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Project 36500.02 Rev 1
10 August 2011
LR:jlb

Landcom
Level 2
330 Church Street
Parramatta NSW 2150

Attention: Mr Paul Hourigan, Development Director

Dear Sirs

Review of Land Capability Study
Menangle Park Urban Release Area, Menangle Park

Douglas Partners Pty Ltd (DP) originally issued the following letter to APP Corporation on 8 December 2009. Douglas Partners Pty Ltd (DP) has now been requested to update the letter by the Development Coordinator of Landcom in an email to DP dated 5 August, 2011. The updates are in respect to contamination and remediation of Lot 59 in Deposited Plan 10718, Cummins Road, only (s.4.6), in accordance with information supplied by Landcom.

1. Introduction

Douglas Partners Pty Ltd (DP) was commissioned by APP Corporation in October 2009 to review the status of the Land Capability Study undertaken in 2004 by DP. The purpose of the review is to assess the applicability of the 2004 report with regard to the current status of the project to identify key and outstanding issued that need to be addressed and any statutory or best practice changes that have occurred since 2004.

The Land Capability Study provided an overall evaluation of the proposed Menangle Park Urban Release Areas identified by NSW Government and Campbelltown City Council for potential rezoning and urban development. The objectives of the 2004 assessment were to provide preliminary evaluations from a planning perspective, and included:

- General risks associated with soil erosion and instability with respect to the various 'precincts' in the area;
- General soil salinity issues over various portions of the land;
- Potential or actual acid sulphate soils over the area, and
- The potential for soil contamination over various precincts of the site.

At the time of the 2004 study limited information regarding the proposed development was provided. A draft revised structure plan (02/12/2009 issue 4) is now available (see attached) from the client. The current review was thus undertaken on the basis of this revised structure plan.

No other detailed design/works plan of the proposed development is available at this stage.

2. Site Description

The site is located approximately 6 km to the south west of Campbelltown, and covers an area of approximately 920 hectares. The site is bounded to the west and south by the Nepean River and to the east by the Hume Highway and Menangle Road. The eastern part of the site comprises broad rolling hills with gentle to moderate slopes (3-15%), passing to the west into a gently sloping to flat alluvial terrace (0-5%) adjacent to the Nepean River. The rolling hills in the north and eastern part of the site are underlain by the Bringelly Shale and Ashfield Shale of the Triassic Wianamatta Group. The flat-lying areas to the west are underlain by Quaternary "low level" alluvial deposits of the Nepean River Valley. Tertiary "high level" alluvial deposits are preserved in the central part of the site, between the Hume Highway and the Main Southern Railway.

3. Scope of Work

Based on the agreed scope of works, the 2004 investigation comprised the following elements:

I. Review of background information including previous investigations, available Council records, aerial photographs, salinity and acid sulphate soil risk maps, and anecdotal evidence;

II. Scoping study of the site comprising a site inspection to identify potential zones of concern for sample collection with regard to contamination and salinity;

III. Preparation of a proposed sampling location plan for approval by APP prior to intrusive sampling;

IV. Services search in liaison with the client including dial-before-you-dig and agreement on sample locations;

V. Excavation and logging of 100 test pits across the site to a maximum depth of 3 m using a backhoe;

VI. Collection of soil/fill samples from near surface from an additional 100 locations across the site for the purposes of the salinity investigation;

VII. Electromagnetic (EM) profiling using a Geonics EM31 Ground Conductivity Meter mounted on a 4WD Quad bike, with a nominal grid spacing of 400 by 750 metres; Calibration of measurements of apparent conductivity (ECa) by correlation with and scaling against values of soil conductivity (ECe) derived from soil measurements ($EC_{1:5}$) across the site; Production of an apparent salinity map for the site by gridding and contouring the scaled data set;

VIII. Collection of soil and fill samples from each test pit for contaminant analysis; Sample collection from the surface (0-0.5 m) and at 1.0 m intervals in fill until test bore completion, including 10% replicate samples and one equipment wash blank (rinsate) per day for QA/QC purposes; Duplication of each jar sample by means of a replicated bag sample for field PID analysis, with the PID suitably calibrated each day;

IX. Decontamination of sampling equipment between sampling events using appropriate protocols;

X. Screening of all replicate samples for volatile organic compounds using a Photoionisation Detector (PID);

XI. Analysis of selected soil/fill samples (plus 10% QA/QC samples) for various combinations of a range of common contaminants; Analysis of at least one sample from each location, including the appropriate number of field duplicate (QA/QC) samples (10%) and a further trip blank and trip spike for each batch of soil samples. Analytes included:

- Heavy Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc) (119 samples);
- Total Recoverable Hydrocarbons (TRH) (34 samples);
- Benzene, Toluene, Ethylbenzene, Xylene (BTEX) (34 samples);
- Polycyclic Aromatic Hydrocarbons (PAH) (34 samples);
- Organochlorine/Organophosphate pesticides (OC/OP) (45 samples);
- pH (1:5) (74 samples);
- EC (1:5) (74 samples); and
- POCAS (Acid sulphate soil potential) analyses were NOT undertaken, as the potential for acid sulphate soils on the site is extremely low.

XII. Storage of remaining soil samples (those not sent for contaminant analysis) for a period of one month pending the need for additional chemical testing and evaluation;

XIII. Provision of monthly progress reports indicating activities completed and schedule for following month;

XIV. Preparation of constraints maps indicating areas of soil contamination risk, soil salinity risk, erosion and sedimentation hazards, acid sulphate soil risk and areas suitable for urban development;

XV. Preparation of a technical report outlining the scope of work, study methodology, background, field work, strategic context, assessment of constraints and opportunities, conclusions and recommendations regarding management and mitigation issues; and

XVI. Preparation of an outline Soil and Water Management Plan (SWMP) for inclusion in the DCP documentation, addressing management procedures and development criteria for application to future subdivision within Menangle Park.

4. Findings and Recommendations of the Study

4.1 Soil Erosion Potential

The rate and severity of soil erosion is dependent on a number of factors including the soil type, topography, rainfall, organic content of the soil, and vegetation cover. The susceptibility of soils to erosion depends on the dispersivity and sodicity of the soils. The dispersivity and sodicity of soils in the Menangle Park Release area were assessed by carrying out the following laboratory tests - Emerson Class Test (measure of soil dispersion); and Exchangable Sodium Percentage (measure of soil sodicity). On the basis of Emerson Class Numbers, soils classify as non-dispersive to highly dispersive.

Values of Exchangeable Sodium Percent (ESP) indicate non-sodic to highly sodic conditions. High sodicity and moderate to high dispersivity were identified in samples from both Blacktown and Theresa Park soil landscapes and are associated with test pit locations in valleys and on mid to lower slopes formed on Wianamatta shales.

On a regional scale, soils of the Blacktown, Theresa Park, and Luddenham soil landscapes are of typically moderate erodibility (K values of 0.024–0.039). The more sodic or saline soils of the Blacktown soil landscape can have high erodibility and the erosion hazard for this landscape is estimated as moderate to very high with calculated soil losses from newly developed areas of up to 70 t/ha in the first 12 months (Hazelton and Tille, 1990). The soil erosion hazard for the Luddenham soil landscape is moderate to extreme for non-concentrated flows, with a calculated soil loss for the first 12 months after urban development of up to 135 t/ha for topsoil and up to 100 t/ha for exposed subsoil. The soil erosion hazard for the alluvial Theresa Park soil landscape is estimated as moderate to high for non-concentrated flow and very high for concentrated flow. Calculated soil losses in the first 12 months of urban development are up to 15 t/ha for topsoil and 25 t/ha for exposed subsoil (Hazelton and Tille, 1990). Using an alternative method based on the Revised Universal Soil Loss Equation (assuming a typical site slope length of 30 metres and gradient of 10%), indicate soil loss from disturbed areas with little or no soil cover of approximately 130 t/ha/yr.

4.2 Slope Instability

Thick residual soil profiles of the Blacktown and Luddenham soil landscapes can be prone to slope instability due to slumping and soil creep, particularly on steep south-facing slopes underlain by shale. The high clay content of these soils results in poor drainage, and therefore reduced cohesion during periods of high rainfall or where natural drainage has been disturbed by development. Instability due to slumping is typically associated with thick soils and slopes in excess of 11-20º (or greater than a 20% gradient; Fell, 1985).

The majority of naturally occurring slopes in the site have a gradient of less than 15%, and therefore slope instability is considered to be unlikely. Based on the current land use, the consequences to property of a landslip would likely be minor, and the overall landslide risk over the majority of the Menangle Park release is therefore considered to be low to very low. An area surrounding a prominent hill in the south east of the site, adjacent to the Hume Highway (MGA 293200 mE, 6223000 mN) has south-facing slopes in excess of 15%. Although no signs of slope instability were noted, future slope instability through earth slide or flow is considered possible, and the area represents a low to moderate instability risk. It should also be noted, that any existing or future excavations on the site that produce slopes with steeper gradients, or that alter the natural drainage, may be prone to instability.

