Residential
Commercial
Industrial
Consulting Engineers

FOOTING CONSTRUCTION REPORT

SITE ADDRESS: **NO. 6**
DAPHNE STREET
KURRALTA PARK

JOB NO: **25269**

DATE: **08/05/2018**

CLIENT: **BERT FARINA CONSTRUCTIONS**
11 INDAMA STREET
REGENCY PARK SA 5010

CONTENTS:

ATTACHMENTS:

RCI CONSULTING ENGINEERS

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1. Site Investigation

Six (6) boreholes were drilled using a Push Tube & Hand Gear to the depths indicated on the borelogs. The cores obtained were logged and then classified in accordance with AS2870-2011. Details of the observed subsurface conditions have been recorded on the borelogs.

At the time of sampling the site was established with an existing dwelling. Observed details of the existing site conditions such as trees and existing buildings along with the borehole locations have been indicated on the borehole location sketch.

2. Site Classification

It must be emphasised that in classifying this site, the engineer did not place sole reliance on the soil borelogs as a means of being an absolute representation of all subsurface features existing at this site but has taken also into consideration the following:-

(i) the broad experience of **RCI Consulting Engineers**

(ii) the known performance of existing structures in the general area

(iii) specific reports on adjacent sites

(iv) published geological maps where they exist

On this basis, the site is classified **"P"** due to tree effects in accordance with AS2870 – 2011. The soil reactivity alone is classified as "E-D" for this site.

This site has been classified by David Angeloni (B.Eng MIEAust).

3. Proposed Structure

It is proposed to construct **4 double storey articulated Hebel veneer dwellings with sheet roofs on site.**

4. Footing Recommendations

A raft footing system with beam sizes as listed below is recommended for the above structure on this site. Refer to the footing plan and detail sheets GR1, GR2, SD1, SS1 & PD1 attached for layout. Contact this office immediately if a conflict between the details on the footing plan and those listed below exist.

Beams:	B1	=	200 wide x 900 deep reinforced with 1/N28 top & 1/N28 bottom
	B2	=	300 wide x 900 deep reinforced with 2/N28 top & 2/N28 bottom

Ligatures: W8 at 1200mm centres generally with W8 at 300mm centres between piers.

Slab: 100 thick reinforced with SL92 mesh top, placed with 20mm cover.

Where depth of uncontrolled fill exceeds 400mm, use 125 thick slab, reinforced with SL92 mesh top and SL72 mesh bottom, placed with 20mm top cover and 30mm bottom cover.

Where tiled flooring is to be used in areas greater than 16 square metres the slab reinforcement shall be increased to SL92 in accordance with AS2870 (2011) Section 5.3.7, or use a flexible adhesive grout bed to accommodate shrinkage movement associated with concrete and screeds.

Contact this office for additional information where polished floor slabs are to be used.

Note: The location and extent of the cut/fill line, piers, slab thickenings and additional reinforcement are indicated as a guide only. Additional piers, slab thickening, reinforcement and/or concrete may be required and are to be determined during footing excavation or the trench inspection. Contact this office as soon as possible if site conditions differ from those assumed/identified in this report.

5. Articulation

Construct full height control joints at the locations shown on the control joint plan.

6. Site Drainage

Stormwater drainage is to be constructed in accordance with the stormwater drainage plan included as part of this report. The building area is to be graded away from the dwelling so that water drains away. Cut the site and provide spoon drains as required.

The builder is to provide temporary drainage during construction to ensure all stormwater is kept away from the footings.

The owner(s) is to ensure proper site management, site drainage and foundation maintenance is observed at all times.

7. Additional Requirements

- Flexible connections in the stormwater and waste drains are required on this site.
- All Footings to be founded 100mm into natural soil or controlled fill.
- The above footing conditions have tried to allow for the existing trees, however it is assumed that no additional tree(s) will be planted within a distance equivalent to 1.5 times the expected mature height of the tree(s) from the footings.
- Pre-wetting of the site prior to the commencement of siteworks is required. Watering may be carried out using garden sprinklers for approximately 2 hours daily for a period of 7 to 10 days or until all visible cracks in the soil have closed up. This watering must be carried out before the underfloor filling is placed. After watering, construction must commence within 3 days.

8. Site Preparation

- Remove surface soil containing grass, roots and organic material from the building area.
- Cut and/or fill the site as required. Place fill in accordance with the requirements of the general notes section of this report.
- Place 100mm nominal compacted quarry rubble as base for proposed floor slabs.
- Excavate footing beams ensuring founding is as specified above.
- All plumbing lines to be lagged as specified on the footing plans and to have flexible connections if specified above.
- Provide 0.2mm plastic membrane over the building area
- Footing reinforcement to be placed in accordance with the footing plan and detail sheets.

9. Site Inspections

Site inspections by this office are required at the following stages:-

i) after footing beam excavation and prior to placement of plastic membrane and/or reinforcement.
ii) after completion of reinforcement placement prior to pouring of concrete.

Work will not be certified unless both inspections are carried out by this office. A minimum of 24 hours notice is required for inspections. Each inspection will incur an additional charge and travel charges will be applicable for travel beyond 40km from the GPO.

10. Earthquake Assessment

In accordance with AS1170.4 – 2007 "**No specific earthquake design is required**"*. The following parameters were used in this calculation:-

Importance Level	–	2
Probability of Exceedance	–	1:500
Structure	–	Domestic
Kp	–	1.0
Z	–	0.1

* The structure is to be built in accordance with the following codes BCA, AS1684.2, AS3700 & AS1170.

11. Design Wind Speed

The design wind speed for this site is **N1.**

The wind speed for this site has been calculated using AS4055-2012 and the South Australian "Design Wind Speed Map, Adelaide Metropolitan Area" where applicable.

RCI CONSULTING ENGINEERS

1 Hawke Street, Albert Park

Surface Soil Borelogs

Job No: **25269 (1 of 2)**
Date Sampled: **24/04/2018**
Site Address: **No. 6 Daphne Street, KURRALTA PARK**

Sampled By: AS Drilling
Sampling Method: Hydraulic Push Tube/Hand Gear
Logged By: JF

BH1	BH2	BH3	BH4	Symbol	Description	Colour	Texture	MC	Bearing	Est Ipt (Ave)
0.00 - 0.35	0.00 - 0.35	0.00 - 0.25	0.00 - 0.35	CL/SC	v/sandy CLAY	dark Brown	Friable	SM	L/M	0.010
0.35 - 0.90	0.35 - 1.05	0.25 - 0.90	0.35 - 1.10	CH	CLAY some fine sand	dark Red mottled	v/Hard	<M	VH/H	0.040
0.90 - 1.85	1.05 - 1.95	0.90 - 2.00	1.10 - 1.50	CH	silty CLAY some sand some to few lime paths	Red Brown Orange Cream parts	Hard	≤M	H	0.035
1.85 - 2.45	1.95 - 3.00	2.00 - 2.55		CH	silty sandy CLAY limey parts	Red mottled dark Brown Cream pockets	v/Stiff	≤M	MH	0.032
2.45 - 3.00		2.55 - 3.00		CL-CH	calcareous sandy silty CLAY	Orange Cream mottled Brown Grey	Friable	<M	M	0.030
			1.50 - 3.00	SC CL	clayey SAND - sandy CLAY v/slightly limey	Orange Brown	Friable	D-SM	LM	0.015

Ys = 74 Ys = 76 Ys = 78 Ys = 59
Δyst = 27 Δyst = 28 Δyst = 27 Δyst = 15

Remarks

Water table was not encountered during drilling.
Site is classified P due to SINGLE TREE effects.

Ys: 78 mm
Δyst: 28 mm
Ymc: 83
Yme: 39
Site Classification: **P**

RCI CONSULTING ENGINEERS

1 Hawke Street, Albert Park

Surface Soil Borelogs

Job No: **25269 (2 of 2)**
Date Sampled: **24/04/2018**
Site Address: **No. 6 Daphne Street, KURRALTA PARK**

Sampled By: AS Drilling
Sampling Method: Hydraulic Push Tube/Hand Gear
Logged By: JF

BH5	BH6			Symbol	Description	Colour	Texture	MC	Bearing	Est Ipt (Ave)
0.00 - 0.40	0.00 - 0.40			CL/SC	v/sandy CLAY	dark Brown	Friable	SM	L/M	0.010
0.40 - 1.00	0.40 - 1.05			CH	CLAY some fine sand	dark Red mottled	v/Hard	<M	VH/H	0.040
1.00 - 1.60	1.05 - 1.55			CH	silty CLAY some sand some to few lime paths	Red Brown Orange Cream parts	Hard	≤M	H	0.035
1.60 - 2.50				CH	silty sandy CLAY limey parts	Red mottled dark Brown Cream pockets	v/Stiff	≤M	MH	0.032
2.50 - 3.00	1.55 - 2.10			CL-CH	calcareous sandy silty CLAY	Orange Cream mottled Brown Grey	Friable	<M	M	0.030
	2.10 - 3.00			SC CL	clayey SAND - sandy CLAY v/slightly limey	Orange Brown	Friable	D-SM	LM	0.015

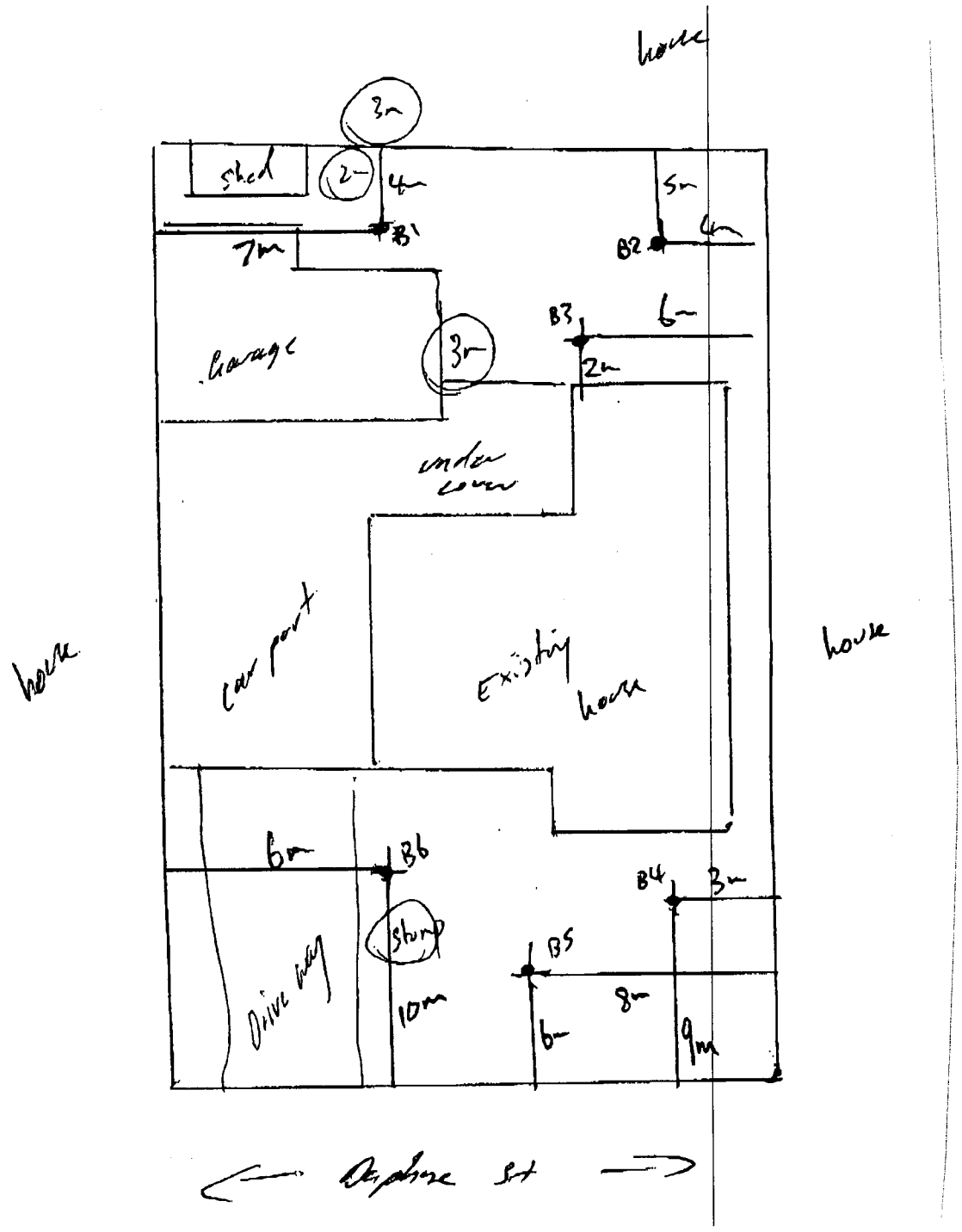
Ys = 72 Ys = 63
Δyst = 27 Δyst = 17

Remarks

Water table was not encountered during drilling.
Site is classified P due to SINGLE TREE effects.

Ys: 78 mm
Δyst: 28 mm
Ymc: 83
Yme: 39
Site Classification: **P**

A4



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BOREHOLE LOCATION PLAN

ADDRESS: NO-6 Daphne street kurralta park

CLIENT: Bert Farina constructions

DRAWN:

SCALE: N.T.S

DATE: 9/5/18

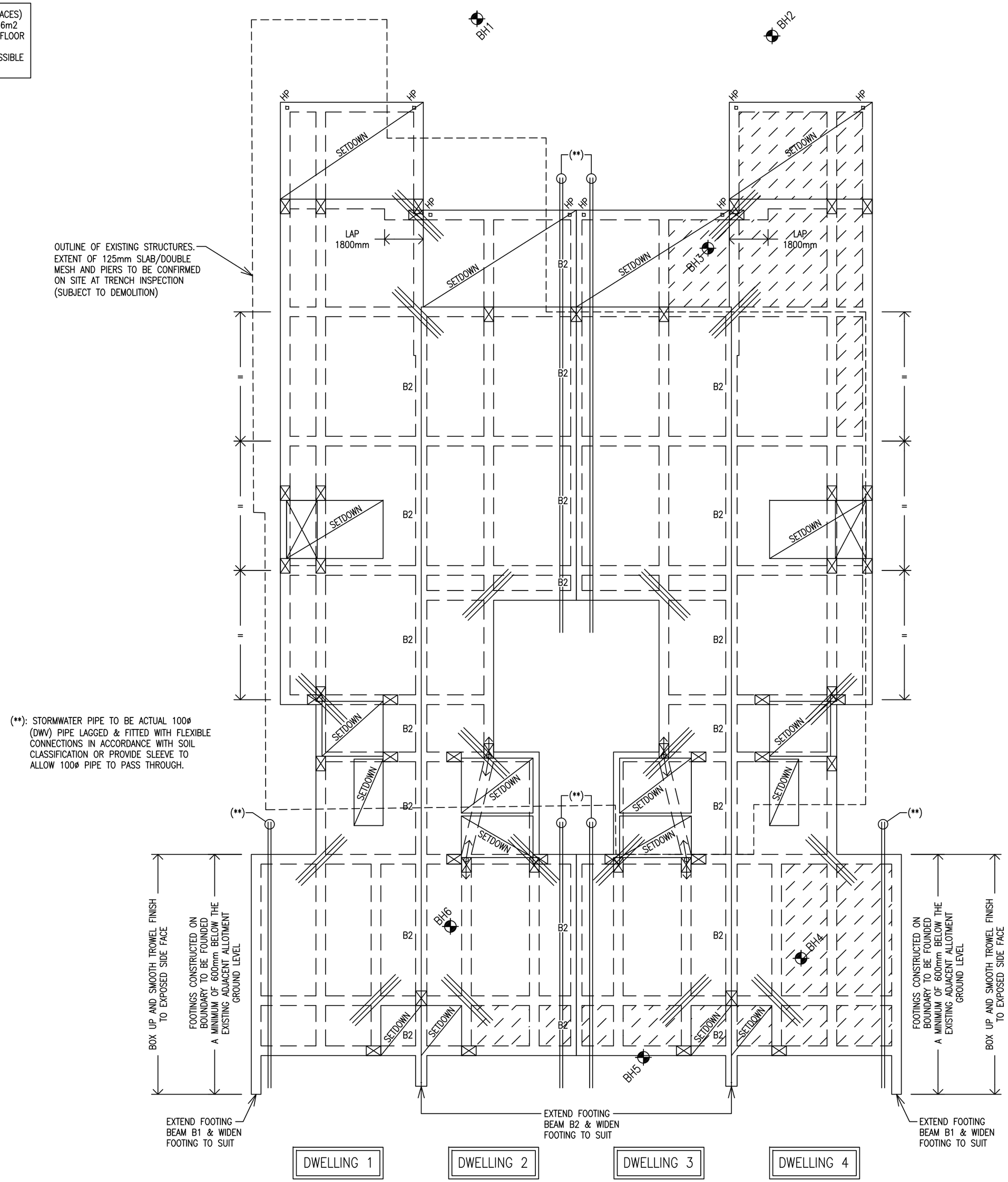
JOB No: 25269

A2

WHERE BRITTLE FLOOR COVERINGS (eg TILED SURFACES) ARE TO BE USED OVER AN AREA GREATER THAN 16m2 FLEXIBLE ADHESIVE IS TO BE USED BETWEEN THE FLOOR COVERING AND SLAB. APPLY IN ACCORDANCE TO MANUFACTURERS SPECIFICATION TO ALLOW FOR POSSIBLE CONCRETE SHRINKAGE.

