

Attachment 11

**Preliminary Environmental Site Assessment, prepared
by JBS Environmental Pty Ltd, October 2009**

Preliminary Environmental Site Assessment

Diverse Property Solutions
c/- EG Property Group

Jacaranda Ponds
Lot 75 DP214752, Lot 44 DP214755, Lot 1
DP784300, Lot 2 DP784300, Lot 3 DP784300, Lot 20
DP214753, Lot 50 DP751637, Lot 3 DP230943, Lot
52 DP1104504 and Lot 2 DP533402
Spinks Road
Glossodia NSW

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JBS 40946-14016
JBS Environmental Pty Ltd

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List of Abbreviations

A list of the common abbreviations used throughout this report is provided below.

AEC	Area of Environmental Concern
AHD	Australian Height Datum
As	Arsenic
ASLP	Australian Standard Leaching Procedure
Cd	Cadmium
COPC	Contaminants Of Potential Concern
CSM	Conceptual site model
Cr	Chromium
Cu	Copper
bgs	below ground surface
BTEX	Benzene, toluene, ethylbenzene and xylenes
B(a)P	Benzo(a)pyrene
DECC	NSW Department of Environment and Climate Change
the Department	NSW Department of Planning
DQIs	Data Quality Indicators
DQOs	Data Quality Objectives
DWE	NSW Department of Water and Energy
EMP	Environmental Management Plan
ESA	Environmental Site Assessment
EPA	NSW Environment Protection Authority
Ha	Hectare
Hg	Mercury
HIL	Health based investigation level
JBS	JBS Environmental
LOR	Limit of Reporting
Mn	Manganese
Ni	Nickel
OCP	Organochlorine Pesticides
OPP	Organophosphorus Pesticides
PAHs	Polycyclic aromatic hydrocarbons
Pb	Lead
PCBs	Polychlorinated Biphenyls
PID	Photoionisation Detector
PIL	Phytotoxicity based investigation level
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RPD	Relative Percentage Difference
SAQP	Sampling, Analysis and Quality Plan
TPH	Total Petroleum Hydrocarbons
Zn	Zinc

Executive Summary

Introduction and Objectives

JBS Environmental Pty Ltd was engaged by Diverse Property Solutions c/o EG Property Group, to conduct a preliminary Environmental Site Assessment (ESA) of a property located off Kurmond Road, Spinks Road, Derby Place and James Street, Glossodia, NSW. The site has an approximate area of 186 hectares, and comprises: Lot 75 DP214752; Lot 1 DP784300; Lot 2 DP784300; Lot 44 DP214755; Lot 3 DP784300; Lot 50 DP751637; Lot 20 DP214753; Lot 3 DP230943; Lot 52 DP1104504; and Lot 2 DP533402.

It is understood that the Stage 1 site assessment was required to identify contamination, and possible constraints on future site development.

The investigation was conducted with consideration to relevant guidelines made or approved by the NSW Department of Environment, Climate Change and Water (DECCW), and relevant Australian Standards.

Scope of Work

The scope of the work comprised: a review of historical documentation to identify potential areas of environmental concern and chemicals of concern; review of the topography, geology and hydrogeology of the Site and surrounding areas; a review of Council planning certificates; a site inspection; and preparation of a Preliminary Contamination Assessment report in general accordance with relevant DECCW Guidelines.

Current Site Use

The site is currently being used as a poultry farm, for grazing of cattle and some horses, and for residential purposes.

Site History and Potential for Contamination

From a site inspection and a review of the historical aerial photographs and the lands title documentation it appeared that the site had previously been used for agricultural and grazing purposes, with parts of the site also historically used as orchards. Development of portions of Lots 2 and 3 in DP784300 for a poultry farming commenced around 1971, while the development of Lot 3 in DP230943 as a poultry farm commenced in 1981. The site is currently being used as a poultry farm, for grazing of cattle and some horses, and for residential purposes.

Areas of Environmental Concern and Associated Contaminants of Potential Concern

Area of Environmental Concern (AEC)	Contaminants of Potential Concern (COPC)
Areas formerly used as orchards	Heavy metals, pesticides
Former and present building and shed locations across the site.	Heavy metals, asbestos
Former site infrastructure (including crushers and screens) in the central, eastern and northern portions of the site.	Heavy metals, TPH, BTEX, PAHs
Likely storage of petroleum products (including aboveground storage tanks) across the site	Heavy metals, TPH, BTEX, PAHs
Stockpiled material across the site	Heavy metals, TPH, BTEX, PAHs, asbestos
Fill material at the site	Heavy metals, TPH/BTEX, PAHs, OCPs, OPPs, PCBs, asbestos
Historical use of the site for rural and agricultural purposes	Heavy metals, OCPs and OPPs

Conclusions

Based on the results of the investigation undertaken at the site, and subject to the limitations stated in **Section 7**, there is the potential for some contamination of the site

to have occurred based on past and current site uses. The site is also located in an area of moderate salinity potential, which may restrict future development in some areas of the site, particularly in low lying areas.

Notwithstanding the potential for some contamination to be present in limited areas of the site, the potential contamination is unlikely to be such that it cannot be cleaned-up by the application of commonly used methods. Consequently, the potential contamination identified at the site is considered not to represent a significant barrier to the future development of the site.

Recommendations

The following recommendations are made in light of the above conclusions:

- Intrusive sampling, targeting areas of concern highlighted by the preliminary ESA, be undertaken to assess potential contamination present onsite, and to provide an adequate assessment of soil and background soil concentrations present at the site.
- Intrusive sampling be undertaken to provide a preliminary assessment of salinity.
- 'Emu picking' to remove ACM fragments from the impacted area identified on Lot 1 in DP784300;
- Conduct hazardous materials audits on any buildings at the site that may require demolition; and
- An assessment of the risks posed by any potential contamination identified following the completion of targeted contamination assessments undertaken at the site and preparation/ implementation of an appropriate Remedial Action Plan and/or Environmental Management Plan to make the site suitable for the proposed future use.

1 Introduction

1.1 Introduction and Background

JBS Environmental Pty Ltd was engaged by Diverse Property Solutions c/o EG Property Group, to conduct a preliminary Environmental Site Assessment (ESA) of a property located off Kurmond Road, Spinks Road, Derby Place and James Street, Glossodia, NSW. The site has an approximate area of 186 hectares, and comprises: Lot 75 DP214752; Lot 1 D784300; Lot 2 DP784300; Lot 44 DP214755; Lot 3 DP784300; Lot 50 DP751637; Lot 20 DP214753; Lot 3 DP230943; Lot 52 DP1104504; and Lot 2 DP533402.

It is understood that the Stage 1 site assessment was required to identify contamination, and possible constraints on future site development.

