site and removal off-site were considered.

Several methods were considered to ensure that public contact with arsenic contaminated soil did not occur. On-site methods included burial in the large pond, burial in a clay envelop in a park, burial under a roadway, or burial in an area of the development where rainfall would not penetrate and which could not be accessed by the public. The options for on-site disposal had serious disadvantages.

- leaching may occur by ingress of rain or perched groundwater;
- human contact could occur in the future from construction or servicing activities.
- public knowledge of arsenic located in close proximity to residential development may cause public concern;

One on-site option was considered;

150000 m³

(i) relocation of material to Section D for use as fill (above flood and natural surface level) in parkland or commercial areas;

Given the engineering costs and the potential for public concern, off-site disposal was considered the preferred option.

Four off-site options were considered;

(ii) disposal as night cover on a Brisbane City Council refuse tip;

(iii) disposal as cover at the Willawong Waste Disposal Facility;

(iv) disposal in a cell in a municipal refuse tip;

(v) disposal of 6,000 m³ in the embankment of the Bulimba Creek overpass (Ref. Main Roads Contract of 2nd May 1990) with the balance disposed using options above.

Given the requirement to have a clean-up satisfactory to the public, removal of all contaminated material from the site was regarded as the preferable option.

All four off-site options and one on-site option provide a cost effective solution to the disposal of contaminated soil from the s78B(2) - P property at Belmont.

RTI DL RELEASE - EHP

R. WILLIAMS
Manager, Hazardous Waste Services

HOI0070
RW/DW/nl
21 May 1990

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
2.0	SCOPE OF WORK	2
3.0	INITIAL INVESTIGATION	3
3.1	Site Decription	3
3.2	Site History	4
3.3	Facility Description	4
3.4	Materials/Chemical Inventory	5
3.5	Underground Storage Tanks	6
3.6	Drainage	6
3.7	Geology & Hydrogeology	6
4.0	FIELD WORK	7
4.1	Preliminary	7
5.0	CHEMICAL ANALYSIS AND QUALITY ASSURANCE	10
6.0	ANALYTICAL RESULTS	12
6.1	Arsenic in Soil	12
7.0	ARSENIC – ACCEPTABLE LEVELS	15
7.1	Toxicology	15
7.2	Soil Contamination	16
8.0	REMEDIATION	19

LIST OF TABLES

		Page
TABLE 1	Supply of Arsenic to Property 1986 to 1989	5

RTI DL RELEASE - EHP

1.0 INTRODUCTION

Hollingsworth Dames & Moore was engaged by Devine Belmont Estates Pty Ltd on 14 March 1990 to undertake an assessment of the arsenic contamination and the determination of an effective clean-up/remediation strategy, s78B(2) - Personal Information property at Belmont.

A contaminated site can be broadly defined as one where contaminants (usually chemicals) are in existence of levels which exceed background levels for the site or above levels normally found in nature.

Contamination of soil will limit current and future uses of land.

The presence of some contaminants can pose immediate or long term threats to public health, to public amenity and to the environment. The problems and risks vary from site to site, both in nature and importance.

Threats to health and the environment can occur via a number of routes including pollution of surface and groundwater, ingestion of soil directly by children or animals and uptake of chemicals by plants and subsequent bioaccumulation in animals, including humans.

Contamination can occur as a result of industrial, agricultural and commercial activities. These include disposal of waste, accidental spillage or leakage during plant operation, storage or transportation of wastes, chemicals or finished products, deposition from the atmosphere near an industrial site, and the deliberate application of chemicals eg. pesticides.

Any industrial site has the potential to be contaminated, but some activities pose an inherently higher probability of being contaminated than others. Where the possibility of contamination constitutes a health hazard with regard to the current or intended use of the land, the nature and extent of contamination requires investigation.

The s78B(2) - Pe property at Belmont is a site where a compound of arsenic has been put to use as an insecticide by spraying onto animal hides. This was carried out over a number of years in sheds occupying hundreds of square metres. As this activity will have caused some degree of soil contamination, an assessment is required before the land may be rezoned for residential use.

RTI DL RELEASE - EHP

2.0 SCOPE OF WORK

The scope of this investigation consisted of the following:

- Initial investigation
- Primary soil sampling and analysis
- Quantification of contaminated areas
- Assessment of remediation options

RTI DL RELEASE - EHP

3.0 INITIAL INVESTIGATION

3.1 Site Decription

The s78B(2) - Pe property covers approximately 41 hectares bordering on Cribb Road and Scrub Road, Belmont, Brisbane. A map showing the property divided into Sections B, C and D as well as neighbouring roads can be seen in Figure 1.

Real Property Descriptions are as follows:

Section B: Lot 2 on RP 33402 and Lot 298 on S312H
(Original Portions 297 & 298)
Parish of Tingalpa
County of Stanley

Section C: Lot 308 on S3124
(Original Portion 308)
Parish of Tingalpa
County of Stanley

Section D: Lot 2 on RP 107694, Lots 6–10,
12 and 13 on RP 13387 and Lot 511 on M33104
(Original Portions IV and 268)
Parish of Bulimba
County of Stanley

The property is located in rural surroundings, the neighbouring properties being used for wool scouring. A portion of the property, Section B, was formerly used by the s78B(2) - P family to dry sheep skins, cure cattle hides and store tallow. In September 1989 all machinery was sold and the land leased to Winrose Skins (Export) Pty Ltd.

The land in the proximity of the house and sheds slopes gently, but to the South of the sheds it falls steeply away to Bulimba Creek. Six small ponds and one large brine pond are located on the steeply sloping area.

Section C was reported to be virgin scrub, but some trees have been removed. Parts of Section D were originally cleared for sand mining and now comprises some swamp areas where water has flooded the pits.

RTI DE RELEASE - EHP

3.2 Site History

The s78B(2) - Pe property was owned previously by Cribb and Foote. The land was used for crops and grazing. In 1943 s78B(2) - Personal Informa bought the property for the sand and gravel which was available. Sand was mined on parts of Section D into the 1970's. In 1954 sheep skin drying was established on Section B and more recently cattle hide curing and transfer of tallow. In September, 1989 Winrose Skins (Export) Pty Ltd bought the machinery and leased the site, and processed skins until January, 1990. In addition to the above activities the s78B(2) - Perso cropped some vegetables over the years in the vicinity of the house.

Water for domestic purposes has come from rainwater tanks and a well near the corner of Scrub and Cribb Roads. A deep bore is located near the hide sheds but has not been used because of its high iron content.

The s78B(2) - Pe curing operations have been regularly inspected by Brisbane City Council and Queensland Health Department (approximately every 4–6 weeks).

3.3 Facility Description

The process of drying the sheep skins is illustrated in Figure C1. Arzene (a water based insecticide containing a soluble compound of arsenic) was sprayed on the sheep skins as they were being dried to prevent flies and maggots infesting the fleece. Arzene was brought onto the property in 200 L drums and more recently in 20 L plastic containers. One litre of this liquid would be mixed with 200 L of water and the solution applied with back–pack sprays. Only one drum of Arzene was brought onto the property at a time and was kept in a small shed. Recent practice has been for the drum to be removed by Cleanaway or used to support racks on which the skins were dried, until it was too rusty. Skins were either dried inside the sheds or outside on racks, depending on the weather. At peak operation up to 50 people were employed, but usually an average of 25.

Since about 1974 cattle hides have been cured on the property. The process of curing is illustrated in Figure C2. During 1988 and 1989 tallow has also been stored on the property (Figure C3). Both cow hides and tallow were transported off and on the property by Dalgety Australia. Some sheep skins were also transported by Dalgety Australia, but the majority arrived through contracts the s78B(2) - Pe had with sheep properties West of Brisbane. In the case of sheep skins the s78B(2) - Pe used their own transport which was maintained and repaired on the property. Drums of sump oil and areas of sump oil spillage atest to these practices (see Figure 1).

RTI - RELEASE - EHP

3.4 Materials/Chemical Inventory

The following chemicals/materials were used on the property:

The list has been prepared based on information gained during the site history investigation, personal interviews, experience and knowledge in relation to the processes carried out and an examination of waste.

(i) Hydrated Lime

(ii) Boric Acid

(iii) Arzene (a pesticide) in 20 litre plastic containers and 200 L drums (567 g/L of arsenic present as sodium arsenite).

(iv) Fenitrogard liquid insecticide (1 kg/L Fenitrothion, an organo-phosphate pesticide)

(v) Pine Tree Oil cleaner

(vi) Drums of sump oil

(vii) Petrol

(viii) Diesel

Originally the arsenic insecticide was purchased from Amalgamated Chemicals. This company has changed hands over the years and now operates under the name Rhone-Poulenc Rural Australia Pty Ltd.

At the commencement of the study a number of Arzene containers still had liquid in them. These have since been removed.

Safety sheets for Arzene and Fenitrogard are presented in Appendix C. For an indication of the quantity of arsenic used on the site, information was obtained on the quantities of arsenic supplied to the property.

RTI DL RELEASE - EHP

TABLE 1
Supply of Arsenic to Property 1986 to 1989

Year	1986	1987	1988	1989
Litres of Arzene Purchased	600	600	900	500
Kg of arsenic Present	340	340	510	230

3.5 Underground Storage Tanks

The only U.S.T. on the site is a 1000 gallon underground petrol tank. The owners of the property have no knowledge of the tank leaking although levels were checked regularly. At the present time the tank is empty.

3.6 Drainage

Figures 1, 2 and 3 show drainage channels constructed on Section B. The majority of run-off drains to channel No. 1 which is approximately 400mm deep and falls to the West. The channel curves around to the South emptying into a large eroded gully just above pond P2. From here it drains in a southerly direction towards the creek until the topography levels out just below P4 where it terminates on the floodplain of Bulimba Creek. Section B has a predominately south-westerly slope and consequently most run-off is caught by one of the drainage channels.

3.7 Geology & Hydrogeology

Surface geology was obtained from a number of auger holes. To the North of the sheds the sub-surface profile comprises a dark red-brown silty clay extending to below 3 m.

In the shed area a thin layer of fill overlays a yellow-brown silty clay/sandy clay.

On the sloping ground South of the sheds the sub-surface is an orange-white mottled sandy clay changing to a dark brown silty sand on the floodplains of Bulimba Creek.

On the south-east perimeter of the shed area, a soft mudstone occurs just below the surface.

No groundwater was encounted to the depth of 3m or until mudstone was met.

Subsurface profiles for Section B are presented in Figure C4.

RTI DL RELEASE - EHP

4.0 FIELD WORK

4.1 Preliminary

The site investigation consisted of 3 main tasks:

(a) a review of the site's operational history,

(b) a preliminary field sampling and laboratory testing programme to screen for soil and surface water contamination, and

(c) a second more detailed sampling and testing programme.

The review of the site's operational history consisted of appraisal and documentation of the history of the site (ownership, processes and chemicals used etc.), liaison with current owners and site inspections.

Preparation for sampling and analysis included assessing the capability of chemical testing laboratories and obtaining quotations, developing field sampling protocols, field work program, quality assurance program, and occupational safety and health plan.

RTI DL RELEASE - EHP

4.2 Sampling Procedures

Soil sampling procedures were developed and sampling undertaken as described in the Work Plan (Appendix A). The following describes briefly the procedure used on this property.

The initial sampling and analysis program was based on information obtained from the preliminary site investigation.

Section B was divided into two grids for the purpose of sampling.

(1) A coarse (100 m) grid over the area expected to have low or neligible concentration of contamination and

(2) A finer (20 m) grid over areas identified as probably being contaminated to a significant degree (the sheds, drying racks and immediate surrounding area).

From the materials/chemical inventory, the hazardous materials likely to be present on the property are arsenic, O–P pesticides, sump oil, petrol and diesel.

Testing for O–P pesticides and sump oil was not carried out because:–

- O–P pesticides break down rapidly in soils and are therefore not persistent.

- Sump Oil is visible in contaminated areas and chemical analysis is not necessary.

In view of the above considerations the following sampling strategy was adopted:-

- Samples of soil were taken from grid nodes and additional locations for arsenic analysis (see Figure 1).

- From areas which were found in the preliminary survey to be contaminated with arsenic, a further set of samples was taken for leachability testing. These samples represented "worst case" contamination and moderate contamination in the Western, Central, and Eastern segments of the contaminated area.

- Water and sediment samples were taken from the ponds, water supply well, and swampy areas (Bulimba Creek flood plain) for arsenic analysis.

- Specific locations were selected for samples to be taken for hydrocarbon analysis.

- As a precautionary measure to test for the presence of organochlorine pesticides and certain heavy metals which may have been used on the site but not revealed in the site investigation, samples were taken from a limited number of locations regarded as representative of the site.

As Sections C and D were determined to have no history of arsenic contamination, grid sampling was not carried out, but spot checks were performed at five locations for confirmation. Water samples were also taken from low lying swamp areas on these two Sections.

The following soil sampling protocol was used:-

(a) spiral flight augering to 500mm, samples were collected at each 100mm and then composited for the total depth. The composite sample was then split for quality control purposes.

(b) spiral flight augering to approximately 3.5 m (or until rock was met) while taking samples between 0-500, 500-1,500, 1,500-2,500, and 2,500-3,500 mm. Samples were composited for each range of depths and then each composite sample was split for quality control purposes.

(c) using a larger diameter hand auger, separate composite samples were taken over the range 0-100, 100-200, 200-300, 300-400, 400-500 mm. Each of these composite samples were split. This sampling protocol provided a vertical concentration profile of arsenic for the top 500 mm of ground.

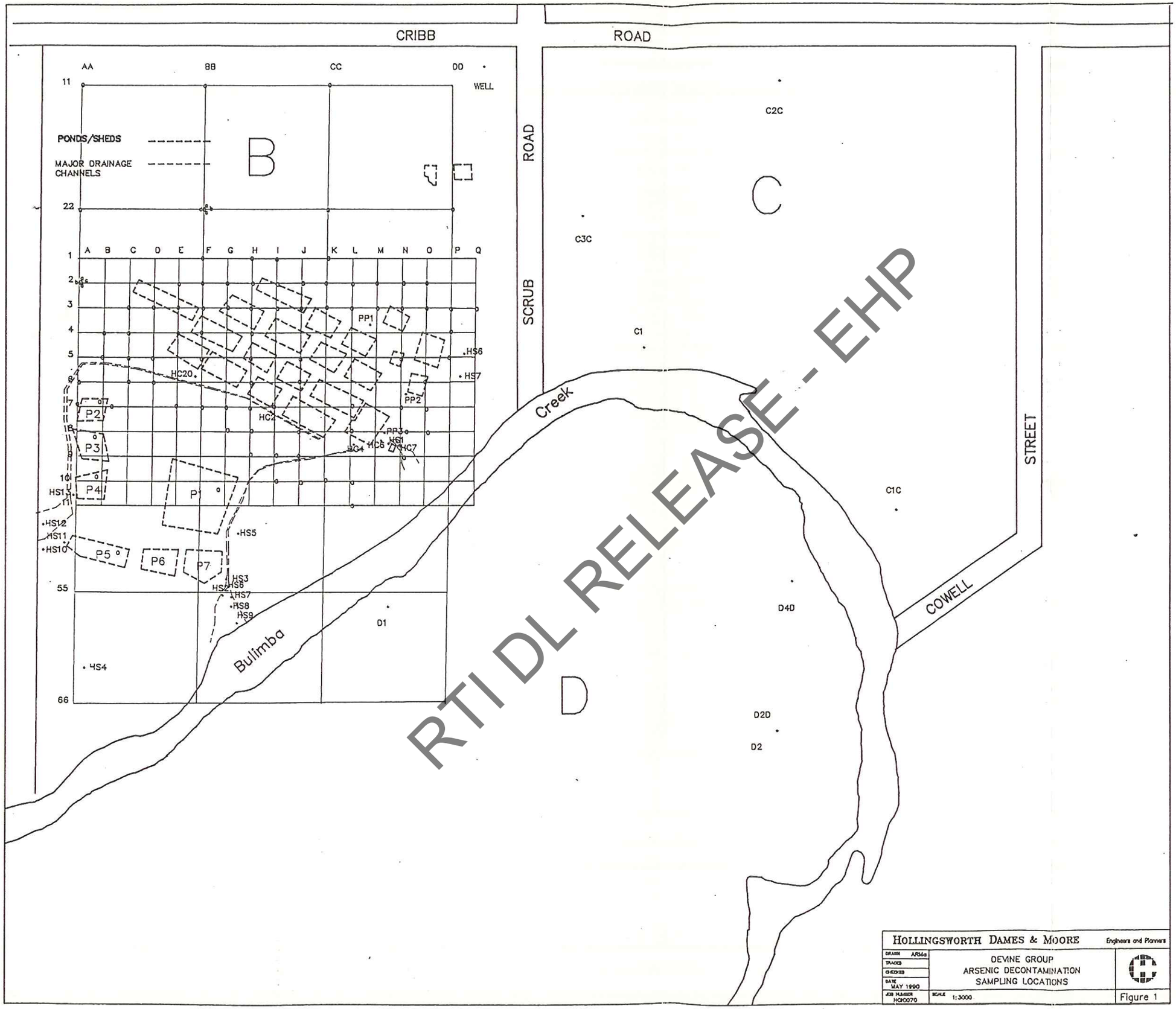
Water and sediment sampling consisted of filling the type of containers specified in the Work Plan with surface samples from the locations indicated above.