CRANK BARS FOR CONTINUITY OR PROVIDE CRANKED LAP BARS. REFER TO FOOTING CONSTRUCTION REPORT ATTACHMENT SHEETS FOR LAP LENGTHS.

HP GALVANISED STEEL/TIMBER POST BUILT INTO HEBEL PIER. BOLT TO FOOTING AND PITCHING BEAMS (WHERE APPLICABLE). WIDEN FOOTING LOCALLY TO SUIT PIER.



(**): STORMWATER PIPE TO BE ACTUAL 100ø (DWV) PIPE LAGGED & FITTED WITH FLEXIBLE CONNECTIONS IN ACCORDANCE WITH SOIL CLASSIFICATION OR PROVIDE SLEEVE TO ALLOW 100ø PIPE TO PASS THROUGH.

ALL FOOTING BEAMS ARE "B1" UNLESS NOTED OTHERWISE

USE SL92 MESH TOP IN SLAB THROUGHOUT

NOTE:
ALL B2 FOOTINGS REQUIRED TO BE CONSTRUCTED ON BOUNDARY ARE TO BE FOUNDED A MINIMUM 600mm BELOW THE EXISTING ALLOTMENT GROUND LEVEL.

TITLE: FOOTING PLAN

ADDRESS: No. 6 Daphne Street, KURRALTA PARK, SA

CLIENT: BERT FARINA CONSTRUCTIONS

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JOB No.	SHEET No.	ISSUE No.
F25269	1 of 1	—

DRAWN : H.C. | DESIGN: D.A. | DATE: 7-May-18

0 2 4 6
SCALE 1:100 METRES

No.	REVISION	BY	DATE

FOOTING BEAMS

BEAM	WIDTH (mm)	DEPTH (mm)	REINFORCEMENT TOP No.	TOP SIZE	BOTTOM No.	BOTTOM SIZE
B1	200	900	1	N28	1	N28
B2	300	900	2	N28	2	N28

HANGERS/LIGATURES:
W8 @ 1200mm CRS. WHERE FOOTING BEAM IS NOT FOUND IN NATURAL SOIL/CONTROLLED FILL PROVIDE HANGERS/LIGATURES @ 300mm CRS.

SLAB:
100mm THICK SLAB REINFORCED WITH ONE LAYER OF SL92 TOP WITH 20mm COVER. WHERE THE DEPTH OF FILL BELOW THE SLAB PANELS EXCEEDS 400mm INCREASE SLAB DEPTH TO 125mm AND PLACE AN ADDITIONAL LAYER OF SL72 MESH BOTTOM WITH 30mm OF BOTTOM COVER. (REFER TO LEGEND). N20 CONCRETE UNLESS NOTED OTHERWISE. (FOR ALL JOBS LOCATED IN CORROSION ZONE, CONCRETE STRENGTH FOR EXTERNAL FOOTINGS (EXPOSED FACE) MUST BE N32 CONCRETE).

SOIL CLASSIFICATION: E-D
- 40mm THICK CLOSED-CELL POLYETHYLENE LAGGING AROUND STORMWATER AND SEWER DRAIN PENETRATIONS THROUGH EXTERNAL FOOTINGS.
- FLEXIBLE CONNECTIONS IN SEWER & STORMWATER DRAIN ARE REQUIRED

GENERAL NOTES

1) THIS DRAWING TO BE READ IN CONJUNCTION WITH THE FOOTING CONSTRUCTION REPORT AND ARCHITECTURAL DRAWINGS. IF ANY CONFLICT OCCUR CONTACT THIS OFFICE IMMEDIATELY.
2) THIS FOOTING PLAN ASSUMES THE SITEWORKS AND DRAINAGE ARE CARRIED OUT IN ACCORDANCE WITH THE FOOTING CONSTRUCTION REPORT.
3) THESE DRAWING ARE NOT TO BE SCALED FROM. ALL WRITTEN DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE.
4) ALL FOOTINGS TO BE FOUNDED A MINIMUM 100mm INTO NATURAL SOIL OR CONTROLLED FILL IF PRESENT (REFER TO BORELOGS). FOOTING TO BE TRENCHED OR PIERED AS REQUIRED TO ENSURE 100mm MINIMUM FOUNDING.
5) PIERS AND EXTENT OF THICKENED SLAB/DOUBLE MESH ARE SHOWN INDICATIVELY ONLY AND SHALL BE CONFIRMED ON SITE AT THE TIME OF A TRENCH INSPECTION.

BOREHOLE
(REFER TO BORELOG)

DEPTH OF FILL FOUND IN BOREHOLE			
HOLE 1	0mm	HOLE 4	0mm
HOLE 2	0mm	HOLE 5	0mm
HOLE 3	0mm	HOLE 6	0mm

LEGEND

- 3/N12 x 2000mm LONG CRACK CONTROL BARS TIED TO UNDERSIDE OF TOP MESH.
- STEP IN FOOTING BEAM, REFER TO FOOTING CONSTRUCTION REPORT FOR DETAILS.
- 1200mm LONG (MIN) x FOOTING WIDTH WIDE PIER. FOUND 100mm INTO NATURAL SOIL. REINFORCE WITH 4/N12 RODS VERTICAL WHERE DEPTH BELOW BASE OF FOOTING EXCEEDS 400mm. EXTENT OF PIERS TO BE CONFIRMED ON SITE.
- SETDOWN SET DOWN IN RAFT SLAB REFER TO FOOTING CONSTRUCTION REPORT FOR DETAILS. ENSURE FOOTING DEPTHS ARE MAINTAINED BELOW SET DOWN.
- 125mm THICK SLAB WITH TWO LAYERS OF MESH. ONE LAYER PLACED WITH 20mm TOP COVER AND THE OTHER WITH 30mm BOTTOM COVER. REFER TO SLAB NOTES FOR MESH SIZE. AREA SHOWN HATCHED IS INDICATIVE ONLY AND IS TO BE CONFIRMED ON SITE.

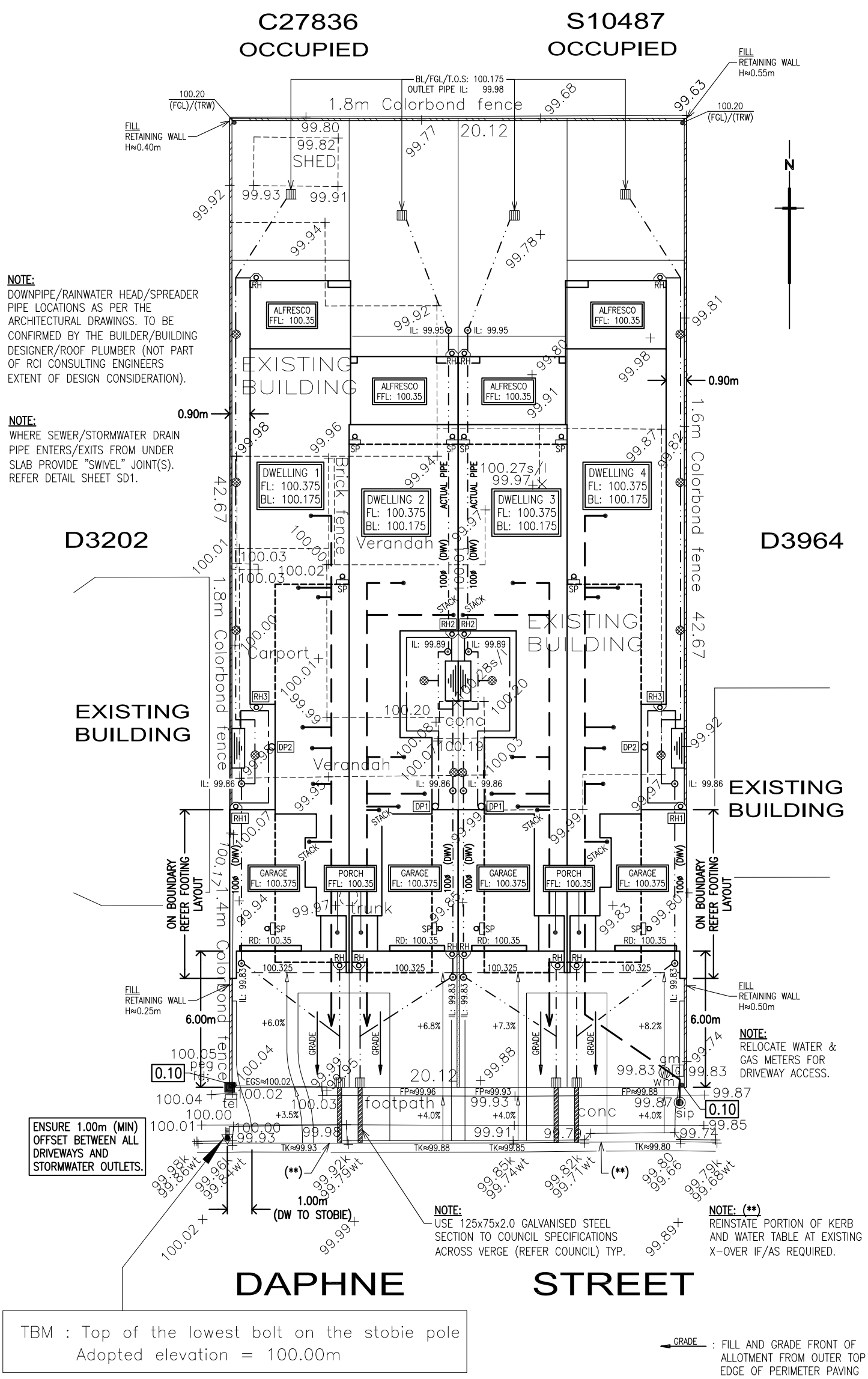
A3

NOTE:
- REFER TO DETAIL SHEET PD1 FOR RECOMMENDED MINIMUM PAVEMENT SETDOWN FROM UNDERSIDE OF REBATE FOR CLASS "E–D" SITE SOIL CLASSIFICATION.
- DUE TO THE HIGHLY REACTIVE NATURE OF THE SOIL PROFILE, IT IS RECOMMENDED SEGMENTAL BRICK/BLOCK PAVING BE UTILISED FOR PERIMETER AND DRIVEWAY PAVING NOT INSITU CONCRETE.

NOTE:
FEATURE SITE SURVEY BY OTHERS.

SITEWORKS PLAN

(THIS PLAN IS TO BE READ IN CONJUNCTION WITH SITEWORKS NOTES – SHEET 2 OF 2)



NOTE:
DOWNPIPE/RAINWATER HEAD/SPREADER PIPE LOCATIONS AS PER THE ARCHITECTURAL DRAWINGS. TO BE CONFIRMED BY THE BUILDER/BUILDING DESIGNER/ROOF PLUMBER (NOT PART OF RCI CONSULTING ENGINEERS EXTENT OF DESIGN CONSIDERATION).

NOTE:
WHERE SEWER/STORMWATER DRAIN PIPE ENTERS/EXITS FROM UNDER SLAB PROVIDE "SWIVEL" JOINT(S). REFER DETAIL SHEET SD1.

NOTE:
RELOCATE WATER & GAS METERS FOR DRIVEWAY ACCESS.

NOTE:
USE 125x75x2.0 GALVANISED STEEL SECTION TO COUNCIL SPECIFICATIONS ACROSS VERGE (REFER COUNCIL) TYP.

NOTE: (**)
REINSTATE PORTION OF KERB AND WATER TABLE AT EXISTING X–OVER IF/AS REQUIRED.

TBM : Top of the lowest bolt on the stobie pole
Adopted elevation = 100.00m

GRADE : FILL AND GRADE FRONT OF ALLOTMENT FROM OUTER TOP EDGE OF PERIMETER PAVING TOWARDS FRONT BOUNDARY.

NOTE:
USING EXISTING AS CONSTRUCTED VERGE/FOOTPATH/ X–OVER GRADES FOR DRIVEWAY DESIGN (TO BE CONFIRMED AS ACCEPTABLE BY RELEVANT CHECKING AUTHORITY **PRIOR** TO ANY WORKS PROCEEDING OR BUILDING/PLANNING APPROVALS FOR CONSTRUCTION BEING ISSUED).

NOTE:
- DWELLINGS 1 –3: LOCATE & CONNECT SEWER DRAIN TO NEW SIP. CONNECTION TO BE AS PER SA WATER STANDARD DETAILS.
- DWELLING 4: SIP WAS LOCATED DURING THE LEVEL CONTOUR SURVEY BUT NO INVERT LEVEL WAS TAKEN.

BUILDER TO CHECK DEPTH OF SEWER CONNECTIONS AND ENSURE ADEQUATE SEWER FALL CAN BE ACHIEVED PRIOR TO ANY COUNCIL APPROVALS BEING ISSUED OR WORKS PROCEEDING. WHERE FALL CANNOT BE ACHIEVED WITH THE PROPOSED FLOOR LEVEL, CONTACT THIS OFFICE IMMEDIATELY FOR REVISED LEVELS.

NOTE:
ALLOTMENT IN FLOOD ZONE. MIN FL: FLOOD LEVEL+0.20+CONTOUR LEVEL=0.10+0.20+100.05=100.35

0.10 FLOOD LEVELS

SURVEY LEGEND

⃝	Permanent survey mark	+	Spot height
▲	Temporary bench mark	× iL	Invert
■	Peg	× fL	Floor level
⊙	Spike	× sL	Step level
●	Metal pin	+ wt	Watertable level
◎	GI nail	+ k	Back kerb level
•	Masonry nail	Ⓦ	Water meter
⌔	Drill hole	G	Gas meter
⤫	Scribe	☐	Domestic outlet

TITLE: SITEWORKS PLAN

ADDRESS: No. 6 Daphne Street, KURRALTA PARK, SA

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JOB No.	SHEET No.	ISSUE No.
C25269	1 of 2	–

DRAWN : H.C. | DESIGN: D.A. | DATE: 7–May–18

0 4 8 12
SCALE 1:200 METRES

No.	REVISION	BY	DATE

GENERAL NOTES:
SITEWORKS AND STORMWATER DRAINAGE ARE TO BE CONSTRUCTED BY THE OWNER OR THE OWNERS REPRESENTATIVE (IE. THE BUILDER WHERE STATED WITHIN THE BUILDING CONTRACT). THIS DOCUMENT IS TO BE READ IN CONJUNCTION WITH THE FOOTING CONSTRUCTION REPORT AND ARCHITECTURAL DRAWINGS. ANY DISCREPANCIES ARE TO BE REPORTED TO THIS OFFICE IMMEDIATELY.

SOIL CLASSIFICATION: E–D
- 40mm THICK CLOSED–CELL POLYETHYLENE LAGGING AROUND STORMWATER AND SEWER DRAIN PENETRATIONS THROUGH EXTERNAL FOOTINGS.
- FLEXIBLE CONNECTIONS IN SEWER & STORMWATER DRAINS ARE REQUIRED – REFER DETAIL SHEET SD1

BENCH:
BUILDING AREA TO BE BENCHED TO 200mm BELOW THE FINISHED FLOOR LEVEL.
GRADE SITE AWAY FROM HOUSE AS FOLLOWS:–
- GRADE PAVED AREAS 45mm IN 1000mm
- GRADE GRASSED AREAS 5mm IN 1000mm

IMPORTANT NOTE:
TO ASSIST IN AVOIDING A "DOWNHILL" MOVEMENT OF FILL ONCE IT HAS BEEN PLACED, A SERIES OF HORIZONTAL BENCHED PLATFORMS SHOULD BE EXCAVATED INTO THE GROUND WHEN THE EXISTING SLOPE IS 1 IN 8 OR GREATER. THIS BENCHING SHOULD BE UNDERTAKEN OVER THE ENTIRE AREA WHERE FILLING IS TO OCCUR.