Both soil landscapes are considered to have high capability for urban development provided adequate provisions are made for foundation design, flooding, soil erosion/sedimentation and slope stability on a site basis.

4.3 Soil Salinity

An apparent salinity map of the Menangle Park site was developed by calibrating EM31 conductivity measurements against soil salinity measurements and gridding the calibrated data. The apparent salinity contour map indicates that generally non-saline conditions prevail in the central and western parts of the site underlain by Tertiary and Quaternary alluvial deposits and slightly to moderately saline conditions are associated with the more elevated areas to the north and south that are underlain by Wianamatta Group shale (following the salinity classification of Richards, 1954). The highest apparent salinity values (equating to moderately saline conditions) tend to occur in drainage areas within the Blacktown and Luddenham soil landscapes and are therefore consistent with the locations of known salinity indicators on the site and with the spatial distribution of salinity risk areas (DIPNR, 2003). Buildings, pavements and vegetation in these areas may be prone to salt related damage, and a number of management options are recommended.

4.4 Acid Sulphate Soil Risk

Acid sulphate soils are typically associated with low-lying coastal areas, including estuarine flood plains, rivers and creeks. The location and elevation of the site (> 60 m asl) are such that the risk of acid sulphate soil may be considered negligible. An assessment of soil samples collected across the site revealed no potential or actual acid sulphate soil material.

4.5 Soil Aggressivity to Buried Structures

Seventeen soil samples from the Menangle Park Release area were analysed for chloride, sulphate, and pH and compared to the exposure classification for concrete piles, based on Australia Standard AS 2159-1995. Laboratory results indicate that soil conditions are likely to be non aggressive to moderately aggressive towards concrete structures and non aggressive to mildly aggressive towards iron and steel.

4.6 Soil Contamination

Potential for soil contamination on the site has been assessed in a preliminary assessment by DP. The assessment comprised a site inspection, review of land use history at the site, and laboratory analysis of soil samples collected from test pits.

Based on available information, potential contaminants could arise on the site from a number of sources including:-

- Contaminated filling used to raise or form the site platforms;
- Landfilling of waste material;
- Application of pesticides;
- Storage of chemicals;
- Movement of contaminated groundwater beneath the site;

- Asbestos in filling materials, soil or sediments;
- Septic tanks; and
- Other contaminants on the site.

Several areas were highlighted as having a moderate potential for contamination based on current or past land use and/ or anecdotal evidence. Where possible test pits were located within or adjacent to these areas to assess contamination levels. The areas of potential contamination noted during the site investigation included-

- The old fireworks factory site, Lot 59, DP 10718 Cummins Rd, Menangle Park (Drawing 16). Soil at the site contains asbestos cement sheet fragments from the demolition of site buildings, and it is understood that waste products associated with fireworks manufacturing were buried on the site. A detailed contaminated site assessment and a remediation action plan have been prepared by Charlie Furr of Consulting Earth Scientists, which identified that the contaminated land could be remediated. The site audit undertaken by Environ (*Summary Site Audit Report, Lot 59 Cummins Road- Menangle Park, NSW*, prepared for Landcom, dated May 2002, reference 31- 0030) indicated that the site would be suitable for use as residential land, parks, recreational, open space, playing fields or commercial/industrial land use, pending the removal of waste materials in the buried trenches and across the site, and the removal of asbestos fibres from the surface soils;
- Lot D, DP 19853, a former farm shed, thought to have asbestos sheet roofing (Drawing 16). This site is in the vicinity of a possible heritage area (refer references to 'Portion 2' in Casey and Lowe Non-Indigenous Heritage Study taken from Menangle Park project web site dated December 2003, pages 62, 63, 74 and 75). Remediation of the site is to be undertaken by Landcom following further advice from APP/Council on any additional heritage work required as part of LES/LEP. The site is contained within a secure paddock;
- Areas of cut and fill associated with Sydney Gas extraction plants, pipes and gas flares adjacent to the Nepean River;
- Refuelling station, sand stockpiles, and disturbed ground associated with sand mining operations adjacent to the Nepean River;
- Various properties used for agricultural purposes; possible contaminants include pesticides; fuels, asbestos, uncontrolled landfill;
- Pindone bait has been laid for rabbits on at least one site on Cummins Rd, Menangle Park; and
- Glenlee Olive Estate.

