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EG FUNDS MANAGEMENT

PROPOSED MIXED USE DEVELOPMENT
SUMMER HILL FLOUR MILL SITE
NOS. 2-32 SMITH STREET AND NOS. 16-32 EDWARD STREET
SUMMER HILL

GEOTECHNICAL INVESTIGATION REPORT

Report No: SE07146-A AB:NK

Date: 17th February 2011

Client: EG Funds Management
Level 14, 345 George Street
SYDNEY NSW 2000

HEAD OFFICE: PO Box 398 Drummoyne NSW 1470
Telephone: 1300 137 038 Facsimile: 1300 136 038 Email: admin@aargus.net Website: www.aargus.net
Aargus Pty Ltd ACN 063 579 313 Aargus Engineering Pty Ltd ACN 050 212 710 Aargus Laboratories Pty Ltd ACN 086 993 937

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Environmental - Remediation - Engineering - Laboratories - Drilling

SE07146-A AB:NK

17th February 2011

EG Funds Management
Level 14, 345 George Street
SYDNEY NSW 2000

Dear Mr Syke,

RE: Proposed Mixed Use Development – Summer Hill Flour Mill Site
Nos. 2-32 Smith Street and Nos. 16-32 Edward Street, Summer Hill

As requested, Brink & Associates' Geotechnical Engineers visited the Summer Hill Flour Mill Site at Nos. 2-32 Smith Street and 16-32 Edward Street in Summer Hill on Monday 11th, Tuesday 12th, and Thursday 14th of March 2008 in order to undertake a Geotechnical Investigation. The purpose of the investigation was to assess the site's surface and subsurface conditions in order to determine the suitability of the site for a proposed mixed use development and to provide recommendations from a geotechnical viewpoint for the design and construction of the proposed development.

This report presents the details and results of the investigation and assessment and provides recommended geotechnical design parameters relevant to the project's structural design and structural works.

For and on behalf of

Aargus Engineering Pty Ltd **Reviewed by**

Anthony Bennett **Nick Kariotoglou**

Geotechnical Engineer Principal & Managing Director

Executive Summary

This report has been prepared for EG Funds Management detailing the results of a Geotechnical Investigation at the Summer Hill Flour Mill Site at Nos. 2-32 Smith Street and Nos. 16-32 Edward Street in Summer Hill.

We understand it is proposed to construct a mixed use residential and commercial development at the site located within the eastern part of Summer Hill, on the south-eastern corner of the intersection between Smith Street and Edward Street, and covering an area of approximately 25,000m².

The geotechnical investigation for the proposed development comprised the drilling of six (6) boreholes through the subsurface soils and the upper reaches of the underlying bedrock down to depths of between 0.8m and 7.3m below existing ground surface levels. In-situ testing of the subsurface soils and laboratory testing of the subsurface soils and rock at our NATA accredited laboratory was undertaken to determine the condition of the soil and rock and to determine suitable design parameters.

The subsurface soil profile within the site consists predominantly of moderately to well compacted fill underlain by stiff to very stiff alluvial clay in the east and very stiff alluvial / residual clay in the west, all overlying residual sandy clays / clayey sands. The fill profile was deepest in the north-eastern corner of the site where the Hawthorne Canal has been backfilled. The depth of the alluvium decreased on increasing distance from the canal. The thickness of the residual soil profile varied between 0.5m and 1.9m, though increasing generally from south to north. Sandstone bedrock was encountered at depths increasing from between about 1.6m (BH3) to 2.4m (BH4) below ground surface levels in the southern area of the site to between about 3.8m (BH1) and 4.5m (BH5) in the northern area of the site. The near-horizontally bedded coarse grained sandstone was found to be distinctly to moderately weathered, containing some cross-bedding, weaker bedding layers and clay seams. A few low angle joints and joint sets were identified within the upper 2m of the bedrock.

Ground water seepage was encountered within one borehole (BH6) only, at a depth of about 3.9m below existing ground surface levels, indicating a possible groundwater table at that location. This location is noted at the centre of the site where no basement excavations are proposed. All basements are also single basements and are not proposed to be excavated more than 3 metres.

The laboratory test results indicate the residual and alluvial materials to be of medium to high plasticity, to have a typical CBR value of 6% and to be non-aggressive , and the rock to be of low to medium strength increasing to medium to high with depth.

We expect that the fill, alluvium and residual clays / sands will be readily excavated by conventional earthworks equipment, such as bulldozers and excavators but that heavy ripping and/or vibratory rock breaking techniques will be required for the sandstone bedrock. Vibration control will be necessary to minimise the impact of the vibrations resulting form the excavation on adjacent structures.

The majority of material at the site may be reused as fill material at the site subject to confirmation by a Geotechnical Consultant at the time of excavation.

Shallow and deep footings are considered suitable for the proposed development.

Excavation retention will not be required, particularly where the excavation extends below the zone of influence of adjacent structures. As no structures are proposed near or adjoining existing dwellings, these should only be considered if any changes to the drawings are proposed. Retaining structures, if required, must be engineer designed. Allowance for isolated rock bolts to retain potential block failure should be made where required. Earth pressures resulting from water ingress should be allowed for in the retaining wall design, unless effectively drained.

Based on the results of the investigation and laboratory testing, we consider the site to be suitable for the proposed development.

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1.0 PROPOSED DEVELOPMENT

The design details for the proposed development are presented in the Hassell Summer Hill Flour Mill Site Concept Plan shown in Appendix E. It is comprised of 280-300 residential dwellings and 2,500-2,800m^2 of retail space and 3,500-4,000m^2 of commercial space.

2.0 LOCATION

The subject site is located within the eastern part of Summer Hill. More specifically, it is located on the south-eastern corner of the intersection between Smith Street and Edward Street, approximately 500m south-east of Summer Hill train station.

3.0 FIELDWORK

In order to determine the geotechnical condition of the subsurface materials at the site, the fieldwork component of our Geotechnical Investigation comprised the following:

- A detailed walk-over inspection of the site.
- The drilling of six (6) boreholes at various locations across the site. The boreholes were drilled using a truck-mounted drilling rig initially to V-bit refusal and then continued to TC-Bit refusal in bedrock at depths of between 1.6m (BH3) and 4.3m (BH6) below existing ground surface levels. Three boreholes (BH1, BH3 & BH6) were advanced by an additional 3.0m within the bedrock using NMLC rock coring techniques.
- Standard Penetrometer Tests (SPT) were performed at regular intervals during borehole excavation in order to determine the strength of the subsurface soils.
- All collected rock core samples were carefully boxed and transported to our NATA accredited laboratory for logging and testing.
- Three (3) disturbed bulk samples were collected for submission to our NATA accredited laboratory in order to determine a typical CBR value and the Atterberg Limits of the soils.
- Five (5) disturbed samples were collected for submission to an external NATA accredited laboratory in order to assist in an exposure classification for the design of concrete or steel structures.

The approximate test locations have been shown on the site sketch referenced Drawing No. S07146-1.in Appendix D.

4.0 SITE CONDITIONS

4.1 Site Description

The site is irregular in shape, covering an area of approximately 24,738m². It has a grade of between approximately 2° and 5° down towards the east. Site features at the time of our investigation include:

- A three storey brick office building located in the north-west corner of the site.
- Demountable offices located in the north to central area of the site.
- A brick flour mill building located on the eastern side of the site.
- Wooden silos located south of the flour mill.
- The general store building of steel frame construction and aluminium cladding located to the south of the wooden silos.
- Four large concrete bulk wheat storage silos located to the south of the general store building.
- Rail wagon unloading facilities located on the south-eastern side of the site.
- Six concrete bulk wheat storage silos located near the centre of the site.
- A workshop of steel frame construction and aluminium cladding located in the southern area of the site.
- Three storage buildings of steel frame construction with fibro cladding, located in the southern corner of the site.
- A brick amenities building with aluminium roofing located between the merchant shed and flour silos.
- Other minor buildings on the site include the office and weigh bridge, main sprinkler pump house, the hydrant pump house, gardeners shed and flammable liquids storage shed.

The site is bound by Smith Street to the north and Edward Street to the west. Hawthorne Canal and the industrial freight line bound the site to the east. The

neighbouring properties surrounding the subject site are occupied by a mix of single and double storey brick houses and light industrial units.