SEWER:
THIS SEWER DESIGN IS BASED ON THE SHORTEST POSSIBLE RUN. BUILDER/PLUMBER TO CONFIRM SEWER CONNECTION INVERT LEVEL AND ASSUMED LAYOUT PROVIDED ON THIS DRAWING. CONTACT THIS OFFICE IMMEDIATELY IF ANY DISCREPANCIES EXIST AS THE FLOOR LEVEL AND/OR UNDERMINING PIER DEPTHS MAY NEED TO BE REVISED. TOP OF FLOOD GULLY AND PAVING AROUND FLOOD GULLY TO BE CONSTRUCTED 150mm BELOW THE LOWEST FIXTURE CONNECTED TO THE DRAIN.

STORMWATER:
GRAVITY FLOW STORMWATER SYSTEM IS TO BE LAID @ 1 IN 250 MIN GRADE WITH 100mm MIN COVER EXCEPT AS NOTED BELOW UNDERSIDE OF PAVING:–
- 50mm (SUBJECT TO PEDESTRIAN TRAFFIC)
- 75mm (SUBJECT TO LIGHT VEHICULAR TRAFFIC)
- 450mm (UNPAVED DRIVEWAYS)

WHERE COVER CANNOT BE ACHIEVED ENCASE STORMWATER DRAIN PIPE WITHIN A CAST IRON SLEEVE OF THICKNESS:
- 2.9mm (SUBJECT TO PEDESTRIAN TRAFFIC)
- 5.0mm (SUBJECT TO LIGHT VEHICULAR TRAFFIC)

SURVEY:
THIS IS NOT A BOUNDARY SURVEY. THEREFORE THE RELATIONSHIP BETWEEN OCCUPATION AND THE PLOTTED BOUNDARY IS INDICATIVE. LEVELS ARE BASED ON A TEMPORARY DATUM (UNO). THE DATUM (SHOWN ON THIS PLAN) IS TO BE LOCATED PRIOR TO COMMENCING SITEWORKS.

DESIGN LEGEND

▥ :	250 SQUARE x 285 DEEP "RELN" RAINWATER PIT (PVC), (SERIES 250) OR SIMILAR (U.N.O.)
⊗ :	GRATED SURFACE S/W SUMP 90ø
—··—··— :	STORMWATER DRAIN PIPE (BY OWNER) – 90ø PVC (U.N.O) AT 1 IN 250 (0.4%) MIN FALL (U.N.O) EXCEPT ON SEALED SYSTEM
—— – —— :	STORMWATER DRAIN PIPE (SEALED SYSTEM) – 90ø PVC (U.N.O)
——···—— :	90ø AGRIC DRAIN (U.N.O)
•— :	INTERNAL SEWER DRAIN LOCATION (TO BE CONFIRMED BY BUILDER)
– – – – :	SEWER PIPE 100ø AT 1.65% MIN (1 IN 60)
TOP OF BATTER / 1:2 / BOTTOM OF BATTER :	BATTERS/EARTHWORK EMBANKMENTS TO BE 50% (1 IN 2) UNLESS NOTED OTHERWISE
:	EXISTING TREES AND STRUCTURES ON SITE TO BE DEMOLISHED/REMOVED BY OWNER PRIOR CONSTRUCTION. UNLESS OTHERWISE STATED.

A4

NOTES:

ANY SURPLUS SPOIL FROM SITEWORKS IS THE OWNERS RESPONSIBILITY AND SHOULD BE REMOVED OR DISPERSED AS APPROPRIATE, UNLESS STATED OTHERWISE IN THE BUILDING CONTRACT. THIS SPOIL SHOULD BE STOCKPILED SUCH THAT IT DOES NOT OBSTRUCT SITE ACCESS AND CAN BE EASILY REMOVED FROM THE SITE

THE RETAINING WALLS SHOWN ON THIS PLAN ARE TO BE CONSTRUCTED BY THE OWNER EXCEPT WHERE THE RETAINING WALL FORMS PART OF THE BUILDING STRUCTURE OR WHERE SPECIFIED OTHERWISE WITHIN THE BUILDING CONTRACT.
ANY RETAINING WALLS ADJACENT EXCAVATIONS, A SERVICE TRENCH/EASEMENT (PROPOSED OR EXISTING) OR IF FOUND IN FILL SHOULD HAVE AN UNDERMINING COMPONENT INCORPORATED IN THE DESIGN OF THEIR FOOTING/PIER SUPPORT SYSTEM.
OWNER TO RETAIN ANY MINOR CUT/FILL ON THE BOUNDARIES WITH A CONCRETE PLINTH, SLEEPER OR SIMILAR.

: MINIMUM 1.0 KILOLITRE RAINWATER TANK (BY OWNER) AS PER THE NCC. TO BE PLUMBED TO AT LEAST A WC, WATER HEATER OR ALL LAUNDRY COLD WATER OUTLETS. WHERE A RWT IS SUPPORTED ON A STAND OR OTHER STRUCTURE, THE SUPPORTING STRUCTURE MUST COMPLY WITH AS/NZ 1170.1 AND 1170.2. ROOF GUTTER HEIGHT IN RELATION TO TANK INLET HEIGHT NEEDS TO BE TAKEN INTO CONSIDERATION. THE TANK SHALL ALSO BE LOOPED INTO THE MAINS WATER SYSTEM.

— – — : STORMWATER DRAIN PIPES AS A SEALED SYSTEM USED TO CONNECT:
- DWELLINGS 1 & 4: RH1 TO RH3 TO RAINWATER TANK.
- DWELLINGS 2 & 3: DP1 TO RH2 TO RAINWATER TANK.

(ENSURE MINIMUM 50m² OF ROOF AREA TO TANK). REFER TO FOOTING CONSTRUCTION REPORT ATTACHMENT SHEET SS1.

— · · — : STORMWATER DRAIN PIPES UNDER GRAVITY FLOW USED TO CONNECT RAINWATER TANK OVERFLOW PIPE, SURFACE STORMWATER DRAIN PIPES & DP's NOT CONNECTED TO RAINWATER TANK TO THE STREET WATER TABLE (VIA THE FRONT BOUNDARY SUMP).

ENSURE GRAVITY FLOW PIPES MAINTAIN SUFFICIENT GRADE TO MEET THE APPROPRIATE OUTLET AS SHOWN ON THIS PLAN. CONSTRUCT ANY SEALED SYSTEM PIPES SUCH THAT THEY DO NOT INTERFERE WITH THE GRAVITY FLOW SYSTEM.

WHERE GRATED SURFACE STORMWATER SUMPS ARE USED GRADE SOIL/PAVING IN TOWARDS SUMPS IN ACCORDANCE WITH THE "BENCH" NOTES ON THIS PAGE. ALTERNATIVELY CONSTRUCT LINED SPOON DRAINS WITH 0.3% GRADIENT AS PER THE DETAILS ON ATTACHMENT SHEET PD1.

SUMP SIZES AND QUANTITY ARE DIAGRAMMATIC ONLY. ADDITIONAL AND/OR LARGER SUMPS MAY BE REQUIRED DEPENDING ON AREAS THEY SERVICE AND PAVEMENT TYPE USED.

USE THE "SUBSTITUTE" VERTICAL FLEXIBLE CONNECTION SET-UP AS SHOWN ON DETAIL SHEET SD1 WHERE DP's CONNECT INTO THE DRAINPIPE (THIS SET-UP **IS NOT** TO BE UTILISED IN A SEALED SYSTEM)

PARAMETERS FOR DESIGN:
(TO BE CONFIRMED BY THE BUILDER AS CORRECT PRIOR TO ANY COUNCIL APPROVALS BEING ISSUED):
- 25mm MAX DEEP REBATE
- PERIMETER PAVING SETDOWN 75mm BELOW UNDERSIDE OF REBATE (visual perimeter termite management provided to AS 3660)
- PERIMETER PAVING TO BE 1000mm WIDE
- PERIMETER PAVING CROSS-FALL AS PER "BENCH" NOTES

NOTE: THE ABOVE PAVING SETDOWN, WIDTH AND CROSS-FALL HAVE BEEN SPECIFIED IN ACCORDANCE WITH AS2870 – 2011, THE NCC AND ENGINEERING JUDGEMENT.
IF ANY OF THE ABOVE PARAMETERS ARE CHANGED/ALTERED OR SETDOWNS ARE DIFFERENT, A REVIEW OF THIS PLAN WILL BE NECESSARY.

TITLE: **SITEWORKS NOTES**

ADDRESS: No. 6 Daphne Street, KURRALTA PARK, SA

CLIENT: BERT FARINA CONSTRUCTIONS

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JOB No.	SHEET No.	ISSUE No.
C25269	2 of 2	–

DRAWN :	DESIGN:	DATE:
H.C.	D.A.	7-May-18

0 4 8 12
SCALE 1:200 METRES

No.	REVISION	BY	DATE

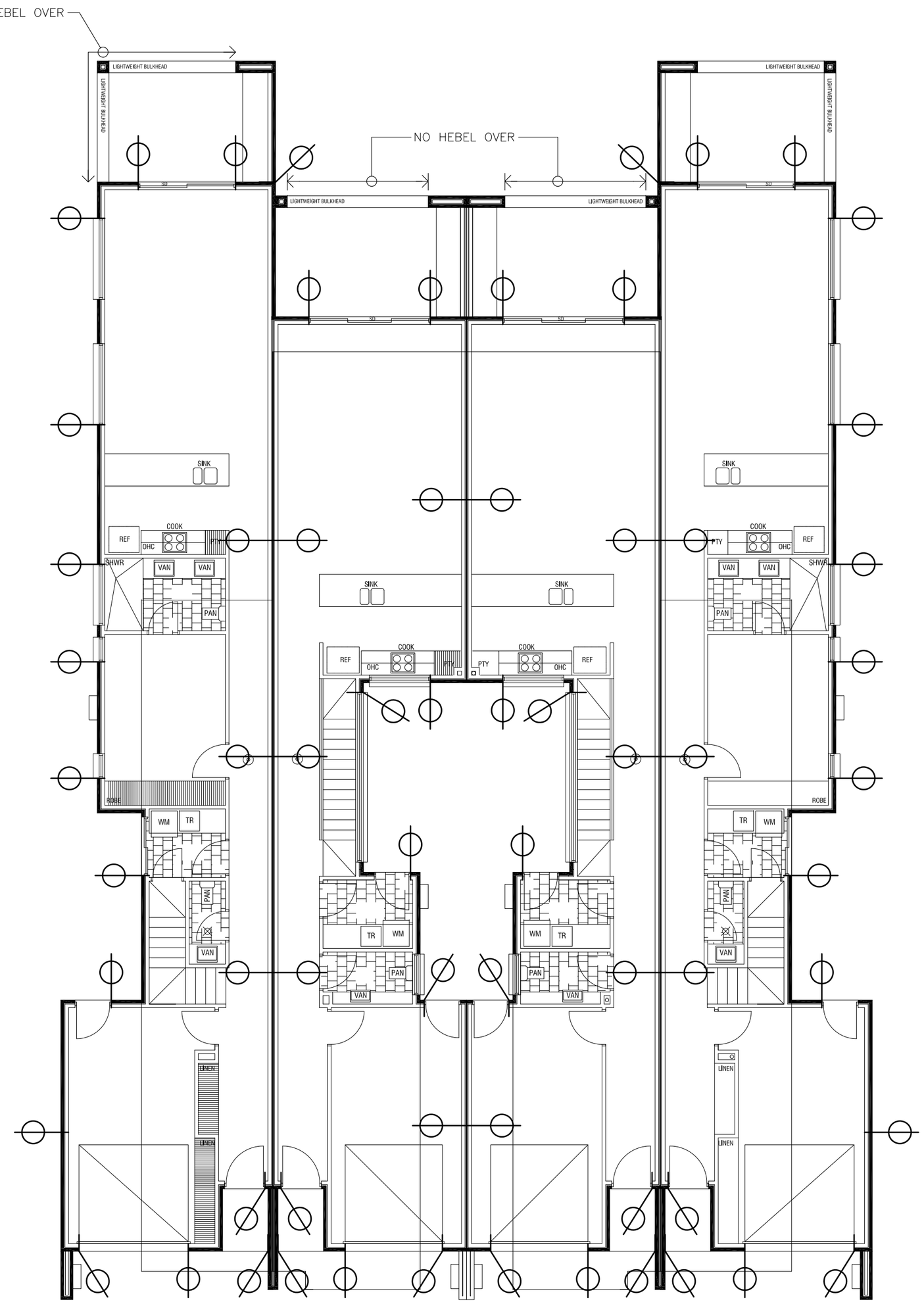
SITEWORKS NOTES

(THESE NOTES ARE TO BE READ IN CONJUNCTION WITH SITEWORKS PLAN – SHEET 1 OF 2)

KEY

TK	TOP OF KERB
WT	WATER TABLE
BL	BENCH LEVEL
FL	FLOOR (POURED) LEVEL
FFL	FINISHED FLOOR LEVEL (ie. tiled/paved/decking level)
IL	INVERT LEVEL (BOTTOM OF GRAVITY FLOW STORMWATER DRAIN PIPE SYSTEM)
T.O.S	TOP OF SUMP
EGS	EXISTING GROUND SURFACE LEVEL
FGL	FINISHED GROUND LEVEL
≈	APPROXIMATE
U.N.O.	UNLESS NOTED OTHERWISE
C.O.S	CHECK ON SITE
RD	ROLLER DOOR REBATE
DW	DRIVEWAY
FP	FOOTPATH
	FINISHED LEVEL
RWT	RAINWATER TANK
DPO	DOWNPIPE
RH	RAINWATER HEAD
SP	SPREADER PIPE
⊙	SCREW CAP STORMWATER INSPECTION POINTS IN GRAVITY FLOW/SEALED SYSTEM SW RUN (AS A MINIMUM) TO FINISHED PAVING/GROUND LEVELS (PROVIDE PROPRIETARY CONCRETE SURROUND AND LID WHERE FOUND IN DRIVEWAY).
RTW	RETAINING WALL
TRW	TOP OF RETAINING WALL
BRW	BOTTOM OF RETAINING WALL
	CONCRETE SLEEPER RETAINING WALL
	CONCRETE PLINTH AS REQUIRED OR SIMILAR

A2



DWELLING 1 | DWELLING 2 | DWELLING 3 | DWELLING 4

GROUND FLOOR PLAN

TITLE: ARTICULATION PLAN

ADDRESS: No. 6 Daphne Street, KURRALTA PARK, SA

CLIENT: BERT FARINA CONSTRUCTIONS

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JOB No.	SHEET No.	ISSUE No.
A25269	1 of 2	–

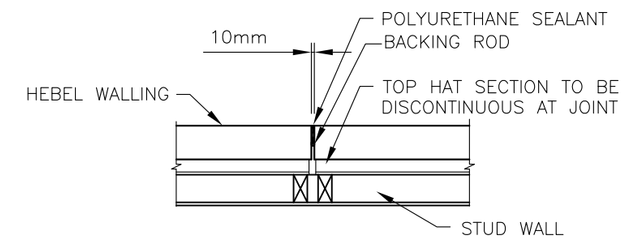
DRAWN :	DESIGN:	DATE:
H.C.	D.A.	7–May–18

No.	REVISION	BY	DATE

ARTICULATION JOINTS SHOWN ARE A MINIMUM ONLY. PROVIDE ADDITIONAL JOINTS AS SPECIFIED BY THE WALLING SYSTEM MANUFACTURE.