The investigation was conducted in accordance with the approved JBS proposal (JBS40946-13786) dated September 2009 and with consideration to relevant guidelines made or approved by the NSW Department of Environment, Climate Change and Water (DECCW), and relevant Australian Standards (**Section 5**).

1.2 Objectives

The objective of the Preliminary ESA is to thoroughly document the site history and background, assess potential for on and off-site sources of contamination assess the potential contamination status of the Site.

1.3 Scope of Work

To achieve the objectives of Preliminary ESA, the following scope of works was implemented:

- Review of available Council documentation (S149 (2 and 5) certificates), aerial photos, legal title information, DECCW records and Heritage records to identify areas of environmental concern and associated contaminants of potential concern (COPCs);
- Review of the topography, geology and hydrogeology of the Site and surrounding areas;
- A site inspection of all accessible areas to identify any additional visible areas of concern and associated potential COPCs;
- Preparation of a Preliminary ESA report in general accordance with relevant DECCW Guidelines.

2 Site Condition & Surrounding Environment

2.1 Site Identification

The location of the site is shown in **Figure 1**. The site details are summarised in **Table 2.1** and described in detail in the following sections.

Table 2.1 Summary Site Details

Lot/DP	Lot 75 DP214752, Lot 44 DP214755, Lot 1 DP784300, Lot 2 DP784300, Lot 3 DP784300, Lot 20 DP214753, Lot 50 DP751637, Lot 3 DP230943, Lot 52 DP1104504 and Lot 2 DP533402.
Address	3 Derby Place, Glossodia, NSW. 103 Spinks Road, Glossodia, NSW. 361 Spinks Road, Glossodia, NSW. James Street, Glossodia, NSW. 746A Kurmond Road, Glossodia, NSW. 780A-780C Kurmond Road, Glossodia, NSW.
Local Government Authority	Hawkesbury City Council.
Coordinates of the approximate centre of the site	MGA 56: 292960E 6286390N
Site Zoning	Housing under Hawkesbury Local Environmental Plan (LEP) 1989 (Lot 44 DP 214755, Lot 75 DP 214752)
Proposed zoning	Mixed Agriculture Hawkesbury LEP 1989 (All other lots)
Current Use	It is understood that there are no proposed zoning changes Lot 75 DP214752 (361 Spinks Road) was used for residential purposes. Lot 44 DP214755 (3 Derby Place) was used for residential purposes. Lots 1,2 and 3 in DP 751637 were used for chicken and chicken egg production and some cattle grazing. Lot 50 in DP 751637 was used for cattle grazing. Lot 3 in DP 230943 was used for chicken production and cattle grazing. Lot 20 in DP 214753 was vacant land. Lot 52 in DP 1104504 was used for horse agistment and cattle grazing. Lot 2 in DP 533402 was vacant land.
Previous Use	The site is currently vacant land with remnant concrete structures and bush, shrub and riparian vegetation present. Portions of the site, the northwest corner and central eastern portion, have been used as orchards.
Proposed Use	It is understood that the Site is being assessed to assist in determining potential future uses for the site.
Site Area	Approximately 186 hectares.

2.2 Site Description

The Site comprised Lot 75 DP214752, Lot 44 DP214755, Lot 1 DP784300, Lot 2 DP784300, Lot 3 DP784300, Lot 20 DP214753, Lot 50 DP751637, Lot 3 DP230943, Lot 52 DP1104504 and Lot 2 DP533402 as shown in **Figure 2**.

The Site is an irregularly shaped parcel of land. Access to Lots 1, 2 and 3 in DP784300 was via a right of way from Kurmond Road across Currency Creek. Lot 75 and Lot 44 could be accessed via Spinks Road and Derby Place, respectively. Lot 2 in DP533402, Lot 20 in DP214753 and Lot 52 in DP1104504, were accessible via Spinks Road. Lot 3 in DP230943 was accessible via James Street. Lot 50 in DP751637 was accessible from Spinks road via Lot 20 in DP214753, or via James Street through Lot 3 in DP 230943. Access to the various lots comprising the site was via unlocked gates or open driveways without gates. With the exceptions of the open driveways the site was surrounded by fences, typically comprising timber and steel fence posts with strung barbed wire and straight steel wire. It is noted that the locations of the large trees at the site have been surveyed with each of these trees having been allocated a number that had been nailed onto the tree. The locations of some of the site features provided in the following description have been referenced to numbered trees.

Lots 1, 2 and 3 in DP784300

Access to Lots 1, 2 and 3 in DP784300 was off Kurmond Road via a private road, which entered the site at the southern end of Lot 2. To the east of the entrance a concrete rubble stockpile with a volume of approximately 4 m³ was observed, approximately 5 m north of tree 216 (T216). Mr John Vassallo of Diverse Property Solutions indicated that the nineteen large sheds, located in two groups in the southern half of Lots 2 and 3, were used to hatch and rear chicks that were either used for egg production at the site or sold on to other chicken farms for egg or meat production. Two rows of seven sheds making up one group were located in Lot 2 with a group of five sheds located in Lot 3. The area around the sheds was not accessible as it was quarantined to protect the chicks from disease. A stockpile of unidentified metal frames and an area that appeared to be used for burning waste materials was observed between the two groups of sheds as shown in Photograph 1.



Photograph 1: Pile of burnt material and unidentified metal frames.

Stockpiles of waste material were observed next to a corrugated iron-clad storage shed located between the two groups of chick rearing sheds. A smaller corrugated iron storage shed was located to the north of the shed and stockpiled materials. The material in the stockpiles could not be closely inspected due as it was in the quarantine area, but appeared to comprise building demolition rubble, soil, asphalt and concrete. The contents of the storage sheds could not be seen from outside the quarantine area fence, however, dead vegetation was noted in the area immediately surrounding the larger shed that may indicate the use of herbicides in this area.



Photograph 2: Dead vegetation around the shed, and stockpiled waste material, shown in the background centre right of the photograph.

Salinity indicator plants (spiny rush), shown in Photograph 2, were observed in the area between the chick rearing sheds and Currency Creek.



Photograph 3: Salinity indicator plants observed in the southern portion of the site.

Salinity indicator plants were also observed in the southeastern corner of Lot 3 in an area where trenches were observed as shown in Photograph 2.



Photograph 4: Water in trench and salinity indicator plants

Also between the chick rearing sheds and Currency Creek, approximately 11 m to the north of T164, there was an overgrown stockpile of material. The stockpile covered an area of approximately 350 m² and appeared to comprise clay, some bricks and timber posts. The stockpile was in the location of what appeared to be a shed or building in the 2005 aerial photograph. There was also what appeared to be overgrown stockpiled material or a possible trenched area in the vicinity of T144. A stockpile of fill material, with an estimated volume of 2 m³, was observed approximately 15 m south of the southwest corner of the chick rearing sheds.