4.2 Topography

The subject property is surrounded by moderately undulating land, typical of the area, which exhibits grades of between 1° to 3° sloping down towards the north-east.

4.3 Regional Geology

Reference to the Sydney 1:100,000 Geological Series Sheet 9130 (Edition 1) 1983, indicates the western part of the site to be underlain by Ashfield Shale (Rwa) of Middle Triassic Age. Ashfield Shale is characterised by black to dark grey shale and laminite, which upon weathering typically forms medium to high plasticity residual silty clays and clays. The Ashfield Shale is typically underlain by Hawkesbury Sandstone.

The eastern area of the site has been indicated to be underlain by either Quaternary Period alluvial soils comprising silty to peaty quartz sands and clays or man made fill.

4.4 Subsurface Conditions

The subsurface soils encountered during drilling confirm the eastern part of the site to have been filled and to be underlain by alluvial soils while the western part of the site is underlain by medium to high plasticity clays indicative of an extremely weathered Ashfield Shale profile. However, considering the presence of sandy clays and clayey sands underlying these surface materials and the presence of Sandstone bedrock throughout the site, we infer the site to be likely located at the transition between the Ashfield Shale and the underlying Hawkesbury Sandstone.

The results of the borehole excavations have been presented as Engineering Borehole Logs, provided in Appendix A, and have been summarised as follows:

PAVEMENT: Concrete, Asphaltic Concrete, DGB, Crushed Sandstone, to depths of between 0.2m and 0.4m below existing ground surface levels in boreholes BH2 - BH6,

or

TOPSOIL: Clayey SILT, medium plasticity, brown, to a depth of 0.2m below existing ground surface levels in borehole BH1 only, overlying

FILL: Silty CLAY, CLAY, Sandy Gravelly CLAY, medium to high plasticity, orange/brown, pale brown, red/orange, grey, moderately to well compacted, to depths of between 0.8m (BH2) and 2.8m (BH6) below existing ground surface levels, overlying

ALLUVIUM / RESIDUAL: CLAY, Sandy CLAY, Clayey SAND, low to medium plasticity clay, coarse grained sand, white, brown, grey, mottled orange/red and white, mottled red and grey, to depths of between about 1.6m (BH3) and 4.3m (BH5) below existing ground surface levels, overlying

BEDROCK: SANDSTONE, coarse grained, distinctly weathered becoming moderately weathered and medium to high strength, yellow, orange, white, grey.

SPT testing indicated the fill material to be moderately to well compacted and the alluvium/residual material to be in a stiff to very stiff condition. V-bit and TC-bit refusal were encountered simultaneously at depths indicated in Table 1.

Table 1: V-Bit/TC-Bit Refusal Depths

Refusal	Depth (m) Below Existing Ground Surface Levels					
	BH1	**BH2**	**BH3**	**BH4**	**BH5**	**BH6**
TC-Bit	3.8	N/A*	1.6	2.6	4.1	4.3

*BH2 was terminated near ground surface levels within an unknown concrete substructure not detailed on any drawings.

Three boreholes (BH1, BH3 and BH6) were advanced below TC-bit refusal by a further 3.0m into bedrock using NMLC rock coring methods. The recovered core samples revealed bedrock to consist of a near-horizontally bedded coarse grained

sandstone that was distinctly to moderately weathered, and of a medium to high strength. Some cross bedding was also encountered. Although only a few joints and joint sets were identified within the upper 2m of bedrock, numerous weak bedding planes and partings were identified throughout the core samples. Photographs of the recovered core samples are provided in Appendix B.

Ground water seepage was encountered within one borehole (BH6) at a depth of about 3.9m below existing ground surface levels, indicating a possible groundwater table at that location. Groundwater monitoring standpipes were installed in boreholes (BH1, BH3 and BH6) by Aargus Pty Ltd in order to facilitate future groundwater monitoring. All results indicated depths of perched water at between 2-2.5 metres with the unconfined aquifer standing at below 5m and below any basement parking or excavations required as part of the development. Initial readings at borehole 6 shows groundwater ingress at 3.9m but as no basement excavation is noted for this area and all basements are above 3m bgl, this does not affect the integrity of the development. The perched water is noted as water ingress and will not provide deleterious affects on building structures.

5.0 LABORATORY TESTING

5.1 CBR Values

Two representative soil samples of the subgrade materials (medium to high plasticity clay) were submitted to our NATA accredited soil laboratory for testing to determine the four day soaked California Bearing Ratio (CBR) value. The laboratory test results are provided in Appendix C and are summarised in Table 2 below.

Table 2: California Bearing Ratio Test Results

Borehole	Depth (m)	CBR (%) @	
		2.5mm*	5.0mm*
BH1	0.4-1.0	6	6
BH4	0.4-1.0	15	16

*Penetration

5.2 Atterberg Limits

Three representative soil samples of the subgrade materials (medium to high plasticity clay) were submitted to our NATA accredited soil laboratory for testing to determine their Atterberg Limits. The laboratory test results are provided in Appendix C and are summarised in Table 3 below.

Table 3: Atterberg Limits Test Results

Borehole	Material Type	Depth (m)	Atterberg Limits		
			Liquid Limit	Plastic Limit	Plasticity Index
BH1	Clay, brown	0.5-0.95	76	29	47
BH4	Sandy Gravelly Clay, orange/brown/grey	0.4-1.0	43	18	25
BH6	Clay, red	1.5-1.7	39	13	26

5.3 Exposure Classification

Five representative soil samples of the subgrade materials (medium to high plasticity clay) were submitted to an external NATA accredited soil laboratory for testing to determine their Exposure Classification. The laboratory test results are provided in Appendix C and are summarised in Table 4 below.

Table 4: Exposure Classification Test Results

Borehole	Depth (m)	Exposure Classification			
		pH	Chlorides (%)	Resistivity (ohm)	Sulphates (%)
BH1	0.4-1.0	5.8	<0.5%	2941	<0.2%
BH1	2.0-2.4	6.1	<0.5%	1960	<0.2%
BH3	0.8-1.0	7.1	<0.5%	1388	<0.2%
BH4	0.4-1.0	6.5	<0.5%	259	<0.2%
BH6	2.0-2.4	6.3	<0.5%	892	<0.2%

Based on the results of the laboratory testing, the soils are assessed to be **"Non-Aggressive"** in accordance with AS2159-1995 "Piling – Design and installation".

5.1 Rock Strength

Axial point load testing of the rock cores recovered from the boreholes was carried out to aid in estimating rock strengths. The point load test results have been shown on the corelogs (See Appendix A) and are summarised in Table 5 below.

Table 5: Point Load Test Results

Borehole	Depth (m)	$I_{s(50)}$	Strength*
BH1	3.90	0.96	M-H
BH1	4.95	1.41	H
BH1	5.10	0.47	M
BH1	5.30	0.57	M
BH1	5.90	0.97	M-H
BH1	6.30	1.3	H
BH1	6.90	1.54	H
BH1	7.40	2.08	H
BH3	1.70	1.72	H
BH3	2.10	0.83	M
BH3	2.70	1.11	H
BH3	3.40	0.31	L-M
BH3	3.50	0.7	M
BH3	3.90	1.03	H
BH3	4.20	1.24	H
BH6	4.40	1.59	H
BH6	4.85	1.32	H
BH6	4.55	1.85	H
BH6	6.95	1.4	H
BH6	7.60	1.16	H

*VL=Very Low, L=Low, M=Medium, H=High

6.0 GEOTECHNICAL COMMENTS AND RECOMMENDATIONS

6.1 General

The subsurface soil profile within the site consists predominantly of moderately to well compacted fill that was underlain by stiff to very stiff alluvial clay in the east and very stiff alluvial / residual clay in the west, all overlying residual sandy clays / clayey sands. The fill profile was deepest in the north-eastern corner of the site where the Hawthorne Canal has been backfilled. The depth of the Alluvium decreased on increasing distance from the canal. The thickness of the residual soil profile varied

between 0.5m and 1.9m, though increasing generally from south to north. Sandstone bedrock was encountered at depths increasing from between about 1.6m (BH3) to 2.4m (BH4) below ground surface levels in the southern area of the site to between about 3.8m (BH1) and 4.5m (BH5) in the northern area of the site. The near-horizontally bedded coarse grained sandstone was found to be distinctly to moderately weathered and of a medium to high strength, containing some cross-bedding, weaker bedding layers and clay seams. A few low angle joints and joint sets were identified within the upper 2m of the bedrock.

