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SPECIALISTS MANAGING THE EARTH

BELLVISTA 2 - PRECINCT 1

EROSION SEDIMENT HAZARD INVESTIGATION REPORT

Brown Consulting (Qld) Pty Ltd

GEOTKPAR01560AA/C(Rev4)
30 November 2010

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SPECIALISTS MANAGING THE EARTH

30 November 2010

Brown Consulting (Qld) Pty Ltd
Level 1, 15 Nicklin Way,
Buddina, Qld 4575

Attention: Mr Brent Thomas

Dear Sir,

RE: Bellvista 2 – Precinct 1

Erosion and Sediment Hazard Investigation

Coffey Geotechnics Pty Ltd (Coffey) is pleased to present our erosion and sediment hazard investigation report for the Precinct 1 of the Bellvista 2 development, Caloundra. Guidance on the uses and limitations of this report is presented in the attached document "*Important Information about your Coffey Report*".

Should you wish to discuss any aspect of this report please contact the undersigned at our Kunda Park office.

For and on behalf of Coffey Geotechnics Pty Ltd

Ron McMahon

Principal Engineer

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1 INTRODUCTION

Coffey Geotechnics Pty Ltd (Coffey) was commissioned by Mr Brent Thomas of Brown Consulting Pty Ltd on behalf of Stockland Caloundra Downs Pty Ltd to undertake the erosion and sediment hazard investigation (ESH) for Precinct 1 at the Bellvista 2 residential development, Caloundra. The scope of the ESH investigation is to assess the sites existing hydrology and erosion hazard to allow for adequate design and implementation of erosion and sediment controls during development. The ESH has been prepared in accordance with the region's best management practices.

The proposed Bellvista 2 development is located 5km to the west of Caloundra and was divided into two areas, being Precinct 1 and Precinct 2. Precinct 1 is some 45.1 hectares and the development involves approximately 21.0 hectares of mixed use residential development and 14.4 hectares of open space. A high level of land disturbance is expected during the construction works. Soil disturbance shall occur through the clearing of existing vegetation and the bulk and civil earthworks. The bulk earthworks shall involve the stripping of topsoil, placement of fill and cut excavations for drains. The civil works shall include trenching for power, water, sewer and stormwater services as well construction of roads and pathways. A site plan prepared by Brown Consulting showing the proposed development is attached as Appendix A.

1.1 General References

In preparation of this ESH reference has been made and should continue to be made to:

- The Manual for Erosion and Sediment Control (Version 1.2, November 2008), prepared by Sunshine Coast Regional Council (referred to as the Maroon Manual hereafter);
- Soil Sampling and Testing Guideline for Erosion Potential (Version 3, November 2001), Brisbane City Council (BCC);
- Sediment Basin Design, Construction and Maintenance Guidelines, (January 2001), BCC; and
- Quality Control Guidelines for Local Governments – Stormwater (February 1998), Department of Natural Resources and Department of Environment.

2 SITE PHYSICAL CHARACTERISTICS

2.1 General

Precinct 1 is a more or less triangular area off the south eastern side of Bellvista Boulevard at Caloundra. It adjoins the Caloundra airport property in the north east.

The lot is at an elevation of about RL 5 to 6 metres AHD along the Bellvista Boulevard frontage and slopes down to the southeast and southwest away from the boulevard frontage with an average gradient less than 1% to an elevation of about RL 2 metres in the southern parts of the site. A natural drainage line flows to the south around the south western end of the precinct.

2.2 Climate

The climatic conditions on the site are expected to be similar to those at Caloundra. Caloundra has an average yearly rainfall of 1578mm (Source BOM). The climate is subtropical with mean 9am temperature of 20.5ºC. Generally, the summers and autumns are wet while the winters and springs are dry, however unexpected and unseasonable high rainfall events may and have occurred during the drier months (recent examples being the significant winter and spring rainfalls recorded during 2006, 2007 and 2008).