RTI DL RELEASE - EHP

Groundwater samples were planned for but no groundwater was discovered.

Every sample was given a unique serial number which was also applied to a record of the sample's location, and placed in its correct container according to the Work Plan (see Appendix A).

RTI DL RELEASE - EHP



RTI DL RELEASE - EHP

5.0 CHEMICAL ANALYSIS AND QUALITY ASSURANCE

5.1 Analytical Procedures

5.1.1 Arsenic in Soil

Sample preparation of AS1289, analysis by G004 (acid digestion, hydride generation, and AAS).

5.1.2 Arsenic leachability

Per USEPA TCLP test at pH 4.9.

5.1.3 Pesticides

Samples to be analysed for a set of 19 organochlorine pesticides by solvent extraction and GLC/EC.

5.1.4 Heavy Metals

Samples to be analysed for chromium, lead, copper, cadmium and zinc by acid digestion and AAS or ICP as appropriate.

5.1.5 Total Petroleum Hydrocarbons

Solvent extraction and IR quantitation.

5.2 Reporting of Results

All results of chemical analyses of soil samples are to be reported in mg/kg dry weight basis. All results of chemical analyses of water samples are reported in mg/Litre.

5.3 Quality Assurance

A quality assurance programme was undertaken on accordance with standard Hollingsworth Dames & Moore practice. In broad outline the programme comprises the following aspects.

All analyses are undertaken by NATA registered laboratories. Normal Quality Assurance procedures followed by NATA registered laboratories, e.g., the routine analysis of standard solution, reagent blanks and laboratory duplicates, are required to be observed and the results included as part of routine reporting.

Samples were analysed for arsenic content, arsenic leachability, other heavy metals and pesticides by Australian Laboratory Services (ALS). Samples were analysed for total petroleum hydrocarbons by MGT Laboratory Services.

Duplicates of all samples collected are held by Hollingsworth Dames & Moore.

RTI DL RELEASE - EHP

Quality assurance with respect to the analytical testing programme was effected as set out below:

Arsenic Content

10% of samples were tested twice. Half of these duplicate samples were forwarded to the Government Chemical Laboratory and half were forwarded to A.L.S. under a new serial number.

Other Heavy Metals

A sample spiked with a known concentration of a specified heavy metal was supplied to ALS as a normal sample for their analysis.

Pesticides

A sample spiked with a known concentration of an organochlorine was supplied to ALS as a normal sample for their analysis.

Hydrocarbons

Part of a sample analysed by MGT was also analysed at the Government Chemical Laboratory.

In addition, seperate boreholes were sunk at some sampling locations and seperate samples were taken and analysed to determine how accurately a particular sample represented the material at a particular location.

RTI DL RELEASE - EHP

6.0 ANALYTICAL RESULTS

6.1 Arsenic in Soil

The results of the chemical analysis are presented in Appendix D. Because the individual samples were identified by serial numbers which do not readily translate to the location of the samples either in terms of lateral position or their depth the concentrations of arsenic at the respective sampling sites have been indicated in Figure 3.

Where a series of samples has been taken at various depths the maximum concentration of arsenic in the series has been presented in the Figure. In all such series the maximum concentration has occurred in either the 0 – 0.1 or 0.1 – 0.2 m samples.

Figure 3 indicates that within Section B there are three categories of land which can be identified as having distinguishable levels of arsenic in the soil. They are as follows:

- The area of sandy soil in the flood plain at the southern extremity of the block demonstrating background levels of 1 mg/kg to 15 mg/kg of arsenic.

- The plateau area in the northern part of the block where the soil contains background levels of 1 mg/kg to 10 mg/kg arsenic.

- The area in the central part of the property in the vicinity of the drying sheds, areas associated with drainage from that area in a southerly direction, and isolated locations to the West and North of the sheds area where the arsenic concentrations are higher than the background levels.

Within the latter areas concentrations of arsenic varied considerably with a general maximum of around 380 mg/kg although one sampling site had a highly localised concentration of 2,400 mg/kg. The average concentration of arsenic in the area where background concentrations were being exceeded was 80 mg/kg.

On the basis of the analytical results its is possible to discern areas which contain levels of arsenic which would exceed that which would be acceptable for residential development. Using the criterion which is presented in Section 7.2 a plan of the affected areas has developed and is presented in Figure 3.

6.2 Arsenic Leachability

The leachability results relate to a selection of sampling locations in the area around the sheds. They represent soils having low and high concentrations of arsenic and the area of highest arsenic concentration detected.

Leachability tests were carried out determine whether the material is suitable for co-disposal with other refuse at a Brisbane City Council refuse tip or would be suitable for some other means of disposal.

RTI DI RELEASE-EHP

6.3 Other Heavy Metals

Seven samples were analysed for copper, lead, zinc, cadmium and chromium. The results for all the samples were below the NHMRC investigation thresholds.

6.4 Organochlorine Pesticides

Five samples were tested for 19 organochlorine pesticides.

The reporting limit for the analysis was 0.01 mg/kg and all the results were below this limit except for the presence of 0.09 mg/kg of dieldrin in one sample.

These results meet the available acceptance criteria for organochlorine pesticides in soil.

6.5 Total Petroleum Hydrocarbons

Three sampling locations were selected for testing on the basis of a reasonable likelihood of detecting hydrocarbons.

For two of the samples the concentration was below the reporting limit for the analytical technique which is 50 mg/kg. The third sample contained 1,050 mg/kg, which is marginally above a draft guideline of the NHMRC*. As this sample originated from an area containing arsenic at a level which will be recommended for remediation, the results is not considered to merit further attention.

6.6 Quality Assurance

6.6.1 Arsenic

The comparison of duplicate samples sent to ALS under disguised identities reveals that the repeatability of analysis was acceptable.

The comparison of results from split samples sent to ALS and the Government Chemical Laboratory shows that ALS results do not underestimate the concentrations of arsenic in the soil.

6.6.2 Other Heavy Metals

The heavy metal spike that was used was applied to the soil at a concentration which was later revealed to be near the reporting limit of the analytical technique. This quality assurance measure failed to yield a meaningful result.

RTI DL RELEASE - EHP

---

* Australian Guidelines for the Rehabilitation of Contaminated Land. National Health and Medical Research Council (NHMRC) Draft, December 1989.

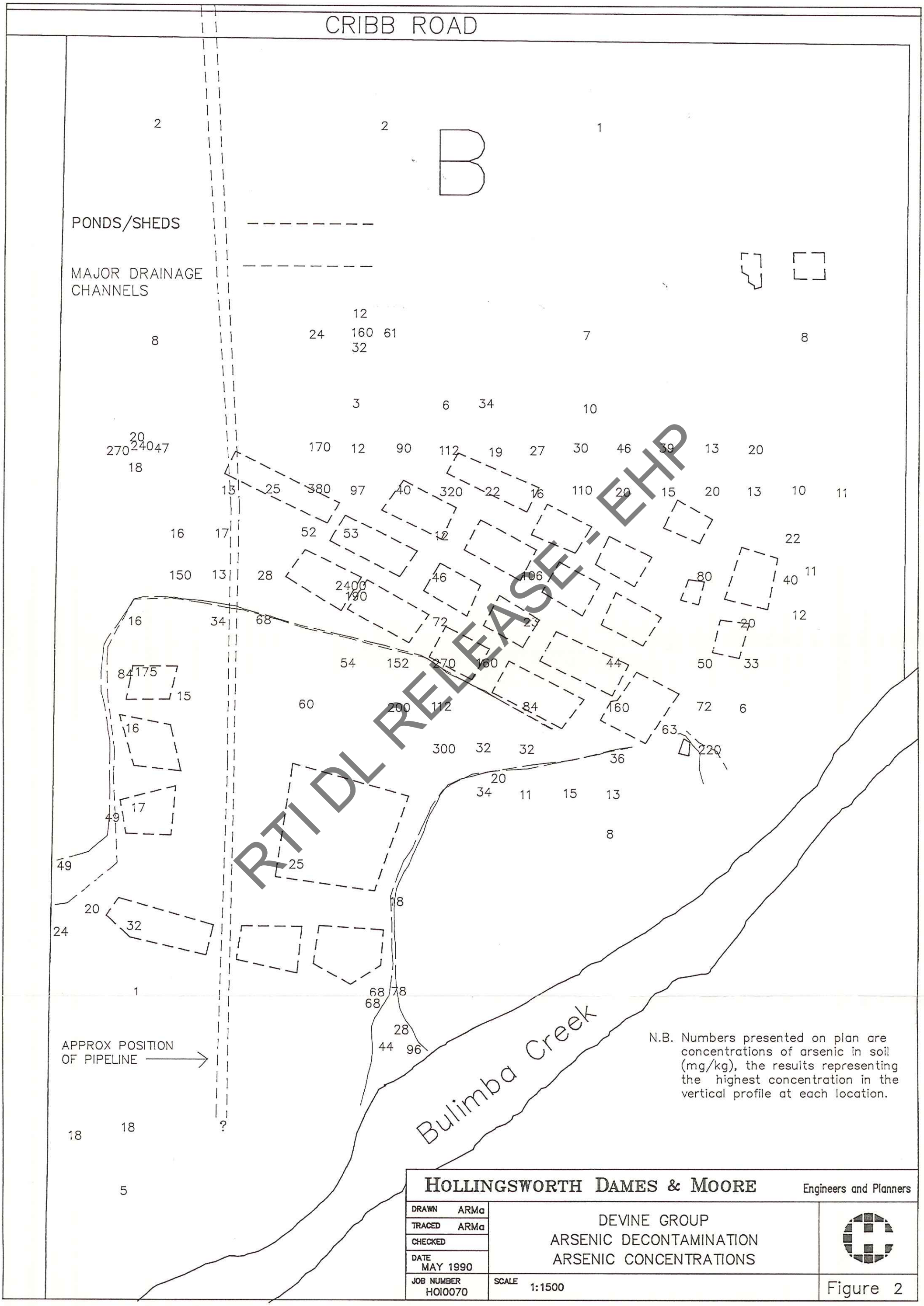
6.6.3 Pesticides

The results for the spiked and unspiked portions of a split soil sample indicated correct identification of the added organochlorine pesticide and an elevation in concentration comensurate with the quantity added.

6.6.4 Total Petroleum Hydrocarbons

The concentration of hydrocarbons in the split sample generated a result at the MGT laboratory which was below their reporting limit of 50 mg/kg. The other part of the sample, which was sent to the Government Chemical Laboratory, produced a result of 62 mg/kg. The hydrocarbon results and their quality control have transpired to be of little significance to the remediation programme.

RTI DL RELEASE - EHP



RTI DL RELEASE - EHP

7.0 ARSENIC – ACCEPTABLE LEVELS

7.1 Toxicology

Arsenic, a metalloid that occurs widely in nature*, is acutely and chronically toxic to man and it is also toxic to marine organisms. Environmental pollution by arsenic may arise from agricultural practices (weed–killers, fungicides, sheep dips, rodenticides, insecticides), and from industry. The agricultural use of arsenic compounds has been greatly reduced in recent years in favour of less persistent and less toxic organic compounds that are available.

Arsenic is found in the air, in food and in water; generally the levels of arsenic in waters throughout Australia are low, i.e. less than 0.01 mg/L, but certain local underground waters have been known to contain up to 12 mg/l**. Although arsenic is not an essential element for human physiology, all humans have a small amount of arsenic in their bodies, distributed widely throughout the tissues including liver, bone, skin, hair and nails. Normal human blood is found to contain 0.2 to 1.0 mg/l of arsenic.

Arsenic is a cumulative, potent, protoplasmic poison that inhibits thiol groups (–SH) in enzymes. The salts are readily absorbed from the gastrointestinal tract, but elemental arsenic is not. Arsenic is also absorbed through the lungs and skin. In short–term and long–term studies on experimental animals a variety of arsenic compounds have been administered orally or by inhalation. The results have generally parallelled the toxic reactions seen in man (Bencko and Symon 1969, 1969a, 1970; Bencko, 1972). Acute arsenic poisoning has been caused by ingestion of as little as 100 mg, while 130 mg has been reported as a fatal dose (Browning, 1969).

Chronic poisoning leads to loss of appetite and weight, diarrhoea alternating with constipation, other gastrointestinal disturbances, peripheral neuritis, conjunctivitis, hyperkeratosis and melanisis of the skin, and sometimes skin cancer (Browning, 1969). During low–level chronic exposure, arsenic accumulates in the body even though clinical disease does not develop. It has been reported that a single arsenic dose may take 10 days for complete disappearance (McKee and Wolf, 1963) and this slow excretion, mainly in the urine and sweat (Lander and Hodge, 1965), is the basis for the cumulative toxic effect.

In 1900 in Manchester and Liverpool, some 7 000 clinical cases of subacute poisoning and 70 deaths were attributed to the consumption of beer containing more than 15 mg/l of arsenic (Kelynack et al., 1900).

RTI DL RELEASE - EHR

* Mainly in sulphur–containing minerals where it replaces part of the sulphur

** Personal Communication, R. Gorman, Director, Government Chemical Laboratories, Perth, Western Australia

Arsenic has been associated with the occurrence of cancer; however, its exact role as a carcinogen has not been determined. It seems that exposure must be quite high and occur over an extended period before skin cancer develops (Hill and Faning, 1948; Perry et al., 1948; Lee and Fraumeri, 1969). It has been reported that industrial workers in a plant manufacturing arsenic powder were exposed to arsenic dust and showed a higher incidence of skin and lung cancer than other occupational groups (Doll, 1959). Tseng et al. (1968) have shown that skin cancer is more frequent in an area of chronic arsenicism in Taiwan, while a recent survey by Berg and Burbank (1972) showed there was no correlation between arsenic concentration in ten drainage basins through the US and skin cancer mortality in the areas; the average arsenic concentration in the drinking water was around 0.07 mg/l.

7.2 Soil Contamination

Arsenic occurs naturally in all soils and rocks. The analytical results demonstrate clearly that parts of the Edwards property have arsenic concentrations above background levels for the soils and rocks. A pivotal consideration in the extent of remediation is the concentration of residual arsenic which may be acceptable to the public and health officials if the land is to be developed for residential use. A detailed analysis of the respective reference levels promulgated by other authorities in Australia and overseas distinguishes between soil that is contaminated in comparison with background levels, soil which is contaminated to a degree which requires investigation, and soil which is contaminated to a degree which precludes residential development. For the purpose of developing a remediation policy at the this site the reference levels proposed by the principal Australian authorities and leading overseas authorities have been presented and discussed below.

RTI DL RELEASE - EHP

National Health And Medical Research Council

In 1989 the N.H.M.R.C. produced draft Australian Guidelines For The Rehabilitation Of Contaminated Land. This document asserts that because of variability in a number of factors contributing to the risk presented by a contaminant and because of gaps in knowledge relating to these factors it is impossible to specify acceptable levels for most contaminants. It does however present thresholds indicating the levels above which an evaluation will be needed to ascertain whether the level of contamination is acceptable to the protection of public health and the environment in the context of the proposed land use. The stated purpose of the investigation threshold implies that that contamination at levels below the threshold does not require investigation. The level proposed for arsenic is 50 mg/kg of air-dried soil. In view of the fact that this guideline originates from the pre-eminent authority on public health in Australia reliance on its reference level should be given due weight in any comparison of available reference levels.

The Victoria Environmental Protection Agency

In mid-1989 the policy of the Victoria E.P.A. was to apply a maximum concentration of 30 mg/kg of arsenic in soil at residential developments. In February 1990 that organisation issued an interim notification criterion of 20 mg/kg in dry soil based on overseas acceptable levels.

This criterion implies automatic acceptance of concentrations below this level but required that the Victoria E.P.A. be informed of contamination above this level. The latter eventuality could initiate a further investigation but does not necessarily entail disqualification of land from residential use.