A steel above-ground storage tank (AST), approximately 1500 L capacity, was observed adjacent to the northern side of the access road to the chick rearing sheds. The AST was labelled 'Super Petrol', however, it did not appear to be in use. The tank was not checked to assess its contents. A shed, clad in corrugated sheet metal, with an access door labelled 'Danger High Voltage', was located approximately 5 m east of the AST. The shed was not accessed due to the warning sign present on the door. What appeared to be a site office was located adjacent to the gate providing access into the quarantined area around the chick rearing sheds. A residential dwelling was located approximately 50 m west of the AST.

A dam was located to the north of the chick rearing sheds. Salinity indicator plants were observed around the perimeter of the dam. A four wheel drive vehicle had been dumped 5 m north of T342, which was located to the northeast of the dam. Stockpiles of clay and shale were observed adjacent to T262, to the northwest of the dam. A concrete slab, together with some demolition rubble including corrugated iron sheet, steel pipe and concrete fragments were observed 3 m east of T265, to the northwest of the dam.

A concrete pad with protruding bolts was observed in a storage building located in proximity to T69. The pad may have been used to seat a piece of machinery, potentially an electrical generator. The shed was being used to house three tractors and some timber pallets although most of the space in the building was vacant. A residential dwelling was located to the west of the storage building.



Photograph 5: Concrete pad with protruding bolts.

Ten sheds used to house chickens for egg production were located in the northern portion of Lots 2 and 3. For descriptive reference purposes the sheds have been numbered 1 to 10 on **Figure 2**. At the eastern end of the sheds was what appeared to be an egg cool storage building. The rear of the egg storage building comprised a small maintenance workshop. Welding of some steel work was being carried out at the time of the site inspection. The interior of these buildings were not inspected. A residential dwelling and garages were located to the east of the egg storage shed. Two 200 L steel drums, which appeared to contain motor oil, were located on a pallet located in front of the garages. It appeared from the presence of a partially dismantled vehicle in one of the garages that some vehicle maintenance was being undertaken in the garages. What appeared to be an abandoned AST (approximately 1500 L) was leaning against the wire fence adjacent to T300. The area between the location of the AST and the garages was being used for car parking, presumably for the workers employed at the egg sheds. Two stockpiles of soil and ripped shale were located between the AST and the sheds used for egg production.

Three cars had been abandoned, to the northeast of the egg storage shed, adjacent to T506. Three stockpiles of material were located approximately 50 m north of the egg storage shed. One stockpile comprised clean, crushed concrete and bricks, one stockpile comprised bent metal fencing and other waste materials, with the third stockpile comprising soil, rock and timber, with the presence of ash indicating that some of the materials had been burnt.



Photograph 6: Materials stockpiled to northeast of the egg storage building.

Three ASTs were observed located on a concrete slab adjoining the southeast corner of shed 4. Two of the ASTs (each approximately 1500 L in volume), which were labelled lead replacement or unleaded petrol, appeared to be no longer in use as the hand pumps had been removed from the tanks and were laying on the concrete slab. The third AST was labelled diesel and appeared to be still in use. There was staining observed on the slab immediately beneath and around the tank. The staining indicated that some of the spilt diesel had runoff the concrete slab onto the surrounding soil.



Photograph 7: ASTs located adjacent to shed 4. Diesel staining is visible on the underlying concrete slab.

Two concrete tanks and a plastic tank were located approximately 20 m south of the gap between sheds 7 and 8. A shed constructed of corrugated iron was located adjacent to the tanks. A half-filled 1000 L plastic container, labelled sodium hypochlorite solution, commonly known as bleach, was located at the rear, southern side, of the shed. Two 200 L plastic drums also containing bleach were located adjacent to the plastic tank. The site manager indicated that the tanks, storage shed and bleach were used for storage of water pumped from Currency Creek that was treated, via sand filters and addition of chlorine to provide drinking water for the chickens.



Photograph 8: Concrete storage tank, shed and 1000 L plastic container containing bleach.

A vegetated stockpile of what appeared to be soil was observed in the southwest corner of Lot 1 in DP784300. A dead cow was observed at the base of the stockpile. Stockpiles of chicken manure were present in the southern third of Lot 1 in DP784300. It appeared that that manure from the chick rearing sheds and egg production sheds was brought to this area, shown on **Figure 2**. Fragments of potential asbestos containing materials were observed in a cleared, bare earth area located approximately 35 m north of the manure stockpiles. A review of the historical aerial photographs indicated there was formerly a structure, possibly a residential dwelling, in this area.



Photograph 9: Area of bare ground, located north of the manure stock, where fragments of potential ACM were observed.

A corrugated iron storage shed was located approximately 50 m northeast of the patch of bare ground. The shed appeared to be used for chicken shed hardware such as lights, and fittings, such as pipes and feed hoppers. Between 5 to 10 kg of a blue crystalline substance, similar in appearance to copper sulphate, was observed on a table in the shed. An area of bare ground and sparse vegetation was observed to the north of the shed as shown in **Figure 2**. The presence of charcoal indicated that material had been burned in a strip of ground within the sparsely vegetated area. A burnt car oil filter was observed mixed in with the charcoal.



Photograph 10: Charcoal observed in a strip of ground in Lot 1 DP 784300.

Two surface water dams were located in the centre of Lot 1, with another dam also observed in the northeast corner of the same Lot. Four large vacant sheds, which appeared to have been previously used for egg production, were located in the northern half of Lot 1. Materials were stored on both sides of the access driveway to these sheds. Materials included sheet metal chicken cages, fuse boxes/electrical switchboards, timber, pipes, empty paint cans and stockpiled soil and ripped shale. The electrical switchboards were potentially constructed with Zelemite or Miscolite, trade names for a product that was manufactured from coal tar pitch and asbestos.



Photograph 11: Materials stored along the access driveway to the former chicken sheds in Lot 1.



Photograph 12: Switchboard constructed from suspected ACM.

Lot 44 DP214755

A residential dwelling, which appeared to be vacant, and a separate double garage were observed on Lot 44 located at 3 Derby Place. Two open covered structures constructed of timber and sheet metal were located along the southern boundary of the Lot. Cut and fill had been carried out to level an area west of the house. A tyre stockpile was observed on the levelled area.



Photograph 13: Cut area and tyre stockpile in Lot 44.

Lot 20 in DP230943

Lot 20 in DP230943 (213 Spinks Road) was a vacant block of land although it was not clear where the north, east and west boundaries of this site were.

Lot 50 in DP751637

There were dams located in the northwest corner and central portion of Lot 50 in DP751637. This parcel of land could be accessed either via 213 Spinks Road or through the adjoining Lot 3 to the east. A vacant vandalised house was located in the northern half of the property on the ridgeline. Adjoining open sheds constructed of timber and corrugated iron were located to the north of the house. It appears the sheds may have

been used as a storage/workshop area and possibly as stables. Tyres, pieces of plastic pipe and bags of concrete or sand and cement mix were observed in one of the sheds. A shack, located between the sheds and the house, had also been vandalised. The shack was constructed of fibre cement sheet, which was suspected to be ACM, and timber.



