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CITY PLAN SERVICES

R/ 158202

$30.00

3 December 2004

The General Manager
Pittwater Council
PO Box 882
MONA VALE NSW 1660

Dear Sir/Madam

1148-1152 BARRENJOEY ROAD, PALM BEACH
DEVELOPMENT APPLICATION NO. N1229/00
CONSTRUCTION CERTIFICATE NO. 24-686

City Plan Services have issued a Construction Certificate under Part 4A of the Environmental Planning and Assessment Act 1979 for the above premises.

Please find enclosed the following documentation:

- Construction Certificate No. CC 24-686
- Copy of application for Construction Certificate.
- Documentation used to determine the application for the Construction Certificate as detailed in Schedule 1 of the certificate.
- Notice of Appointment of Principal Certifying Authority.
- Cheque for Council's registration fee.

Our client has been advised of the necessity to submit to Council the notice of commencement of building works 48 hours prior to the commencement of works.

Should you need to discuss any issues, please do not hesitate to contact the Project Building Surveyor Brendan Bennett on 8270-3500.

Yours Sincerely

Brendan Bennett
Managing Director
encl

TELEPHONE 8270 3500 LEVEL 1 364 KENT STREET WWW.CITYPLAN.COM.AU
FACSIMILE 8270 3501 SYDNEY NSW 2000 ABN 30 075 223 353

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1148-1152 Barrenjoey Road, Palm Beach
Construction Certificate No. 24686

TELEPHONE 8270 3500
FACSIMILE 8270 3501

LEVEL 1 364 KENT STREET
SYDNEY NSW 2000

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CONSTRUCTION CERTIFICATE NO. 24686

Issued under Section 81A(5) and Part 4A Sections 109C of the Environmental Planning and Assessment Act 1979

APPLICANT	
Name of person having benefit of the development consent:	**Raypond P/L**
Address:	**PO Box 1364 Dee Why 2099**
Contact Details:	**Phone: 0412 226 044 Fax: 9944 0316**
OWNER	
Name:	**Raypond P/L**
Address:	**PO Box 1364 Dee Why 2099**
Contact Details:	**Phone: 0412 226 044 Fax: 9944 0316**
DEVELOPMENT CONSENT	
Consent Authority/Local Government Area:	**Pittwater Council**
Development Consent No:	**N1229/00**
Date of Development Consent:	**24.01.02**
PROPOSAL	
Address of land on which the work is to be carried out:	**1148-1152 Barrenjoey Road, Palm Beach (Site 1)**
Building Classification:	**Class 1a**
Type of Construction:	**N/A**
Scope of building works covered by this Notice:	**Excavation/Civil Works**
Value of Construction Certificate (Incl GST):	**$650,000.00**
Plans and Specifications approved:	**Schedule 1**
Fire Safety Schedule:	**N/A**
Critical stage inspections;	**See attached Notice**
Exclusions:	**Construction of dwelling**
Conditions (Clause 187 or 188 of the Environmental Planning & Assessment Regulation 2000):	**Nil**
PROJECT BUILDING SURVEYOR	Please contact **Brendan Bennett** for any inquiries
CERTIFYING AUTHORITY	**Brendan Bennett** for and on behalf of **City Plan Services Pty Ltd**
ACCREDITATION BODY	**Planning Institute Australia NSW Accreditation Scheme** Registration No. 3004

That I, Brendan Bennett, as the certifying authority, certify that the work if completed in accordance with the plans and specifications identified in Schedule 1 (with such modifications verified by the certifying authority as may be shown on that documentation) will comply with the requirements of the Environmental Planning & Assessment Regulation 2000 as referred to in section 81A(5) of the Environmental Planning and Assessment Act 1979.

DATED THIS **3rd** **day of** **December** **2004**

Brendan Bennett
Managing Director

NB: Prior to the commencement of work S81A(2)(b)(i) and (ii) and (b2)(i) and (ii) and (iii) and (c) of the Environment Planning and Assessment Act 1979 must be satisfied.

M:\PROJECTS\CP2004\24-686\CC 24582 Lot 1.doc

TELEPHONE 8270 3500
FACSIMILE 8270 3501
LEVEL 1 364 KENT STREET
SYDNEY NSW 2000
WWW.CITYPLAN.COM.AU
ABN 30 075 223 353

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SCHEDULE 1
APPROVED PLANS AND SPECIFICATIONS

1. Endorsed Bushland Management plans prepared by Urban Bushland Management Consultants Pty Ltd

Plan Title	Drawing No	Revision	Date
Native Vegetation under 3m and Weed assessment	Diagram A	-	-
Revegetation and regeneration zones	Diagram B	-	-

2. Endorsed landscape plan prepared by Selena Hannan Landscape Design

Plan Title	Drawing No	Revision	Date
Landscape Plan	LP12	A	10.11.04

3. Endorsed stormwater and erosion plans prepared by Northern Beaches Consulting Engineers P/L

Plan Title	Drawing No	Revision	Date
Stormwater and erosion control plan	D01	-	Sept 2004
Stormwater and erosion control details	D02	-	Sept 2004
OSD Tank DT1 sections and details	D03	-	Sept 2004
Shoring sections	S12	-	Aug 2004
Anchor details	S13	-	Aug 2004

5. Endorsed structural plans prepared by Northern Beaches Consulting Engineers P/L

Plan Title	Drawing No	Revision	Date
General Notes & Drawing Schedule	S01	-	Aug 2003
Footing Plan and Details	S02	-	Aug 2003
Footing and Retaining Wall Details	S03	-	Aug 2003
Lower Level Framing Plan	S04	-	Aug 2003
Lower Level Framing Details	S05	-	Aug 2003
Mid Level Slab and Framing Plan and Details	S06	-	Aug 2003
Mid Level Slab and Framing Details	S07	-	Aug 2003
Upper Level Slab and Lower Roof Framing Plan	S08	-	Aug 2003
Upper Level Slab and Lower Roof Framing Details	S09	-	Aug 2003
Upper Roof Framing Plan	S10	-	Aug 2003
Lower and Upper Roof Framing Details	S11	-	Aug 2003

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6. Other documents relied upon

Title	Prepared By	Reference	Date
CC Application form	Darren Leete	-	02.12.04
Long Service Levy Receipt	LSPC	00032405	03.12.04
Letter of seed collection	GIS Environmental Consultants	-	25.01.02
Natural Resources Unit and Landscape Site Inspection	Pittwater Council	-	10.11.04
Tree Bond requirements letter	Pittwater Council	-	30.11.04
Proposed Method Statement for Excavation	Douglas Partners	35515C	16.03.04
Conditions of Consent Letter	Selena Hannan Landscape Design	-	13.11.04
Stormwater, siltation and sediment control and structural design certificate	Rick Wray	030705	15.11.04
Structural Certificate	Rick Wray	030702	15.11.04
Pre-Construction Arboricultural Assessment	Urban Forestry Australia	-	November 2004
Landscape Softworks Specification	Selena Hannan Landscape Design	-	November 2004
Bushland Management Plan	Urban Bushland Management Consultants	-	12.11.04

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NOTICE TO APPLICANT OF CRITICAL STAGE INSPECTIONS

Made under Part 4 of the Environmental Planning and Assessment Act 1979 Sections 81A(2)(b1)(ii)

PROPOSAL

Address of land on which the work is to be carried out:	**1148-1152 Barrenjoey Road, Palm Beach (Site 1)**
Description of building works covered by this Notice:	**Excavation/ Civil Works**

APPLICANT

Name of person having benefit of the development consent:	**Raypond P/L**
Address:	**PO Box 1364 Dee Why 2099**
Contact Details:	**Phone: 0412 226 044 Fax: 9944 0316**

RELEVANT CONSENTS

Development Consent No:	**N1229/00**
Date of Development Consent:	**24.01.02**
Construction Certificate No:	**CC 24-686**
Date of Construction Certificate:	**03.12.04**

INSPECTION TELEPHONE NUMBER

Please telephone the following number to book a critical stage inspection: Ph8270 3500
A minimum period of 48 hours is to be provided

CERTIFYING AUTHORITY	Brendan Bennett for and on behalf of CPS
ACCREDITATION BODY	Planning Institute Australia NSW Accreditation Scheme Registration No. 3004

MANDATORY CRITICAL STAGE INSPECTIONS

That I, Brendan Bennett, of City Plan Services located at Level 1, 364 Kent Street, Sydney acting as the principal citifying authority hereby give notice in accordance with Section 81A(2)(b1)(ii) of the Environmental Planning and Assessment Act 1979 to the person having the benefit of the development consent that the mandatory critical stage inspections identified in Schedule 1 & Schedule 2 are to be carried out in respect of the building work.

The applicant, being the person having benefit of the development consent is required under Section 81A(2)(b2)(iii) of the Environmental Planning and Assessment Act 1979 to notify the principal contractor (if not an owner-builder) of the applicable mandatory critical stage inspections specified under this notice.

To allow a principal certifying authority or another certifying authority time to carry out mandatory critical stage inspections, the principal contractor for the building site, or the owner builder, must notify the principal certifying authority at least 48 hours before building work is commenced at the site if a mandatory critical stage inspection is required before the commencement of the work in accordance with Clause 163 of the Environmental Planning & Assessment Regulation 2000.

Failure to request a mandatory critical stage inspections will prohibit the principal certifying authority under with Section 109E(3)(d) of the Environmental Planning and Assessment Act 1979 to issue an occupation certificate.

DATED THIS **3rd** **December** **2004**

Brendan Bennett
Managing Director

TELEPHONE 8270 3500 LEVEL 1 364 KENT STREET WWW.CITYPLAN.COM.AU
FACSIMILE 8270 3501 SYDNEY NSW 2000 ABN 30 075 223 353

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SCHEDULE 1
MANDATORY CRITICAL STAGE INSPECTIONS

NO.	CRITICAL STAGE INSPECTION	INSPECTOR
1.	At commencement of building work	Certifying Authority
2.	Prior to covering of waterproofing in any wet areas, for a minimum of 10% of rooms with wet areas within a building. At least **1** units are to be inspected.	Certifying Authority
3.	Prior to covering any stormwater drainage connections	Certifying Authority
4.	After the building work has been completed & prior to any occupation certificate being issued in relation to the building	Principal Certifying Authority

SCHEDULE 2
OTHER MANDATORY INSPECTION SPECIFIED BY THE PRINCIPAL CERTIFYING AUTHORITY

NO.	OTHER CRITICAL STAGE INSPECTIONS	INSPECTOR
	None have been specified in this instance	N/A

CB 24686

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CONSTRUCTION CERTIFICATE APPLICATION

Made under the *Environmental Planning and Assessment Act 1979*
Sections 81A(2), 109C(1)(b)

IDENTIFICATION OF BUILDING

Address Site 1

Lot, DP/MPS etc 1

Suburb or town PALM BEACH Post Code

DESCRIPTION OF DEVELOPMENT

Detailed Description: EXCAVATION / CIVIL WORKS

APPLICANT

Name Company RAYPOND P/L

Address C/- P.O. Box 1364

Suburb or town DEE WHY Post Code 2099

Phone B/H 0412 276 044 Fax No 9944 0316

Mobile 0412 276 044 Email darrenleete@ozemail.com.au

As the applicant, I/we hereby submit this Construction Certificate Application under the Environmental Planning & Assessment Act 1979, with City Plan Services Pty Ltd.

Signature of applicant: Sign Date 2/12/04

CONSENT TO ALL OWNER(S)

Name Company RAYPOND P/L

Address C/- P.O Box 1364

Suburb or town DEE WHY Post Code 2099

Phone B/H 0412 276 044 Fax No 9944 0316

Mobile 0412 276 044 Email darrenleete@ozemail.com.au

As the owner of the above property:
1. I/we consent to this application; and
2. I/we appoint Brendan Bennett of City Plan Services Pty Ltd as the Principal Certifying Authority for the building work identified in this application.

Signature of Owner Sign Date 2/12/04

TELEPHONE 9270 3500
FACSIMILE 9270 3501
LEVEL 1 384 KENT STREET
SYDNEY NSW 2000
WWW.CITYPLAN.COM.AU
ABN 30 075 223 353

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VALUE OF WORK

Estimated Cost of work: $ 650,000

GST: $

For developments over $5 million, a Quantity Surveyors Certificate verifying the cost must be submitted on lodgement of the application.

DEVELOPMENT CONSENT

Development Consent No: No. N1229/00

Date of Determination: Date ~~24 Aug 2000~~ 24 JAN 02
S% Modification 23 Aug 04

BUILDING CODE OF AUSTRALIA BUILDING CLASSIFICATION

Nominated on the Development Consent: Class 1a

RESIDENTIAL BUILDING WORK

Relevant only to residential building work

Owner-builder Permit No. _____
or
Name of Builder PAN CIVIL Pty Ltd
Address Unit 7 33-35 Stanley St Peakhurst
Telephone 9584 2122 Fax 9584 2209
Contractor License No. 125448C

REQUIRED ATTACHMENTS

- Note 1 details the information that must be submitted with an application for a construction certificate for proposed building works
- Note 2 details the additional information that may be submitted with an application for a construction certificate for proposed residential building work.

LONG SERVICE
BUILDING & CONSTRUCTION

3 December 2004

Building and Construction Industry
Long Service Payments Corporation
Ground Floor
cnr Donnison & Baker Streets
Gosford NSW 2250
Locked Bag 3000
Central Coast MC NSW 2252
Tel: 13 14 41
Fax: (02) 9287 5685
Email: info@lspc.nsw.gov.au
www.lspc.nsw.gov.au
ABN 93 646 090 808

BAYPOND DEVELOPMENTS P/L
PO BOX 1364
DEE WHY NSW 2099

Levy Receipt

Receipt No
00032405

Received from: (Name of person or organisation paying for levy) | the amount of

BAYPOND DEVELOPMENTS P/L	$1,300.00

Payment details:

Direct Deposit $1,300.00

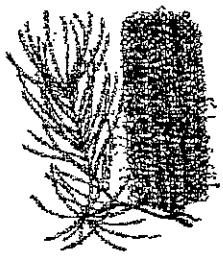
being payment for Long Service Levy as detailed below

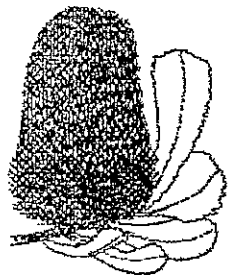
Levy Payment Form number	0273170
Council/Department/Authority	PITTWATER COUNCIL
C.C. Number	24686PCERT
Work address	LOT 1 1148-1152 BARRENJOEY ROAD PALM BEACH NSW 2108
Estimated value of work	$650,000.00
Levy payable (No exemption)	**$1,300.00**
Total levy paid	**$1,300.00**

Signed: (Signature of authorised person) | Date

Johnny Jack | 6 DEC 2004

40036





GIS Environmental Consultants

45 Austin Avenue, North Curl Curl 2099
Mobile Ph: 041 943 8672, Ph: (02) 9939 5129, Fax: 9401 715, Email: nicksk@mail.usyd.edu.au

Darren Leete
Raypond Developments, Salga Pty Ltd.
C/o Simon Thorne
Crone Associates
364 Kent St, Sydney

Date: 25 January 2002

Dear Darren,

I spoke to Grayham Mc Donald from Toona Rainforest Nursery in Mudgeeraba North NSW coast and Sally at Burringbah Rainforest Nursary. He said this species propagates from seed readily, and will germinate in 3-4 months. We will need to clean the flesh off the fruit and this is the only treatment needed.
In this species there is only one seed in each drupe (fruit). Birds are known to take the fruit.
In good conditions the trees are likely to be 8 cm high after 1 year.
I can get 4 plants that are 30 cm high that are grown from local stock from a local nursery.
It is my opinion that this species is unlikely to be able to be propagated by cuttings.

On the 23 of January we bagged unripe Black Plum fruit in situ and collected 200 fruit. See Photo 1. The bagging was to catch the fruit as they ripens and to prevent bird predation. See Photo 2. Some of the trees did not have any fruit. There is not viable seed in many of the fruit. The trees with bags were 102, 105 and 402. The trees where fallen seed was collected were 182 105 and 402.

We will harvest the bagged fruit and collect more fallen fruit in 2 weeks and send this new fruit to Tharwa.

This initial collection of fruit was divided into 2 parts and taken the next day to two nurseries, Wirreanda Nursery and Tharwa Propagation Nursery with instructions to grow the seed and phone GIS Environmental Consultants when they germinate.

When we are informed of the germination we will instruct the nurseries to transfer a total of approximately 100 plants to pricked to tube stock, then 90 tube stock to be potted up to 8 inch pots when ready.

I will ring you to let you know of progress at each stage of the process.

Yours sincerely

Nick Skelton

The first harvest of seed

Bagged branches with unripe fruit.

10 November 2004

Re: 1148 – 1152 Barrenjoey Road, Palm Beach, NSW
DCN1229/00 Lot 1 (House 1)
DCN1233/00 Lot 2 (House 2)
DCN1232/00 Lot 4 (House 4)
Development Consent for Construction of dwelling houses on proposed Lots 1, 2 and 4 (Houses 1, 2 and 4).

This is to confirm that an Officer from Natural Resources and a Landscape Officer from Pittwater Council have attended a site inspection with regards to item B7 of the above Conditions of Consent.

Attendees	Name, Signature and Date
Pittwater Council Landscape Officer	S. Hobley 11/11/04
Pittwater Council Natural Resources Officer	Eva Twarkowski, 10/11/
Client	
Consultants	Selena Hannan 10 & 11/11/04

Note: Eva took file note of dead, bonded trees:
T477, T489

Douglas Partners
Geotechnics · Environment · Groundwater

Douglas Partners Pty Ltd
ABN 75 053 980 117
96 Hermitage Road
West Ryde NSW 2114, Australia

FACSIMILE TRANSMISSION

e-mail: sydney@douglaspartners.com.au

Our Fax No: (02) 9809 4095
Our Phone No: (02) 9809 0666

	Organisation	Attention	Fax No
To	RAYPOND PTY LTD	DARREN LEETE	9844 0316
cc	*WARREN LAVIS*		*9979 6174*
From:	JOHN BRAYBROOKE	Date: 16/3/04	Total pages: 3

Subject: OBSERVATION POINT	Project No:

COPY OF AMENDED PROPOSED METHOD STATEMENT FOLLOWS.

REGARDS.....JCB

JCB:ss
Project 35515C
16 March, 2004

OBSERVATION POINT
PROPOSED METHOD STATEMENT FOR EXCAVATION AND SUPPORT OF BATTERS

1.	Clear Site.	Contractor (Pan Civil
2.	Peg top of batter.	Surveyor (Bowdens)
3.	Excavate test holes at 5 – 10 m centres (closer if necessary) to determine depth to extremely to highly weathered rock. **Hold Point**	Contractor + DP

4. If colluvium/residual soil ≤ 2.5 m thick to be supported by mesh reinforcement, shotcrete and M28 dowels at 2 m spacings.

   If colluvium/residual soil > 2.5 m thick design soil nailed (dowelled) or other support to be advised.

5. Depending on profile identified and 3 day weather forecast, open up to 10 m length (or such a length as can be supported on the same day) of face to a maximum depth of 2 m, cut at 1 horizontal to 5 vertical.

6. Douglas Partners to inspect during/following excavation.

7. Depending on exposed conditions either:
   - Install strip drains (as per above Drawings),
   - apply 60 mm shotcrete (if unstable face only),
   - stand and fix mesh,
   - install dowels/rock bolts,
   - install shotcrete depth pins,
   - apply remaining shotcrete.

8. Douglas Partners/Northern Beaches Consulting Engineers to inspect during and following installation.

9. Repeat process to top of very low to low strength rock (if necessary).

10. HOLD POINT – Douglas Partners to inspect and sign off on Form 35515C, if correctly stabilised at this point the probability of failure of the colluvium slope will be 'Unlikely' (i.e. the event might occur under very adverse circumstances with indicative annual probability of about 1×10^{-4}) **Note:** At this point continue to next stage of excavations if applicable.

11. HOLD POINT released – repeat items 6 to 9.

12. For cuttings which extend into very low to low strength rock, excavate a further 2 m – HOLD POINT.

13. Douglas Partners to inspect for adversely oriented joints/faults. If present, requiring dowels/bolts additional to those designed for joints dipping out of face at 60° specific additional bolting on Form 35515C/2 – HOLD POINT released.

14. Repeat items 6 and 7.

    If satisfactory repeat 11 to 13.

15. HOLD POINT on reaching base of cutting.

16. Douglas Partners/Northern Beaches to carry out final inspection for sign off on each cutting (Form 35515C/2).

Pittwater Council ABN 61 340 837 871

All Correspondence to be addressed to General Manager

Units 9, 11 & 12/ 5 Vuko Place
WARRIEWOOD NSW 2102
Avalon Customer Service Centre
59A Old Barrenjoey Road, AVALON 2107

Postal Address
P.O. Box 882
MONA VALE NSW 1660
DX 9018MONA VALE

Telephone (02)9970 1111
Facsimile (02) 9970 7150
Internet www.pittwaterlga.com.au
Email: pittwater_council@pittwater.nsw.gov.au

Matt Edmonds, Principal Officer - Development
8am to 6pm Mon - Thurs, 8am to 5pm Fri
Phone 9970 1162 Mobile 0417021314

30 November 2004

Darren Leete
Raypond
PO Box 1364
Dee Why NSW 2099

Dear Sir

Re: Tree Bond requirements – DA N1228/00; N1229/00; N1230/00; N1232/00; N1233/00

I refer to your letter dated 16 November 2004 and confirm that as the trees referred to in Condition C7 of Development Consents N1229/00; N1230/00; N1232/00; N1233/00 are the same trees as those referred to in Condition C1 of Development Consent N1228/00, and given you have already satisfied the bond requirement for these trees on 22/04/04 under Condition C1 (N1228/00) there is no need presently for you to submit further bonds for these trees. The existing bond paid on 22/04/04 will satisfy all tree bond requirements under these approvals whilst it is in place with Pittwater Council pursuant to Condition 1 of Consent N1228/00.

Yours faithfully

Matt Edmonds
Principal Officer – Development

SELENA HANNAN LANDSCAPE DESIGN

Landscape Design and Horticultural Consultation

Date: 13 November 2004

To: City Plan Services

Attention: Brendan Bennett

From: Selena Hannan

Re: **House 1, Observation Point, Palm Beach**
Construction Certificate Documentation

Dear Brendan,

To hopefully make it easier for you to find where the information is with regards to the Conditions of Consent, please find the following:

Refer to: Selena Hannan Landscape Design Landscape Plan LP12A and Landscape Softworks Specification for House 1, dated November 2004.

B4. Darren to provide

B5. Darren to provide

B7. Planting locations only are shown on Landscape Plan LP12. B8. Done. Letter attached to demonstrate compliance.

B9. Refer to Urban Forestry Australia Arboricultural Assessment House 1, dated November 2004 (hereon referred to as UFAAAH1).

B15. Refer to Bushland Management Report by Urban Bushland Management, dated November 2004 (hereon referred to as BMP).

B15a. As above

B16. Darren to provide

B17. Refer to notes on Landscape Plan and UFAAAH1, Section 3.

B18. Refer BMP. Refer Landscape Plan.

B19. Darren to provide

B20. Darren to provide

B22. Refer BMP

1/59 Central Road, Avalon, NSW 2107
Phone 02 9973 3247 Fax 02 9973 3247 Mobile 0403 041 187
Email selena@tech2u.com.au
ABN 33 990 514 397

B23. Refer to Landscape Plan and BMP. Note that 'Plant Mix X' IS the revegetation mix contained in the BMP. 'Plant Mix Y' is shown on the Landscape Plan.

B24. Refer to Landscape Plan and UFAAAH1.
B26. No juveniles worth transplanting on this site – info. to this effect contained in BMP.

B27. Refer to Landscape Plan, UFAAAH1 and BMP.

B28. Refer to Landscape Plan.

B29. Darren to provide

B45 and B45a. Refer Landscape Plan and Landscape Softworks Specification.
Item 9 is dealt with in LP12 and also in BMP, as this planting is in a bush reveg. area.
Item 12 is accommodated by the revegetation planting mix of the BMP, which allows for layered stratum. The plant list in the back of the BMP shows heights of shrubs and trees.
'Plant Mix E' is irrelevant as all revegetation planting is, by necessity, included in the BMP, and not specified or shown in the Landscape Plans.

B60. Darren to provide

B60a. Darren to provide

B61. Darren to provide

B64. Darren to provide

Please call me if you have any questions,

Yours sincerely,

Selena Hannan

1/59 Central Road, Avalon, NSW 2107
Phone 02 9973 3247 Fax 02 9973 3247 Mobile 0403 041 187
Email selena@tech2u.com.au
ABN 33 990 514 397

DIRECTORS
Stewart McGaed Rick Wray Lucas Molloy

15th November 2004

Raypond
C/O PO Box 1364
Dee Why NSW 2099

House 1, 1148 – 1152 Barrenjoey Rd, Palm Beach

Job N° 030702

With reference to the Stormwater design, Siltation and sediment control design, and the structural engineering design.

The above designs are in compliance with DA conditions :-
B19, B20, B29, B60, & B61 paragraph 1 & 2.

The above are also in compliance with the relevant Standards and BCA requirements.

I can be contacted as below, and would be happy to discuss any aspects of this project with you.

Yours Sincerely,

Rick Wray
B.E. C.P.Eng NPER Director

N:\ENG NBC\2003\030702\L001Certification.doc

Northern Beaches Consulting Engineers Pty Ltd Structural, Civil & Stormwater Engineers ACN 076 121 616 ABN 24 076 121 616
Suite 207, 30 Fisher Road Dee Why, NSW 2099 Tel 9984 7080 Fax 9984 7444 Email nbc@nbconsulting.com.au

Structural Certificate

Date: 15th November 2004 Job No. 030702
Engineer: Rick wray

HOUSE 1

Barrenjoey and Palm Beach Roads Palm Beach

We hereby certify that the following structural drawings have been designed in accordance with the Architectural plans by Crone Associates Architects.

Note : The deck extensions to mid level and minor alterations to the bed 1, laundry and void area to mid level are not yet included in the following set of structural plans.

Structural Drawings:
S01 - General Notes and Drawing Schedule
S02 - Footing plan and details
S03 – Footing & retaining wall details
S04 – Lower level slab & framing plan
S05 – Lower level framing details
S06 – Mid level slab & framing plan details
S07 – Mid level slab & framing details
S08 – Upper level slab & lower roof framing plan
S09 – Upper level slab & lower roof framing details
S10 – Upper roof framing plan
S11 - Shoring sections
S12 - Anchor details

Architectural drawings:
20006 / ADA1 0100 / D
20006 / ADA1 1001 / D
20006 / ADA1 1002 / D
20006 / ADA1 1701 / E
20006 / ADA1 2001 / D
20006 / ADA1 3001 / C
20006 / ADA1 0400 / B

We trust that this certificate meets with your requirements. Please contact the author if further clarification is required.

NB CONSULTING ENGINEERS P/L

Rick Wray
BE Cpeng NPER Director

Northern Beaches Consulting Engineers Pty Ltd Structural, Civil & Stormwater Engineers ACN 076 121 616 ABN 24 076 121 616
Suite 207, 80 Fisher Road Dee Why, NSW 2099 Tel 9984 7000 Fax 9984 7444 Email nb@nbconsulting.com.au

SELENA HANNAN LANDSCAPE DESIGN
Landscape Design and Horticultural Consultation

LANDSCAPE SOFTWORKS SPECIFICATION

HOUSE 1

LOT 1, OBSERVATION POINT
1148 – 1152 BARRENJOEY ROAD
AND 56 PALM BEACH ROAD
PALM BEACH

NOVEMBER 2004

To be read in conjunction with Landscape Plan,
Selena Hannan Landscape Design, LP12

1/59 Central Road, Avalon, NSW 2107
Phone 02 9973 3247 Fax 02 9973 3247 Mobile 0403 041 187
Email selena@tech2u.com.au

CONTENTS

Note: VEGETATION PROTECTION AND REMOVAL SPECIFICATION (dated 18 November 2002, by PITTENDRIGH SHINKFIELD BRUCE, was issued as part of contract set for CC for subdivision. Pages 2 – 5 inclusive have been referenced for use in this document for sections 2 to 9).

1.0 GENERAL

SCOPE
Planting works including tree and vegetation protection, soils, edging, plant and associated materials, planting, mulches, irrigation and establishment.

REFERENCED DOCUMENTS
AS 4419 (1981) Soils for Landscaping and Garden Use
AS 4454 (1997) Composts, Soil Conditioners and Mulches
AS 4373 (1996) Pruning of Amenity Trees

2.0 INSPECTION

NOTICE: Give sufficient notice so that inspection may be made of the following:

- Supervision of installation of protective fencing, tree trunk protection, root/ground protection and protection of natural rock features as shown on Landscape Plans.
- Supervision of all excavation works around trees to be retained and protected.

3.0 WORK NEAR TREES

GENERAL
All existing trees that are to remain undisturbed are indicated on the drawings and shall be adequately protected for the duration of the building works.

REQUIREMENTS
Storage of materials, mixing of materials, vehicle parking, disposal of liquids, machinery repairs and refuelling, site office and sheds, and the lighting of fires, stockpiling of soil, rubble or any debris shall not be carried out within the dripline of trees. No excavation or backfilling shall occur within the dripline of existing trees unless approved by qualified arborist. Trees shall not be removed or pruned unless specific instruction is given in writing by Superintendent. Should a tree or trees listed for retention be damaged or removed without prior consent in writing, a penalty may be applied. All tree protection works shall be carried out before excavation, grading and site works commence.
Contractor to refer to specific DA Conditions of Consent regarding consultants and others required to attend site to approve installation of tree protection measures, and ensure adequate notice is given for them to attend.

PROTECTION
Protect trees specified or shown to be retained from damage by groundworks with temporary Protective Fencing (Refer **PROTECTIVE FENCING, TRUNK PROTECTION, GROUND PROTECTION**). Take necessary precautions, including the following:

- Harmful materials: Do not store or otherwise place bulk materials and harmful materials under or near trees. Do not place spoil from excavations against tree trunks. Prevent wind-blown materials such as cement from harming trees and plants.
- Damage: Prevent damage to tree bark. Do not attach stays, guys and the like to trees, unless specifically instructed to do so as a temporary stability measure.
- Work under trees: Do not add or remove topsoil within the dripline of trees. If it is necessary to excavate within the dripline, use hand methods such that root systems are preserved intact and undamaged. Open up excavations under tree canopies for as short a period as possible.
- Roots: Do not cut tree roots exceeding 50mm diameter unless permitted by qualified consulting arborist. Where it is necessary to cut tree roots, use means such that cutting does not unduly disturb the remaining root system. Immediately after cutting with a clean sharp instrument, the tree should be watered and treated with a liquid rooting hormone to stimulate the production of new roots. Examples include Formula 20® or Hormone 20®.

- Compacted ground: Avoid compaction of the ground underneath trees.

WARNING SIGN
Display a sign in a prominent position near the entrance to the site warning that trees and plantings are to be protected during the Contract period. Lettering shall be road sign-type sans-serif letters, 100mm high in red or black on a white background, to AS 1744. Remove sign on completion of works.

4. PROTECTIVE FENCING

Refer Landscape Plan for location. Trees and vegetation to be retained throughout the site must be protected by stout fencing or have trunk protection installed, enclosing a sufficient area so as to prevent damage to the critical root zone and the trunk. Fencing should be erected before any materials are brought onto the site or before any site works, civil works or construction is commenced and shall remain in place for the duration of the building works. The fences are to be erected as indicated on plans and should be erected to enclose the Primary Root Zones, where practicable. (Primary Root Zone = DCH x 9 (Diameter at Chest Height) expressed as a radius from the trunk). The fence should comprise:

- 2.1m high steel star pickets, driven 0.4m into the ground.
- Run three strands of fencing wire through top, central and lower positions of pickets.
- Fix hinged ring lock wire mesh to stranded wires already in place through star pickets.
- Fix orange safety mesh to hinged ring lock mesh to full height of fence.
- No storage of building materials, tools, paint, fuel or contaminants shall occur within the fenced area.
- Ropes or ties shall not be attached to any part of the trees.

Where construction works are to be carried out upslope of protected, fenced areas, the protective fencing shall incorporate sediment control fencing installed to manufacturer's instructions (ie silt/sedimentation cloth partially buried and securely attached to base of wire mesh fencing) to create a barrier at ground level to potentially contaminated run-off or excess silt).

Advise contractors and visitors to the site of the purpose for fencing and protecting the trees by the placement of suitable warning signs on fences.