Ground water was initially encountered within one borehole (BH6) only, at a depth of approximately 3.9m below existing ground surface levels. Further investigations showed that perched water seepage was found at a depth of between 2-2.5m with groundwater levels for the unconfined groundwater aquifer noted as being present at below 5 metres.

6.2 Footings

Based on the investigation results, we consider shallow (for light weight structures only) and deep footings to be suited to the subject site conditions. Such footings must be constructed in accordance with good engineering principles and the following recommendations:

- Owing to the fact that no compaction certificates can be presented for the placement of the fill and owing to the variable nature of the fill materials, we recommend that all footings penetrate though any fill. Should compaction certificates be available, an allowable end bearing pressure of 100kPa may be assigned to the fill materials.
- Shallow footings (such as strip and pad footings) founding on stiff to very stiff alluvium / residual material may be designed for an allowable end bearing pressure of 100kPa (see Table 6).
- Shallow and deep footings founding within low strength sandstone bedrock and/or within 1m below TC-bit refusal may be designed for an allowable end bearing pressure of 1000kPa and an allowable shaft adhesion of 100kPa (see

Table 6).

- Deep footings founding on and socketed a minimum of 300mm into medium strength sandstone bedrock may be designed for an allowable end bearing pressure of 2000kPa and an allowable shaft adhesion of 200kPa (see Table 6).
- Deep footings founding on and socketed a minimum of 300mm into high strength sandstone bedrock may be designed for an allowable end bearing pressure of 3000kPa and an allowable shaft adhesion of 300kPa (see Table 6).
- Maximum footing settlements are expected to be 1% of the minimum footing dimension for the above end bearing conditions.
- All footings should be taken to the same bearing materials. Alternatively, design of the structure should incorporate articulation to minimise the effects of differential settlements.
- All footing excavations should be free of loose debris and wet soil prior to concrete placement.
- The geotechnical consultant should inspect footing excavations at the time of excavation to ensure that all foundation loadings are taken to suitable bearing materials.
- All footings must be founded below the "zone of influence" of adjacent excavations; that is, a line drawn 45^{o} down from the foundation level to the based of any retaining walls or features.
- Groundwater infiltration into excavated footings is expected where footings extend below depths of about 3.9m. If so, all water should be pumped from the base of the excavated piles prior to concrete placement. Alternatively a tremmie system should be adopted for concrete placement.

Table 6: Allowable Bearing Pressures

Allowable Bearing Pressure / Adhesion (kPa) #**		**Depth Below Existing Ground Surface Levels (m)*****				
End Bearing	**Shaft Adhesion**	**BH1**	**BH3**	**BH4**	**BH5**	**BH6**
-	-	0-3.0	0-1.2	0-0.8	0-1.4	0-1.4
100	-	3.0-3.8	1.2-1.6	0.8-2.6	1.4-4.1	1.4-4.3
1000	**100**	3.8-5.8	1.6-2.6	2.6+*	4.1+*	4.3-5.3
2000	**200**	5.8-7.0	2.6-4.4##	-	-	-
3000	**300**	7.0-7.3##	-	-	-	5.3-7.3##

* BH4 & BH5 were non-cored boreholes.

** Allowable bearing pressures must be confirmed by a Geotechnical Engineer/Engineering Geologist at the time of footing excavation.

*** BH2 was terminated within an unknown concrete substructure not detailed on any drawings.

\# Consideration must be given to rock strength reduction as a result of the presence of shear zones, bedding weaknesses, joint sets and increased weathering within 1m of foundation level.

Final Depth of core sample

6.3 Excavations

We expect that the fill, alluvium and residual clays / sands will be readily excavated by conventional earthworks equipment, such as bulldozers and excavators. However, we anticipate that heavy ripping and/or vibratory rock breaking techniques will be required for the sandstone bedrock.

If vibratory rock breaking equipment is required for the proposed excavations in sandstone bedrock, we recommend that, prior to the use of vibratory equipment, the excavation perimeter is saw cut where appropriate with the aid of an excavator mounted rock saw or by drill and split techniques so as to minimise transmission of vibrations to adjoining structures. Following sawing of the perimeter of the excavation, sandstone bedrock may be broken up using a vibratory hammer suited to an excavator no larger than 30.0 tonnes. To further reduce vibration, the rock hammer should be inserted horizontally into bedding planes within the rock to be excavated. Induced vibrations in structures adjacent to the excavation are to be examined at the time of applying vibration (or at the time of excavation) to ensure that they do not exceed a peak particle velocity (PPV) of 10mm/sec. If vibrations in adjacent structures exceed a PPV of 10mm/sec or if vibrations appear excessive, excavation work should cease and this office should be contacted immediately.

If it is desired to utilise larger excavation equipment, or not to saw cut the excavation perimeter prior to use of smaller vibratory excavation equipment, then induced vibrations in structures adjacent to the proposed excavations must be monitored continuously using specialised monitoring equipment to ensure excessive vibrations do not transfer to surrounding structures. If vibrations in adjacent structures exceed a

PPV of 10mm/sec or if vibrations appear excessive, excavation work should cease at the site and this office should be contacted immediately.

We consider the majority of material at the site to be suitable for fill placement, should it be required. Suitability of the material for fill should however be determined by a Geotechnical Consultant at the time of excavation.

Groundwater was encountered within the excavations at depths greater than 5m below with water ingress through perched water found at some locations at between 2-2.5m. No excavations are planned to extend below the depth of groundwater (5m) so infiltration into the excavation would be minimal and based upon water seepage only. We recommend that the excavation perimeter should provide adequate drainage and a sump to allow any water seepage to be appropriately collected and removed. Any construction should provide adequate temporary drainage to allow removal of any water seepage.

Groundwater quality was tested to meet regulatory criteria and as such will not affect ecological or environmental receptors. As no groundwater pump out is required, no concerns arise from drawdown or settlement. No beneficial use of groundwater is noted for the area as Summer Hill has low recharge rates. The proposed development will remove any observed contaminants (minimal – refer to Aargus Detailed Environmental Site Assessment, June 2008) and also remove fill of poor quality from the site. This removes the potential for any fill or waste to leach into the groundwater table. The removal of these waste fill materials will enhance the local groundwater quality and green landscaped areas will allow for rainwater interaction to occur with the groundwater allowing constant hydraulic gradients to remain unchanged.

6.4 Batters / Retaining walls

Deep excavation may form part of the proposed development. Resultant unretained embankments should be battered back where appropriate to the following recommended slopes:

- Short term unretained batters in uncontrolled fill and alluvium / residual clays not steeper than 1 Vertical to 2.0 Horizontal.
- Short term unretained batters in low to medium strength sandstone bedrock not steeper than 1 Vertical to 0.5 Horizontal.
- Long term unretained batters in uncontrolled fill and alluvium / residual clays not steeper than 1 Vertical to 2.5 Horizontal.
- Long term unretained batters in low to medium strength sandstone bedrock not steeper than 1 Vertical to 1 Horizontal.

Excavations less than 1m in height may not require temporary retention.

Exposed medium to high strength sandstone may remain temporarily unretained, subject to confirmation at the time of excavation by a suitably qualified Geotechnical Engineer / Engineering Geologist. The Engineering Consultant is to inspect the exposed rock faces at the time of excavation in order to identify potential presence of any rock defects that could induce instability of the exposure and thus affect adjacent properties. The Geotechnical Consultant is to advise on the nature of the required permanent retention, should it be deemed necessary, which may include rock bolts or pre-tensioned rock anchors.

Unretained excavations should not extend below the “zone of influence” of adjacent structures; that is a line drawn 45^{o} down from the foundation level of adjacent structures or features (including paths, fences, stairs etc). If excavations are to extend below this line, proposed excavations are to be retained prior to excavation.