Photograph 14: Tyres, pieces of plastic pipe and bags of concrete or sand and cement mix observed in one of the sheds on Lot 50.



Photograph 15: Shack constructed of suspected ACM.

Lot 3 in DP230943

Vegetated stockpiles of material, which included timber and rock, were present at the northern end of Lot 3 in DP230943, to the north of a steel water tank on an elevated timber platform. Five sheds used for chicken meat production were located in the eastern central portion of the Lot. A sheet metal shed, located at the western of shed 2, housed a diesel powered generator. The generator appears to have been used for emergency power supply as the diesel motor was only connected to a self contained fuel tank and not a bulk fuel supply. On the western side of the shed's access driveway was an office and open machinery shed. A four wheel drive vehicle and some spraying equipment were stored in the shed. A 200 L steel drum, located on a concrete block, was observed outside the shed. The contents of the drum were not inspected. What appeared to be oil staining was visible on the dirt and gravel driveway between the storage shed and chicken sheds. Approximately five dead chicks had been discarded on the ground surface

next to the storage shed. A pile of dead chicks had also been discarded on the ground surface adjacent to the dam located to the west of the storage shed. A residential dwelling was located in the east central portion of the site north of the chicken sheds. The house and immediate surroundings were not inspected.



Photograph 16: A 200 L drum located on a concrete block outside a storage shed on Lot 3 in DP230943. Oil staining on the gravel driveway between the storage shed and chicken sheds.



Photograph 17: Dead chicks discarded adjacent to the dam west of the chicken sheds on Lot 3 in DP230943.

Lot 52 in DP1104504

Two dead cows were observed in a depression south of T1342, in the southwest corner of Lot 52. Potential salinity indicator plants were observed in an area, with approximate dimensions of 20 m by 10 m, 10 m west of T1198. Potential salinity indicator plants were also observed around a surface water dam, located immediately south of T1362 in the southern central portion of Lot 52. A residential dwelling and some associated sheds, located in the central portion of Lot 52 were not inspected as there were dogs preventing access to this portion of the property. A stockpile of bitumen and concrete and another stockpile of unknown composition were observed approximately 35 m north of T1377.



Photograph 18: Material stockpiled 35 m north of T1377.

An area of sparse vegetation and bare ground was observed immediately southwest of T1511.



Photograph 19: Area of bare ground and sparse vegetation southwest of T1511.

Potential salinity indicator plants were observed at a depression located to the southwest of T1592. The dry, cracked, bare ground in the centre of this area suggests it would hold surface water following rainfall. Surface water dams were observed in the central and northern portions of the property.

Lot 2 in DP533402

A dilapidated shed, perhaps constructed as a horse shelter, was located in the southwest portion of Lot 2 in DP533402. A surface water dam, which covered an area of approximately 4 hectares, occupied approximately one quarter of this Lot. A corrugated iron shed housing an electrical pump was located on the northeastern side of the dam. The remainder of the Lot was vacant and vegetated with grass.

Lot 75 in DP214752

It appeared that a residential dwelling and some sheds were located on Lot 75 in DP214752. Due to access constraints this property was not inspected.

2.2.1 Fuel Storage Tanks

As described in Section 2.2, there were a number of ASTs observed on the site although only one was in use. The manager for the western half of the property indicated that there were no underground storage tanks (USTs) present on the site.

2.2.2 Disposal of chicken carcasses

The manager for the western half of the property indicated that dead chickens were composted in bins then transported off-site with the chicken manure to be reprocessed into fertiliser.

2.3 Surrounding Landuse

The current landuse of adjacent properties or properties across adjacent roads is shown in **Figure 2** and summarised below.

- North – Rural/residential properties and Spinks Road were located immediately to the north of the site.
- East – Market gardens and rural/residential properties.
- South – Currency Creek was the southern boundary of the site. Properties used to grow turf for commercial purposes and rural/residential properties were located to the south of Currency Creek.
- West – Rural/residential properties and Spinks Road were located to the west of the site.

Although the properties adjoining the site were not inspected there did not appear to be any significant potential offsite contamination sources located at the properties in the vicinity of the site.

2.4 Topography

A review of the regional topographic map (LPI 2000¹) indicated that the site has an elevation of between approximately 30 and 70 m Australian Height Datum (AHD), with an east-west ridgeline located in the northern western portion of the site. The site slopes to the south towards Currency Creek and to the north towards Howes Creek.

2.5 Hydrology

The nearest surface water receptors for most of the site is Currency Creek, which adjoins the southern boundary of the site. Surface water run-off from the northern portions of Lots 1, 2 and 3 in DP784300 and Lot 50 in DP751637 would flow towards Howes Creek, which is located approximately 1.5 km to the north of the Site.

Some rainfall is expected to infiltrate the clay soils. Stormwater runoff generated during heavy or prolonged rain periods is expected to move to the south towards Currency Creek or to the north towards Howes Creek depending upon local topography.

¹ *Topographic and Orthophoto Map, Springwood Sheet 9030-4S (3rd Edition)*, Land and Property Information NSW (2001).

2.6 Geology

A review of the regional geological map (DME 1991²) indicated the site is underlain by Ashfield Shale of the Wianamatta Group. Ashfield Shale is comprised of dark grey to black claystone-siltstone and fine sandstone-siltstone laminite.

Shale outcrop was observed at the site at the top of a ridgeline in a cutting that had been excavated for a gravel driveway

A review of the regional soil map (SCS NSW 1989³) indicated that the soil overlies the contact between erosional soils of the Gynea and Woodlands soil groups.

Erosional soils of the Gynea landscape group are describes as being: shallow to moderately deep yellow earths and earthy sands; yellow siliceous sands; localised gleyed podzolic soils; yellow podzolic soils; and leached sands.

Erosional soils of the Woodlands landscape group are describes as being: leached sands; lithosols; red solodic soils; xanthozems; and yellow earths.

Clayey soils were observed at a number of locations on the site.

2.7 Salinity

A review of the regional salinity potential map⁴ indicated the site is located in an area with a moderate salinity potential. A review of the information provided on the map also indicates the presence of two high salinity potential areas within the site.

The definition provided on the map indicates moderate salinity potential is where scattered areas of scalding and indicator vegetation have been noted but no concentrations have been mapped. High salinity potential areas are those where conditions are similar to areas of known salinity, that is, where aerial photography interpretation and field observations have confirmed more than one of the following:

- scalding
- salt efflorescence
- vegetation dieback
- salt tolerant plant species
- waterlogging.