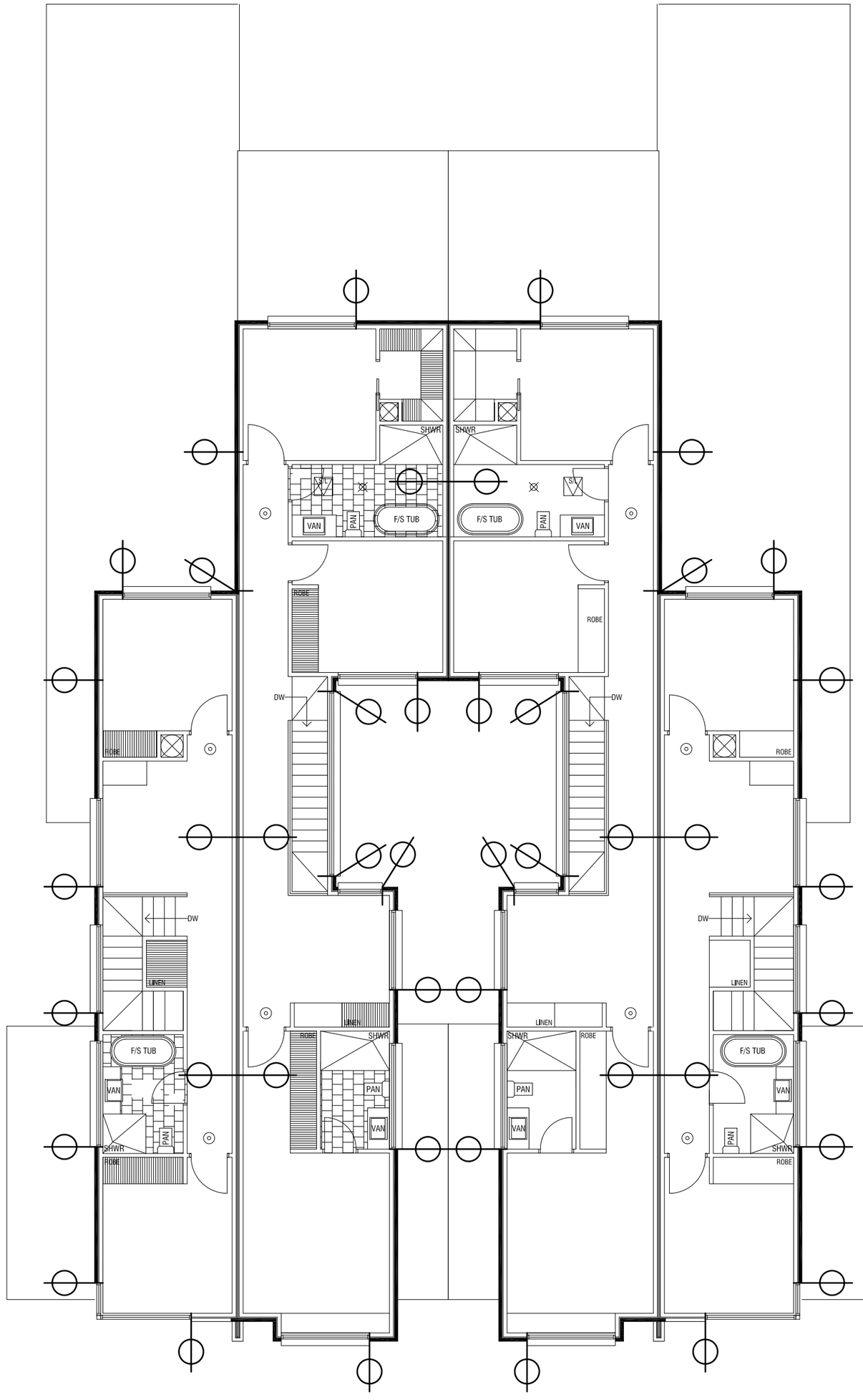
HORIZONTAL ARTICULATION JOINTS:– PROVIDE HORIZONTAL JOINTS AT 3m MAXIMUM CENTRES OR AT FLOOR JOIST LEVEL, WHICHEVER IS LESSER HEIGHT.

PROVIDE ADDITIONAL JOINTS TO THE PARTY WALL AS SPECIFIED BY THE WALLING SYSTEM MANUFACTURER.



ARTICULATION JOINT DETAIL
(HEBEL VENEER WALL)

A2



DWELLING 1 | DWELLING 2 | DWELLING 3 | DWELLING 4

UPPER LEVEL FLOOR PLAN

TITLE: ARTICULATION PLAN

ADDRESS: No. 6 Daphne Street, KURRALTA PARK, SA

CLIENT: BERT FARINA CONSTRUCTIONS

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JOB No.	SHEET No.	ISSUE No.
A25269	2 of 2	–

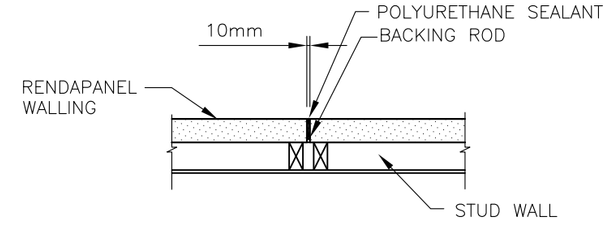
DRAWN : H.C. | DESIGN: D.A. | DATE: 7–May–18

No.	REVISION	BY	DATE

ARTICULATION JOINTS SHOWN ARE A MINIMUM ONLY. PROVIDE ADDITIONAL JOINTS AS SPECIFIED BY THE WALLING SYSTEM MANUFACTURE.

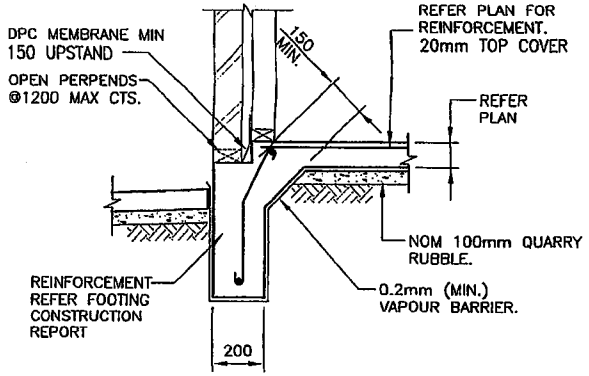
HORIZONTAL ARTICULATION JOINTS:– PROVIDE HORIZONTAL JOINTS AT 3m MAXIMUM CENTRES OR AT FLOOR JOIST LEVEL, WHICHEVER IS LESSER HEIGHT.

PROVIDE ADDITIONAL JOINTS TO THE PARTY WALL AS SPECIFIED BY THE WALLING SYSTEM MANUFACTURER.

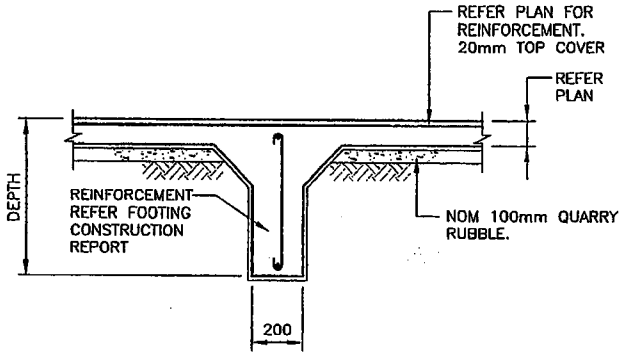


ARTICULATION JOINT DETAIL
(RENDAPANEL VENEER WALL)

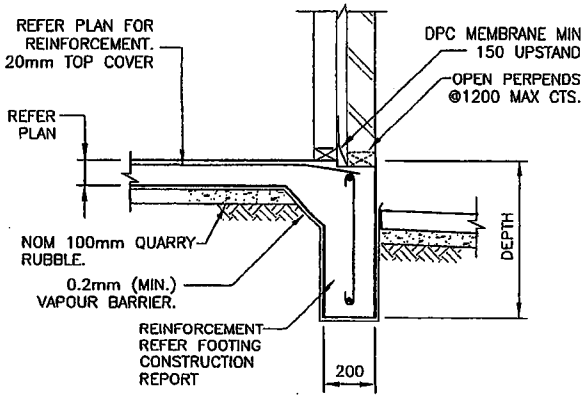
A3



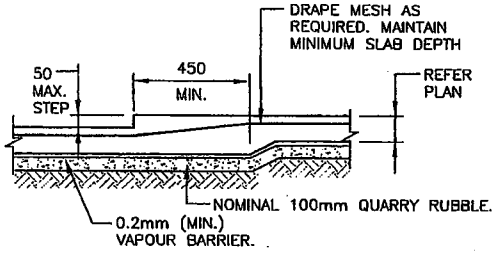
TYPICAL EXTERNAL FOOTING
(ONE BRICK COURSE MAXIMUM REBATE)



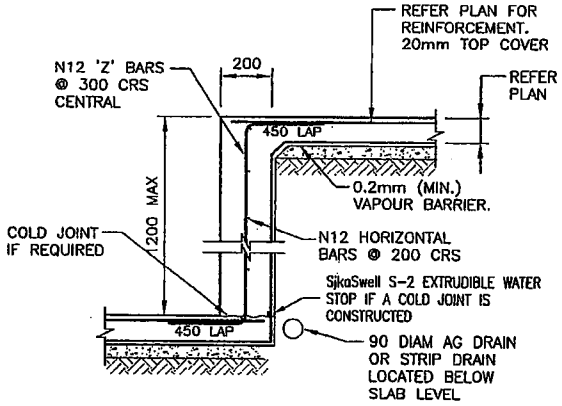
TYPICAL INTERNAL FOOTING



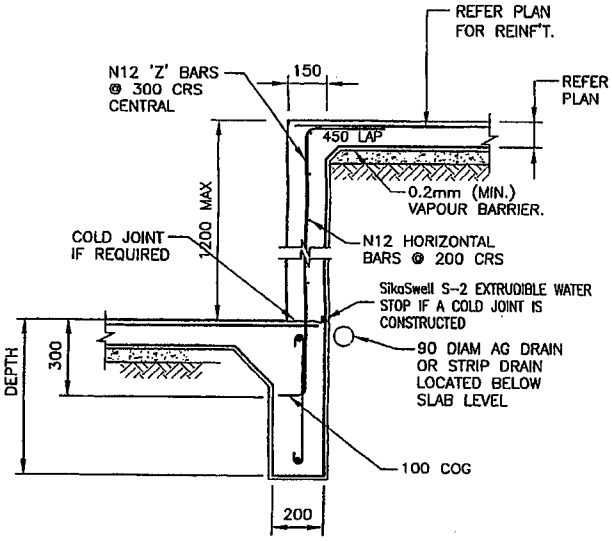
TYPICAL EXTERNAL FOOTING
(25mm MAXIMUM REBATE)



STEP IN SLAB
(50mm MAX STEP)



SLAB SPLIT DETAIL
(1200mm MAX STEP)



TYPICAL SPLIT DETAIL AT FOOTING BEAM LOCATION
(1200mm MAX STEP)

REINFORCEMENT LAPS						
BAR SIZE	N12	N16	N20	N24	N28	N32
TOP BAR	400	750	1200	1650	2150	2400
BOTTOM BAR	400	600	950	1300	1700	2000

No.	REVISION	BY	DATE

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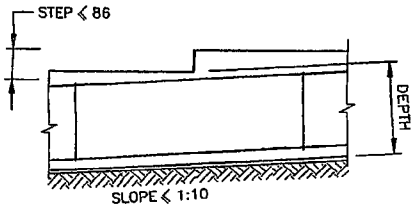
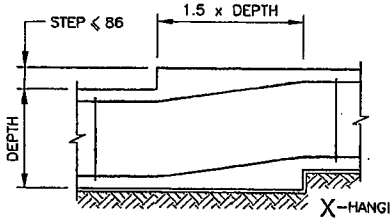
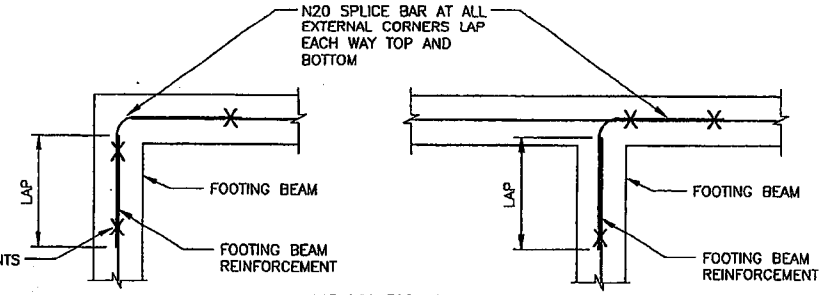
TITLE: GRILLAGE FOOTING DETAILS SHEET 1

DRAWN : D.A.	DESIGN: D.A.	DATE: 1-Jul-16
	SHEET No. GR1	ISSUE No. —

A3

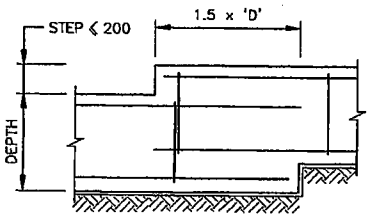


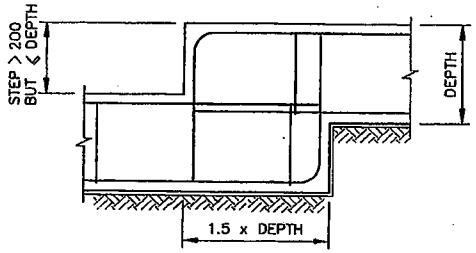


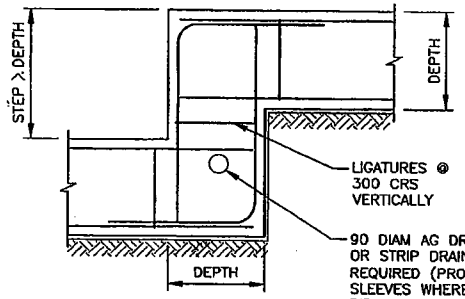


LAP 500 FOR N20 BARS
LAP 1000 FOR BARS > N20

SPLICE BAR DETAILS

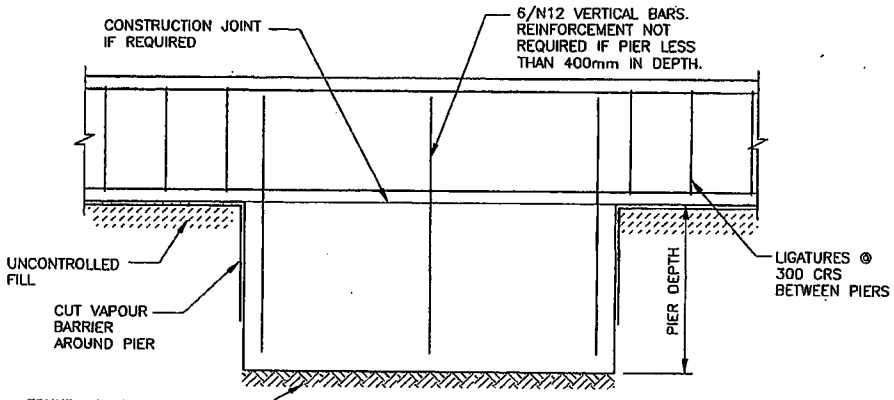




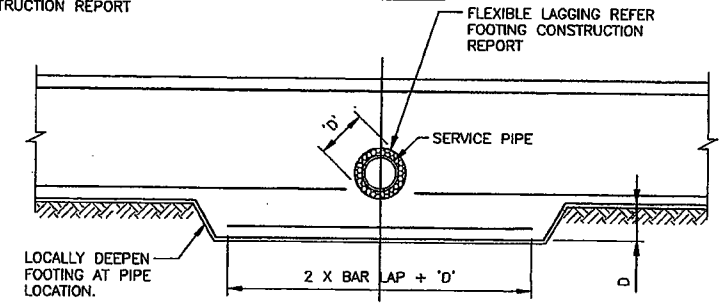


DROP PIER

TYPICAL STEPPED FOOTING DETAILS



PIER DETAIL



PIPE PENETRATION THROUGH FOOTING

REINFORCEMENT LAPS						
BAR SIZE	N12	N16	N20	N24	N28	N32
TOP BAR	400	750	1200	1650	2150	2400
BOTTOM BAR	400	600	950	1300	1700	2000

No.	REVISION	BY	DATE
A.	REVISE SPLICE BAR DETAIL TO SHOW HANGING POINTS	S.H.	09.05.14

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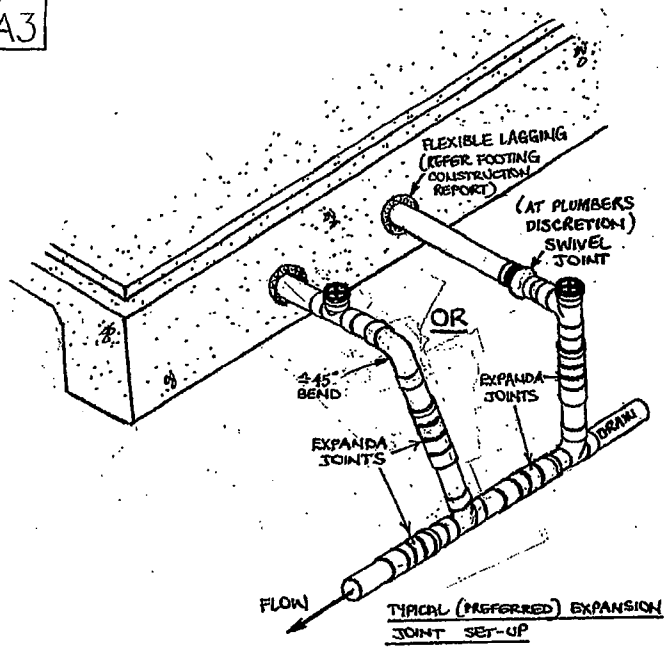
TITLE: GRILLAGE FOOTING DETAILS SHEET 2

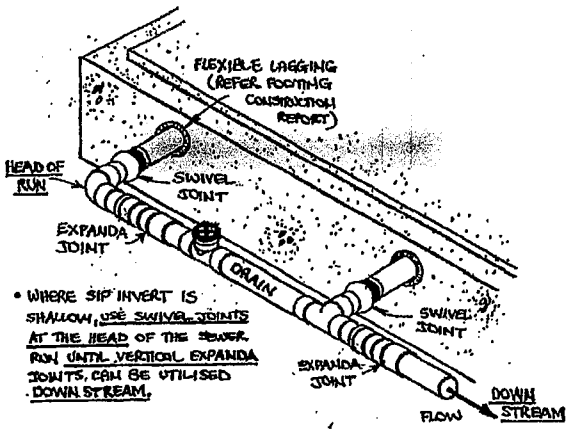
DRAWN : D.A. | DESIGN: D.A. | DATE: 15-Jun-16

SHEET No. CR2 | ISSUE No. A

A3

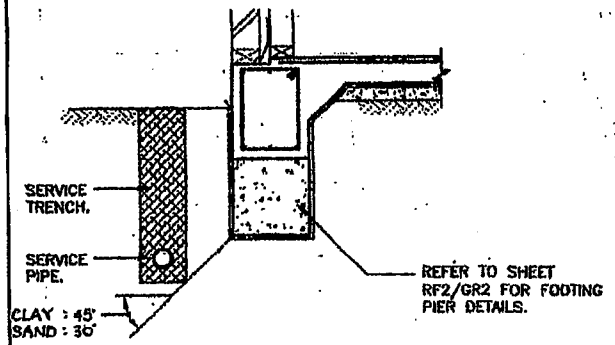


TYPICAL (PREFERRED) EXPANSION JOINT SET-UP

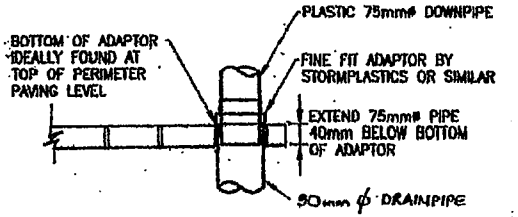


- WHERE SIP INVERT IS SHALLOW, USE SWIVEL JOINTS AT THE HEAD OF THE SEWER RUN UNTIL VERTICAL EXPANDA JOINTS, CAN BE UTILISED DOWN STREAM.

