Ecovision Consulting (2004f). Biodiversity Survey: Lot 1862 and Lot 1865 DP 850166, Lot 22 DP 739469 Gresford Road, Fern Gully. Unpublished report prepared for Singleton Shire Council, Singleton.

Ecovision Consulting (2006). Detailed Ecological Study: Lands identified north of Retreat 10 Wattle Ponds Road, Wattle ponds. Unpublished report prepared for Singleton Shire Council, Singleton.

Harden G (*ed*). 2000. *Flora of New South Wales Vol 1*. NSW University Press, Kensington.

Harden G (*ed*). 2002. *Flora of New South Wales Vol 2*. NSW University Press, Kensington.

Harden G (*ed*). 1992. *Flora of New South Wales Vol 3*. NSW University Press, Kensington.

Harden G (*ed*). 1993. *Flora of New South Wales Vol 4*. NSW University Press, Kensington.

HLA (2000). Flora and Fauna Report. Proposed Rezoning of Land at Ironbark Lane, Sedgefield. Report prepared for Mr Dibben, Singleton.

HLA (2003). Ecological Investigations for Lot 209 DP 877391 and Part Lots 204 and 208, DP 839648 Big Ridge Lane, Sedgefield. Report prepared for Mr Wint, Singleton.

Hoye GA & Richards GC. 1995. *Greater Broad-nosed Bat Scoteanax rueppellii*. In Strahan R (*ed*). *The Mammals of Australia*. Angus & Robertson Publishers, Sydney.

Martin RW & Handasyde KA. 1995. *Koala Phascolarctos cinereus*. In Strahan R (ed). *The Mammals of Australia*. Australian Museum/Reed Books.

Menkhorst P & Knight F. 2001. *A Field Guide to the Mammals of Australia*. Oxford University Press.

NPWS 2003. Vegetation Survey, Classification and Mapping – Lower Hunter and Central Coast Region. Lower Hunter Central Coast Regional Environment Strategy, Thornton.

NPWS 2003. *Draft Recovery Plan for the Barking Owl*. New South Wales National Parks and Wildlife Service, Hurstville, NSW.

NPWS. 1997. *Recovery Plan for the Regent Honeyeater Xanthomyza phrygia - Draft*. NSW National Parks & Wildlife Service, Hurstville.

Novo Eco Consultancy / Banksia Environmental Consultancy (2002) Flora & Fauna Assessment – Proposed Extension to Singleton Landfill. Report prepared for GHD, Newcastle.

Phillips W. 1995. *Eastern False Pipistrelle Falsistrellus tasmaniensis*. In Strahan R (*ed*). *The Mammals of Australia*. Angus & Robertson Publishers, Sydney.

Pizzey G & Knight F. 1997. *The Field Guide to the Brids of Australia*. Angus & Robertson, Australia.

Richards GC. 1995a. *Yellow-bellied Sheathtail-bat Saccolaimus flaviventris*. In Strahan R (*ed*). *The Mammals of Australia*. Angus & Robertson Publishers, Sydney.

Strahan R (ed). 1995. *The Mammals of Australia*. Australian Museum/Reed Books.

Suckling GC. 1995. Squirrel Glider *Petaurus norfolcensis*. In Strahan R (ed). *The Mammals of Australia*. Australian Museum/Reed Books.

Tidemann CR. 1995. Grey-headed Flying-fox *Pteropus poliocephalus*. In Strahan R (ed). *The Mammals of Australia.* Australian Museum/Reed Books.

Triggs B. 1998. Tracks, Scats and Other Traces: A Field Guide to Australian Mammals. Oxford University Press, Melbourne.