Areas of high salinity potential are typically encountered in lower slopes and drainage systems where water accumulation is high.

Urban infrastructure such as roads, buildings, water and sewage pipes can be degraded by urban salinity to such an extent that they have to undergo expensive repair or premature replacement.⁵

During the site inspection, on the 28 September 2009, potential salinity indicator plants were observed in a number of areas, which were primarily located along the lower areas adjoining Currency Creek. Photographs of some of these areas are provided in Section 2.2.

² Penrith Geological Series Sheet 9030 (1st Edition), Departments of Minerals and Energy, 1991 (DME 1991)

³ Penrith Soil Landscape Series Sheet 9030. Soil Conservation Service of NSW, 1989 (SCS NSW 1989).

⁴ Salinity Potential in Western Sydney 2002, Department of Infrastructure, Planning and Natural Resources DIPNR, 2003).

⁵ Introduction to Urban Salinity, DIPNR, 2006.

2.8 Acid Sulphate Soils

Review of the Wilberforce Acid Sulfate Soil Risk Map⁶ indicated that the site was situated in an area where there was no known occurrence of acid sulphate soils.

2.7 Hydrogeology

Registered groundwater bore information obtained from the NSW National Resource Atlas Database (DECCW 2009) is included in **Appendix A** and summarised below.

Based on information from DECCW 2009 there were 27 registered bores within 3 km of the Site. The closest registered groundwater bore (GW044990) was located approximately 200 m north of the Site. Groundwater in bore GW044990 (domestic and stock use) was encountered within sand and silt at depths of approximately 40 and 53 m, respectively. The standing water level (SWL) was approximately 27 m below ground level (BGL). No details on the yield or quality of the water were provided on the Groundwater Work Summary sheet.

The following summary of the groundwater well data for nearby bores is based on a review of the available groundwater bore information obtained from the Groundwater Works Summary Sheets:

- Groundwater in bore GW044990 (domestic and stock use), located approximately 200 m north of the site, was encountered within sand and silt at depths of approximately 40 and 53 m, respectively. The standing water level (SWL) was approximately 27 m below ground level (BGL). No details on the yield or quality of the water were provided on the Groundwater Work Summary sheet;
- Groundwater in bore GW058335 (domestic, farming, stock use), located approximately 450 m north of the site, was encountered within sandstone at depths between 40 and 41 m BGL. The standing water level was reported as 39 m BGL. No details of the water quality were provided;
- Groundwater in bore GW072212 (domestic and stock use), approximately 230 m northwest of Lot 75 in the west of the site, was encountered within a sandstone and quartz water bearing zones. The shallowest water bearing zone was approximately 88 m BGL, with the groundwater salinity estimated between 500 to 1000 ppm;
- Groundwater bore GW075081, located approximately 1 km west of the site, was listed as a monitoring bore. The screened section of the bore was installed at a depth of between 3 and 6 m BGL. The groundwater in the bore had a SWL of 0.3 m BGL and a salinity of 4736 ppm;
- Groundwater bore GW075404, located approximately 570 m north of the site, was listed as a monitoring bore. The shallowest water bearing zone in this well was reported at 42 to 48 m BGL in sandstone. The groundwater in the bore had a SWL of 21.75 m BGL;
- Groundwater in bore GW101237 (irrigation), approximately 600 m east of the site, was encountered within sandstone at depths between 50 and 53 m BGL. The SWL was reported as 7 m and the salinity was reported as 680 ppm;

⁶ Wilberforce Acid Sulfate Soil Risk Map – Edition 2, Department of Land and Water Conservation, 1997 (DLWC 1997).

- Groundwater at the remaining bore locations was typically encountered within sandstone and shale bedrock at depths ranging between 33 m and 145 m bgs; and
- Registered groundwater bores located within a 2 km radius of the site were registered for a combination of domestic, irrigation, farming and stock watering purposes as well as monitoring.

3 Site History

3.1 Aerial Photographs

Aerial photographs from 1961, 1970, 1978, 1986, 1994 and 2005 were obtained from the Department of Land and Property Information. Copies of the aerial photographs are included in **Appendix B**.

Relevant information from the aerial photograph review is summarised below.

1961 With the exceptions of the northeast corner, strips along the western side, including Lot 75, and northern side, the site had been cleared. What appeared to be orchards were evident in the northwest corner of Lot 1 DP784300, the northern end of Lot 3 DP230943 and the central portion of Lot 52. The southern half of the site appeared to be used for agricultural purposes, while most of the northern half appeared to be grassed. Around eight dams were present, four in the westernmost quarter of the site, and four distributed over the central and eastern portions. A further possible former dam is visible in the central portion of Lot 50, with another in the central portion of Lot 1 DP784300, east of the existing dam.

Four to five buildings, likely small sheds or houses, were present in the southern portion of Lot 1 in DP784300, and a further possible two in the central portion of Lot 2 in DP784300. A long shed and a number of smaller buildings were present in Lot 50, while five to six large sheds and numerous smaller ones were in the proximity to the orchards in Lot 3 DP230943 and Lot 52, typically on the southern borders. A round structure was visible in the southern central portion of Lot 52.

Several avenues for site access were visible: a track entering at the southern boundary of Lot 2 DP784300 which appeared to provide access to Lot 1 DP784300; a track entered the northern boundary of Lot 52, and Lot 2 DP533402 from Spinks Road; and a third track entering the northern boundary of Lot 50 from Spinks Road. From landscape scars, the last two roads may previously have been connected across the boundary of Lot 50 and Lot 3 DP230943.

Some of the land surrounding the site has been cleared but is undeveloped.

1970 Orchards in the northern portion of Lot 3 DP 230943 and northern and western portions of Lot 52 appeared to have been removed. The northeastern portion of the site, in Lot 52, and Lot 2 DP 533402, had been extensively cleared. The number and location of dams had changed. The dam in the central portion of Lot 2 DP784300 no longer appeared to be in use, while a second dam in the central portion of Lot 1 DP 784300 appeared to be in use. An additional dam was present in the northern portion of Lot 3 DP230943, as were two additional dams in the northern portion of Lot 52. A large dam had been constructed in Lot 2 DP533402.

Eleven warehouse style sheds had been constructed in the southern area of Lot 2 DP 784300, oriented North-South, and in two parallel rows running East-West. The eastern end of the southern row had also been cleared and appeared to comprise bare earth. An extensive area immediately north of the eastern half of these sheds appears to have been cleared or excavated,

possibly for construction of a dam.

One large warehouse style shed had been constructed in the northern portion of Lot 3 DP784300. An area adjoining this shed to the north and west had been cleared. Immediately south of the approximate centre of the cleared area were two small unidentified round structures, possibly tanks.

