smartalliances
ENGINEERING / RESOURCE MANAGEMENT / ARCHITECTS LTD

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19 January 2018

Kevin & Morag Dobbs
Sent via email

Dear Kevin & Morag

Foundation Investigation at Lot 34 Golf View Close, Marlborough Ridge, Blenheim
Our ref: 6388

At your request, we have carried out a foundation investigation for the proposed residential dwelling at the above site. A total of four penetrometer tests, numbered P1 to P4, were put down at the site during the site investigation on 01December 2017. The locations of P1 to P4 are shown on the attached site plan.

The attached test results of P1 to P4 indicate that the subsoils generally have a soil bearing resistance in excess of 300kPa (ultimate bearing capacity) at 500mm below ground level. On the basis of the foregoing, it is considered that the site is suitable for the proposed development and for construction of conventional foundations designed and constructed at a depth of 500mm below ground level in accordance with NZS 3604:2011. For this particular site however, it is anticipated that that an engineer designed waffle slab will be constructed on the engineer designed flat building platform.

Geotechnical issues pertaining to developments on the Marlborough Ridge site are complex and, whilst this particular development has no specific design requirement, the site development in general should be observed by an engineer to ensure no matters arise during construction. Marlborough District Council guidance contains a number of mitigation measures that should be incorporated into any Marlborough Ridge development. These are outlined as follows:

- Fill areas in excess on 600mm deep should be designed by an engineer
- Batter slopes over 600mm high, not retained by a structure should be sloped at 1V:1.5H and the slope protected by geo-fabric to sustain plant growth
- Filter cloths to be laid behind any retaining structure
- Service trenches on moderate slopes should be backfilled with cement stabilized backfill (5%)
- Service trenches on steep slopes should be stabilized as above but should also be fitted with concrete cut-off dams designed by an engineer

To ensure that the above measures are incorporated into the site development we recommend that a suitably experienced engineer conduct the following inspections:

- All retaining walls are designed and certified by an engineer.
- Foundation inspection prior to placing fill or DPC
- Backfill inspection behind walls and foundations
- Trench inspection prior to backfilling

Taking into account the information provided above we have evaluated the proposed development in regard to excavation and fill on site. The proposed development consisting of construction of new dwelling with attached garage is to require approximately 450m^3 of excavation. From this, 350m^3 of material will be reused onsite for landscaping purposes and the remainder will be removed from the site and disposed of appropriately.

As the penetrometer test results indicate good ground bearing resistance over the site and taking into account the area of property proposed to be excavated to create the building platform, the proposed excavation is not envisaged to have any adverse effects on the environment or surrounding properties.

The excavated building platform will leave a cut face of up to 3.0m maximum along the western boundary. To secure the stability of this cut face a 3.0m maximum timber retaining wall has been design for the conditions on site. Less steep cuts such as those undertaken to form the driveway will utilise engineer designed gabion walls.

As the excavation of the building platform will produce a substantial quantity of material it will be used mostly for non-structural fill to create a terraced garden area (landscaping). Details of how this material should be compacted are provided herein.

Filling on site is allowable as long as it meets the requirements outlined on the drawings and as follows:

- Areas of proposed fill should be cleared of vegetation and benched prior to filling as to create a stable filling platform.
- All topsoil stripped from the development area and shall be stockpiled on site for use with landscaping. The topsoil shall be screened prior to reuse and shall be lightly rolled following placement. All loose stones shall be removed from the topsoil surface.
- The contractor shall excavate to the extent and levels as required by the scope of works with excavated material being stockpiled on site and used as fill as directed.
- The excavated areas shall be kept free of excess moisture and traffic and any areas determined unsuitable due to damage shall be over excavated and backfilled at the contractor's expense.
- Following completion of excavation to desired levels, the subgrade shall be rolled to the approval of the engineer.
- Engineered fill material shall be placed and compacted in uniform near horizontal layers not exceeding 150mm uncompact thicknesses. Fill material shall not be placed during or immediately following wet weather, or on saturated ground.
- Compaction of Fill shall be carried out at water content appropriate to the compaction plant.
- Fill forming batter slopes must not be placed and compacted at slopes greater than 1V:1.5H
- Non-structural fill material excavated from site such as that of clay base known to be in the area can be used as fill as long it is placed and compacted with a padfoot roller in 150mm layers and is not within 1m of the proposed dwelling footprint. An engineer is required to monitor these works.
- All earthworks on site shall be conducted in a manner as to control all stormwater discharge so that all sediment is contained on site and not be discharged to any drains or waterways.