5.0 TRUNK PROTECTION

Where space does not permit the placement of protective fencing as instructed by arborist or as shown on plans, install trunk protection to individual trees. Trunk protection shall be by the placement of 2.0 metre lengths of 50mm x 100mm hardwood timbers spaced at 150mm centres and secured by 10-guage wires on steel straps at 300mm centres. Place hessian padding to ends of battens to prevent damage to bark. The trunk protection shall be maintained intact until the completion of building works.

6.0 GROUND PROTECTION

Where construction occurs close to or beneath the dripline of trees to be retained, or as instructed by arborist, it shall be necessary to install ground protection to avoid compaction of the ground surface, lateral and absorbing roots. Where machinery is used close to or beneath the dripline of trees to be retained the ground is to be protected by way of an elevated timber platform supported clear of the ground on horizontal timber planks or scaffolding.

7.0 PROTECTION OF ROCKS

Where rocks to be retained and protected are located outside of the line of Protective Fencing, place recycled carpet or carpet underlay over faces of rock outcrops to prevent mechanical damage or surface defacement by accidental spillage of paints, concrete etc.

Weight protective material temporarily with concrete blocks to prevent movement. Carpet may then be pegged into adjacent ground if this will not cover or damage vegetation. Fix into ground by means of U-shaped steel pegs, minimum 450mm long, as many as required to fix in place.

8.0 VEGETATION TO BE REMOVED

MARKING
Trees to be removed are to be marked with yellow spray paint on tree trunk approx. 1000mm above ground level. All other trees are to be retained for the duration of the works. **Do not confuse yellow spray paint with the yellow tape with tree identification number written on it.**
Trees to be retained are marked with green tape.
Trees to be retained and bonded are marked with both green tape and CAUTION tape.

REMOVAL
All felling, root removal and pruning is to be carried out in strict accordance with **Australian Standard AS4373 –Pruning of Amenity Trees** and **Occupational Health and Safety Act 2001.** The arborist should be fully insured. No tree or trees are to be removed or pruned unless written approval/permission is given by Council.

No work is to commence until all works as specified in Bush Management Plan as having to be done prior to construction are completed, ie translocation of tagged plants.

WORK ON TREES
If it is necessary to perform any work on trees to be retained, notify Superintendent.

REPAIR
Should existing trees to be retained be damaged by the works, make good any damage and undertake tree surgery. All work shall be carried out under the supervision of an approved tree surgeon.

REMOVAL
If repair work is impracticable, or is attempted and is rejected, remove the tree and root system if directed, make good, and either replace the tree with a replacement tree of the same species and similar size, or pay damages.

DAMAGES
If replacement is not approved, damages may be liable to be paid. Refer to the specific DA Conditions of Consent.

9.0 CLEARING AND GRUBBING

GENERAL
The work to be executed under this specification consists of the clearing of vegetation both living and dead, all man-made structures, all rubbish and other materials that are unsuitable for use in the works and the grubbing of trees and stumps, from the areas to be landscaped, unless otherwise noted on Landscape Plan. It does not include any work in any areas that are located behind the Protective Fencing, eg areas of bush revegetation or bush regeneration.
The work includes the disposal of all material that has been cleared and grubbed.
In advance of clearing works, effective erosion and sedimentation control measures shall be implemented as required, as per documentation by others.

CLEARING
The area to be cleared is defined as being enclosed by the line of Protective Fencing shown on the drawings, (generally incorporating the building footprint, an area adjacent to the building footprint for construction access, and an area to the north of the footprint). All operations shall be planned, and protective measures to be taken as itemised elsewhere in this specification, to ensure that there is no damage to trees and vegetation outside the approved limits of clearing.

GRUBBING
All trees and stumps within the limits of clearing, that are unable to be felled and removed by the clearing methods used by the Contractor without threatening to, or directly damaging trees or tree root systems of trees to be retained, shall be removed by use of a manually portable stump grinder. Grubbing operations are to be carried out to a depth of 500mm below the natural surface. Promptly backfill grubbed holes with inert sand where the hole is located in an area subject to landscaping.

DISPOSAL OF MATERIALS
Unless otherwise specified, all materials cleared and grubbed shall become the property of the Contractor and shall be removed from the site, and disposed of in an approved manner. Vegetation and other waste shall not be burnt. **Note that leaf litter mulch may be able to be made from removed trees**. Refer Mulch.

10.0 SOILS

GENERAL
Where existing soil quantity or quality is insufficient use imported topsoil and subsoil.

SOIL DEPTH
Minimum total soil depth for areas to be turfed to be 400mm, being min. depth 100mm of subsoil and min. depth 300mm of topsoil.
Minimum total soil depth for areas where shrubs and trees are to be planted to be 500mm, being min. depth 200mm of subsoil and min. depth 300mm of topsoil.

DEFINITIONS
Imported Topsoil
Soil and compost or other additives defined as loamy sand or equivalent which complies generally with the texture classifications and typical uses of AS 4419 and thoroughly mixed before placing.
To contain approximately:
80% crushed Hawkesbury Sandstone, gap-graded to replicate a well-structured natural soil (free from soluble salts, neutral pH),
20% Nutrihumus Compost (aged, no toxins, free from seeds and reproductive parts of weeds)

The product is to be equivalent to Benedict SmartMix No 6, W117, Native Garden Mix. Refer Technical Data Sheet in Appendix.

Soil shall comply generally with the texture classifications and typical uses of AS4419 and be free from unwanted matter such as:
Stones over 75mm diameter,
Clay lumps over 75mm diameter,
Weeds,
and tree roots greater than 75mm in size.

Imported Subsoil
To contain approximately:
40% crushed Hawkesbury Sandstone,
60% washed medium sand,
Organic content of subsoil mix to be <1% by mass.
<10mm graded, silt and clay content maximum 15%.

The product is to be equivalent to Benedict Subsoil Mix W110.

11.0 SOIL PREPARATION AND SUBSOIL DRAINAGE

11.1 SUBSOIL

PREPARATION
Remove all weeds, roots, builders rubbish and other debris.

EXCAVATION
Excavate to bring subsoil to a minimum of 300mm below finished design levels. Shape the subsoil to fall to subsoil drains where applicable. Break up

the newly excavated subsoil surface to a further depth of 100mm. Should the subsoil base be rock, excavate rock as necessary to ensure adequate drainage.

CULTIVATION
Cultivate subsoil to all grass and planting areas ongrade to a depth of 100mm. Do not disturb services or tree roots, if necessary cultivate these areas by hand. During cultivation thoroughly mix in any materials required by testing, eg gypsum. Hand-cultivate within 300mm of structures. Trim the surface to required levels after cultivation.

IMPORTED SUBSOIL
Where required, place imported subsoil to required depths to finish 300mm below finished design levels.

11.2 SUBSOIL DRAINAGE

REQUIREMENT
Install subsoil drains where required to intercept ground water seepage and prevent surface water build-up. Connect subsoil drains to surface drains or to stormwater drainage system as applicable. All retaining walls are to be provided with subsurface drains located behind walls.

MATERIALS
Drainage line shall be perforated plastic piping 100mm diameter, with geofabric sock. Joints, couplings, elbows, tees and end plugs shall conform to manufacturer's specification.
Sand shall be clean, coarse, washed river sand, free from deleterious material.
Filter fabric shall be to AS 3705 and be either, or equivalent to Terram 700 by Nylex Co Pty Ltd or Propex 4545 by Humes Concrete.
Drainage aggregate shall be 20mm blue metal.

INSTALLATION
Subsoil drains shall be installed to the rear of all retaining walls and excavated to the required line and depth, providing clearance for laying and jointing of pipes (approx. 200mm wide trench). Grade of trench behind wall to be approx 1:100. Lay pipes to the required line and grade, bedded with drainage aggregate, connect pipes to stormwater and backfill with drainage aggregate to within 300mm of surface. The top 300mm shall be sandy topsoil.

11.3 SITE TOPSOIL

Where existing soil horizon is unaffected by building works, and there is no requirement to preserve existing vegetation, cultivate topsoil by hand to a depth of 300mm.

Where landscaping works require alterations to levels, use **imported topsoil** as defined in SOILS.

INSTALLATION
Install 300mm depth of topsoil over prepared subsoil (refer SUBSOILS). Compact lightly and uniformly in 150mm layers. Prevent areas of excess compaction from being caused by construction machinery or traffic.

The finished topsoil surface should be:

- At design levels,
- Smooth and free from lumps of stone or soil,
- Graded to freely drain, without ponding, to catchment points,
- Graded evenly into adjoining ground surfaces and,
- Ready for planting.

CONTAMINATION
Where diesel oil, cement, paint or other phytotoxic material has been spilt on the topsoil, excavate the contaminated soil and dispose of it offsite. Replace with appropriate topsoil to required levels.

12.0 PLANTS AND PLANTING

SCOPE
Provide and install plants to garden beds and other areas as per Landscape Plan.

GENERAL REQUIREMENTS
Supply plants which:

- have well formed, healthy root systems, with no evidence of girdling, restriction or damage
- are vigorous, well established and true-to-type
- are of good form, and have foliage size, texture and colour consistent with that shown in healthy specimens of the species
- have pests or diseases to less than 10% of the foliage, such that potential for long term success of the plant is not affected
- shrubs or small trees are self-supporting unstaked
- comply with the recommendations of AS 4373
- are hardened off, not soft or forced, and suitable for planting in the natural climatic conditions of the site
- trees, unless specified to be multi-stemmed, to have single leader, the terminal shoot should be healthy

SUBSTITUTIONS
Make no substitutions. Contractor must apply in writing to the Superintendent with available substitutions for approval.

LABELLING
At least one plant of each species or cultivar in a batch should have a readable tag.

REPLACEMENTS
Replace any plants that are damaged or fail under the terms of the Contract, with plants of the same type, quality and size.

STORAGE
Plants should be delivered on a day-to-day basis, and planted immediately. Do not store plants on site unless authorised.

LOCATIONS

Do not vary the locations from those indicated. Should the need arise to vary for any reason, eg to avoid service lines, apply for directions to the Superintendent.

PLANTING CONDITIONS
Do not plant in extreme cold, heat, wind or rain.

PLANTING
Dig planting hole to twice the diameter of the root ball and at least 100mm deeper than the root ball. Do not dig the holes into clay subsoil where there is no free drainage. Roughen the sides of the planting hole. Remove pot and place the root ball into the hole, keeping the soil level at the base of the stem equal to the finished level of the garden bed topsoil. Backfill with topsoil from planting hole, do not compact. Create watering saucer with backfill to minimum 200mm diameter around base of plant.

WATERING
Thoroughly water plants in containers immediately before planting and immediately after planting. Maintain stress-free growth rates of the plant with watering as required.

FERTILISING
Provide Aboska Native Plant Food, N(8):P(1):K(5), or product with similar N:P:K ratio, suitable for use on native plants. Place fertiliser pellets around the plants on the soil at the time of planting, before the mulch is laid, to manufacturer's recommended dose (50g/sq. metre for sandy soils).

STAKES AND TIES
Install timber stakes and hessian ties to shrubs and trees with Superintendent's approval only if it is deemed not sufficiently self-supporting, or if it is in an area of high traffic. Stakes and ties to be regularly checked and removed as soon as tree is self-supporting.

13.0 MULCH

SCOPE
Mulch all garden beds in landscaped areas as shown on Landscape Plan. Refer to Bush Management Plan for mulching in revegetation and regeneration areas.

REQUIREMENTS
Generally, use mulch that conforms to AS 4454, that is free of deleterious material such as soils, weeds, sticks and stones.

MATERIAL
Leaf Litter Mulch
Leaf mulch processed from native trees, to pieces not larger than 75 x 50 x 15mm. Mulch to be free of weed species such as Privet, Camphor Laurel, Coral Tree.

PLACING
Spread evenly to thickness nominated, after planting and fertilising. Leaf litter mulch to be placed to a thickness of 75mm. Ensure that mulch is not placed in contact with plant stems. Apply mulch to all bare soil so that after settling it is smooth and evenly graded between design surface levels, and flush with adjacent finished levels of paving, etc.
Note that gravel mulch where indicated as path surface on plan is to be laid over uncompacted soil for water and air permeability.

14.0 CRUSHED SANDSTONE GRAVEL MULCH

SCOPE
Mulch level landscaped areas for use as informal paving surface as shown on Landscape Plan.

REQUIREMENTS
Generally, use mulch that conforms to AS 4454, that is free of deleterious material such as soils, weeds, sticks and stones.

MATERIAL
Crushed Sandstone Mulch
Crushed sandstone, nominal size 10mm, **equal to Benedict Gravel's product W114, 'minus 14 to 5mm',** (as used by National Parks and Wildlife for their walking tracks)

PLACING
Grade subgrade soil evenly. Do not compact. Spread mulch evenly to thickness of 80 -100mm. Apply mulch to all bare soil so that after settling it is smooth and evenly graded between design surface levels, and flush with adjacent finished levels of paving, etc. **Do not compact**. Natural rainfall will partially compact and solidify surface due to presence of fines in mulch.
Note that gravel mulch where indicated as path/paving surface on plan is to be laid over uncompacted soil for water and air permeability.

15.0 IRRIGATION

GENERAL
Manual or automatic irrigation systems are not to be installed. Watering to establish plants is to be by hand, and is to be undertaken by the contractor. The contractor is to ensure that water supply of suitable pressure is available at the time of planting and throughout the Plant Establishment Period.

WATERING
From the time of planting, and throughout the first six (6) months of plant establishment, all newly planted areas, including lawn areas, are to receive a minimum of one (1) complete watering per week, so that soil is soaked to a depth of 150mm, irrespective of natural rainfall. NOTE: Should it be observed that the plants are under stress, ie if the planting works occur in the summer months, a once-weekly watering as described may not be adequate to maintain healthy plants. The contractor shall be responsible for adjusting the frequency of watering required to maintain healthy plant growth.

16.0 ESTABLISHMENT AND MAINTENANCE

GENERAL
The contractor shall maintain the contract areas for a set period after the date of Practical Completion, with any maintenance of the works prior to the date of Practical Completion not to be included as part of this period.

PRACTICAL COMPLETION
Practical Completion of all works shall include, but not be limited to, the installation of soils and subsoil drainage, of establishment of turfed areas and garden areas, replacement of plants that have failed and/or died, been damaged or stolen during the Contract.

PLANTING ESTABLISHMENT PERIOD
Twenty six (26) weeks. Throughout the Planting Establishment Period, the Contractor is to continue to carry out recurrent works of a maintenance nature including, but not limited to, watering, mowing, weeding, rubbish removal, fertilising, pest and disease control, returfing, staking and tying, replanting, topping-up mulch, cultivation, pruning, hedge clipping, aerating, renovating, top dressing, and keeping the site neat and tidy.

DEFECTS LIABILITY PERIOD
The Contractor shall be liable for defects for all works undertaken within this contract for a period of twenty six (26) weeks to run after the date of Practical Completion, to run concurrently with the nominated Plant Establishment Period.

MAINTENANCE LOGBOOK
The Contractor is to supply a maintenance logbook, to include a proposed maintenance program, and record what has been done and what materials, including toxic materials have been used, and when.

PLANTING
The Contractor is to continue to ensure that the general appearance and presentation of the landscape and the quality of the plant material at date of Practical Completion is maintained for the full Planting Establishment Period.
Existing planting: Where existing planting is within the landscape contract area, maintain it as if for new planting.
Replacements: Continue to replace failed, dead and/or damaged plants at minimum 2 to 3 week intervals as necessary throughout the Plant Establishment Period.
Pruning: Pruning of shrubs will be required during Spring and may be necessary at other times of the year. Pruning should reflect the natural growth, flowering habits and regrowth habit of individual species. Refer to Landscape Plan for intent of hedging and other specialised pruning requirements. Generally prune shrubs after flowering.
Generally trees are to be pruned to remove diseased or damaged growth, rubbing branches, or to be directionally or formatively pruned. Work on trees, even young trees, should be performed by an experienced horticulturist/arborist/tree surgeon with advanced knowledge of trees. Young trees that are showing signs of unhealthy or poor development, or are damaged (for instance damage to terminal leader, development of included

bark at branch junctions, or damage at root crown) should be replaced while young. Good initial stock selection is vital to help avoid these and other problems. No topping, lopping, flush cuts or overthinning to be performed.

FERTILISING
Fertilising should be done at periods as indicated by soil testing results and in response to plant performance. Soil should be tested every two years, more frequently if conditions require it or where specific problems exist. Generally, a twelve-month all-purpose slow release fertiliser of N:P:K ratio appropriate to the plant material may be applied at manufacturer's recommended rates, normally in early Spring.

PEST AND DISEASE CONTROL
The Contractor shall be responsible for control of any pest or disease which may affect plants or turf. Correct identification and treatment will be required, with strict adherence to manufacturer's recommended rates, and safe handling and application practices.

STAKES AND TIES
Adjust stakes and ties where necessary. Remove stakes and ties when plants are sufficiently robust, or if stakes and ties have been provided as protection measures, when the protection is no longer required.

WEEDING
Remove all weed growth by hand or spray with approved herbicide throughout all planting and mulched areas. Execute regularly, minimum monthly intervals. Vigorous ground covers to be maintained 200mm away from the base of any shrub or tree.

RUBBISH REMOVAL
Any bottles, papers, etc shall be removed from site.

LEAF LITTER
Leaf litter shall be removed from turf and pavement areas and re-distributed over mulched garden beds.

MULCHED AREAS
Depth of shall be inspected and maintained at approx. 75mm cover to ensure weed suppression. Keep mulch away from base of plants.

DRAINS
Drainage structures shall be inspected and cleaned out at minimum six-monthly intervals to ensure that they are in proper working order.

WATERING
From the time of planting, and throughout the six (6) months of plant establishment, all newly planted areas, including lawn areas, are to receive a minimum of one (1) complete watering per week, so that soil is soaked to a depth of 150mm, irrespective of natural rainfall. NOTE: Should it be observed that the plants are under stress, ie if the planting works occur in the summer months, a once-weekly watering as described may not be adequate to maintain healthy plants. The contractor shall be responsible for adjusting the frequency of watering required to maintain healthy plant growth.

BENEDICT

Benedict *SmartMix*™ No. 6 Native Garden Mix

Product Code (s): W117 (N/MIX)
Source: Belrose

Description:

A well balanced mix based on a minus 25mm gap graded Hawkesbury sandstone. Low phosphorous and good drainage makes this ideal for most native plantings. Fertiliser additions will improve the suitability of this mix for exotic plants.

80% Crushed Hawkesbury Sandstone
20% Nutrihumus Compost

Uses:

W117 is designed to meet the needs of phosphorous sensitive plants preferring a low pH. The high permeability makes this mix suitable for both on-grade and slab applications.

Benefits:

- gap graded sandstone replicates a well structured natural soil.
- sandstone to sandstone contact buffers the soil mix from excessive compaction.
- high porosity allows for easy root expansion, good aeration and drainage.

Handling/ Transport/ Storage:

Native Garden Mix is a gap-graded blend. It is important that the mix is well turned prior to placement. There may be some particle segregation if the mix is allowed to dry out. Install at a maximum depth of 300mm in lifts not exceeding 200mm. Where planter depth

Handling/ Transport/ Storage: (cont.)

exceeds 300mm, we recommend a sub-soil mix such as our W110 (40% crushed sandstone : 60% washed medium sand) be installed. The organic matter content of this sub-soil mix should be <1% by mass

Characteristics:

(a)Chemical Properties:

	Result	*Ideal Range*
pH in water (1:2)	5.8	5.0 - 6.0
pH in CaCl (1:2)	5.5	5.0 - 6.0
Electrical conductivity	0.17mS/cm	

Soluble Cations	*mg/kg*	*% ECEC*	*Ideal Range*
Sodium	34.5	7.35	<5
Potassium	70.2	6.97	5 - 15
Calcium	154.0	58.17	60 - 75
Magnesium	46.7	18.4	5 - 25
Calcium:magnesium ratio	3.3	-	3 - 6

Nutrient	*mg/kg*	*Ideal Range*
Phosphate	7.23	10 - 50
Ammonium	5.15	<100
Nitrate	3.55	<100
Sulphate	19.85	>40<100

Characteristics:

(b) Physical Properties

	Result	*Ideal Range*
Permeability	27cm/hour	2 - 80cm/hour
Water holding capacity	40 to 45%	
Air filled porosity	18 to 23%	
Organic matter (% by mass)	13.23	5 - 15%

Alternative Products:

See **BS133, W13, R111, R101**

Technical Enquiries:

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CONTACT: MURRAY FRASER BSc(Ag)

TREE MANAGEMENT CONSULTING ARBORICULTURISTS

PRE- CONSTRUCTION ARBORICULTURAL ASSESSMENT

A Report on the Potential Development Impacts on Trees to Be Retained

for

RAYPOND PTY LTD
PO Box 1364
DEE WHY NSW 2099

SITE ADDRESS

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PALM BEACH NSW

NOVEMBER 2004

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CONTENTS

1 INTRODUCTION

1.1 This Arboricultural Assessment was commissioned by Mr Darren Leete of Raypond Pty Ltd, owners of the subject site.

1.2 The subject site is identified as Lot 1, and known as House 1 at 1148 -1152 Barrenjoey Road, Palm Beach, New South Wales.

1.3 This Arboricultural Assessment addresses Pittwater Council Development Consent DA N1229/00. This assessment intends to meet the arboricultural requirements for the issue of the Construction Certificate for House 1, specifically addressing Conditions B9, B24, B27, B17, C5, C19 and C20.

1.4 This Arboricultural Assessment briefly assesses the health and condition of trees to be retained, and examines the possible development impacts on trees in proximity to the approved development.

1.5 This assessment is not a tree audit and uses the previous Tree Report dated April 2003 by Pittendrigh Shinkfield Bruce Pty Ltd for tree details. All trees referenced in this assessment use the numbers accorded them in the Tree Report by Pittendrigh Shinkfield Bruce Pty Ltd.

1.6 This Arboricultural Assessment gives recommendations as to the retention or removal of trees on the site, and gives recommendations to minimize any identified impacts from the proposed development.

1.7 Care has been taken to obtain all information from reliable sources. All data has been verified as far as possible; however, I can neither guarantee nor be responsible for the accuracy of information provided by others.

1.8 This Arboricultural Assessment is not intended as an assessment of any impacts on trees by any proposed future development of the site other than the current development application.

2 METHODOLOGY

2.1 In preparation for this report site meetings were attended by Mr Darren Leete (Raypond Pty Ltd), Ms Selena Hannan (Selena Hannan Landscape Design), and myself on 25 October and 3 November 2004.
During the site visit on 3 November 2004 Ms Hannan and myself identified all trees for removal, retention, or as bonded trees by tagging them in colour coded tape.
During this visit any trees which needed further investigation were also addressed.

2.2 The inspection was limited to generally brief examination of some trees, relying on the previous report (April 2003) by Pittendrigh Shinkfield Bruce Pty Ltd for specific tree details.

2.3 No aerial (climbing) inspections, woody tissue testing, dissection, excavation, probing, coring or tree root investigation was undertaken as part of this site or tree inspection.

2.4 Plans and/or documentation used for the preparation of this Arboricultural Assessment include:

- Pittwater Development Consent (modified 2003) DA No: N01229/00;
- Pre-Construction Tree/Vegetation Report, dated 10 April 2003, prepared by Pittendrigh Shinkfield Bruce Pty Ltd;
- Bushland Management Plan, dated May 2003, prepared by GIS Environmental Consultants;
- Tree Survey - House One Plan TP04B and Tree Protection Plan -House One TP12A, prepared by Pittendrigh Shinkfield Bruce Pty Ltd;
- Landscape Plan LP12A, dated November 2004 prepared by Selena Hannan Landscape Design;
- Pre-construction Arboricultural Assessments for House 3 and House 2, 1148 – 1152 Barrenjoey Road, Palm Beach, August and November 2004, prepared by Urban Forestry Australia; and
- Sewerage plans, File No. 13701WW, prepared by Sydney Water.

3 DISCUSSION

3.1 Current health and condition of trees to be retained.

3.1.1 The health of trees currently growing on the site can only be described as fair, and is likely to be due in some part to the unfavourable soil moisture content resulting from prolonged drought conditions.

The structure and form of many trees is compromised by suppression from other trees, and competition for root space, soil moisture, etc. Secondary problems are evident, such as poor extension growth and foliage density of Cheese Trees due to repeated defoliation by insects. Storm damage, stem and branch inclusions, and high amounts of deadwood are also noted in Forest Oaks.

These problems are typical of a dense woodland/rainforest community, particularly when affected by drought.

3.2 Potential impacts on trees within 5 metres of House 1.

3.2.1 In accordance with Consent Condition B9, the potential impacts of works on trees within 5 metres of the dwelling, stormwater/sewerage lines and private driveway were assessed.

Note: For impacts on trees in proximity to the main driveway, please refer to the Pre-construction Tree/Vegetation Report by Pittendrigh Shinkfield Bruce, 10 April 2003, which deals with subdivision works (DA N1228/00).

The following trees have been identified as being located within the nominated 5 metre setback, and were shown on plans to exist at the time of Development Application.

Trees in bold are bonded trees as per Condition C7.

Trees 39, 40, **42, 44, 45**, 55, **61**, 63, 108, 488, **489** and **514.**

Note: Tree 488 is within site boundary of House 2. Refer to Arboricultural Assessment, House 2, November 2004, by Urban Forestry Australia for details relating to this tree.

3.2.2 Tree 39 (Cabbage Tree Palm) is to be retained at the front (southwest) of the new dwelling. It appears the approved deck may be in conflict with the actual location of the Palm.
This may be verified during deck construction and the deck altered to allow a minimum clearance of 500mm clearance between the Palm and nearest edge of the deck.
Posts may be easily located outside a minimum setback of 500mm from the base of the Palm.
No significant impacts are expected to this palm.

3.2.3 Tree 40 (Port Jackson Fig) is growing on top of a very large rock outcrop and well setback from the dwelling and driveway. The base of the tree sits approximately 4 – 5 metres above the proposed works. Landscaping and a new retaining wall are proposed at the base of the rock and some care to avoid major roots growing over this rock must be considered.
As the tree is elevated above the works, any changes to contours at this lower level will not impact on the tree. There is no requirement for the Landscape Plan to be adjusted to delete proposed new contouring in this area. No works are expected to affect the current health and condition of this tree.
Note: This tree is in poor condition and declining vigour.

3.2.4 Tree 42 (Black Plum) has no works proposed or changes to the existing contours within the Critical Root Zone (CRZ) or Primary Root Zone (PRZ). The tree is not expected to suffer any impacts as a direct result of approved works.

3.2.5 Tree 44 (Cheese Tree) is located approximately 2 metres from the new driveway and excavation for the dwelling. This driveway will be elevated approximately 2.2 metres above existing ground within the CRZ/PRZ of the tree. No changes to existing contours within the tree's CRZ/PRZ are proposed. The stormwater line will be elevated above existing ground level.

Excavation for the dwelling is at the edge of the tree's CRZ. The proportion of potentially affected root area is considered to be very small but onsite supervision and advice by the arborist would be required to avoid or minimise impacts on tree roots.
Some landscaping is proposed within the CRZ of the tree.

3.2.6 Tree 45 (Black Plum) has proposed works within the CRZ, including driveway construction and the installation of stormwater line. The driveway is suspended adjacent to the tree and is likely to avoid significant impact on tree roots. No changes to existing contours within the tree's CRZ/PRZ are proposed. The majority of the stormwater line will be suspended i.e. attached to the underside of driveway. There may be some conflict where some excavation is required for the line where it meets existing ground near the top of the private driveway.
It may be necessary for modification of the proposed stormwater layout adjacent to the tree to avoid unnecessary root loss.

There is a large boulder adjacent to the tree that needs to be broken up and removed to accommodate road construction. Extreme care must be taken during this process. The tree will require trunk protection.
Works within this area must be supervised by an arborist to minimise impacts on woody roots and to assess tree stability once the rock is removed.

3.2.7 Tree 61 (Cheese Tree) does not have any works proposed within its CRZ or PRZ. The lowest level of the proposed dwelling is elevated above the R.L. of the tree. Minor branch removal may be required to avoid conflict between the structure and tree branches. No impacts on tree health are expected.
Silt fencing should be placed upslope of the tree to avoid disturbed soil from entering the root zone.

3.2.8 Tree 63 (Pittosporum) is well downslope of the proposed deck. No impacts are expected.

3.2.9 Tree 108 (which is actually two Port Jackson Figs) is growing on top of a rock outcrop. It is considerable higher than the surrounding land and well setback from proposed works. No impacts are expected to this tree.

3.2.10 Tree 489 (Rough-barked Apple) is in very poor condition and almost dead. Consideration should be given to its removal.
The sewer line is within 1 metre and at the edge of the Trees PRZ. No impacts from the trenching for lines is expected to this tree, however its general further decline due to its current condition is expected.

3.2.11 Tree 514 (Cheese Tree) is located approximately 2.5 metres from the dwelling. This is outside the tree's PRZ of 1 metre and no impacts are expected. Silt fencing should be placed upslope of the tree to avoid disturbed soil from entering the root zone.

3.2.12 In consideration of Condition B9 and B24.
The drainlines are to be laid in an excavated trench. The actual location will be decided on site, from information to be gathered with project arborist in attendance. The method of determining the location of pits and lines is proposed to be thus: All roots over 50mm in diameter of potentially affected trees in this area (Trees 44 and 45) are to be located by hand excavation at the depths required for the trench and pits. The most appropriate trench and pit location will be determined from this information. The arborist will make informed decisions as to which roots, if any, may be cut so as to minimise impacts on the trees. The trench is to be backfilled by firstly replacing site subsoil to equal previous depth, then site topsoil to equal previous depth. The locations of these trees, tanks, pits and lines has been shown on the Landscape Plan LP12A and it is not considered necessary to repeat this information on a separate plan.

3.2.13 With reference to Condition B27, the requirement for tree protection /exclusion fencing is detailed on Landscape Plan LP12A.

3.2.14 With reference to condition C5 and C19, these requirements will be met by the arborist prior to commencement of works.

3.2.15 In consideration of condition C20 the following is noted. No palm species have been nominated for relocation or transplanting on the site. This condition does not contain any relevance to the proposal.

3.3 Tree removal

3.3.1 Trees 43, 46 and 60 are Large-leaved Privets which are to be removed.

3.3.2 Tree 489 is a bonded tree, but should be removed as it is in very poor condition. This may be done as a separate application under Pittwater Council's Tree Preservation and Management Order.

4 CONCLUSIONS

4.1 Most of the trees within this area are of average to poor condition with identifiable defects, suppressed growth, storm damage, effects of ongoing drought conditions and the secondary problems associated with these factors.
Several of these trees are bonded.

4.2 The majority of trees to be retained will experience little, if any, impacts on their current health and condition as a result of the approved works.
Impacts on trees close to the development can be minimized, if not avoided entirely, by the presence and supervision of an experienced arborist during works in proximity to trees.

Some potential damage may occur to Tree 45. Close supervision and appropriate protection measures would avoid further unnecessary impacts on the root system of this tree.

4.3 At least one bonded tree (489) should be considered for removal as it is almost dead and unlikely to develop into a sound mature specimen.

5 RECOMMENDATIONS

5.1 Tree Protection Zones (TPZ)

5.1.1 Provide a Tree Protection Zone (TPZ) to all trees to be retained. This may be in the form of extended protective fencing, individual tree guards and other protective devices, depending on the specific requirements of each tree or group of trees to be retained. Refer to Landscape Plan LP13A for general protection fencing locations.

5.1.2 The most appropriate procedure for protecting trees to be retained is to firstly arrange a site meeting with the arborist and fencing contractor. This must be carried out prior to erecting any fencing or other tree protection devices.

It is important to remember that there may be many surface roots which could be damaged or crushed during site works and this issue needs to be addressed at the time of the site meeting with the contractor. This will require very specific and individual assessment of the protection devices used for each tree or group of trees.

To ensure the contractor has met with the arborist, and understands the requirements for protection of each tree as directed by the arborist, it is recommended the contractor provide written confirmation of that meeting and their understanding of those tree protection requirements. Alternatively, the arborist is to supervise the erection of Tree Protection Zones and other tree protection devices.

Where trees cannot be fenced adequately due to the proximity to the dwelling or deck the arborist must specify the type of protective measures e.g. fabrics, mulches, tree guards, etc to ensure that these trees are well protected before any tree removal or other site works are undertaken.