SHALLOW SIP INVERT SET-UP



FOOTING UNDERMINING DETAIL



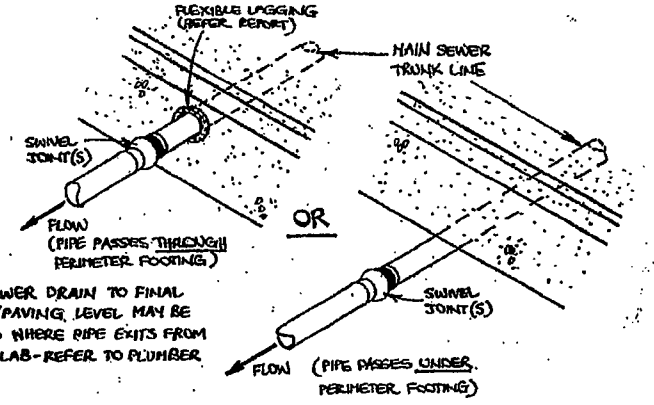
NOTE: (DETAIL ONLY APPROPRIATE TO BE INCORPORATED IN GRAVITY FLOW STORMWATER SYSTEM)

"SUBSTITUTE" VERTICAL FLEXIBLE CONNECTION

TO BE USED ONLY IN A SEALED SYSTEM OR WHERE DESIGNED BENCH LEVEL IS OF ADEQUATE HEIGHT TO DISCHARGE POINT TO ALLOW THESE TO BE USED IN A GRAVITY FLOW STORMWATER SYSTEM

STANDARD VERTICAL FLEXIBLE CONNECTION - BY STORMPLASTICS OR SIMILAR

TYPICAL 75mmø (PLASTIC) DOWNPIPE TO 90mmø DRAINPIPE CONNECTION ON "H" AND "E" SITES (AND TO BE USED ON OTHER SITE CLASSIFICATIONS IF SPECIFED IN REPORT)



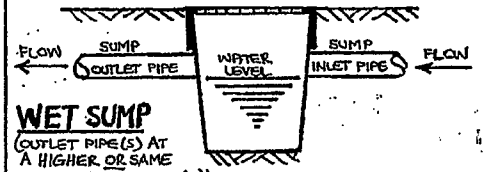
- IF IN SEWER DRAIN TO FINAL GROUND/PAVING LEVEL MAY BE REQUIRED WHERE PIPE EXITS FROM UNDER SLAB - REFER TO PLUMBER.

DETAIL WHERE MAIN SEWER TRUNK LINE HAS BEEN LAID UNDER THE SLAB AND EXITS AT PERIMETER FOOTING

- STORMPLASTICS OR SIMILAR FLEXIBLE CONNECTION TO SUIT "H-D", "E-D" OR "P" SITE (REFER TO MANUFACTURERS SPECIFICATIONS)

FLEXIBLE SEWER CONNECTION

JOINTS TO BE SPRINKLED WITH SULPHATE CRYSTALS AND THEN WRAPPED FOR 50mm EACH SIDE OF THE JOINT WITH DENSO TAPE.



WET SUMP
(OUTLET PIPE(S) AT A HIGHER OR SAME LEVEL AS INLET PIPE(S)) IE. PIPES NOT AT BASE OF SUMP

No.	REVISION	BY	DATE

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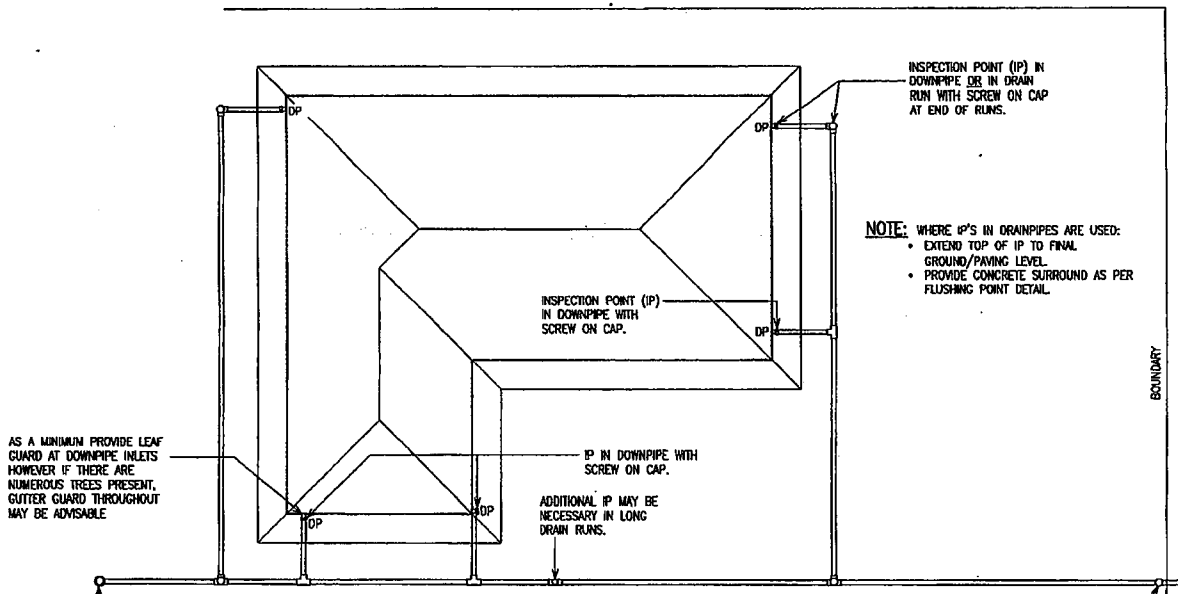
TITLE: SEWER AND DRAINAGE DETAILS

DRAWN	DESIGN	DATE
D.A.	D.A.	11-Oct-09

SHEET No.	ISSUE No.
S01	—

A3

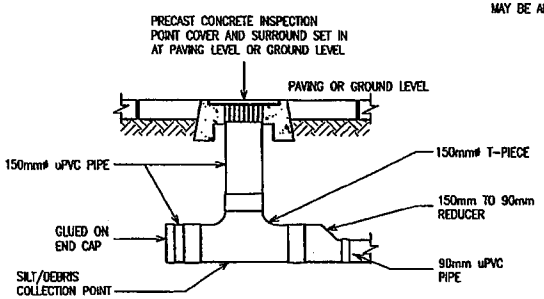
NOTES:
SEALED SYSTEMS SHALL:
- BE uPVC DRAIN AND DOWNPIPES ONLY THROUGHOUT (IE. NO SEAMED METAL DOWNPIPES OR FITTINGS TO BE USED.)
- BE CONSTRUCTED WITH SOLVENT WELDED JOINTS FOR uPVC PIPES.
- BE STATIC TESTED BEFORE TRENCHES ARE BACKFILLED.
- HAVE NO SURFACE STORMWATER DRAINAGE CONNECTED INTO THEM.
- BE MAINTAINED/FLUSHED BY THE OWNER ON A REGULAR BASIS.



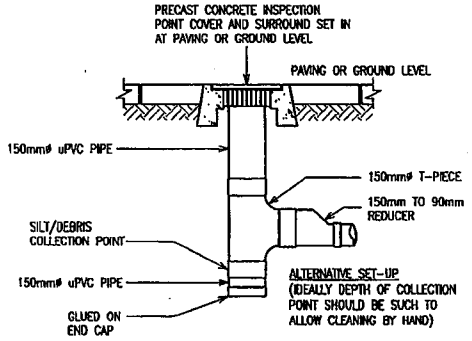
NOTE: WHERE IP'S IN DRAINPIPES ARE USED:
- EXTEND TOP OF IP TO FINAL GROUND/PAVING LEVEL.
- PROVIDE CONCRETE SURROUND AS PER FLUSHING POINT DETAIL.

ELEVATION ①
PLAN VIEW

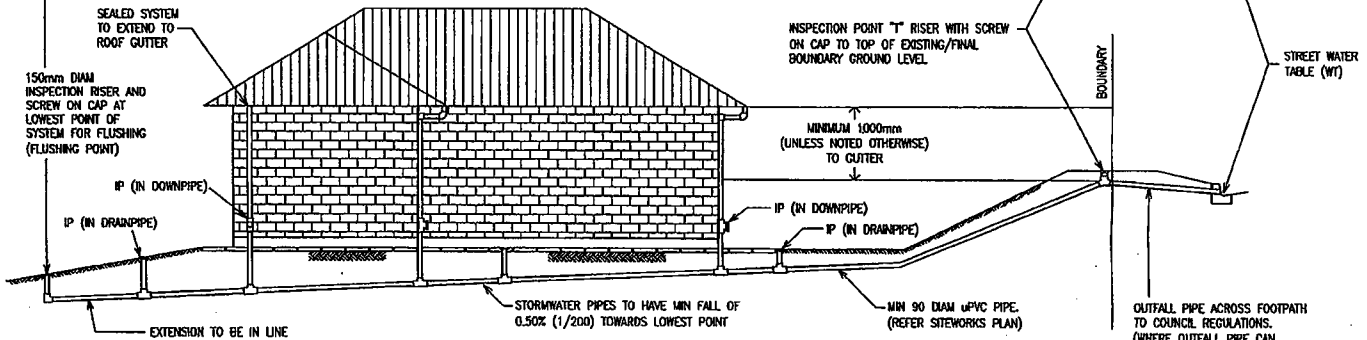
OPTION 1



OPTION 2



FLUSHING POINT DETAILS



ELEVATION ①

NOTE:
ON "FLAT" SITES WHERE A SEALED SYSTEM IS SPECIFIED, THE DRAIN PIPES MAY BE LAID WITHOUT ANY GRADE TO THE STREET WATER TABLE. IN THIS CASE A FLUSHING POINT MAY NOT ACTUALLY BE NECESSARY AS "FLUSHING" OF THE SYSTEM MAY BE ABLE TO BE ACHIEVED THROUGH THE IP's TO THE STREET – CONSULT DRAIN CONTRACTOR.

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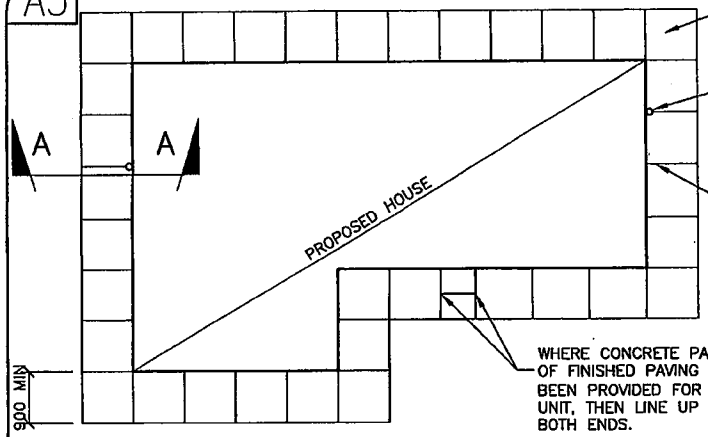
TITLE: SEALED SYSTEM (DIAGRAMATIC)

DRAWN : S.H	DESIGN: D.A.	DATE: 31-Oct-11
	SHEET No. SS1	ISSUE No. —

A3



PANEL LENGTH NOT TO EXCEED TWICE THE PANEL WIDTH.

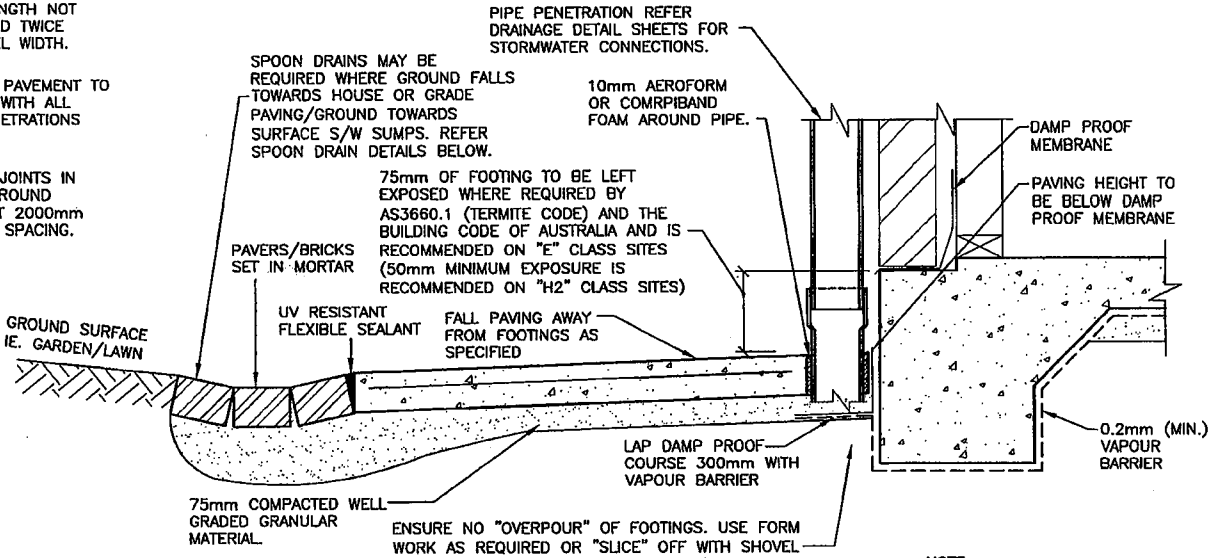
JOINT IN PAVEMENT TO LINE UP WITH ALL PIPE PENETRATIONS

PROVIDE JOINTS IN PAVING AROUND HOUSE AT 2000mm MAXIMUM SPACING.

WHERE CONCRETE PAD TO TOP OF FINISHED PAVING LEVEL HAS BEEN PROVIDED FOR IE. A/C UNIT, THEN LINE UP JOINTS AT BOTH ENDS.