Taking into account our recommendations as outlined above the site is suitable for the excavation and fill as to create a suitable building platform for the proposed construction.

Yours sincerely

Richard Evans
Engineer

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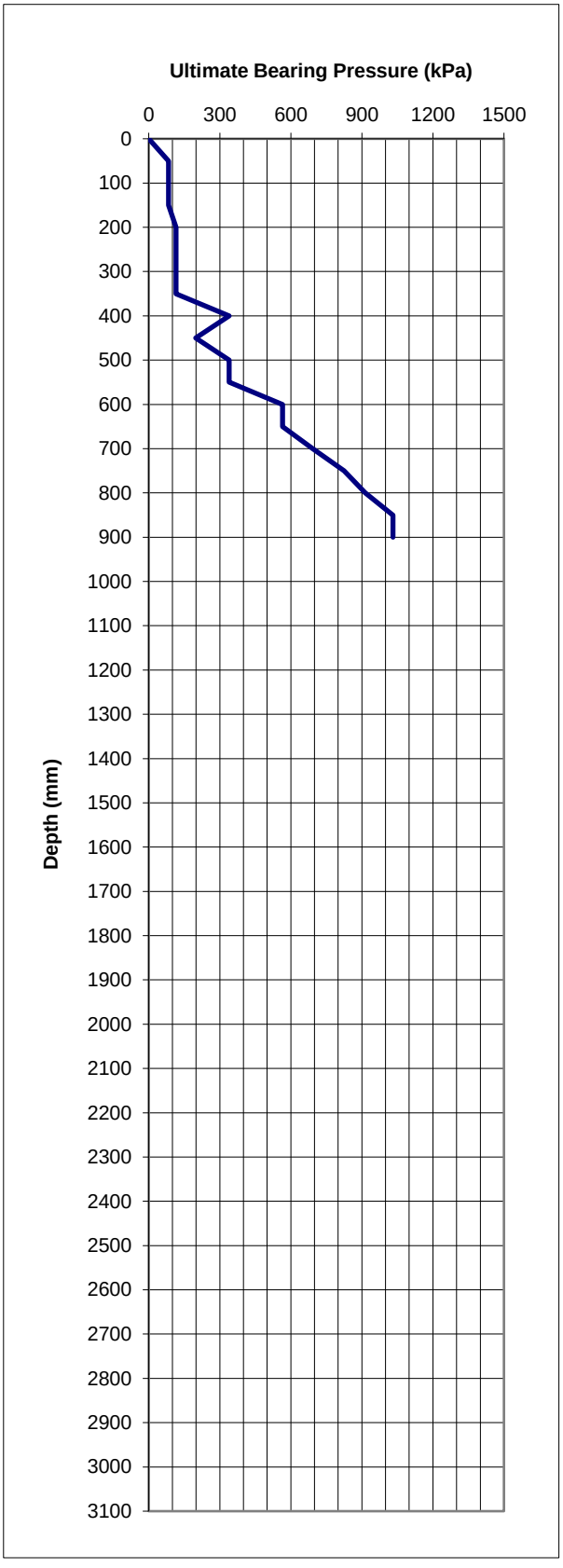
Project:	**Dobbs Dwelling**		
Client:	**Kevin & Morag Dobbs**		
Ref:	**6388**	**Eng**	**KL**
Date:	**19/10/2017**	**Sheet:**	**1 of 4**

PENETROMETER TEST RESULTS

Notes: No groundwater encountered. Indicative topsoil layer of 200mm.