Attachment 3 – Geotechnical Assessment

Douglas Partners

Geotechnics • Environment • Groundwater

Integrated Practical Solutions

PRELIMINARY CONTAMINATION AND URBAN CAPABILITY ASSESSMENT

PROPOSED REZONING
LOT 12 DP 192526,
14 BURBANK CRESCENT, SINGLETON

Prepared for

ORBIT PLANNING

PROJECT 39661

MARCH 2007

Douglas Partners

Geotechnics • Environment • Groundwater

PRELIMINARY CONTAMINATION AND URBAN CAPABILITY ASSESSMENT

PROPOSED REZONING
LOT 12 DP 192526,
14 BURBANK CRESCENT, SINGLETON

Prepared for

ORBIT PLANNING

PROJECT 39661

MARCH 2007

Douglas Partners Pty Ltd
ABN 75 053 980 117

Box 324
Hunter Region Mail Centre
NSW 2310 Australia

15 Callistemon Close
Warabrook, NEWCASTLE

Phone: 02 4960 9600
Fax: 02 4960 9601
newcastle@douglaspartners.com.au

Douglas Partners
Geotechnics · Environment · Groundwater

TABLE OF CONTENTS

ATTACHMENTS

BRR:PH:mkw

Project No: 39661

P:\39661\Docs\39661.doc

15 March 2007

PRELIMINARY CONTAMINATION AND URBAN CAPABILITY ASSESSMENT
LOT 12 DP 192526
14 BURBANK CRESCENT, SINGLETON

1. INTRODUCTION

This report presents the findings of a Preliminary Contamination and Urban Capability Assessment for Lot 12 DP 192526, 14 Burbank Crescent, Singleton, New South Wales. The assessment was carried out at the request of Sally Flannery of Orbit Planning.

It is understood that:

- The site is to be rezoned to accommodate future residential development;
- The residential development will occur only in the northern portion of the site;
- The southern portion of the site is to remain rural.

The objective of the investigation was to provide a preliminary assessment of the suitability of the site for future development with respect to potential site contamination and geotechnical conditions, for proposed rezoning.

The assessment comprised the following tasks:

- Desktop study, including brief review of site history, aerial photographs, topographic, orthophoto, geological and soil landscape maps;
- Searches with NSW Department of Environment & Conservation (DEC), NSW Department of Natural Resources (DNR), and Singleton Council (SC);
- Site inspection on 11 January 2007, which included in-situ measurement of pH and Electrical Conductivity (EC) of surface waters;
- Brief discussions with site personnel familiar with former and current site activities;
- Preparation of this report, which discusses the findings of the combined assessment.

2. SITE IDENTIFICATION

The site has a total area of approximately 18.62 ha and comprises one agricultural lot as shown on Drawing 1 in Appendix B. The site is identified as Lot 12 DP 192526, 14 Burbank Crescent, Singleton, New South Wales.

The main site area is bound by the agricultural land to the south and south-west, residential to the north north-west and the Hunter River to the east.

3. DESKTOP REVIEW

Topography

Reference to the 1:25,000 topographical map for Singleton indicates that the site is dominated by a large tree-lined gully, which traverses the site west to east. The gully drains to the east, into the Hunter River, which forms the eastern boundary of the site. Site slopes generally fall towards the gully, from the north and south. The eastern portion of the site appears to drain to the east, towards the Hunter River.

The site generally falls towards the gullies at slopes in the order of 30-40°. However localised regions of the gully exhibited slopes of up to 70°. The topographical map indicates surface levels of around 50 m AHD within the site.

Drainage

The predominant surface water drainage paths within the site comprise the gully draining towards the east. A small farm dam is located in the north-western corner of the site, and was observed to contain water at the time of the walkover (refer to Section 4).

Soils generally appeared to be well drained on the upper slopes. Damp surface conditions and ponded water were however observed within the main gully lines during the site inspection, as discussed in Section 4.

Geology/Hydrogeology

Reference to the 1:100 000 Newcastle Regional Coalfields geological map indicates the site lies on the border of the Permian Aged Maitland Group (specifically Mulbring Sandstone) and Quaternary alluvium. Mulbring Siltstone is predominantly siltstone, however may also contain claystone and minor fine grained sandstone. Quaternary Alluvium comprises silt, sand and gravel.

The regional groundwater flow regime is believed to be towards the Hunter River, which is located, adjacent to the eastern site boundary.