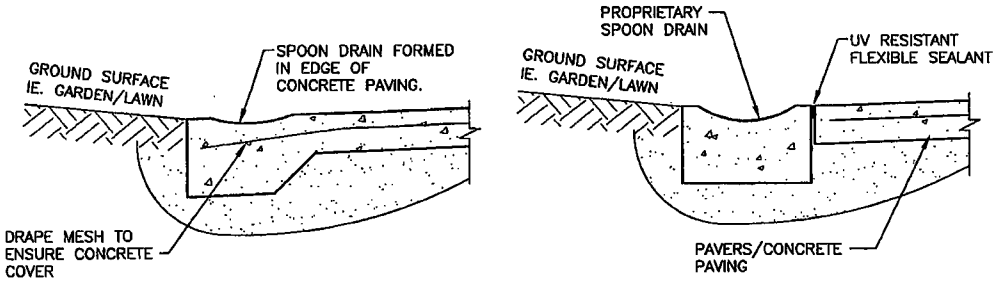
TYPICAL PAVING PLAN AROUND HOUSE

PAVING TO FALL AWAY FROM FOOTINGS AT A RATE OF
25mm IN 1000mm FOR CLASS S/M–D SITES
35mm IN 1000mm FOR CLASS H–D SITES
45mm IN 1000mm FOR CLASS E–D SITES
UNPAVED GROUND TO FALL AWAY FROM THE FOOTINGS AT A RATE OF 50mm IN 1000mm



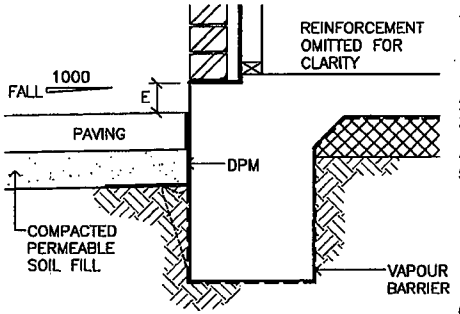
SECTION "A–A"

NOTE:
BRICK/BLOCK SEGMENTAL PAVING RECOMMENDED TO BE USED ON REACTIVE SITES AND WHERE EXTENSIVE DEEP EXISTING FILL HAS BEEN FOUND.



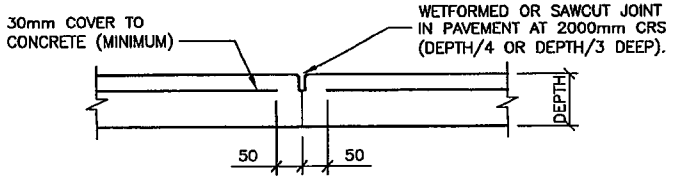
ALTERNATIVE SPOON DRAIN DETAILS

REFER TO AS3727.1–2016 GUIDE TO RESIDENTIAL PAVEMENTS "LIGHT" TRAFFIC CONDITION & THE GENERAL NOTES OF THIS REPORT.



SLAB EDGE DAMPNESS

1. PREVENT "OVERPOUR" OF CONCRETE BY LINING ANY COLLAPSED SIDES OF TRENCHES WITH FIBRE CEMENT SHEETING, FORMPLY, BOARD OR COMPACTED SOIL BACKFILLING BEHIND VAPOUR BARRIER DURING POUR.
2. FALL "CUT" BENCHING AWAY FROM THE FOOTING
3. TERMINATE VAPOUR BARRIER UNDER DPM OR "CUT" BENCHING
4. PLACE DPM BETWEEN PAVING AND FOOTING
5. MINIMUM EDGE EXPOSURE (E) OF 75mm MAY BE REQUIRED FOR TERMITE PROTECTION TO COMPLY WITH AS3660.1 AND IS RECOMMENDED ON "E" CLASS SITES. 50mm MINIMUM EXPOSURE IS RECOMMENDED ON "H2" CLASS SITES (THE GREATER THE EXPOSURE HOWEVER, THE GREATER THE OPPORTUNITY TO DRY OUT FROM THE OUTSIDE FACE.)
6. THE DPM (VISCOURSE DAMP PROOF MEMBRANE AS USED BY BRICKLAYERS) SHOULD SIT ON THE 'CUT' BENCH LEVEL FOR A MINIMUM OF 75mm. IT SHOULD THEN EXTEND UP THE FACE OF THE FOOTING TO END AT THE TOP OF THE PAVEMENT.



PAVING JOINT DETAIL

REINFORCEMENT TO COMPLY WITH TABLE 2 OF AS3727.1–2016 AND GENERAL NOTES OF THIS REPORT.

No.	REVISION	BY	DATE
A.	SLAB EDGE DAMPNESS DETAIL ADDED	M.O.	03.11.09
B.	GENERAL REVISION	S.H.	03.05.11
C.	GENERAL REVISION	S.H.	16.12.13
D.	CODE UPDATED	D.A.	17.10.17

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TITLE: PAVEMENT DETAILS

DRAWN : M.O.	DESIGN: D.A.	DATE: 11–Oct–09
	SHEET No. P01	ISSUE No. D.

Residential
Commercial
Industrial
Consulting Engineers

PROJECT:	No.6 Daphne Street, Kurralta Park				
CLIENT:	Bert Farina Constructions				
JOB NO:	25269	SHEET:	F.1	REV:	
DATE:	8/5/18	BY:	R.F	CHECK:	

FOOTING DESIGN:

SITE CLASSIFICATION = P (Tree)

SOIL CLASSIFICATION = E-D

y_s = 78mm

Δy_{se} = 28mm

BUILDING CONSTRUCTION:

No OF STOREYS = 2

ROOF CONSTRUCTION = Sheet

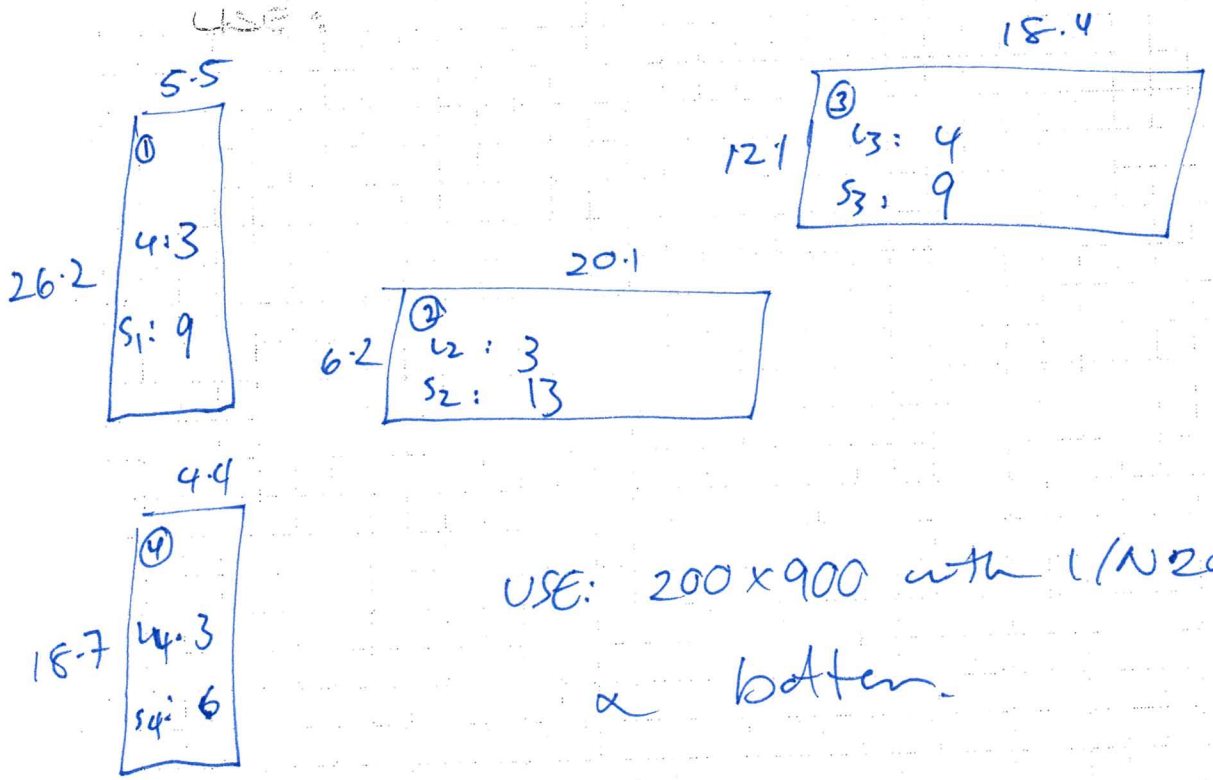
EAVES O/H = 0.0

WALL HEIGHT = 6.2m

WALL CONSTRUCTION = HEBEL.

(LL: 2.0kPa)

USE:



USE: 200×900 with 1/N20 top & batten.

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Code Oriented Raft Design (Version 8.0)
****

FOOTING DESIGN TO AS2870 - 2011
-- Raft Footing --

****
RECTANGLE 1 of 4 (26.2m x 5.5m)

THE FOLLOWING VALUES WILL BE USED:

External Wall Weight .....= 1.5 kPa
Internal Wall Weight .....= 0.5 kPa
Roof Type - Conventional
Roof Weight .....= 0.45 kPa
Roof Eaves Overhang .....= 0 m
Wall Height Internally .....= 6.2 m
Wall Height Externally .....= 6.2 m
Internal Wall Length .....= 0 m
Slab Live Load .....= 2 kPa
Deflection Ratio .....= 1 / 400
E conc. long term (max) .....= 15.48 GPa
Hs .....= 4 m
Footing design modified for tree effects - Yes

Ys .....= 78 mm

Yt .....= 28 mm

Ym tree (centre) --> 0.7Ys + Yt = 83 mm

Ym (edge) --> 0.5Ys .....= 39 mm

Footing design accounts for tree removal - No

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Job Number: 25269 Date: 08/05/2018 (16:48)

Code Oriented Raft Design (Version 8.0)
****

****
LOAD CALCULATION (Note: Footing self-weight is generated automatically)

External line load PE (kN/m)
- Wall load (6.2 x 1.5) .....= 9.30 kN/m
- Roof eaves load
  - Direction 1 (sides 1 & 3)
    (0 x (26.2 + 0 + 0) / 26.2 x 0.45) .....= 0.00 kN/m
  - Direction 2 (sides 2 & 4)
    (0 x (5.5 + 0 + 0) / 5.5 x 0.45) .....= 0.00 kN/m
- Footing self weight:-
  - Direction 1 (0.8 x 0.2 x 24) .....= 3.84 kN/m
  - Direction 2 (0.8 x 0.2 x 24) .....= 3.84 kN/m

- PE (Direction 1) .....= 13.14 kN/m
- PE (Direction 2) .....= 13.14 kN/m

Distributed internal load W (kPa)
- Roof load .....= 0.45 kPa
- Additional slab load .....= 0.00 kPa
- Internal walls (0 x 0.5 x 6.2 / (26.2 x 5.5)) .....= 0.00 kPa
- Slab self weight (0.1 x 24).....= 2.40 kPa
- Footing self weight:-
  - Direction 1 ((1 x 0.2 x (0.9 - 0.1) x 24) / 5.5 .= 0.70 kPa
  - Direction 2 ((7 x 0.2 x (0.9 - 0.1) x 24) / 26.2 = 1.03 kPa
- Live load .....= 2.00 kPa
- Sub Total (Omega) .....= 6.57 kPa

Longitudinal edge loads
- Direction 1 (2 x 13.14 / 5.5) .....= 4.78 kPa
- Direction 2 (2 x 13.14 / 26.2) .....= 1.00 kPa

- W (Direction 1) .....= 11.35 kPa
- W (Direction 2) .....= 7.58 kPa

Total distributed load Q (kPa)
- Omega .....= 6.57 kPa
- Line loads
  - Direction 1 (2 x 13.14 x 26.2) / (26.2 x 5.5) ...= 4.78 kPa
  - Direction 2 (2 x 13.14 x 5.5) / (5.5 x 26.2) ....= 1.00 kPa

- Q .....= 12.36 kPa

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Job Number: 25269 Date: 08/05/2018 (16:48)

Code Oriented Raft Design (Version 8.0)
****

****
RECTANGLE 2 of 4 (20.1m x 6.2m)

THE FOLLOWING VALUES WILL BE USED:

External Wall Weight .....= 1.5 kPa
Internal Wall Weight .....= 0.5 kPa
Roof Type - Conventional
Roof Weight .....= 0.45 kPa
Roof Eaves Overhang .....= 0 m
Wall Height Internally .....= 6.2 m
Wall Height Externally .....= 6.2 m
Internal Wall Length .....= 0 m
Slab Live Load .....= 2 kPa
Deflection Ratio .....= 1 / 400
E conc. long term (max) .....= 15.48 GPa
Hs .....= 4 m
Footing design modified for tree effects - Yes

Ys .....= 78 mm

Yt .....= 28 mm

Ym tree (centre) --> 0.7Ys + Yt = 83 mm

Ym (edge) --> 0.5Ys .....= 39 mm

Footing design accounts for tree removal - No

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Job Number: 25269 Date: 08/05/2018 (16:48)

Code Oriented Raft Design (Version 8.0)
****

****
LOAD CALCULATION (Note: Footing self-weight is generated automatically)

External line load PE (kN/m)
- Wall load (6.2 x 1.5) .....= 9.30 kN/m
- Roof eaves load
  - Direction 1 (sides 1 & 3)
    - (0 x (20.1 + 0 + 0) / 20.1 x 0.45) .....= 0.00 kN/m
  - Direction 2 (sides 2 & 4)
    - (0 x (6.2 + 0 + 0) / 6.2 x 0.45) .....= 0.00 kN/m
- Footing self weight:-
  - Direction 1 (0.8 x 0.2 x 24) .....= 3.84 kN/m
  - Direction 2 (0.8 x 0.2 x 24) .....= 3.84 kN/m

- PE (Direction 1) .....= 13.14 kN/m
- PE (Direction 2) .....= 13.14 kN/m

Distributed internal load W (kPa)
- Roof load .....= 0.45 kPa
- Additional slab load .....= 0.00 kPa
- Internal walls (0 x 0.5 x 6.2 / (20.1 x 6.2)) .....= 0.00 kPa
- Slab self weight (0.1 x 24).....= 2.40 kPa
- Footing self weight:-
  - Direction 1 ((1 x 0.2 x (0.9 - 0.1) x 24) / 6.2 ..= 0.62 kPa
  - Direction 2 ((11 x 0.2 x (0.9 - 0.1) x 24) / 20.1 = 2.10 kPa
- Live load .....= 2.00 kPa
- Sub Total (Omega) .....= 7.57 kPa

Longitudinal edge loads
- Direction 1 (2 x 13.14 / 6.2) .....= 4.24 kPa
- Direction 2 (2 x 13.14 / 20.1) .....= 1.31 kPa

- W (Direction 1) .....= 11.81 kPa
- W (Direction 2) .....= 8.88 kPa

Total distributed load Q (kPa)
- Omega .....= 7.57 kPa
- Line loads
  - Direction 1 (2 x 13.14 x 20.1) / (20.1 x 6.2) ....= 4.24 kPa
  - Direction 2 (2 x 13.14 x 6.2) / (6.2 x 20.1) .....= 1.31 kPa

- Q .....= 13.12 kPa

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Job Number: 25269 Date: 08/05/2018 (16:48)

Code Oriented Raft Design (Version 8.0)
****

****
RECTANGLE 3 of 4 (18.4m x 12.1m)

THE FOLLOWING VALUES WILL BE USED:

External Wall Weight .....= 1.5 kPa
Internal Wall Weight .....= 0.5 kPa
Roof Type - Conventional
Roof Weight .....= 0.45 kPa
Roof Eaves Overhang .....= 0 m
Wall Height Internally .....= 6.2 m
Wall Height Externally .....= 6.2 m
Internal Wall Length .....= 0 m
Slab Live Load .....= 2 kPa
Deflection Ratio .....= 1 / 400
E conc. long term (max) .....= 15.48 GPa
Hs .....= 4 m
Footing design modified for tree effects - Yes

Ys .....= 78 mm

Yt .....= 28 mm

Ym tree (centre) --> 0.7Ys + Yt = 83 mm

Ym (edge) --> 0.5Ys .....= 39 mm

Footing design accounts for tree removal - No

****

****
LOAD CALCULATION (Note: Footing self-weight is generated automatically)

External line load PE (kN/m)
- Wall load (6.2 x 1.5) .....= 9.30 kN/m
- Roof eaves load
  - Direction 1 (sides 1 & 3)
    - (0 x (18.4 + 0 + 0) / 18.4 x 0.45) .....= 0.00 kN/m
  - Direction 2 (sides 2 & 4)
    - (0 x (12.1 + 0 + 0) / 12.1 x 0.45) .....= 0.00 kN/m
- Footing self weight:-
  - Direction 1 (0.8 x 0.2 x 24) .....= 3.84 kN/m
  - Direction 2 (0.8 x 0.2 x 24) .....= 3.84 kN/m

- PE (Direction 1) .....= 13.14 kN/m
- PE (Direction 2) .....= 13.14 kN/m

Distributed internal load W (kPa)
- Roof load .....= 0.45 kPa
- Additional slab load .....= 0.00 kPa
- Internal walls (0 x 0.5 x 6.2 / (18.4 x 12.1)) .....= 0.00 kPa
- Slab self weight (0.1 x 24).....= 2.40 kPa
- Footing self weight:-
  - Direction 1 ((2 x 0.2 x (0.9 - 0.1) x 24) / 12.1 = 0.63 kPa
  - Direction 2 ((7 x 0.2 x (0.9 - 0.1) x 24) / 18.4 = 1.46 kPa
- Live load .....= 2.00 kPa
- Sub Total (Omega) .....= 6.95 kPa