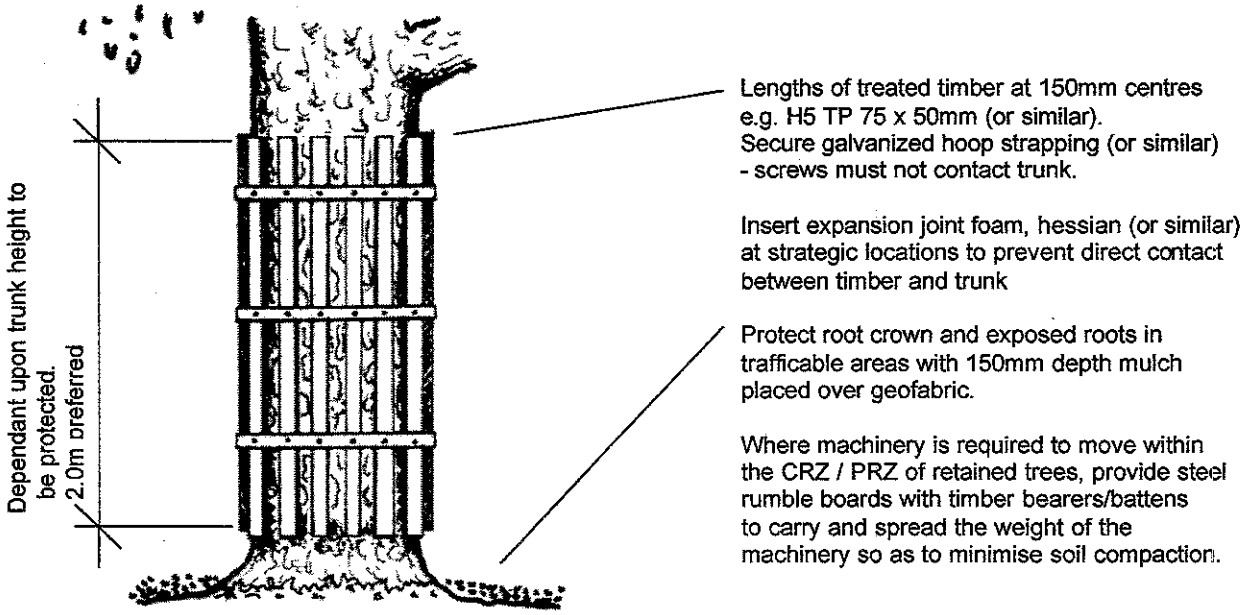
The arborist must also take into account the requirement for access for construction activities and provide a reasonable space for work between protective fencing and those activities.

5.1.3 Trees 39 and 45 require individual trunk protection. Refer to Figure 1 for details.

5.1.4 Silt/erosion control devices must be installed upslope of trees 61 and 514.

5.1.5 Any exposed roots must be covered with soil or moistened fabrics, such as jute or hessian to avoid dessication. Replacement of soil to natural ground levels must take place as soon as possible after roots are exposed.

Figure 1 TREE GUARD DETAIL



5.1.5 The following recommendations for protection of trees to be retained are:

- Tree Protection Zones must be established and installed before any site works are carried out including any clearing or grading or approved tree removals;
- Provide Tree Protection devices to all trees to be retained;

- Provide Protection fencing as far as practicable from the trunk of the trees, and preferably outside the PRZ of the tree. Where possible the fencing should be placed to encircle the whole tree;
- The most appropriate fencing is 1.8m chainlink with 50mm metal pole supports. During installation care must be taken to avoid damage to significant roots;
- Nothing should occur inside the TPZ of the tree, so therefore all access to personnel and machinery, and storage of fuel, chemicals, cement or site sheds is prohibited;
- Signage should explain exclusion from the fenced off areas and carry a contact name for access or advice; and
- The TPZ may only be removed, altered, replaced or relocated with the authorisation of the project arborist.

5.2 Bonded Trees

5.2.1 Bonded trees should be photographed prior to works commencing on the site; during works; at completion of works; and prior to application for the release of the bond. A written record of their health and condition during all works phases must be kept by the project arborist and forwarded to the project supervisor.

5.3 Minimising impacts on tree to be retained.

5.3.1 Arboricultural supervision

The arborist must supervise all works, particularly demolition, excavation, trenching, subgrade preparations, foundations and other associated procedures within the *Primary Root Zone* (PRZ) of the trees.

Each site visit and all observations, details etc, must be recorded by the project arborist.

5.3.2 Construction access

Where practicable construction access for all vehicles must be located outside the Primary Root Zone (PRZ) of trees to be retained.

5.3.3 Landscape plantings

Any proposed planting locations within the PRZ of trees to be retained must remain flexible so as to avoid damage to existing roots.
In some cases, tubestock container size may be the only suitable size for planting within the root zone of a tree.

Mattocks and similar digging instruments must not be used within the dripline of trees to be retained. Planting holes should be dug by hand with a garden trowel, or similar small tool.

5.3.4 Mulching

The inclusion of a temporary mulch layer of composted leaf and woodchip to a depth of 75mm within TPZ will help retain soil moisture, protect soil from contaminants and reduce soil compaction.

5.4 Hand digging near trees.

5.4.1 With reference to Condition B24 the requirement for detailing of methods of hand digging within canopy driplines to be provided on plans is not practical. The following should be carried out under the supervision of an arborist:

- Determine the required depth of soil and/or rock removal to accommodate works;
- Carefully remove the organic layer (leaf litter and other organic material) by hand, and place aside;
- Using a small hand tool such as a trowel, carefully remove topsoil along the proposed location for construction, and place aside outside the canopy dripline of the tree (Do not mix topsoil with organic layer);
- Any subsoil encountered may require the use of a narrow spade (e.g trenching or post-hole shovel) to remove it. Place aside and away from stockpiled topsoil.
- If rock is encountered, expose required area. A 'kanga' rock breaker can be used to remove rock to the required levels;
- If significant roots are encountered do not cut them. The project arborist is to determine which, and how many, may be cut without impacts on the trees health or stability;
- Wrap or cover exposed roots with damp fabric to minimise root moisture losses;
- Any soil to be reused as backfill must be placed as it was removed i.e. subsoil first, followed by topsoil and organic layer on top

5.4.2 Where significant tree roots are encountered which coincide with the desired location for a pier or deck posts, the location should be moved so as to avoid the root/s. In the event this is not possible to achieve, the arborist should be consulted to assess the impacts of the removal of further significant roots on the trees health and stability.

5.5 Tree Pruning

5.5.1 Pruning methods and techniques

Contracted tree workers must have a minimum Level 2 qualification in Tree Surgery to carry out any pruning works on this site.

Pruning methods and techniques used are to be in accordance with these written specifications complying with Australian Standard AS 4373 – 1996 *Pruning of Amenity Trees*.

A copy of this document must be available and held on site by the supervisor.

5.5.2 Safe work practices

When pruning trees the following are to be complied with:

- Australian Standard AS4373 – 1996 *Pruning of Amenity Trees*; and
- The Workcover Authority's *Code of Practice for the Amenity Tree Industry*, No. 34, May, 1998.

5.5.3 Supervision of pruning works

Pruning work is to be carried out under the direct supervision of a nominated qualified tree worker or the project arborist.

5.4.4 During all pruning works any defective or diseased tree parts encountered by tree workers are to be reported to the site supervisor.

5.6 General

5.6.1 General recommendations during development, construction and post-construction are as follows:

- No stock-piling should take place around the root zone of trees. Providing a regular supply of water to the trees during the period of works is recommended.
- Do not allow excavation vehicles or equipment to rip at, or remove the roots along the face of any excavation adjacent to a tree. In the event the vehicles 'grab' at roots during works, the machine operator must stop work immediately and allow the roots to be cut before continuing.
- Regular monitoring of the tree during development works for unforeseen changes or decline will help maintain the tree in a healthy state.
- Irrigation – An arborist should determine whether irrigation should be carried out during extended periods of drought.
- Mulching - removal of mulch after construction to remove any contaminants. Replacement with a good quality mulch and addition of 10% organic matter will improve beneficial soil micro-organisms, retain moisture and improve aeration and water infiltration.
- Pest management – Monitoring is required as trees under stress are more prone to insect attack.
- Hazard Management – monitoring and management of the trees and re-assessment by a qualified arborist is required for adequate long-term safety of site users.

Should you require further assistance with this matter, or require my liaison with Council officers, please do not hesitate to contact me.

Catriona Mackenzie
Consulting arborist and landscape designer.
Member Australian Institute of Horticulture
Member Institute of Australian Consulting Arboriculturists

APPENDIX A - TERMS AND DEFINITIONS

TERMS AND DEFINITIONS

The following relates to terms or abbreviations that may have been used in this report and provides the reader with a detailed explanation of those terms.

Age classes

- (I) = immature and refers to a well established but juvenile tree.
- (S) = semi-mature and refers to a tree at growth stages between immaturity and full size.
- (M) = mature and refers to a full sized tree with some capacity for further growth.
- (O) = over-mature and refers to a tree about to enter decline or already declining.

Condition refers to the tree's form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) and the state of the scaffold(ie trunk and major branches), including structural defects such as cavities, crooked trunks or weak trunk/branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition.

Critical Root Zone (CRZ) refers to a radial offset of five (5) times the trunk DBH measured from the center of the trunk. Excavation within this area may seriously destabilize the tree. Fully elevated construction within this area is possible with specific root zone assessment.

Footprint refers to the area occupied by structures including dwellings driveways and paths.

Hazard refers to anything with the potential to harm health, life or property.

Health refers to the tree's vigour as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion, and the degree of dieback.

Primary Root Zone (PRZ) refers to a radial offset of ten (10) times the trunk DBH measured from the center of the trunk. Excavation is possible within one offset only with this area and subject to specific rootzone assessment.

Scaffold branch A primary structural branch of the crown.

Stem/bark inclusion, a genetic fault and potentially a weak point of attachment.

Tree Protection Zone (TPZ), generally the minimum distance from the center of the tree trunk where protective fencing or barriers are to be installed to create an exclusion zone.

Within Building Footprint (WBF) refers to those trees within the footprint of the proposed development.

URBAN
BUSHLAND
MANAGEMENT
CONSULTANTS

Bushland Management Plan

For Proposed Lot 1

Observation Point

1148-1152 Barrenjoey Road, Palm Beach

12 November 2004

Prepared for

Raypond Developments Pty Ltd

Prepared by

Urban Bushland Management Consultants Pty Ltd
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Certification

I, Judith Rawling Managing Director Urban Bushland Management Consultants and UBM Projects hereby state that the Bushland Management Plan for Lot 1, Observation Point Palm Beach has been prepared in accordance with Department of Urban Affairs & Planning's Urban Bushland Management Guidelines, Pittwater Development Control Plan #25 - Conservation of Biodiversity, the management of Threatened Flora and Fauna in Pittwater LGA and other relevant planning instruments. The guidelines and requirements of draft Pittwater 21 DCP have also been addressed.

This Bushland Management Plan has also been prepared in accordance with Pittwater Council's consent requirements, as set out the Modification of Development Consent No N1232/00) for Lot 1 Observation Point, Palm Beach (correspondence 5 May 2003 – see Appendix 1).

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Judith Rawling
12 November 2004

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1 INTRODUCTION

1.1 BACKGROUND INFORMATION

This Bushland Management Plan (the **'BMP'**) has been prepared in accordance with Pittwater Council's consent requirements, as set out the Modification of Development Consent No N1232/00) for Lots 1, 2, 3 and 4 Observation Point, Palm Beach (correspondence 5 May 2003 – see Appendix 1).

The proposed development at Observation Point comprises the construction of four (4) new residences on approximately 0.6 hectares of land (the **'subject site'**) zoned for residential use at Palm Beach, within Pittwater Local Government Area (see Figure 1.1).

The Development Application was submitted by Raypond Developments Pty Ltd (the **'proponents'**) and approved by Pittwater Council (**'Council'**) on 24 January 2002, with Modified Conditions of Development Consent issued on 5 May 2003.

Several earlier reports predate this BMP. A Flora and Fauna Impact Assessment was prepared in support of the original development application (GIS Environmental Consultants November 2000), and subsequently, a Bushland Management Concept Plan was prepared in response to the Modified Conditions (GIS Environmental Consultants May 2003). Council has accepted these reports.

However, the BMP submitted by GIS Environmental Consultants (2003) was a 'generic plan', covering all parts of the subject site, and did not deal with the rehabilitation and management of remnant vegetation in each of the four (4) Lots individually. Council has therefore required the proponent to prepare separate Plans for each of the four (4) Lots within the development area.

In response to the Modified Conditions set by Council, a separate BMP for Lot 3 was prepared and approved (Footprint Green August 2004). Subsequently, UBMC was commissioned by the proponents to prepare BMPs for each of the remaining Lots 1, 2 and 4.

1.2 DEVELOPMENT PROPOSAL

The subject site is known as 1148-1152 Barrenjoey Road (Lots 16 DP 6746 and 17 DP 651987) and 56 Palm Beach Road (Lot 181 DP 534139), Palm Beach. Together these Lots form a property approximately 0.6 hectares in size.

The development proposal approved by Council (May 2003) involves the subdivision of three (3) existing Lots into four (4) new Lots with an access easement. A new residence is proposed for each of these Lots, with access from a common driveway off Palm Beach Road (see Figure 1.1).

Construction of the common driveway has commenced (under a separate DA). It is anticipated that construction of the new residences will commence as soon as the BMP is approved and Construction Certificates are issued. The proponent intends to construct the new residences in the following order: first Lot 3, then Lot 2, Lot 1, and finally Lot 4.

1.3 REPORT PURPOSE

This BMP has been prepared by Urban Bushland Management Consultants (**'UBMC'**) to comply with Council's Modified Development Consent Conditions – i.e. to provide separate BMPs for each of the four (4) Lots at Observation Point.

The BMP for 1148-1152 Barrenjoey Road (this report) deals only with bushland management within Lot 1. BMPs for each of Lots 2 and 4 are presented under separate cover.

Information contained in this BMP relating to the biophysical characteristics of the subject site has been summarised from the previous Flora and Fauna Assessment (GIS Environmental Consultants November 2000), the Bushland Management Concept Plan (May 2003), while other background

information has been taken from the recently prepared BMP for Lot 3, (Footprint Green August 2004).

It is intended that this BMP should be read in conjunction with the Landscape Plan developed for Lot 1 Observation Point (Drawing #LP 12A – Hannan, 2004).

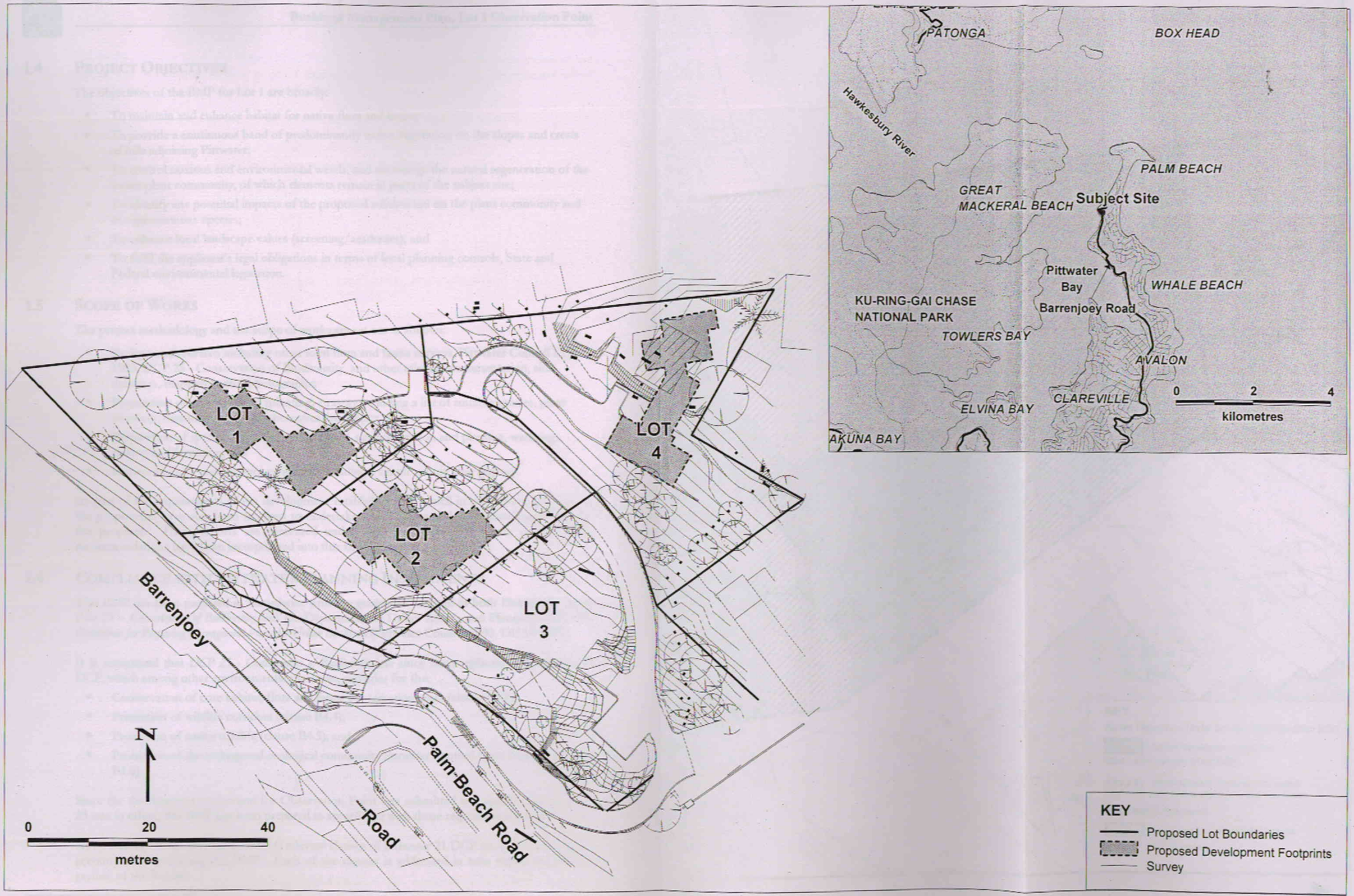


Figure 1.1
Site Details

URBAN BUSHLAND
MANAGEMENT CONSULTANTS PTY LTD

1.4 PROJECT OBJECTIVES

The objectives of the BMP for Lot 1 are broadly:

- To maintain and enhance habitat for native flora and fauna;
- To provide a continuous band of predominantly native vegetation on the slopes and crests of hills adjoining Pittwater;
- To control noxious and environmental weeds, and encourage the natural regeneration of the native plant community, of which elements remain in parts of the subject site;
- To identify any potential impacts of the proposed subdivision on the plant community and its representative species;
- To enhance local landscape values (screening/aesthetics); and
- To fulfil the applicant's legal obligations in terms of local planning controls, State and Federal environmental legislation.

1.5 SCOPE OF WORKS

The project methodology and the scope of works are set out as follows:

- Background research including other local flora and fauna surveys, Pittwater Council LEP 1993, DCP 25 - Conservation of Biodiversity, and other relevant documentation, site drawings, maps and aerial photographs;
- Preparation of a revegetation (planting) strategy including a list of suitable species, plant numbers, densities and distribution over the subject site;
- Preparation of specifications for weed control, site preparation and planting, watering, staking and fertilising; and
- Preparation of a maintenance program (including a simple monitoring regime).

As part of the requirements of the development established by Council in preliminary discussions, the proponents have also been required to undertake a tree survey and an archaeological study of the property. These reports are presented under separate covers, but where relevant, their recommendations have been incorporated into this BMP.

1.6 COMPLIANCE WITH PITTWATER PLANNING INSTRUMENTS

This BMP has been prepared in accordance with the guidelines outlined in both *Development Control Plan 25 – Conservation of Biodiversity* and the Department of Urban Affairs and Planning's (DUAP[1]) *Guidelines for Preparing Management Plans for Urban Bushland* (Pittwater Council 2000, DUAP 1991).

It is recognised that *DCP 25 - Conservation of Biodiversity* has since been replaced with *Pittwater 21 DCP*, which among other environmental measures, provides for the:

- Conservation of core habitat, flora and fauna conservation areas (clause B4.2);
- Protection of wildlife corridors (clause B4.4);
- Protection of native wildlife (clause B4.5); and
- Protection of the endangered ecological community Pittwater Spotted Gum Forest (clause B4.6).

Since the development application for Observation Point was submitted and approved when DCP 25 was in effect, this BMP has been prepared in accordance with those requirements and guidelines.

Nevertheless, UBMC has taken four (4) relevant clauses of Pittwater 21 DCP (as set out above) into account when preparing this BMP. Each of the clauses is addressed in turn within the relevant section of the Report.

[1] DUAP is now part of the NSW Department of Environment & Conservation

The BMP prepared for Lot 1 Observation Point identifies the natural conservation values of the subject Lot, and recommends a range of management strategies to protect the remnant native vegetation, which may be impacted by development and construction works.

A timetable of works is proposed and a monitoring program designed to assess the progress of bushland rehabilitation works.

1.6.1 Development Control Plan 25 – Conservation of Biodiversity

DCP 25 guides development within the Local Government Area to ensure that it is compatible with the conservation of biodiversity, and that development complies with the objectives and requirements of the *Threatened Species Conservation Act 1995* and the *NSW Biodiversity Strategy.*

Pittwater DCP 25 aims to:

- Conserve and rehabilitate remnant bushland in Pittwater that provides habitat for threatened species, populations and ecological communities listed under the Threatened Species Conservation Act 1995;
- Conserve and rehabilitate remnant bushland in Pittwater that provides important habitat for other species, populations and ecological communities that are native to the area;
- Maintain and re-establish native vegetation links between major bushland areas as wildlife corridors;
- Promote retention and replanting of native trees and shrubs throughout the developed areas of Pittwater; and
- Provide a clear guide for persons wishing to develop land to achieve ecologically sustainable development.

DCP 25 applies to all lands within Pittwater LGA, excluding Ku-ring-gai Chase National Park.

Under the DCP 25, Development Applications on properties containing core bushland and fragmented bushland, (such as the subject site) must include a Flora and Fauna Assessment and requires the preparation of a Bushland Management Concept Plan.

The Flora and Fauna Assessment was prepared by GIS Environmental Consultants (2000), and the Bushland Management Concept Plan by GIS Environmental Consultants (2003). The BMP (this report) deals with bushland management specifically in Lot 1.

1.6.2 Pittwater 21 Development Control Plan

Corridors and Connectivity

Pittwater 21 DCP B4.4 Protection of Wildlife Corridors requires the retention of the existing wildlife corridors, which basically means that the tree canopy and sub-canopy on the subject site must remain intact. As this part of the suburb of Palm Beach has been developed for many years, most residents have cleared the native understorey and planted exotic species, although some gardens have retained selected local plants such as Cabbage Palms, Tree Ferns and some Eucalypts.

'Filter corridors' used by birds and arboreal mammals are generally limited to the canopy and sub-canopy strata. Within the subject site, native trees and shrubs have been retained on the ridgetop and the lower slopes, below the rock ledges. The Bushland Management Concept Plan (GIS Environmental Consultants 2003) and Landscape Drawing (Hannan 2004), identifies areas within each Lot for 'indigenous revegetation' and 'landscaping'. Specifications include the replanting of native canopy and sub-canopy trees, which will enhance connectivity between the lower slopes and the ridgetop.

Rockeries and garden beds within the subject site and in adjacent gardens also provide habitat for small animals, particularly insectivorous birds and small reptiles. Long-nosed Bandicoots are known to regularly utilise the gardens in the locality, including those in the subject site.

Recommendations

1) Retain as many of the existing native tree canopy and sub-canopy on the slopes in order to facilitate movement by birds and arboreal mammals.

2) Where native trees must be removed for construction, for improved access, or due to poor health, a similar tree (i.e. same species) should be planted elsewhere on the Lot to avoid further fragmentation of the already tenuous wildlife corridor.

3) Retention and or creation of some areas of 'untidy' native grasses, dense ground covers and small shrubs are recommended to provide protective habitat for small animals. Such habitat features are best sited in the designated 'bush regeneration' areas.

4) In other parts of the property designated as 'landscape areas' a range of small to medium sized flowering shrubs should be included in the planting design to provide food resources for native birds.

5) In re-creating native habitat, consideration must be given to the bushfire legislation[2] and the need to retain an appropriate Asset Protection Zone around the new residence and other built structures.

Protection of Native Vegetation

Clause B4.6 of *Pittwater 21 DCP* requires protection of the endangered ecological community – Pittwater Spotted Gum Forest and the representative species contained therein. However, the vegetation community in the locality of the subject site has NOT been identified as Pittwater Spotted Gum Forest (GIS Environmental Consultants 2000). It is likely that the original vegetation was the Narrabeen Slopes Forest Type (community type 9hii, after Benson & Howell 1994).

Nevertheless, the protection of any remnant native vegetation within Pittwater is highly desirable. Accordingly, Council has required the proponent to protect all native vegetation outside the development footprint(s) on the property, and to retain a significant number of native trees.

Further, there are areas within each Lot identified for 'bush regeneration'. Such areas will be rehabilitated to provide habitat for native flora and fauna. This will be achieved by the removal of weeds and introduced plants, thereby encouraging the (natural) regeneration of local native species.

There are also areas within each Lot identified for 'indigenous revegetation'. These areas (cleared or badly degraded sites) will be weeded and planted with a range of local native species grown by a specialist native plant nursery from seeds collected within a 5-kilometre radius of the subject site.

Recommendations

1) The placement of the new residences, driveways and other structures must comply with the Masterplan prepared in support of the development application to Council.

2) Prior to the commencement of construction works, the development footprint (construction zone) must be fenced off from adjoining areas of native vegetation. No incursion into the reserved area must occur at any time.

3) Trees to be retained inside and immediately outside the development footprint must be protected by the erection of tree guards around the trunk and/or protective fencing that should be erected on the outside edge of the drip line of each specimen.

4) Trees in poor health or damaged trees should be examined by a qualified arborist, and removed if they pose a threat to public safety.

5) Only suitably qualified and experienced bush regenerators (or landscapers with experience in native landscapes) should be employed to carry out weed control and planting.

[2] Planning for Bushfire Protection RFS 2001

2 OBSERVATION POINT - SITE DESCRIPTION

2.1 PHYSICAL ENVIRONMENT

2.1.1 Location and Setting

The subject site is located on the corner of Palm Beach and Barrenjoey Roads, Palm Beach. The property is an irregular shape, with a road frontage on both Palm Beach and Barrenjoey Roads.

The property forms a triangle between the two (2) roads, with land generally sloping to the west, towards Pittwater. Observation Point is within 100 metres of Pittwater (west) and 300 metres from the ocean at Palm Beach (east). Co-ordinates are Easting 344055 and Northing 6281318.

There is an existing house (circa 1950) located on the crest (or ridgetop), with views to Barrenjoey and Pittwater. Two (2) houses in neighbouring properties are located in close proximity. The access driveway (now under reconstruction) is from Palm Beach Road.

2.2 TOPOGRAPHY, GEOLOGY AND SOILS

The physical characteristics of the subject site and locality are summarised in Table 2.1, below.

Table 2.1: Summary of Physical Characteristics in the Locality of the Subject Site.

Feature	Description
Topography	Locally rolling to steep low hills and side slopes, with associated rocky headlands, bluffs and rocky outcrops. Site topography comprises northerly sloping land (mean slope angle approximately 40%), with a number of sandstone outcrops occurring.
Geology	The under-lying geology is characterised by Triassic Narrabeen Group Sediments of inter-bedded laminite, shale, quartz sandstone and lithic sandstone (Chapman and Murphy, 1989). Observable features – a group of sandstone 'floaters', with other outcrops occurring on adjoining Lots. Natural terraces have been enhanced with sandstone retaining walls.
Soils	The parent (or native) soil is derived from Narrabeen Group sediments. These are shallow to deep (30-200 cm) Lithosols/Siliceous Sands and Yellow Podzolics on sandstone, while Brown, Red and Gleyed Podzolics occur on shale geology. Site soil characteristics are consistent with those described for sandstone geology (above). *Limitations*: very high soil erosion hazard, impermeable plastic low wet-strength subsoil, localised run-on and seasonal waterlogging of footslopes (Chapman & Murphy
Soil Landscape	The soil landscape is classified as 'Watagan'. Local relief is 60-120 metres, with slopes generally >25 degrees. There are narrow convex crests and ridges, steep colluvial side slopes, and occasional sandstone boulders and benches. *Limitations:* mass movement hazard, steep slopes, severe soil erosion hazard and occasional rock outcrop (Chapman & Murphy 1989).
Climate	Mean daily maximum temperature is 22.5°C, with highest temperatures recorded in Dec, Jan and Feb. The mean daily min. temperature 13.3°C, with lowest temperatures in June, July and Aug. Mean annual rainfall is 1220.6 mm; with April, May and June recording the highest mean levels (Bureau of Meteorology 2004, Manly Town Hall #066035).
Local Hydrology	No natural drainage lines occur within the site. Two constructed drainage lines have been identified on the construction drawing to service the development.

2.3 BIOLOGICAL ENVIRONMENT

2.3.1 Flora

The native vegetation at Observation Point is highly disturbed and comprises an introduced (exotic) mid-storey and understorey under a predominantly native tree canopy. The canopy is discontinuous, and tree height is variable across the site[3].

The understorey supports a number of species commonly described as 'rainforest' plants, although these are more representative of the mesic or 'closed forest' vegetation type, which is commonly found in gullies and on sheltered slopes.

Terraced garden beds and steps have been constructed around the old house and on the steep upper slopes, and exotic trees and shrubs have been planted elsewhere on the property. Neighbouring gardens in the locality have been similarly landscaped. Many of these early planting have spread downslope into the 'bushland' sector of the subject site.

The lower slopes of the subject site retain significantly more native plants in each of the canopy, sub-canopy and understorey strata, although this area has also been degraded by weeds invasion and garden escapes.

GIS Environmental Consultants (2000) have prepared a species list for the subject site. This list (replicated in Appendix 2) identifies all remnant native species, and most of introduced plantings and weed species extant on the site in November 2000.

The original (pre-disturbance) vegetation of the subject site has been described by GIS Environmental Consultants (2000) as **Narrabeen Slopes Forest Type** (community 9hii, after Benson & Howell, 1994). GIS Environmental Consultants states that although the site supports "a few elements of the threatened Pittwater Spotted Gum Forest ecological community", these elements are too few in occurrence, and the vegetation is too disturbed to be described as such.

2.3.2 Fauna

A fauna survey carried out by GIS Environmental Consultants (2000) identified 28 fauna species utilising the subject site, including 14 bird species (11 native and 3 introduced), one (1) amphibian, three (3) reptile and eight (8) mammal species.

Although a number of threatened fauna species (*Threatened Species Conservation Act 1995*) occur within the Pittwater area, none have been recorded within the subject site.

GIS Environmental Consultants describe fauna habitat on the site as 'moderate to good' because of the large amount of cover provided by the overgrown garden and weed thickets. Such habitat would favour small birds, reptiles and small mammals. Invertebrate populations are expected to be high.

Habitat for arboreal mammals and birds is provided by the canopy and sub-canopy trees extant on site; and the property forms part of a discontinuous 'filter corridor' through the Palm Beach area, connecting to bushland on the shores of Pittwater and beyond. However, there are no canopy trees with hollows or caves on the site that could potentially provide habitat for micro bats and other specialised fauna.

[3] It should be noted that many of the existing native canopy trees in this area are in poor condition, with a high % of dieback in the canopy. Termite nests and tunnels are clearly visible on some of the trees that have been identified for retention.