Suitable permanent pre-excavation retention may comprise cantilevered contiguous bored pile walls, secant bored pile walls or diaphragm walls, should excavations extend below the ground water table, or reinforced concrete soldier pile walls in conjunction with shotcreted infill panels should excavations not extend below the ground water table. Where the toes of bored piles extend below the ground water table or where ground water inflow is encountered, a tremmie system is to be utilised to ensure correct and effective concrete placement. Alternatively all water is to be

pumped from the excavation prior to concrete placement. Furthermore, the concrete is to be placed as soon as practicable and no later than 6 hours after excavation completion.

The pressure distribution on such retaining structures above ground water levels is assumed triangular and estimated as follows:

$p_h = \gamma kH + qk$

Where,

p_h = Horizontal pressure (kN/m^2)

γ = Wet density (kN/m^3)

k = Coefficient of earth pressure (k_a or k_o)

H = Retained height (m)

q = Surcharge pressure behind retaining wall (kN/m^2)

Recommended parameters for the design of retaining structures are presented in Table 7.

Table 7: Material parameters

Material	K_a	K_o	K_p	Unit Weight kN/m^3
Uncontrolled Fill	0.42	0.59	2.37	17
Alluvium / Residual Clay	0.36	0.53	2.8	18
Low to Medium Strength Sandstone	0.31	0.47	3.25	20
Medium to High Strength Sandstone	0.22	0.36	4.60	22

The above coefficients assume that ground level behind the retaining structures is horizontal and the retained material is effectively drained.

The design of any retaining structure should be checked by a Structural Engineer for bearing capacity, overturning, sliding and overall stability. Should retention comprise soldier piles with reinforced shotcrete infill panels, the design of such a system is to

allow for additional forces placed on the wall as a result of potential wedge or planar block failure from the rock face. Allowance for isolated rock bolts to retain potential block failure should be made. In addition, earth pressures resulting from groundwater should be allowed for in the retaining wall design, unless effectively drained.

6.5 Pavements

Based on the results of the borehole excavations and the laboratory test results, we consider a CBR of 6% to be typical for the materials encountered at the site. We therefore recommend the use of a CBR value of 6% for the design of any new pavements.

7.0 LIMITATIONS

Assessment of the sub-surface profile at the site and the recommendations presented in this report are based on information from six boreholes, drilled at locations considered representative across the site. Based on the results of the investigation and subsurface variability, there is a possibility that actual geotechnical conditions across the site could differ from the inferred geotechnical model (on which our recommendations are based) presented in this report.

The report contains geotechnical parameters to be used as input for the structural design of footings and retaining walls. On-going geotechnical input is required to ensure recommendations provided in this report are followed and that actual ground conditions reflect those indicated in this report.

Furthermore, the recommendations and conditions presented in this report pertain to the general development of the site. Upon design finalisation of the proposed development, the geotechnical conditions are to be reassessed with respect to the final design.

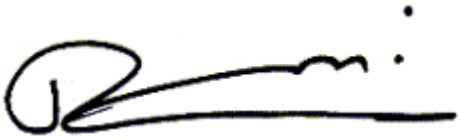
Please do not hesitate to contact the undersigned if you require any further information.

For and on behalf of

Aargus Engineering Pty Ltd

Anthony Bennett
Geotechnical Technician

Reviewed by



Ralph Erni **B.Sc. Eng. (Civil) MIEAust CPEng NPER3**
National Engineering Manager

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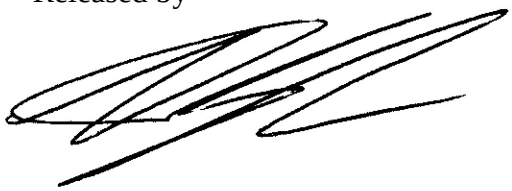

Nick Kariotoglou
Managing Director

APPENDIX A

Brink Holdings Pty Ltd ABN 75050212710 trading as

BRINK & Associates

Geotechnical, Geological, Environmental Consultants

Job No:	S07146-A
Hole No:	BH1
Sheet	1 of 2

ENGINEERING LOG OF BOREHOLE

Client:	EG Funds Management	Test Location:	Ref. Dwg No. S07146-1
Project:	Proposed Mixed Use Development	Test Method:	Truck Mounted Drill Rig
Project Location:	Nos. 2-32 Smith Street and Nos. 16-32 Edward Street, Summer Hill	Coordinates: -	Logged by: AB
		Surface level: Existing	Date: 11/3/08

Groundwater	Samples/ Field Tests	Depth (m)	Graphic Log	Unified Classification	Description	Moisture Condition	Consistency/ Rel. Density	Additional Comments	Depth (m)
NIL		0.0		-	Clayey SILT, medium plasticity, brown.	M>Wp	-	TOPSOIL	0.0
		0.5		-	Silty CLAY, medium plasticity, orange/brown.	M>Wp	-	FILL - appears moderately compacted	0.5
		1.0			CLAY, high plasticity, brown.				1.0
	2,3,4 N=7	1.5			CLAY, medium plasticity, white, with minor gravel.				1.5
		2.0			Sandy CLAY / Clayey SAND, low plasticity clay, coarse grained sand, brown.				2.0
	1,2,3 N=5	2.5							2.5
		3.0		CI	CLAY, medium plasticity, red/brown	M>Wp	St-VSt	RESIDUAL	3.0
		3.5							3.5
		4.0			Borehole continued with NMLC rock core barrel from 3.8m			TC-Bit refusal at 3.8m	4.0

Explanatory Notes:

Consistency		Density Index		Samples		Moisture	
VS	Very Soft	**VL**	Very Loose	**B**	Bulk Sample	**D**	Dry
S	Soft	**L**	Loose	**D**	Disturbed Sample	**M**	Moist
F	Firm	**MD**	Medium Dense	**U50**	Undisturbed Sample (50mm diam.)	**W**	Wet
St	Stiff	**D**	Dense			**Wp**	Plastic Limit
VSt	Very Stiff	**VD**	Very Dense	**N**	S.P.T. Value	**Wl**	Liquid Limit
H	Hard						

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Geotechnical, Geological, Environmental Consultants

Job No:	S07146-A
Hole No:	BH2
Sheet	1 of 1

ENGINEERING LOG OF BOREHOLE

Client:	EG Funds Management	Test Location:	Ref. Dwg No. S07146-1
Project:	Proposed Mixed Use Development	Test Method:	Truck Mounted Drill Rig
Project Location:	Nos. 2-32 Smith Street and Nos. 16-32 Edward Street, Summer Hill	Coordinates: -	Logged by: AB
		Surface level: Existing	Date: 12/3/08

Groundwater	Samples/ Field Tests	Depth (m)	Graphic Log	Unified Classification	Description	Moisture Condition	Consistency/ Rel. Density	Additional Comments	Depth (m)
NIL	NIL			-	Asphaltic Concrete (50mm) DGB, grey. (100mm) Crushed SANDSTONE, white (250mm)	D	-	PAVEMENT	
		0.5		-	Silty CLAY, high plasticity, red/orange.	M>Wp	-	FILL - appears moderately compacted	0.5
		1.0			BH2 terminated at 1.0m due to TC-bit refusal. Borehole continued with NMLC rock core barrel from 1.0m revealing an unknown concrete substructure.				1.0
		1.5							1.5
		2.0							2.0
		2.5							2.5
		3.0							3.0
		3.5							3.5
		4.0							4.0

Explanatory Notes:

Consistency		Density Index		Samples		Moisture	
VS	Very Soft	**VL**	Very Loose	**B**	Bulk Sample	**D**	Dry
S	Soft	**L**	Loose	**D**	Disturbed Sample	**M**	Moist
F	Firm	**MD**	Medium Dense	**U50**	Undisturbed Sample (50mm diam.)	**W**	Wet
St	Stiff	**D**	Dense			**Wp**	Plastic Limit
VSt	Very Stiff	**VD**	Very Dense	**N**	S.P.T. Value	**Wl**	Liquid Limit
H	Hard						

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Geotechnical, Geological, Environmental Consultants

Job No:	S07146-A
Hole No:	BH3
Sheet	1 of 2

ENGINEERING LOG OF BOREHOLE

Client:	EG Funds Management	Test Location:	Ref. Dwg No. S07146-1
Project:	Proposed Mixed Use Development	Test Method:	Truck Mounted Drill Rig
Project Location:	Nos. 2-32 Smith Street and Nos. 16-32 Edward Street, Summer Hill	Coordinates: -	Logged by: AB
		Surface level: Existing	Date: 12/3/08