No. of Blows	e (mm/blow)	Soil bearing resistance (kPa)	Depth (mm)
0	0	**0**	0
0.333	150	**84**	50
0.333	150	**84**	100
0.333	150	**84**	150
0.5	100	**115**	200
0.5	100	**115**	250
0.5	100	**115**	300
0.5	100	**115**	350
2	25	**339**	400
1	50	**198**	450
2	25	**339**	500
2	25	**339**	550
4	13	**565**	600
4	13	**565**	650
5	10	**693**	700
6	8	**824**	750
7	7	**915**	800
8	6	**1031**	850
9	6	**1031**	900



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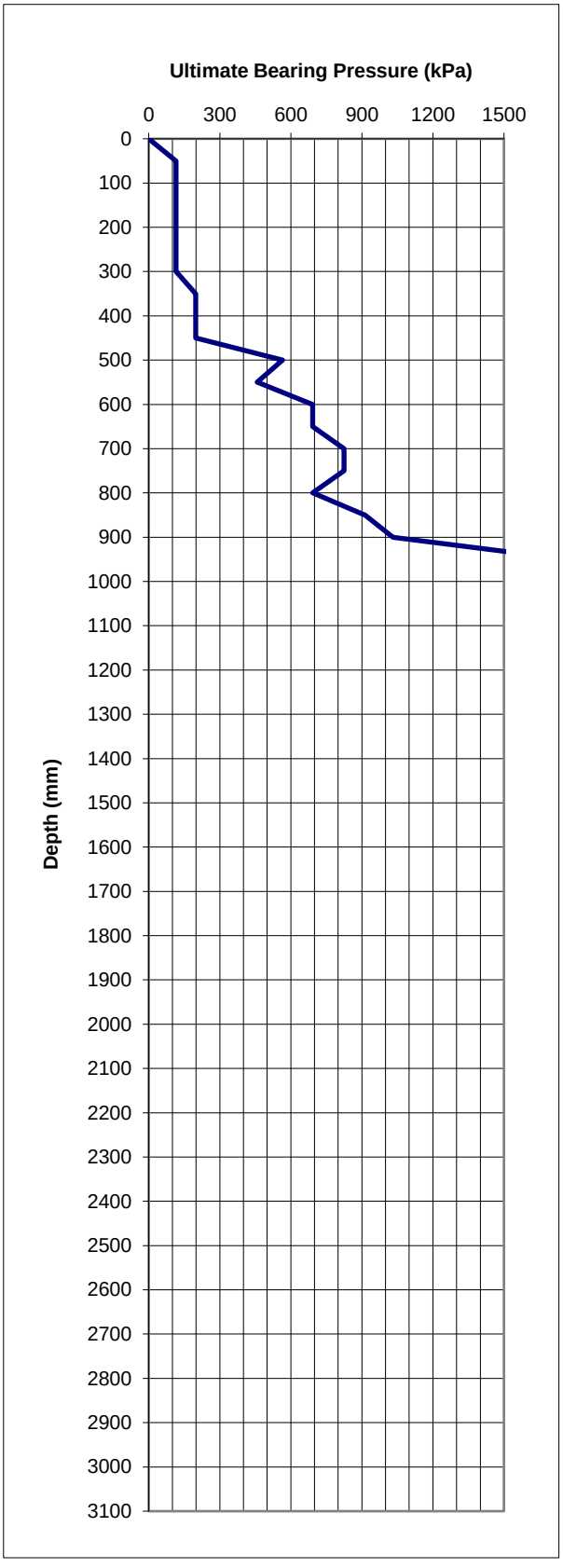
PENETROMETER TEST RESULTS

Notes: No groundwater encountered. Indicative topsoil layer of 200mm.

No. of Blows	e (mm/blow)	Soil bearing resistance (kPa)	Depth (mm)
0	0	**0**	0
0.5	100	**115**	50
0.5	100	**115**	100
0.5	100	**115**	150
0.5	100	**115**	200
0.5	100	**115**	250
0.5	100	**115**	300
1	50	**198**	350
1	50	**198**	400
1	50	**198**	450
4	13	**565**	500
3	17	**458**	550
5	10	**693**	600
5	10	**693**	650
6	8	**824**	700
6	8	**824**	750
5	10	**693**	800
7	7	**915**	850
8	6	**1031**	900
15	3	**1769**	950