Given that the site could be developed for residential purposes with accessible soils, the recommended guideline levels adopted in the 2004 assessment were the lower of Health based investigation levels for residential sites with access to soil, including cultivation of home-grown produce, and the more stringent provisional phytotoxicity based investigation levels (NEPC, 1999).

In summary, based on the limited sampling undertaken in this study, there is no evidence for significant widespread or diffuse contamination across the site. Low levels of aliphatic (chain) hydrocarbons and polycyclic aromatic hydrocarbons were detected in three samples associated with disturbed ground or imported fill, indicative of local minor contamination, but the observed concentrations were well below the relevant guideline levels. Similarly, a marginal exceedance of the

Provisional Phytotoxicity –based Investigation Levels (PPILs) for arsenic was detected in one sample. The detected arsenic value (22mg/kg) was within the range of natural background levels for arsenic and the exceedance was considered to probably represent natural background levels.

It should be noted that more localised contamination may occur due to past and present activities conducted at specific sites. It is recommended that site specific evaluation should be undertaken at the time of development. For sites that are identified to have an elevated potential for contamination, more detailed, site specific assessment should be conducted at the time of development. Based on the Environ site audit statement (Environ 2002), the old fireworks factory site will be suitable for its planned use once the contamination has been remediated and validated.

4.7 Land Use Implications

On the basis of an initial assessment of soil erosion and sedimentation hazards, and slope stability, it is considered that urban or rural-residential development is generally feasible over most of the site that is outside flood prone areas. However the study also highlights some areas that may have issues related to soil salinity, soil erodibility, slope stability, and contamination.

Zones of moderate soil erosion and slope stability risk are restricted to the steeper slopes in the south west of the site, and any excavated areas that expose the soil and/ or create steep embankments. Management strategies for building in areas of low to moderate slope stability and soil erosion risk are outlined in a preliminary Soil and Water Management Plan, developed as part of the 2004 assessment.

Areas of slight salinity risk occur along drainage lines and lower breaks of slope in hill areas formed on the Wianamatta Group. Groundwater investigations on an adjacent site have identified saline groundwater at shallow levels in these areas indicating that saline conditions may be exacerbated by fluctuating groundwater levels or deep excavations. Saline soil and groundwater can cause significant degradation of buildings and pavements, and will ultimately reduce the lifespan of these structures and add significantly to infrastructure maintenance costs. It is recommended that urban development be avoided these areas, or that appropriate salinity management strategies be implemented.

The preliminary contamination assessment has found that contaminant levels across the site were generally low and do not indicate signs of restriction on development of the site. It is however anticipated that more localised areas of contamination may occur that are related to past activities such as uncontrolled tipping and filling, chemical storage and disposal, pesticide use, and disposal of material containing asbestos. It is suggested that further investigations may be required to determine the nature and extent of contamination on a site by site basis.

5. Statutory Guidelines and Legislative Requirements

Land capability studies Land capability studies are subject to statutory guidelines and some relevant legislation. No significant variations in legislation have occurred since 2004 when the report was

produced although a number of guidelines/references have since been issued/updated. Relevant comments in the various areas are reviewed below.

a) Salinity – Reference to the Department of Infrastructure Planning and Natural Resources (DIPNR), now part of the Department of Environment, Climate Change and Water (DECCW) map entitled "Salinity Potential in Western Sydney 2002" provides an indication of the potential risk associated with various sites. A document entitled "Site Investigations for Urban Salinity" (Department of Land and Water Conservation, 2002) remains the most relevant guideline for investigations.

b) Acid sulphate soils – Reference to the regional *Acid Sulphate Soils Risk Map* Edition 2 (DLWC, 1997) and the relevant guidelines relating to the Acid Sulphate Stone, including *Acid Sulfate Soils Manual 1998* (Acid Sulphate Soil Management Advisory Committee [ASSMAC], Wollongbar, NSW, Australia) indicates that the probability of ASS occurrence is low.

c) Environmental/soil contamination – Guidelines adopted in the 2004 assessment were the National Environmental Protection Council (1999) for a range of site uses including PPILs, residential, parks/recreational and industrial/commercial. Other guidelines included the NSW EPA (1994) Guidelines for Assessing Service Stations Sites. Both guidelines are still relevant. The only major new relevant reference in this regard is the revised NSW EPA (2006) Guidelines for the NSW Site Auditor's Scheme Edition 2 (2006). The updated guidelines contain clarification of various items pertaining to the role of the Auditor and specific site evaluation processes, however these have not materially impacted the study or the conclusions presented above.

d) Environmental/groundwater – While no groundwater investigation was conducted as part of the previous investigation, the relevant groundwater criteria remain the ANZECC (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality Trigger Values for toxicants in marine water with a 95% level of protection.

e) Environmental/Soil and Management Plan – Managing Urban Stormwater: Soils and Construction (1988) remains the relevant guideline in this regard.