If this guideline were to be considered as a precedent for the application of a standard to the s78B(2) - Perso property it would have to be clearly recognised that the Victoria E.P.A. criterion is not an upper limit for safety but an indicator that a site may be contaminated and warrants further consideration. The need for further consideration might arise quite properly from a suspicion that a contaminated site may incorporate areas of high contamination which need to be located and remediated. This does not imply, for example, that all land with contamination levels marginally above the notification level are deemed to present a health hazard.

In view of this the Victoria E.P.A. notification level for arsenic in soil should not be taken as the maximum level which can be tolerated in the interest of public health, and should not be given precedence over the the N.H.M.R.C. guideline.

N.S.W. S.P.C.C.

The S.P.C.C's Discussion Paper on Contaminated Sites presents Tentative Threshold Levels for some Contaminants At Domestic Single Dwelling Sites. The thresholds given for arsenic in soil are 30 mg/kg – acceptable, 500 mg/kg – unacceptable. The origin of the figures, a report by Wilson and Stephens, is given but the basis on which they were derived was not.

Netherlands Ministry Of Environment

Soil Clean-up Guidelines issued by this authority in 1988 gave the following reference levels for arsenic in soil:

- 30 mg/kg – Level B – needs further investigation.
- 50 mg/kg – Level C – for concentrations above this figure a clean-up programme is required.

Other Authorities

Various authorities overseas have prescribed reference concentrations which may be descriptive e.g. Greater London Council, 30 mg/kg to 50 mg/kg – slight contamination, or may carry a mandatory obligation of notification e.g. USEPA for concentrations >20 mg/kg.

Summary

Although the various authorities have not converged on a single set of reference concentrations for arsenic contamination in soil, where the soil is on land intended for residential use the following criteria have emerged:

- At levels below 20 mg/kg there is no cause for concern.

RTI DL RELEASE - EHP

- Some authorities require notification and/or site investigation at 20 mg/kg and above while others have set the reference concentration at 30 mg/kg.

- The N.H.M.R.C. and the Netherlands Ministry of Environment have indicated 50 mg/kg as the level above which a site needs to be cleaned up.

Recommendation For Acceptance Level

The soil at the s78B(2) - Per property has been subjected to a detailed analytical investigation which has achieved the following:

- Background levels have been established

- A requirement for a further investigation of the site with regard to contamination has already been satisfied.

- The extent and distribution of contamination have been determined.

It is therefore contended that the soil no longer falls into a category requiring further investigation and that if remediation effecting a maximum arsenic concentration of 50 mg/kg is carried out the land will be suitable for residential development.

RTI DL RELEASE - EHP

R

CRIBB ROAD

Remove top 500mm of soil.

Remove top 300mm of soil

PONDS/SHEDS

MAJOR DRAINAGE CHANNELS

Bulimba Creek

APPROX POSITION OF PIPELINE →

N.B. Numbers presented on plan are concentrations of arsenic in soil (mg/kg), the results representing the highest concentration in the vertical profile at each location.

RTI DL RELEASE - EHP

HOLLINGSWORTH DAMES & MOORE	Engineers and Planners
DRAWN ARMa	DEVINE GROUP
TRACED ARMa	ARSENIC DECONTAMINATION
CHECKED	AREAS RECOMMENDED FOR REMOVAL OF SOIL
DATE MAY 1990	
JOB NUMBER HOI0070	SCALE 1:1500
	Figure 3

8.0 REMEDIATION

From consideration of the analytical results and the acceptance criteria, some of the land in Section B should not be used for residential purposes.

Of the remediation options available, including soil removal, capping, and chemical treatment, the first option is considered to be the most economically and practically viable.

The depth to which soil would need to be removed in order that the remainder meets the proposed 50 mg/kg criteria is 0.3 m in some areas and 0.5 m in others. The areas affected are shown in Figure 3. The volume of soil which requires relocation is estimated at 15,000 m^3.

The disposal options are determined by the extent to which arsenic in the soil may transfer, or leach, into any water which may permeate the soil and subsequently affect areas into which it flows. This factor is referred to as leachability and may be determined by laboratory tests. Soils with high arsenic leachability may have to be deposited in a secure landfill which would ensure that arsenic in the soil would be prevented from dispersing. Soils with a low arsenic leachability may be deposited at a site affording a less stringent levels of containment because of the reduced risk of health and environmental hazards posed by the leachate.

The disposal options which have been considered include removal to refuse tips operated by the Brisbane City Council. This course would be subject to the approval of the Council, and such approval would be predicate on the Council's assessment of the suitability of the soil for its tips as determined by leachability tests. Discussions with Council officers have revealed that on the basis of the leachability test this means of disposal may be available.

Where the leachability of arsenic from the soil is low, it may also be possible to dispose of the soil at sites other than Council tips where the intended use of the soil will ensure there is no public health hazard or environmental problem. Such sites afford containment of the soil so as to prevent access to the soil, dispersion of fugitive dust, and the release of arsenic into the surrounding environment and waterways by leaching. An example of this method of disposal would be road embankment construction.

Considering the above issues, the disposal options which have been identified are given below. All the options are conditional on Council approval based on the leachability tests.

* Relocation of the material elsewhere on the properties, engineered in such a way that it could not generate leachate or the accessible to the public.

* Placement at Nudgee tip for use as cover. It is understood that if this was agreed to by the Brisbane City Council there would be no tip fees.

* Co-disposal with other refuse at Willawong tip. A charge of $13.00 per tonne would be levied.

* Placement at Willawong refuse tip for use as night-cover. This option would be subject to agreement with Thiess Contractors, Brisbane City Council Health Department, and the Willawong Hazardous Waste Disposal Facility Management. It is understood that if this was agreed to by the Brisbane City Council there would be no tip fees.

RTI DLRELEASE - EHP

* Placement in the Willawong Waste Disposal Facility. This option would be subject to negotiation with Brisbane City Council on handling charges. It is understood that storage volume is limited at the Facility.

* Portion of the material being used as embankment fill at the Bulimba Creek overpass. The overpass project would account for 6,000 m^3 of soil as above-grade fill and, provided that the soil meets the requirements of CBR-15, a further, as yet undetermined amount, could be disposed of as 1 m sub-grade for the roadway. The remainder would need to be disposed using one of the other options.

  This option has arisen from informal assent to the scheme by Bielby Constructions and J.F. Hull Construction Pty Ltd who have submitted the lowest conforming tender to the Main Roads Department.

for **HOLLINGSWORTH DAMES & MOORE**

R WILLIAMS
Manager - Hazardous Wastes

HOI0070
DW/RW/nl
25 July 1990

RTI DL RELEASE - EHP

APPENDIX A

Work Plan

RTI DL RELEASE - EHP

APPENDIX A

WORK PLAN

ENVIRONMENTAL SURVEY OF s78B(2) - Personal SITE, CARINDALE

TABLE OF CONTENTS

		Page
A1.0	INTRODUCTION	A1
A2.0	SCOPE OF FIELD INVESTIGATION	A1
	A2.1 Surface Soil Samples	A1
	A2.2 Sub–Surface Soil Samples	A1
	A2.3 Groundwater Sampling	A1
A3.0	SAMPLING PROCEDURES	A2
	A3.1 Soil Sampling	A2
	A3.2 Sample Handling and Preservation	A2
A4.0	QUALITY ASSURRANCE	A4

RTI DL RELEASE - EHP

APPENDIX A

Work Plan

A1.0 INTRODUCTION

This document contains the work plan for a preliminary site assessment of potentially contaminated soils at the s78B(2) - Pe site, Carindale, as outlined in our proposal dated 8 March 1990.

A2.0 SCOPE OF FIELD INVESTIGATION

A historical survey has provided much of the information required to evaluate the potential contamination of soils at the site. Based on an assessment of available data and a site inspection, soil sampling locations are selected. Locations for sampling are indicated on a site plan (Figure 1). During an investigation, the Site Investigator may choose to move the actual location slightly. The decision to move a location is based on location accessibility, sub-surface hazards, and a visual assessment of surface contamination.

A number of selected sampling locations are identified by measuring offsets from fixed landmarks using a measuring tape. These are indicated on the Site Plan, (Figure 1).

The site is divided into a grid of 100 metre centres for general sampling. Areas where there may be high concentrations of Arsenic or other contaminants from the process known to have been carried out are subdivided into a 20 metre grid. (Reference 1)

Samples will also be taken at locations suspected to be contaminated with other materials. These locations include the sump oil change area, the petrol and diesel tanks area, the arsenic storage area, the waste dump, gully run-off drains and sediment from the ponds. Approximate locations for these samples are shown on Figure 1.

At the time of sampling duplicates of all samples will be made by splitting the material collected. Each duplicate consists of two samples which represents the same entity. To achieve this the original sample is thoroughly mixed before division and placement in the sample containers.

RTI DE RELEASE - EPP

A2.1 Surface Soil Samples

"Surface samples" are taken at the nodes of the grid. These comprise a composite sample of the soil of the surface material to a depth of 500mm.

At a number of selected locations, "surface samples" comprising seperate and discrete samples from each of 0-100, 100-200, 200-300, 300-400, and 400-500mm below the surface are taken to ascertain the variation of concentration with depth.

A2.2 Sub-Surface Soil Samples

Seperate and discrete samples are collected using a spiral flight auger to a depth of 3.5m or until rock is reached at 0-500, 500-1500, 1500-2500 and 2500-3500mm.

A2.3 Groundwater Sampling

Samples are taken of pondwater and groundwater if found.

A3.0 SAMPLING PROCEDURES

A3.1 Soil Sampling

Soils are to be sampled at the locations marked on Figure 1 using a hand auger and spiral flight auger. Samples size is to be preferably 1 kg as stated in TABLE 6.1 of AS 1726 of the Site Investigation Code and should be a minimum of 0.5kg.

A3.1.1 Hand Auger Sampling

A hand auger bucket consists of angled blades below a collection tube. As the auger is rotated by its T-handle, the soil is cut and forced into the collection tube. The soil is then removed from the auger after carefully removing it from the hole. The sampling procedure is as follows; clean the site of grass and organic matter, auger until the desired depth is reached or the bucket is filled then transfer the collected material to a compositing tray. If the desired depth has not been reached continue augering to the depth.

A Jarrat Hand Auger of between 75 and 150 mm diameter is used.

Any unusual appearances of the surrounding area or sample hole are recorded.

A3.1.2 Field Compositing

Material collected for compositing is placed in a metal compositing box. When all material to be composited has been placed in the box, a sampling tool is used to mix the material. The sample is then subdivided into equal portions and packed in plastic bags for transport. One sample portion is labled for transport to the chemical testing laboratory while the second sample portion is seperately labled and stored at Earthtech Laboratory.

A3.2 Sample Handling and Preservation

This procedure presents the requirements for handling, labelling and preserving samples of soils, both for analysis and storage.

A3.2.1 Decontamination Procedures

All sampling equipment is decontaminated between sampling locations. The auger is brushed to ensure that soil from one hole does not contaminate the next hole. If necessary the equipment is thoroughly washed off with tap water to remove any remaining particles of soil.

A3.2.2 Soil and Water Sample Containers

Sampling Containers

Soil Samples will be contained as follows:-

RTI DL RELEASE - EHP

Arsenic

Soil will be contained in plastic bags.

Heavy Metals

Soil will be contained in plastic bags.

Hydrocarbons

Soil will be contained in glass jars.

Pesticides

Special glass bottles solvent washed as provided by the testing laboratory.

Pond Sediment

Sediment will be contained in glass jars.

Water Samples will be contained as follows:

Arsenic

Water samples will be contained in acid washed plastic bottles supplied by the testing laboratory.

Pesticides

Water samples will be contained in solvent washed glass bottles as provided by the testing laboratory.

A3.2.3 Labelling

Each sample is labelled to identify the sample uniquely. In the case of soil samples, multiple tear off labels are provided inside each sample bag in the event that further testing is required. In the case of liquid or sediment samples the jar or bottle is labeled. The following information is recorded for each soil and water sample:–

- Sample Number
- Sample Location
- Sample Date
- Sample Depth
- Sampler(s) Initials

A3.2.4 Analysis Request Form

Details of tests to be conducted are faxed to the laboratory (stating sample numbers and analysis to be performed) as soon as possible after the samples have been dispatched from the field.

RTI DL RELEASE - EHP

APPENDIX B

Site Health and Safety Plan

RTI DL RELEASE - EHP

APPENDIX B

HOLLINGSWORTH DAMES & MOORE

SITE HEALTH AND SAFETY PLAN

Project Name	:	Arsenic Decontamination – s78B(2) - Personal In Property – Devine Group HOI0070
Project Site Location	:	Carindale, Brisbane
Field Supervisor and Onsite Safety Officer	:	Andrew Mabin
Project Manager	:	Rod Williams
Brisbane Office Health and Safety Officer	:	David Williams
Plan Preparer	:	Andrew Mabin
Plan Reviewer	:	David Williams
Preparation Date	:	16 March 1990
Plan Approvals	:	

Office Health and Safety Coordinator

sch4p4(6) Personal information

23/03/90 Date

Managing Principal–in–Charge

sch4p4(6) Personal information

23/3/90 Date

Project Manager

sch4p4(6) Personal information

23/3/90 Date

RTI DL RELEASE - EHP

APPENDIX B

HOLLINGSWORTH DAMES & MOORE
SITE HEALTH AND SAFETY PLAN

TABLE OF CONTENTS

		Page
B1.0	INTRODUCTION	B1
	B1.1 Hollingsworth Dames & Moore Activity	B1
	B1.2 Site Location	B1
B2.0	PURPOSE	B1
B3.0	APPLICABILITY	B1
B4.0	HAZARD EVALUATION	B1
B5.0	MONITORING REQUIREMENTS	B2
B6.0	LEVELS OF PROTECTION	B2
B7.0	AUTHORIZED PERSONNEL	B2
B8.0	health and saftey duties	B2
B9.0	EMERGENCY INFORMATION	B3
	B9.1 General	B3
	B9.2 Site Resources	B3
	B9.3 Emergency Procedures	B3
B10.0	STANDARD SAFE WORK PRACTICES	B4
B11.0	STANDARD FORMS	B5
	o Plan Acceptance Form	
	o Plan Feedback Form	
	o Accident Report Form	
	o Exposure History Form	

RTI DL RELEASE - EHP

APPENDIX B

Site Health & Safety Plan

B1.0 INTRODUCTION

B1.1 Hollingsworth Dames & Moore Activity

Hollingsworth Dames & Moore has been contracted to perform an environmental survey to provide detailed information to the Devine Group concerning the levels of contamination on the s78B(2) - Per property and to recommend remediation strategies. This survey will involve a fieldwork programme. The purpose of the fieldwork will be to perform geochemical sampling at areas identified on Figure 2.

The fieldwork will consist of hand augering, spiral flight augering, soil and water sampling.

B1.2 Site Location

The s78B(2) - Pe Properties are located on approximately 41 hectares of land at Cribb Road, Carindale.

B2.0 PURPOSE

The purpose of this plan is to assign responsibilities, establish personnel protection standards and mandatory safety practices and procedures, and provide for contingencies that may arise while operations are being conducted at the site.

B3.0 APPLICABILITY

The provisions of the plan are mandatory for all on-site Hollingsworth Dames & Moore employees and subcontractors engaged in hazardous material management activities including, but not limited to, initial site reconnaissance, preliminary field investigation, mobilization, project operation and demobilization.

The work performed by Hollingsworth Dames & Moore for the Devine Group at the s78B(2) - Persona Site, Carindale comprises a soil and water sampling programme. The work will be conducted solely by Hollingsworth Dames & Moore, with soil sampling equipment and personnel being provided by Earthtech Laboratories Pty Ltd.

B4.0 HAZARD EVALUATION

It is not expected that any hazardous situation will be encountered during the Background Sampling programme. Nevertheless, precautions will be taken to minimise the risk of exposure to any contaminants that may be present. Gloves will be worn during all sampling. Hands will be washed before eating or smoking, protective footwear will be worn.

If any problems are encountered, the appropriate Hollingsworth Dames & Moore Health and Safety Plans should be referred to. Wash bottles and soapy water will be carried on site in the event that unanticipated hazards are met.

RTI DE RELEASE - EHP

B5.0 MONITORING REQUIREMENTS

No special monitoring requirements are needed during the investigation. The hazardous substances indicated in the site history would be soil–bound, and site workers could not be exposed to fugitive dust containing significant contamination during the course of drilling and sampling.

B6.0 LEVELS OF PROTECTION

The level of protection for activity is Level D according to the following criterion.