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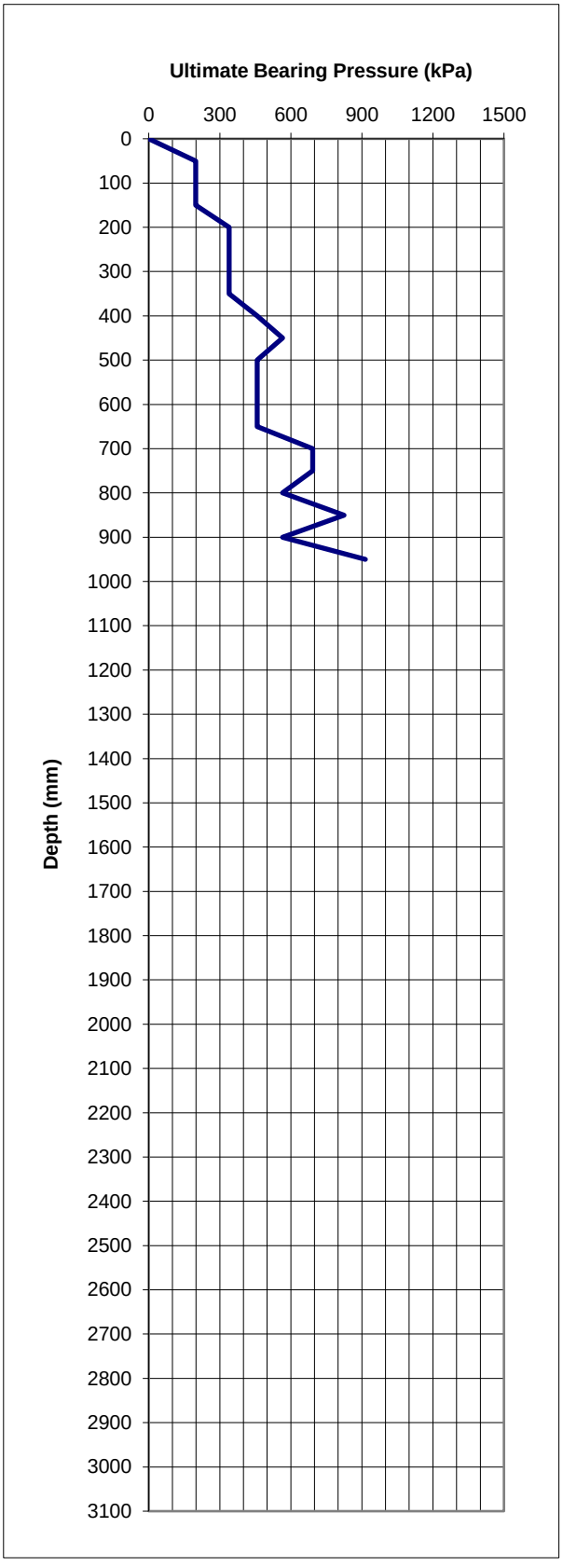
PENETROMETER TEST RESULTS

Notes: No groundwater encountered. Indicative topsoil layer of 200mm.

No. of Blows	e (mm/blow)	Soil bearing resistance (kPa)	Depth (mm)
0	0	**0**	0
1	50	**198**	50
1	50	**198**	100
1	50	**198**	150
2	25	**339**	200
2	25	**339**	250
2	25	**339**	300
2	25	**339**	350
3	17	**458**	400
4	13	**565**	450
3	17	**458**	500
3	17	**458**	550
3	17	**458**	600
3	17	**458**	650
5	10	**693**	700
5	10	**693**	750
4	13	**565**	800
6	8	**824**	850
4	13	**565**	900
7	7	**915**	950
19	-50	**#NUM!**	