Soil Landscape

Reference to the 1:100,000 Soil Landscape Series Sheet for Singleton (Sheet SI 56-1) prepared by the Department of Land & Water Conservation of NSW (DLWC, now DNR), indicates that the northern portion of the site is underlain by the Sedgefield soil landscape, while the southern portion is underlain by the Hunter soil landscape.

The Sedgefield Landscape is generally defined as having the following properties:

- Low undulating hills and rises with many small creek flats;
- The main soil types are Yellow Soloths on the upper to midslopes with Yellow Sodolic Soils on lower slopes and drainage lines;
- Black Soloths may also occur in areas of seepage on the slopes.
- Salinity is evident in the Sedgefield Landscape in some drainage lines. There is also a general high propensity for structural degradation/erosion.

The Hunter Landscape is generally defined as having the following properties:

- Alluvial plains and terraces of the Hunter River and its tributaries;
- Black clays and Black earths on prior stream channels and on tributary flats;
- Alluvial soils on levees and flats adjacent to the present river bed;
- Non-calcic Brown soils on terraces with Yellow Sodolic soils in drainage lines.

Acid Sulphate Soils

Acid sulphate soils are not expected to be encountered within the site, based on the elevation of the site. Acid Sulphate Soil Risk Maps have not been published for the Singleton area.

Salinity

Searches with DNR indicates that no areas within the site have been identified as having mapped salinity occurrences or salinity hazard.

4. PRELIMINARY CONTAMINATION ASSESSMENT

4.1 Scope of Work

The preliminary contamination assessment was conducted with reference to NSW EPA Guidelines (Ref 1), and comprised the following:

- Brief discussions with Mr Bob and Mrs Jocelyn Graham, the owners of Lot 12 DP 192526;
- Searches with Singleton Council (SC);
- Searches with NSW Department of Environment & Conservation (DEC);
- Review of historical aerial photos;
- Search of nearby registered groundwater bores through DNR;
- Site inspection on 11 January 2007 to assess site conditions.

4.2 Discussions with Current Owner

The following information was obtained from discussions with Mrs Jocelyn Graham, the current owner of Lot 12, DP 192526, and her husband:

- Mrs Graham has owned the site for approximately 35 years;
- Mrs Graham indicated that pig farming on the site had ceased at least 45 years ago;
- Mrs Graham conducted cattle grazing on the northern section of the site, which ceased in November 2006;
- There was a maximum of 20 cattle on site at any time during Mrs Graham's tenure;
- Cattle were only sprayed with pesticides and no cattle dipping was conducted on the site;
- A piggery was located next to the site in the past, where residential housing is now located;
- The southern section of the site is used for vegetable crops and has been leased for that purpose by Mrs Graham for the past 20 years;
- Some filled areas are located on the site;
- A former silage pit has been retained as a fill pit for timber and green waste, however opportunistic dumping had resulted in some building materials being dumped in the pit;
- Mrs Graham had the building waste removed from the pit the day before the walk over;
- A former fill pit for glass bottles used by former owners of the site is located in the western section of the site;
- A 10 x 10 m area of soil located at the southern end of the dam was sourced from the excavation of swimming pools in the area;
- No chemicals were stored at the site;

- Prior to residential development, a spring fed the dam in the north western portion of the site;
- No known landslides had occurred on the site during Mrs Graham's tenure of the site;
- Mrs Graham indicated that during heavy rainfall, large volumes of stormwater run-off course through the gully system and river water backs up, causing a ponding effect;
- There have been no major issues relating to salinity or erosion on the site, however minor erosion is present within gullies;
- No chemicals were used to control plant growth;
- Effluent is generally stored in an onsite tank;
- Excess effluent is disposed in an area immediately west of the site dwelling;
- A large water tank next to the former dairy shed collects storm water run-off;
- Dairy ceased in 1968, however cattle were still kept on site;
- An above ground fuel storage tank was located next to the dairy, along with a 44 gallon drum.