Longitudinal edge loads
- Direction 1 (2 x 13.14 / 12.1) .....= 2.17 kPa
- Direction 2 (2 x 13.14 / 18.4) .....= 1.43 kPa

- W (Direction 1) .....= 9.12 kPa
- W (Direction 2) .....= 8.37 kPa

Total distributed load Q (kPa)
- Omega .....= 6.95 kPa
- Line loads
  - Direction 1 (2 x 13.14 x 18.4) / (18.4 x 12.1) ..= 2.17 kPa
  - Direction 2 (2 x 13.14 x 12.1) / (12.1 x 18.4) ..= 1.43 kPa

- Q .....= 10.55 kPa

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Job Number: 25269 Date: 08/05/2018 (16:48)

Code Oriented Raft Design (Version 8.0)
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****
RECTANGLE 4 of 4 (18.7m x 4.4m)

THE FOLLOWING VALUES WILL BE USED:

External Wall Weight .....= 1.5 kPa
Internal Wall Weight .....= 0.5 kPa
Roof Type - Conventional
Roof Weight .....= 0.45 kPa
Roof Eaves Overhang .....= 0 m
Wall Height Internally .....= 6.2 m
Wall Height Externally .....= 6.2 m
Internal Wall Length .....= 0 m
Slab Live Load .....= 2 kPa
Deflection Ratio .....= 1 / 400
E conc. long term (max) .....= 15.48 GPa
Hs .....= 4 m
Footing design modified for tree effects - Yes

Ys .....= 78 mm

Yt .....= 28 mm

Ym tree (centre) --> 0.7Ys + Yt = 83 mm

Ym (edge) --> 0.5Ys .....= 39 mm

Footing design accounts for tree removal - No

Licensed User: RCI Consulting Engineers
Job Number: 25269 Date: 08/05/2018 (16:48)

Code Oriented Raft Design (Version 8.0)
****

****
LOAD CALCULATION (Note: Footing self-weight is generated automatically)

External line load PE (kN/m)
- Wall load (6.2 x 1.5) .....= 9.30 kN/m
- Roof eaves load
  - Direction 1 (sides 1 & 3)
    - (0 x (18.7 + 0 + 0) / 18.7 x 0.45) .....= 0.00 kN/m
  - Direction 2 (sides 2 & 4)
    - (0 x (4.4 + 0 + 0) / 4.4 x 0.45) .....= 0.00 kN/m
- Footing self weight:-
  - Direction 1 (0.8 x 0.2 x 24) .....= 3.84 kN/m
  - Direction 2 (0.8 x 0.2 x 24) .....= 3.84 kN/m

- PE (Direction 1) .....= 13.14 kN/m
- PE (Direction 2) .....= 13.14 kN/m

Distributed internal load W (kPa)
- Roof load .....= 0.45 kPa
- Additional slab load .....= 0.00 kPa
- Internal walls (0 x 0.5 x 6.2 / (18.7 x 4.4)) .....= 0.00 kPa
- Slab self weight (0.1 x 24).....= 2.40 kPa
- Footing self weight:-
  - Direction 1 ((1 x 0.2 x (0.9 - 0.1) x 24) / 4.4 .= 0.87 kPa
  - Direction 2 ((4 x 0.2 x (0.9 - 0.1) x 24) / 18.7 = 0.82 kPa
- Live load .....= 2.00 kPa
- Sub Total (Omega) .....= 6.54 kPa

Longitudinal edge loads
- Direction 1 (2 x 13.14 / 4.4) .....= 5.97 kPa
- Direction 2 (2 x 13.14 / 18.7) .....= 1.41 kPa

- W (Direction 1) .....= 12.52 kPa
- W (Direction 2) .....= 7.95 kPa

Total distributed load Q (kPa)
- Omega .....= 6.54 kPa
- Line loads
  - Direction 1 (2 x 13.14 x 18.7) / (18.7 x 4.4) ...= 5.97 kPa
  - Direction 2 (2 x 13.14 x 4.4) / (4.4 x 18.7) ....= 1.41 kPa

- Q .....= 13.92 kPa

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Job Number: 25269 Date: 08/05/2018 (16:48)

Code Oriented Raft Design (Version 8.0)
****

Rectangle 1 of 4	DIRECTION 1	DIRECTION 2
L(m)	26.2	5.5
B(m)	5.5	26.2
P Edge (kN/m)	13.14	13.14
P Centre (kN/m)	0.00	0.00
W(kPa)	11.35	7.58
k(kPa/m)	1235.54	1235.54
Delta(mm)	30.0	13.8
No. of Beams	3	9
	CENTRE HEAVE	
Delta > Ymc ?	NO	NO
Edge Dist. (m)	2.794	2.794
M work (kNm/m)	66.57	43.85
I req(x10^6 mm4/m)	4271.78	573.02
	EDGE HEAVE	
Delta > Yme ?	NO	NO
Edge Dist. (m)	2.160	1.100
M work (kNm/m)	9.91	14.95
I req(x10^6 mm4/m)	181.68	213.31

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Job Number: 25269 Date: 08/05/2018 (16:48)

Code Oriented Raft Design (Version 8.0)
****

Rectangle 2 of 4	DIRECTION 1	DIRECTION 2
L(m)	20.1	6.2
B(m)	6.2	20.1
P Edge (kN/m)	13.14	13.14
P Centre (kN/m)	0.00	0.00
W(kPa)	11.81	8.88
k(kPa/m)	1311.70	1311.70
Delta(mm)	30.0	15.5
No. of Beams	3	13
CENTRE HEAVE		
Delta > Ymc ?	NO	NO
Edge Dist. (m)	2.794	2.794
M work (kNm/m)	69.72	52.32
I req(x10^6 mm4/m)	5052.38	778.91
EDGE HEAVE		
Delta > Yme ?	NO	NO
Edge Dist. (m)	2.160	1.240
M work (kNm/m)	12.43	19.77
I req(x10^6 mm4/m)	250.64	321.09

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Job Number: 25269 Date: 08/05/2018 (16:48)

Code Oriented Raft Design (Version 8.0)
****

Rectangle 3 of 4	DIRECTION 1	DIRECTION 2
L(m)	18.4	12.1
B(m)	12.1	18.4
P Edge (kN/m)	13.14	13.14
P Centre (kN/m)	0.00	0.00
W(kPa)	9.12	8.37
k(kPa/m)	1054.57	1054.57
Delta(mm)	30.0	30.0
No. of Beams	4	9
	CENTRE HEAVE	
Delta > Ymc ?	NO	NO
Edge Dist. (m)	2.794	2.794
M work (kNm/m)	63.63	64.60
I req(x10^6 mm4/m)	4700.57	2250.63
	EDGE HEAVE	
Delta > Yme ?	NO	NO
Edge Dist. (m)	2.160	2.160
M work (kNm/m)	0.87	0.59
I req(x10^6 mm4/m)	0.80	0.71

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Job Number: 25269 Date: 08/05/2018 (16:48)

Code Oriented Raft Design (Version 8.0)
****

Rectangle 4 of 4	DIRECTION 1	DIRECTION 2
L(m)	18.7	4.4
B(m)	4.4	18.7
P Edge (kN/m)	13.14	13.14
P Centre (kN/m)	0.00	0.00
W(kPa)	12.52	7.95
k(kPa/m)	1392.22	1392.22
Delta(mm)	30.0	11.0
No. of Beams	3	6
	CENTRE HEAVE	
Delta > Ymc ?	NO	NO
Edge Dist. (m)	2.794	2.794
M work (kNm/m)	71.07	34.62
I req(x10^6 mm4/m)	4919.31	354.13
	EDGE HEAVE	
Delta > Yme ?	NO	NO
Edge Dist. (m)	2.160	0.880
M work (kNm/m)	15.05	14.11
I req(x10^6 mm4/m)	324.86	161.18

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Job Number: 25269 Date: 08/05/2018 (16:48)

Code Oriented Raft Design (Version 8.0)
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TRIAL FOOTING PROPERTIES :-

Edge Beams:
Beam Width = 200 mm
Beam Depth = 900 mm
Reinforcement
- top = 1 x N28 bars, 40 mm cover
- bottom = 1 x N28 bars, 65 mm cover

Internal Beams:
Beam Width = 200 mm
Beam Depth = 900 mm
Reinforcement
- top = 1 x N28 bars, 40 mm cover
- bottom = 1 x N28 bars, 65 mm cover

Slab:
Thickness = 100 mm
Reinforcement
- layer 1 = 179 mm^2/m in both directions, 20 mm cover

Material Properties:
Fsy = 500 MPa
F'c = 20 MPa

A COMPARISON OF THE REQUIRED DESIGN PROPERTIES AND THOSE OBTAINED FOR THE ABOVE FOOTING SYSTEM IS TABULATED BELOW

- Note that where relevant, the properties are expressed in units per metre width of total footing cross section
- The I required values have been factored up to take account of the variation in the long term creep factor for concrete, refer to AS3600, clause 8.5.3.3

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Job Number: 25269 Date: 08/05/2018 (16:48)

Code Oriented Raft Design (Version 8.0)
****

RECTANGLE 1 of 4 (26.2m x 5.5m)

BEAM DEFLECTED SHAPE	CENTRE HEAVE		EDGE HEAVE	
	REQUIRED	ACTUAL	REQUIRED	ACTUAL
DIRECTION 1				
Moment of Inertia (x 10^9 mm^4/m)	4.272 (Ireq)	13.909 (Ieff)	0.182 (Ireq)	13.909 (Ieff)
Flexural Strength (kNm/m)	66.6 (M*)	168.3 (øMu)	9.9 (M*)	115.0 (øMu)
Ductility Check (kNm/m)	143.6 (1.5Mcr)	210.4 (Mu)	88.5 (1.5Mcr)	143.8 (Mu)
Flange Width (m)	External 1.375	Internal 2.75		
DIRECTION 2				
Moment of Inertia (x 10^9 mm^4/m)	0.573 (Ireq)	7.635 (Ieff)	0.213 (Ireq)	7.635 (Ieff)
Flexural Strength (kNm/m)	43.9 (M*)	93.1 (øMu)	14.9 (M*)	71.5 (øMu)
Ductility Check (kNm/m)	66.0 (1.5Mcr)	116.4 (Mu)	52.3 (1.5Mcr)	89.3 (Mu)
Flange Width (m)	External 0.75	Internal 1.3		

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Job Number: 25269 Date: 08/05/2018 (16:48)

Code Oriented Raft Design (Version 8.0)
****

RECTANGLE 2 of 4 (20.1m x 6.2m)

BEAM DEFLECTED SHAPE	CENTRE HEAVE		EDGE HEAVE	
	REQUIRED	ACTUAL	REQUIRED	ACTUAL
DIRECTION 1				
Moment of Inertia (x 10^9 mm^4/m)	5.052 (Ireq)	12.803 (Ieff)	0.251 (Ireq)	12.803 (Ieff)
Flexural Strength (kNm/m)	69.7 (M*)	155.7 (øMu)	12.4 (M*)	102.4 (øMu)
Ductility Check (kNm/m)	139.1 (1.5Mcr)	194.6 (Mu)	79.9 (1.5Mcr)	128.1 (Mu)
Flange Width (m)	External 1.55	Internal 3.1		
DIRECTION 2				
Moment of Inertia (x 10^9 mm^4/m)	0.779 (Ireq)	15.084 (Ieff)	0.321 (Ireq)	15.084 (Ieff)
Flexural Strength (kNm/m)	52.3 (M*)	181.6 (øMu)	19.8 (M*)	135.2 (øMu)
Ductility Check (kNm/m)	136.7 (1.5Mcr)	227.0 (Mu)	100.8 (1.5Mcr)	169.0 (Mu)
Flange Width (m)	External 0.82	Internal 1.44		

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Job Number: 25269 Date: 08/05/2018 (16:48)

Code Oriented Raft Design (Version 8.0)
****

RECTANGLE 3 of 4 (18.4m x 12.1m)

BEAM DEFLECTED SHAPE	CENTRE HEAVE		EDGE HEAVE	
	REQUIRED	ACTUAL	REQUIRED	ACTUAL
DIRECTION 1				
Moment of Inertia (x 10^9 mm^4/m)	4.701 (Ireq)	9.681 (Ieff)	0.001 (Ireq)	9.681 (Ieff)
Flexural Strength (kNm/m)	63.6 (M*)	122.8 (øMu)	0.9 (M*)	70.8 (øMu)
Ductility Check (kNm/m)	123.8 (1.5Mcr)	153.5 (Mu)	57.0 (1.5Mcr)	88.5 (Mu)
Flange Width (m)	External 2.016667	Internal 3.88		
DIRECTION 2				
Moment of Inertia (x 10^9 mm^4/m)	2.251 (Ireq)	13.001 (Ieff)	0.001 (Ireq)	13.001 (Ieff)
Flexural Strength (kNm/m)	64.6 (M*)	156.9 (øMu)	0.6 (M*)	103.7 (øMu)
Ductility Check (kNm/m)	140.2 (1.5Mcr)	196.1 (Mu)	80.9 (1.5Mcr)	129.6 (Mu)
Flange Width (m)	External 1.15	Internal 2.3		

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Job Number: 25269 Date: 08/05/2018 (16:48)

Code Oriented Raft Design (Version 8.0)
****

RECTANGLE 4 of 4 (18.7m x 4.4m)

BEAM DEFLECTED SHAPE	CENTRE HEAVE		EDGE HEAVE	
	REQUIRED	ACTUAL	REQUIRED	ACTUAL
DIRECTION 1				
Moment of Inertia (x 10^9 mm^4/m)	4.919 (Ireq)	16.166 (Ieff)	0.325 (Ireq)	16.166 (Ieff)
Flexural Strength (kNm/m)	71.1 (M*)	196.1 (øMu)	15.1 (M*)	142.8 (øMu)
Ductility Check (kNm/m)	152.6 (1.5Mcr)	245.1 (Mu)	106.9 (1.5Mcr)	178.5 (Mu)
Flange Width (m)	External 1.1	Internal 2.2		
DIRECTION 2				
Moment of Inertia (x 10^9 mm^4/m)	0.354 (Ireq)	6.546 (Ieff)	0.161 (Ireq)	6.546 (Ieff)
Flexural Strength (kNm/m)	34.6 (M*)	82.5 (øMu)	14.1 (M*)	66.2 (øMu)
Ductility Check (kNm/m)	52.5 (1.5Mcr)	103.1 (Mu)	46.8 (1.5Mcr)	82.8 (Mu)
Flange Width (m)	External 0.64	Internal 1.08		

FOR FOOTINGS USE :-

EXTERNALLY:- 200 mm (Wide) x 900 mm (Deep)
- With 2 /N28 Bars - 1 Top And 1 Bottom

INTERNALLY:- 200 mm (Wide) x 900 mm (Deep)
- With 2 /N28 Bars - 1 Top And 1 Bottom

GENERAL NOTES

1.0 GENERAL

It is the builder's responsibility to present a complete original copy of the footing construction report including any and all amendments made during the building contract to the owner on completion of the building contract. The builder shall also instruct the owner to read the Footing Construction Report carefully and in its entirety so that they may act upon matters pertaining to maintenance of their site after handover.

The builder is to ensure that it's representatives have read this report carefully and that all subcontractors are familiar with the appropriate sections of this report.

The Footing Construction Report is an important document and should be kept by the owner in a safe place and passed on to subsequent owners. The performance of the foundation and the structure supported on the foundation is dependent on the management of the site by the present and future owners. It is important to read this document thoroughly in order to be made aware of the consequences of making changes to site management that could jeopardise the long term serviceability of the building.

2.0 FOOTING PERFORMANCE

The owner should appreciate that on reactive clays it is not economical to design a footing system that will totally prevent movement. As a result this footing system has been designed with the aim of preventing cracking within the structure exceeding the damage category 2, as defined in AS2870, Appendix C, Tables C1 and C2. It must be noted that in the event of leaking water or sewer pipes or departure from the site management requirements this level of damage is likely to be exceeded.

If the owner wishes to reduce the level of movement within the footing system a stiffer design can be provided by contacting this office prior to the commencement of construction.

In classifying this site and designing the footing system the engineer has undertaken a site investigation (or used one provided by the client) along with knowledge of the performance of similar structures. The site investigation typically involves the taking of three core samples within the building area. It must be understood that it is impossible to discover all sub-surface anomalies which exist on the site while maintaining a cost effective soil investigation.