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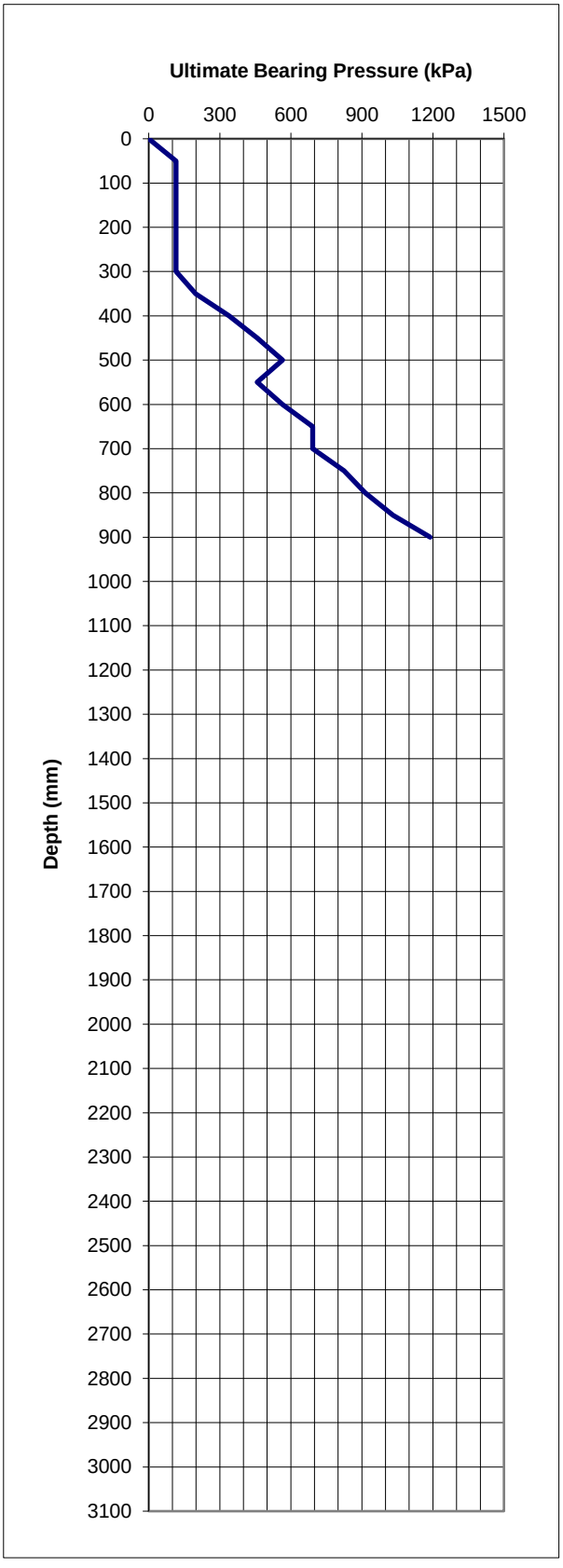