The elongated shed building in Lot 50 still appeared to be present but was extensively overgrown. The central portion of the orchards in Lot 1 DP 784300 appeared to have been cleared. Two unidentified features were present in this cleared area and were possibly the cleared orchard trees placed in piles.

Landscape scars in central Lot 50 and southern central Lot 52 suggest possible former buildings, while most of the buildings in the central portion of Lot 52 had been cleared. A road appears to have been constructed from the southern boundary of lot 2 DP 784300 to the warehouses in the northern portion of Lots 2 and 3 DP 784300, with a side road that provided access to the warehouses in the southern portion of Lot 2 DP 784300.

The surrounding landuse appears similar to that observed in the 1961 aerial photograph although there appeared to be some rural residential development to the north of Spinks Road.

1978 The site layout and land use appear consistent with the 1970 aerial photograph. All areas previously used as orchards appear to have been cleared. Approximately two-thirds of Lot 75 had been cleared. Two surface water dams appeared to be present on Lot 75. The dam in the northern half of Lot 2 DP 533402 had been increased in size and occupied approximately one-third of that lot. A dam was present in the cleared or excavated area north of the buildings in the southern portion of Lots 2 and 3 in DP 784300. A warehouse-like building had been constructed in the northern portion of Lot 1. Warehouses or large buildings had been constructed in the northern portion of Lots 2 and 3 in DP784300. From the presence of dark lines on the aerial photograph it appeared that surface water runoff from these buildings drained to the dam to the south. A building, possibly a residential dwelling, had been constructed to the east of the large buildings.

A further eight buildings had been constructed adjacent to those existing in the southern portions of Lots 2 and 3 in DP 784300. A number of small warehouses and other buildings appeared to have been constructed in the central portion of Lot 52. Some small buildings or sheds also appeared to have been constructed along the northern portion of the eastern boundary of Lot 52. Two small possible fenced areas have been constructed in line directly south of the dam in Lot 3 DP 230943. The elongated building in Lot 50 appeared to have been removed or was no longer visible among trees.

There appears to be some rural residential development along both sides of Spinks Road, to the north.

Land to the north of Spinks Road was being developed for residential use.

1986 The site use and layout appear relatively consistent to that in the 1978 aerial photograph. The dams in Lot 75 appeared to be no longer present. The two small unidentified buildings extending southward from the dam in Lot 3 DP 230943 appeared to have been demolished, although the former locations were

still evident. Five warehouse-like buildings had been constructed in the central eastern portion of Lot 3 DP 230943, with a new road from the northern boundary of this lot providing access to the buildings. A smaller building had been constructed on the western side of the access directly opposite the centre warehouse-like building.

Some small buildings or sheds had been constructed around the residential dwelling in the northern portion of Lot 3 in DP784300. A small building had been constructed in the southwestern portion of Lot 2 DP 533402. The small buildings in the central portion of Lot 52 appeared to have undergone change, however, it is difficult to determine if this is further development or partial demolition.

Surrounding landuse was similar to that observed in the 1978 aerial photograph. Two surface water dams were visible adjacent to the southern side of Currency Creek. Further residential development had occurred along Spinks Road, including along the site's western boundary.

1994 Site layout and land use remained consistent with the 1986 aerial photograph. Trees were present in the previously cleared area of Lot 75. A new dam appeared to have been constructed in the north eastern area of Lot 3 DP 230943. The amount of water in the large dam in the northeastern portion of the site had decreased noticeably.

An additional three warehouse-style buildings had been constructed in the northern portion of Lot 1 DP 784300, however, they were smaller than the warehouse-like building already in this portion of the site.

Surrounding landuse appears consistent with that visible in the 1986 aerial photograph. Land to the south of Currency Creek appeared to be used for agricultural purposes.

2005 Site layout and land use remains consistent with the 1994 aerial photograph. There were two elongated landscape scars in the southern portion of Lot 1 DP 784300, to the south of the residential dwelling. Some buildings appear to have been constructed adjacent to the northern boundary of Lot 75.

A road extended from the northwest corner of the warehouse-like buildings in Lot 2 in DP 784200 to Lot 44. Significant tree cover had developed around the north and eastern sides of the warehouse-like buildings in Lot 3 in DP230943, but south and east of this tree covered area were three distinct areas that appear to comprise bare ground. What appeared to be bare areas were also apparent along the boundary between Lot 2 DP 533402 and Lot 52.

Surrounding landuse appears consistent with that visible in the 1994 aerial photograph.

3.2 DECCW Records

A search was undertaken through the DECCW's contaminated land register. The search identified that there have been no notices issued for the site under the *Contaminated Land Management Act 1997*.

3.3 Title Details

A historic title search was conducted for the site. Results are included in **Appendix C**, with a summary of the owners provided below.

Lot 75 in DP214752

1936-1951	John James McMahon (Orchardist)
1951-1956	Stanley Ernest White (Grazier)
1956-1961	National Subdivisions Pty Limited
1961	Leslie Harper (Clerk)
1961-1964	Glossodia Estates Pty Limited
1964-1971	Valerie Jean Whitton (Married woman)
1971-1972	William Leonard Troy (Farmer)
1972	Raymond John Brooks (Manager)
1972-1978	Barry Michael Guthrie (Insurance Representative)
1978-1995	Phillipa Ann Guthrie and Barry Michael Guthrie
1995-2004	Dinor Elinor French and Murray French
2004-2006	Raymond John Borg, Wendy Patricia Borg and Michael Contos
2006-2009	Michael Contos
2009	Feecha Pty Ltd, Himbla Pty Ltd, Rashka Pty Ltd and Printsilk Pty Ltd

Lot 1 in DP784300

1914-1939	Thomas Riley (Farmer)
1939-1949	Herbert Darcey Riley (Engine Driver)
1949-1957	Hector Shafto Stevens (Company Director) and Amildra Elizabeth Stevens (wife)
1957-1966	Hector Shafto Stevens (re share of Amildra Elizabeth Stevens)
1966-1971	Noela Amilda Troy (married woman)
1971-1988	Allied Mills Industries Pty Ltd (later Goodman Fielder Mills Ltd)
1988-1991	Ian Hunter Livingston (Egg Producer) and Marilyn Leigh Livingstone (his wife), Frank George Pace (egg Producer) and Dianna Elizabeth Pace (his wife)
1991-1997	Frank George Pace and Dianna Elizabeth Pace
1997 to present	Frank George Pace and Pace Land Holdings Pty Ltd