Groundwater	Samples/ Field Tests	Depth (m)	Graphic Log	Unified Classification	Description	Moisture Condition	Consistency/ Rel. Density	Additional Comments	Depth (m)
NIL				-	Asphaltic Concrete (50mm) DGB, grey. (150mm)	D	-	PAVEMENT	
		0.5		-	Silty CLAY, high plasticity, dark brown / grey. … orange/brown from 0.6m…	M>Wp	-	FILL - appears well compacted	0.5
		1.0							1.0
	2,3,3 N=6			SC	Clayey SAND, medium to coarse grained, white	M	S-F	RESIDUAL	
		1.5							1.5
					Borehole continued with NMLC rock core barrel from 1.6m				
		2.0							2.0
		2.5							2.5
		3.0							3.0
		3.5							3.5
		4.0							4.0

Explanatory Notes:

Consistency		Density Index		Samples		Moisture	
VS	Very Soft	**VL**	Very Loose	**B**	Bulk Sample	**D**	Dry
S	Soft	**L**	Loose	**D**	Disturbed Sample	**M**	Moist
F	Firm	**MD**	Medium Dense	**U50**	Undisturbed Sample	**W**	Wet
St	Stiff	**D**	Dense		(50mm diam.)	**Wp**	Plastic Limit
VSt	Very Stiff	**VD**	Very Dense	**N**	S.P.T. Value	**Wl**	Liquid Limit
H	Hard						

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Job No:	S07146-A
Hole No:	BH4
Sheet	1 of 1

ENGINEERING LOG OF BOREHOLE

Client:	EG Funds Management	Test Location:	Ref. Dwg No. S07146-1
Project:	Proposed Mixed Use Development	Test Method:	Truck Mounted Drill Rig
Project Location:	Nos. 2-32 Smith Street and Nos. 16-32 Edward Street, Summer Hill	Coordinates: -	Logged by: AB
		Surface level: Existing	Date: 14/3/08

Groundwater	Samples/ Field Tests	Depth (m)	Graphic Log	Unified Classification	Description	Moisture Condition	Consistency/ Rel. Density	Additional Comments	Depth (m)
NIL	NIL			-	DCB, grey	D	-	PAVEMENT	
				-	Sandy Gravelly CLAY, medium plasticity, orange/brown/grey.	M>Wp	-	FILL - appears moderately compacted	
		0.5							0.5
				CI-CH	Silty CLAY, medium to high plasticity, mottled yellow and orange.	M>Wp	St	ALLUVIUM / RESIDUAL	
		1.0							1.0
	2,4,6 N=10								
		1.5							1.5
		2.0							2.0
		2.5							2.5
					BH4 terminated at 2.6m due to TC-Bit refusal on Sandstone Bedrock.				
		3.0							3.0
		3.5							3.5
		4.0							4.0

Explanatory Notes:

Consistency		Density Index		Samples		Moisture	
VS	Very Soft	**VL**	Very Loose	**B**	Bulk Sample	**D**	Dry
S	Soft	**L**	Loose	**D**	Disturbed Sample	**M**	Moist
F	Firm	**MD**	Medium Dense	**U50**	Undisturbed Sample (50mm diam.)	**W**	Wet
St	Stiff	**D**	Dense			**Wp**	Plastic Limit
VSt	Very Stiff	**VD**	Very Dense	**N**	S.P.T. Value	**Wl**	Liquid Limit
H	Hard						

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Job No:	S07146-A
Hole No:	BH5
Sheet	1 of 1

ENGINEERING LOG OF BOREHOLE

Client:	EG Funds Management	Test Location:	Ref. Dwg No. S07146-1
Project:	Proposed Mixed Use Development	Test Method:	Truck Mounted Drill Rig
Project Location:	Nos. 2-32 Smith Street and Nos. 16-32 Edward Street, Summer Hill	Coordinates: -	Logged by: AB
		Surface level: Existing	Date:

Groundwater	Samples/ Field Tests	Depth (m)	Graphic Log	Unified Classification	Description	Moisture Condition	Consistency/ Rel. Density	Additional Comments	Depth (m)
NIL				-	DGB, grey	D	-	PAVEMENT	
				-	Gravelly ASH, grey	D	-	FILL - appears well compacted	
		0.5			Gravelly CLAY, medium plasticity, grey.	M>Wp			0.5
		1.0							1.0
	2,3,7 N=10								
		1.5		CI-CH	Gravelly CLAY, medium to high plasticity, mottled grey & orange/brown.	M>Wp	St-VSt	ALLUVIUM	1.5
		2.0							2.0
		2.5							2.5
	3,5,7 N=12			CI-SC	Sandy CLAY / Clayey SAND, medium to coarse grained sand, medium plasticity clay, mottled orange/brown & white.	M>Wp	VSt	ALLUVIUM / RESIDUAL	
		3.0							3.0
		3.5							3.5
		4.0							4.0
					BH5 terminated at 4.1m due to TC-Bit refusal on Sandstone Bedrock.				

Explanatory Notes:

Consistency		Density Index		Samples		Moisture	
VS	Very Soft	**VL**	Very Loose	**B**	Bulk Sample	**D**	Dry
S	Soft	**L**	Loose	**D**	Disturbed Sample	**M**	Moist
F	Firm	**MD**	Medium Dense	**U50**	Undisturbed Sample (50mm diam.)	**W**	Wet
St	Stiff	**D**	Dense			**Wp**	Plastic Limit
VSt	Very Stiff	**VD**	Very Dense	**N**	S.P.T. Value	**Wl**	Liquid Limit
H	Hard						

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Job No:	S07146-A
Hole No:	BH6
Sheet	1 of 1

ENGINEERING LOG OF BOREHOLE

Client:	EG Funds Management	Test Location:	Ref. Dwg No. S07146-1
Project:	Proposed Mixed Use Development	Test Method:	Truck Mounted Drill Rig
Project Location:	Nos. 2-32 Smith Street and Nos. 16-32 Edward Street, Summer Hill	Coordinates: -	Logged by: AB
		Surface level: Existing	Date: 14/3/08

Groundwater	Samples/ Field Tests	Depth (m)	Graphic Log	Unified Classification	Description	Moisture Condition	Consistency/ Rel. Density	Additional Comments	Depth (m)
				-	Concrete (200mm) DGB (100mm)	-	-	PAVEMENT	
		0.5		-	Gravelly CLAY, medium plasticity, grey.	M>Wp	-	FILL - appears well compacted	0.5
		1.0							1.0
	3,6,7 N=13								
		1.5		CI	CLAY, medium plasticity, red.	M>Wp	VSt	ALLUVIUM	1.5
		2.0							2.0
		2.5							2.5
	4,8,8 N=16								
		3.0							3.0
				CI	Sandy CLAY, medium plasticity, mottled red and grey.	M>Wp	VSt-H	RESIDUAL moderate to high V-Bit resistance from 3.1m	
		3.5							3.5
▼		4.0						groundwater at 3.9m	4.0
					Borehole continued with NMLC rock core barrel from 4.3m				

Explanatory Notes:

Consistency		Density Index		Samples		Moisture	
S	Soft	**VL**	Very Loose	**B**	Bulk Sample	**D**	Dry
F	Firm	**L**	Loose	**D**	Disturbed Sample	**M**	Moist
St	Stiff	**MD**	Medium Dense	**U50**	Undisturbed Sample	**W**	Wet
VSt	Very Stiff	**D**	Dense		(50mm diam.)	**Wp**	Plastic Limit
H	Hard	**VD**	Very Dense	**N**	S.P.T. Value	**Wl**	Liquid Limit

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Job No: S07146-A
Hole No: BH1
Sheet: 2 of 2

CORELOG OF TEST HOLE

Client:	EG Funds Management	Hole Commenced:	11/3/08
Project:	Proposed Mixed Use Development	Hole Completed:	11/3/08
Project Location:	Nos. 2-32 Smith Street and Nos. 16-32 Edward Street, Summer Hill	Supervised by:	AB
		Checked by:	RE