4.3 Council Records Search

Discussions with SC indicated that no Development Applications (DA) or Building Applications (BA) have been submitted for the site based on the records that the council have held for the last 10 years.

Review of the Section 149 Planning Certificate for the site provided by SC indicated the following:

- The site is currently zoned Rural 1 (a);
- The site is not proclaimed to be within a mine subsidence district;
- Development within the site is not restricted because of the likelihood of acid sulphate soils;
- The site has no matters arising under the Contaminated Land Management Act 1997.

4.4 NSW Department of Environment & Conservation

An information search with the NSW DEC (formerly the EPA) indicated that the site has no statutory notices issued under the provision of the Contaminated Land Management Act.

4.5 Review of Historical Aerial Photos

The following historical aerial photos were reviewed:

Table 1 – Aerial Photo Review

Year	Approximate Scale	Black and White/Colour
1963	1:40 000	Black and White
1974	1:40,000	Black and White
1984	1:40 000	Black and White
2000	1:25 000	Colour
2001 Approx	Digital[1]	Colour
2004	1:25 000	Colour

Notes to Table 1:
1 – Source *iplan.australis.com.au*

1963 Aerial Photograph

- A gully is present, bisecting the site in an east/west alignment;
- The gully appears to contain water;
- Minor areas of sparse vegetation are observed, mainly in the western portion of the site, where another minor gully is observed;
- Site area south of the gully appears to be agricultural landuse;
- Site area north of the gully contains up to three buildings and cleared/grassed land;
- Adjacent site uses appear to also be agricultural, with Hunter River running parallel to the eastern boundary of the site;
- The majority of the site appears to be clear of trees with some small pockets located centrally (i.e. along the gully) and in the northern portion of the site;
- An access road is visible from the north-western corner of the site to the buildings in the centre of the site.

1974 Aerial Photograph

- Similar to the 1963 photograph;
- A second access road appears to have been constructed in the western portion of the site towards the buildings;
- Another building appears to have been constructed in the central portion of the site;
- Some erosion scarring/disturbed ground is present along the bank of the Hunter river along the eastern boundary of the site;
- Adjacent landuse appears unchanged.

1984 Aerial Photograph

- The site is similar to the 1974 photograph with slightly increased vegetation growth, predominantly along the gully;
- Residential development is in the process of being constructed immediately north and west of the site, otherwise surrounding landuse appears similar to 1974 photograph.

2000 Aerial Photograph

- The site appears similar to its current condition (see Section 5 for details);
- A small area of disturbed ground is present in the west of the site;
- A small area of disturbed ground is visible in the north of the site (possible agricultural/grazing area).

2001 Aerial Photograph

- The site appears similar to its current condition.

2004 Aerial Photograph

- The site appears similar to its current condition.
- A few small areas of disturbed ground are visible in the north-eastern corner of the site.

It is noted that the review of aerial photos was difficult due to the relatively small scale and poor resolutions.

4.6 Groundwater Bore Search - DNR

A groundwater bore search by DNR indicated that the nearest groundwater well (GW016059) is located approximately 1 km to the north of the site. Review of the details of the bore licence indicates that the bore is authorised for irrigation purposes. There are no groundwater bores between the site and the Hunter River.

5. FIELD WORK

5.1 Methods

A site walk-over was undertaken on 11 January 2007 to assess dominant geomorphologies, site slopes, and site features such as eroded areas, gullies, wet ground, existing dams and potential contamination. Field measurement of surface waters for pH and electrical conductivity (EC) was also undertaken using calibrated portable meters.

The approximate photo locations and general site features are indicated on Drawing 1, Appendix A.

5.2 Results

The results of the walk-over survey including slope measurement and site observations are presented on Drawing 1 in Appendix A, and are discussed in Section 4.

The results of in-situ pH and EC testing of surface waters are summarised in Table 2 below.

Table 2 – Surface Water pH and EC Testing in Dam

Location	pH	EC (µS/cm)
Dam	6.6	260

Notes to Table 2:
EC – Electrical Conductivity
Refer to Drawing 1 attached for dam location

The results of surface water testing generally indicate that surface waters are close to neutral pH and generally fresh.