2.3 Geology

According to the 1:100 000 Geological Series mapping, sheet 9444 and part 9544, prepared by the Department of Mines and Energy Queensland, the site is underlain by Quaternary alluvium (mapping unit Qa). This unit consists predominantly of sands and silty sands in this area. The alluvium is underlain at shallow depth by residual soils derived from the Late Triassic to Jurassic Landsborough Sandstones (mapping unit RJl). This sequence is predominately sandstone in this area.

2.4 Existing Vegetation

Precinct 1 has been previously cleared of its native vegetation cover. A dense exotic grass cover is established over the site. Larger woody vegetation within Precinct 1 was generally in the form of regrowth and limited to areas along the existing drainage lines. Tree species identified included *Pinus radiate, Acacia melanoxylon, Lophostemon suaveolens, Melaleuca quinquenervia* and various Eucalyptus species. Plates 1 to 4 illustrate the existing vegetation within Precinct 1 and are attached as Appendix B.

2.5 Hydrology and Hydrologic Impact

The Bellvista 2 development is situated on an alluvial plain (constrained site) within the Lamerough Creek catchment. Several previously excavated channels exist within the site. These channels transport storm water from the upper catchment through the site in a southerly direction before draining into Lamerough Creek. Lamerough Creek flows through the Pelican Waters development before its efflux into Pumicestone Passage.

Presently, runoff from the Precinct 1 precinct drains via a series of shallow excavated channels into the larger high velocity channel which forms the southern border of Precinct 1. Clearing the existing vegetation for development purposes is likely to increase sediment loads and runoff velocities during rainfall events if adequate erosion and sediment controls are not implemented.

Site runoff with increased sediment concentrations can cause significant damage to the receiving waterway by:

- fine sediment infill of riffle zone strata;
- elevated nutrient concentrations (especially nitrogen); and
- fluctuations in physico-chemical parameters (i.e. pH and electrical conductivity).

Increased runoff velocities can cause significant damage to the receiving waterway by way of:

- channel widening and bank instability; and
- pool-riffle elongation.

Higher sediment concentrations and velocities caused by runoff from disturbed sites have the ability to impact the receiving environment significant distances beyond the site boundary. Hydrologic impacts generally result in a decrease in species richness (both aquatic fauna and aquatic flora) within the receiving waterway.

2.6 Acid Sulfate Soils

Quantitative laboratory results from Coffey's acid sulfate soils (ASS) investigation (refer to report GEOTKPAR01560AA/B(Rev3) dated 30 November 2010) have been interpreted to assess the sulfuric acidity of the sites soil within Precinct 1. The laboratory results indicate that the pre oxidation sulfur (Skcl) and oxidisable sulfur (S_{CR}) were zero or near zero for all samples. The soils are therefore not actual ASS nor potential ASS. The acidity present is either organic due to the breakdown of the vegetative cover or a result of the replacement of leached cations by hydrogen as is common in soils along the east coast of Australia.

3 EROSION HAZARD

The erodibility of a soil is the susceptibility of a soil to erode, based on soil properties. Topsoil and subsoil testing to evaluate the site's soil properties and erosion hazard was undertaken in accordance with Brisbane City Council's Soil Sampling and Testing Guideline for Erosion Potential (Version 3, November 2001).

3.1 Scope of Work

The following scope of work was undertaken:

- Eleven boreholes from the 61 boreholes drilled within Precinct 1 were selected for erosion hazard potential with soil samples collected for analysis;
- Emerson Class, pH and Electrical Conductivity (EC) measurements were determined on four topsoil and six sub soil samples; and
- Seven Particle Size Distribution (PSD) tests on selected topsoil and sub soil samples.

3.2 Borehole Investigation

The subsurface profile was inferred the Coffey boreholes on the site. Borehole logs together with explanation sheets are attached as Appendix C. The soil profile generally consists of upper alluvial sand strata overlying stiff residual sandy clays. Sandy clay/clayey sand fill soils between 200 mm and 600 mm deep were noted in four boreholes. The compaction history of the fill is not known. Furthermore, borehole investigations indicate that the site was not stripped prior to the placement of the fill.