Meeting all of the following conditions allows use of level D protection:

- o no hazardous air pollutants have been detected;
- o work functions preclude splashes, immersion of potential for unexpected inhalation of any chemicals.

Protective equipment at Level D is as follows:

- o Coveralls
- o Workboots
- o Gloves
- o Hardhat (face shield – optional)

B7.0 AUTHORIZED PERSONNEL

Hollingsworth Dames and Moore field staff will be the Field Supervisor.

B8.0 HEALTH AND SAFTEY DUTIES

In accordance with Hollingsworth Dames & Moore's internal policy, a description of the health and safety duties are as follows:

- o Assure a copy of the health and safety plan is maintained on–site during all field activities.
- o Assure the appropriate designated personal protective equipment is available and properly utilized.
- o Be aware of the provisions of the plan, instructed in the work practices necessary to ensure safety, and in the planned procedures for dealing with emergencies.
- o Be aware of the potential hazards associated with site operations.
- o Correct any work practices or conditions that may result in injury or exposure to hazardous substances.
- o Prepare any accident/incident reports (see attached Accident Report Form).

RTI DE RELEASE - EHP

Mr. Rod Williams will be the Project Manager and Mr. Andrew Mabin will be the Field Supervisor from Hollingsworth Dames & Moore. Exposure history forms (as presented in Section 11.0) will be maintained by the Brisbane Office Health and Safety Officer for their medical history.

B9.0 EMERGENCY INFORMATION

B9.1 General

Should any emergency situation or unplanned occurrence require outside or support services, the appropriate contact from the following list should be made:

Contact	Person or Agency	Telephone
Ambulance	Local service	000
Fire Department	Local service	000
Police	Local service	000
HD&M Project Manager	Rod Williams	832 3222

B9.2 Site Resources

Phones are available at the s78B(2) - P house. A two-way radio will be available from time to time at the Earthtech vehicle.

B9.3 Emergency Procedures

In the event that emergency develops on-site, the procedures delineated herein are to be immediately followed. Emergency conditions are considered to exist if:

- Any of the field personnel are involved in an accident or experiences any adverse effects or symptoms of exposure while on the scene.
- Any condition is discovered that SUGGESTS the existence of a situation more hazardous than anticipated.

The following emergency procedures should be followed:

- The pre-established site work area entrance and exit routes delineated by the field supervisor should be followed.
- In the event that any of field personnel experiences any adverse effects or symptoms of exposure while on the scene, his work should be halted.

RTI DL RELEASE - EHP

- The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated, should result in the suspension of work until the Hollingsworth Dames & Moore Safety Officer has been notified and appropriate instructions have been provided to the field team.

- In the event that an accident occurs, the Project Manager is to complete an Accident Report Form for submittal to the Managing Principal-in-Charge of the office. A copy will be forwarded to the firmwide health and safety program office.

B10.0 STANDARD SAFE WORK PRACTICES

- Eating, drinking, chewing tobacco, and smoking are prohibited in the potentially high concentration areas.

- Avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, etc. Avoid, whenever possible, kneeling on the ground, leaning or sitting on equipment on the ground. Do not place monitoring equipment on potentially contaminated surface (ie. ground, etc).

- All field members should make use of their senses (all senses) to alert them to a potentially dangerous situation in which they should not become involved (ie. presence of strong and irritating or nauseating odours).

- Prevent splashing of contaminated materials.

- Field crew members shall be familiar with the physical characteristics of investigations, including:

  - accessibility to equipment, vehicles
  - communications
  - hot zones (areas of known or suspected contamination)
  - site access
  - nearest water sources (wash bottles, etc)

- Soil adhering to protective clothing should be removed by brushing or washing before leaving the site.

- The number of personnel and equipment in the contaminated area should be minimised consistent with site operations.

RTI DL RELEASE - EHP

B11.0 STANDARD FORMS

The following forms are enclosed in this Section:

- Plan Acceptance Form
- Plan Feedback Form
- Accident Report Form
- Exposure History Form

The Plan Acceptance Form and Plan Feedback Form should be filled out by field personnel working at the site. The Accident Report Form should be filled out by the Project Manager in the event of an accident occurring.

ALL COMPLETE FORMS SHOULD BE RETURNED TO THE HOLLINGSWORTH DAMES & MOORE BRISBANE OFFICE HEALTH AND SAFETY OFFICER

RTI DL RELEASED EHP

PLAN ACCEPTANCE FORM

INSTRUCTIONS: This form is to be completed by each person who is to work on the subject project work site and returned to the Hollingsworth Dames & Moore Health and Safety Officer in the Brisbane Office.

JOB NO: _____

PROJECT: _____

I represent that I have read and understand the contents of the attached plan and agree to perform my work in accordance with it.

_____

Signed

_____

Print Name

_____

Company

_____

Date

Forms/nl

RTI DL RELEASE - EHP

EXPOSURE HISTORY FORM

JOB NAME: _____

JOB NUMBER: _____ DATES FROM/TO: _____

HOLLINGSWORTH DAMES & MOORE PERSONNEL ON-SITE:

1. _____ 5. _____

2. _____ 6. _____

3. _____ 7. _____

4. _____ 8. _____

SUSPECTED CONTAMINANTS	VERIFIED CONTAMINANTS AND AIRBORNE CONCENTRATION THEREOF

RTI DL RELEASE - EHP

(RETURN TO HEALTH & SAFETY OFFICER, HOLLINGSWORTH DAMES & MOORE, BRISBANE)

Forms/nl

ACCIDENT REPORT FORM

TO	FROM TELEPHONE
NAME OF INJURED OR ILL EMPLOYEE	
DATE OF ACCIDENT / TIME OF ACCIDENT / EXACT LOCATION OF ACCIDENT	
DECSRIPTION OF ACCIDENT	
NATURE OF ILLNESS OR INJURY AND PART OF BODY INVOLVED	TIME LOST

PROBABLE DISABILITY (Check One)

FATAL	LOST WORK DAY + DAYS AWAY FROM WORK	LOST WORK DAY+ DAYS OF RESTRICTED ACTIVITY	NO LOST WORK DAY	FIRST AID ONLY

CORRECTIVE ACTION WHICH REMAINS TO BE TAKEN (By whom and by when)	
NAME OF SUPERVISOR	TITLE
SIGNATURE	DATE

(RETURN TO HEALTH & SAFETY OFFICER, HOLLINGSWORTH DAMES & MOORE, BRISBANE)

Forms/nl

RTI D - RELEASE - EHP

PLAN FEEDBACK FORM

Problems with plan requirements:

Unexpected situations encountered:

Recommendations for future revisions:

RTI DL RELEASE - EHP

(RETURN TO HEALTH & SAFETY OFFICER, HOLLINGSWORTH DAMES & MOORE, BRISBANE)

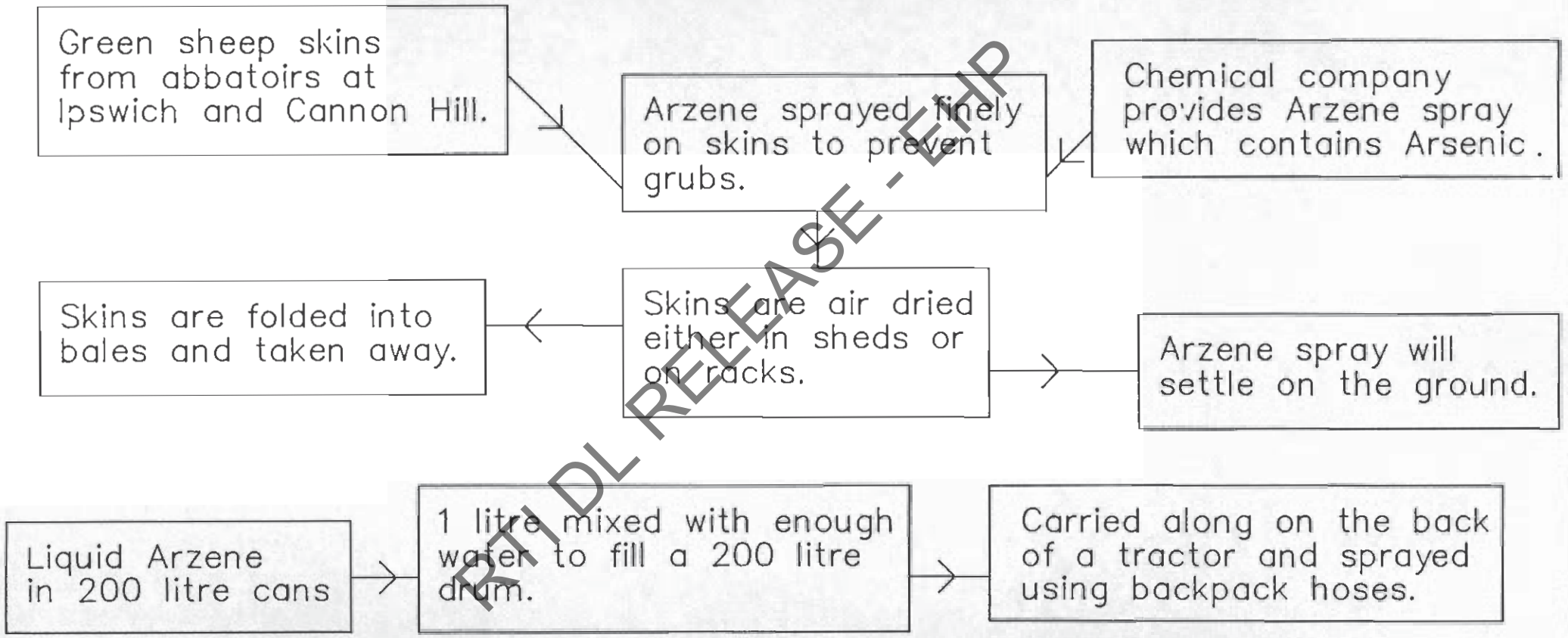
Forms/nl

APPENDIX C

Preliminary Investigation

RTI DL RELEASE - EHP

Sheep Skins



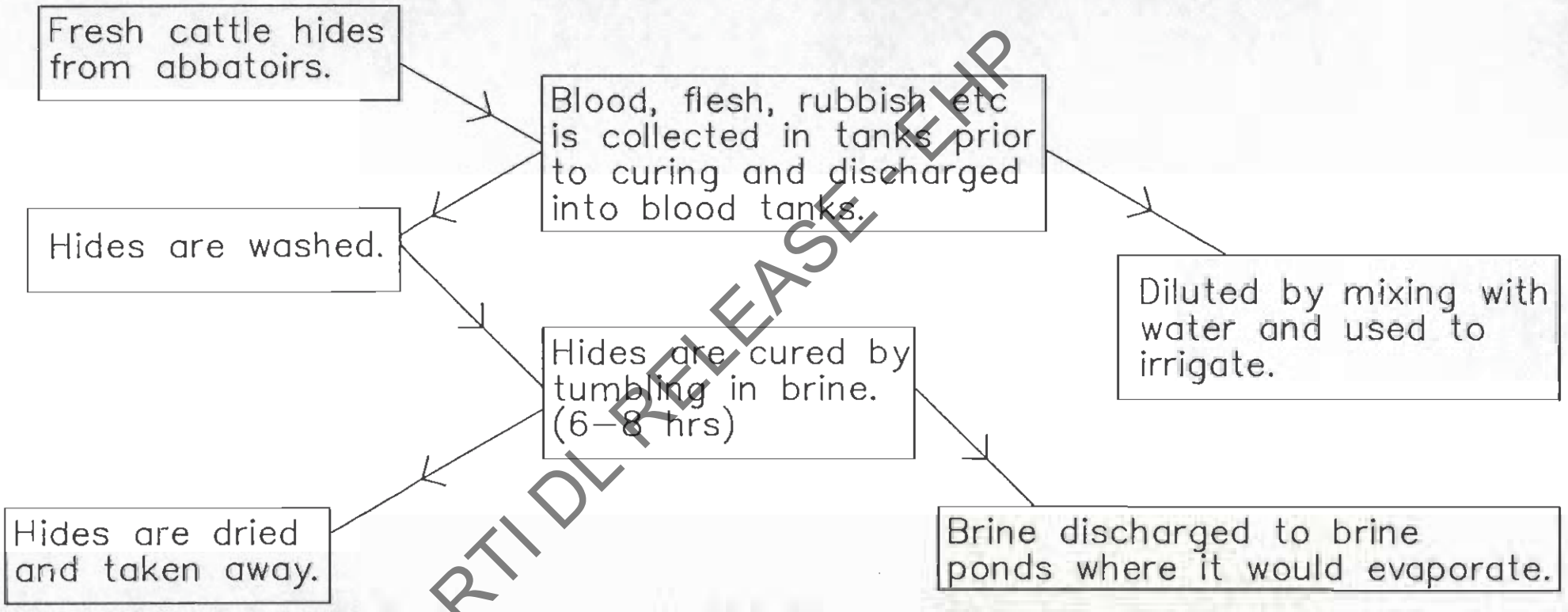
RTI DL RELEASE - EHP

HOLLINGSWORTH DAMES & MOORE Engineers and Planners

DRAWN ARMa	DEVINE GROUP [redacted] PROPERTY FLOW DIAGRAM
TRACED	
CHECKED	
DATE 1/5/90	
JOB NUMBER 1010070	SCALE

Figure C1

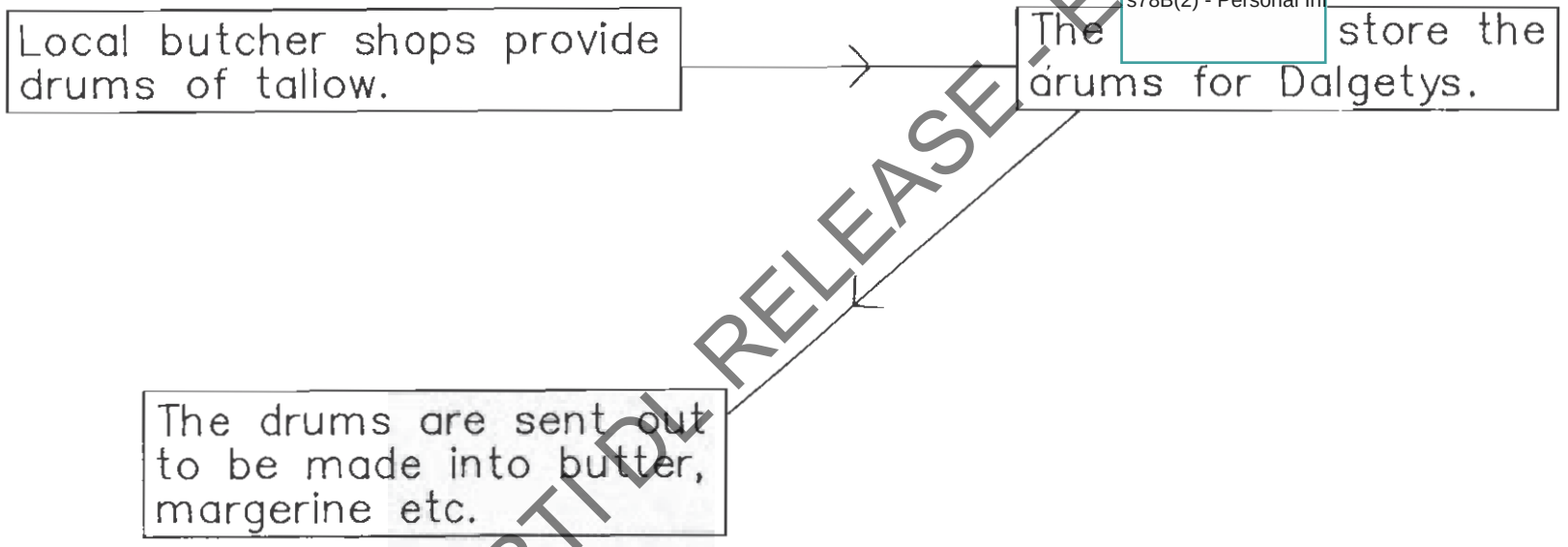
Cattle Hides



RTI DL RELEASE EHP

HOLLINGSWORTH DAMES & MOORE	Engineers and Planners	
DRAWN ARMa	DEVINE GROUP	
TRACED	s78B(2) - Personal PROPERTY	
CHECKED	FLOW DIAGRAM	
DATE 1/5/90		
JOB NUMBER HOI0070	SCALE	Figure C2