6. SITE CONDITION

The dominant topographical feature of the site is the gully system, which traverses the site. Towards the east of the site the gully system was up to approximately 10 m deep, with bank slopes observed to range from 30° to 40° with localised slopes of 60° to 70° observed in possible erosion scarps (Photos 1 to 4). The floor of the gully appeared to be relatively flat.

Photo 1 – Typical section of the gully, looking south-east

Photo 2 – Typical section of the gully, looking west. Some erosion scarring is visible along the southern side of the gully.

Photo 3 – View along the gully looking east

Photo 4 – View along the gully looking east

The upper reaches of the gully system within the site originate from suburban run-off onto the site, specifically a stormwater culvert draining into a farm dam located in the north-eastern corner of the site (photos 5, 6 and 8). The dam was observed to be turbid and contained some reeds and surface vegetation at the time of investigation.

Photo 5 – Stormwater culvert draining onto site looking north-west

Photo 6 – Farm dam located in the north-western portion of the site, looking south-west.

The southern end of the dam within the gully contained some fill at the time of investigation (photos 7 and 8) comprising clayey sand and gravel (generally 100mm diameter or less) at the surface.

Photo 7 – Fill located at the southern end of the fill batter, looking west.

Photo 8 – Upper reaches of the gully system showing open unlined drainage channel, dam and fill area, looking north-west.

A series of minor drainage channels were observed in the north-western corner of the site in the vicinity of the dam. Site slopes of 10° to 15° were observed in the vicinity of the drainage channels. Localised erosion scarring was observed along the gully banks (photos 2, 9 and 10). Some of these erosion scars were the cause of the steeper slopes observed on site. Erosion scarring appeared to be in areas of decreased surface vegetation. Slopes within the eroded gullies were typically above 30° and less than 3 m in height. At the time of inspection, the gully lines were generally vegetated with some tree cover, grasses and small shrubs.

Photo 9 – Erosion scarring along the gully banks

Photo 10 – Erosion scarring along the gully banks

The remainder of the site sloped generally toward the main gully, with the exception of the eastern portion of the site, which sloped to the Hunter River.

Vegetation at the site generally comprised medium dense pockets of shrubs and semi mature trees, predominantly along the gully line (photos 1 to 4 and 11), to grassed former pasture land (photo 12) in the northern portion of the site, and current crop land observed over the southern section of the site (photo 13).

Photo 11 – Semi mature trees and along the major gully line

Photo 12 – Open former pasture land at the northern end of the site, looking east.

Photo 13 – Crop land in the southern section of the site looking north-east

A number of small fill stockpiles were observed on site, the largest of which was located adjacent to the dam (approximately 10 x 10 m in area) in the north-western corner of the site (photos 7 and 8). The surface of the fill stockpile generally comprised clayey sand and gravel materials.

A fill stockpile containing timber and green waste, (previously containing building demolition materials) was located south-east of the dam in the western section of the site (photo 14). A further fill stockpile to the south of the dam contained clayey sand and gravel, glass, timber, plastic, PVC, brick and concrete up to 500 mm in diameter (photos 16 and 17). A small area of disturbed ground (possible rubbish burial area) was located in the western section of the site near the timber and green waste stockpile (photo 15).

Photo 14 – Timber and green waste fill stockpile in the western section of the site, looking south.

Photo 15 – Small buried fill area in the western section of the site looking east.

Photo 16 – Fill stockpile in the western section of the site containing various materials, looking south-east.

Photo 17 – Fill stockpile in the western section of the site containing various materials, looking north.

At the time of investigation, three sheds were located on-site as well as the site dwelling. The northernmost shed comprised timber, sheet metal and masonry construction on a concrete slab (photo 18). It is understood that this shed housed a dairy.

Two further sheds were located in the central-western portion of the site, adjacent to the residence, as shown in photos 19 and 20.