6. Best Practice

The approach and methodologies employed for the 2004 study were considered best practice and are still considered best practice. However, the extent to which individual methods were applied was sometimes limited by the strategic rather than specific nature of the study (ie the absence of specific development concepts) and by the budgetary constraints imposed in this preliminary study.

Our experience with this and subsequent large-area studies indicates that best practice should involve more detailed evaluation of higher risk sites e.g. assessment using a higher density of ground conductivity measurements (ie closer spacings of electromagnetic profiles) in preliminary studies, to avoid duplication or difficult in-fill of data closer to development stage. Similarly, more detailed

contamination investigations should be undertaken on areas identified to have an elevated potential for contamination or sites having a higher potential for prior uncontrolled filling.

Future best practice investigations should improve the basic data density by additional electromagnetic profiling and/or test pitting, according to the current development concepts. Further consideration should also be given to groundwater studies, tailored to the development concepts.

7. Summary and Recommendations

Various recommendations were provided in Section 8 pertaining to the range of issues identified and investigated at the site. In particular, the following areas were highlighted:

- **Salinity** – various management strategies were recommended including road/pavement construction techniques, excavation in lower slope areas, use of specific building and landscaping methods, drainage and building and construction techniques. These strategies should be fine-tuned and made site-specific when detailed development plans are available for the various development precincts;
- **Hydrogeological assessment** is recommended to determine the potential impact of proposed cut/fill activities on groundwater levels and soil salinity. In addition, groundwater investigation needs to be included in the future works as part of the contamination assessment works;
- **Contamination** - further assessment is recommended on a site-by-site basis prior to the development of each land parcel or site, a preliminary contamination assessment comprising a site inspection and review of previous land uses should be undertaken, hopefully when the site development plan is better defined. If no potential contaminants or potentially contaminating land-use is identified, then further action may not be required. If potential contamination is identified, then further assessment may be required. This would normally involve soil and/or groundwater sampling and analysis to determine the nature and extent of contamination at the site. Any asbestos material identified would have to be removed or otherwise remediated using appropriate procedures; and any uncontrolled fill or waste material would need to be assessed, and depending on the nature of the fill or waste material, be removed or otherwise remediated using appropriate procedures.
- **Development on Hill Slopes** – the areas with moderately steep slopes in the south east part of the site represent a low to moderate landslide risk and therefore lower housing density has been recommended in steeper areas; and
- **Soil and Water Management Plan** – following development consent a detailed Soil and Water Management Plan should be developed in accordance with Managing Urban Stormwater: Soils and Construction (1988).

It is noted that at the time of the preliminary investigation and this review, it is understood that detailed development plans have not been compiled for the site and therefore have not been provided to DP. DP notes that a re-assessment of the Land Capability Study and determination of the range of additional work required should be undertaken when a more detailed development strategy has been constructed for the site. In particular, increased density of electromagnetic profiling for salinity assessment (eg. 100 m x 100 m spacings in selected areas), preliminary contamination assessments and groundwater investigation should be undertaken in areas identified for specific development. These can be conducted on a site by site basis according to the proposed development schedule.

Regardless of the detailed development, a number of areas of additional investigation are recommended in the report. These recommendations are still considered to be relevant for the site.

8. Limitations

Douglas Partners (DP) has prepared this letter report for this project at Menangle Park in accordance with DP's original revised proposal dated 9 February 2007 and additional request received from the Development Coordinator of Landcom by email dated 5 August 2011. The work was carried out under DP's conditions of Engagement. This letter report is provided for the exclusive use of Landcom for the specific project and purpose as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are considered to be indicative of the sub-surface conditions on the site only to the depths investigated at the specific sampling and/or testing locations, and only at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Please contact the undersigned for clarification of the above as necessary.