The upper sandy profile consists of a silty sand topsoil 200 mm to 300 mm thick overlying the subsoils. Organic matter was present in the topsoils but was a relatively small percentage of the soil mass at depths greater than 200 mm. The subsoils are medium dense to very dense sands and clayey sands. In some areas the subsoils are indurated. The depth of the upper sand strata varies from 0.6 metres deep to more than 3 metres deep overlying the residual soils.

The residual soils are sandy clays derived from the in situ weathering of the underlying Landsborough Sandstones and grade to sandstone with depth. The clays are stiff to very stiff in consistency. Laboratory testing was not undertaken but Coffey's experience with these clays and visual classification indicates that they have a high plasticity and are moderately reactive.

3.3 Laboratory Analysis

Eleven samples were selected for pH, Electrical Conductivity and Emersion Class analysis. All testing was undertaken in Coffey's laboratory at Kunda Park by an experienced Environmental Scientist. The physico-chemical samples were prepared in a 1:5 distilled water solution and tested using TPS 90 FLT meter. The Emerson Class method as outlined in AS 1289 3.8.1 was used for soil dispersion analysis.

Test certificates are attached in Appendix D. A summary of the results are presented in Table 3.1 below.

Table 3.1: Field Results for the Topsoil and Subsoil Sampling

Borehole Number	Soil Profile Description (Visual)	Physicochemical		Emersion Class
		pH	EC (µS/cm)	
BH 2	Dark grey sandy clay (0.6 – 0.8m)	4.20	159	8
BH 4	Grey sandy clay (5.5m)	4.98	73	5
BH 8	Dark grey silty sand (0.0-0.25m)	4.22	31	5
BH 24	Pale grey sandy clay (1.2-2.0m)	4.00	95	5
BH 31	Pale grey silty clay (1.2-1.5m)	3.77	40	5
BH 36	Pale grey sandy clay (1.2-1.5m)	4.10	281	5
BH 49	Pale grey sandy clay (1.2-1.5m)	4.41	71	5
BH 52	Dark grey/grey silty sand (0.2-0. 5m)	3.99	30	8
BH78	Dark grey silty sand (0.0 -0.3m)	3.42	7.9	3
BH56	Dark grey silty sand (0.0-0.3m)	4.05	11.2	4/5
BH78	Pale grey sandy clay (1.2-1.9m)	4.79	29.2	8/5
BH56	Pale grey sandy clay (1.6-2.0m)	4.45	24.1	4/5

The topsoil pH ranged from 3.42 to 4.22 with electrical conductivity of the topsoil ranging from 7.9 to 31µS/cm. These results suggest that the topsoil is acidic but not saline. The pH of subsoils ranged from 3.77 to 4.98 with EC ranging from 24.1 to 281µS/cm. These results also suggest that the subsoils are strongly acidic and but not saline soils.

An Emersion Class of 1 or 2 indicate strongly dispersive soils, whilst an Emerson Class of 8 indicates a non dispersive soil. Classes 3-7 indicate soils with varying degrees of dispersion. The results indicate that generally the topsoil is not dispersive (Emersion Class 5 and 8) while the subsoil's are dispersive after reworking (Emerson Class 5).

Seven samples were selected for PSD analyses. The samples were tested in accordance with the AS 1289.3.8.1. Test certificates are attached in Appendix D. A summary of the laboratory test results are present in Table 3.2 below.

Table 3.2: Laboratory Analysis of Subsoils

Sample Number		BH 24	BH31	BH36	BH52	BH78	BH55	BH68
Particle Size Distribution Analysis (%)	Clay (<0.002 mm)	40	75	38	32	23	37	55
	Silt (0.002 - 0.02 mm)							
	Sand (0.02 – 2 mm)	60	25	62	68	77	63	45
Emerson class		5	5	5	8	3	4/5	4/5
Fine Soils[1]		Yes	Yes	Yes	Yes	No	Yes	Yes
Dispersion Percentage		N/A	N/A	N/A	N/A	N/A	N/A	N/A
% Dispersible Soil		N/A	N/A	N/A	N/A	N/A	N/A	N/A
Significantly Dispersive[2]		No	No	No	No	No	No	No

[1] Fine soils are soils which contain >33% finer than 0.02mm diameter. [2] Significantly dispersive soils are soils which have a percentage dispersible soil >10%.