The southernmost shed was of timber and sheetmetal construction on a concrete slab, and at the time of investigation was used for vehicle storage. The third shed, also of timber and sheetmetal construction, was on bare ground and was used for storage of hay bales, empty 44 gallon drums, a caravan, timber and building materials.

Photo 18 – Former dairy shed, looking south-east.

Photo 19 – vehicle storage shed, looking south.

Photo 20 – inside the southernmost storage shed

A water tank located adjacent to the dairy shed appears to collect stormwater from the roof of the shed and has not been used since 1971 (photo 21). No surface staining was observed in the vicinity of the shed at the time of investigation.

Photo 21 – Stormwater collection tank next to the dairy shed. Looking east toward the storage shed.

The southern section of the site contained large ploughed fields for cropping purposes (photo 22). Above ground fuel storage tanks were observed on the southern boundary of the site (photo 23). Some localised staining was observed at the base of the tanks.

Photo 22 – Ploughed fields for cropping purposes.

Photo 23 – Above ground fuel storage tanks located on the southern boundary of the site.

6.1 Potential Contaminants

Based on the results of the preliminary assessment, the potential for gross contamination to be present within the site is considered to be low due to on site activities or current site condition. The following observations were made with respect to potential contamination:

- Localised surface areas near the dwelling was observed to contain lush grass growth, which is likely to be a result of elevated nutrients from effluent disposal;
- The fill pad found next to the dam contained brown clayey sand and gravel at the surface and was sourced from the excavation of nearby swimming pools, however the chance of opportunistic dumping in this area cannot be discounted;
- A fill pad located in the western section of the site near the dam contained glass, timber, plastic, PVC, bricks and concrete up to 500 mm in diameter at the surface and could contain a range of potential contaminants including TRH, PAH, BTEX, PCB, OCP/OPP, Asbestos and Heavy metals;
- A former silage pit in the western section of the site contains predominantly green waste and timber, however, building materials which were removed from this area may have contained a range of contaminants including asbestos and the possibility of remnant contamination cannot be discounted;
- A large shed currently used for storage has an unsealed base and may have come into contact with a range of potential contaminants including TRH, PAH, BTEX, PCB, OCP/OPP and Heavy Metals from past landuse;
- Soils in the vicinity of the former above ground storage tank and 44 gallon drum near the former dairy have the potential to contain a variety of contaminants including TRH, PAH and Heavy Metals;
- Soils in the vicinity of the above ground fuel storage tanks on the southern boundary have the potential to contain a variety of contaminants including TRH, PAH and Heavy Metals;
- Contamination due to the former piggery landuse cannot be discounted, however, contamination is considered unlikely due to the period of time that has passed since the piggery was discontinued;
- Possible pesticide use in the southern section of the site may have caused contamination, however given that this area of the site is proposed to remain agricultural, further assessment is not required at this stage;

- The presence of rubbish burial areas on the site. The extent of these burial areas has not been assessed.

7. URBAN CAPABILITY

Slope Stability

Slopes in the vicinity of the major gully are generally in the order of 30° to 40°, with some localised steeper slopes associated with erosion within the gullies. Further assessment of slope stability (including set back requirements for the proposed residential development) by an experienced geotechnical engineer or engineering geologist is recommended.

Further assessment of the long term stability will be required for the on site dam (if retained), prior to re-development. Some remedial works, such as compaction of embankment material and erosion protection may be required if dam is retained.

The main gully system comprises relatively wide gullies with a meandering stream at the base. The gully is incised with steep slopes, both in proximity of the stream and remote from the stream.

Slopes within the northern banks of the gully system were observed to range from 20° to 60° although slopes of up to 70° were observed in the north-eastern corner of the site. The batters were up to around 10 m in height but in places are around 5 m in height (near western boundary). It is possible that on-going erosion in these areas may in future cause localised slumping or instability in the banks and the adjacent areas, which is part of the natural geomorphological processes in such areas.