2.4 PLANNING AND LEGISLATIVE FRAMEWORK

A number of local planning policies, State and Commonwealth Acts and policies are relevant to the management of remnant bushland in Pittwater Local Government Area. A summary of the planning and legislative framework has been provided in Table 2.2

Table 2.2: Summary of Policies, Local Planning & Legislative Requirements

Level	Relevant policy / legislation	Relevance to subject site
LOCAL	*Pittwater Local Environmental Plan (LEP) 1993*	Controls the zoning of land and land uses within the Council area. Currently zoned 2(a) Residential
	LEP 1993 – Clause 41 (Preservation of Trees)	Council consent required for removal of trees within study area, via *Tree Preservation Order 1997.*
	Development Control Plan 25 – Conservation of Biodiversity	DCP 25 guides development within the LGA to ensure that it is compatible with the conservation of biodiversity, and that it complies with the objectives of the *Threatened Species Conservation Act 1995* and the *NSW Biodiversity Strategy.* According to DCP 25, Development Applications on properties containing core bushland and fragmented bushland must include a Flora and Fauna Assessment, and requires the preparation of a Bushland Management Concept Plan. Both documents have been prepared for the subject site (GIS Environmental Consultants 2000 and 2003).
STATE	*Threatened Species Conservation Act 1995*	There is no threatened ecological community present. No threatened flora or fauna species or populations were recorded within the subject site.
	Noxious Weeds Act 1993	There are 13 noxious weed species within the study area (see Appendix 3). The landowner has a legal responsibility to control weeds and prevent spread to adjoining land. Noxious weeds (including Pampas Grass) occur on the road boundary (Palm Beach Road) – on Council land. Control is Council's responsibility.
	Rural Fires Act 1997 and Rural Fires and Environmental Assessment Legislation Amendment Act 2002	The subject site is not identified as 'bushfire prone land' on Pittwater Council's bushfire risk map. However, there is still the potential for the site to be fired accidentally or through vandalism. Any proposed new dwelling should conform to the provisions of *Planning for Bushfire Protection 2001* (NSW Rural Fire Service and PlanningNSW).
	SEPP 19 – Bushland in Urban Areas	Pittwater is not listed in Schedule 1 of the SEPP. Therefore this Policy does not apply to the subject site. According to the definition provided by SEPP-19 the remnant bushland is too fragmented and too simplified to be described as 'urban bushland'.
	SEPP 44 – Koala Habitat Protection	The subject site is not identified as existing or potential koala habitat. Proposed subdivision will not have a significant impact on any Koala populations or their habitats. Therefore, the preparation of a Plan of Management for areas of Koala Habitat is not required.
	Sydney Regional Environmental Plan No 20--Hawkesbury-Nepean River	SREP 20 requires that the impacts of future land uses on the Hawkesbury-Nepean River System be considered in a regional context. Pittwater LGA is listed in Section 2, and therefore the aims and objectives of the Plan must be applied when planning the development.
	Native Vegetation Conservation Strategy	To adhere to the strategy, options should be identified to allow for the retention of areas with the highest concentration of indigenous species, and a planting program utilising locally indigenous species should be adopted. This is being addressed by reserving areas for bush regeneration works.
	NSW Biodiversity Strategy	As for the Native Vegetation Conservation Strategy, above.
FEDERAL	*Environment Protection and Biodiversity Conservation Act 1999*	No threatened flora species or ecological communities were recorded within the subject site.

3 LOT 1 - BUSHLAND MANAGEMENT PLAN

3.1 SITE DESCRIPTION

Lot 1 is sited at the northern end of the subject site, and comprises land on a steep west-facing slope overlooking Pittwater. A neighbouring property and residence is located immediately to the north, and a second property is located upslope (north-east).

Lot 1 is 0.14 hectares in size (1,390 sq metres). Of this total area, 521 sq metres have been identified for bush regeneration works and 149234 sq metresare for revegetation with locally indigenous species (Bushland Management Concept Plan, GIS Environmental Consultants 2003) (Figure 3.1).

3.2 MANAGEMENT ISSUES & RECOMMENDATIONS

3.2.1 Retention of Native Vegetation & Weed Control

There are very few native plants remaining in Lot 1. Noted during site investigations were a small number of individuals of *Banksia integrifolia* (Coast Banksia), *Acacia sophorae* (Coast Wattle), *Glochidion ferdinandi* (Cheese Tree), a single *Livistona australis* (Cabbage Palm), a *Ficus* sp. (Fig Tree) and several *Pittosporum undulatum* (Sweet Pittosporum). These native plants occur mainly below the rock ledges on the lower slopes, well below the proposed dwelling footprint and in an area proposed for 'bush regeneration' works (see Figure 3.1).

A number of native plants also occur within the development footprint. These include Coast Banksia, Coast Wattle and several Cheese Trees. However, these plants are far too large to transplant successfully. Due to the dense weed growth over most of the development footprint, it was not possible to locate any juvenile or native seedlings for translocation.

These native plants described in the development footprint and immediately surrounding areas are growing out of a dense weed thicket (to approximately 1.5 in height), which comprises *Lantana camara* (Lantana) overgrown with *Lonicera japonica* (Japanese Honeysuckle), *Ipomoea indica* (Morning Glory) and other weeds. The site is boggy and difficult to access for survey purposes. There is a dense growth of *Ageratina adenophora* (Crofton Weed) and *Ageratina riparia* (Mist Flower) in these boggy areas, with a large stand of *Arundo donax* (Giant Reed) occurring near the northern Lot boundary.

Recommendations

1) Clear all vegetation within the development footprint[4] using a bobcat or small backhoe. Hand removal of weeds is not an option in the development footprint due to weed density, difficulty of access and steepness of the slope.
2) Clear weeds around rock outcrops within the development footprint by hand where machine access is not possible.
3) Stockpile weed debris is a pre-designated site for collection and disposal off-site.
4) A qualified bush regenerator should supervise weed clearance.
5) Fence off the development footprint (as per Modified Conditions) to ensure no machine access to or construction impact on the remaining native vegetation.
6) Identify and clearly mark all native plants to be retained immediately outside the development footprint to ensure that these are protected from accidental damage.
7) Ensure that these native plants are protected during construction by the erection of tree guards around the trunk and/or protective fencing that should be erected on the outside edge of the drip line of each specimen.

[4] The development footprints have been staked and flagged on all four (4) corners.

8) In the designated 'bush regeneration' area, commence a targeted weeding program to remove all keystone weeds – i.e. environmental and declared noxious weeds. The bush regeneration program is to extend over a minimum period of 12 months from completion of construction.

9) For the designated 'indigenous revegetation' areas, select species from the list provided in Appendix 5, which comprises locally indigenous species and complements the landscape values of the locality. Also see Landscape Drawings (Hannan, 2004). At least four (4) months lead-time will be required for propagation of tubestock.

10) The bush regeneration and indigenous revegetation programs are to be carried out by trained bush regenerators[5]. All works involving on-ground works in area supporting native vegetation are to be supervised by a trained bush regeneration supervisor or ecological consultant with experience in bushland management.

3.2.2 Weed Control Methods

There are numerous methods used to control weeds on private and public lands. In theremnant urbanenvironment.

bushland, the bush regeneration approach - which includes hand weeding, the careful use of selective herbicides, and planting with local species - has become accepted practice. However, the use of machinery, broad-scale application of herbicides (boom or aerial spraying) or the use of fire to control weeds may also be appropriate on cleared or badly degraded land, or in rural situations.

The most commonly used methods of weed control are:

- Hand weeding (minimal impact);
- Herbicides;
- Mowing and slashing;
- Mechanical clearing;
- Burning;
- Weed matting and mulching; and
- Biological control.

The most appropriate weed control methods for Lot 1 will be mechanical clearing (within the development footprint on the mid to upper slopes), with hand weeding and the selective use of herbicides suitable for work in the remainder of the Lot.

Recommendations

A list of weeds and non-indigenous native species to be removed and their recommended methods of control has been included as Appendix 4. The recommended control methods are based on current 'best-practice' techniques currently used in the bush regeneration industry.

Table 3.1: List of Keystone Weeds to be removed from Lot 1 *

Botanic Name	Common Name	Status
Acetosa sagittata	Turkey Rhubarb	W4b noxious weed
Ageratina adenophora	Crofton Weed	Environmental weed
Ageratina riparia	Mist Flower	Environmental weed
Araujia hortorum	White Moth Plant	W4c noxious weed
Arundo donax	Giant Reed	W4a noxious weed
Asparagus densiflorus	Asparagus 'Fern'	W4c noxious weed

[5] A trained bush regenerator is one who has successfully completed the Natural Area Restoration Certificate II at NSW TAFE (or interstate equivalent).

Botanic Name	Common Name	Status
Cotoneaster pannosus	Cotoneaster	Environmental weed
Chlorophytum comosum	Spider Lily	Environmental weed
Crocosmia x *crocosmiiflora*	Montbretia	Environmental weed
Ipomoea indica	Morning Glory	W4c noxious weed
Lantana camara	Lantana	W2 noxious weed
Ligustrum lucidum	Large-leaf Privet	W4c noxious weed
Ligustrum sinense	Small-leaf Privet	W4c noxious weed
Nephrolepis cordifolia	Fishbone Fern	Environmental weed
Ochna serrulata	Ochna	W4b noxious weed
Rubus fruticosus	Blackberry	W2 noxious weed
Phoenix canariensis	Canary Island Palm	Garden Escape
Senna pendula	Cassia	Environmental weed
Strelitzia parviflora	Bird of Paradise	Garden Escape

* this weed list is not meant to be exhaustive as more species may be recorded once bush regeneration work gets underway

3.3 BUSH REGENERATION PROGRAM

3.3.1 General Guiding Principles

The management of any natural area (which includes native bushland and wetlands) should be guided by the following broad principles:

- To **protect** bushland remnants from further loss and the effects of existing and future threatening processes;
- To **identify** all biodiversity and geo-diversity elements;
- To **conserve** significant items/areas by mitigating or removing threatening process and promoting those natural processes required to ensure long-term viability;
- To **enhance** species diversity in highly simplified or degraded remnants not capable of restoration and in non-remnant areas;
- To **provide** corridors and linkages between remnants to facilitate movement and to encourage the flow of genetic material; and
- To **provide** opportunities for passive recreation in a controlled manner consistent with its ecological values.

This approach to bushland management has been adopted in the BMP for the subject site.

3.3.2 Definition of Urban Bushland

According to *SEPP-19*, bushland means "land on which there is vegetation which is either a remainder of the natural vegetation of the land or, if altered, is still representative of the structure and floristics of the natural vegetation".

In order to determine whether a stand of vegetation may be regarded as 'bushland' in terms of the legislation (*SEPP-19*), it should exhibit all of the attributes set out below.

- Indigenous native species should comprise the canopy (i.e. the upper stratum);
- The understorey stratum (a natural characteristic of the bushland type), and the ground cover stratum, should comprise indigenous native species, or if disturbed, will retain sufficient resources (i.e. seed or standing biomass) to re-establish those strata when disturbance is arrested or ameliorated; and

- The structure of the vegetation should be recognisably a remnant of a natural bushland type, or a regrowth form that has achieved a near natural structure, or is a seral stage towards that structure[6].

The native vegetation within the subject site is highly degraded and structurally simplified, and although there are some emergent canopy trees, shrubs and some discrete areas of native understorey remaining, the vegetation on Lot 1 cannot be described as 'bushland' in terms of SEPP-19[7]. Rather the site can be described as a neglected or overgrown garden, with some native species remaining in situ.

3.3.3 Determining Bushland Condition

Assessing Bushland Health & Regenerative Potential

Before commencing a bush regeneration project, the condition or health of the native plant community must be assessed, quantified and mapped. A 'condition of bushland' map is usually prepared to provide an indication of the regenerative potential or site resilience. There are four (4) categories in common use, explained below in Table 3.2.

Table 3.2: Assessment of Bushland Condition or Health

Category	Quantification	Description
Very good/excellent	> 70% native plants remaining	High quality
Good to fair	50-70% native plants remaining	High to moderate quality
Poor / degraded	30-50% native plants remaining or canopy trees only w/ native understorey absent	Moderate to degraded quality
Chronically degraded	< 30% native plants remaining, mostly cleared, or scattered native trees over pasture / introduced grassland	Non-bushland

In determining categories of bushland 'health' or condition, and thereby selecting the best approach to the rehabilitation of the plant community, the following points must be considered:

- The ratio of cover provided by native and weed species, and the height of both canopies;
- The diversity and number of native plants remaining;
- The life forms of the native plants (woody plants, herbs, ground covers);
- Target weed species present (determining techniques, time-frame for action, costs); and
- The proximity of nearby bushland (to provide seed and other propagative material).

Using the above-listed criteria, the condition of the (remaining) native vegetation in Lot 1 can be described as 'chronically degraded' or 'non-bushland: i.e. there are fewer than 30% native plants remaining. However, there are some small trees/large shrubs over a weedy understorey occurring below the rock ledges on the lower part of the Lot (designated as a 'bush regeneration area'): condition of this area is described as 'poor to moderately degraded'.

Site Resilience

Regenerative potential (site resilience) will be determined in large part by the distribution and abundance of native plants remaining on the site (or occurring close-by), and by the presence of native seed remaining in the soil seed bank. Where site resilience is judged to be 'moderate to high', the methods and techniques used by the bush regeneration industry will assist to re-establish the native plant community from *in-situ* sources.

Conversely, where for some reason site resilience is likely to be low (or absent), revegetation (or 'restoration') using local species ('indigenous revegetation') is the most practical and economical way to proceed.

Site resilience in Lot 1 is expected to be 'low to absent' on the middle to upper parts of the Lot, and 'low to moderate' on the lower slopes, where some native canopy and sub-canopy species remain in situ.

[6] NSW Department of Urban Affairs & Planning, *Circular No B13. 17 March* 1989

[7] Although it is noted that GIS (2000) describe the vegetation as 'bushland', although highly simplified and degraded.

3.3.4 Application of Bush Regeneration Principles

The bush regeneration approach usually concentrates on the rehabilitation of sites categorised as 'good to fair', relying on natural regeneration from *in situ* sources (i.e. existing native plants, seeds/root or rhizome fragments in the soil). Bushland in the 'good to fair' categories will retain sufficient regenerative potential (or resilience) to re-establish the native plant community once weeds have been removed.

In areas identified as 'poor quality' or 'degraded' – eg. rubble or fill soils, or where the native vegetation has been cleared for many years - there are usually few native plants remaining on the site. In such areas, it is likely that the soil seed bank is depleted (or absent entirely), thereby greatly reducing the potential for 'natural regeneration'. For such areas, alternate bushland rehabilitation methods must be used. In chronically degraded or extensively cleared areas, the plant community must be re-created - not regenerated. This usually involves broad scale and often-expensive revegetation programs.

3.3.5 Bush Regeneration

The most commonly used approach to the rehabilitation of native plant communities (bushland) is bush regeneration, which is defined as:

> *"...the practice of restoring bushland by focusing on reinstating and reinforcing the system's on-going natural regeneration processes" (Australian Association of Bush Regenerators, nd).*

The bush regeneration approach (removing weeds and encouraging native plant regeneration from *in situ* seed sources) is suitable only for those high resilience sites where the soil seed bank is intact, where native plants still occur, and where there is enough species diversity to restore the major structural components of the vegetation community.

Representative species of each layer (or stratum) – the canopy, mid-storey and understorey – must be present or (potentially) be present in the above-ground biomass or in the soil seed bank for natural regeneration to function as the primary rehabilitation process. Such bushland is described as 'structurally intact', and conforms to the definition provided by *SEPP-19*. Regeneration of the native plant community from soil seed sources cannot occur where the potential for regeneration (resilience) is very low or absent.

The bush regeneration approach incorporates a number of methodologies, or strategies – the most commonly used are:

- **Natural Regeneration** – consists of removing weeds using a mixture of hand weeding methods and the use of selective herbicides, and caring for the native seedlings which subsequently colonise the site.
- **Assisted Natural Regeneration** – combines traditional bush regeneration methods (e.g. weeding) with seed collection, propagation and planting of locally indigenous tubestock to supplement natural (unassisted) regeneration.
- **Reconstruction or Restoration** – is used where a native plant community has been completely lost, but where the biophysical attributes of the site (e.g. soil type, soil nutrient status, hydrological regime) are still within levels which remain tolerable by the original plant community. Reconstruction techniques centre on the planting of locally indigenous species in the proportions, range and densities representative of those found in the original plant community.
- **Fabrication** – is used where the original native plant community is no longer present, and where biophysical attributes have changed to the point where the original plant community cannot be reconstructed or recreated (i.e. where site conditions have changed so dramatically that simply replanting with local native species is impractical). Fabrication of a new plant community will necessarily take place over a long period of time (up to and possibly greater than 10 years). The time frame will depend heavily on the feasibility of ameliorating site impacts and of course, on the resources available for on-ground works.

The rehabilitation of native bushland in those parts of Lot 1 identified for bush regeneration works will be managed using strategies described as 'Natural Regeneration' and 'Assisted Natural Regeneration'.

Degraded or cleared sites will be 'Reconstructed' or 'Restored' through a program of indigenous revegetation (see Figure 3.1). A list of species suitable for revegetation works on Lot 1 has been included as Appendix 5.

3.4 REVEGETATION PROGRAM

Revegetation works in bushland usually involves 'enrichment' or supplementary planting in areas of low species diversity; and more comprehensive 'bush landscaping' on edge sites, buffer zones, or landscaped garden beds to create an extended native habitat.

Enrichment planting is usually carried out in order to increase species diversity by planting small shrubs, herbs, grasses and occasionally, a new canopy tree. Enrichment planting can also be used to increase habitat potential for native fauna, and/or to re-introduce species which are known to have once been a component of the local plant community, but for some reason have now been lost.

The term 'bush landscaping' refers to more extensive plantings, which are used to in-fill clearings or gaps, to link remnants, establish buffer zones at the interface between bushland and developed areas, or to create complementary native 'gardens' on adjoining sites.

Both approaches to the restoration of a native landscape are appropriate to the restoration of native bushland within the subject site.

With respect to Observation Point, enquiries have been made to three (3) specialist native plant nurseries – Wirreander, Toolijooa and Hills Native Plant Nurseries. Each of these commercial nurseries has indicated that they are able to collect seed and propagate the majority of species list in Appendix 5. As soon as sites and plant numbers are finalised, a pre-order will be lodged with one of these nurseries for the supply of indigenous tubestock.

Revegetation techniques are discussed in Section 3.4. A list of locally indigenous species suitable for landscaping and bushland regeneration has been included as Appendix 5 and provided with planting densities on Figure 3.1 (B).

3.4.1 Densities and Spatial Arrangement

The final density and height of any species planted must be considered with regards to maintaining views for neighbours, screening, and adhering to Pittwater 21 DCP and other planning guidelines.

Planting arrangements should be clumped (i.e. based on likely natural configurations and densities) in order to replicate the pre-disturbance plant community. Planting densities will depend on the number and type of native plants remaining after weeds are removed. If the site is effectively denuded after weed removal, and it is considered unlikely that natural regeneration will provide the desirable result, tubestock can be planted to replicate the pre-disturbance community structure.

Planting densities should be based on the final size of the relevant species used. For example, small-sized plants (generally less than 500 millimetres in height) should be planted in groups at a density of approximately three (3) to five (5) units per sq metre. Larger species may also be planted in groups of three (3), five (5) or seven (7), but should be placed sufficiently close together to enable a dense cover to form (where this is appropriate, and where it will not suppress light-demanding groundcovers, or obscure views for neighbours).

3.4.2 Planting Aids

Plant Fertilisers

A specially formulated native plant fertiliser (low in phosphorus) should be used when planting native tubestock on cleared or disturbed land. Regular applications of dilute fertiliser should be used twice yearly (spring and early autumn) or when plants show signs of yellowing or spindly growth (at least until the plants become established and drought hardy).

The use of a native plant fertiliser will promote plant establishment in the first 6-12 months of the planting program. As the vegetation cover is re-established and organic matter is re-cycled into the topsoil, there will be less need for supplementary nutrient input. Complete native plant fertilisers are available in granular form or as tree tablets. Soluble fertilisers are preferable to granular forms, although tree tablets (or pellets) are useful at planting time.

Water Retaining Granules/Soil Wetters

Soil wetters such as Debco, Saturaid, Terracottem (or similar) should be used in harsh conditions and/or where post-planting watering may be a problem, and they are particularly useful in free-draining sandy soils.

These products are inert, and do not react with fertilisers or herbicides. If used at planting time, watering times can be reduced by up to 50%. Experience in bush regeneration sites has allowed a much greater survival rate than previously achieved.

3.4.3 Staking & Plant Bags

As tubestock will be used for both enrichment planting and bush landscaping (indigenous revegetation), staking will not be necessary. There is no evidence of rabbits, hares or wallabies grazing on the subject site, so the use of protective plant bags will not be necessary.

Where advanced trees or shrubs are placed into the designated 'landscaped areas', stakes will be required to protect against high winds. This will be particularly important, as the soils on many parts of the site are very shallow.

3.4.4 Mulching and Weed Matting

Mulch is crucial to the success of most planting projects as it keeps the soil cool and moist and suppresses weed growth. Mulching around planted tubestock can utilise chipped eucalypt mulch (if this is available), or if costs allow, commercial 'leaf mulch' may be used.

Chipped or mulch from woody weed sources are never acceptable. All imported mulch must be of known provenance and free of weeds. Alternately, it is possible to foliar spray dense weed grasses with a selective herbicide (eg Fusilade) and to leave the dead thatch in place as mulch.

Mulch must be applied at the time of planting, after thorough soil wetting. When planting in large open areas, plants should be grouped to allow mulch to be applied around each 'planting island' or cluster. This reduces the edge effect (weed invasion, drying) and makes plant maintenance easier.

Weed Matting (such as Jutemaster, Enviromat, coconut fibre) is also useful for retaining soil moisture and suppressing weed growth. Individual weed mats may be used around each plant at planting time, or broad-scale weed matting can be placed over a large area. If the latter approach is used, the matting must be firmly anchored with long metal pins.

Note that weeds will grow well in most types of mulch and on the surface of weed matting, but seeds beneath are usually prevented from germinating. Note that grasses and bulbs, which have very sharp leading shoots (new growth), can pierce loosely spun weed mats and grow up through them.

3.4.5 Irrigation

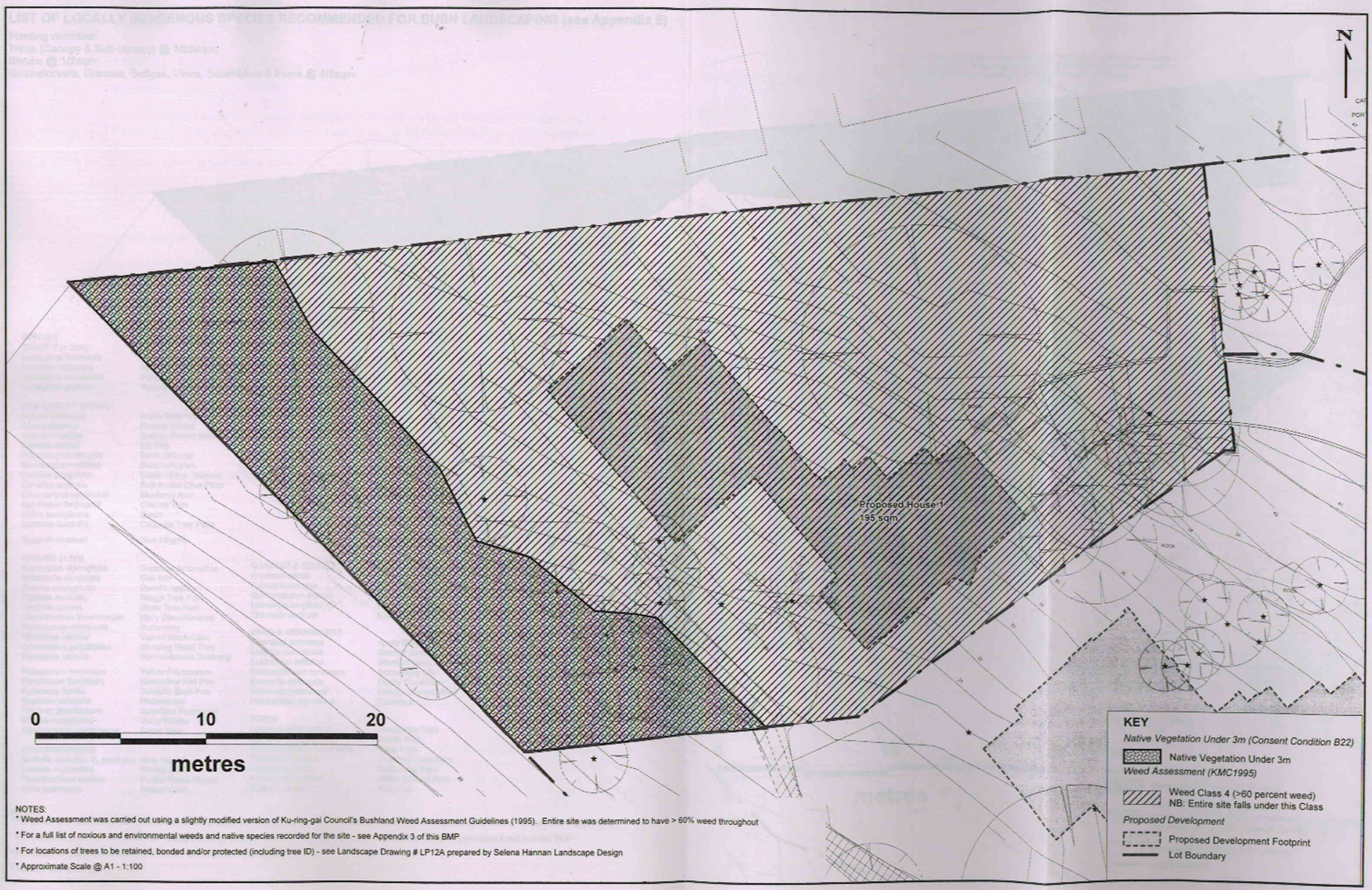
It may not be possible to water new plantings over a long period, therefore the planting program should be planned to coincide with the period of maximum (and regular) rainfall. In most of the Sydney Region, optimal planting times are autumn and spring (respectively).

It is also important to ensure adequate watering at placement, applying 1-1.5 litres of water to each new plant immediately after planting. Additionally, the use of a water-retaining compound and some form of surface mulch are strongly recommended to retain soil moisture and decrease the need for on-going watering.

Plants should be soaked for at least 30 minutes prior to planting (before being removed from their pots), watered thoroughly at planting and thereafter, watered once each week for a period of four (4) weeks (weather conditions dictating frequency).

After this period, watering comprising one (1) litre of water/plant each month will be required until the plants have established. If drought conditions prevail, the watering period may have to be extended to ensure plant survival. Watering is best carried out in the early morning, as watering at dusk encourages fungal attack in some species.

Irrigation following planting in bush garden settings is most effective using a 'dripper system', which delivers water to the plant roots rather than spraying it into the air. The existing irrigation system in the subject site could economically be converted from a spray system to a dripper system



NOTES:
* Weed Assessment was carried out using a slightly modified version of Ku-ring-gai Council's Bushland Weed Assessment Guidelines (1995). Entire site was determined to have > 60% weed throughout
* For a full list of noxious and environmental weeds and native species recorded for the site - see Appendix 3 of this BMP
* For locations of trees to be retained, bonded and/or protected (including tree ID) - see Landscape Drawing # LP12A prepared by Selena Hannan Landscape Design
* Approximate Scale @ A1 - 1:100

Figure 3.1
Action Plan - Lot 1
Diagram A - Native Vegetation Under 3m & Weed Assessment

URBAN BUSHLAND
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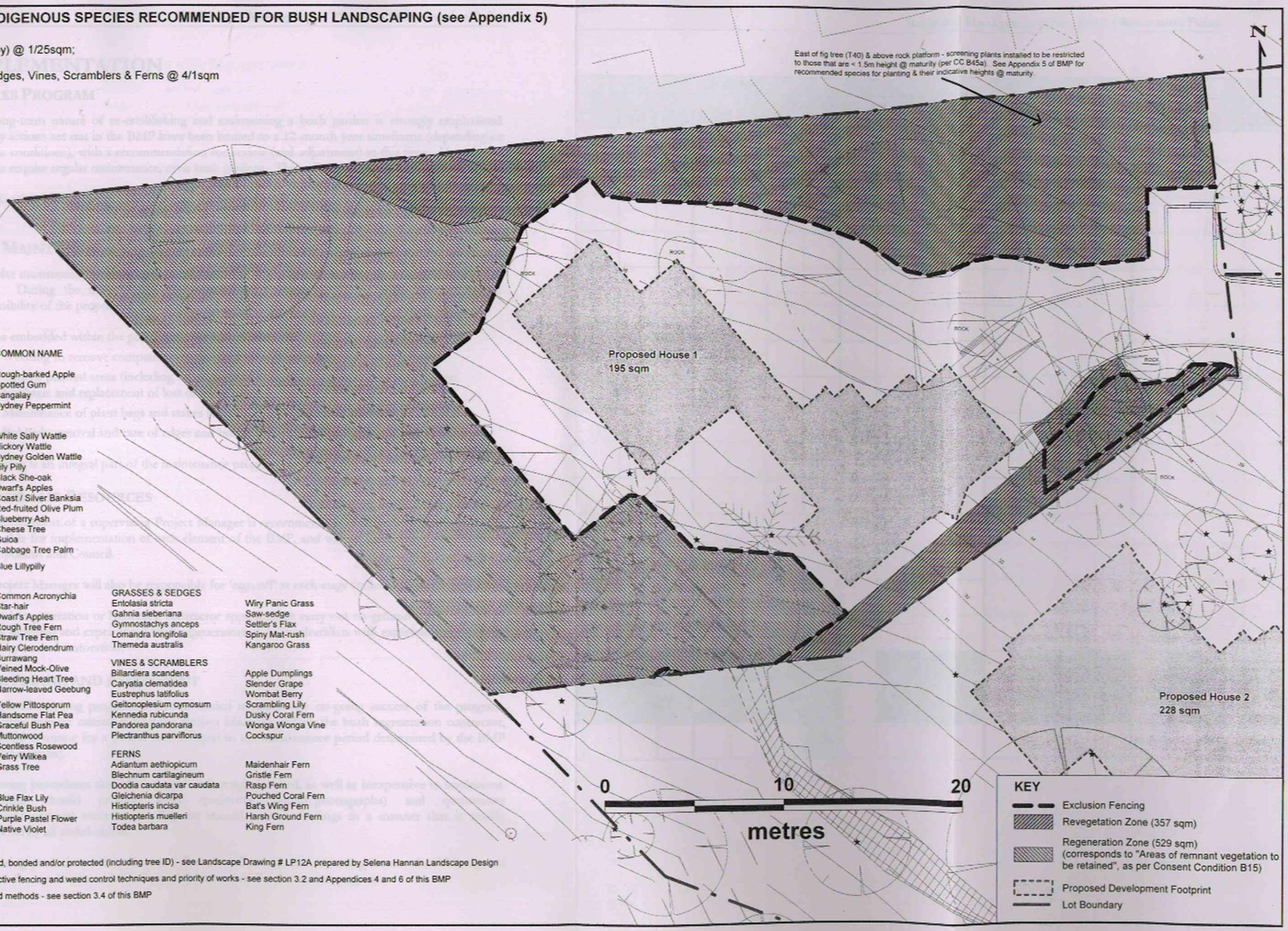
\\UBMC\Consultancy\Observation Point, Palm Beach\Mapping\Action Plan - Lot 1.WOR

LIST OF LOCALLY INDIGENOUS SPECIES RECOMMENDED FOR BUSH LANDSCAPING (see Appendix 5)

Planting densities:
Trees (Canopy & Sub-canopy) @ 1/25sqm;
Shrubs @ 1/2sqm;
Groundcovers, Grasses, Sedges, Vines, Scramblers & Ferns @ 4/1sqm



SPECIES	COMMON NAME
CANOPY (> 20m)	
Angophora floribunda	Rough-barked Apple
Corymbia maculata	Spotted Gum
Eucalyptus botryoides	Bangalay
Eucalyptus piperita	Sydney Peppermint
SUB-CANOPY (8-20m)	
Acacia floribunda	White Sally Wattle
Acacia implexa	Hickory Wattle
Acacia longifolia	Sydney Golden Wattle
Acmena smithii	Lily Pilly
Allocasuarina littoralis	Black She-oak
Backhousia myrtifolia	Dwarf's Apples
Banksia integrifolia	Coast / Silver Banksia
Cassiine australis	Red-fruited Olive Plum
Elaeocarpus reticulatus	Blueberry Ash
Glochidion ferdinandi	Cheese Tree
Guioa semiglauca	Guioa
Livistona australis	Cabbage Tree Palm
Syzgium oleosum	Blue Lillypilly
SHRUBS (< 8m)	
Acronychia oblongifolia	Common Acronychia
Astrotriche divaricata	Star-hair
Breynia oblongifolia	Dwarf's Apples
Cyathea australis	Rough Tree Fern
Cyathea cooperi	Straw Tree Fern
Clerodendrum tomentosum	Hairy Clerodendrum
Macrozamia communis	Burrawang
Notelaeas venosa	Veined Mock-Olive
Omalanthus populifolius	Bleeding Heart Tree
Persoonia linearis	Narrow-leaved Geebung
Pittosporum revolutum	Yellow Pittosporum
Platylobium formosum	Handsome Flat Pea
Pultenaea flexilis	Graceful Bush Pea
Rapanea variabilis	Muttonwood
Synoum glandulosum	Scentless Rosewood
Wilkiea huegeliana	Veiny Wilkea
Xanthorrhoea macronema	Grass Tree
GROUNDCOVERS	
Dianella caerulea, D. producta	Blue Flax Lily
Lomatia myricoides	Crinkle Bush
Pseudranthum varibile	Purple Pastel Flower
Viola hederacea	Native Violet
GRASSES & SEDGES	
Entolasia stricta	Wiry Panic Grass
Gahnia sieberiana	Saw-sedge
Gymnostachys anceps	Settler's Flax
Lomandra longifolia	Spiny Mat-rush
Themeda australis	Kangaroo Grass
VINES & SCRAMBLERS	
Billardiera scandens	Apple Dumplings
Caryatia clematidea	Slender Grape
Eustrephus latifolius	Wombat Berry
Geitonoplesium cymosum	Scrambling Lily
Kennedia rubicunda	Dusky Coral Fern
Pandorea pandorana	Wonga Wonga Vine
Plectranthus parviflorus	Cockspur
FERNS	
Adiantum aethiopicum	Maidenhair Fern
Blechnum cartilagineum	Gristle Fern
Doodia caudata var caudata	Rasp Fern
Gleichenia dicarpa	Pouched Coral Fern
Histiopteris incisa	Bat's Wing Fern
Histiopteris muelleri	Harsh Ground Fern
Todea barbara	King Fern

NOTES:
* For locations of trees to be retained, bonded and/or protected (including tree ID) - see Landscape Drawing # LP12A prepared by Selena Hannan Landscape Design
* For details re. exclusion and protective fencing and weed control techniques and priority of works - see section 3.2 and Appendices 4 and 6 of this BMP
* For details re. planting sources and methods - see section 3.4 of this BMP
* Approximate Scale @ A1 - 1:100

Figure 3.1
Action Plan - Lot 1
Diagram B - Revegetation and Regeneration Areas

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4 IMPLEMENTATION

4.1 WORKS PROGRAM

The long-term nature of re-establishing and maintaining a bush garden is strongly emphasised. Priority actions set out in the BMP have been limited to a 12-month year timeframe (depending on climatic conditions), with a recommendation for review (and adjustment) at this time. However all gardens require regular maintenance, even bush gardens. This will be on going.