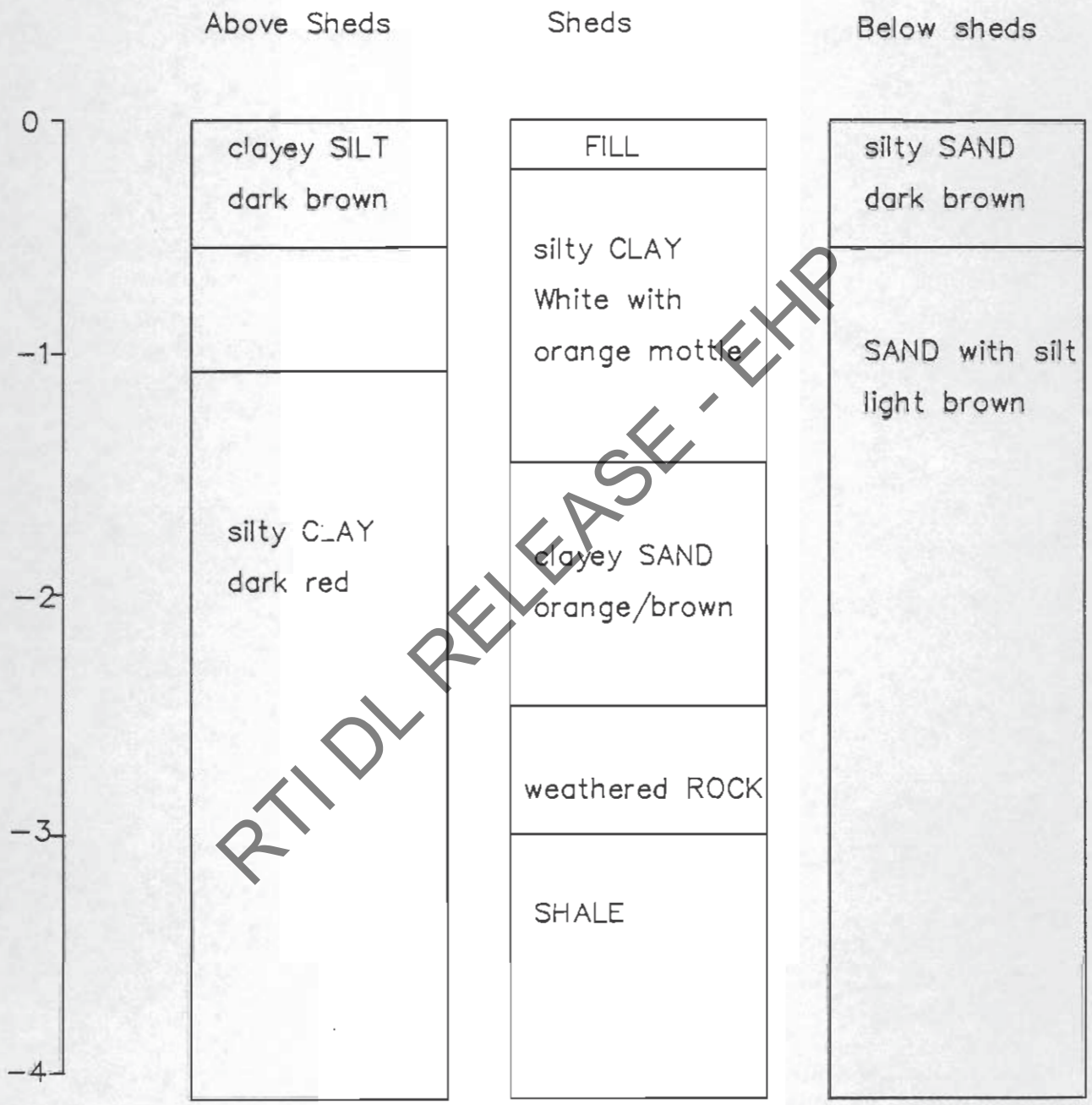
Tallow



RTI DL RELEASE - EHP

HOLLINGSWORTH DAMES & MOORE		Engineers and Planners
DRAWN ARMa	DEVINE GROUP s78B(2) - Personal PROPERTY FLOW DIAGRAM	
TRACED		
CHECKED		
DATE 1/5/90		
JOB NUMBER H010070	SCALE	Figure C3

Typical Subsurface Profiles for Section B



RTI DL RELEASE - EHP

HOLLINGSWORTH DAMES & MOORE Engineers and Planners

DRAWN ARMa	DEVINE GROUP s78B(2) - Personal PROPERTY	
TRACED		
CHECKED		
DATE 1/5/90		
JOB NUMBER HOI0070	SCALE	Figure C4

RHÔNE-POULENC

RHÔNE-POULENC RURAL AUSTRALIA PTY LTD

261 TINGIRA STREET,
PINKENBA, QLD 4008, AUSTRALIA
POSTAL ADDRESS: P.O. BOX 335,
HAMILTON CENTRAL 4007, AUSTRALIA
FAX: (07) 260 1041 TELEX: AA40540
TELEPHONE: (07) 260 1091

MATERIAL SAFETY DATA SHEET

PRODUCT.: ARZEEN

Infosafe:0000C Status: ISSUED RHORURAL 30/03/90 Data Source:RHORURAL

PRODUCT IDENTIFICATION

UN No....:2994	D.G.Class:6.1(a)	CAS No...:N.A.
Hazchem..:3XE	Sub. Risk:N.A.	Poisons..:7 (Fe)
G.T.EPG..:N.A.	Spec.EPG.:GENERAL	Pack. Grp:II

Tradenames.:	Manuf.: ManCode:	Supplier:
Arzeen	RHORURAL	RHORURAL

Use.....:
For control of perennial grasses, as specified, in industrial areas, trees, Dead Arm Disease in vines and Hide Beetles.

Synonyms...:No other synonyms

Ingredients:

	--CAS No:--	Proportion:
Arsenic(present as sodium arsenite)	7784-46-5	56.7% w/v
Water	7732-18-5	52.7% w/v
Caustic Soda liquid	1310-73-2	45.0% w/v

Other Ingredients Data:
No other ingredients

Physical Description / Properties:
Appearance:
A dark brown/black to clear odourless liquid
Formula...:
Sodium arsenite NaAsO2
Boiling Range.....:Greater than 100°C
Volatile Component.:60%
Specific Gravity...:1.75
Flash Point.....:Non flammable
Molecular Weight...:60.0 (Sodium Arsenite)
pH.....:12.0 - 13.0
Form.....:Liquid
Other Physical Data:
Solubility in Water : Miscible

RTI DI RELEASE - EHP

PRODUCT.: ARZEEN

Infosafe:0000C Status: ISSUED RHORURAL 28/02/90 Data Source:RHORURAL

HEALTH HAZARD INFORMATION

Acute Effects

Eye:
Dangerous / toxic

Skin:
Dangerous / toxic

Inhaled:
Dangerous / toxic

Swallowed:
Dangerous / toxic resulting in death

Other Health Effects:
EFFECTS OF OVEREXPOSURE/ACUTE OVEREXPOSURE : Intestinal pain, vomiting, diarrhoea, severe drop in blood pressure.
Repeated minor exposure may have a cumulative effect.

Chronic Effects:
Skin, liver and nerves affected, difficulty in walking

First Aid

Eye:
Irrigate with copious quantity of water for 15 minutes.Seek medical assistance if symptoms persist.

Skin:
Wash with plenty of soap and water.

Inhaled:
Remove victim to fresh air.
Seek medical advice.

Swallowed:
Give plenty of water to drink and induce vomiting.Use fingers in the throat, Ipecac Syrup (APF) or similar emetic.Seek immediate medical assistance.

Other First Aid:
Do not attempt to give anything to a semi-conscious or unconscious person.
In the case of poisoning by any exposure route, contact a doctor or Poisons Information Centre.

Advice to Doctor:

CONSULT POISONS INFORMATION CENTRE

Sydney	(02) 519 0466	Perth	(09) 381 1177
Melbourne	(03) 345 5678	Canberra	(062) 43 2154
Brisbane	(07) 253 8233	Hobart	(002) 38 8485
Adelaide	(08) 267 7000	Darwin	(089) 20 7211

RTIDL RELEASE - EHP

HEALTH HAZARD INFORMATION - (continued)

Toxicity Data:

Highly toxic by oral route
Oral LD50(rat): 10 - 50 mg/kg
Dermal LD50(rabbit): Not available

PRECAUTIONS FOR USE

Exposure Limits:

No occupational exposure standards have been established for the ingredients of this product.

Ventilation:

Use in a well ventilated area only.

Personal Protection:

The following personal protective equipment should be worn.
Safety glasses,goggles or faceshield as appropriate.
PVC gloves.
Approved S.A.A. 1716 respirator for pesticide mists
Long sleeved overalls buttoned at wrist and neck

Flammability:

Non flammable.

Environment:

Highly toxic to aquatic life/ birdlife.
Non-biodegradable.
Avoid contamination of ponds, streams, rivers and water courses

Other Precautions:

To be used strictly in accordance with label instructions

SAFE HANDLING INFORMATION

Storage and Transport:

Wear long sleeved overalls and gloves while handling. Wash thoroughly after handling. DO NOT smoke, eat, drink or chew until after washing.
Store away from food, feed or any other items intended for human or animal consumption.
Avoid contact with skin, eyes and clothing or inhilation of product.
Store in a cool, dry place away from direct sunlight.
Keep out of the reach of children.

RTI DL RELEASE - EHP

PRODUCT.: ARZEEN

Infosafe:0000C Status: ISSUED RHORURAL 28/02/90 Data Source:RHORURAL

SAFE HANDLING (continued):

Packaging and Labeling:

Use product strictly in accordance with the label

Spills and Disposal:

Contain spill, absorb with earth, clay, sand, sawdust, sweeping compound or absorbant material and store in steel drums, for safe disposal.

Avoid contact with skin, eyes and clothing, and inhilation of product.

WASTE DISPOSAL METHOD : Contact Rhône-Poulenc Rural Australia immediately

Reactivity Data:

INCOMPATIBILITY : Will react with strong acids

Fire/Explosion Hazard:

Extinguish fire with the following:

Use water, fog, foam or dry agent

Full protective gear including breathing apparatus (SAA 1716) must be worn

Other Safe Handling:

NEUTRALIZING CHEMICALS : Not needed

ADDITIONAL INFORMATION

Technical Data:

Refer to Rhône-Poulenc Technical Manual or contact a Rhône-Poulenc office

Additional Data A:

EMERGENCY CONTACTS

Police or Fire Brigade : Dial 000 - If ineffective Dial 1100 (Exchange)

Organisation	Location	Telephone	Ask for
Australian Chemicals Ltd	Australia-wide	008 033 111	Emergency Response Coordinator

Contact Points:

Mr Neil Haigh, Quality Control Chemist or Mr Leon Huinck, Manufacturing Manager Ph. (07) 260 1091

End: Infosafe printed: 29 March 1990 By: sch4p4(6) Personal inf

N.A. = Not Applicable or Not Available

RTI DL RELEASE - ERP

ITN: ANDREW MABIN
FAX: (07) 832-3222

Wellcome

WELLCOME AUSTRALIA LIMITED

53 PHILLIPS STREET
CABARITA, N.S.W. 2137

Tel. No.: (02) 736 0666
Emergency Tel. No.: (008) 033 111

MATERIAL SAFETY DATA

IDENTIFICATION

RTI DE RELEASE - ERP

Product Name	FENITROGARD® Liquid Insecticide	U.N. Number: Dangerous Goods Class: Subsidiary Risk:
Trade Name Other Names	FENITROGARD®	Hazchem Code: Poisons Schedule:

Use

A liquid insecticide concentrate for application to stored grain.

Physical Description/Properties

Appearance:	Dark brown oily liquid, unpleasant odour.
Boiling Point:	140-145°C at 0.1 mm of Hg (decomposes).
Vapour pressure (mm of Hg at 20°C):	6×10^{-6}.
Per cent Volatiles:	Negligible.
Specific Gravity:	1.284 at 20°C.
Flash Point:	>71°C (closed cup).
Flammability Limits:	Not applicable.
Autoignition Temperature:	Not available.
Other properties:	Forms emulsion with water.

Ingredients

Chemical entity:	CAS No.:	Proportion:
fenitrothion	122-14-5	100% w/v
other ingredients	-	medium content (10-60%)

SAFE HANDLING INFORMATION

Sto age and Transport: Store in the closed original container in a safe, well ventilated area, as cool as possible. Do not store for prolonged periods in direct sunlight. The product is classified as Class 6.1b, Packaging Group III under the Australian Code for the Transport of Dangerous Goods by Road and Rail.

Spi ls and Disposal: Contain spillage and absorb with sand, earth or inert absorbent. Scoop or shovel into scalable containers for disposal in a designated landfill in accordance applicable local, state and federal regulation

Fir :/Explosion Hazard: The product is not flammable but is combustible. When heated to decomposition emits very toxic fumes of oxides of nitrogen, phosphorus and sulphur. Full protective clothing including breathing apparatus and boots should be worn.

Extinguishing media: Foam, carbon dioxide or dry chemical powder.

• Trade Mark

RTI DL RELEASED - EHP

Co tact Point:

1. Quality Assurance Manager	(02) 736 0666 ext. 898
2. Development Chemist	(02) 736 0666 ext. 862
Emergency only (24 hours)	(008) 033 111

Da

HEALTH HAZARD INFORMATION

Poisonous Hazards

Swallowed:)
Eye:) – Poisonous. Repeated minor exposure may
Skin:) have a cumulative poisoning effect.
Inhaled:)

First Aid

If poisoning occurs, contact a doctor or Poisons Information ...

Swallowed: Induce vomiting preferably using Ipecac Syrup AP; ... atropine tablet every 15 minutes until dryness of the mouth occurs.

Eye: Rinse immediately with plenty of water and seek medical advice.

Skin: Remove any contaminated clothing, wash skin thoroughly and give atropine tablets as above. Get to a doctor or hospital quickly.

Inhaled: Remove person into fresh air. Give atropine tablets as above and get to a doctor or hospital as quickly.

Advice to Doctor

Fenitrothion is an anticholinesterase compound.

RTI DO RELEASE - EHP

PRECAUTIONS FOR USE

Exposure Limits:
TLV not established.

Ventilation:
No special ventilation is required.

Personal Protection:
Avoid contact with eyes and skin. Do not inhale spray mist. Wear cotton overalls buttoned to the neck and wrist and washable hat, elbow length PVC gloves and face shield. When used in enclosed areas wear goggles and half face respirator with combined dust and gas cartridge. If product on skin, immediately wash area with soap and water. After use and before eating, drinking or smoking, wash hands, arms and face thoroughly with soap and water. After each days use wash contaminated clothing, gloves, face shield, goggles and respirator or face piece. Obtain an emergency supply of atropine tablets 0.6 mg.

All personnel handling this product routinely should undergo monitoring of blood cholinesterase levels.