Lots 2 and 3 in DP784300

1908-1914	William Morris Hughes (M.H.R.)
1914-1951	Thomas Riley (Farmer)
1951-1953	Evelyn Millington (widow), Neta Mary Riley (spinster), Myrtle Annie Mahon (wife of Herbert Mahon, Postal Employee)
1953-1958	Reg Thompson (Carrier)
1958-1963	Ronald Thomas Hughes (Clerk) and Constance Hughes (his wife)
1963-1970	William David Dickens (Farmer)
1970-1988	Allied Mills Industries Pty Ltd (later Goodman Fielder Mills Ltd)
1988-1991	Ian Hunter Livingston (Egg Producer) and Marilyn Leigh Livingstone (his wife), Frank George Pace (egg Producer) and Dianna Elizabeth Pace (his wife)
1991-1997	Frank George Pace and Dianna Elizabeth Pace
1997 to present	Frank George Pace and Pace Land Holdings Pty Ltd

Lot 44 in DP214755

1951-1956 Stanley Ernest White
 1956-1963 National Subdivisions Pty Limited
 1963 Glossodia Estates Pty Limited
 1963-1972 Eugene Indov (?) (Machine Operator) and Helen Bardot (his wife)
 1972 Robert Hugo Wyner (Bricklayer) and Cornelia Margaret Wyner (his wife)
 1972-1973 Martinus Johannes Cornelius G. Van Baardwyck (Plumber) and Cecilia Van Baardwyck (his wife)
 1973-1979 Trim Tri Pty Limited
 1979-1981 Alan Dramham (sales Co-Ordinator) and Jan Dramham (his wife)
 1981-1988 Ian Sills (Estimator) and Lynette Kay Sills (Receptionist)
 1988-1990 James Gerard Slattery (Truck Driver) and Belinda May Slattery (Clerk)
 1990-1991 Joseph Leslie Pace
 1991-1997 Frank Pace and Dianne Pace
 1997 to Pace Land Holdings Pty Limited
 present

Lot 50 in DP 751637

1920-1945 James Lee Wood (Farmer)
 1945-1949 Alfred John Rose (Farmer)
 1949-1976 Robert Henry Guy (Artist) and Elizabeth Guy (his wife)
 1976-2008 Summertime Chicken Pty Limited (later known as RJ & JA Somers Pty Limited)
 2008 to E J Cooper & Son Pty Ltd
 present

Lot 20 in DP214753

1922-1951 John James McMahon (Orchardist)
 1951-1956 Stanley Ernest White (Grazier)
 1956-1960 National Subdivisions Pty Limited
 1960 Leslie Harper (Clerk)
 1960-1964 Glossodia Estates Pty Limited
 1964-1968 Edward Jung (Industrial Chemist) and Annemarie Jung (his wife)
 1968-1970 William George Larry (Storeman)
 1970-1976 Malcolm John Guy (Farmer) and Wendy Jeanette Guy (his wife)
 1976-2008 Summertime Chicken Pty Limited (later known as RJ & JA Somers Pty Limited)
 2008 to E J Cooper & Son Pty Ltd
 present

Lot 3 in DP 230943

1920 Percy Herbert Tebay (Farmer)
 1920-1925 Robert James (Farmer)
 1925-1929 Rolana Vivian Small (Overseer)
 1929-1937 Cline Wynter Ducat (Farmer)
 1937-1942 John Link (Farmer)
 1942-1944 Alice Bowring (widow)
 1944-1949 Arthur Eugene Yates
 1949-1967 Shelagh Cowper Loveday (widow)
 1967-1973 John Bernard Roydhouse (Engineer) and Pamela Margaret Roydhouse (his

wife)
 1973-1978 Werribell Pty Limited
 1978-1981 Robert Arthur Hoskins (Grazier)
 1981-2008 Summertime Chicken Pty Limited (later known as RJ & JA Somers Pty Limited)
 2008 to E J Cooper & Son Pty Ltd
 present

Lot 52 in DP1104504

1909-1926 James Gregory (Machinist)
 1926-1927 Mary Single (wife of Raymond George Single, Farmer)
 1947-1934 Lindsay Isabel Hazelton (wife of William Henry Hazelton, Engineer)
 1934-1950 Felix Frederick King (Licensed Surveyor)
 1950-1967 Sidney Leonard Link (Farmer) and Kathleen Link (his wife)
 1967-1972 Daphne Eudoria Way (married woman)
 1972-2008 Summertime Chicken Pty Limited (later known as RJ & JA Somers Pty Limited)
 2008 to E J Cooper & Son Pty Ltd
 present

Lot 2 in DP533402

1913-1954 Francis Ryan (Farmer)
 1954-1966 Andrew Bros (Dairymen) Pty Ltd
 1966-1970 Malcolm Alexander McEwan (Dental Surgeon)
 1970-1972 Daphne Eudoria Way (married woman)
 1972-2008 Summertime Chicken Pty Limited (later known as RJ & JA Somers Pty Limited)
 2008 to E J Cooper & Son Pty Ltd
 present

3.4 Council Records

The planning certificates for the site were obtained from Hawkesbury City Council and are included in **Appendix D**. Relevant information is summarised below.

- Lot 75 in DP 214752, Lot 20 in DP 214753 and Lot 44 in DP 214755 are zoned Housing under Hawkesbury Local Environment Plan 1989;
- Lots 1, 2 and 3 in DP784300 Lot 20 DP214753, Lot 50 DP751637, Lot 3 DP230943, Lot 52 DP1104504 and Lot 2 DP533402 are zoned Mixed Agriculture under Hawkesbury Local Environment Plan 1989
- The land is not affected by Section 38 or 39 of the Coastal protection Act 1979;
- The land is not proclaimed to be a mine subsidence district;
- The land is not affected by any road widening or road realignment;
- The land is not affected by a policy adopted by Hawkesbury City Council that restricts the development of the land because of likelihood of landslide, tidal inundation, subsidence;
- Complying development under the General Housing Code can not be carried out on the land as is it bushfire prone;

- Hawkesbury City Council has adopted a policy that restricts the development of the land because of the likelihood of Acid Sulfate Soils;
- The land is not subject to flood related development controls;
- The land is not affected by provisions under an environmental planning instrument applying to the land that provides for acquisition by a public authority;
- The land is not a declared investigation area or remediation site, or the subject of an investigation order or remediation order under the CLM Act 1997. The land is not the subject of a voluntary investigation or remediation proposal or a site audit statement within the meaning of the CLM Act 1997.

3.5 Australian and NSW Heritage Register

A search of the Australian Heritage Trust database and the NSW Heritage Inventory did not reveal any Heritage listed items at the.

3.6 Workcover Dangerous Goods Licenses

At the client's request a WorkCover search of records of licenses to store Dangerous Goods at the site was not undertaken.

3.7 Previous Investigations

There are no known previous environmental investigations, with respect to potential contamination, which have been conducted at the site.

3.8 Development Application / Building Application (DA/BA) records

DA/BA records were not obtained from Hawkesbury City Council for inclusion in this report. However, it is considered that the comprehensive nature of the remaining historical research has identified all significant potential sources of contamination, and the absence of DA/BA records does not affect the conclusions of the investigation.