The results indicate that the soils on site are predominantly fine soils which disperse after reworking. As all Emersion Class values are greater than 2, no calculation of dispersion percentage is required under the BCC guidelines. The Maroon Manual defines these soils as Type D soils.

4 SITE CONSTRAINTS

The sites constraints are assessed below.

4.1 Rainfall-Runoff Erosivity Factor

The rainfall-runoff erosivity factor (R factor) is used in the Revised Universal Soil Loss Equation (RUSLE) to measure the ability of rainfall to cause erosion. It is a product derived from probability statistics by analysing the energy and maximum intensity of storms.

An R factor of 5540 for the Bellvista 2 development was calculated by using RAINER software. The hydrologic analysis and rainfall intensity outputs off the RAINER program are attached as Appendix E.

4.1.1 Design Event

The default criterion for design purposes is the 5-day, 85th percentile storm depth for erosion and sediment design if total duration of disturbance is likely to be more than six months (Table 6.2, Maroon Manual). It is anticipated that the bulk and civil phase will cause disturbances for up to one year within Precinct 1.

The 2 year 6 hour storm intensity, duration and frequency (IDF) is also used in channel and sediment basin design calculations.

The calculated rainfall depths for each criterion are shown in Table 4.1 below.

Table 4.1: Calculated rainfall depths

Design Criteria	Area A
5-day 85th percentile storm depth (for Caloundra in the Maroon Book)	57.7mm
2 year 6 hour storm intensity (calculated using the Rainer program)	15.7mm

4.1.2 Soil Loss Class

The soil loss for the site was calculated using the RULSE.

RUSLE is represented by:

A = R K LS P C

Where, A = computed soil loss (tonnes/ha/yr)

R = rainfall erosivity factor (calculated RAINER)

K = soil erodibility factor (calculated nomograph)

LS = slope length/gradient factor (calculated)

P = erosion control practise factor (default value)

C = ground cover and management factor (default value)

Using the above parameters the computed soil loss is approximately 147 tonnes/ha/year. A site data spread sheet showing RUSLE factors and soil loss calculations is attached as Appendix F.

4.1.3 Erosion Risk Assessment

The formula for calculating the predicted total soil loss is:

R = A B T

Where R = predicted soil loss in tonnes

A= calculated soil loss (RUSLE)

B= surface area of disturbance

T= predicted duration of the disturbance

Table 4.2: Erosion Risk Assessment Factors and Calculations

Erosion Factors	Area A
Soil Loss (A) (t/ha/yr)	147
Disturbed Surface Area (B) (ha)	27
Predicted Disturbance Duration (T) (years)	1
Total Soil Loss (R) (tonnes)	4000

Using the erosion risk formula it is calculated that approximately 4000 tonnes of soil could be potentially lost from the development over a construction period of one year.

5 EROSION AND SEDIMENT HAZARD EVALUATION

Precinct 1 has an extremely high erosion hazard (Soil Loss Class 7), with potential soil loss significantly greater than 1500 tonnes over the constructed period. Consequently, the need for detailed, conservative planning for soil and water controls during the construction phase for all times of the year is essential.

As such the Maroon Manual suggests the preparation of a major Erosion and Sediment Control Plan (major E&SCP). To aid in the preparation of major E&SCP and achieving E&SC design objectives an evaluation of the site constraints and suggested erosion and sediment controls are outlined below.

5.1 Site Constraints

Precinct 1 is situated on an alluvial plain with high natural ground water levels. The Maroon Manual describes sites with high permanent water tables as a constrained site and as such all proposed E&SC measures should be designed accordingly.

Precinct 1 also receives large volumes of runoff waters from the upper catchment. Plates 3 and 4 attached as Appendix B illustrates the upper catchment runoff entering the site. It is critical that the E&SCP identifies the upper catchment through flows and ensures that adequate management strategies are implemented during the construction phase to ensure all clean water is diverted away from dirty water or disturbed soil surfaces.