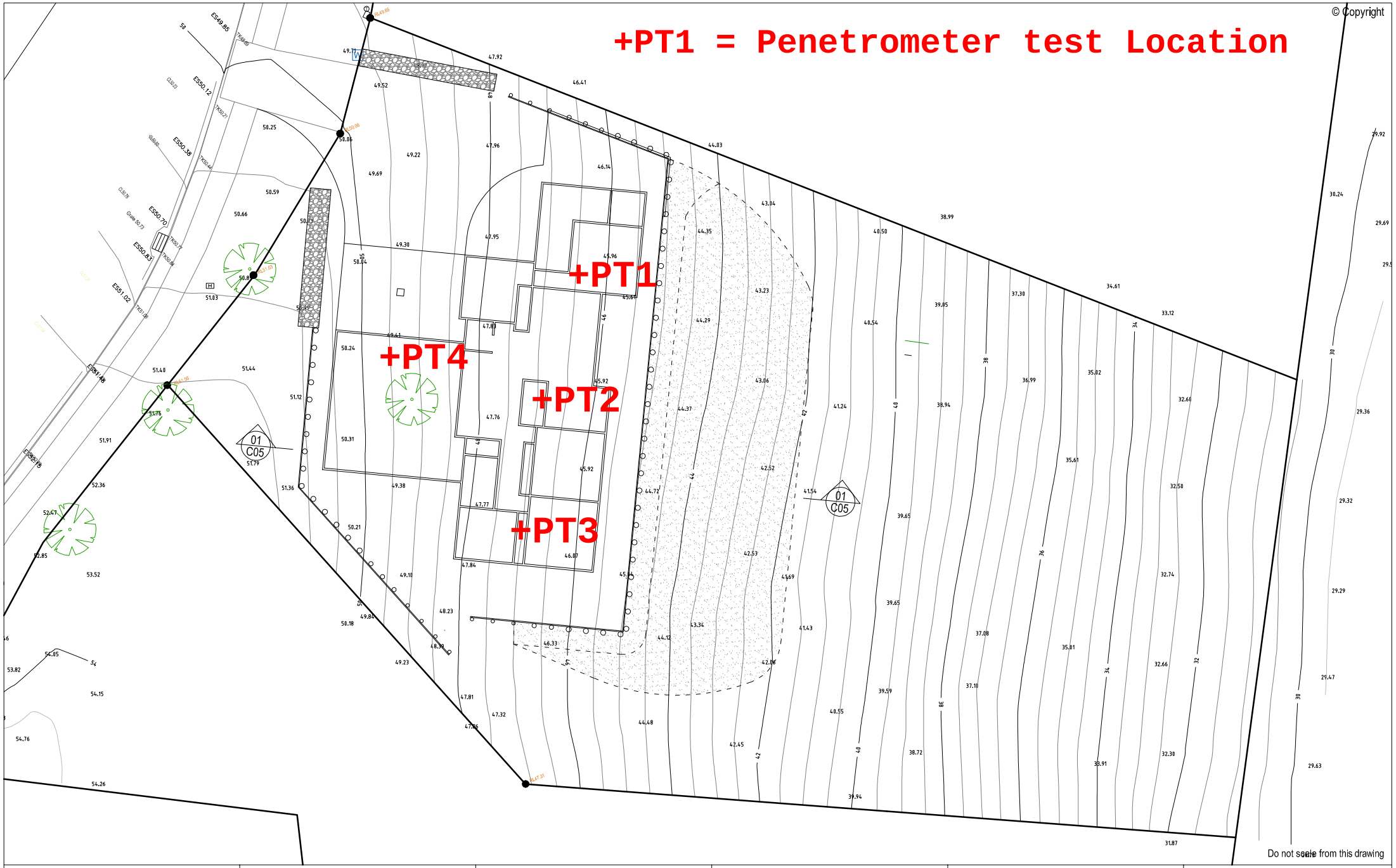
PENETROMETER TEST RESULTS