Drill Model: Truck Mounted Drill Rig Slope: 90° R.L. Surface: existing

Barrel Type / Length: NMLC/ 1.5m Bearing - Datum: AHD

Drilling Information					Rock Substance							Rock Mass Defects		
Method	Case - Lift	Groundwater	Samples / Field Tests	Depth (m)	Graphic Log	Substance Description	Weathering	Estimated Strength (EL VL L M H VH EH)	Is(50) MPa	Defect Spacing (30 100 300 1000 3000)	Defect Description	Depth (m)
						coring started at 3.8m						
NMLC		NIL	NIL	4.0		SANDSTONE, coarse grained, yellow, white, orange/brown, grey.	DW	M	0.96		clay seam @ 4.00m, 50mm	4.0
				4.5			EW	L			clay seam @ 4.54m, 10mm Joint set from 4.5m to 4.8m, 15°, about 50mm spacing clay seam @ 4.72m, 20mm	4.5
				5.0			DW	M	1.41			5.0
									0.47		Bedding parting (bp) @ 5.11m, 10°, KL, Ro3,PL	
				5.5					0.58		bp @ 5.43m, 10°, KL, Ro3,PL	5.5
							MW	M			bp @ 5.84m, 10°, KL, Ro3,PL	
				6.0				H	0.97			6.0
				6.5					1.30			6.5
											clay seam @ 6.72m, 5mm clay seam @ 6.76m, 5mm	
				7.0					1.54			7.0
									2.08			
						BH1 terminated at 7.3m						

Key - Method		Case - lift		Weathering		Strength	Is (50) MPa
AS	Auger Screwing	Casing used		Fr	Fresh	EL Extremely Low	< 0.03
AD	Auger Drilling	Barrel withdrawn	water level	SW	Slightly weathered	VL Very Low	0.03 - 0.1
R	Roller / Tricone		date shown	MW	Moderately weathered	L Low	0.1 - 0.3
W	Washbore	Water inflow		DW	Distinctly weathered	M Medium	0.3 - 1.0
NMLC	NMLC Core Drill	Partial drilling water loss		EW	Extremely weathered	H High	1.0 - 3.0
NQ,HQ	Wireline Core Drill	Complete drilling water loss				VH Very High	3.0 - 10.0
						EH Extremely High	>10.0

Brink Holdings Pty Ltd ABN 75050212710 trading as

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Geotechnical, Geological, Environmental Consultants

Job No: S07146-A
Hole No: BH3
Sheet: 2 of 2

CORELOG OF TEST HOLE

Client:	EG Funds Management	Hole Commenced:	12/3/08
Project:	Proposed Mixed Use Development	Hole Completed:	12/3/08
Project Location:	Nos. 2-32 Smith Street and Nos. 16-32 Edward Street, Summer Hill	Supervised by:	AB
		Checked by:	RE

Drill Model: Truck Mounted Drill Rig Slope: 90° R.L. Surface: existing

Barrel Type / Length: NMLC/ 1.5m Bearing - Datum: AHD

Drilling Information					Rock Substance									Rock Mass Defects			
Method	Case - Lift	Groundwater	Samples / Field Tests	Depth (m)	Graphic Log	Substance Description	Weathering	Estimated Strength: EL	VL	L	M	H	VH	EH	Is(50) MPa	Defect Spacing: 30	100	300	1000	3000	Defect Description	Depth (m)
						Coring Started at 1.6m																
NMLC		NIL	NIL	2.0		SANDSTONE, coarse grained, yellow, orange, white.	DW					■			1.72	■	■				joint (jt) @ 1.70m, 10°, clean (KL), rough (Ro3), planar (PL)	2.0
				2.5								■			0.83	■	■				jt @ 2.13m, 10°, KL, Ro3,PL jt @ 2.22m, 10°, KL, Ro3,PL jt @ 2.35m, 10°, KL, Ro3,PL jt @ 2.54m, 10°, KL, Ro3,PL	2.5
				3.0								■			1.11	■	■				jt @ 2.76m, 10°, KL, Ro3,PL	3.0
				3.5		Extremely weathered seam between 3.35 and 3.4m, with organic infill Cross-bedded from 3.6m	EW	■							0.31	■	■				clay seam @ 3.08m, 5mm jt @ 3.09m to 3.25m, 90°, clay infill, Ro3, undulating	3.5
				4.0			DW					■			0.70	■	■				bedding parting (bp) @ 3.68m, 0°, KL, Ro3,PL bp @ 3.91m, 0°, KL, Ro3, PL	4.0
				4.5								■			1.03	■	■				bp @ 4.17m, 0°, KL, Ro3,PL bp @ 4.29m, 10°, KL, Ro3,PL	4.5
				5.0		**BH3 terminated at 4.4m**						■			1.24	■	■				Ext. weathered seam @ 4.37m, 5mm, 10°	5.0

Key - Method		Case - lift		Weathering		Strength	Is (50) MPa
AS	Auger Screwing	Casing used		Fr	Fresh	EL Extremely Low	< 0.03
AD	Auger Drilling	Barrel withdrawn	water level	SW	Slightly weathered	VL Very Low	0.03 - 0.1
R	Roller / Tricone		date shown	MW	Moderately weathered	L Low	0.1 - 0.3
W	Washbore	Water inflow		DW	Distinctly weathered	M Medium	0.3 - 1.0
NMLC	NMLC Core Drill	Partial drilling water loss		EW	Extremely weathered	H High	1.0 - 3.0
NQ,HQ	Wireline Core Drill	Complete drilling water loss				VH Very High	3.0 - 10.0
						EH Extremely High	>10.0

Brink Holdings Pty Ltd ABN 75050212710 trading as

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Geotechnical, Geological, Environmental Consultants

Job No:	S07146-A
Hole No:	BH6
Sheet:	2 of 2

CORELOG OF TEST HOLE

Client:	EG Funds Management	Hole Commenced:	14/3/08
Project:	Proposed Mixed Use Development	Hole Completed:	14/3/08
Project Location:	Nos. 2-32 Smith Street and Nos. 16-32 Edward Street, Summer Hill	Supervised by:	AB
		Checked by:	RE

Drill Model: Truck Mounted Drill Rig Slope: 90° R.L. Surface: existing

Barrel Type / Length: NMLC/ 1.5m Bearing - Datum: AHD

Drilling Information						Rock Substance					Rock Mass Defects		
Method	Case - Lift	Groundwater	Samples / Field Tests	Depth (m)	Graphic Log	Substance Description	Weathering	Estimated Strength (EL VL L M H VH EH)	Is(50) MPa	Defect Spacing (30 100 300 1000 3000)	Defect Description	Depth (m)
						coring started at 4.3m						
NMLC		NIL	NIL	4.5		SANDSTONE, coarse grained, orange, grey, white.	DW	H	1.59	100	Beddign parting (bp) @ 4.37m, 10°, KL, Ro3, PL	4.5
							MW	H	1.32		bp @ 4.74m, 15°, clay filled, Ro3, PL	
				5.0								5.0
						Bedding at 10° from 5.1m to 7.5m					bp @ 5.35m, 15°, KL, Ro3,PL	
				5.5								5.5
									1.85		bp @ 5.58m, 15°, KL, Ro3,PL	
											bp @ 5.67m, 15°, KL, Ro3,PL	
											bp @ 5.83m, 15°, KL, Ro3,PL	
				6.0								6.0
											bp @ 6.11m, 15°, KL, Ro3,PL	
											bp @ 6.34m, 15°, clay coated Ro3, PL	
				6.5		Some bedding containing quartz gravel						6.5
											joint @ 6.62m, 15°, KL, Ro3,PL	
				7.0					1.40		bp @ 6.93m, 15°, KL, Ro3,PL	7.0
				7.5								7.5
									1.16		bp @ 7.60m, 15°, KL, Ro3, undulating	
						BH6 terminated at 7.7m						