5.2 Soils Physico-chemical Constraints

The results of the investigation have determined the physico-chemical characteristics of the sites soils and its erosion and sediment hazard.

5.2.1 Dispersibility

The laboratory testing indicated that the subsoils on the site are fine soils which are not significantly dispersive. However, flocculation shall be required as the subsoils tested showed no natural flocculation after manipulation (Emerson Class 5).

5.2.2 Organic Matter

Generally, the topsoil contained limited amounts of organic matter and humus. Organic matter and humus is essential for successful long term revegetation. All topsoils used in the final landscaping should be approved by the landscaping contractor and contain the appropriate levels of organic matter and humus to support vegetation growth.

5.2.3 Acidity

The soils are non ASS but are strongly acidic. Acid specific management of the earthworks is not required under the State Planning Policy SPP2/02. All soils to be used for vegetation growth should be approved by the landscaping contractor and should be treated with the appropriate levels of neutralising agent to ensure a soil pH which will support vegetation growth.

5.2.4 Salinity

The topsoils and subsoils tested do not indicate saline soils. EC measurements for all samples were well below 500µS/cm, the level for defining saline soils. Again, all topsoil used in the final landscaping should be approved by the landscape contractor.

5.3 Suggested Erosion Control Techniques

Preventing and minimising erosion is the primary and most effective control in reducing the environmental impacts associated runoff from disturbed soils. The aim of erosion control is to minimise the amount of area to be disturbed and to stabilise the disturbed area as soon as practical following the works completion. Standard drawings (SD) illustrating the various erosion and sediment control techniques are attached as Appendix G. Recommended erosion controls that should at a minimum be employed during the construction phase are:

5.3.1 Timing of works

As the site is classified Soil Loss Class 7, works should be scheduled for the drier months of the year (April to November). However, more stringent erosion control measures require even during these drier months. It is suggested that the E&SC are designed for the 5 day 90th percentile rainfall depth.

5.3.2 Staging of Works

To minimise the amount of area to be disturbed at any one time it is recommended that the works be staged on any site greater than 2ha.

5.3.3 Soil Stabilisation

The disturbed soil surfaces shall be adequately protected from rain and wind erosion. Table 5.3 below outlines required maximum C-factors during the construction phase.

Table 5.3: Maximum C-factors during Construction Phases

Lands	Maximum C-factor	Details
Waterways and other areas subjected to concentrated flows, post construction	0.05	Applies after ten working days from completion of formation and before they are allowed to carry any concentrated flows. Foot and vehicular traffic will be prohibited in these areas (70% ground cover).
Stockpiles, post construction	0.10	Applies after ten working days from completion of formation. Maximum C-factor of 0.10 equals 60% ground cover.
All lands, including waterways and stockpiles during construction	0.15	Applies after 20 working days of inactivity, even though works might continue later. Maximum C-factor of 0.15 equals 50% ground cover.
All lands, including waterways	0.05	Applies at the commencement of on-maintenance. (70% ground cover).

Note: application rates to achieve the required C Factor are product and supplier specific. The proposed method and product shall be outlined in the E&SCP.

5.4 Suggested Sediment Control Techniques

The purpose of sediment control is to ensure that all sediment and dissolved solids eroded from disturbed surfaces are minimised, captured, transported and treated (if required) before release. SD's illustrating the various erosion and sediment control techniques are attached as Appendix G.

Controlling sediment consists of drainage control and the capture of sediment.

5.4.1 Drainage Control

Excavated Major Drains

The excavated drains are priority works during the construction phase for Precinct 1. It is recommended that the excavations occur within the drier months (April to November). Diversion drains and staging during constructions may be required. These drains are not intended to be erosion and sediment control devices. As such, they shall be designed and constructed based on the requirement to carry internal and external flows as calculated by a hydrologist. Stabilisation of the drains shall be incorporated in their design.

Diversion of Upper Catchment Flow

All “clean” water from above the works area shall be diverted away from any disturbed ground via stable concentrated flow paths. Where this is not possible, sediment controls (dirty water catch drains and sediment basins) must factor in clean water inflows into the dirty water design.