Yours faithfully
Douglas Partners Pty Ltd

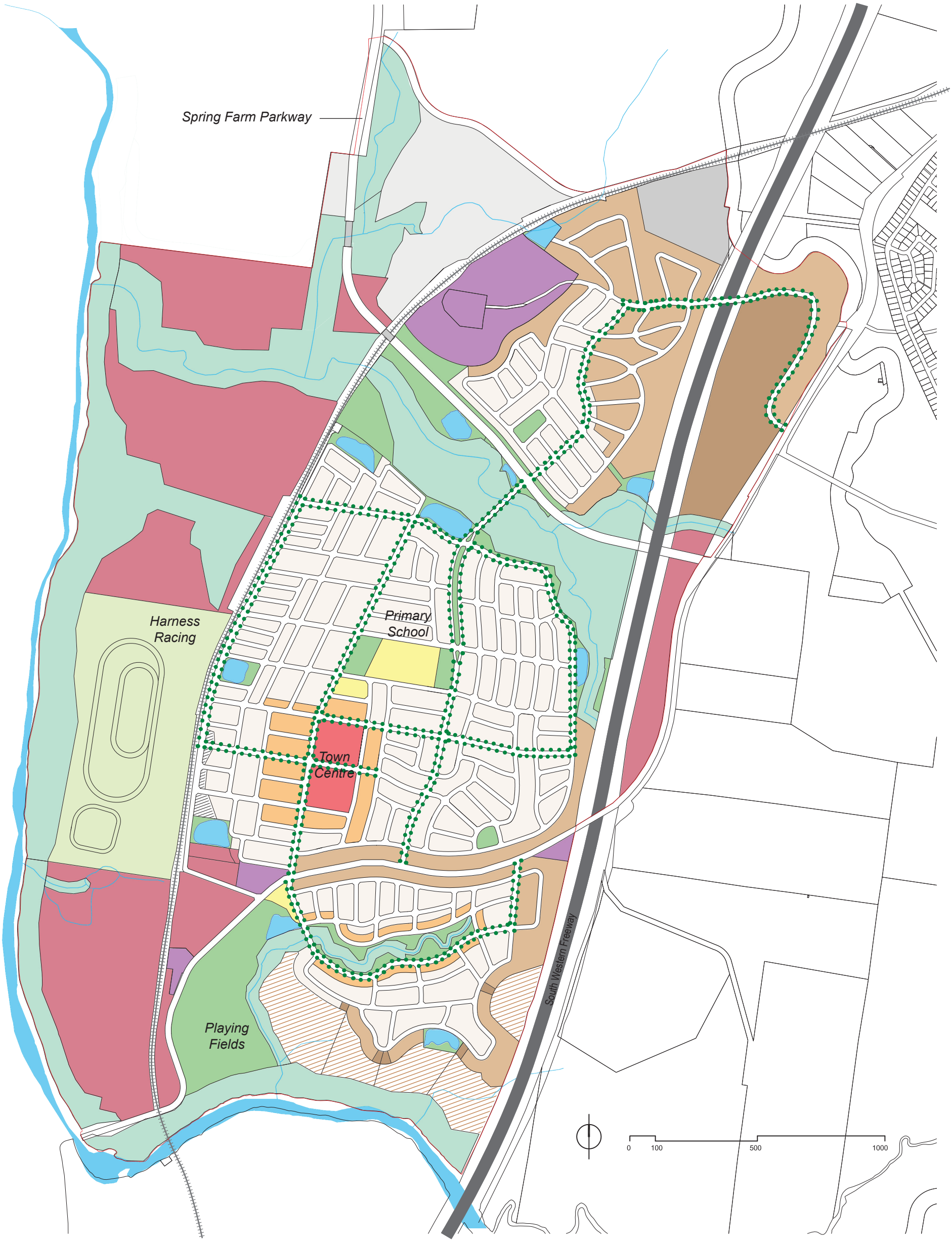
Kate Graham
Environmental Scientist

John Lean
Principal

Reviewed by

Lindsay Rockett
Principal

Attachment: Structure Plan
Notes About this Report



350 - 390 sqm lots
540 - 700 sqm lots
1000 - 1500 sqm lots
2000+ sqm lots
Private Open Space

Town Centre
Community Use
Open Space
Riparian
Private Recreation

Rural
Heritage
Employment
Transgrid
Collector Roads

menanglepark

See Visual Scale	Urbis	Menangle Park
09 12 01 Structure Plan.indd	02/12/2009 ISSUE 4	DRAFT Revised Structure Plan

PROJECT PARTNERS

campbelltown city council

LANDCOM

DRAFT

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.