Notes: No groundwater encountered. Indicative topsoil layer of 200mm.

No. of Blows	e (mm/blow)	Soil bearing resistance (kPa)	Depth (mm)
0	0	**0**	0
0.5	100	**115**	50
0.5	100	**115**	100
0.5	100	**115**	150
0.5	100	**115**	200
0.5	100	**115**	250
0.5	100	**115**	300
1	50	**198**	350
2	25	**339**	400
3	17	**458**	450
4	13	**565**	500
3	17	**458**	550
4	13	**565**	600
5	10	**693**	650
5	10	**693**	700
6	8	**824**	750
7	7	**915**	800
8	6	**1031**	850
10	5	**1189**	900



+PT1 = Penetrometer test Location



Do not scale from this drawing

REV	DATE	DETAILS
01	19/01/18	ISSUED FOR CONSENT

REV	DATE	DETAILS

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CLIENT
KEVIN & MORAG DOBBS

ISSUE
CONSENT

PROJECT
DOBBS RETAINING WALL
LOT 34 GOLF VIEW CLOSE

DRAWING
SITE PLAN

DATE
06/11/17

SCALE (A3)
1:200 (A3)

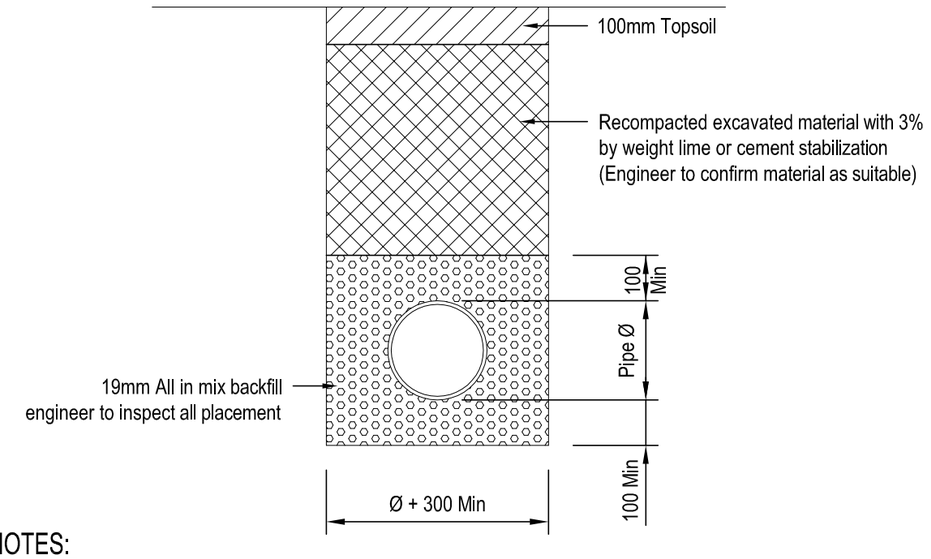
DRAWN
KL

REVISION
01

APPROVED
RE

DWG NO.
6388-C01

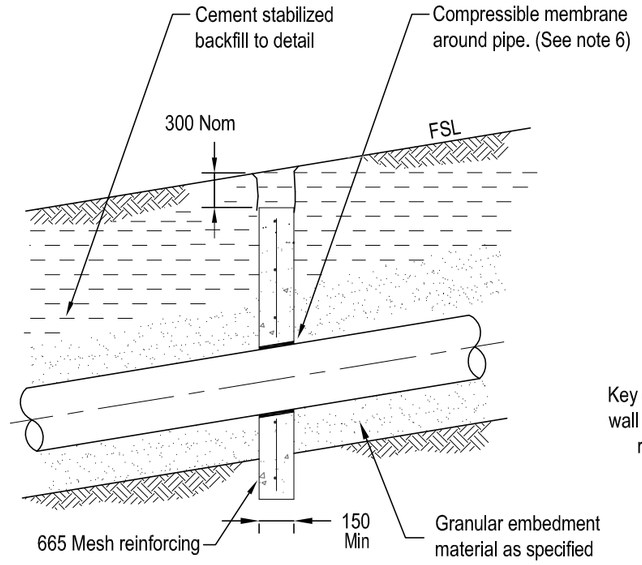
CAD FILE REF: P:/ 6388 - Retaining Wall

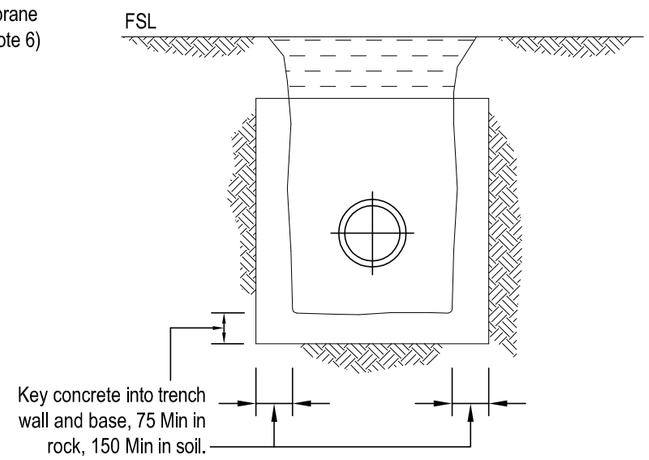


NOTES:

1. All excavation backfill for pipes and foundations to be backfilled using 3% cement stabilisted material
2. Trench dams to be installed on pipe trenches where slope exceeds 1:5 or 10°