An indicative works program has been set out in Figure 4.1. Indicative costings are shown in Table 4.1.

4.2 SITE MAINTENANCE

A regular maintenance program will be required for all planted areas after the completion of initial works. During the initial works and establishment phase (to 12-months), this will be the responsibility of the proponent.

Actions embedded within the plant maintenance program are:

- Weeding to remove competitive exotic plant species and control invasive natives;
- Care of planted areas (including watering, disease control, application of native plant fertilisers and replacement of lost or failed plants);
- Maintenance of plant bags and stakes (with removal once plants overtop the bags); and
- Rubbish removal and care of edges and buffer zones.

Monitoring is an integral part of the maintenance program (see Section 4.4).

4.3 LABOUR AND RESOURCES

The appointment of a supervising Project Manager is recommended. The Project Manager will be responsible for implementation of each element of the BMP, and will act as liaison officer between the proponent and Council.

The Project Manager will also be responsible for 'sign off' at each stage (milestone) of the project.

The bush regeneration or landscape contractor appointed to carry out on-ground works should be suitably qualified and experienced bush regenerators or horticulturalists with experience in bushland rehabilitation and restoration.

4.4 MONITORING AND ASSESSMENT

A simple monitoring program is recommended to assess the on-going success of the program. Monitoring may be carried out by the Project Manager and/or the bush regeneration contractor, and should continue for a period at least equal to the maintenance period determined by the BMP (set at 12 months).

Monitoring procedures should be simple and straightforward, as well as inexpensive to implement. Monitoring should provide both qualitative (visual/photographs) and quantitative (statistical/quadrats) assessment. Reports should provide findings in a manner that is readily interpreted by all stakeholders.

Monitoring procedures, frequency and duration of survey, and reporting format should be agreed between the contractor and the client at the outset of the restoration project.

4.5 PERFORMANCE INDICATORS AND MILESTONES

Performance indicators and milestones (or 'targets') are used to demonstrate that the program of implementation for the strategies outlined has been achieved.

The BMP has, as one of its primary goals, the restoration and maintenance of the native plant community in selected parts of the subject site. Other goals include the retention of native canopy trees and other within the subject site in order to retain the existing wildlife corridor through the locality.

The following indicators have been developed to serve as a general guide to monitoring the progress of revegetation works.

- An increase in the % cover of indigenous vegetation in each of the designated bush regeneration areas;
- An increase in the number of indigenous plant species (i.e. > species diversity);
- No net loss of canopy trees (i.e. replacement of trees removed for construction); and
- Eradication of all listed keystone weeds by the end of a 12-month period of primary and secondary weeding (bush regeneration works).

Figure 4.1: Timetable of Works

TASK	MONTH																														
	Pre-construction				Construction	Post-construction																									
	4	3	2	1		1	2	3	4	5	6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60
Pre-construction																													
Identify appropriate native species for post-construction revegetation and source a tubestock supplier.	■																												
Treat introduced (weed) grasses and other weed species located within the identified construction zone.		■	■																										
Patches of native vegetation identified for retention are to be weeded prior to construction works commencing.		■	■																										
Identify native vegetation for retention, and protect these using temporary barriers and exclusion fencing.				■																									
Install appropriate erosion and sediment controls.				■																									
Trees to be retained and/or patches of native vegetation clearly identified on site maps.				■																									
Identify sites for service areas and access routes and fence to prevent accidental incursion into vegetation to be retained.				■																									
During Construction																													
Reserve cleared native vegetation for re-use in rehabilitation works.					■																								
Ongoing maintenance of exclusion fencing, tree guards, erosion control measures, access routes and stockpile sites.					■																								
Post-construction																													
Remove exclusion fencing and tree guards.						■																							
Planting in revegetation and regeneration areas						■	■	■	■																				
Weed control throughout entire Lot (includes primary and follow-up treatments)						■	■	■	■																				
Maintenance and replacement planting (as needed).										■	■	■	■	■	■	■	■		■	■	■		■	■	■		■		■
On-going weed control program.										■	■	■	■	■	■	■	■		■	■	■		■	■	■		■		■
Remove erosion and sediment fencing																	■												

Table 4.1: Indicative Costing for the Works

Please note that the below costing is indicative only, and should be used as a guide only.

Activity	Unit Rate	Quantity	Cost
On-going implementation of BMP, during construction	500.00	5	2,500.00
Primary weed control in revegetation and regeneration areas,as indicated on Drawing (521 sq.m approx)	32.00	60	1,920.00
On-going implementation of BMP, post construction (5 years) Year 1 - 4 visits	525.00	4	2,100.00
Year 2 - 4 visits	550.00	4	2,200.00
Year 3 - 3 visits	580.00	3	1,740.00
Year 4 - 3 visits	605.00	3	1,815.00
Year 5 - 2 visits	640.00	2	1,280.00
Supply and plant Tubestock Approx	3.80	114	433.20
Supply and plant Hikos/virocells Approx	1.80	880	1,584.00
Establishment & maintenance of plantings. 10 sess over 3 months	240.00	10	2,400.00
Quarterly reporting on status of relocated plants (per DA)	185.00	4	740.00
Project Management & reporting	$500 Lump sum per annum	5	2,500.00
		Subtotal	**$21,212.20**
		GST	**$1,869.30**
		GST	**$2,121.22**
		Total	**$20,562.30**
		Total	**$23,333.42**

Variation Rates

Annual reports	Item	750.00	Variation rates do not include GST, add at the rate of 10%.
Bush regeneration supervision	Hour	38.00	
Bush regeneration labour	Hour	32.00	
Supply & install tubestock	Each	3.80	
Supply & install hiko/virocells	Each	0.90	
Exclusion fencing	Lin.m	13.50	
Sediment fencing	Lin.m	13.50	
Mulch	Cu.m	52.00	
Jute matting, supply & lay	Sq.m	8.93	
Nurse crop, as specified	Sq. m	5.93	

REFERENCES

Benson, D.H. and Howell, J. (1994). The Natural Vegetation of the Sydney 1:100 000 Map Sheet. *Cunninghamia* 3: (4) 677-787.

Briggs, J. and Leigh, J. (1996). *Rare or Threatened Australian Plants.* CSIRO Publishing, Collingwood.

Bureau of Meteorology Online (2004). *Climate Averages for Australian Sites: Riverview Observatory #066131.* http://www.bom.gov.au/climate/averages/tables/cw_066131.shtml. [Accessed June 2004].

Chapman, G.A. and Murphy, C.L. (1989). *Soil Landscapes of the Sydney 1:100 000 Sheet.* Soil Conservation Service of NSW, Sydney.

GIS Environmental Consultants (November 2000). Flora and Fauna Impact Assessment for Proposed Development at Observation Point, 1148-1152 Barrenjoey Road, Palm Beach. Unpublished report prepared for Raypond Developments Pty. Ltd

GIS Environmental Consultants (May 2003). Bushland Management Concept Plan for Observation Point, 1148-1152 Barrenjoey Road, Palm Beach. Unpublished report prepared for Raypond Developments Pty. Ltd.

Herbert, C. (ed.) (1983). *Geology of the Sydney 1:100 000 Sheet.* NSW Department of Mineral Resources.

Ku-ring-gai Municipal Council (1995). Bushland Weed Assessment Guidelines. Ku-ring-gai Council, Gordon.

NSW Scientific Committee (2004). *Threatened Species - Final Determinations.* http://www.nationalparks.nsw.gov.au/npws.nsf/Content/List+of+Scientific+Committee+determinations [Accessed June 2004].

Pittwater Council (2000) Development Control Plan #25 Conservation of Biodiversity. Pittwater Council, Dee Why.

Pittwater Council (2001 - 2003). *State of the Environment Report.* Pittwater Council, Sydney.

Pittwater Council (2003). Pittwater draft 21 Development Control Plan, Pittwater Council, Dee Why.

Rural Fire Service (NSW) (2001). Planning for Bushfire Control. RFS/DUAP, Sydney.

Smith, J. and Smith, P. (2000). *Management Plan for Threatened Fauna and Flora in Pittwater.* Report prepared for Pittwater Council.

6 APPENDICES

APPENDIX 1: SAMPLE MODIFIED CONDITIONS OF CONSENT (PITTWATER COUNCIL MAY 2003)

Bushland Management Plan
House 1, Observation Point, 1148-1152 Barrenjoey Road, Palm Beach

Development consent was given by Pittwater Council for construction of a dwelling on Lot 1 subject to a number of conditions. Included in these were the following:

B15. Three copies of a detailed **Bushland Management Plan** covering the regeneration/revegetation/ restoration of the site are to be submitted prior to the release of the Construction Certificate. The Bushland Management Plan is to be accompanied by a certification by an appropriately qualified and experienced Bushland Management Consultant stating that the Bushland Management Plan is consistent with Department of Urban Affairs and Planning's Urban Bushland Management Guidelines, the Conservation of Biodiversity DCP, the management for Threatened Flora and Fauna in Pittwater and any relevant requirements.

B15a. In particular, the following matters are to be addressed:

1. Define each project task to be undertaken during regeneration/revegetation/restoration; how each task will be done; the duration of each task; the priority order for each task; and who will be responsible for undertaking each task.
2. Prepare a time frame for all tasks involved.
3. Local native to be used - identify local native plant stock.
4. Prepare maps/diagrams and plant species lists including existing vegetation, site constraints and trees, vegetation, habitat, bush rock and other natural features to be retained.
5. Prepare maps/diagrams including proposed vegetation (species/communities), density of planting, size of plants (virocells, long stems, tubestock etc), sediment and erosion control to protect the vegetation etc.
7. Specify techniques to be used for domestic and feral animal control.
9. Detail site preparation including:
    a. Protection of trees, vegetation, habitat, bush rock or other natural feature to be retained;
    b. Installation of sediment and erosion control devices.
    c. Completion of any site works.
    d. Weed control prior to disturbance (techniques and sequences of removal).
    e. Weed control immediately following completion of site works (techniques and sequence of removal).
    f. Application of herbicides (if any) prior to site disturbance.
    g. Application of herbicides (if any) immediately following completion of site works.
    h. Top soil/litter layer.
    i. Soil remediation.
    j. Surface preparation (including levelling, deep ripping, scarifying, mulching).
    k. Surface stabilisation (must be suitable for the site vegetation) - matters including erosion matting, mulch brush-matting, sterile cover crops, binding sprays, and
    l. Site drainage.

10. Planting program and method including installation of weed matting, mulch, stakes and ties, tree guards, use of fertilizer and type (including justification of the use of fertilizer), use of water retaining crystals.

11. Site and vegetation maintenance including sediment and erosion control, watering, replacement of plant loss, disease and insect control, mulch, maintenance for a period of 18 months commencing at date of issue of Occupation Certificate.

12. Site management to prevent the placement of soil or storage of any materials in the drip line of trees or native vegetation or habitat to be retained on the site.

13. Monitoring and review (develop method for performance evaluation, replacement of plant losses and other relevant matters).

14. Other issues including public safety, signage, relevant legislation, planning instruments/guidelines, OH&S, community involvement, liaison with Department of Land and Water Conservation and other government departments, how other areas of the property and adjacent areas can be managed to complement the vegetation strategy (weed control, drainage, planting of indigenous canopy).

15. Detail the enhancement and regeneration of retained remnants. Where thickets of noxious or environmental weeds are to be removed, such removal is to be gradual and staged to prevent sudden complete loss of habitat.

16. Identification of protection of trees, vegetation, habitat, bush rock or other natural features, prior to works commencing on the site to prevent damage or injury during development.

17. Materials, stockpiles and vehicle stockpile areas are to be located on already cleared and disturbed land well away from creek line, trees, vegetation, habitat, bush rock or other natural features.

Whilst there are a number of certifications required as part of the development consent the following certifications are directly relevant to this plan.

Prior to issue of Construction Certificate

B15. This Bushland Management Plan is consistent with the Department of Urban Affairs and Planning's Urban Bushland Management Guidelines, the Conservation of Biodiversity DCP, the management for Threatened Flora and Fauna in Pittwater and any relevant requirements (date and signature) 15/11/04

C4. Prior to commencement of works a qualified bushland management consultant is to certify that adequate tree protection/exclusion fencing has been adequately installed as detailed in the approved plans prior to issuer of the construction certificate. (date and signature) .....

Prior to Commencement of Work

C1. Prior to commencement of site works, a qualified experienced bushland management consultant is to certify that they have been engaged to conduct a program of Bushland Management covering the regeneration/revegetation/restoration of the site. All details of the Bushland Management Program are to be in accordance with the Bushland Management Plan approved and/or nominated on the Construction Certificate. (date and signature) .....

C2. See C1.

C2a1. Pre-order or evidence of supply of plant material to be used identifying local native plant stock is to be submitted to Council or the accredited certifier. Failure to submit will involve breach of this consent/approval. (date and signature) .....

C2a3. A qualified ecologist is to certify that protective fencing has been installed around the trees, vegetation, habitat, bush rock or other natural features to be retained. (date and signature) .....

C2a4. The Site Manager is to certify that sediment and erosion control devices have been installed. (date and signature) .....

C2a5. A qualified experienced bushland management consultant is to certify that application of herbicides required prior to disturbance of the site has been completed. (date and signature) 15.11.04

C2a6. A qualified experienced bushland management consultant is to certify that the weed control required prior to disturbance of the site has been completed in accordance with the techniques and sequences of removal weed control. (date and signature) 15.11.04

C2a7. A qualified experienced bushland management consultant is to certify that application of herbicides required prior to disturbance of the site has been completed. (date and signature) 15.11.04

C2a8. The Site Manager is to certify that top soil/litter storage has been completed. (date and signature) ..... N/A

C2a9. The Site Manager is to certify that soil remediation has been completed. (date and signature) ..... N/A

C2a10. The Site Manager is to certify that surface preparation has been completed. (date and signature) ..... N/A

C2a11. A qualified experienced bushland management consultant is to certify that surface stabilization suitable for site vegetation has been completed. (date and signature) ..... N/A

C2a12. A qualified bushland management consultant is to certify that site drainage has been completed. (date and signature) ..... N/A

C2a13. The Site Manager is to certify that no soil or storage has been placed in the drip line of trees or native vegetation or habitat to be retained on the site. (date and signature) .....

C2a14. The Project Manager is to certify that other issues including public safety, signage, relevant legislation, planning instruments/guidelines, OH&S, community involvement, liaison with Department of Land and Water Conservation and other government departments, how other areas of the property and adjacent areas can be managed to complement the vegetation strategy (Weed control, drainage, planting of indigenous canopy) have been addressed.

APPENDIX 2: LIST OF FLORA SPECIES RECORDED AT OBSERVATION POINT

* from GIS Environmental Consultants (November 2000)

Flora Species List for Observation Point, Palm Beach

By Nicholas Skelton, GIS Environmental Consultants, 45 Austin Ave North Curl Curl, Ph: 041 943 8672

Species list for the site not just a quadrat or a sub sample. The list is ordered by abundance then genus then species.

October 2000

Location **AMG Easting 344055 and Northing 6281318**

Vegetation Type **9h II**

Survey Area **0.5843 ha**

Plants in the More Disturbed Areas

	Abundance On Site	Genus and Species	Family	Habit	Common Name	Status
1	Common	Asparagus plumosus	ASPARAGACEAE	Herb	Climbing asparagus	Nox W4c
2	Frequent	Adiantum aethiopicum	ADIANTACEAE	Fern	Maidenhair Fern	Protected
3	Frequent	Ageratina riparia	ASTERACEAE	Herb	Crofton Weed	Weed
4	Frequent	Banksia integrifolia ssp. integrifolia	PROTEACEAE	Tree	Coastal Banksia	
5	Frequent	Diospyros australis	EBENACEAE	Tree		Significant
6	Frequent	Ficus rubiginosa	MORACEAE	Tree	Port Jackson Fig	
7	Frequent	Glochidion ferdinandi var. ferdinandi	EUPHORBIACEAE	Tree	Cheese Tree	
8	Frequent	Imperata cylindrica var. major	POACEAE	Grass	Blady Grass	
9	Frequent	Ipomea indica	CONVOLVULACEAE	Vine	Morning glory	Nox W4c
10	Frequent	Lantana camara	VERBENACEAE	Shrub	Lantana	Nox W2
11	Frequent	Ligustrum lucidum	OLEACEAE	Shrub	Privet - broad leaved	Nox W4b
12	Frequent	Pittosporum undulatum	PITTOSPORACEAE	Tree	Sweet Pittosporum	
13	Frequent	Pteridium esculentum	DENNSTAEDTIACEAE	Fern	Bracken	
14	Frequent	Tradescantia albiflora	COMMELINACEAE	Herb	Wandering Jew	Weed
15	Widespread	Cissus antarctica	VITACEAE	Vine	Kangaroo Vine	
16	Widespread	Commelina cyanea	COMMELINACEAE	Herb	Creeping Christian	

17	Widespread	Dichondra repens	CONVOLVULACEAE	Herb	Kidney Weed	
18	Widespread	Kennedia rubicunda	FABACEAE	Vine		
19	Widespread	Ligustrum sinense	OLEACEAE	Shrub	Privet - narrow leaved	Nox W4b
20	Widespread	Lonicera japonica	CAPRIFOLIACEAE	Vine	Japanese Honeysuckle	Weed
21	Widespread	Pandorea pandorana	BIGNONIACEAE	Vine	Wonga Wonga Vine	
22	Widespread	Pennisetum clandestinum	POACEAE	Grass	Kikuyu	Planted
23	Widespread	Senna floribunda	CAESALPINIOIDEAE	Shrub	Cassia	Weed
24	Widespread	Sida rhombifolia	MALVACEAE	Shrub	Paddy's Lucerne	Weed
25	Widespread	Strelitzia sp.	MUSACEAE	Shrub	Bird of Paradise	Planted
26	Widespread	Verbena officinalis	VERBENACEAE	Herb	Common Verbena	Weed
27	Widespread	Viola hederacea	VIOLACEAE	Herb	Native Violet	
28	Widespread	Allocasuarina torulosa	CASUARINACEAE	Tree	Forest She-oak	
29	Scattered	Acacia longifolia	FABACEAE	Shrub	Sydney Golden Wattle	
30	Scattered	Acetosa sagittata	POLYGONACEAE	Vine	Turkey Rhubarb	Nox W4b
31	Scattered	Ageratina riparia	ASTERACEAE	Herb	Mistflower	Weed
32	Scattered	Angophora floribunda	MYRTACEAE	Tree	Rough-barked Apple	
33	Scattered	Bidens pilosa	ASTERACEAE	Herb	Cobbler's Pegs, Pitchforks	Weed
34	Scattered	Briza maxima	POACEAE	Grass	Quaking Grass	Weed
35	Scattered	Briza minor	POACEAE	Grass	Shivery Grass	Weed
36	Scattered	Canna indica	CANNACEAE	Herb	Canna Lily	Weed
37	Scattered	Conyza albida	ASTERACEAE	Shrub	Fleabane	Weed
38	Scattered	Dendrobium linguiforme	ORCHIDACEAE	Herb	Tongue Orchid	
39	Scattered	Gnaphalium sp.	ASTERACEAE	Herb	Cud weed	weed
40	Scattered	Hibiscus sp.	MALVACEAE	Shrub	Hibiscus	Planted
41	Scattered	Hypochaeris glabra	ASTERACEAE	Herb	Smooth Cats Ear	Weed
42	Scattered	Ipomea cairica	CONVOLVULACEAE	Vine	Morning Glory	Nox W4c
43	Scattered	Livistona australis	ARECACEAE	Palm	Cabbage Tree Palm	Significant
44	Scattered	Nephrolepis cordifolia	DAVALLIACEAE	Fern	Fishbone Fern	Weed

45	Scattered	Ochna serrulata	OCHNACEAE	Shrub	Ochna, Mickey Mouse Plant	Nox W4b
46	Scattered	Oplismenus aemulus	POACEAE	Grass	Basket Grass	
47	Scattered	Paspalum dilatatum	POACEAE	Grass	Paspalum	Weed
48	Scattered	Rubus hillii	ROSACEAE	Scrambler	Broad-leaved Bramble	
49	Scattered	Solanum mauritianum	SOLANACEAE	Shrub	Wild Tabacco Tree	Weed
50	Scattered	Tropaeolum majus	TROPAEOLACEAE	Herb	Nasturtium	Weed
51	Scattered	Watsonia meriana cv.Bulbillifera	IRIDACEAE	Herb	Wild Watsonia, Bugle Lily	Weed
52	Uncommon	Arundo donax	POACEAE	Grass	Giant Reed / Elephant Grass	Nox W4a
53	Uncommon	Bougainvillea sp.	NYCTAGINACEAE	Shrub	Bougainvillea	Weed
54	Uncommon	Bryophyllum delagoense	CRASSULACEAE	Herb	Mother-of-millions	Weed
55	Uncommon	Cestrum parqui	SOLANACEAE	Shrub	Green Cestrum	Nox W2
56	Uncommon	Clivea miniata	AMARYLLIDACEAE	Herb	Kaffir Lily	Planted
57	Uncommon	Cotoneaster pannosus	ROSACEAE	Shrub	Cotoneaster	Weed
58	Uncommon	Dimorphotheca ecklonis	ASTERACEAE	Herb	Sailor Boy Daisy	Weed
59	Uncommon	Grevillea Hybrid	PROTEACEAE	Shrub	Grevillea	Planted
60	Uncommon	Monstera deliciosa	ARACEAE	Herb	Swiss Cheese Plant	Weed
61	Uncommon	Musa sp.	MUSACEAE	Herb	Banana	Planted
62	Uncommon	Nerium oleander	APOCYNACEAE	Shrub	Oleander	Planted
63	Uncommon	Phoenix canariensis	ARECACEAE	Palm	Canary Island Palm	Planted
64	Uncommon	Physalis peruviana	SOLANACEAE	Herb	Cape Gooseberry	Weed
65	Uncommon	Plantago lanceolata	PLANTAGINACEAE	Herb	Lamb's Tongues, Plantain	Weed
66	Uncommon	Plectranthus parviflorus	LAMIACEAE	Herb	Cockspur Flowers	
67	Uncommon	Protoasparagus aethiopicus	ASPARAGACEAE	Herb	Asparagus Fern	Nox W4c
68	Uncommon	Solanum nigrum	SOLANACEAE	Herb	Black-berry Nightshade	Weed
69	Uncommon	Syzygium oleosum	MYRTACEAE	Tree	Blue Lillypilly	Significant
70	Uncommon	Tetragonia tetragonoides	AIZOACEAE	Herb	Warrigal Greens, Native Spinach	

Plants in the Less Disturbed Areas

	Abundance On Site	Genus and Species	Family	Habit	Common Name	Status
71	Common	Allocasuarina torulosa	CASUARINACEAE	Tree	Forest She-oak	
72	Common	Pittosporum undulatum	PITTOSPORACEAE	Tree	Sweet Pittosporum	
73	Frequent	Acmena smithii	MYRTACEAE	Tree	Lily Pilly	
74	Frequent	Adiantum aethiopicum	ADIANTACEAE	Fern	Maidenhair Fern	Protected
75	Frequent	Banksia integrifolia ssp. integrifolia	PROTEACEAE	Tree	Coastal Banksia	
76	Frequent	Backhousia myrtifolia	MYRTACEAE	Tree	Grey Myrtle	
77	Frequent	Diospyros australis	EBENACEAE	Tree		
78	Frequent	Eucalyptus piperita	MYRTACEAE	Tree	Sydney Peppermint	
79	Frequent	Ficus rubiginosa	MORACEAE	Tree	Port Jackson Fig	
80	Frequent	Glochidion ferdinandi var. ferdinandi	EUPHORBIACEAE	Tree	Cheese Tree	
81	Frequent	Ligustrum lucidum	OLEACEAE	Shrub	Privet - broad leaved	Nox W4b
82	Widespread	Acacia longifolia	FABACEAE	Shrub	Sydney Golden Wattle	
83	Widespread	Briza minor	POACEAE	Grass	Shivery Grass	Weed
84	Widespread	Cissus antarctica	VITACEAE	Vine	Kangaroo Vine	
85	Widespread	Commelina cyanea	COMMELINACEAE	Herb	Creeping Christian	
86	Widespread	Elaeocarpus reticulatus	ELAEOCARPACEAE	Tree	Blueberry Ash	
87	Widespread	Imperata cylindrica var. major	POACEAE	Grass	Blady Grass	
88	Widespread	Ipomea indica	CONVOLVULACEAE	Vine	Morning glory	Nox W4c
89	Widespread	Lantana camara	VERBENACEAE	Shrub	Lantana	Nox W2
90	Widespread	Notelaea venosa	OLEACEAE	Shrub	Native Olive	
91	Widespread	Pandorea pandorana	BIGNONIACEAE	Vine	Wonga Wonga Vine	
92	Widespread	Pteridium esculentum	DENNSTAEDTIACEAE	Fern	Bracken	
93	Widespread	Rapanea variabilis	MYRSINACEAE	Tree	Brush Muttonwood	
94	Widespread	Strelitzia sp.	MUSACEAE	Shrub	Bird of Paradise	Planted
95	Widespread	Tradescantia albiflora	COMMELINACEAE	Herb	Wandering Jew	Weed
96	Scattered	Acacia implexa	FABACEAE	Shrub	Hickory	

97	Scattered	Acacia parramattensis	FABACEAE	Tree	Parramatta Green Wattle	
98	Scattered	Ageratina riparia	ASTERACEAE	Herb	Crofton Weed	Weed
99	Scattered	Angophora floribunda	MYRTACEAE	Tree	Rough-barked Apple	
100	Scattered	Calochlaena dubia	DICKSONIACEAE	Fern	False Bracken Fern	
101	Scattered	Cassine australis var. australis	CELASTRACEAE	Tree		Sig Plt
102	Scattered	Cissus hypoglauca	VITACEAE	Vine	Native Grape	
103	Scattered	Cortaderia sp.	POACEAE	Grass	Pampas Grass	Nox W2
104	Scattered	Corymbia maculata	MYRTACEAE	Tree	Spotted Gum	
105	Scattered	Dianella caerulea	PHORMIACEAE	Herb	Blue Flax Lily	
106	Scattered	Dichondra repens	CONVOLVULACEAE	Herb	Kidney Weed	
107	Scattered	Entolasia stricta	POACEAE	Grass		
108	Scattered	Eucalyptus botryoides	MYRTACEAE	Tree	Bangalay	
109	Scattered	Eustrephus latifolius	LUZURIAGACEAE	Vine	Wombat Berry	
110	Scattered	Geitonoplesium cymosum	LUZURIAGACEAE	Vine	Scrambling Lily	
111	Scattered	Geranium homeanum	GERANIACEAE	Herb		
112	Scattered	Gleichenia dicarpa	GLEICHENIACEAE	Fern		
113	Scattered	Glycine clandestina/microphylla	FABACEAE	Vine	Love Creeper	
114	Scattered	Hypochaeris glabra	ASTERACEAE	Herb	Smooth Cats Ear	Weed
115	Scattered	Livistona australis	ARECACEAE	Palm	Cabbage Tree Palm	Significant
116	Scattered	Oplismenus aemulus	POACEAE	Grass	Basket Grass	
117	Scattered	Senna floribunda	CAESALPINIOIDEAE	Shrub	Cassia	Weed
118	Scattered	Smilax glyciphylla	SMILACACEAE	Vine	Native Sarsaparilla	
119	Scattered	Trifolium repens	FABACEAE	Herb	White Clover	Weed
120	Scattered	Viola hederacea	VIOLACEAE	Herb	Native Violet	
121	Uncommon	Acacia ulicifolia	FABACEAE	Shrub	Prickly Moses	
122	Uncommon	Angophora costata	MYRTACEAE	Tree	Smooth-barked Apple	
123	Uncommon	Asparagus densiflorus	ASPARAGACEAE	Herb	Asparagus Fern	Nox W4c
124	Uncommon	Asparagus plumosus	ASPARAGACEAE	Herb	Climbing asparagus	Nox W4c
125	Uncommon	Blechnum ambiguum	BLECHNACEAE	Fern		
126	Uncommon	Brachychiton acerifolius	STERCULIACEAE	Tree	Flame Tree	
127	Uncommon	Breynia oblongifolia	EUPHORBIACEAE	Shrub	Breynia	

128	Uncommon	Cyathea cooperi	CYATHEACEAE	Fern	Straw Tree Fern	
129	Uncommon	Eriobotrya japonica	ROSACEAE	Shrub	Loquat	Planted
130	Uncommon	Histiopteris incisa	DENNSTAEDTIACEAE	Fern	Batswing Fern	
131	Uncommon	Lilium formosum	LILIACEAE	Herb	Roadside Lilly	Weed
132	Uncommon	Ochna serrulata	OCHNACEAE	Shrub	Ochna, Mickey Mouse Plant	Nox W4b
133	Uncommon	Persoonia linearis	PROTEACEAE	Shrub	Narrow-leaved Geebung	
134	Uncommon	Petroselinum crispum	PLATYSTACEAE	Herb	Parsley	Weed
135	Uncommon	Pittosporum revolutum	PITTOSPORACEAE	Tree	Rough-fruit Pittosporum	
136	Uncommon	Rubus fruticosus (agg. sp.)	ROSACEAE	Scrambler	Blackberry	Nox W2 or Nox W3
137	Uncommon	Todea barbara	OSMUNDACEAE	Fern		

Noxious weed classifications	
W1	The presence of the weed on land must be notified to the local control authority and the weed must be fully and continuously suppressed and destroyed.
W2	The weed must be fully and continuously suppressed and destroyed.
W3	The weed must be prevented from spreading and its numbers and distribution reduced.
W4a	The weed must not be sold, propagated or knowingly distributed and any part of the weed must be prevented from growing within 3 metres of the boundary of a property.
W4b	The weed must not be sold, propagated or knowingly distributed and any existing weed must be prevented from flowering and fruiting.
W4c	The weed must not be sold, propagated or knowingly distributed and the weed must be prevented from spreading to an adjoining property.
W4d	The weed must not be sold, propagated or knowingly distributed and the weed must be removed if it is: 3 metres in height or less, or within half a kilometre of remnant urban bushland, as defined by SEPP 19, and is not deemed by Council as having historic
W4e	The weed must be fully and continuously suppressed and destroyed. All reasonable precautions must be taken to ensure produce, soil, livestock, equipment and vehicles are free of the weed before sale or movement from an infested area of the property.
W4f	The weed must not be sold, propagated or knowingly distributed. Any biological control or other control program directed by a local control authority must be implemented.
W4g	The weed must not be sold, propagated or knowingly distributed.

APPENDIX 3: NOXIOUS WEEDS LISTED IN PITTWATER LOCAL CONTROL AREA

Those species in **bold** were recorded in the subject site at Observation Point (GIS Environmental Consultants 2003). The actions required are described below.