Key - Method		Case - lift		Weathering		Strength	Is (50) MPa
AS	Auger Screwing	Casing used		Fr	Fresh	EL Extremely Low	< 0.03
AD	Auger Drilling	Barrel withdrawn	water level	SW	Slightly weathered	VL Very Low	0.03 - 0.1
R	Roller / Tricone		date shown	MW	Moderately weathered	L Low	0.1 - 0.3
W	Washbore	Water inflow		DW	Distinctly weathered	M Medium	0.3 - 1.0
NMLC	NMLC Core Drill	Partial drilling water loss		EW	Extremely weathered	H High	1.0 - 3.0
NQ,HQ	Wireline Core Drill	Complete drilling water loss				VH Very High	3.0 - 10.0
						EH Extremely High	>10.0

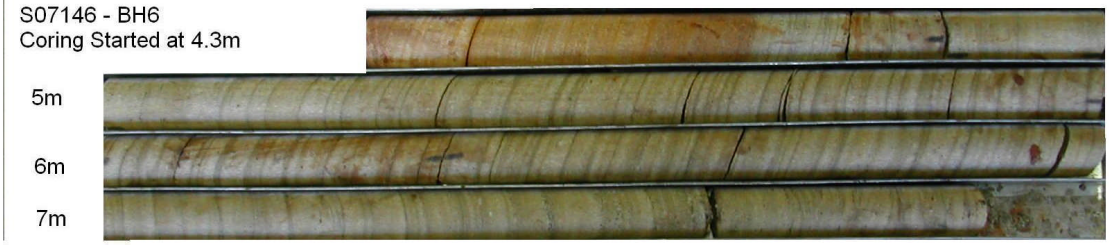
APPENDIX B

Photos of Recovered Cores

S07146 - BH1
Coring Started at 3.8m

S07146 - BH3
Coring Started at 1.6m

S07146 - BH6
Coring Started at 4.3m



APPENDIX C

Brink Holdings Pty Ltd ABN 75050212710 trading as
BRINK & Associates
Geotechnical, Geological, Environmental Consultants

P.O.Box 6871
Wetherill Park NSW 2164
Telephone: (02) 9609 3800
Facsimile: (02) 9604 6427

CALIFORNIA BEARING RATIO TEST REPORT

Client	EG Funds Management			Job Number	SL07146-A
Project	Proposed Mixed Use Development			Date	4/03/2008
Location	Nos. 2-32 Smith St & Nos. 16-32 Edward St, Summer Hill			Page	1 of 1
SAMPLE DETAILS					
Test Number		MT 1	MT 2		
Date Sampled		11/03/2008	14/03/2008		
Test Location		BH:1	BH: 4		
Sample Depth		0.4m - 1.0m	0.4m-1.0m		
LABORATORY COMPACTION		**AS1289 5.1.1 (Standard)** ☑		**AS1289 5.2.1 (Modified)** ☐	
Maximum Dry Density	t/m^3	1.62	1.84		
Optimum Moisture Content	%	19.2	15.3		
TEST RESULTS		**AS1289.6.1.1**			
Dry Density Before Soak	t/m^3	1.55	1.85		
Moisture Content Before Soak	%	23.3	14.7		
Density Ratio Before Soak	%	96.0	101.0		
Moisture Ratio Before Soak	%	121.0	96.0		
Dry Density After Soak	t/m^3	1.53	1.84		
Moisture Content After Soak	%	25.7	16.6		
Moisture Cont. After Test (Whole)	%	21.8	15.8		
Moisture Cont. After Test (Top30mm)	%	23.4	16.9		
Material Retained 19.0mm	%	10.3	10.3		
+19.0mm Crushed/Included (Y/N)		N	N		
Mass of Surcharge	Kg	4.5	4.5		
Compactive Effort		STD	STD		
Period of Soaking	days	4	4		
Swell After Soaking	%	1.5	0.3		
CBR value @ 2.5/5.0mm penetration	%	6 / 6	15 / 16		

Specification:

Material Description:

Notes: 1. Unless otherwise stated the CBR test is not repeated if the 5.0mm value exceeds the 2.5mm value

Approved Signatory

O. Mendoza

Date 04/03/2008

Brink Holdings Pty Ltd ABN 75050212710 trading as

BRINK & Associates

Geotechnical, Geological, Environmental Consultants

P.O.Box 6871
Wetherill Park NSW 2164
Telephone: (02) 9609 3800
Facsimile: (02) 9604 6427

ATTERBERG LIMITS AND LINEAR SHRINKAGE TEST REPORT

Client	EG Funds Management	Job Number	SL07146-A
Project	Proposed Mixed Use Development	Date	15/04/2008
Location	Nos. 2-32 Smith St & Nos. 16-32 Edward St, Summer Hill	Page	1 of 1

SAMPLE DETAILS					
Sample Number		MT1	MT2	MT3	
Date Sampled		11/03/2008	14/03/2008	14/03/2008	
Sample Location / Source		BH 1 0.5- 0.7m	BH 4 0.4m - 1.0m	BH 6 1.5m-1.7m	
Material Description		Silty CLAY, orange-brown	Sandy Gravelly CLAY, orange/brown	CLAY, red	
Sample History					
Method of Preparation		Oven Dried	Oven Dried	Oven Dried	
Shrinkage Mould Length	mm	Dry Sieved	Dry Sieved	Dry Sieved	
TEST METHOD		**TEST RESULTS**			
Liquid Limit	%	76	43	39	
AS1289 3.1.1	☑				
RTA (NSW) T108	☐				
Plastic Limit	%	29	18	13	
AS1289 3.2.1	☑				
RTA (NSW) T109	☐				
Plasticity Index	%	47	25	26	
AS1289 3.3.1	☑				
RTA (NSW) T109	☐				
Linear Shrinkage	%	-	-	-	
AS1289 3.4.1	☐				
RTA (NSW) T113	☐				

Notes:

Approved Signatory

O.Mendoza

Date 19/03/2008

LabMark
ENVIRONMENTAL LABORATORIES

Laboratory Report No: E037038
Client Name: Aargus Pty. Ltd
Contact Name: Anthony Bennett
Client Reference: Summer Hill S07146

Date: 22/04/08
This report supercedes reports issued on: 17/04/08

Final
Certificate
of Analysis

Laboratory Identification		**149539**	**149540**	**149541**	**149542**	**149543**	**149540d**	**149540r**	**mb**		
Sample Identification		BH1	BH1	BH3	BH4	BH6	QC	QC	QC		
Depth (m)		0.4-1.0	2.0-2.4	0.8-1.0	0.4-1.0	2.0-2.4	--	--	--		
Sampling Date recorded on COC		20/2/08	20/2/08	20/2/08	20/2/08	20/2/08	--	--	--		
Laboratory Extraction (Preparation) Date		10/4/08	10/4/08	10/4/08	10/4/08	10/4/08	10/4/08	--	10/4/08		
Laboratory Analysis Date		14/4/08	14/4/08	14/4/08	14/4/08	14/4/08	14/4/08	--	14/4/08		
Method : E032.2											
Electrical conductivity (EC)	**EQL**										
Electric conductivity (uS/cm)	5	34	51	72	286	112	158	102%	<5		

Results expressed in uS/cm unless otherwise specified

Comments:

E032.2: Measurement by EC probe as per 1:5 soil:water extract. Results expressed as uS/cm as per the extract.

Laboratory Identification		**149539**	**149540**	**149541**	**149542**	**149543**	**149540d**	**149540r**			
Sample Identification		BH1	BH1	BH3	BH4	BH6	QC	QC			
Depth (m)		0.4-1.0	2.0-2.4	0.8-1.0	0.4-1.0	2.0-2.4	--	--			
Sampling Date recorded on COC		20/2/08	20/2/08	20/2/08	20/2/08	20/2/08	--	--			
Laboratory Extraction (Preparation) Date		10/4/08	10/4/08	10/4/08	10/4/08	10/4/08	10/4/08	--			
Laboratory Analysis Date		10/4/08	10/4/08	10/4/08	10/4/08	10/4/08	10/4/08	--			
Method : E018.2											
pH in soil	**EQL**										
pH (pH units)	0.1	5.8	6.1	7.1	6.5	6.3	6.9	12%			

Results expressed in pH units unless otherwise specified

Comments:

E018.2: 1:5 soil leachate. Followed by measurement by pH ion selective electrode. Results expressed as per leachate.