Flammability:
The product is not flammable

APPENDIX D

Analytical Results

RTI DL RELEASE - EHP

APPENDIX D

SOIL ANALYSIS RESULTS

TABLE D1
ARSENIC (mg/kg dry weight)

GRID REFERENCE		ARSENIC CONTENT	GRID REFERENCE		ARSENIC CONTENT
AA11		2	M2	0.0–0.1m	39
BB11		2		0.1–0.2m	14
CC11		1		0.2–0.3m	12
AA22		8		0.3–0.4m	12
BB22	0.0–0.1m	160		0.4–0.5m	15
	0.1–0.2m	62	N2		13
	0.2–0.3m	24	O2		20
	0.3–0.4m	48	C3		13
	0.4–0.5m	21	D3		25
BB22	a	12	E3	0.0–0.5m	380
	b	61		0.5–1.0m	104
	c	32		1.0–2.0m	8
	d	24		2.0–3.0m	11
CC22		7	F3		97
DD22		8	G3		40
F1		3	H3	0.0–0.1m	320
H1		6		0.1–0.2m	132
I1		34		0.2–0.3m	20
K1		10		0.3–0.4m	17
A2	0.0–0.1m	99		0.4–0.5m	22
	0.1–0.2m	240	I3		22
	0.2–0.3m	118	J3		16
	0.3–0.4m	58	K3		110
	0.4–0.5m	36	L3		20
A2	a	20	M3		15
	b	270	N3		20
	c	47	O3		13
	d	18	P3		10
E2		170	Q3		11
F2		12	B4		16
G2	0.0–0.1m	90	C4		17
	0.1–0.2m	19	E4		52
	0.2–0.3m	10	F4		53
	0.3–0.4m	9	H4		12
	0.4–0.5m	8	P4		22

RTI DL RELEASE - EXP

TABLE D1 (cont'd)
ARSENIC (mg/kg dry weight)

GRID REFERENCE		ARSENIC CONTENT	GRID REFERENCE		ARSENIC CONTENT
H2	0.0–0.1m	112	B5	0.0–0.1m	150
	0.1–0.2m	73		0.1–0.2m	72
	0.2–0.3m	44		0.2–0.3m	40
	0.3–0.4m	20		0.3–0.4m	13
	0.4–0.5m	34		0.4–0.5m	11
I2		19	C5		13
J2		29	D5		28
K2		30	F5	0.0–0.1m	420
L2		46		0.1–0.2m	2,400
F5'	0.0–0.1m	190	I9		32
	0.1–0.2m	94	J9		32
	0.2–0.3m	119	N9		220
	0.3–0.4m	44	K10		34
	0.4–0.5m	19	J10	0.0–0.1m	11
H5		46		0.1–0.2m	10
J5		106		0.2–0.3m	10
N5		80		0.3–0.4m	8
P5		40		0.4–0.5m	6
A6		16	K10		15
C6	0.0–0.1m	34	L10		13
	0.1–0.2m	21	L11		8
	0.2–0.3m	24	HS1	0.0–0.5m	67
	0.3–0.4m	9		0.5–1.0m	18
	0.4–0.5m	13		1.0–1.5m	14
				1.5–2.0m	6
D6		68		2.0–2.5m	10
H6		72		2.5–3.0m	6
J6		23			
O6		20			
A7		84	HS2	0.0–0.5m	68
B7		15		0.5–1.5m	2
E7	0.0–0.1m	60		1.5–2.5m	7
	0.1–0.2m	40		2.5–3.5m	2
	0.2–0.3m	34	HS3		78
	0.3–0.4m	46	HS4		18
	0.4–0.5m	40	HS6		11
F7		54	HS7		12
G7		152	HS8		18
H7		270	HS9		68
I7		160	HS10		24
N7		50	L7		44

RTI DL RELEASE - EHP

TABLE D1 (cont'd)
ARSENIC (mg/kg dry weight)

GRID REFERENCE		ARSENIC CONTENT	GRID REFERENCE	ARSENIC CONTENT
O7	0.0–0.1m	24	HS11	20
	0.1–0.2m	33	HS12	49
	0.2–0.3m	25	HS13	49
	0.3–0.4m	18	HS14	28
	0.4–0.5m	7	HS15	44
G8		200	HS16	96
H8		112	HS17	20
J8		84	C1C	2
L8		160	C2C	6
N8		72	C3C	6
O8		6	D2D	1
H9	0.0–0.1m	300	D4D	1
	0.1–0.2m	102		
	0.2–0.3m	69		
	0.3–0.4	44		
	0.4–0.5m	41		

RTI DI RELEASE - EHP

TABLE D2
HEAVY METALS (mg/kg)

GRID REFERENCE	COPPER	LEAD	ZINC	CADMIUM	CHROMIUM
HC2	30	20	115	<1	<5
HC4	5	20	50	<1	<5
HC6	5	15	25	<1	<5
HC7	75	45	90	<1	<5
HC20	5	10	90	<1	<5
P1	5	20	15	<1	<5
P2	10	30	65	<1	<5

TABLE D3
TOTAL PETROLEUM HYDROCARONS
(mg/kg of dry soil)

GRID REFERENCE	T.P.H.
PP1	<50
PP1 (resubmitted)	<50
PP2	<50
PP3	1,050

TABLE D4
ORGANOCHLORINE PESTICIDES
(mg/kg of dry soil)

ORGANOCHLORINE PESTICIDE	GRID REFERENCE				
	HC2	HC4	HC6	HC7	HC20
Aldrin	<0.01	<0.01	<0.01	<0.01	<0.01
a-BHC	<0.01	<0.01	<0.01	<0.01	<0.01
b-BHC	<0.01	<0.01	<0.01	<0.01	<0.01
Bromophos-ethyl	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorphrifos	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorpyrifos-methyl	<0.01	<0.01	<0.01	<0.01	<0.01
Dechlorochlorpyrifos	<0.01	<0.01	<0.01	<0.01	<0.01
DDD	<0.01	<0.01	<0.01	<0.01	<0.01
DDE	<0.01	<0.01	<0.01	<0.01	<0.01
DDT	<0.01	<0.01	<0.01	<0.01	<0.01
Dieldrin	<0.01	<0.01	<0.01	<0.09	<0.01
Endosulfan	<0.01	<0.01	<0.01	<0.01	<0.01
Ethion	<0.01	<0.01	<0.01	<0.01	<0.01
HCB	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor epoxide	<0.01	<0.01	<0.01	<0.01	<0.01
Lindane	<0.01	<0.01	<0.01	<0.01	<0.01
Methoxychlor	<0.01	<0.01	<0.01	<0.01	<0.01
Oxychlordane	<0.01	<0.01	<0.01	<0.01	<0.01

RTI EL RELEASE - EHP

TABLE D5
LEACHABILITY RESULTS

GRID REFERENCE	ARSENIC IN SOIL (mg/kg)	ARSENIC IN LEACHATE (mg/L)
H7	270	0.02
N9	220	<0.01
C3	13	<0.01
F5	2,400	5.0
A2	270	0.62
H5	46	0.03
HS1	67	0.01

RTI DL RELEASE - EHP

HOLLINGSWORTH DAMES & MOORE

Geotechnical Engineers
Environmental Scientists
Town and Regional Planners

ENGINEERS REPORT

REMOVAL OF SOIL FROM 670 GRIEVE ROAD, ROCHEDALE TO CNR SCRUB AND CRIBB ROADS, BELMONT

Supervision of the works outlined below was carried out by Duncan Irvine who ensured the correct removal of each load of fill material from the Rochedale site.

Fill material which had been tipped at 670 Grieve Road, Rochedale was removed and transported to the s78B(2) - Pers property on the corner of Scrub and Cribb Roads in Belmont. This was carried out over two consecutive days, 30 and 31 August, 1990, using a 12 tonne excavator and five 10m³ dump trucks.

The fill material consisted mainly of soil but also included building rubble and concrete which had become mixed with the soil. Several loads of concrete were also returned, as the concrete had originated from the Belmont site. Since the contaminated material could not easily be identified by eye except where it had been spread on the surface, it was necessary to return a more mixed material than was originally dumped. This was done so as to ensure the successful removal of all contaminated soil and concrete.

A total of 76 loads of fill material were removed and transported to the s78B(2) - Pers property.

Average volume per load = 9m³
Total volume removed = 684m³

Number of loads of different material types:

a) Soil/Rubble 36
b) Soil/Concrete 31
c) Concrete 9

HOLLINGSWORTH DAMES & MOORE

sch4p4(6) Personal it

DUNCAN IRVINE
Engineering Geologist

DI/hd
mmw/HD10105

RTI DL RELEASE - EHP

136

Full Report
sent to
minister Office
12/3/91.
(To Be Returned

HOLLINGSWORTH DAMES & MOORE

FINAL REPORT ON REMEDIATION COMPLETION AND SITE VALIDATION

s78B(2) - Personal Int PROPERTY BELMONT

RTI DL RELEASE - EHP

DEVINE BELMONT ESTATES PTY LTD

FINAL REPORT ON REMEDIATION COMPLETION AND SITE VALIDATION s78B(2) - Personal Infor PROPERTY BELMONT

HQI0110
FEBRUARY 1991

RTI DL RELEASE - EHP

HOLLINGSWORTH DAMES & MOORE

135 Wickham Terrace
Brisbane Qld 4004
Australia
Ph : (07) 832 3222
Fax: (07) 832 1687

TABLE OF CONTENTS

VOLUME 1

		Page
1.0	EXECUTIVE SUMMARY	1
1.1	General	1
1.2	Standard	1
1.3	Investigation	1
1.4	Remedial Work in Respect of Section B	2
1.5	Removal of Soil	2
1.6	Waste Water	3
1.7	CHEM Unit	3
1.8	Remediation Work – November 1990 – February 1991	3
1.8.1	Mixing and Removal	4
1.8.2	Validation	4
1.8.3	Validation of Landfill	4
1.8.4	Completion	5
2.0	INTRODUCTION	6
3.0	BACKGROUND	7
4.0	REMEDIATION WORK PREVIOUSLY UNDERTAKEN	9
4.1	Ponds	9
4.2	Demolition Material	9
4.3	Soil	10
4.4	Site Status	10
5.0	REMEDIATION STRATEGY	11
6.0	REMEDIATION WORK NOVEMBER 1990 – FEBRUARY 1991	13
6.1	Site Description	13
6.2	Site Preparation	13
6.3	Pond Material	15
6.4	Contaminated Soil	15
7.0	SAMPLING	18
7.1	Sampling For Arsenic Tests	18
7.1.1	Stockpiles	18
7.1.2	Scraper Loads	18
7.1.3	Relocated Material on Section D	19
7.1.4	Validation Sampling	19
7.2	Sampling for Engineering Tests	21

RTI DL RELEASE - EHP

8.0 TESTING AND QUALITY ASSURANCE 22
8.1 Chemical Testing 22
8.2 Engineering Testing 25

9.0 TEST RESULTS 27
9.1 Stockpiles 27
9.2 Scraper and Truck Loads 28

10.0 VALIDATION 30

11.0 SUMMARY OF REMEDIATION PROCESS 31

PHOTOGRAPHS
Photographic Plates P1 to P9

FIGURES
Figure 1 Approximate Boundary of s78B(2) - Pe Land
Figure 2 Site Layout Section B
Figure 3 Section D Landfill Site
Figure 4 Concentration Prior to Remediation
Figure 5 Validation Testing to 20/2/91
Figure 6 Section D – Top of Mixed Fill
Figure 7 Section D – Top of Capping

VOLUME II

APPENDICES

A. Correspondence CHEM Unit
B. Health & Safety Plan
C. Work Plan
D. Specification
E. Daily Record of Soil Moved on Section B
F. Summaries of Chemical Test Results
G. Chemical Test Certificates
H. Engineering Laboratory Reports
J. Graphs of Distribution of Arsenic Test Results

RTI DL RELEASE - EHP

1.0 EXECUTIVE SUMMARY

1.1 General

This report concerns the assessment and remediation of the s78B(2) - Pe property, Belmont Queensland. Suspected contamination of the soils present on the site was investigated by Hollingsworth Dames & Moore during 1990. A remediation strategy was prepared and implemented.

Remediation of the parts of the site proposed for redevelopment as residential land was completed during February 1991 and is detailed in the attached report to the CHEM Unit of the Bureau of Emergency Services of the Government of Queensland. The CHEM Unit were kept informed of all activities on the site during the remediation process and monitored progress.

All phases of the investigation and remediation have been reported at intervals to the Chem Unit and approval obtained for each subsequent step in the remediation process.

RTI DL RELEASE - EHP

1.2 Standard

In our opinion land is suitable for residential use if the arsenic concentration of its soil does not exceed 50mg/kg. This has been indicated to be acceptable to the CHEM Unit.

1.3 Investigation

In accordance with the processes set out in this report:-

(a) The s78B(2) - Pe land (comprising sections B, C and D in Figure 1) were investigated for arsenic contamination.

(b) Sections C and D were found to not contain contamination levels greater than 50mg/kg.

(c) Some areas of section B (as shown in Figure 2) were found to contain arsenic contamination levels greater than 50mg/kg.

1.4 Remedial Work in Respect of Section B

All soils, including pond walls and sludge, with a concentration of greater than 50mg/kg were remediated. For these areas, a target concentration of less than 30mg/kg has been generally achieved. Some isolated areas of surface arsenic contamination in the range of 30/50mg/kg remain, however this does not affect the suitability of the land for residential use.

Detailed work programmes and health and safety plans were provided to the CHEM Unit for each phase of the work and covered initial investigation, remediation and site validation.

1.5 Removal of Soil

The soil removed from Section B was disposed of in three locations.

(a) Willawong toxic waste disposal facility (off site);

(b) the embankment of the Bulimba Creek viaduct of the Gateway Arterial Road (off site);

(c) the location shown in Section D in Figure 1 (on site).

In accordance with the processes as set out in this report the soil disposed of to locations (b) and (c) was first tested and, if necessary, mixed with clean soil, so that the concentration of arsenic was less than 50mg/kg in accordance with CHEM unit recommendations.

RTI DL RELEASE - EHP

1.6 Waste Water

Waste water from holdings ponds on Section B was discharged to the Brisbane City Council sewerage system with their approval, and the ponds backfilled with clean clay.

1.7 CHEM Unit

Reports on all phases of work and the results of all sampling, testing and monitoring, have been provided to the CHEM Unit. These are listed below for reference:-

a) "Decontamination s78B(2) - Pers Property" Ref. HOI0070 dated May 1990.
This report covered the initial investigation of the s78B(2) - Per Property. It established background levels and levels of contamination on the property and put forward possible remediation.

b) "Soil from s78B(2) - Pe Property Used as Fill, Gateway Arterial" Ref HOI0103 dated October 1990. This report provided information to the CHEM Unit on the soil used as fill in the Bulimba Creek viaduct and documented the associated site work.

c) "An Interim Assessment of the s78B(2) - Per Property, Belmont", Ref. HOI0110R dated October, 1990.
This report was submitted to the CHEM Unit on 22nd October 1990 to indicate the estimated level of contamination remaining on the property as at 10 October, 1990. The attached letter sought the concurrence of the CHEM Unit for the disposal of the remaining soil to a suitable location on Section D of the site.

1.8 Remediation Work - November 1990 - February 1991

This report documents the final removal of the remaining contaminated soils from Section B of the site to the approved landfill site on Section D.

RTI DL RELEASE - EHP

1.8.1 Mixing and Removal

The soil was mixed with clean clay until tests indicated that the arsenic content was below 50mg/kg. Approximately 60,000m^3 of mixed soil and pond sludge was removed from Section B at an average arsenic content of 42mg/kg. The average arsenic content was approximately 44mg/kg in the initial stages which reduced to about 37mg/kg towards the end of the remediation work with slightly less than 90% of the tests recording levels below the required 50mg/kg.

The detailed distribution of the arsenic test results for all phases of this work are included in the attached report.

1.8.2 Validation

The effectiveness of the removal was validated during the remediation process, and some areas required up to 3 to 5 operations before test levels dropped below the 50mg/kg level.

The distribution of test results for validation of Section B are detailed in this report and indicate that the target level of below 30mg/kg was achieved over 80% of the site with an average concentration of 21mg/kg.

1.8.3 Validation of Landfill

The arsenic content of the layers of capping material in the landfill was also extensively checked during placement.

Test results from the uppermost 100mm layer of the clay capping indicated an average value of 19mg/kg, slightly above background levels. More than 90% of these materials were below 30mg/kg and all were below 40mg/kg of arsenic.

A 150 to 200mm top dressing layer of soil stockpiled from preparation of the landfill area was placed over the last capping layer.