Botanical Name	Common Name	Category
Acacia karroo	Karroo Thorn	W1
Acetosa sagittata	**Turkey Rhubarb**	**W4b**
Alternanthera philoxeroides	Alligator Weed	W1
Anredera cordifolia	Madeira Vine	W4c
Araujia sericifera	Moth Vine	W4c
Arundo donax	**Giant Reed / Elephant Grass**	**W4a**
Asparagus densiflorus	**Asparagus Fern**	**W4c**
Asparagus plumosus	**Climbing Asparagus**	**W4c**
Cabomba spp. (except *C. furcata*)	Cabomba (except Pink Cabomba)	W4g
Centaurea maculosa	Spotted Knapweed	W1
Centaurea nigra	Black Knapweed	W1
Cestrum parqui	**Green Cestrum**	**W2**
Chromolaena odorata	Siam Weed	W1
Chrysanthemoides monilifera	Bitou Bush/Boneseed	W2
***Cortaderia* spp.**	**Pampas Grass**	**W2**
Eichhornia crassipes	Water Hyacinth	W1
Equisetum spp.	Horsetail	W1
Gymnocoronis spilanthoides	Senegal Tea Plant	W1
Harrisia spp.	Harrisia Cactus	W4f
Hieracium spp.	Hawkweeds	W1
Hypericum perforatum	St John's Wort	W2
Ipomea cairica	**Morning Glory**	**W4c**
Ipomea indica	**Morning Glory**	**W4c**
Kochia scoparia (except *K. scoparia* ssp. *tricophylla*)	Kochia (except Summer or Mock Cypress)	W1
Lagarosiphon major	Lagarosiphon	W1
Lantana camara	**Lantana (Pink Flowered)**	**W2**
Lantana camara	Lantana (Red Flowered)	W2
Ligustrum lucidum	**Privet - broadleaf**	**W4b**
Ligustrum sinense	**Privet – narrow-leaf**	**W4b**
Ludwigia peruviana	Ludwigia	W2
Miconia spp.	Miconia	W1
Nassella tenuissima syn *Stipa tenuissima*	Mexican Feather Grass	W1
Ochna serrulata	**Ochna**	**W4b**
Opuntia spp. (except *O. ficus indica*)	Prickly Pears (except Indian Fig)	W4f
Orobanche spp. (except *O. minor* and *O. cernua* var. *Australiana*)	Broomrape	W1
Parietaria judaica	Pellitory	W3
Parthenium hysterophorus	Parthenium Weed	W1
Phyllostachys spp.	Rhizomatous Bamboo	W4a
Pistia stratiotes	Water Lettuce	W1
Ricinus communis	Castor Oil Plant	W2

Botanical Name	Common Name	Category
***Rubus fruticosus* (agg. spp.)**	**Blackberry**	**W2**
Salix spp.*	Willows	W4g
Salvinia molesta	Salvinia	W1
Toxicodendron succedaneum	Rhus Tree	W2

* with the exception of *S. babylonica*, *S. calodendron*, *S. reichardtii.*

Actions Required For Noxious Weed Categories

W1 must be notified to local Council then fully and continuously suppressed and destroyed.

W2 must be fully and continuously suppressed and destroyed.

W3 must be prevented from spreading and its numbers and distribution reduced.

W4a shall not be sold, propagated or knowingly distributed. No part of the plant can grow within 3m of boundary.

W4b shall not be sold, propagated or knowingly distributed. Established plantings must be prevented from flowering and fruiting.

W4c shall not be sold, propagated or knowingly distributed. Occupier must prevent spreading to adjoining property.

W4d shall not be sold, propagated or knowingly distributed. Any tree three (3) m in height or less must be removed. Any tree within half a kilometre (0.5 km) of remnant urban bushland, as defined by SEPP 19, and not deemed by Council as having historical or heritage significance shall be removed.

W4f shall not be sold, propagated or knowingly distributed. Occupier must implement biological control or other control program directed by the Local Control Authority.

W4g must not be sold, propagated or knowingly distributed.

(NSW *Noxious Weeds Act 1993*)

Note: *Cortaderia selloana* (Pampas Grass) occurs in the cement crib retaining wall on Palm Beach Road. This is public land and the control of noxious weeds in this area is the responsibility of Pittwater Council.

APPENDIX 4: KEYSTONE WEEDS IN THE SUBJECT SITE AND RECOMMENDED CONTROL METHODS

Species	Common Name	Status / Comments	Method of Control							
			Hand Weeding			Herbicide Application				Other Methods & Comments
			Hand removal	Rake & pile	Dig out	Cut stump & poison	Drill & poison	Scrape & poison	Spot spray	
Woody Weeds										
Cestrum parqui	Green Cestrum	Noxious (W2)			✓ seedling < 0.5 m			✓		Few plants only
Cotoneaster pannosus	Cotoneaster	Garden escape / Environmental	✓seedling < 0.5 m			✓				Few plants, mainly Lots 2 and 4
Lantana camara	Lantana	Noxious (W2)			✓	✓				Mainly Lot 4, with isolated clumps elsewhere
Ligustrum sinense, L. lucidum	Privets	Noxious (W4b)	✓ seedling < 5 cm		✓ seedling < 0.05	✓	✓ >1m	✓ sapling 0.05 - 1m	✓ seedling < 5 cm	Widespread, some very large Privet trees (Lots 2 & 4)
Ligustrum sinense, L. lucidum	Privets	Noxious (W4b)	✓ seedling < 5 cm		✓ seedling < 0.05	✓	✓ >1m	✓ sapling 0.05 - 1m	✓ seedling < 5 cm	Widespread, some very large Privet trees (Lots 2 & 4)
Ochna serrulata	Ochna	Noxious (W4b)			✓ seedling < 0.25 m			✓		Scattered throughout
Olea europaea var africana	African Olive	Garden escape / Environmental			✓ seedling < 0.5 m	✓				Few plants, mainly Lots 2 & 4
Phoenix canariensis	Canary Island Palm	Ornamental garden plant			✓ seedling < 0.25 m	✓				Remove seedlings only – keep mature specimens
Rubus fruticosus	Blackberry	Noxious (W2).			✓	✓		✓	✓	Mainly Lots 1 & 2. Use Garlon spray
Senna pendula	Cassia / Arsenic Bush	Environmental Weed			✓	✓				
Herbaceous Weeds										
Arundo donax	Giant Reed	Noxious (W4a)				✓				Large infestation Lot 1 only
Agave sp, Aloe sp	Succulents	Garden escape			✓ Bobcat					Large specimen Lot 2, plus seedlings

Species	Common Name	Status / Comments	Method of Control							
			Hand Weeding			Herbicide Application				Other Methods & Comments
			Hand removal	Rake & pile	Dig out	Cut stump & poison	Drill & poison	Scrape & poison	Spot spray	
Ageratina adenophora,A. riparia	Crofton Weed, Mist Flower	Environmental	✓						✓	Lots 1, 2 & 4 colonising damp soils
Bryophyllum tubiflora	Resurrection Plant	Garden escape / Environmental	✓		✓				✓	In garden of old fibro house – Lot 4
Chlorophytum comosum	Spider Lily	Garden escape/ Environmental			✓				✓	Remove all roots
Nephrolepis cordifolia	Fishbone Fern	Garden escape/ Environmental			✓				✓	Mainly Lot 4 – around old house
Ehrharta erecta	Panic Grass	Environmental							✓	Spray and oversow with native grasses or mulch.
Protasparagus plumosus	Asparagus Fern	Noxious (W4c)			✓					Scattered but few plants
Strelitzia sp.	Fan Palm	Garden escape/ Environmental			✓ young plants	✓				Widespread – throughout site
Watsonia bulbillifera	Pink Bugle Lily	Garden escape/ Environmental			✓ isolated plants				✓	Lot 4 – garden of old house
Vines / Scramblers										
Acetosa sagittata	Turkey Rhubarb	Noxious (W4c)			✓				✓	Scattered: minor
Delairea odorata	Cape Ivy	Environmental			✓				✓	
Hedera helix	English Ivy	Environmental weed			✓	✓				One occurrence Lot 4
Ipomoea indica	Morning Glory	Noxious (W4c)			✓ isolated plants				✓	Widespread but light infestations except for Lot 2
Jasminium polyanthum	Chinese Jasmine	Environmental weed/ Garden escape			✓ isolated plants			✓	✓	In Lot 4, garden of old house
Lonicera japonica	Honeysuckle	Environmental weed/ Garden escape			✓ isolated plants			✓	✓	Major weed, widespread, especially Lots 1 & 2
Protasparagus densiflorus	Ground Asparagus	Noxious (W4c).			✓				✓	Spray w Brushoff. Forms dominant groundcover in Lots 2 & 3.

APPENDIX 5: LIST OF LOCALLY INDIGENOUS SPECIES RECOMMENDED FOR BUSH LANDSCAPING AT LOTS 1, 2, 3 & 4 OBSERVATION POINT, PALM BEACH

Species	Common Name	Height (m) *	Comments
Canopy (> 20m)			
Angophora floribunda	Rough-barked Apple	15-20	Small to medium sized tree: needs deep moist soils (eg sheltered position).
Corymbia maculata	Spotted Gum	To 45	Large canopy tree - locally significant
Eucalyptus botryoides	Bangalay	30	Pockets of deep sandy soils preferred
Eucalyptus piperita	Sydney Peppermint	20	Frequent occurrence on site
Sub-canopy (8-20m)			
Acacia floribunda	White Sally Wattle	15	Pale yellow flowers for late winter colour
Acacia implexa	Hickory Wattle	4-10	Extant on site in sub-canopy – suffers from galls
Acacia longifolia	Sydney Golden Wattle	3-4	Short-lived – suffers from galls & borers.
Acmena smithii	Lilly Pilly	To 20	Common on site, but needs shelter
Allocasuarina littoralis	Black She-oak	5-6	Plant in groups of 3+ near top of slope
Backhousia myrtifolia	Dwarf's Apples	3-4	Will sucker in damp sites: drainage easement
Banksia integrifolia	Coast / Silver Banksia	6-16	Common on site: feature plant
Cassine australis	Red-fruited Olive Plum	6-10	Council requirements to propagate
Elaeocarpus reticulatus	Blueberry Ash	10	Ornamental species w/ blue berries: attracts birds.
Glochidion ferdinandi	Cheese Tree	15	Suckering habit: good for slope retention.
Guioa semiglauca	Guioa	8-15	Attracts fruit bats and birds
Livistona australis	Cabbage Tree Palm	15	Common species in the area but only a few specimens on site.
Syzygium oleosum	Blue Lillypilly	3-8	Common in the area
Shrubs (< 8m)			
Acronychia oblongifolia	Common Acronychia	2-8	Needs a very sheltered site
Astrotricha divaricata	Star-hair	2-5	Common early pioneer species in understorey
Breynia oblongifolia	Dwarf's Apples	2	Suckers well & will stabilise banks
Clerodendrum tomentosum	Hairy Clerodendrum	2-4	Needs a moist, sheltered position
Macrozamia communis	Burrawang	2	Large fern-like plant with spiky leaves & red fruit bodies – extant on site
Notelaea venosa	Veined Mock-Olive	2.5-8	Widespread on site.
Omalanthus populifolius	Bleeding Heart Tree	2-4	Opportunistic pioneer species: short lived
Persoonia linearis	Narrow-leaved Geebung	3	Common in area in understorey
Pittosporum revolutum	Yellow Pittosporum	1-3	Needs a moist, sheltered location
Platylobium formosum	Handsome Flat Pea	1	Plant in groups in open drier sites
Pultenaea flexilis	Graceful Bush Pea	4	Dry sheltered locations: good pioneer species
Rapanea variabilis	Muttonwood	2-3	Suckering habit: good bank stabiliser
Synoum glandulosum	Scentless Rosewood	1.5-3	Attractive species useful in landscaping/screening
Wilkiea huegeliana	Veiny Wilkiea	1-2	
Xanthorrhoea macronema	Grass Tree	1 - 2	Specimen plant or use in groups of 3+
Groundcovers			
Dianella caerulea, D. producta	Blue Flax Lily	0.5	Strap-like foliage, blue flowers: hardy

Species	Common Name	Height (m) *	Comments
Lomatia myricoides	Crinkle Bush	0.5-1	
Pseuderanthemum variabile	Purple Pastel Flower	0.1-0.3	Delicate ground cover. Will volunteer into site from adjacent bushland in any case.
Viola hederacea	Native Violet	0.25-0.3	Creeping ground cover useful in moist locations
Grasses & Sedges			
Entolasia stricta	Wiry Panic Grass	< 0.25	Will volunteer from adjacent bushland
Gahnia sieberiana	Saw-sedge	2	Good plant for drainage easements: plant in groups of 3+
Gymnostachys anceps	Settler's Flax	2	Tufted herb common in sheltered sites
Lomandra longifolia	Spiny Mat-rush	1.5	Common sedge: variety of uses: cluster plant
Themeda australis	Kangaroo Grass	1	High light levels required- open sites
Vines/Scramblers			
Billardiera scandens	Apple Dumplings	~ 1	Shade needed
Cayratia clematidea	Slender Grape	< 1	Rainforest scrambler: needs support
Eustrephus latifolius	Wombat Berry	Up to 2	Delicate scrambler over small shrubs
Geitonoplesium cymosum	Scrambling Lily	> 2	Hardy wiry scrambler: may need cutting back
Kennedia rubicunda	Dusky Coral Fern	> 2	Hardy but rampant vine/scrambler
Pandorea pandorana	Wonga Wonga Vine	> 2	Occurs on site – can become very large (cut back to contain growth)
Plectranthus parviflorus	Cockspur	0.3-0.6	Weak scrambling herb: moist sheltered location
Ferns			
Adiantum aethiopicum	Maidenhair Fern	< 0.5	Sheltered sites, needs ample moisture
Blechnum cartilagineum	Gristle Fern	0.6-1	As above
Cyathea australis	Rough Tree Fern	2.5-6	Sheltered sites, rock ledges. Plant in groups
Cyathea cooperi	Straw Tree Fern	2.5-6	As above
Doodia caudata var *caudata*	Rasp Fern	< 0.25-0.3	Erect or drooping fronds: moist, sheltered sites
Gleichenia dicarpa	Pouched Coral Fern	1.5-2	Best in well irrigated sites: below rock ledges
Histiopteris incisa	Bat's Wing Fern	1-2	Moist sheltered sites
Histiopteris muelleri	Harsh Ground Fern	0.3-1	Moist sheltered sites
Todea barbara	King Fern	< 1	Best in well irrigated sites: below rock ledges

* Height at maturity depends on micro-site characteristics, eg. soil type & depth, sub-surface drainage and soil moisture levels, nutrient availability and shelter from prevailing winds.

Note: it is not intended that all the species listed above be used at Observation Point. This list provides a choice of local native species that may be used in revegetation and/or indigenous landscaping.

APPENDIX 6: PROTOCOL FOR PROTECTION OF BUSHLAND DURING CONSTRUCTION

The following recommendations, while 'generic in nature', have been included in this BMP to guide any future construction works, and ensure that there is minimal damage to extant native vegetation.

To guard against inadvertent damage to extant native vegetation and geological features (rock ledges, sandstone 'floaters'), UBMC makes the following recommendations.

Pre-construction

1) Identify individuals or patches of native vegetation for retention in and adjacent to the construction zone, and protect these using temporary barriers and exclusion fencing.

2) Protect native canopy trees identified for retention in the construction zone by the erection of tree guards around the trunk and/or protective fencing that should be erected on the outside edge of the drip line of each specimen, and by restricting parking or stockpiling of construction material.

3) Protective measures must be erected prior to commencement of construction and maintained in good order for the duration of construction works.

4) Trees to be retained and/or patches of native vegetation are to be clearly identified on the engineer's drawings and other site maps.

5) Patches of native vegetation identified for retention should be weeded prior to construction works commencing. Seed-bearing weed debris and weeds/exotics with fragments (rootstock, rhizomes) capable of regeneration are to be removed and taken to an approved landfill site. The area of native vegetation should be clearly marked on all site maps.

6) Introduced (weed) grasses and other weed species located within the identified construction zone should be treated with a foliar herbicide (eg Roundup or Glyphosate 340) or a grass-specific herbicide (eg. Fusilade) at least 4 weeks prior to construction works. If the soil within the construction site is to be re-used elsewhere on the Lot, it is important to ensure that weeds are completely dead before the reserved soil is spread [8].

7) Identify appropriate native species for post-construction revegetation and source a tubestock supplier. Allow at least four (4) months for propagation of required species.

8) Construction huts, parking lots, stockpiles, access routes and the like are not to be located within areas of vegetation to be retained. Identify appropriate sites for service areas and access routes and fence to prevent accidental incursion by vehicles etc.

NB: the Bushland Management Concept Plan (GIS Environmental Consultants 2003) requires pre-weeding of areas 'to be disturbed'. This has been interpreted as the 'development footprint'.

NNB: As the topsoil is predominantly weedy, the BMCP calls for removal of excavated topsoil from the site. No topsoil is to be stockpiled for reuse.

During Construction

1) Install appropriate erosion and sediment controls (as determined by a site-specific Soil and Water Management Plan) and ensure runoff from construction site does not affect the native canopy trees on the neighbouring Lots.

2) Any fill soil imported onto the site should be sourced from non-contaminated sites. Imported fill should be certified as 'free of noxious plants', including their seed. Fill soils should be stockpiled in a reserved area and contained with sediment barriers until such time as they are required for use.

[8] It is envisaged that much of the weedy topsoil will be removed mechanically during preparation for construction.

3) Cleared native vegetation (timber, small branches, leaf litter) should be reserved and stockpiled for re-use in the rehabilitation works undertaken post-construction, where it can be utilised for mulch, fauna habitat and a potential seed source. Ideally, stockpiled native vegetation should be stored on a tarpaulin so that any seed dropped during storage can be collected. **Note** that timber from woody weeds should never be chipped to use as mulch unless the material can be completely composted.

4) Ongoing maintenance of exclusion fencing, tree guards, erosion control measures, access routes and stockpile sites is required throughout the construction period to ensure no undue impacts are cause on the vegetation to be retained. If required, stabilise any areas of exposed soil on steep slopes using heavy-duty black plastic or erosion control matting.

Post Construction

1) Once construction works have been completed and the site is stabilised, remove exclusion fencing and tree guards.

2) Bush regeneration works are to commence in the areas identified for 'bush regeneration' (see Figure 3.1) and should be completed within 12 months.

3) Revegetation works must be carried as quickly as possible post-construction, using a planting mix that should be predominantly local native species. Areas for indigenous vegetation are identified on Figure 3.1.

4) The developer must ensure no net loss of native canopy species, and must consider the provision of suitable habitat for flora and fauna in all landscaping works.

5) A qualified bush regeneration company should undertake weed control and (ideally) indigenous revegetation within the identified bush area.

6) Maintenance and replacement planting within the bush area should be undertaken over a (minimum) 12-month period to ensure a tubestock survival rate of at least 80%.

7) An on-going weed control program should be an integral part of site management. Noxious and environmental weeds are to be controlled throughout the subject site on a regular basis (as per *Noxious Weeds Act 1993*).

APPENDIX 7: PLATES

View west of dense weed growth in proposed development footprint – this section is classed as a 'revegetation' area

View north upslope above proposed development footprint – this section is classed as a 'revegetation' area

View of vegetation below the rock platform (western end of Lot), classed as a 'regeneration' area. Note presence of noxious weed Asparagus Fern in understorey

View west of boundary between Lots 1 (RHS) and 2 (LHS). The stormwater line will be installed in this approximate location

APPENDIX 8: JUDITH RAWLING, *CURRICULUM VITAE*

CURRICULUM VITAE

JUDITH LOUISE RAWLING

BA • DipEd• MEnvStud • MAIBiol • MEIA • MRAIPR • ECA (NSW)

PERSONAL DETAILS

Name:	Judith Louise Rawling	
Citizenship:	Australian/Canadian	
Health:	Excellent	
Address:	Business:	111 Showground Road, CASTLE HILL NSW 2154
	Home:	"St Clements", 1238 Bells Line of Road KURRAJONG HEIGHTS NSW 2758
Telephone:	Home:	(02) 4567 7979
	Business:	(02) 9894 2255
	Mobile:	0414 886 219
Fax:	Home:	(02) 4566 7979
	Business:	(02) 9894 2215

CURRENT POSITION

- 1990 – present *Managing Director* – Urban Bushland Management Consultants Pty Ltd and *Principal* – Urban Bushland Management Projects Pty Ltd.
- Set up *Urban Bushland Management Consultants* in 1990 – a company specialising in planning and consultancy in the field of natural resource management along with "hands–on" contractual work rehabilitating degraded bushland remnants in the urban environment.
- Management of consultancy and contracting services.
- 2000 Winner of Hills Excellence in Business Award for Excellence in Environmental Management & Contribution.
- Provision of consultancy services on bushland management. This includes survey design and implementation, mapping, report writing, advice on the impact of government policies, etc.
- Planning and supervision of the work of 60 field staff, on an average of 30 concurrent projects in Sydney/Wollongong/Central Coast/Blue Mountains.
- Liaison and negotiation with municipal and shire councils and other landholders on contracts and continuing work.
- Preparation and implementation of project budgets, including salaries, equipment purchase, costing of special tasks, etc.
- Course design, field exercise planning and teaching, and other participation in training courses for bush regenerators.
- Publicity activities – preparation of newsletter and other publications, displays, speeches to community groups.
- Nominee for the Eureka Prizes (Excellence in Scientific Research), an honour which recognises contribution to the field of Restoration Ecology.
- Extensive experience teaching biology and environmental studies in Australia, Canada and Britain and part–time lecturing at a number of universities in Australia.

- Author of numerous publications and conference papers.
- Employed as a specialist associate–consultant for a number of large firms, including Landscan, EDAW (Australia), Hyder Consulting, Gutteridge Haskins & Davey, AMBS and Pittenridgh, Shinkfield and Bruce, Colin Ging & Partners, Carson Group.

COMMITTEE AND OTHER MEMBERSHIPS

Professional Memberships

- Member, Royal Australian Institute Parks & Recreation, 1994 – present
- Member, Environment Institute of Australia, 1993 – present
- Member, Australian Institute of Biology, 1991 – present
- Member, Municipal Conservation Association, 1995 – present
- Member, Weed Society (NSW) 1986 – present
- Member, National Trust of Australia (NSW) 1986 – 1995, 1999 – present
- Ecological Consultants Association (NSW), Council Member 1999–present, Member of the Executive 2003 and 2004.

Committee Memberships

- Member, Hawkesbury–Nepean Catchment Trust: Revegetation Steering Committee 1994 – 1996
- Member, Lane Cove Catchment Management Committee – 1990 – 1996
- Member Cattai Catchment Management Committee 1998 – 2000
- Discovering Alternatives to Garden Escapes – Committee Member 203 - present
- Member, Hawkesbury Rainforest Network – Executive Member 2001-2004
- Member, NSW Noxious Weeds Advisory Committee (NSW Agriculture), 1993 – present
- Member Noxious Weeds Technical Advisory Committee (NSW Agriculture), 1993 – present.

EMPLOYMENT HISTORY

1989 – present Various TAFE colleges

Guest Lecturer

1995 University of Western Sydney

Part Time Teacher

1993 – 1995 University of Sydney

Part–time Teacher, Continuing Education

1986 – 1990 National Trust of Australia (NSW Division)

Bush Management Officer

- Responsible for the planning and management of the Trust's Bush Management Program B.A., Business Administration and Computer Science.

1989 University of Technology

Guest Lecturer, School of Biological Sciences

1989 University of Technology Sydney

Guest Lecturer, School of Biological Sciences

1985–86 and 1988–89 Macquarie University

Part–time Tutor Environmental Studies.

1964–1985 Sydney, Canberra, Oxford, London and Montreal

Teacher, Senior Biology and Science

- Design and implementation of new courses in the ACT secondary system, including those for tertiary accreditation
- Environmental education field trips throughout the ACT and the Sydney region, and to the Barrier Reef, the Snowy Mountains area, and Central Australia
- Supervision of graduate teacher trainees. Mentor program.

EDUCATIONAL QUALIFICATIONS

1989 Macquarie University Sydney

- **Master of Environmental Studies**
- Thesis title: The Ecology and Distribution of Pampas Grass (Cortaderia selloana) in Sydney Bushland
- Concurrently with Masters Degree studies (1984–87) undergraduate courses at Macquarie University: Introductory Statistics, Plant Structure and Function, Introductory Ecology.

1982 – 1983 Macquarie University Sydney

- **Diploma in Environmental Studies**
- Courses completed: Principles of Environments, Chemicals in the Environment, Aspects of Urban Ecology, Natural and Managed Ecosystems, Environmental Impact Assessment, Environmental Policy and Law, Social Impact on Environments, Australian Ecosystems

1971–72 Canberra College of Advanced Education

- **Graduate Diploma in Education**

1969–70 and 1976 Australian National University

- Courses completed: Vertebrate Ecology, Animal Ecology, Theoretical Zoology, Animal Behaviour, Human Ecology.

(*NOTE: All the above studies were completed part–time while in full–time employment)*

1961 – 1964 University of Ottawa Canada

- **Bachelor of Arts**
- Studies in English, French, Philosophy, Biology, Classics, Mathematics

LICENSES

- National Parks & Wildlife Scientific License Section 132C, NP Act 1974. Licence No. S10411
- Class A Drivers License

ADDITIONAL TRAINING

- Bush Fire Personnel Basic Training Program – ACT Bush Fire Council
- Alpine Ecology Course – Department of Conservation and Natural Resources, Falls Creek, Victoria
- Human Resource Management – University of Sydney, Centre for Continuing Education, 1991
- Botany and Ecology of the Sydney Region – University of Sydney, Centre for Continuing Education, 1991
- Chainsaw Use and Maintenance
- Seed Collection Workshop, Ku–ring–gai Municipal Council
- Grasses and Sedges Identification Workshop

GENERAL NOTES:

GENERAL

G1. The drawings are to be read together with all Architects drawings and specifications.

G2. Dimensions shall not be obtained by scaling from the drawings. All setting out dimensions shall be verified and discrepancies shall be referred to the Engineer prior to commencement of work.

G3. Care is required during construction so that structural elements are not over stressed and that the works and excavations required therefore are kept stable at all times.

G4. Design, materials and workmanship are to be in accordance with current S.A.A standards and statutory authority regulations except where varied by these documents.

G5. Design live loads are in accordance with AS 1170.1

FOOTINGS

F1. Foundation strata is assumed for design purposes in accordance with AS 2870. See footnote. Classification to be verified by a Geotechnical Engineer commissioned by the client if certification of foundation is required.

F2. Footings to be constructed and back filled as soon as possible following excavation to avoid softening by rain or drying out by exposure.

F3. Footings must bear into undisturbed natural ground clear of organic material. Refer to details.

F4. If rock or variable bearing strata is encountered during excavation of the footings all footings/piers are to be excavated to similar material of greater bearing capacity.
The Engineer is to be contacted at that time for approval or review.

F5. Footings to be cast in approved material having an allowable capacity as follows:

Sand Foundations:

SA1. Required bearing capacity 100 kPa.
SA2. Trenches must be cleaned of all debris and hand compacted prior to placement of reinforcement.

Clay Foundations:

CL1. Required bearing capacity 150 kPa.
CL2. Trenches must be cleaned of all debris. Soft spots must be cut out and filled as per compacted fill notes, prior to placement of reinforcement.

Shale Foundations:

SH1. Required bearing capacity 400 kPa.
SH2. Excavation for footings into shale must be cast or capped with plain concrete on the same day as excavation.

Sandstone Foundations:

SS1. Required bearing capacity 650 kPa.
SS2. Scrape weathered surface to remove cleaved sandstone under footings.

Refer adjacent for assumed Design bearing strata.

CONCRETE

C1. All workmanship and materials shall be in accordance with AS 3600.

C2. Concrete quality shall be as follows and shall be verified by tests.

C3. All concrete unless otherwise noted shall have a slump of 80mm at point of placement, a max. aggregate size of 20 mm, and a min. cement content of 280 kg/cubic metre. No water shall be added to the mix prior to or during placement of concrete.

C4. Clear concrete cover to reinforcement shall be as follows unless otherwise shown-

ELEMENT	INTERIOR	EXTERIOR	EXTERIOR CAST AGAINST GROUND
FOOTINGS	-	-	50
COLUMNS/PEDESTALS	30 UNO	REFER TO PLAN	-
SLABS/WALLS	25	REFER TO PLAN	40 ON MEMBRANE
BEAMS	25 UNO	REFER TO PLAN	50
BLOCKWORK	55 FROM APPROPRIATE FACE		

C5. Sizes of concrete elements do not include thickness of applied finishes.

C6. All Construction Joints locations shall be approved by the Structural Engineer.

C7. Beam depths are written first and include slab thickness, if any.

C8. No holes or chases other than those shown on the structural drawings shall be made in concrete elements without the prior approval of the engineer.

C9. Shrinkage reducing admixtures such as 'Eclipse' or approved equivalent, if specified, must be added to mix prior to pour.

C10. Water reducing agents, if specified, must be added to mix prior to pour. No extra water is to be added to increase slump.

C11. Where vertical slab/beam surfaces are formed against a masonry (or other) wall, provide 10 mm styrene separation material.

C12. Water must not be added to concrete mix prior to placement of concrete.

C13. Above covers may have to be adjusted if fire rating is a requirement.

REINFORCEMENT

R1. All reinforcement specified is Grade D500 unless noted otherwise.

R2. Reinforcement is represented diagrammatically it is not necessarily shown in true projection.

R3. Top reinforcement is to be continuous over supports.
Bottom reinforcement to be lapped at supports.

R4. Welding of reinforcement shall not be permitted unless shown on the structural drawings.

R5. Pipes or conduits shall not be placed within the zone of concrete cover to the reinforcement without the approval of the engineer.

R6. All reinforcing bars and fabric shall comply with AS 4671-2001.

R7. Reinforcement symbols:
N - Grade 500N deformed bar (D500) Normal Ductility
R - Grade 250N plain round bar (R250) Normal Ductility.
SL - Grade 500L welded deformed ribbed mesh (D500) Square Low Ductility.
RL - Grade 500L welded deformed ribbed mesh (D500) Rectangular Low Ductility.
The number immediately following these symbols is the number of millimeters in the bar diameter.
Example :
8 N12-250, denotes 8, Grade 500N deformed bars, 12 mm diameter at 250 cts.

R8. Fabric reinforcement to be lapped 1 complete square + 25 mm unless noted otherwise.

R9 All reinforcement shall be firmly supported on bar chairs spaced at a maximum of 750 centres both ways under rod and fabric reinforcement. Reinforcement shall be tied at alternate intersections.

FORMWORK

FW1. Formwork must be cleaned of all debris prior to casting of concrete.

FW2. Minimum stripping times for form work shall be as recommended in AS 1509 or as directed by the engineer.

FW3. The finished concrete shall be a dense homogeneous mass, completely filling the form work, thoroughly embedding the reinforcement and free of stone pockets. All concrete elements including slabs on ground and footings shall be compacted with mechanical vibrators.

FW4. Curing of all concrete is to be achieved by keeping surfaces continuously wet for a period of 3 days, followed by prevention of loss of moisture for seven days followed by a gradual drying out . Approved sprayed on curing compounds may be used where no floor finishes are proposed. Polythene sheeting or wet hessian may be used if protected from wind and traffic.

BRICKWORK

BR1. Brickwork is to be constructed to AS 3700.

BR2. Two layers of approved greased metal based slip material shall be used over all load bearing walls that support concrete slabs and placed on smooth brickwork or trowelled mortar finish. Non load-bearing walls shall have 10 mm compressible material and ties to the slab soffit.

BR3. No brickwork shall be constructed on suspended slabs until all propping has been removed from the underside of the slab and the concrete has the specified 28 day cylinder strength verified by tests.

BR4. Control joints to be placed at a maximum of 8m centres or in accordance with AS 3700.

BR5. Exposure grade bricks to be used below damp proof course.

BR6. Vertical control joint material where specified on plan between slabs and brick walls shall be: 10 mm Spandex External UNO.
Bitumastic fibreboard internal UNO.

BR7. Provide stainless steel wall ties below DPC to AS 3700. Provide galvanized wall ties above DPC to AS 3700 & Local Council Specifications.

BLOCKWORK

BL1. Concrete blocks shall have a minimum compressive strength of 15 MPa and conform to AS 1500.
Masonry to be constructed to AS 3700.

BL2. Where cores of hollow blocks are to be filled, properly compacted 20MPa concrete with 10 mm aggregate and 230 mm slump shall be used. Clean out openings must be utilized for all cores.