Laboratory Identification		**149539**	**149540**	**149541**	**149542**	**149543**	**149540d**	**149540r**	**149542s**	**lcs**	**mb**
Sample Identification		BH1	BH1	BH3	BH4	BH6	QC	QC	QC	QC	QC
Depth (m)		0.4-1.0	2.0-2.4	0.8-1.0	0.4-1.0	2.0-2.4	--	--	--	--	--
Sampling Date recorded on COC		20/2/08	20/2/08	20/2/08	20/2/08	20/2/08	--	--	--	--	--
Laboratory Extraction (Preparation) Date		10/4/08	10/4/08	10/4/08	10/4/08	10/4/08	10/4/08	--	10/4/08	10/4/08	10/4/08
Laboratory Analysis Date		15/4/08	15/4/08	15/4/08	15/4/08	15/4/08	15/4/08	--	15/4/08	15/4/08	15/4/08
Method : E033.2/E045.2/E047.2											
Chloride	**EQL**										
Chloride	10	10	<10	<10	50	30	<10	--	110%	105%	<10

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E033.2/E045.2/E047.2: 1:5 water extraction. Determination by colour and/or by Ion Chromatography.

Laboratory Identification		**149539**	**149540**	**149541**	**149542**	**149543**	**149540d**	**149540r**	**149540t**	**149542s**	**lcs**
Sample Identification		BH1	BH1	BH3	BH4	BH6	QC	QC	QC	QC	QC
Depth (m)		0.4-1.0	2.0-2.4	0.8-1.0	0.4-1.0	2.0-2.4	--	--	--	--	--
Sampling Date recorded on COC		20/2/08	20/2/08	20/2/08	20/2/08	20/2/08	--	--	--	--	--
Laboratory Extraction (Preparation) Date		10/4/08	10/4/08	10/4/08	10/4/08	10/4/08	10/4/08	--	17/4/08	10/4/08	10/4/08
Laboratory Analysis Date		15/4/08	15/4/08	15/4/08	15/4/08	15/4/08	15/4/08	--	18/4/08	15/4/08	15/4/08
Method : E042.2/E045.2											
Sulphate/Sulphite	**EQL**										
Sulphate	10	<10	130	20	210	150	10	171%	<10	116%	100%

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E042.2/E045.2: 1:5 water extraction. Determination by colour and/or Ion Chromatography. Note Sulphite test is not covered by NATA accreditation.

Laboratory Identification		**lcs**	**mb**	**mb**							
Sample Identification		QC	QC	QC							
Depth (m)		--	--	--							
Sampling Date recorded on COC		--	--	--							
Laboratory Extraction (Preparation) Date		17/4/08	10/4/08	17/4/08							
Laboratory Analysis Date		17/4/08	15/4/08	17/4/08							
Method : E042.2/E045.2											
Sulphate/Sulphite	**EQL**										
Sulphate	10	94%	<10	<10							

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E042.2/E045.2: 1:5 water extraction. Determination by colour and/or Ion Chromatography. Note Sulphite test is not covered by NATA accreditation.

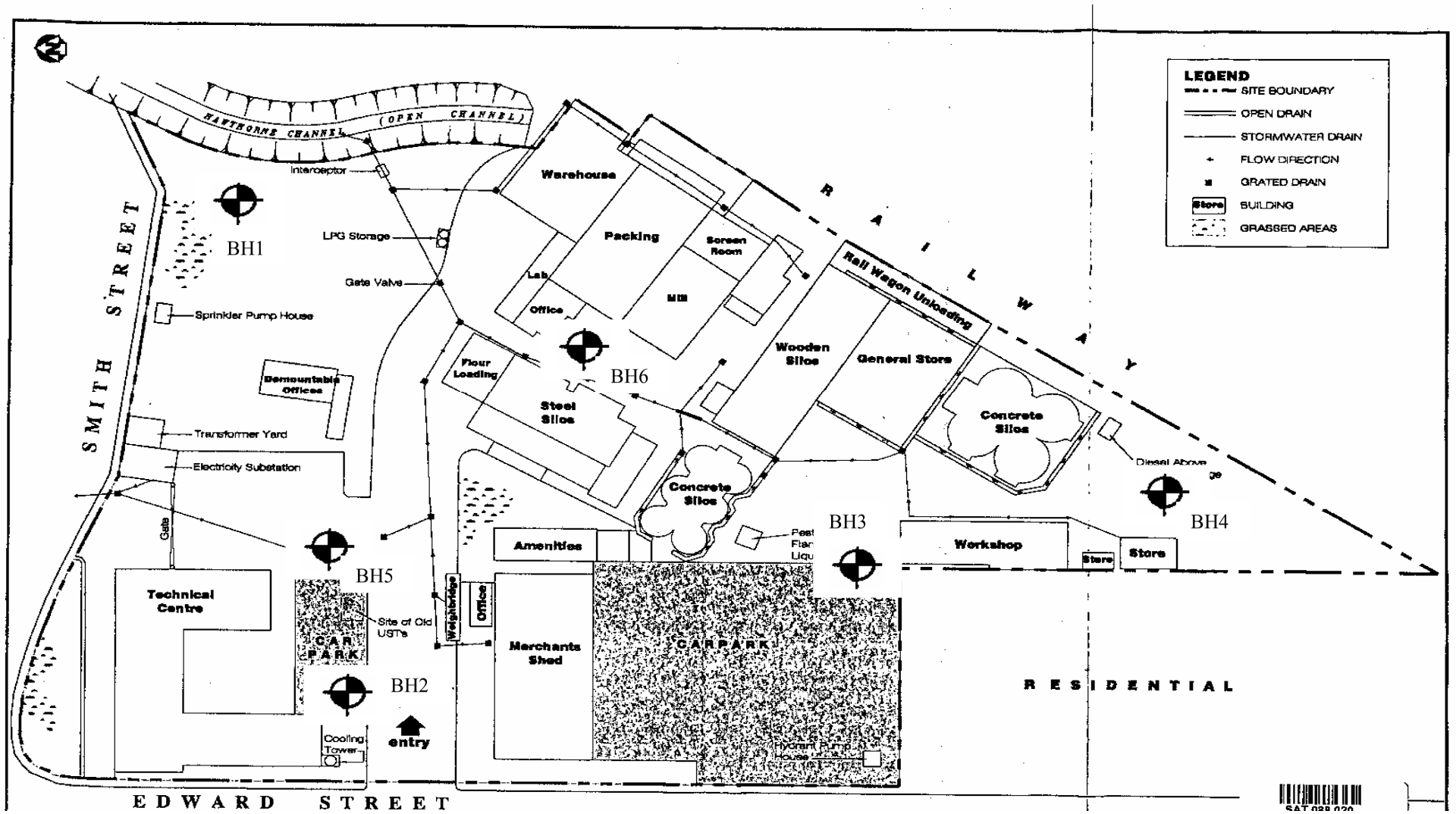
Laboratory Identification		**149539**	**149540**	**149541**	**149542**	**149543**	**149540d**	**149540r**			
Sample Identification		BH1	BH1	BH3	BH4	BH6	QC	QC			
Depth (m)		0.4-1.0	2.0-2.4	0.8-1.0	0.4-1.0	2.0-2.4	--	--			
Sampling Date recorded on COC		20/2/08	20/2/08	20/2/08	20/2/08	20/2/08	--	--			
Laboratory Extraction (Preparation) Date		10/4/08	10/4/08	10/4/08	10/4/08	10/4/08	10/4/08	--			
Laboratory Analysis Date		11/4/08	11/4/08	11/4/08	11/4/08	11/4/08	11/4/08	--			
Method : E005.2											
Moisture	**EQL**										
Moisture	--	9	7	16	11	15	9	25%			

Results expressed in % w/w unless otherwise specified

Comments:

E005.2: Moisture by gravimetric analysis. Results are in % w/w.

APPENDIX D



LEGEND

Approximate Borehole Location

BRINK & ASSOCIATES
Geotechnical, Geological, Environmental
Consulting Engineers and Scientists

P.O. Box 6871
WETHERILL PARK NSW 2164
Ph: (02) 9609 3800
Fax: (02) 9604 6427

N

SCALE:
N.T.S

DRAWING NO:
S07146-1

EG PROPERTY GROUP
PROPOSED RESIDENTIAL DEVELOPMENT
2 SMITH STREET
SUMMER HILL

SITE PLAN

APPENDIX E