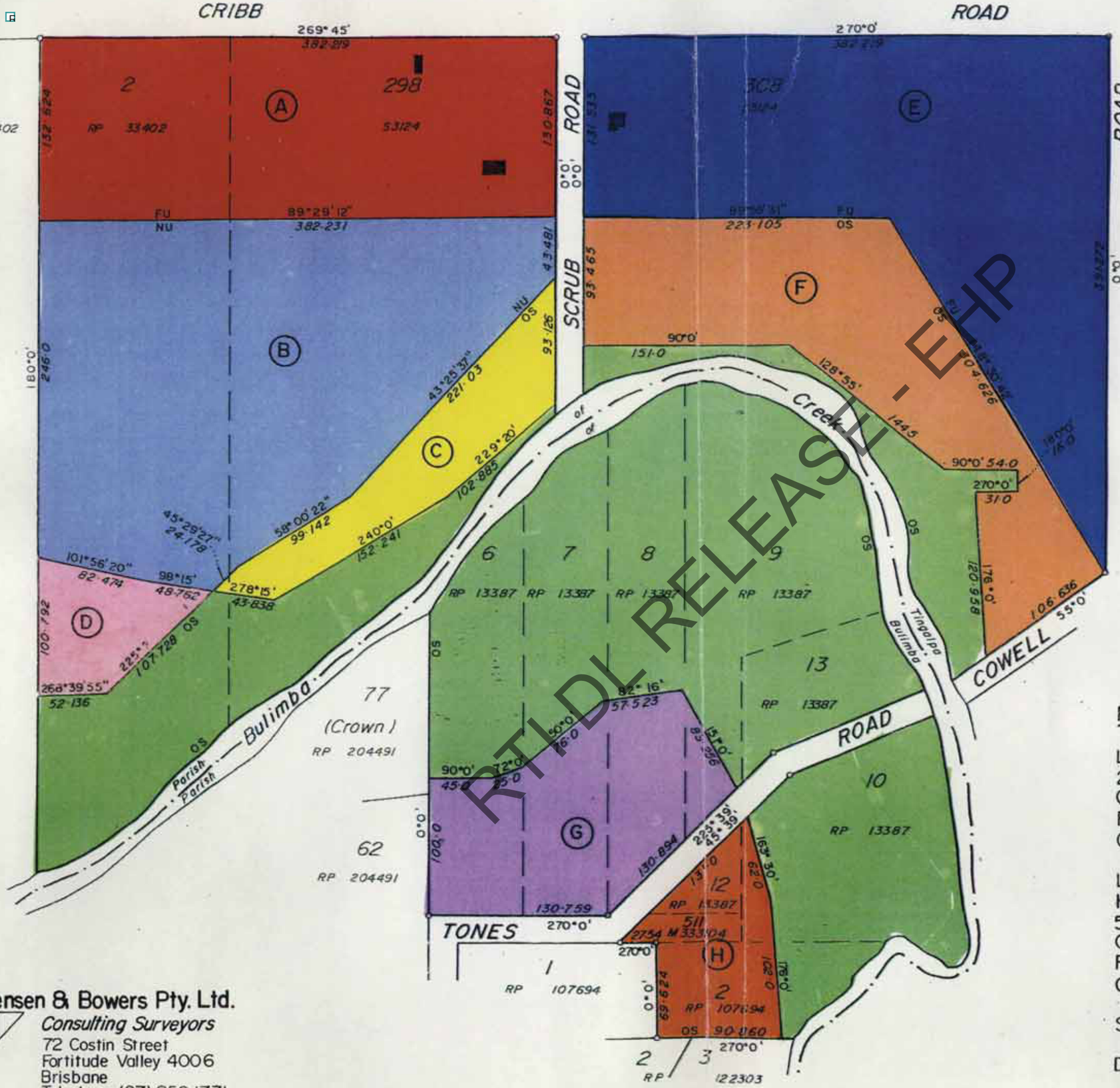
RTI DL RELEASE - EHP

The top dressing material has an arsenic content below general background levels with levels mostly of below 2mg/kg being recorded from check tests.

1.8.4 Completion

It is considered that remediation of the site has been achieved to the levels and in the manner indicated to be acceptable to the CHEM Unit.

RTI DL RELEASE - EHP



SECT.	AREA	COLOUR CODE	PRESENT ZONING	PROPOSED ZONING
A	5·036ha		Future Urban	Residential A
B	7·592ha		Non Urban	Residential A
C	1·441ha		Open Space	Residential A
D	829m^2		Non Urban	Open Space
E	7·093ha		Future Urban	Residential A
F	4·037ha		Open Space	Residential A
G	2·469ha		Open Space	Residential A
H	1·157ha		Open Space	Residential A
			The balance area is to remain in the Open space zone	

PLAN SHOWING PROPOSED ZONING OF

LOT 2 ON RP 33402 AND LOTS 298 AND 308 ON S31.24
ORIG. PORS. 297, 298 AND 308
PARISH OF TINGALPA
COUNTY OF STANLEY

LOT 2 ON RP 107694, LOTS 6-10, 12 AND 13 ON RP 13387 AND LOT 511 ON M333104
ORIG. PORS. IV AND 268
PARISH OF BULIMBA
COUNTY OF STANLEY

SCALE 1:3000

DATE 27-11-90

FINAL AREAS AND DIMENSIONS ARE SUBJECT TO SURVEY.

T.H. Jensen & Bowers Pty. Ltd.
Consulting Surveyors
72 Costin Street
Fortitude Valley 4006
Brisbane
Telephone (07) 852 1771

3737-27-B

RTI DL RELEASE - EHP
RTI 14-037 File A Page 75 of 98

CHEM UNIT

CHEMICAL HAZARDS AND EMERGENCY MANAGEMENT UNIT
A Division of the Bureau of Emergency Services

Telephone: (07) 224 4422
Facsimile: (07) 224 4471

P.O. BOX 13,
NORTH QUAY, QLD 4002

6th March, 1991

SITE CONTAMINATION REPORT

1.0 APPLICANT

1.1 Name: Devine Belmont Estates Pty. Ltd.,

1.2 Address: c/– David Devine,
Devine Group,
3 Westmoreland Boulevard,
SPRINGWOOD, QLD 4127

2.0 SUBJECT PROPERTY IDENTIFICATION

2.1 Address: Corner of Cribb and Scrub Road, BELMONT, QLD

2.2 Real Property Description: Lot 2 on RP33402 and Lots 298 and 308 on S3124 Original Portions 297, 298 and 308, Parish of Tingalpa, County of Stanley.

Lot 2 on RP 107694, Lots 6–10, 12 and 13 on RP 13387 and Lot 511 on M 333104 Original Portions IV and 268, Parish of Bulimba, County of Stanley.

2.3 Current Zoning: Future urban/Non Urban/Open Space (refer Attachment I)

2.3 Proposed Zoning: Residential A/Open space (refer Attachment I)

3.0 LOCAL AUTHORITY AREA

3.1 Name: Brisbane City Council

3.2 Address: c/– Town Clerk
G.P.O. Box 1434,
BRISBANE, QLD 4001

RTI DI RELEASE - EHP

OFFICE ADDRESS: 8th Floor, Executive Building, 100 George Street, BRISBANE 4000

4.0 DATE INITIAL SUBMISSION RECEIVED BY CHEM UNIT

May 1990 (Report "Decontamination s78B(2) - Per Property" Ref. HOI0070, Consultants Hollingsworth Dames and Moore)

5.0 STATUS ON REGISTER OF CONTAMINATED SITES

Former contaminated site, file reference number CS6

6.0 SUMMARY OF STUDIES UNDERTAKEN BY APPLICANT OR REQUESTED BY DIRECTOR

Four reports of studies which were undertaken by the applicants consultant Hollingsworth Dames and Moore were provided to the CHEM Unit. (Refer Attachment II)

7.0 STATEMENT OF SUITABILITY

On the basis of information supplied to the CHEM Unit the subject property is suitable for Residential A zoning with the following conditions.

7.1 CONDITIONS

With reference to Attachment I:-

(a) The area colour coded green and presently zoned as Open Space is unsuitable as Residential A but is suitable to remain as Open Space zone;

(b) The area colour coded pink and identified as Section D and is presently zoned as Non Urban is suitable for open Space zoning.

RTI DL RELEASE - EHP

sch4p4(6) Personal information

MICHAEL KINNANE
Acting Director

6th March, 1991

R

ATTACHMENT II

- "Decontamination s78B(2) - Per Property" Ref HOI0070 dated May 1990. This report covered the initial investigation of the s78B(2) - Personal Information property. It established background levels and gave a preliminary identification of contaminated and non-contaminated zones. Options for remediation were outlined.

- "Soil from s78B(2) - Pers Property Used as Fill, Gateway Arterial" Ref HOI0103, dated October 1990. This report provided information on soil used as fill in the Bulimba Creek viaduct and documented the associated site work.

- "An Interim Assessment of the s78B(2) - Pers Property, Belmont", Ref HOI0110R dated October, 1990. This report detailed the level and extent of contamination remaining on the property as at 10 October 1990. A letter dated 22 October was attached to this report seeking advice on a proposed remediation plan for remaining contaminated soil.

  On 14 November 1990 the CHEM Unit advised approval of the final remediation works with certain recommendations and conditions.

- "Final Report on Remediation Completion and Site Validation s78B(2) - Pe Property Belmont", Ref HOI0110 dated February 1991. This report summarised the initial site survey assessment, the development and implementation of remediation plans, quality control of chemical monitoring of remediation and final validation testing of decontaminated zones and on site disposal areas.

RTI DL RELEASE - EHP

97

Draft

Comment on heading and content would be appreciated.

sch4p4(6) P

16/11

SITE CONTAMINATION REPORT

APPLICANT

Devine Belmont Estate Pty. Ltd.
3 Westmoreland Blvd,
SPRINGWOOD, QLD 4127

PROPERTY

Address

s78B(2) - Person property
Cnr Scrub Road and Cribb Road,
BELMONT, QLD 4153

Description

B:	Lot 2 on RP 3302	Parish of Tingalpa
	Lot 298 on S 3124	Parish of Tingalpa
C:	Lot 308 on S 3124	Parish of Tingalpa
D:	Lot 2 on RP 107694	Parish of Bulimba
	Lots 6–10, 12 and 13 on RP 133877	Parish of Bulimba
	Lot 511 on M 33104	Parish of Bulimba

Current Zoning

Future Urban (B, C)

Non Urban (B)

Open Space (B, C, D)

Residential A (D)

Proposed Zoning

Residential A

Open Space

Ian,

Perhaps we could have a standard form (say one page) with attachments eg conditions studies analyses

sch4p4(6)

26/11

RTI DL RELEASE - EHP

Date of Submission

(?) 28 July 1990

Is Property or part of it on Register of Contaminated Sites ?

Yes – Reference Number _____

Summary of Studies

1. Hollingsworth Dames and Moore, May 1990 Decontamination of Edwards Property.

   (a) Brief site history.

   (b) Potential contaminants.

   - arsenic from hide treatment
   - pesticides
   - waste oil
   - petrol (underground storage tank)
   - diesel

   (c) Brief site description.

   (d) Field investigations.

   - confirm site history
   - preliminary soil and surface water testing
     100 m and 20 m grids
   - second sampling program

     arsenic determinations (107 locations, 177 samples)

     leachability testing (7 samples)

     hydrocarbon analyses (4)

     testing for nineteen organochlorines (5)

     testing for five heavy metals (7)

RTI DL RELEASE - EHP

- analysis by a NATA registered laboratory
- quality assurance program using 10% of samples

  half retested/half to Government Chemical Laboratory

  one spiked with organochlorines

(e) Extent of contamination.

- toxicology
- soil standards for Arsenic

(f) Proposed remediation.

Relocate 15 000 m^3 of soil to:

- elsewhere on property
- cover in a BCC tip
- co–disposal at Willawong
- placement at Willawong
- fill in a road embankment

(g) Site health and safety plan.

(h) Analytical results.

2. Letter from Hollingsworth Dames and Moore of 14 August 1990, seeking approval to relocate 6000 m^3 of soil containing approximately 50 mg/kg As. Material containing more than 100 mg/kg As is to go to Willawong; 1000 m^3 immediately and 4000 m^3 to be stockpiled.

RTI DL RELEASE - EHP

3. Hollingsworth Dames and Moore, October 1990. An interim assessment of the s78B(2) - Pers Property, Belmont.

(a) Remedial action.

270 m^3 (av 476 mg/kg As) taken to Willawong

970 m^3 (av 209 mg/kg As) taken to Willawong

6000 m^3 (less than 50 mg/kg As) taken to road embankment

(b) Field investigations

- testing soil samples from remediated areas
  30 samples, 20 metre grid, top 100 mm
- testing soil stockpile (8 samples)
- testing soil from backhoe pits (8 samples)
- testing 2 samples for hydrocarbons

(c) Analysis at NATA registered laboratory with a quality assurance program.

(d) Remaining contamination:

m^3	Location	mg/kg As
300	concrete screenings	115
500	drain scrapings	70
780	beneath shed	30
280	ridge	200
760	top corner	60
1350	slope below shed	160
400	small patches	40
2000	stockpile	77
5000	pond sludge (to be relocated on site)	42

RTI DL RELEASE - EHP

4. Letter from Hollingsworth Dames and Moore of 22 October 1990 seeking concurrence with proposal to relocate 7000 m^3 low level contaminated soil to an adjacent property owned by the present owner. The material is unlikely to be accepted at Willawong or as subgrade for road construction. Two disposal options south of Bulimba Creek are presented:

   (a) fill for gravel pits below grade

   (b) placement above the "Regulation Line"

5. Hollingsworth Dames and Moore (c. Nov. 1990)
   Soil from s78B(2) - Per Property Belmont used as fill Gateway Arterial.

   (a) Details of the clean–up proposal involving 6000 m^3 of low level contaminated material.

   (b) Conditions placed on proposal by CHEM Unit:

      - o should not exceed 50 mg/kg arsenic
      - o prior analysis
      - o avoid placing fill near materials that would lower or raise pH
      - o control dust
      - o each truck should be sampled and placement area recorded

   (c) site preparation and soil dispatch

   (d) 1500 m^3 high level contaminated material accepted by Willawong

   (e) results of analyses

      - o 292 of low level contaminated material ("S" classified soil)
        mean 31.9 mg/kg arsenic
        90 percentile arsenic concentration 130 mg/kg
      - o 200 of "clean" soil ("c" classified)
        mean 20.1 mg/kg arsenic
        90 percentile arsenic concentration 49 mg/kg.
      - o 128 quality assurance check samples
      - o 14 subsurface samples from three test pits (and soil profiles) and surface samples from the vicinity.

RTI DL RELEASE - EHP

Other Investigations

Officers of the CHEM Unit, Department of Environment and Heritage and Brisbane City Council have visited the site on several occasions between May and November 1990.

Brisbane City Council has analysed material disposed of at Willawong to confirm levels of arsenic and establish leaching properties. Arsenic levels determined by BCC have tended to be higher than expected (800 mg/kg cf 476 mg/kg average).

Statement of Suitability

On the basis of the information provided in the above documents, the proposal to develop the subject property would be acceptable to this Unit provided the following conditions are met.

Conditions

1. Surface material know to contain more than 50 mg/kg is removed from residential areas and the success of the removal validated by subsequent testing.

2. The 5000 m^3 of pond sludge is relocated to an area that will not be used for residential development. RAV3387. buried under 1m 20-50ppm.

3. The 7000 m^3 of low level contaminated soil is relocated to an area that will not be used for residential development.

4. The proposal to dispose of the low level contaminated material and the pond sludge in the abandoned loam pits between the sewerage main and the western gravel pit would be most acceptable to this Unit.

It is noted that five out of six leaching tests conducted under mildly acid conditions (US EPA TCLP) on similar material from the site produced leachates that are acceptable under the National Health and Medical Research Council/Australian Water Resources Council Guidelines for Drinking Water. The leachate from one sample (which contained 270 mg/kg As) exceeded the drinking water guideline by a factor of 12 which is well inside the x 100 drinking water standard accepted in most countries for leachates. Another sample which contained 2400 mg/kg of As produced a leachate which contained 100 times the drinking water standard. The bulk leachate concentrations from a predominantly clay environment would be expected to be considerably less than the laboratory estimates.

Deposition with additional clay material would be highly desirable to decrease the permeability of the material and to increase the likelihood of arsenic binding to clay in the disposal site.

The disposed material should be covered by 0.5 m of clay with a surface contour resembling the original land surface. This should be covered with clean top soil and stabilised to minimise the risk of erosion.

RTI DL RELEASE - EHP

UPDATE REPORT ON CONTAMINATED SITES IN BELMONT/CARINDALE

In the vicinity of Scrub and Cribb Roads, four significant sites of contamination are in the process of assessment and remediation.

Those sites are:

OWNER	LOCATION	CONTAMINATION	CAUSE
s78B(2) - Personal Information	Cnr. Scrub and Cribb Roads	Arsenic	Tannery Site
Starlight Nominees	Scrub Road	Arsenic	Cattle Dip
Suncorp	Cnr. Scrub and Cribb Roads	Arsenic Pesticides	Wool Scour
s78B(2) - Perso	Cribb Road	Arsenic	Tannery Site

As these sites are to be redeveloped for residential use, remediation to less than a 50 mg/kg (arsenic in soil) standard is required.

Further detail on each site is set out below and illustrated on the attached sketch.

1. s78B(2) - Personal Information PROPERTY

Arsenic contamination up to 380 mg/kg has been found over an extensive area of this site.

The site is in the later stages of remediation as set out below:

- 1500 cu metres of soil (arsenic content > 250 mg/kg) has been taken to the Willawong Average Liquid Waste Treatment Plant.
- 7000 cu metres of soil (arsenic content less than 30 mg/kg) has been used as fill in Gateway Arterial embankment at Bulimba.
- 10,000 cu metres of soil (av arsenic content approximately 80 mg/kg) and 5,000 cu metres of Arsenic contaminated sludge (30-40 mg/kg) have to be relocated before the site can be considered decontaminated.

As space for such soil is restricted at Willawong, this 15,000 cu metres may have to be encapsulated on site.

RTI DL RELEASE - EHP

2. s78B(2) - Pers **PROPERTY**

This site has been decontaminated and is being prepared for residential development.