BL3. Location of actual starters is critical to suit block cores, allow 55 mm cover from the outside face of blockwork. All reinforcement lap lengths to conform to AS 3600.

BL4. Control joints to be placed at a maximum of 8 m centres or in accordance with AS 3700.

BL5. Vertical control joint material where specified on plan between slabs and brick walls shall be: 10 mm Spandex External UNO.
Bitumastic fibreboard internal UNO.

BL6. Retaining walls or any reinforced and concrete core filled block walls to be of Double 'U' Block Construction.

BL7. No blockwork shall be constructed on suspended slabs until all propping has been removed from the underside of the slab and the concrete has the specified 28 day cylinder strength verified by tests, unless approved by the Structural Engineer.

BL8. Max. pour height for unrestrained blockwork is 2000.

STEEL

S1. All Structural steelwork to be Grade 300 or greater.
Design, fabrication and erection to be in accordance with AS 4100.

S2. Materials and workmanship shall comply with AS 1250 - 1981, SAA Steel Structures Code and the specification for Structural Steel.

S3. Rolled steel sections including steel plates shall comply with AS 3678 - 1990.

S4. Cold formed steel sections shall be Grade 450 Zinc coated in accordance with AS 1538-1988.

S5. Welded and seamless steel hollow sections shall comply with AS 1163. Grade 350.

S6. Bolt Designation:
4.6S - Commercial bolts Grade 4.6, snug tightened.
8.8S - High Strength structural bolts Grade 8.8, snug tightened.
8.8TB - High Strength structural bolts Grade 8.8, fully tightened to AS 1511 and acting as a Bearing Joint.
8.8TF - High Strength structural bolts Grade 8.8, fully tensioned to AS 1511 and acting as a Bearing Joint.
Unless noted otherwise, all bolts will be 8.8S.

S7. Unless shown otherwise, minimum connection shall be 2M16 bolts, 10 thick gusset plates, 6mm continuous fillet welds.

S8. Load indicating washers shall be used in all fully tensioned joints. (8.8TF & 8.8TB).

S9. All welding shall be carried out in accordance with AS 1554 SAA Structural Steel Welding Code.

S10. Unless noted otherwise all welds shall be category SP using E41xx Electrodes.
All butt welds shall be complete penetration butt welds category SP.

S11. Grouting of anchor bolt sleeves and base plates shall be completed by the contractor using High Strength, Non-Shrink grout.

S12. Fabrication and erection tolerances for Structural Steelwork shall be in accordance with AS 4100.

S13. Purlin bolts shall be M12 - 4.6S galvanised.

S14. Steel work shall have one of the following grades of corrosion protection:-

INTERNAL

a. Thoroughly cleaned wire brushing, followed by two coats of zinc phosphate primer equivalent to Dulux Luxaprime applied by hand using brushes to achieve a total dry film thickness of 70 microns.

EXTERNAL ELEMENTS, & ELEMENTS WITHIN EITHER SKIN OF EXTERNAL CAVITY WALLS

b. Preparation Blast clean to a minimum standard Class 2.5 in accordance with AS 1627 Part 4.
Primer 2-pack epoxy phosphate at dft 75 microns (Dulux Durepon P14).
Barrier Coat 2-pack epoxy micaceous iron oxide, dft 100 microns
Finish Coat 2-pack epoxy high gloss acrylic to dft 75 microns (e.g. Dulux Acrathane 1 F) in an approved colour.

c. Hot dipped galvanized to AS 4680.
Where galvanized coating is broken on site make good with two coats of zinc rich epoxy primer equivalent to Dulux Zinc anode 202 or Hot Metal Spray in accordance with AS 4680.

S15. Workshop drawings shall be prepared and two copies submitted to the engineer for review prior to fabrication commencement.

TIMBER

T1. All workmanship and materials to be in accordance with AS 1684 and AS 1720. All soft wood to be Grade F7 unless noted otherwise. All hardwood to be minimum Grade F14 unless otherwise noted. Exposed timber to be CCA treated (to AS 1604) redried after full impregnation, or durability class 1 or 2.

T2. All joists deeper than 150 to have blocking over support bearers and at a maximum 3000 centres.

T3. Roof trusses to be designed by the manufacturer to the relevant standards. Pre camber to be an amount equal to dead load deflection u.n.o.

T4. All holes for bolts to be exact size. Washers to be used under all heads and nuts and to be at least 2.5 times the bolt diameter. Bolts to be M16 grade 4.6 unless noted otherwise.

T5. Treat all exposed cut ends with Reseal by Protim to manufacturers specification to achieve required Hazard Level Exposure Classification.

T6. Battens for T & G to be Kiln Dried to 12 %.
38mm minimum deep treated pine or as recommended by supplier. Flooring to be installed no sooner than 28 days after slab pour.

T7. Hot dip galvanized nails/clouts/screws to be used with all timber connections.

T8. Continuous nailing must not be used for any timber connections.

COMPACTED FILL

CF1. Only to be used with approval Engineer & to be certified by a geotechnical Engineer.

CF2. Clear organic material and topsoil under proposed slabs/footings.

CF3. Filling shall be granular material compacted in not more than 200 mm layers to a minimum dry density ratio (AS 1289/E4.2 1982) of 98 percent.

CF4. During clearing and excavation for slabs and footings cut out soft spots and fill as above.

INSPECTIONS BY ENGINEER

24 HOURS NOTICE IS REQUIRED BEFORE ANY SITE INSPECTION

1. Bearing strata of all footings prior to concrete pour.
2. Any reinforcement prior to concrete pour.
3. Timber and Steel framing prior to cladding or lining.
4. Steel lintels after installation.

ASSUMED FOUNDATION CLASSIFICATION FOR DESIGN PURPOSES - 'A'
ASSUMED BEARING STRATA FOR DESIGN PURPOSES - ROCK, 1000kPa.

DRAWING SCHEDULE:

CITY PLAN SERVICES
Construction Cert. No: Approved Date:
2 4 0 8 7 03 DEC 2004
Certifying Authority: Brendan Bennett
Accreditation No: PIA0004

16/11/04

NOT FOR CONSTRUCTION
ISSUED FOR TENDER

-	-	-
Date:	Rev:	Amendment:

DOCUMENT CERTIFICATION

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil),CPEng,MIEAust.,NPER.
Institute of Engineers Membership No. 803938
I hereby state that this drawing is in compliance with the conditions of the development consent, the provisions of the Building Code of Australia and/or relevant Australian Industry Standards.
Date : AUG 03'
Rick G. Wray .....
(Director Northern Beaches Consulting Engineers)

NORTHERN BEACHES Consulting Engineers P/L.
A.C.N. 076 121 816 A.B.N. 24 076 121 816
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail : nb@nbconsulting.com.au

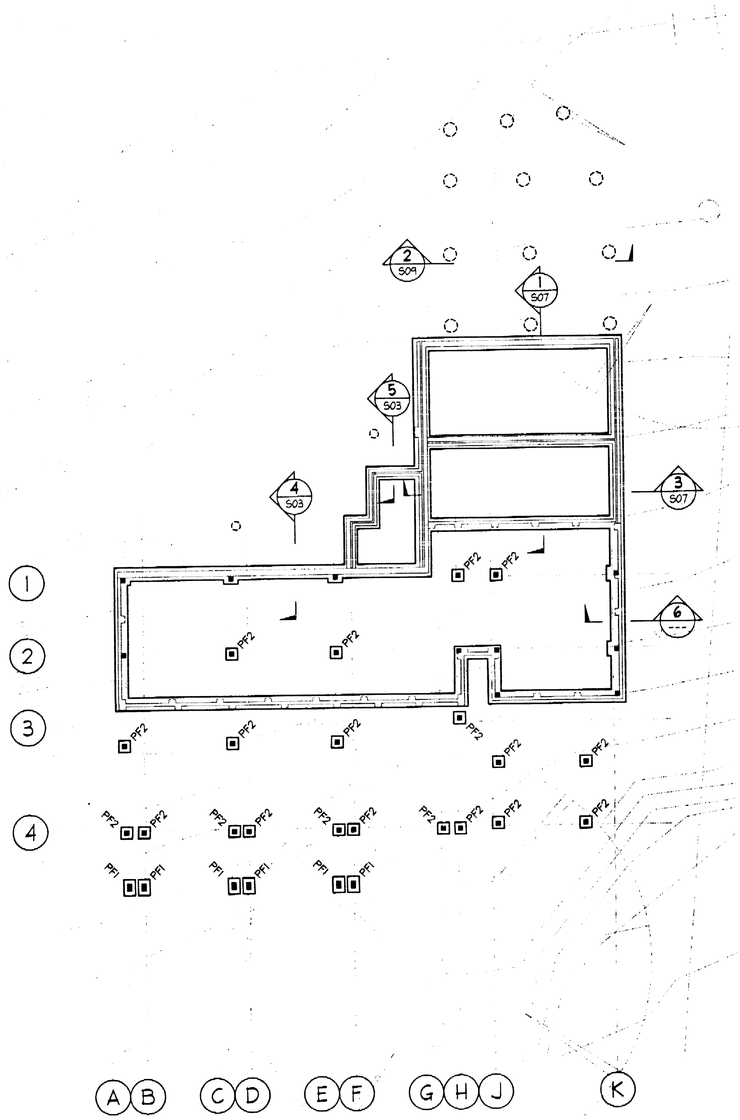
Project:
HOUSE 2
1148-1152 Barrenjoey Road
56 Palm Beach Road
Palm Beach
Raypond Development

Drawing Title:
GENERAL NOTES AND DRAWING SCHEDULE

Date:	Design:	Drawn:	Checked:
Aug 2003	R.G.W.	Paul R Bruce OMIEAust.,MIDDAust.	

Job No:	Drawing No:	Rev.
030703	S01	-

A1



FOOTING PLAN
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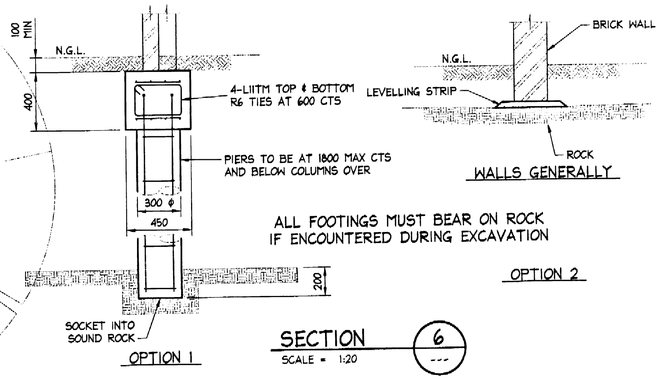

OPTION 1

ALL FOOTINGS MUST BEAR ON ROCK
IF ENCOUNTERED DURING EXCAVATION

OPTION 2

SECTION 6
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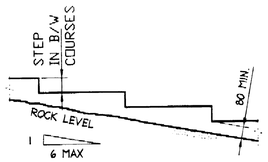
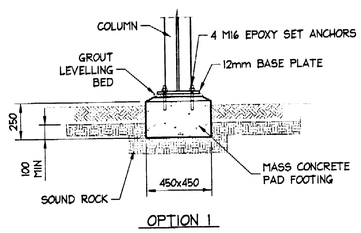
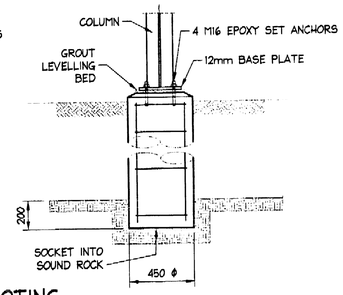
WALLS GENERALLY



SLOPED LEVELLING COURSE



OPTION 1



OPTION 2

TYPE PF1 PAD FOOTING
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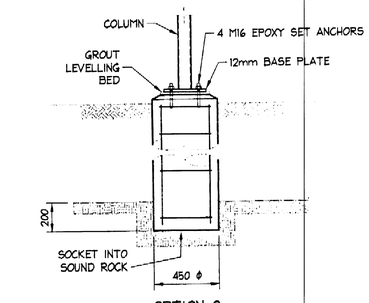

OPTION 1

OPTION 2

TYPE PF2 PAD FOOTING
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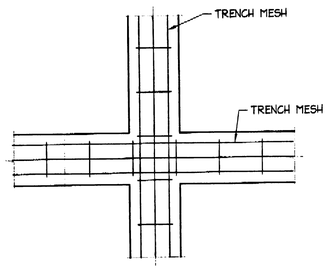

PLAN

FOOTING 'X' JUNCTION
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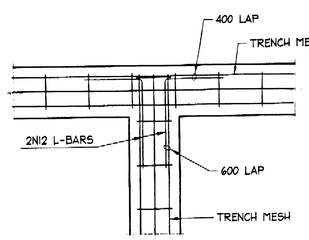

PLAN

FOOTING 'T' JUNCTION
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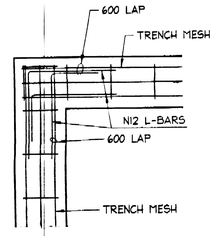
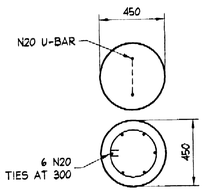


PLAN

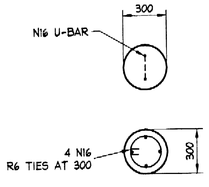
FOOTING CORNER
SCALE = 1 : 20

CONCRETE PIERS:
1. PIERS TO BE 450mm DIAMETER SOCKET 200mm INTO SOUND ROCK
2. FOR DEPTH LESS THAN 1200mm 1 N20 U-BAR.
4. FOR DEPTH GREATER THAN 1200mm 6 N20, R10 TIES AT 300.



450mm ϕ FOOTING PIER SECTION
SCALE = 1 : 20

CONCRETE PIERS:
1. PIERS TO BE 300mm DIAMETER SOCKET 200mm INTO SOUND ROCK.
2. FOR DEPTH LESS THAN 1200mm 1 N16 U-BAR.
4. FOR DEPTH GREATER THAN 1200mm 4 N16, R6 TIES AT 300.



300mm ϕ FOOTING PIER SECTION
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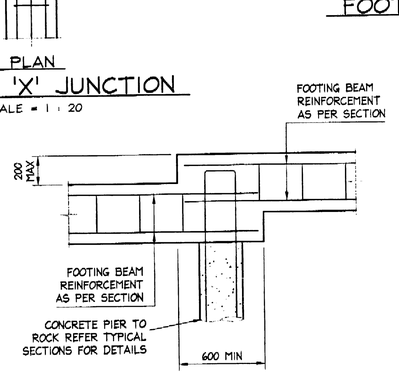


TYPICAL STEP FOOTING DETAILS
SCALE = 1 : 20

NOTES:
1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

CITY PLAN SERVICES
Construction Cert. No: 24 o 8 7
Approved Date: 03 DEC 2004
Certifying Authority: Brendan Bennett
Accreditation No: PIA3004

NOT FOR CONSTRUCTION
ISSUED FOR TENDER

A1

Date:	Rev:	Amendment:
	-	-

DOCUMENT CERTIFICATION
Date : Aug 03'
Rick G. Wray .....
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER.
Institute of Engineers Membership No. 803938
I hereby state that this drawing is in compliance with the conditions of the development consent, the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

NORTHERN BEACHES Consulting Engineers P/L.
A.C.N. 076 121 616 A.B.N. 24 076 121 616
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail : nb@nbconsulting.com.au

Project:
HOUSE 2
1148-1152 Barrenjoey Road
56 Palm Beach Road
Palm Beach
Raypond Development

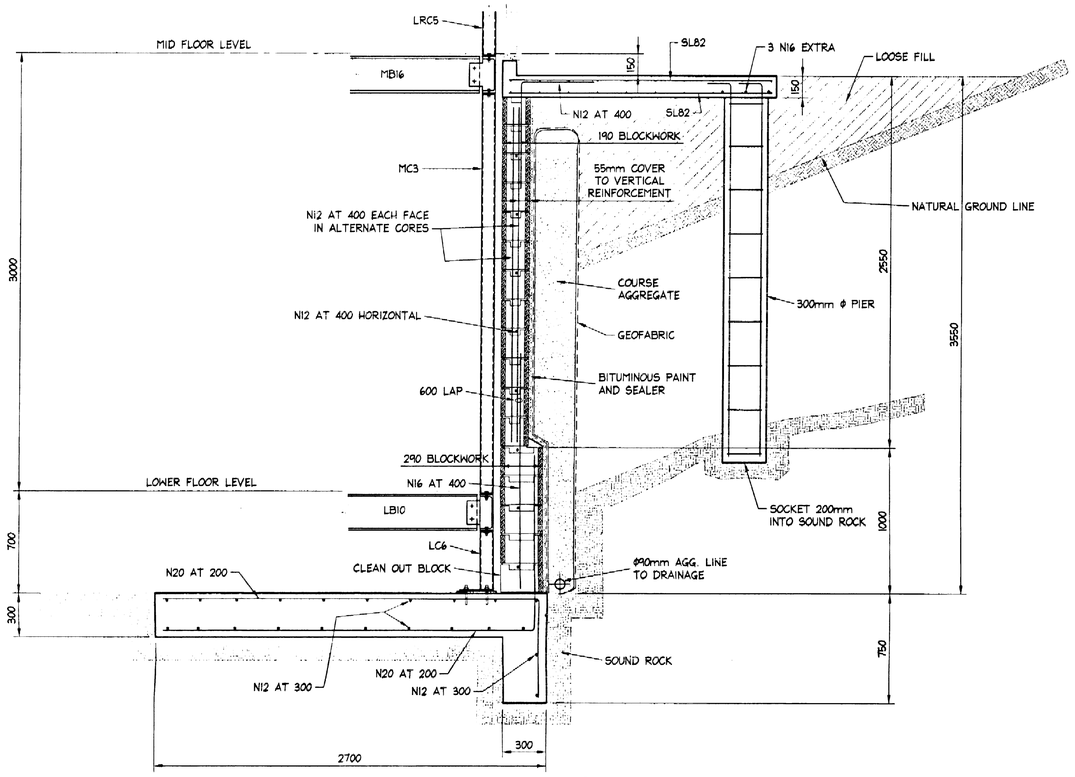
Drawing Title:
FOOTING
PLAN AND DETAILS

Date:	Design:	Drawn:	Checked:
Aug 2003	R.G.W.	Paul R Bruce cmIEAust., MIDPAust.	

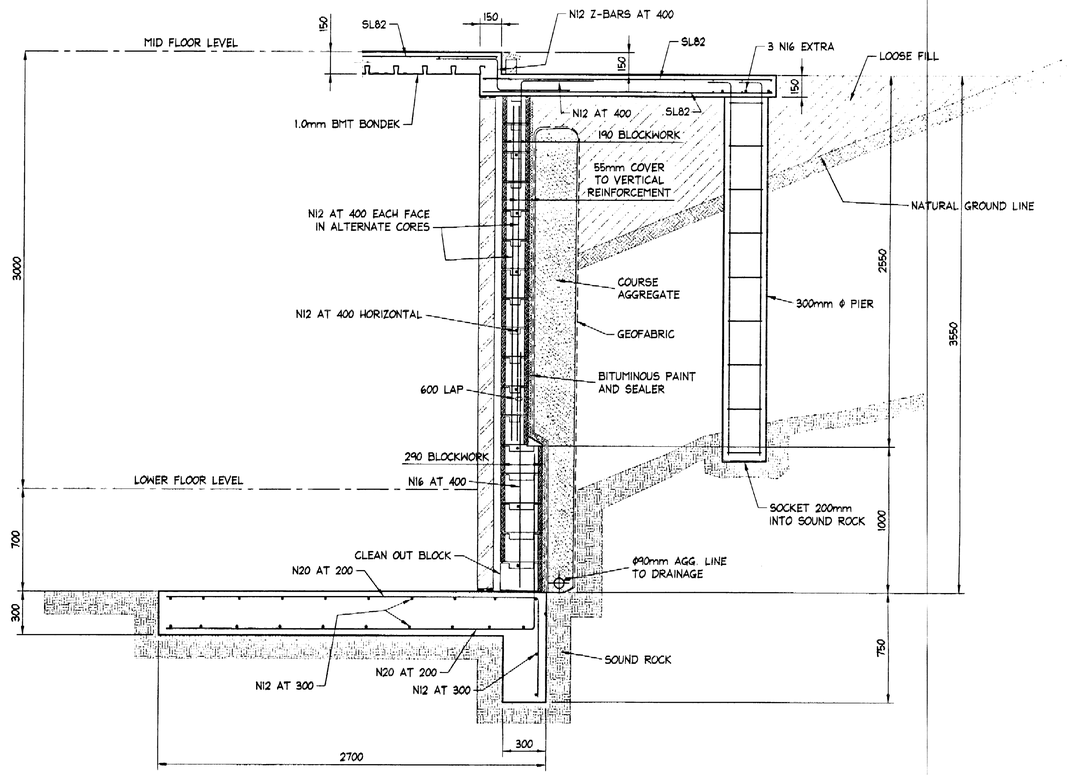
Job No:	Drawing No:	Rev:
030703	S02	-

NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.



SECTION 4
SCALE = 1:20
S02,4,6



SECTION 5
SCALE = 1:20
S02,4,6

CITY PLAN SERVICES
Construction Cert. No: 24887 Approved Date: 07 DEC 2004
Certifying Authority: Brendan Bennett
Accreditation No: PIA3004

16/11/04

NOT FOR CONSTRUCTION
ISSUED FOR TENDER

A1

Date:	Rev:	Amendment:
-	-	-

DOCUMENT CERTIFICATION
Date : 16th 03'
Rick G. Wray .....
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil),CPEng,MIEAust.,NPER.
Institute of Engineers Membership No. 803938
I hereby state that this drawing is in compliance with the conditions of the development consent, the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

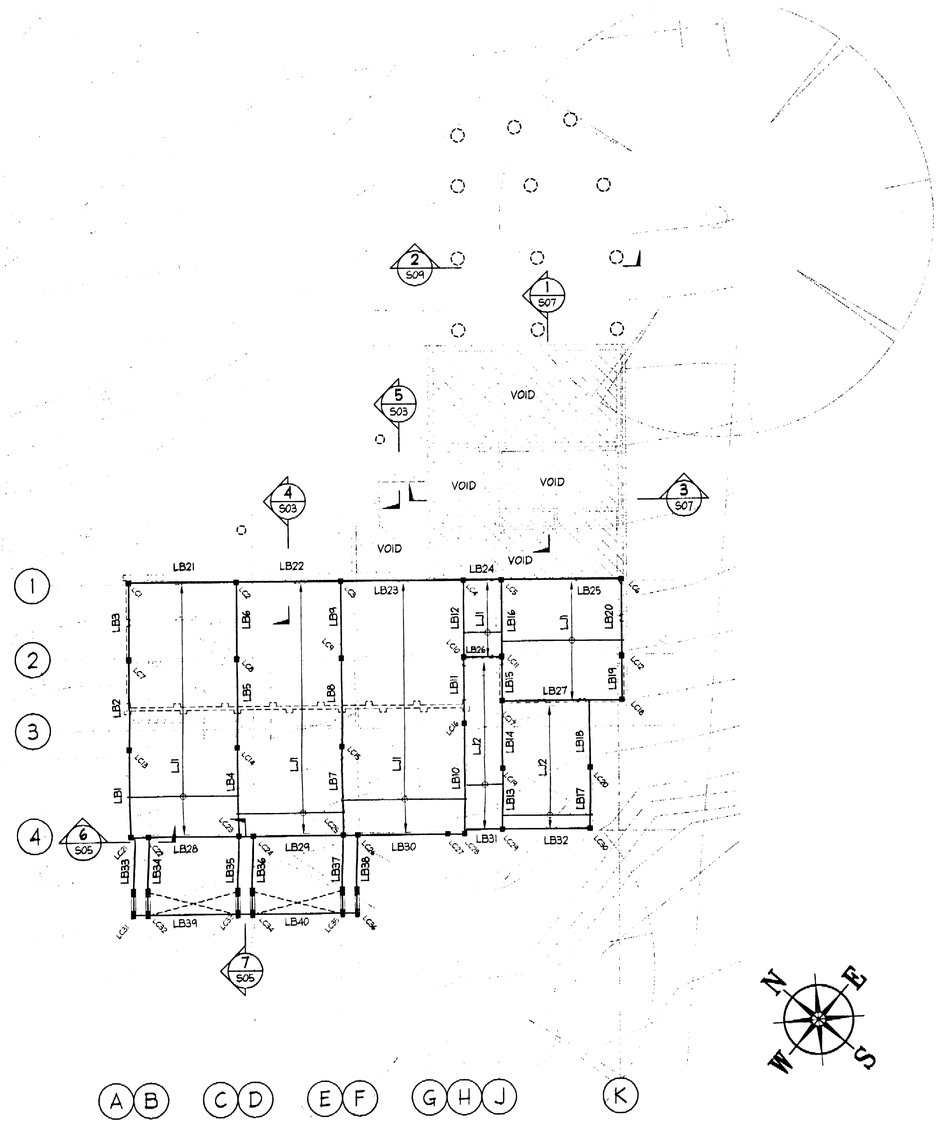
NORTHERN BEACHES Consulting Engineers P/L.
A.C.N. 076 121 616 A.B.N. 24 076 121 616
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail : nb@nbconsulting.com.au

Project:
HOUSE 2
1148-1152 Barrenjoey Road
56 Palm Beach Road
Palm Beach
Raypond Development

Drawing Title:
FOOTING AND RETAINING WALL DETAILS

Date:	Design:	Drawn:	Checked:
Aug 2003	R.G.W.	Paul R Bruce OMIEAust.,MIDDAust.	

Job No:	Drawing No:	Rev:
030703	S03	-



LOWER LEVEL FRAMING PLAN

SCALE = 1 : 100

NOTE:
ALL COLUMN TO BEAM CONNECTIONS TO BE FULLY SITE WELDED AFTER ERECTION.

MEMBER SCHEDULE

MARK	MEMBER	REMARKS
MID LEVEL FLOOR FRAMING		
LC1 - LC30 incl	90x90x5 SHS	COLUMN
LC31 - LC36 incl	205 BT 27 (CUT FROM 410 UB 54)	COLUMN
LB1 - LB32 incl	200 PFC	BEAM
LB33 - LB40 incl	200 PFC	BEAM
LJ1	200x45 HYSPAN LVL	FLOOR JOISTS AT 450 CTS
LJ2	200x50 F7 H3 TREATED	FLOOR JOISTS AT 450 CTS
GENERAL FRAMING		
SB	PRYDA STRAP BRACING WITH TENSIONERS TO UNDER SIDE OF FLOOR JOISTS AND RAFTERS WHERE INDICATED ON PLAN	
A	STRAP BRACING REFER TYPICAL DETAILS	
B	PLY BRACING REFER TYPICAL DETAILS	
DJ	DOUBLE JOISTS NAIL LAMINATED	

NOTE:
1. ASTERISK (*) BESIDE MEMBER SIZE INDICATES MEMBERS DESIGNED TO SUIT ARCHITECTS REQUIREMENTS FOR MINIMUM SIZE, SPACING AND LOCATION OF MEMBERS.
2. MGP 12 MAY BE SUBSTITUTED FOR F7 SOFTWOOD OR LESS.
   MGP 15 MAY BE SUBSTITUTED FOR F11 SOFTWOOD OR LESS.
   MGP MUST NOT BE USED AS A SUBSTITUTE WHERE HARDWOOD IS SPECIFIED.
3. ALL HARDWOOD SHALL BE KILN DRIED, DO NOT USE GREEN HARDWOOD.
4. ALL H3 AND H4 TREATED TIMBER TO BE KILN DRIED AFTER TREATMENT.

NOTES:
1. ORGANIC TERMITE TREATMENT TO BE CARRIED OUT TO PERIMETER OF ENTIRE BUILDING AND SUB-FLOOR AREAS. ANNUAL INSPECTIONS AND TREATMENT AS REQUIRED SHALL BE THE RESPONSIBILITY OF THE PROPRIETOR.
2. WALL FRAMING SHALL BE IN ACCORDANCE WITH AS 1684 TIMBER FRAMING CODE AND NSW TIMBER FRAMING MANUAL. 90x45 MGP 12 STUDS AT 450 CTS.
3. BRACE WALLS AND ROOF IN ACCORDANCE WITH AS 1684 TIMBER FRAMING CODE AND NSW TIMBER FRAMING MANUAL.
4. TIE DOWNS TO ROOF RAFTERS AND BEAMS SHALL BE IN ACCORDANCE WITH AS 1684 TIMBER FRAMING CODE AND AS 1170.2 WIND LOADING CODE.
5. TRIM ROOF OPENINGS WITH EQUIVALENT RAFTER SIZES UNLESS NOTED OTHERWISE.
6. EXTERNAL/EXPOSED HYSPAN LVL OR TASBEAM MEMBERS TO BE SUITABLY PRESERVATIVE TREATED TO H3 LEVEL (AS 1604) THEN STAINED OR PAINTED.
7. EXTERNAL/EXPOSED HARDWOOD MEMBERS TO BE DURABILITY CLASS 2 OR BETTER (AS 1604) THEN STAINED OR PAINTED.
8. ENGINEER TO INSPECT AND CERTIFY ALL FRAMING AND BRACING PRIOR TO SHEETING.