3.0 SITE PREPARATION

3.1 Clearing

Remove all grass, roots and organic material from the building site prior to construction. Where large trees exist within the building envelope they are to be removed as far in advance of commencement of construction as possible. Holes left by the removal of the tree roots are to be backfilled and compacted in accordance with section 3.3 of these notes.

3.2 Embankments

Treatment of sloping sites is to be in accordance with AS2870-1996 Section 6.4.4 and the notes below. AS2870 shall take precedence where any conflict arises.

The following table gives an indication of the maximum batter slopes which may be used for certain materials under the following conditions:

- bank height less than 1.5m;
- banks not subjected to traffic loads;
- natural ground slope less than 1 vertical to 5 horizontal;
- protection provided against damage due to surface erosion or ground water flow.

Material	Surface Slope
Heavy clay	1 vertical to 1 horizontal
Soft clay	1 vertical to 1.5 horizontal
Sands, cohesionless materials	1 vertical to 2 horizontal
Friable and sandy cohesionless soils	1 vertical to 1.5 horizontal
Weathered rock in good condition	1 vertical to 0.5 horizontal
Sound Rock	Nearly vertical

3.3 Site Filling

Only clean fill is to be used as filling material. Clean fill is defined as filling soil not containing excavated rock fragments, boulders or other solid objects (eg brickbats, concrete debris, etc.) of a size or frequency of inclusion so as to create an obstructive and/or impenetrable medium through which a conventional auger drilling rig could not pass.

Filling material is not to contain topsoil, plant root intrusions or any other organic matter.

Where suitable filling material can not be sourced from site (whether due to insufficient quantity, moisture content, reactivity, or contamination) quarry rubble or other approved granular materials may be substituted.

When filling is placed on a steeply sloping site (greater than 1 vertical in 8 horizontal), excavate a series of horizontal benched platforms into the natural soil prior to placing the fill. This will reduce the risk of downhill slip. The benching shall be carried out across the entire building envelope.

3.3.1 Uncontrolled Fill

Except where the footings have been designed as pier and beam construction uncontrolled fill is not to be used over the building site.

Where a pier and beam footing has been constructed the builder shall be responsible for providing a suitable level of compaction such that subsidence of patios, driveways, footpaths, carport and garage floors will not be excessive.

3.3.2 Rolled Fill

Rolled fill consists of material compacted in layers of repeated rolling by an excavator. Rolled fill shall not exceed 300mm and shall be compacted in layers of 150mm thick.

3.3.3 Controlled Fill

Controlled fill is clean fill compacted in accordance with the table below in layers dependent on the compaction equipment being used and having been tested and certified by a suitably qualified organisation in accordance with the requirements of AS3798 (Guidelines on earthworks for commercial and residential developments) and AS2870. The number of density tests required on a site is specified under Section 8.2 of AS3798.

The following table gives compaction requirements for different types of filling material.

The densities are expressed as a percentage of the maximum density of the particular material. The maximum dry density is as determined by Standard (Std) Compaction Test AS1289, Part 5.1.1 or Modified (Mod) Compaction Test AS1289, Part 5.2.1.

Filling Material	**Compaction** MIN	**Compaction Equipment**	
Crushed Rock Quarry Rubble Gravel / Sand	95% Mod	Smooth drum roller	Easy to compact near optimum moisture content (OMC 8-12%)
Fine Sands, Silts, Gravel	95% Std	Smooth drum vibrating roller	Not recommended as they are difficult to compact and their finished surface easily disturbed. Must be saturated to achieve compaction.
Clayey Silts, Fine Grained Soils (low plasticity)	95% Std	Sheep foot or smooth drum vibrating roller	Hard to compact except at optimum moisture content.
Silty Clays, Clays (high plasticity)	95% Std	Sheep foot roller	Heavy plant required but good compaction achieved when near optimum moisture content (OMC 12-20%)

3.4 Temporary Drainage

Temporary drainage is to be arranged prior to construction to divert run-off from, and prevent ponding near the construction area. This is to be maintained throughout the construction period until the permanent pavements and drainage are installed.

3.5 Working Surface Beneath Concrete Slab

Provide a working surface of compacted quarry rubble of a nominal thickness of 100mm. The material shall be free of sharp aggregates to avoid damaging the vapour barrier.

Where the specified footing is a standard raft system and a large tree or dwelling has recently been removed or demolished the soil beneath the slab should be carefully pre-wet. This can be achieved by watering the surface of the site with garden sprinklers for several hours daily. This is to take place for at least 7 days, and before footing excavations are commenced. Check with statutory authority for local regulations and restrictions regarding to pre-wetting of the site.

3.6 Temporary Excavations

Temporary excavations for services parallel to the edge of a slab shall not extend below a line drawn at 30º to the horizontal for sand of 45º to the horizontal for clay from the bottom edge of the edge beam or footings. Where excavations below this level are required the excavation shall be backfilled with controlled fill, no fines concrete or approved similar.

4.0 FOOTING CONSTRUCTION

4.1 Beam Excavations

Footing beams are to be formed or excavated to the sizes as specified in the Footing Construction Report, and in the locations as indicated on the footing plan. All beams are to be founded at least 150mm below finished surface level and 100mm into natural soil or Controlled Fill. Where a pier and beam footing system is designed the beams may be founded in the fill as long as piers as indicated on the footing plan are founded a minimum of 100mm into the natural soil or Controlled Fill. Please note the extent of piers indicated on the plan is a guide only and should be verified on site during construction or inspection of the excavations. Over excavation must not be backfilled, but filled with concrete at the time of pouring footings.

The minimum height of the slab above finished ground level shall be 150mm except in sandy well drained areas where the minimum height shall be 100mm. These minimum levels may have to be increased to suit selected Termite Risk Management requirements and minimum clearances from the top of the flood gully to finished floor level.

Beam excavations are to be in accordance with the standard details, with rebates and fillets where applicable, and adequate allowance for any steps in footings.

4.2 Termite Risk Management

Termite treatment is to be provided in accordance with AS3660.1.

4.3 Vapour Barrier

A vapour barrier shall be placed beneath the floor slab, lapped 200mm, taped and made waterproof. Continue the vapour barrier up the outside of the external footings to the top of the paving.

Where services penetrate the waterproof membrane the penetration is to be made waterproof by wrapping it in polythene and carefully taping it to the vapour barrier.

Puncturing the polythene membrane for any purpose may only be carried out if the penetration can be made fully waterproof by wrapping it in polythene and carefully taping it to the membrane.

4.4 Installation of Services

Services shall be installed as necessary. All buried drains and water pipes should be very carefully constructed since leakage of these can result in significant wetting and consequent swelling of the soil. Conversely, these services are to be designed and installed so that movements due to the natural movement of the soil will not result in leaks.

Wherever possible, these services should be located well clear of critical foundation elements. Where pipes pass through footings they can be located as shown on detail sheet SD1. Pipes are to be wrapped in closed cell polythene and taped. Where services penetrate the waterproof membrane the penetration is to be made waterproof by wrapping it in polythene and carefully taping it to the moisture barrier. Connections of stormwater drains and waste drains should include flexible connections, on Class H, E & P sites as shown on detail sheet SD1 & SD3.

4.5 Edge Rebates

Where raft/waffle footings are used it is a requirement to provide an edge rebate of 20mm minimum depth to the edge of the footing. A rebate is not required for timber framed or single leaf construction or construction on strip footings.

The edge rebate shall be flashed and drained. Weepholes are to be spaced at no greater than 1.2m centres. Weepholes shall be located above the finished ground and or pavement level. Any portion of a deepened rebate that cannot be drained shall be mortar filled (AS2870 Section 5.3.4(c)).

The external leaf of masonry is not to overhang the footing by more than 15mm.

4.6 Reinforcement

Sizes, grade, location and laps to reinforcement shall be as specified in the Footing Construction Report. Side and end laps to fabric shall be one full square (AS2870 Section 5.2.2 (b) and Figure 5.1). The reinforcement is to be placed in accordance with the standard detail for the particular footing and clear cover is to be as listed below:-

- 30mm where the concrete is protected by a vapour proof membrane in contact with the ground.
- 40mm where the concrete is in direct contact with the ground.
- 20mm for internal slab surfaces.
- 40mm for external surfaces (including sides of footings and the top of pavements/slabs)

At junctions of footings, bars are to extend to the outer bar of the other footing. Provide corner lap bars as shown on detail sheet RF2 or GF2 as appropriate.

Grillage footing beams shall have corner lap bars at all “T” and “L” intersections of the footing refer to detail sheet GR2.

4.7 Slab Thickening

Where the depth of clay fill exceeds 300mm or the depth of non clay fill exceeds 600mm the slab shall be reinforced with an additional bottom layer of SL72 mesh and shall be increased to 125mm thick (for a standard 4m x 4m grid).

Hot water heating pipes may be embedded in a slab provided the slab thickness is increased by 25mm and an increase made in the mesh of one level; for example, SL82 for SL72 and SL92 for SL82 (AS 2870 Section 5.3.6).

Where brittle floor coverings are to be used over an area greater than 16m squared, extra measures shall be taken to control the effect of shrinkage cracking. Such measures shall include one of the following:-

- The slab reinforcement shall be increased to SL92 throughout the effected area alternatively an additional sheet of slab mesh shall be placed over the affected area.
- The bedding system for brittle coverings shall be selected on the basis of the expected slab movement and the characteristics of the floor covering.
- The placement of floor coverings shall be delayed (at least 3 months).

Contact this office for additional information where polished floor slabs are to be used.

5.0 MATERIALS

5.1 Concrete

Concrete shall be supplied in accordance with AS 3600 – Concrete Structures Code. All concrete shall be N20 concrete having a minimum strength of 20MPa, 20mm nominal aggregate size and 100mm maximum slump, unless noted otherwise.

All concrete shall be placed and vibrated in accordance with AS3600 – Concrete Structures Code and good building practices.

Concrete in slabs must be adequately compacted, and slab surfaces, including edges, moist cured for 7 days.

After vertical surfaces are stripped of formwork, slab edges must be finished prior to curing.

Loading of concrete slabs with stacked materials or building plant must not occur for a minimum of 7 days after pouring although construction of wall frames and setting out brickwork may be undertaken during this period.

5.2 Reinforcement

Main beam reinforcement shall be one of the following types:

- deformed bars – grade N500 with (normal ductility)
- Ligatures shall be hard drawn wire, to be grade 500
- Fabric shall be hard draw wire with grade SL500 (low ductility)

Reinforcement shall be cleaned of loose rust, mud, paints and oils immediately prior to the concrete pour.

5.3 Vapour Barrier

The vapour barrier is to be branded continuously “AS2870 Concrete Underlay, 0.2mm high impact resistance”. Do not reuse discarded vapour barriers.

6.0 INSPECTIONS

A minimum of two inspections is advisable. One at completion of the footing excavations and the other after placement of the reinforcement and prior to the pouring of concrete.

One full working days notice is required for an inspection to be made.

Since full supervision will generally not be possible, it should be pointed out that it is the builder’s responsibility to ensure that:

- the layout dimensions are in accordance with the architectural drawings
- correct position of and cover to reinforcement is achieved and maintained throughout the pour
- the correct grade of concrete is used and specified slump range is not exceeded
- concrete is finished to the correct level, and to the appropriate standard of finish

The cost of inspections and certification are in addition to the cost of the Footing Construction Report. Fees will be quoted on application.

7.0 ARTICULATION

In order to design an economical footing design, articulation joints are provided in masonry buildings. These joints must not be omitted or varied without permission from the engineer. If a reduced number of articulation joints is preferred a stiffer footing system can be designed by contacting this office prior to commencement of construction.

8.0 DRAINAGE AND PLUMBING

Where construction of site drainage does not fall within the scope and extent of the building contract, it shall be the builder’s responsibility to give notice in writing to the owners instructing them that all site drainage work, as set out in the council approved documents, should be completed by the time the building contract is completed.

Drainage shall be designed and constructed to avoid water ponding against or near the footing. The ground in the immediate vicinity or the perimeter footing, including the ground uphill from the slab on cut/fill sites, shall be graded to fall 50mm minimum away from the footing over a distance of 1m (refer sheet PD1).

Plumbing trenches shall be sloped away from the house and shall be backfilled with clay in the top 300mm within 1.5m of the house. The clay used for backfilling shall be compacted. Where pipes pass under the footing system, the trench shall be backfilled with clay or concrete to restrict the ingress of water beneath the footing system.

Subsurface drains shall be free draining and shall be able to be inspected and maintained. Subsurface drains shall be protected by filters and geotextiles.

Closed-cell polyethylene lagging shall be used around all stormwater and sewer pipe penetrations through external footings. The lagging shall be a minimum of 20mm thick for Class H sites and 40mm thick for Class E sites. Sleeves allowing equivalent movements may be used as an alternative. Lagging is not required around vertical penetrations through slab panels. Lagging for Class A, S and M sites is to be 10mm thickness but does not necessarily need to be of a closed cell polyethylene type.

Service penetrations shall be permitted through the middle third of the footing. Where penetrations are made outside of this zone the footing shall be deepened as per the detail on detail sheet RF2 or GR2 as appropriate.

On H-D and E-D sites flexible connections shall be fitted to all stormwater and sewer pipes exiting the footing system. Refer to SD1, SD3 and the Siteworks plan provided as part of this Footing Construction Report

Where footings are located adjacent sewer / drainage or other excavations, the footings shall be piered / trenched such that a line drawn from the bottom of the footing / pier does not intersect the excavation (refer to detail on sheet SD1).

9.0 PAVING REQUIREMENTS

As a recommended guide, in-situ concrete pavements should have minimum thickness and reinforcement as follows.

Pedestrian Traffic	:	75mm reinforced with SL52 fabric top (20MPa minimum)
Vehicular Traffic	:	100mm reinforced with SL62 fabric top (20MPa minimum)

(Fabric to have 30mm top cover and 40mm end cover)

Control joints shall be provided as noted and detailed on detail sheet PD1.

The preferred width of perimeter paving is 900mm, however since dwellings can be constructed 600mm off boundaries then the minimum width of perimeter paving shall be 600mm in this instance. Paving shall have a crossfall as specified on detail sheet PD1.

Where concrete paving is being used on steep driveways, it may be advisable to use a broom finish to help facilitate an ‘anti skid’ finished surface.

In addition, it is advisable that brick/concrete pavers be utilised around the dwelling and for driveways on extremely reactive soils. i.e. of soil classification E-D and on sites where there is extensive existing uncontrolled fill where in both instances soil movement can cause damage to pavements. The use of pavers allows for simpler localised remedial work to be carried out if necessary.

Where the estimated soil heave is in excess of 40mm it is recommended that paving be constructed at the end of winter when the site soils are wet so that crossfalls constructed in the paving will not reduce. It is important however, if the house is occupied during a winter period and no paving is provided, that the soil surface around the perimeter of the house is maintained in a well drained state until such time as paving is installed. If it is necessary to construct paving on these sites at other times of the year it is recommended that a crossfall of 70mm be allowed.

The paving shall not be constructed above any damp-proof course or built-in damp-proof membrane (refer to the details on sheet PD1).

Where gaps occur between footings and the paving due to soil movement the gap may be sealed using a flexible mastic sealant.

10.0 LAWNS AND GARDENS

It is strongly recommended that all lawns and gardens be established as soon as possible after construction is completed. This should help to provide or form a uniform soil moisture environment around the building. It should be noted that changes to the garden and watering pattern in the proximity of the building may lead to changes in soil moisture content, and subsequent movement if the soil is reactive. This may lead to greater risk of cracking and damage to the superstructure.

The planting of trees close to buildings especially those likely to grow to a large size or with a high transpiration rate, should be avoided as these are likely to result in a considerable drying of the soil with consequential shrinkage. If existing trees close to the structure are preserved but subsequently die or are removed, wetting up and consequential expansion of the soil in the vicinity may occur. This may also lead to greater risk of cracking and damage to the superstructure.

To reduce but not eliminate the risk of damage to the dwelling from trees it is recommended that the planting of trees be restricted to a distance from the house of:-

- 1.5 times the mature height or the tree for Class E-D sites
- 1 times the mature height of the tree for Class H-D sites
- 0.75 times the mature height of the tree for Class M-D sites

Where rows or groups of trees are involved, the distance from the building should be increased.

11.0 CONDITIONS OF ACCEPTANCE OF THIS REPORT

The Engineer shall not be liable for any defect in, or damage to, the building (which includes the footing) arising from footing inadequacy or movement of the building, including its footing caused by, or contributed to, by any breach of the terms, conditions and recommendations of this report committed, permitted or allowed by the Client.

The client will comply and procure compliance in all respects and at all times with all terms conditions and recommendations contained in or attached to this Footing Construction Report