Levels of contamination were similar to the s78B(2) - Perso Property and approximately 60,000 cu metres of soil were removed to Willawong.

3. **STARLIGHT NOMINEES**

Soil contaminated with up to 250 mg/kg of arsenic has been found over a relatively small area of this site.

It is planned to remove some 200 cu metres of soil. This soil will be accepted by the Brisbane City Council at Willawong.

4. **SUNCORP PROPERTY**

Investigation of this site is at a preliminary stage only. However, it appears that contamination is due to residues from the wool bought in for cleaning rather than use of arsenic chemicals on site.

Further sampling is needed to fully delineate the areas of contamination.

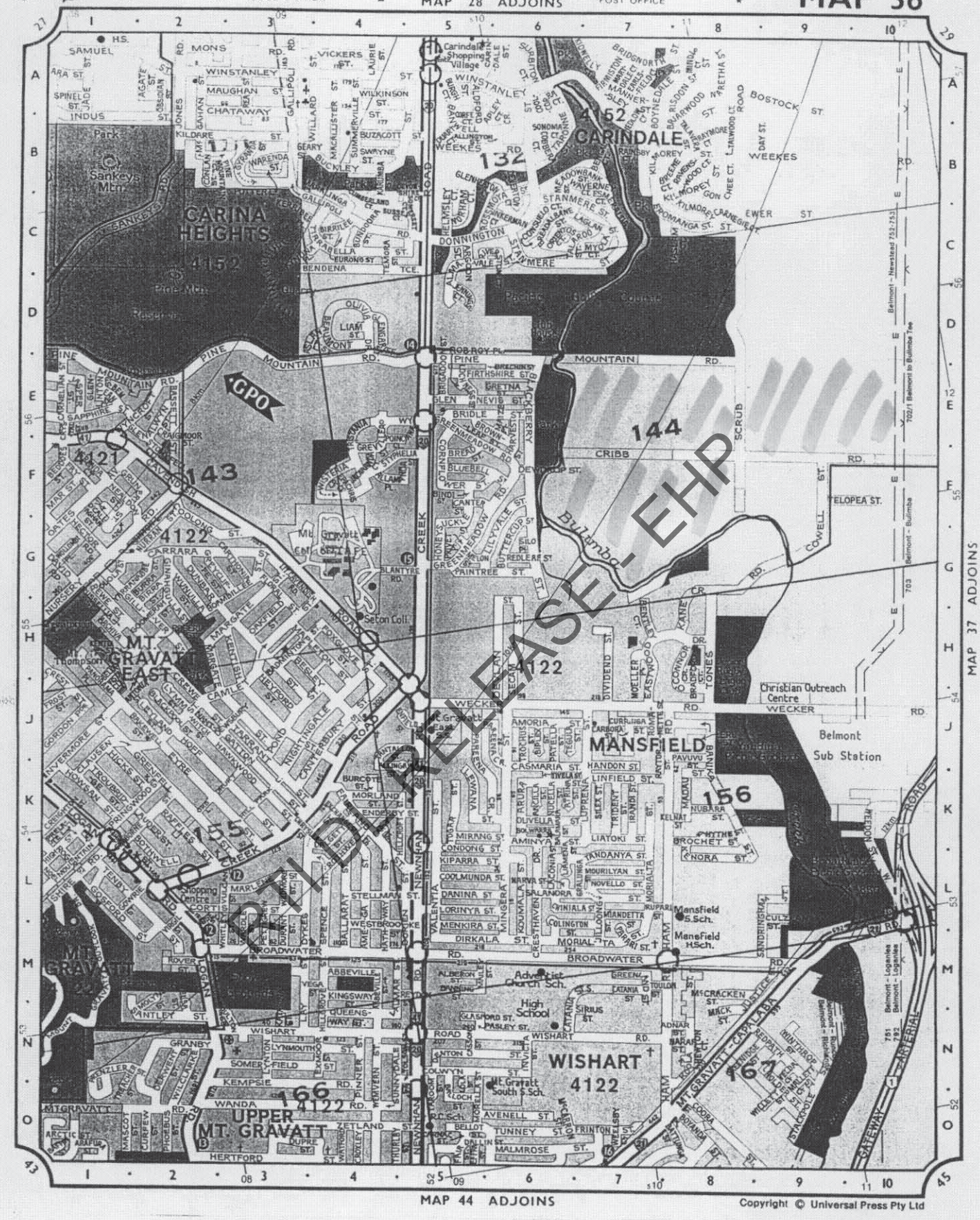
A. Brunner
G. O'Brien

24.10.90

RTI DL RELEASE - EHP

Properties Under Investigation

b



Contaminated Areas

5

MAP 36

RTI DU RELEASE - EHP

DEPARTMENT OF ENVIRONMENT AND HERITAGE

		Date
rector-General	sch4p4(6) Personal informatic	
...al Director		3/11
...anch Head (sign in full)		3/11/92
ontact Officer (sign in full)	sch4p4(6) Pe	27 October 1992
		2/11/92

Contaminated Land Section
(07) 227 7370

900006

SITE CONTAMINATION REPORT

REPORT NUMBER 140-0289

RTI DL RELEASE - EHP

1.0 APPLICANT

Name: td

Address:

2.0 PROPERTY IDENTIFICATION

2.1 Address: Cnr Cribb & Scrub Road

2.2 Real Property Description: Lot 13 RP 13387
County of Stanley
Parish of Bulimba

2.3 Name and Address of Owner/s:

2.4 Current Zoning: Future urban/non urban/open space

sch4p4

5.11.92

2.5 Proposed Zoning: Residential A/open space

3.0 LOCAL AUTHORITY

Name: Brisbane City Council

4.0 DATE FINAL SUBMISSION RECEIVED BY THE DEPARTMENT OF ENVIRONMENT AND HERITAGE

15 October 1992

5.0 STUDIES UNDERTAKEN BY APPLICANT OR REQUESTED BY DIRECTOR

Reports of studies which were undertaken by Hollingsworth Dames and Moore Consultants

1. Decontamination s78B(2) - Pe Property
2. Remediation of s78B(2) - P Property
3. Soil from s78B(2) - Pe Property - Belmont - Used as fill Gateway Arterial
4. Interim Assessment of s78B(2) - Pe Property - Belmont
5. Remediation and Site Validation - s78B(2) - Pe Property
6. Final Report on Remediation completion and Site Validation - s78B(2) - Pers Property Belmont

6.0 STATUS ON REGISTER OF CONTAMINATED SITES

Status: Restricted

File No.: 900006

7.0 STATEMENT OF SUITABILITY

On the basis of information supplied to the Department of Environment and Heritage, the subject property is unsuitable as Residential A but is suitable as Open Space zone. Any proposal to utilise this area for other purposes requires approval from the Department of Environment and Heritage.

Yours sincerely

SIGNED BY
DIRECTOR-GENERAL

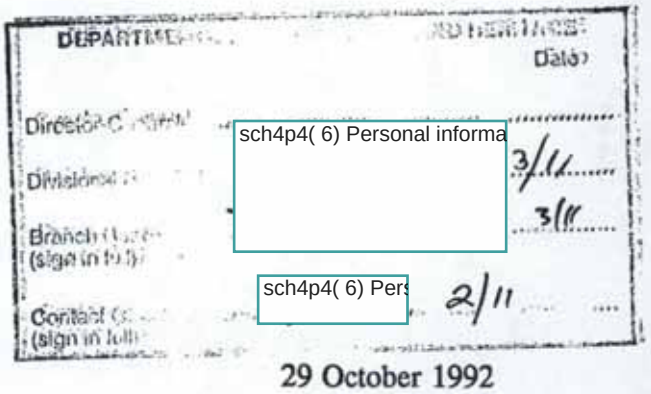
Craig Emerson
Director-General

C:\WP51\DOC\REPORTS\13

sch4p4(6) Pe

2.11.92

RTI DL RELEASE - EHP



Contaminated Land Section
(07) 227 7370

29 October 1992

900006

SITE CONTAMINATION REPORT

0283 (was corrected on original).

REPORT NUMBER 140-283

RTI DL RELEASE - EHP

1.0 APPLICANT

Name:

Address:

2.0 PROPERTY IDENTIFICATION

2.1 Address: Cnr Cribb & Scrub Road, BELMONT

2.2 Real Property Description: Lot 6 RP 13387
County of Stanley
Parish of Bulimba

2.3 Name and Address of Owner/s:

5.11.92

sch4p

2.4 Current Zoning: Future urban/non urban/open space

2.5 Proposed Zoning: Residential A/open space

3.0 LOCAL AUTHORITY

Name: Brisbane City Council

4.0 DATE FINAL SUBMISSION RECEIVED BY THE DEPARTMENT OF ENVIRONMENT AND HERITAGE

15 October 1992

5.0 STUDIES UNDERTAKEN BY APPLICANT OR REQUESTED BY DIRECTOR

Reports of studies which were undertaken by Hollingsworth Dames and Moore Consultants

1. Decontamination s78B(2) - Pe Property
2. Remediation of s78B(2) - P Property
3. Soil from s78B(2) - Pe Property - Belmont - Used as fill Gateway Arterial
4. Interim Assessment of s78B(2) - P Property - Belmont
5. Remediation and Site Validation - s78B(2) - Pe Property
6. Final Report on Remediation completion and Site Validation - s78B(2) - Person Property Belmont

6.0 STATUS ON REGISTER OF CONTAMINATED SITES

Status: Restricted

File No.: 900006

7.0 STATEMENT OF SUITABILITY

On the basis of information supplied to the Department of Environment and Heritage, the subject property is unsuitable as Residential A but is suitable as Open Space zone. Any proposal to utilise this area for other purposes requires approval from the Department of Environment and Heritage.

Yours sincerely

SIGNED BY
DIRECTOR-GENERAL

Craig Emerson
Director-General

RTI DL RELEASE - EHP

DEPARTMENT OF ENVIRONMENT AND HERITAGE

Date

Director-General .....

Divisional Director sch4p4(6) Personal informa 3/11

Branch Head (sign in full) 3/11/92

29 October 1992

Contact Officer (sign in full) sch4p4(6) Pers 2/11

Contaminated Land Section
(07) 227 7370

900006

SITE CONTAMINATION REPORT

REPORT NUMBER 140-0284

RTI DL RELEASE - EHP

1.0 APPLICANT

Name:

Address:

2.0 PROPERTY IDENTIFICATION

2.1 Address: Cnr Cribb & Scrub Road
BELMONT

2.2 Real Property Description: Lot 7 RP 13387
County of Stanley
Parish of Bulimba

2.3 Name and Address of Owner/s:

sch4p4(6) Pe 2.11.92

2.4 Current Zoning: Future urban/non urban/open space

2.5 Proposed Zoning: Residential A/open space

3.0 LOCAL AUTHORITY

Name: Brisbane City Council

4.0 DATE FINAL SUBMISSION RECEIVED BY THE DEPARTMENT OF ENVIRONMENT AND HERITAGE

15 October 1992

5.0 STUDIES UNDERTAKEN BY APPLICANT OR REQUESTED BY DIRECTOR

Reports of studies which were undertaken by Hollingsworth Dames and Moore Consultants

1. Decontamination s78B(2) - Pe Property
2. Remediation of s78B(2) - Pe roperty
3. Soil from s78B(2) - P Property - Belmont - Used as fill Gateway Arterial
4. Interim Assessment of s78B(2) - Pe Property - Belmont
5. Remediation and Site Validation - s78B(2) - P Property
6. Final Report on Remediation completion and Site Validation - s78B(2) - Perso Property Belmont

6.0 STATUS ON REGISTER OF CONTAMINATED SITES

Status: Restricted

File No.: 900006

7.0 STATEMENT OF SUITABILITY

On the basis of information supplied to the Department of Environment and Heritage, the subject property is unsuitable as Residential A but is suitable as Open Space zone. Any proposal to utilise this area for other purposes requires approval from the Department of Environment and Heritage.

Yours sincerely

SIGNED BY
DIRECTOR-GENERAL

Craig Emerson
Director-General

RTI DL RELEASE - EHP

DEPARTMENT OF ENVIRONMENT AND HERITAGE

Date

Director-General .....

Divisional Director sch4p4(6) Personal inform .. 3/11

Branch Head (sign in full) .. 3/11/92

Contact Officer (sign in full) sch4p4(6) 27 October 1992 .. 2/11/92

Contaminated Land Section
(07) 227 7370

900006

SITE CONTAMINATION REPORT

REPORT NUMBER 140-0285

RTI DL RELEASE - EHP

1.0 APPLICANT

Name:

Address:

2.0 PROPERTY IDENTIFICATION

2.1 Address: Cnr Cribb & Scrub Road
BELMONT

2.2 Real Property Description: Lot 8 RP 13387
County of Stanley
Parish of Bulimba

2.3 Name and Address of Owner/s:

sch4p4

3.11.92

2.4 Current Zoning: Future urban/non urban/open space

2.5 Proposed Zoning: Residential A/open space

3.0 LOCAL AUTHORITY

Name: Brisbane City Council

4.0 DATE FINAL SUBMISSION RECEIVED BY THE DEPARTMENT OF ENVIRONMENT AND HERITAGE

15 October 1992

5.0 STUDIES UNDERTAKEN BY APPLICANT OR REQUESTED BY DIRECTOR

Reports of studies which were undertaken by Hollingsworth Dames and Moore Consultants

1. Decontamination s78B(2) - Pe Property
2. Remediation of s78B(2) - Pers Property
3. Soil from s78B(2) - Pe Property - Belmont - Used as fill Gateway Arterial
4. Interim Assessment of s78B(2) - Pe Property - Belmont
5. Remediation and Site Validation s78B(2) - Pers Property
6. Final Report on Remediation completion and Site Validation - s78B(2) - Perso Property Belmont

6.0 STATUS ON REGISTER OF CONTAMINATED SITES

Status: Restricted

File No.: 900006

7.0 STATEMENT OF SUITABILITY

On the basis of information supplied to the Department of Environment and Heritage, the subject property is unsuitable as Residential A but is suitable as Open Space zone. Any proposal to utilise this area for other purposes requires approval from the Department of Environment and Heritage.

Yours sincerely

SIGNED BY
DIRECTOR-GENERAL

Craig Emerson
Director-General

sch4p4(6

2.11.92

RTI DL RELEASE - EHP

DEPARTMENT OF ENVIRONMENT AND HERITAGE

Date

Director-General sch4p4(6) Personal informa .....

Divisional Director . 3/11

Branch Head (sign in full) . 3/11/92

Contact Officer (sign in full) sch4p4(6) Perso 2/11/92

Contaminated Land Section
(07) 227 7370

29 October 1992

900006

SITE CONTAMINATION REPORT

REPORT NUMBER 140-0286

RTI DL RELEASE - EHP

1.0 APPLICANT

Name:

Address:

2.0 PROPERTY IDENTIFICATION

2.1 Address: Cnr Cribb & Scrub Road
BELMONT

2.2 Real Property Description: Lot 9 RP13387
County of Stanley
Parish of Bulimba

2.3 Name and Address of Owner/s:

2.4 Current Zoning: Future urban/non urban/open space

2.5 Proposed Zoning: Residential A/open space

sch4p4

3.0 LOCAL AUTHORITY

Name: Brisbane City Council

4.0 DATE FINAL SUBMISSION RECEIVED BY THE DEPARTMENT OF ENVIRONMENT AND HERITAGE

15 October 1992

5.0 STUDIES UNDERTAKEN BY APPLICANT OR REQUESTED BY DIRECTOR

Reports of studies which were undertaken by Hollingsworth Dames and Moore Consultants

1. Decontamination s78B(2) - Pe Property
2. Remediation of s78B(2) - Pe Property
3. Soil from s78B(2) - Pe Property - Belmont - Used as fill Gateway Arterial
4. Interim Assessment of s78B(2) - Pe Property - Belmont
5. Remediation and Site Validation - s78B(2) - Per Property
6. Final Report on Remediation completion and Site Validation - s78B(2) - Persona Property Belmont

6.0 STATUS ON REGISTER OF CONTAMINATED SITES

Status: Restricted

File No.: 900006

7.0 STATEMENT OF SUITABILITY

On the basis of information supplied to the Department of Environment and Heritage, the subject property is unsuitable as Residential A but is suitable as Open Space zone. Any proposal to utilise this area for other purposes requires approval from the Department of Environment and Heritage.

Yours sincerely

SIGNED BY
DIRECTOR-GENERAL

Craig Emerson
Director-General

C:\WP51\DOC\REPORTS\REP.9

sch4p4(

2.11.92.

RTI DL RELEASE - EHP