It is suggested that the following constraints should be applied to development on the flanks of the gully:

- No development on slopes between 15° and 25° or within 10 m of the crest of these slopes without specific geotechnical assessment;
- No development on slopes exceeding 25° and within 25 m of the crest of these slopes without specific geotechnical assessment and suitable remedial works where necessary.

The approximate extent of the area affected by these restrictions is shown on Drawing 1, Appendix B.

The site is considered to be generally suitable for development with respect to slope stability providing that the above constraints are addressed during the design and/or construction phase.

Soils in the immediate vicinity of the farm dam were observed to contain some wet to saturated surface soils and some ponded water. The presence of soft / wet or poorly drained soils would not necessarily preclude development but would require some form of ground treatment, depending on the nature of the development. Further investigation is required in this area to determine the most appropriate treatment for future foundation and pavement design.

Acid Sulphate Soils

Acid sulphate soils are not anticipated within the site as described previously.

Erosion Potential

Near surface soils within the site were observed to be erodable where vegetation was sparse predominantly in the vicinity of the gully system. Further assessment including laboratory testing of soils is required to assess erosion potential of soils on site.

Provision of an adequate vegetation cover would aid in preventing large scale erosion at the site. It should also be noted that erosive soils are readily amenable to standard mitigation measures during and following construction.

Salinity Potential

During the site inspection, there were no obvious indicators of gross salinity (i.e. impacted vegetation or salt scalds). In addition, preliminary water testing in major creeks and dams on site indicated that generally fresh surface water was present (i.e. no indication of saline surface waters).

Based on the soil landscape mapping, there may be a potential for salinity issues associated with drainage lines within the site. It is noted, however, that salinity occurrences or hazards have not been identified on the site by DNR.

Additional soil sampling and testing is recommended as part of the detailed design to further assess the distribution salinity of the soils, and confirm appropriate measures to manage such soils.

Mine Subsidence

The site Section 149 certificate indicates that the site is not within a proclaimed Mine Subsidence District and is unlikely to be undermined.

8. COMMENTS

The results of the preliminary geotechnical and contamination assessment have identified issues that should be considered for site development:

- Localised constraints imposed by steep gully slopes requiring specific geotechnical assessment in relation to slope stability;
- The potential for salinity issues within drainage lines;
- The presence of erodable soils where not protected by vegetation cover;
- Uncontrolled fill, fill stockpiles and rubbish burial areas which will require further assessment and possible removal;

- The potential for hydrocarbon contamination in the vicinity of former aboveground fuel storage and in unsealed areas in the vicinity of sheds.

The above issues are considered to be minor and readily addressed through detailed investigation and design. The potential for contamination at the site is considered to be low. The presence of elevated nutrients in surface soils near the effluent disposal area can be readily addressed during earthworks construction. Further investigation is recommended to confirm the absence of contamination associated with the fill stockpiles, and other areas such as the unsealed shed base, in the vicinity of the dairy shed and above ground tanks located in the southern section of the site.

Overall the northern portion of the site is considered to be suitable for future rezoning, subject to the above issues being addressed, with further subsurface investigation recommended.

9. LIMITATIONS OF THIS REPORT

DP have performed investigation and consulting services for this project in general accordance with current professional and industry standards for land contamination investigation.

DP, or any other reputable consultant, cannot provide unqualified warranties nor does DP assume any liability for site conditions not observed or accessible during the time of the investigations.

No site investigations can be thorough enough to provide absolute confirmation of the presence or absence of substances, which may be considered contaminating, hazardous or polluting.

This report and associated documentation and the information herein have been prepared solely for the use of Orbit Planning and any reliance assumed by other parties on this report shall be at such parties own risk. Any ensuing liability resulting from use of the report by other parties cannot be transferred to DP.

DOUGLAS PARTNERS PTY LTD

Reviewed by:

Brendan Rice
Environmental Scientist

Stephen R Jones
Principal

REFERENCES

1. NSW EPA Contaminated Sites "Guidelines for Consultants Reporting on Contaminated Sites", November 1997.

2. Department of Land and Water Conservation, "Site Investigations for Urban Salinity", 2002.