Control Surface Water Runoff

Surface water runoff velocities from disturbed areas shall be reduced by contour riling at no greater than 80m intervals.

Concentrated Flow Path Design

All runoff shall be confined within Precinct 1 by grading all exposed surfaces towards a concentrated stabilised flow path which drains into the nearest sediment basin. The stabilised concentrated flow paths shall be designed using the 10 year, time of concentration peak flow.

Check dams (as per SD 5-4) and temporary water crossing (as per SD 5-1) shall be constructed where and if required.

5.4.2 Capture Sediment

Sediment Basin Design

Sediment basins are (in most circumstances) the final erosion and sediment control before runoff waters exit the site and enter the receiving environment. Type D high efficient sediment basin/s are required to be constructed for sites having a developing period greater than six months.

Type D high efficient sediment basins must be placed above the water table to achieve maximum storage capacity at all times. These basins can also be set up as flow through basins which are designed to flocculate, settle and release automatically. Appendix H presents a diagram illustrating a prototype of a high efficient sediment basin used recently on a Sunshine Coast construction site. Final design of the sediment basin/s shall be presented in the approved E&SCP.

Discharge Water Quality

All waters released from the site via the sediment basins shall be monitored and must comply with the criteria specified in Table 5.2 below. It should be acknowledged that flocculation will be required to meet these objectives. Flocculation techniques and dosage rates shall be undertaken in accordance with the approval of the controlling authority. It should be noted that calcium chlorate (CaCl) has been used as a flocculent in flow through systems with good success.

Table 5.2: Monitoring parameters for release waters

Parameter	Frequency	Release Limit
pH	Daily when releasing	Background or 6.5 to 8.5
Suspended Solids[1]	Daily when releasing	<50mg/L

[1] To be calibrated with turbidity in accordance with the Maroon Manual

5.4.3 General Sediment Controls

Entry and Exit Sediment Protection

Movement of plant equipment shall be limited to the area of work. Site access shall be via the Council approved entry and exit point. A stabilised crushed rock "shake down" entry shall be installed as per SD 6-14.

Deliveries shall be managed to control dust by:

- covering all loads entering and exiting the site
- the manual collection of all fallen materials from trucks or their wheels when required and,
- the removal of soil from the tyres via the shake down sediment trap.

Topsoil Stockpiles

Topsoil stockpiles are to no greater than two metres in height where possible and shall be constructed as per SD 4-1. The topsoil stockpiles shall be mulched or temporarily vegetated (by hydromulch) if they are to remain for more than 30 days. All runoff from stockpiles shall be diverted into the nearest sediment basin via a concentrated flow path.

Stockpiles

Soil, aggregate and other construction material shall only be stockpiled within the works area and shall be stored as per SD 4-1. The surface of the stockpile kept moist to prevent wind erosion and rainfall splatter. All surface water runoff from stockpiles shall be diverted to the nearest sediment basin via a concentrated flow path.

Sediment Fences

Sediment fences are to be installed parallel to the contours no greater than two metres down slope of disturbed surfaces as per SD 6-8.

Accumulated sediment from sediment fences (including check dams and other sediment traps) shall be removed when 30% full. CAUTION: Fines removed from sediment traps are usually extremely erodible; this material must be transported and placed in locations not likely to be eroded in future (i.e. within topsoil stockpiles).

For and on behalf of Coffey Geotechnics Pty Ltd

Ron McMahon

Principal Engineer

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Important information about your **Coffey** Report

As a client of Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

Your report is based on project specific criteria

Your report has been developed on the basis of your unique project specific requirements as understood by Coffey and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Coffey cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature and external data source review, sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of Coffey through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

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Important information about your **Coffey** Report

Interpretation by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other project design professionals who are affected by the report. Have Coffey explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

Data should not be separated from the report*

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way.

Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Geoenvironmental concerns are not at issue

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment.
Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Coffey for information relating to geoenvironmental issues.

Rely on Coffey for additional assistance

Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

Responsibility

Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

* For further information on this aspect reference should be made to "Guidelines for the Provision of Geotechnical information in Construction Contracts" published by the Institution of Engineers Australia, National headquarters, Canberra, 1987.