3.9 Site History Summary

From a site inspection and a review of the historical aerial photographs and the lands title documentation it appeared that the site had been used for agricultural and grazing purposes, with parts of the site also used as orchards. Development of portions of Lots 2 and 3 in DP784300 for poultry farming commenced around 1971, while the development of Lot 3 in DP230943 as a poultry farm commenced in 1981. The site is currently being used as a poultry farm, for grazing of cattle and some horses, and for residential purposes.

3.10 Integrity Assessment

The data obtained from the historical sources reviewed has been found to be in general agreement. It is therefore considered that the information provided in this historical assessment has an acceptable level of accuracy.

4 Potential Contamination Issues

4.1 Potential Areas of Environmental Concern

Based on the history review and field observations from the site, areas of environmental concern have been identified and are presented in **Table 4.1**.

Table 4.1 Areas of Environmental Concern and Associated Contaminants of Potential Concern

Area of Environmental Concern (AEC)	Contaminants of Potential Concern (COPC)
Areas formerly used as orchards	Heavy metals, pesticides
Former and present building and shed locations across the site.	Heavy metals, asbestos
Former site infrastructure (including crushers and screens) in the central, eastern and northern portions of the site.	Heavy metals, TPH, BTEX, PAHs
Likely storage of petroleum products (including aboveground storage tanks) across the site	Heavy metals, TPH, BTEX, PAHs
Stockpiled material across the site	Heavy metals, TPH, BTEX, PAHs, asbestos
Fill material at the site	Heavy metals, TPH/BTEX, PAHs, OCPs, OPPs, PCBs, asbestos
Historical use of the site for rural and agricultural purposes	Heavy metals, OCPs and OPPs

4.2 Potentially Contaminated Media

Potentially contaminated media present at the site include:

- fill material;
- natural soils;
- surface water; and
- groundwater

Site historical information and findings from the site inspection identified the potential for fill material at the site. The source of fill material is unknown and therefore has been identified as a potentially contaminated medium.

In addition, surface soils (whether fill material or natural) in some areas of the site are considered to be a potentially contaminated medium based on the presence of staining, poor vegetation cover, and past agricultural uses such as orchards.

Based on the potential leachability of contaminants within fill material and other surface soils, and the historical uses of the site, vertical migration through the fill into the underlying natural soils may occur.

Surface water in some of the surface water dams is identified as a potentially contaminated medium at the site, based on the observation that runoff from the chicken sheds appeared to drain to at least one surface water dam.

Groundwater at the site is considered not to be a potentially contaminated medium based on the low permeability of the surface soils (clays) (**Section 2.7**). However, the potential for groundwater to be contaminated is dependant upon the potential mobility of any soil contamination identified at the site.

4.3 Potential for Migration

Contaminants generally migrate from site via a combination of windblown dusts, rainwater infiltration, groundwater migration and surface water runoff. The potential for contaminants to migrate is a combination of:

- The nature of the contaminants (solid/liquid and mobility characteristics);
- The extent of the contaminants (isolated or widespread);
- The location of the contaminants (surface soils or at depth); and
- The site topography, geology, hydrology and hydrogeology.

The potential contaminants of concern identified as part of the site history review and site inspection are generally in solid form (eg. asbestos, fill materials). The site is generally covered in vegetation (tree cover and long grasses) or sealed (concrete) which significantly reduces the potential for windblown contaminants to migrate from the site.

As the majority of the site is unpaved, there is potential for vertical contaminant migration from soils to groundwater via infiltration.

5 Regulatory Guidelines

The investigation was undertaken with consideration to aspects of the following guidelines, as relevant:

- *Contaminated Sites: Guidelines for Assessing Service Station Sites*, NSW EPA, 1994 (EPA 1994)
- *Contaminated Sites: Sampling Design Guidelines*, NSW EPA, 1995 (EPA 1995)
- *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*, NSW EPA, 1997 (EPA 1997)
- *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme, 2nd Edition*, NSW EPA, 2006 (DEC 2006)
- *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*, NSW DECC, 2009 (DECC 2009)
- *National Environment Protection (Assessment of Site Contamination) Measure*, National Environment Protection Council, 1999 (NEPC 1999)
- *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*, Australian and New Zealand Environment and Conservation Council and the National Health and Medical Research Council, 1992 (ANZECC/NHMRC 1992)
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Paper No 4, 2000 (ANZECC/ARMCANZ 2000)
- *Australian Drinking Water Guidelines*, National Health and Medical Research Council and Agriculture and Resource Management Council of Australia and New Zealand, 2004 (NHMRC/NRMMC 2004)
- *Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards*, Department of Health and Ageing and EnHealth Council, Commonwealth of Australia, June 2002 (EnHealth 2002)
- *Contaminated Sites: Guidelines for the Assessment and Management of Groundwater Contamination*, NSW DECC, March 2007 (DECC 2007)

6 Conclusions and Recommendations

6.1 Conclusions

Based on the results of the investigation undertaken at the site, and subject to the limitations stated in **Section 7**, there is the potential for some contamination of the site to have occurred based on past and current site uses. The site is also located in area of moderate salinity potential, which may restrict future development in some areas of the site, particularly in low lying areas.

Notwithstanding the potential for some contamination to be present in limited areas of the site, the potential contamination is unlikely to be such that it cannot be cleaned-up by the application of commonly used methods. Consequently, the potential contamination identified at the site is considered not to represent a significant barrier to the future development of the site.

6.2 Recommendations

The following recommendations are made in light of the above conclusions:

- Intrusive sampling, targeting areas of concern highlighted by the preliminary ESA, be undertaken to assess potential contamination present onsite, and to provide an adequate assessment of soil and background soil concentrations present at the site;
- Intrusive sampling be undertaken to provide a preliminary assessment of salinity;
- 'Emu picking' to remove ACM fragments from the impacted area identified on Lot 1 in DP784300;
- Conduct hazardous materials audits on any buildings at the site that may require demolition; and
- An assessment of the risks posed by any potential contamination identified following the completion of targeted contamination assessments undertaken at the site and preparation/ implementation of an appropriate Remedial Action Plan and/or Environmental Management Plan to make the site suitable for the proposed future use.

7 Limitations

This report has been prepared for use by the client who commissioned the works in accordance with the project brief only and has been based in part on information obtained from other parties. The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

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Ground conditions may vary across a site, and this should be considered when extrapolating between observations. Potential chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS Environmental Pty Ltd reserves the right to review the report in the context of the additional information.

Figures

Appendix A
Groundwater Works Summary Sheets

Appendix B

Historical Aerial Photographs

Appendix C
Title Records

Appendix D
Council S149 (2 and 5) Certificates

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Rev No.	Author	Reviewer	Approved for Issue		
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