01 / - PIPE TRENCH DETAIL
Scale 1:10

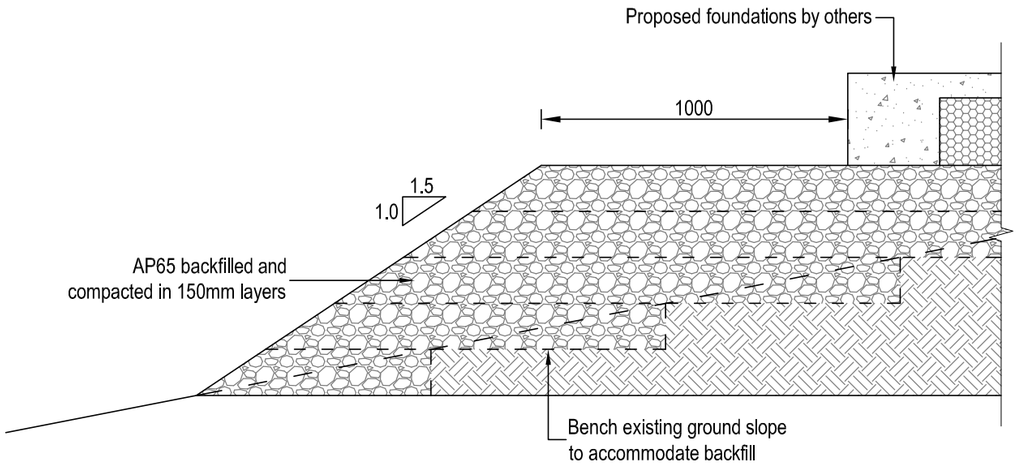




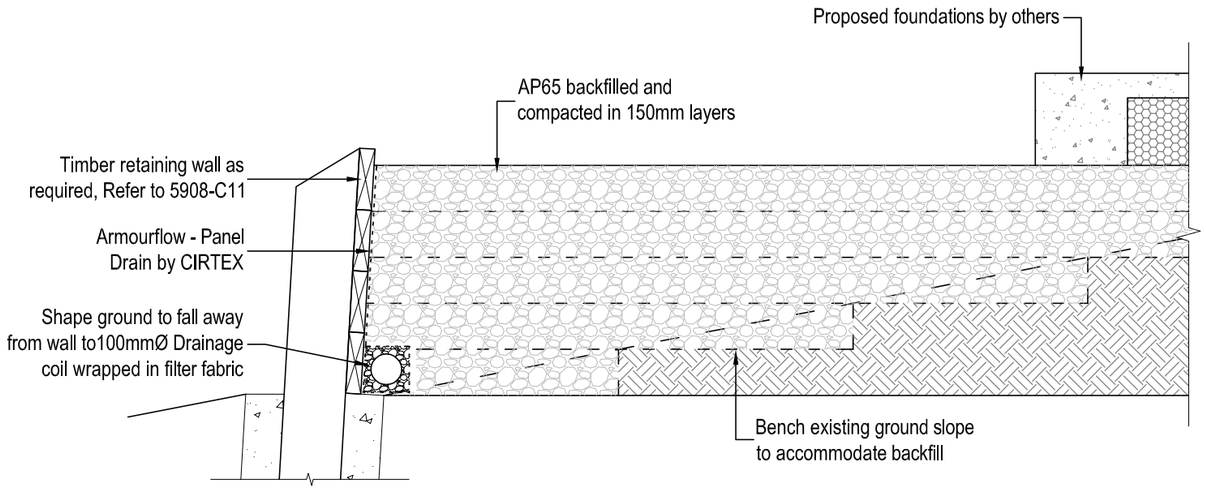
NOTES:

1. All dimensions in millimetres.
2. Construct concrete bulkheads at 20m centres along slope
3. Key concrete bulkheads into sides and bottom of trench against a bearing surface of undisturbed soil.
4. Concrete to be 17.5 MPa.
5. Do not deform pipes during placement of concrete or bags.
6. Compressible membrane around pipe to be 3mm thick rubber

02 / - TRENCH DAM DETAIL
Scale 1:10



03 / - EXCEVATION AND FILL DETAIL
Scale 1:20



04 / - EXCAVATION AND FILL DETAIL
Scale 1:20

Do not scale from this drawing

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LOT 34 GOLF VIEW CLOSE

DRAWING
PIPE TRENCH & FILL DETAILS

DATE 06/11/17
SCALE (A3) AS SHOWN
DRAWN KL
REVISION **01**
APPROVED RE
DWG NO. **6388-C11**

CAD FILE REF: P:/ 6388 - Retaining Wall