NOTES:
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2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

CITY PLAN SERVICES
Construction Cert. No: 24687 Approved: 03 Dec 04
Certifying Authority: Brendan Bell
Accreditation No: BPB0004

NOT FOR CONSTRUCTION
ISSUED FOR TENDER

A1

Date:	Rev:	Amendment:
-	-	-

DOCUMENT CERTIFICATION
Date: AUG 03
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

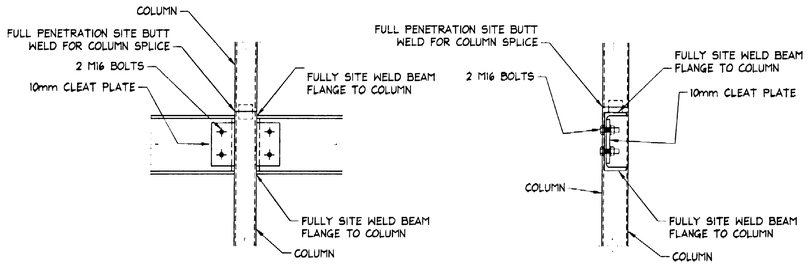
I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil),CPEng,MIEAust.,NPER.
Institute of Engineers Membership No. 809938
I hereby state that this drawing is in compliance with the conditions of the development consent, the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

NORTHERN BEACHES Consulting Engineers P/L.
A.C.N. 076 121 616 A.B.N. 24 076 121 616
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail : nbc@nbconsulting.com.au

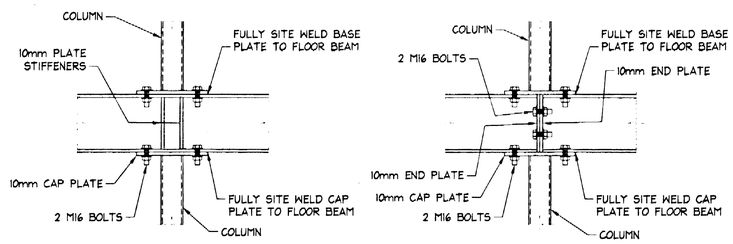
Project: HOUSE 2
1148-1152 Barrenjoey Road
56 Palm Beach Road
Palm Beach
Raypond Development

Drawing Title: LOWER LEVEL FRAMING PLAN

Date:	Design:	Drawn:	Checked:
Aug 2003	R.G.W.	Paul R Bruce MIEAust.,MIDDAust.	
Job No: 030703		Drawing No. S04	Rev: -



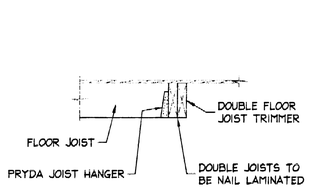
OPTION 1

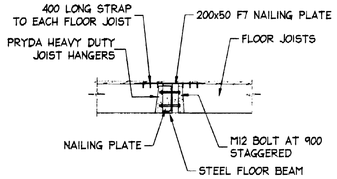


OPTION 2

TYPICAL COLUMN TO BEAM CONNECTION DETAILS

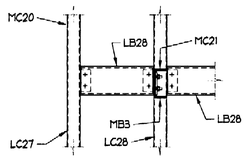
SCALE = 1 : 10





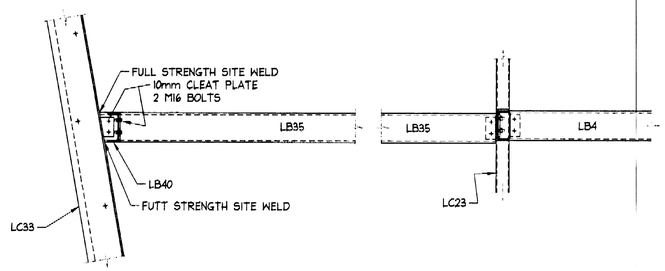
TYPICAL FLOOR JOIST CONNECTION DETAILS

SCALE = 1 : 20



SECTION 6 / S06

SCALE = 1:20



NOTE: FLOOR JOISTS OMITTED FOR CLARITY

SECTION 7 / S06

SCALE = 1:20

NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

CITY PLAN SERVICES
Construction Cert. No: 24687 Approved Date: 03 DEC 2004
Certifying Authority: Brendan Belmont
Accreditation No: BPAS904

NOT FOR CONSTRUCTION ISSUED FOR TENDER

A1

Date:	Rev.	Amendment:
-	-	-

DOCUMENT CERTIFICATION

Date : Aug 03'

Rick G. Wray

(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil),CPEng,MIEAust.,NPER.
Institute of Engineers Membership No. 803938
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NORTHERN BEACHES Consulting Engineers P/L.
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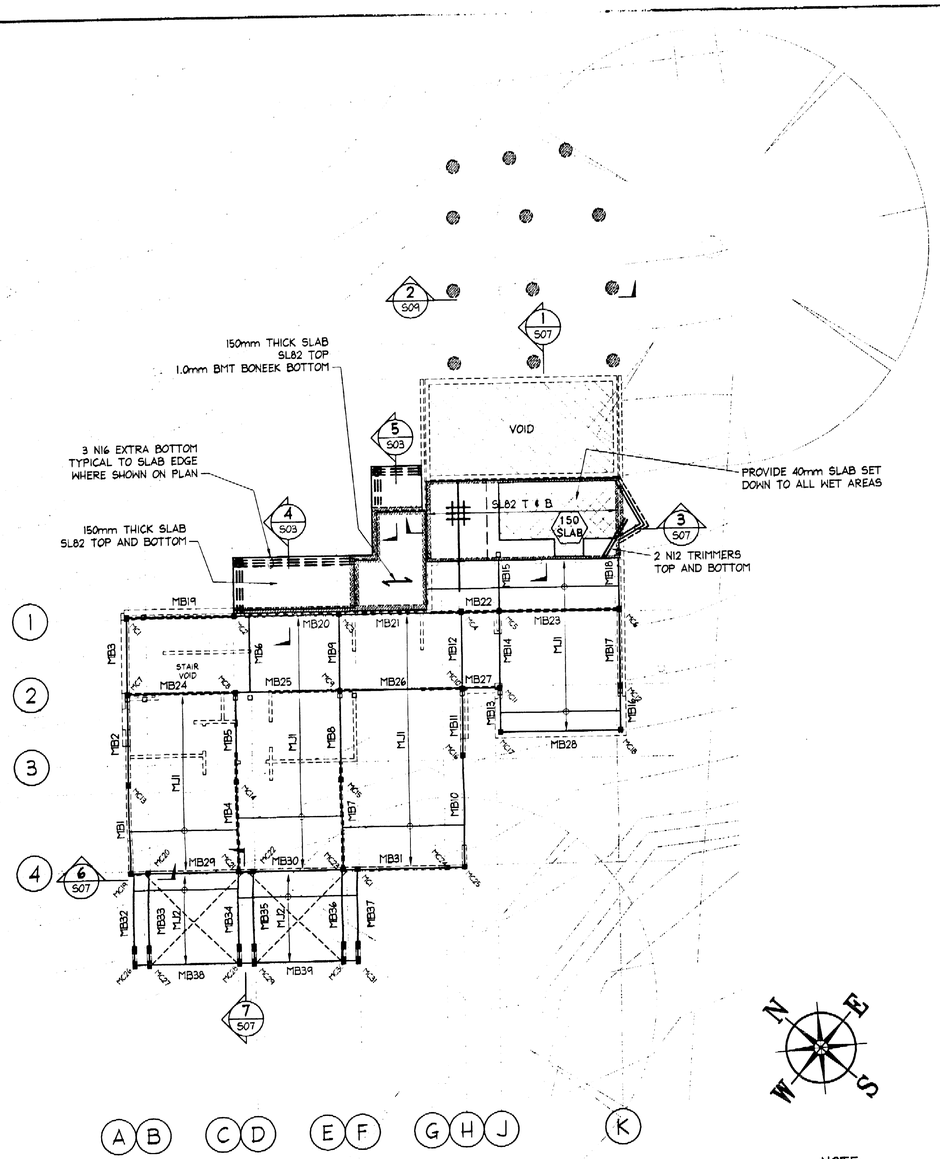
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail : nb@nbconsulting.com.au

Project: HOUSE 2
1148-1152 Barrenjoey Road
56 Palm Beach Road
Palm Beach
Raypond Development

Drawing Title: LOWER LEVEL FRAMING DETAILS

Date:	Design:	Drawn:	Checked:
Aug 2003	R.G.W.	Paul R Bruce OMIEAust.,MIDDAust.	

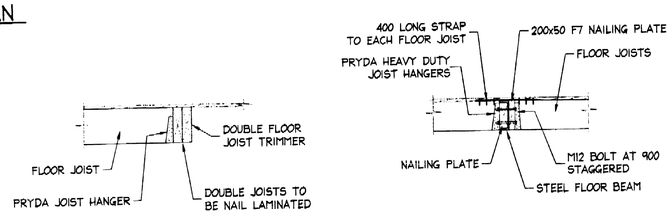
Job No:	Drawing No:	Rev:
030703	S05	-



MID LEVEL SLAB AND FRAMING PLAN

SCALE = 1 : 100

NOTE:
ALL COLUMN TO BEAM CONNECTIONS TO BE FULLY SITE WELDED AFTER ERECTION.



TYPICAL FLOOR JOIST CONNECTION DETAILS

SCALE = 1 : 20

MEMBER SCHEDULE

MARK	MEMBER	REMARKS
MID LEVEL FLOOR FRAMING		
MC1 - MC25 incl	90x90x5 SHS	COLUMN
MC26 - MC31	205 BT 27 (CUT FROM 410 UB 54)	COLUMN
MB1 - MB31 incl	200 PFC	BEAM
MB32 - MB39 incl	200 PFC	BEAM
MJ1	200x45 HYSPAN LVL	FLOOR JOISTS AT 450 CTS
MJ2	200x50 F7 H3 TREATED	FLOOR JOISTS AT 450 CTS
GENERAL FRAMING		
SB	PRYDA STRAP BRACING WITH TENSIONERS TO UNDER SIDE OF FLOOR JOISTS AND RAFTERS WHERE INDICATED ON PLAN	
A	STRAP BRACING REFER TYPICAL DETAILS	
B	PLY BRACING REFER TYPICAL DETAILS	
DR	DOUBLE RAFTERS NAIL LAMINATED	
X	2 STUDS NAIL LAMINATED or 90x90 F7 POST	LOAD CONCENTRATION POINT

NOTE:
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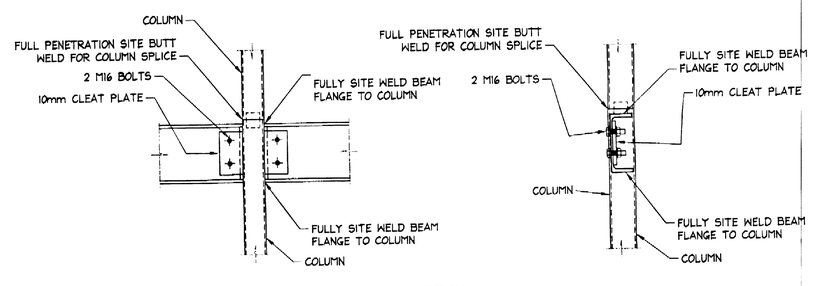
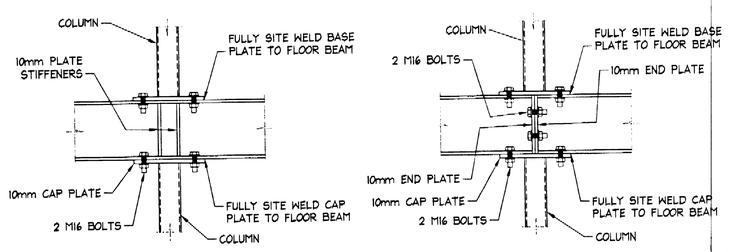


OPTION 1



OPTION 2

TYPICAL COLUMN TO BEAM CONNECTION DETAILS

SCALE = 1 : 10

CITY PLAN SERVICES
Construction Cert. No: Approved
Certifying Authority: Brendan Bonnett
Accreditation No: PIA3004

NOT FOR CONSTRUCTION
ISSUED FOR TENDER

A1

Date:	Rev:	Amendment:
-	-	-

DOCUMENT CERTIFICATION
Date: AUG 03
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER.
Institute of Engineers Membership No. 803938
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NORTHERN BEACHES
Consulting Engineers P/L.
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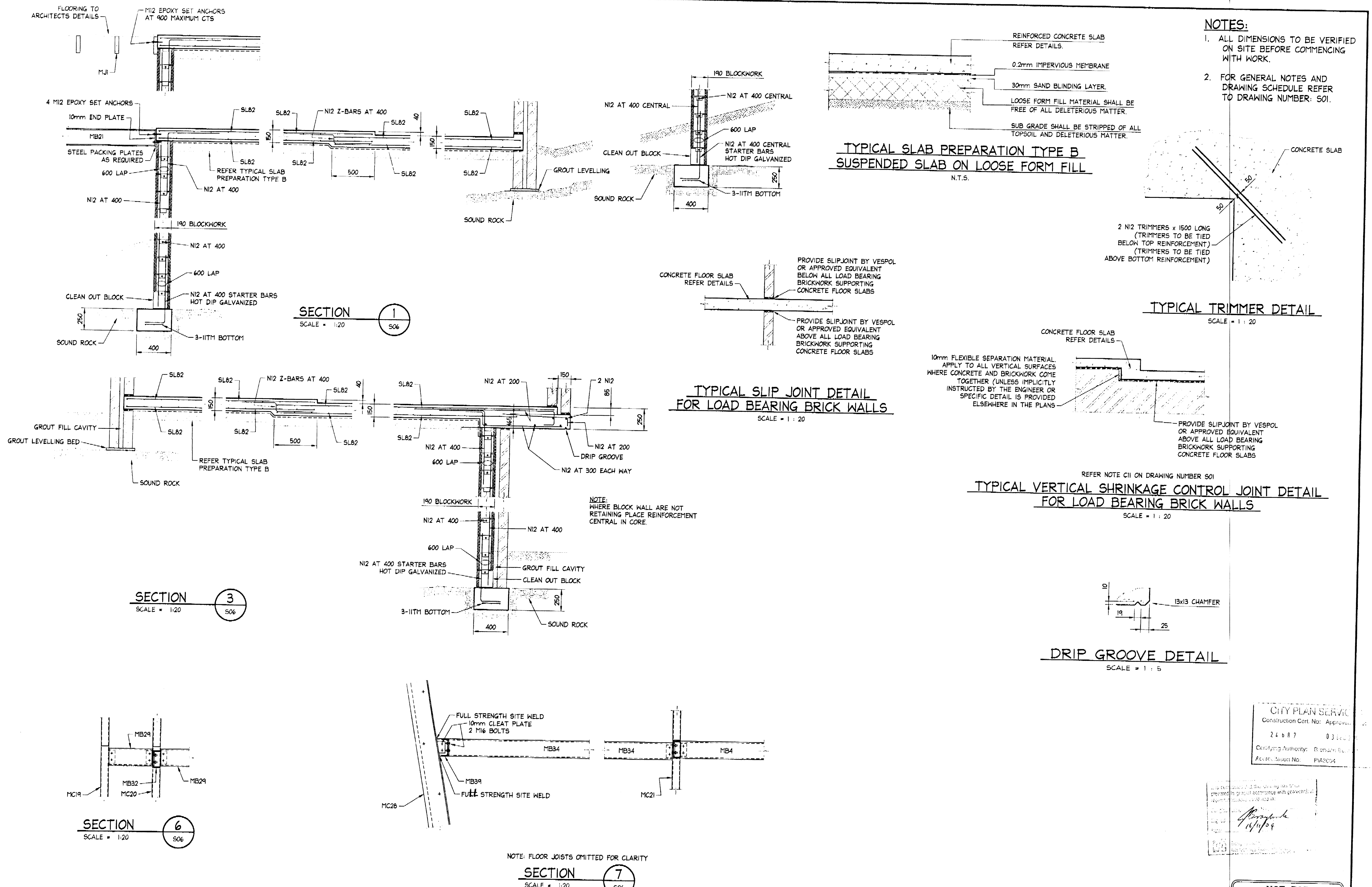
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail : nb@nbconsulting.com.au

Project: HOUSE 2
1148-1152 Barrenjoey Road
56 Palm Beach Road
Palm Beach
Raypond Development

Drawing Title: MID LEVEL SLAB AND FRAMING PLAN AND DETAILS

Date:	Design:	Drawn:	Checked:
Aug 2003	R.G.W.	Paul R Bruce MIEAust., MIDDAust.	
Job No: 030703		Drawing No: S06	Rev: -



NOTES:

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2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

CITY PLAN SERVICES
Construction Cert. No: 24687

NOT FOR CONSTRUCTION
ISSUED FOR TENDER

A1

Date:	Rev:	Amendment:
-	-	-

DOCUMENT CERTIFICATION

Date: AUG 03
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil), CPEng, MIEAust., NPER. Institute of Engineers Membership No. 803938. I hereby state that this drawing is in compliance with the conditions of the development consent, the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

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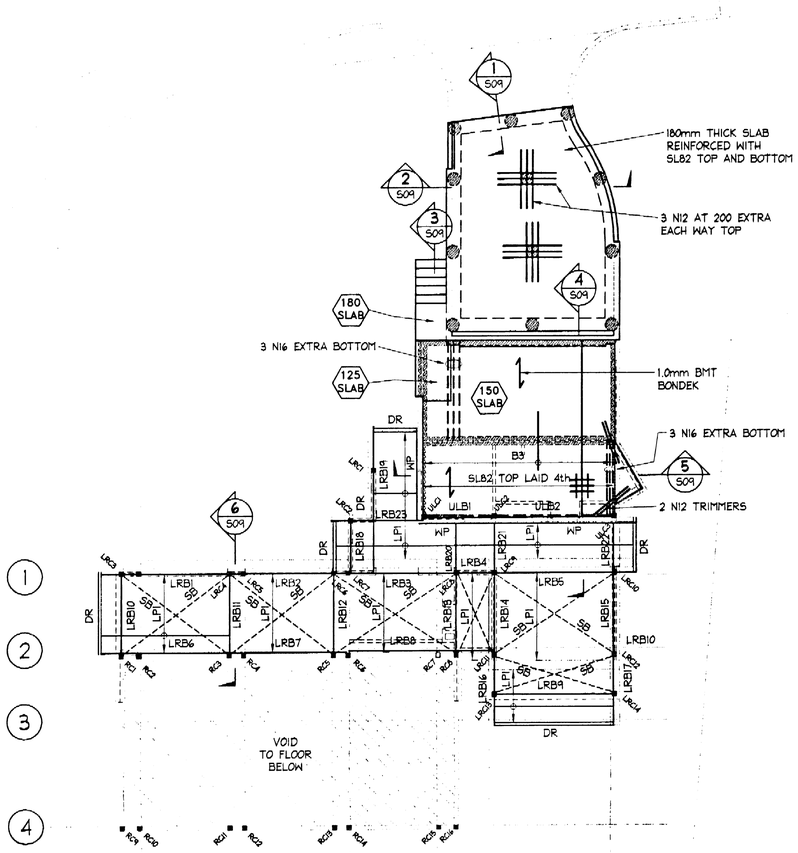
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail: nb@nbconsulting.com.au

Project: HOUSE 2
1148-1152 Barrenjoey Road
56 Palm Beach Road
Palm Beach
Raypond Development

Drawing Title: MID LEVEL SLAB AND FRAMING DETAILS

Date:	Design:	Drawn:	Checked:
Aug. 2003	R.G.W.	Paul R Bruce	

Job No.	Drawing No:	Rev:
~~030702~~ 030703	S07	-



UPPER LEVEL SLAB AND LOWER ROOF FRAMING PLAN

SCALE = 1 : 100

MEMBER SCHEDULE

MARK	MEMBER	REMARKS
UPPER LEVEL SLAB		
ULB1, ULB2	300 PFC + 250x12 PLATE	BEAM
ULC1 - ULC3 incl	90x90x5 SHS	COLUMN
LOWER ROOF FRAMING		
LRB1 - LRB23 incl	150 PFC	ROOF BEAM
RC1 - RC16 incl	REFER TO DRAWING No. S11	COLUMN
LRC1 - LRC14 incl	90x90x5 SHS	COLUMN
LP1	150x50 F7	PURLINS AT 600 CTS
WP	150x50 F7	WALL PLATE
GENERAL FRAMING		
SB	PRYDA STRAP BRACING WITH TENSIONERS TO UNDER SIDE OF RAFTERS WHERE INDICATED ON PLAN	
A	STRAP BRACING REFER TYPICAL DETAILS	
B	PLY BRACING REFER TYPICAL DETAILS	
DR	DOUBLE RAFTERS NAIL LAMINATED	

NOTE:
1. ASTERISK (*) BESIDE MEMBER SIZE INDICATES MEMBERS DESIGNED TO SUIT ARCHITECTS REQUIREMENTS FOR MINIMUM SIZE, SPACING AND LOCATION OF MEMBERS.
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   MGP MUST NOT BE USED AS A SUBSTITUTE WHERE HARDWOOD IS SPECIFIED.
3. ALL HARDWOOD SHALL BE KILN DRIED, DO NOT USE GREEN HARDWOOD.
4. ALL H3 AND H4 TREATED TIMBER TO BE KILN DRIED AFTER TREATMENT.

NOTES:

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4. TIE DOWNS TO ROOF RAFTERS AND BEAMS SHALL BE IN ACCORDANCE WITH AS 1684 TIMBER FRAMING CODE AND AS 1170.2 WIND LOADING CODE.
5. TRIM ROOF OPENINGS WITH EQUIVALENT RAFTER SIZES UNLESS NOTED OTHERWISE.
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8. ENGINEER TO INSPECT AND CERTIFY ALL FRAMING AND BRACING PRIOR TO SHEETING.

REINFORCEMENT SCHEDULE

MARK 'X' (prefix)	BAR SIZE	BAR SPACING
A	N12	600
B	N12	400
C	N12	300
D	N12	250
E	N12	200
F	N12	150
G	N12	100
H	N16	400
J	N16	300
K	N16	250
L	N16	200
M	N16	150
N	N16	100

LAYER 'Y' (suffix)	
1	BTM 1st
2	BTM 2nd
3	TOP 3rd
4	TOP 4th

NOTE:
THE REINFORCEMENT SHALL BE SPECIFIED ON PLAN USING THE XY (PREFIX/SUFFIX) e.g. N16 AT 400 LAID SECOND IN THE BOTTOM WILL BE SPECIFIED ON PLAN AS - H2

NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

CITY PLAN SERVICES
Construction Cert. No: Approved
24087 03 Dec 08
Certifying Authority: Brandrick Bennett
Accreditation No: BPB0001

NOT FOR CONSTRUCTION
ISSUED FOR TENDER

A1

Date	Rev:	Amendment:
-	-	-

DOCUMENT CERTIFICATION

Date : Aug 03'
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

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NORTHERN BEACHES Consulting Engineers P/L.
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Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail : nb@nbconsulting.com.au

Project: HOUSE 2
1148-1152 Barrenjoey Road
56 Palm Beach Road
Palm Beach
Raypond Development

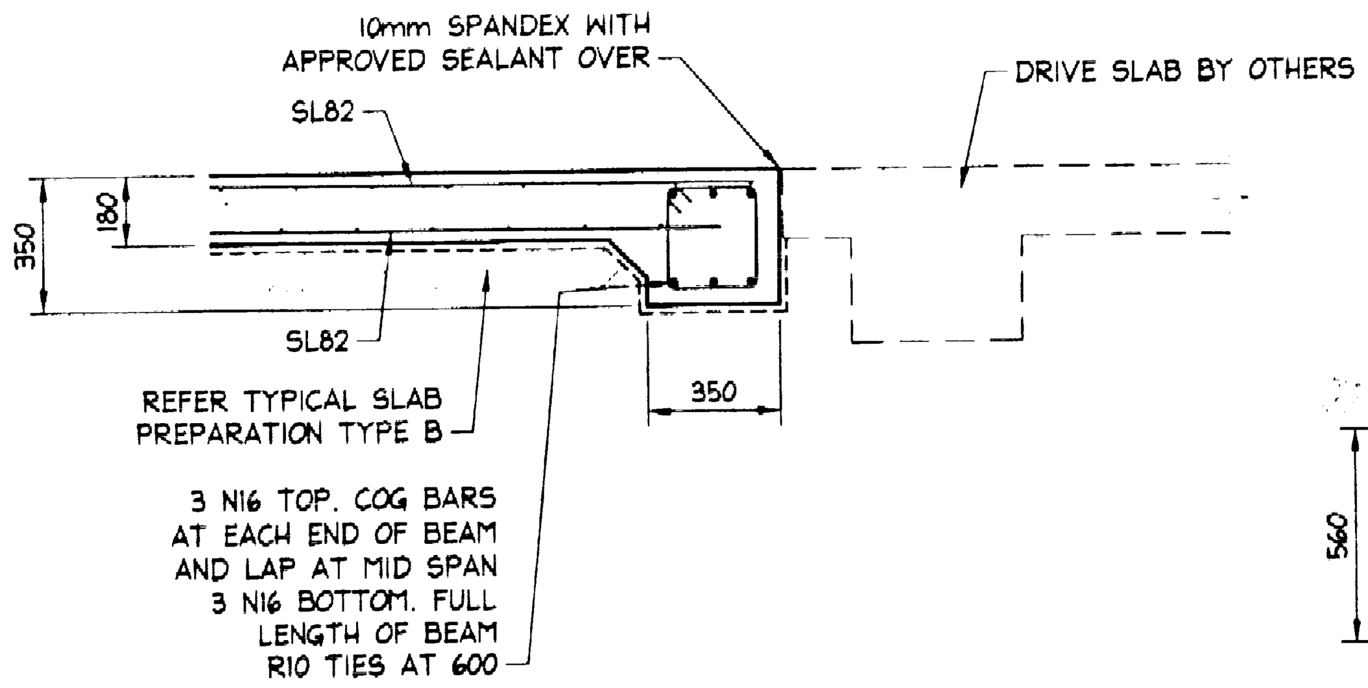
Drawing Title: UPPER LEVEL SLAB AND LOWER ROOF FRAMING PLAN

Date:	Design:	Drawn:	Checked:
Aug 2003	R.G.W.	Paul R Bruce ofMIEAust., MIDDAust.	

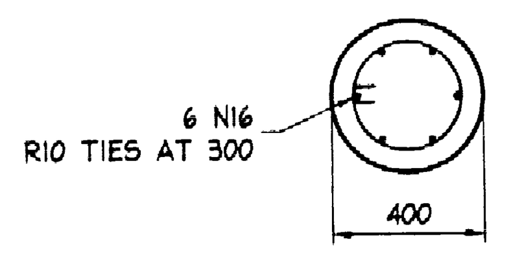
Job No:	Drawing No:	Rev:
030703	S08	-

NOTES:

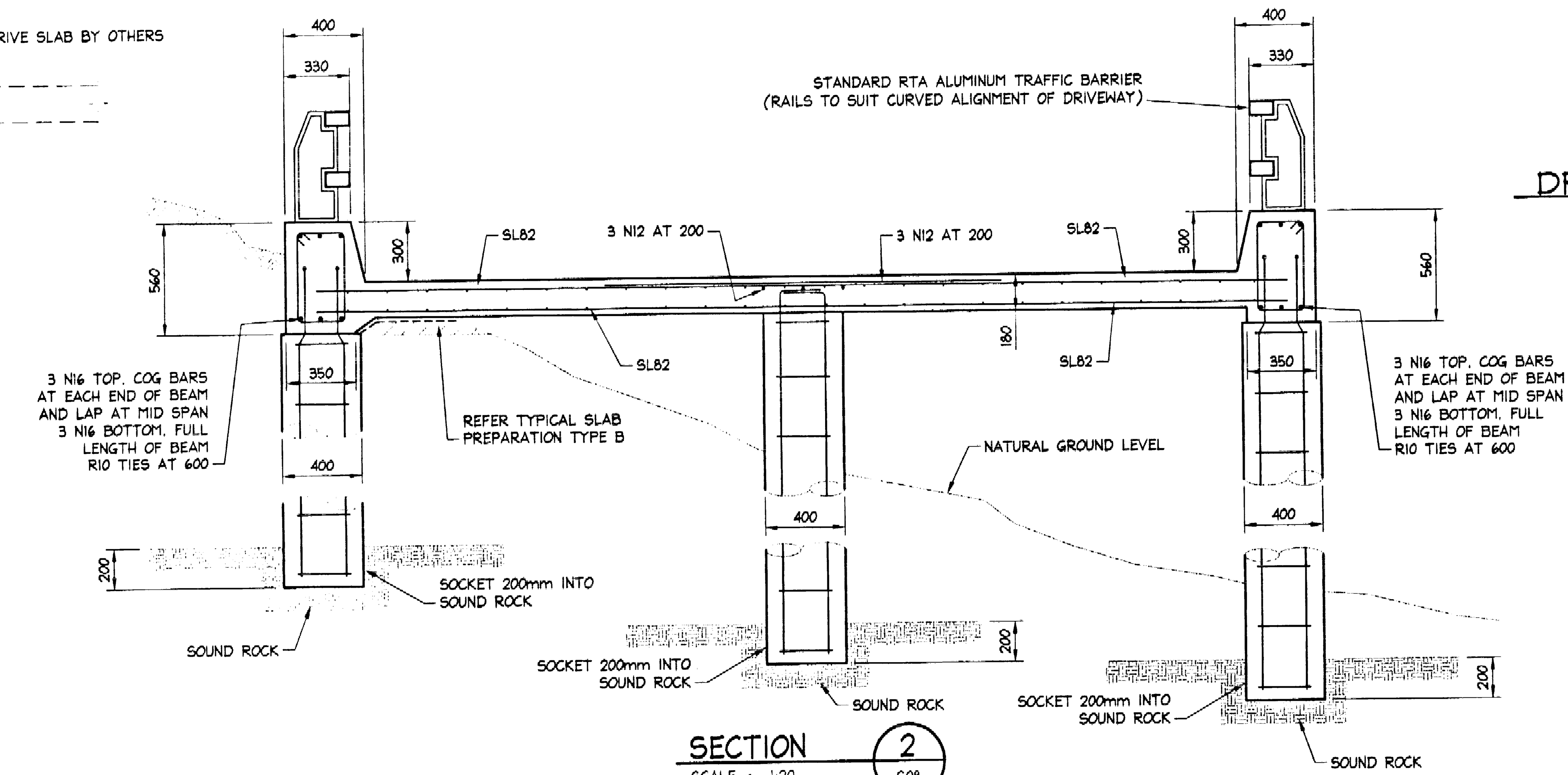
1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.



SECTION 1 (S08)
SCALE = 1:20



FOOTING PIER SECTION
SCALE = 1 : 20



SECTION 2 (S08)
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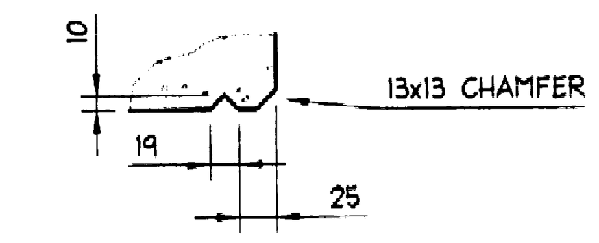
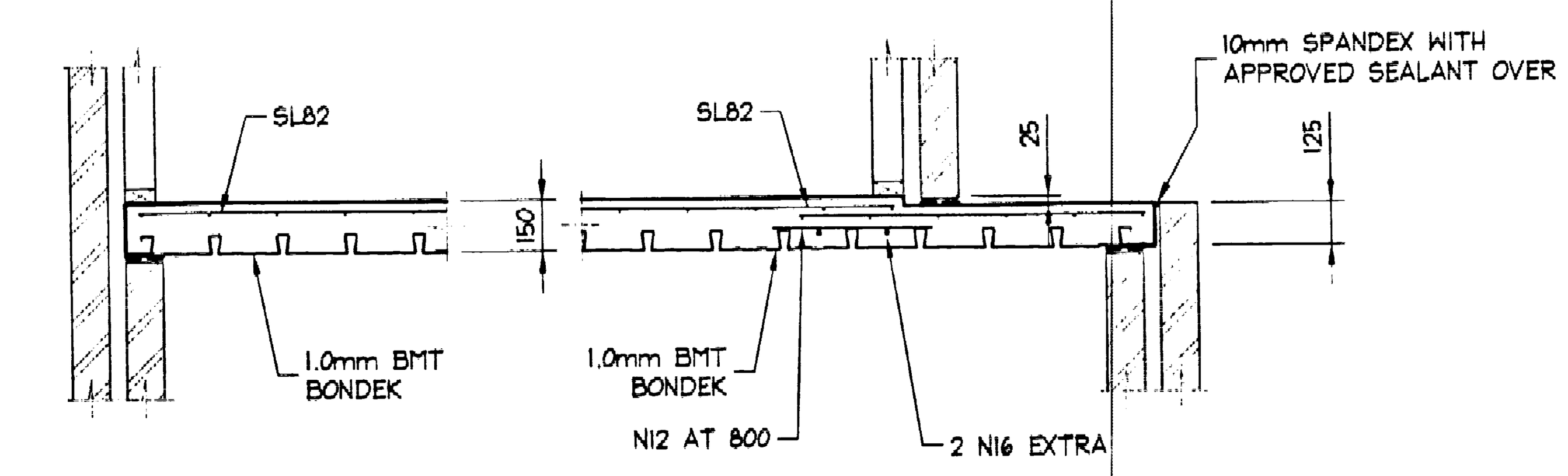


DRIP GROOVE DETAIL
SCALE = 1 : 5



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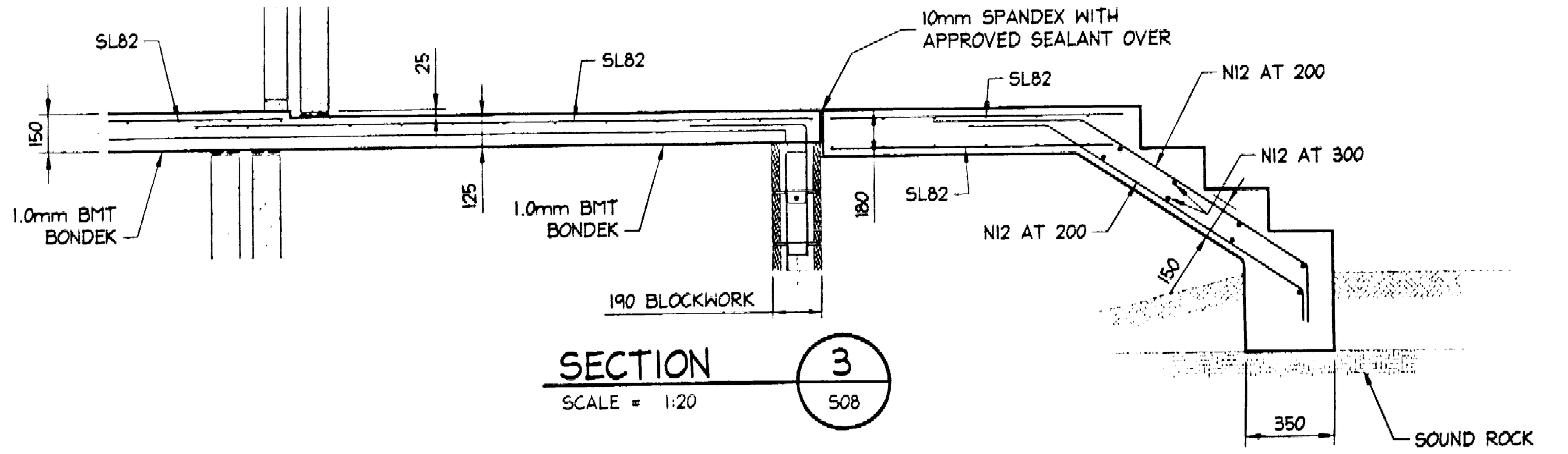

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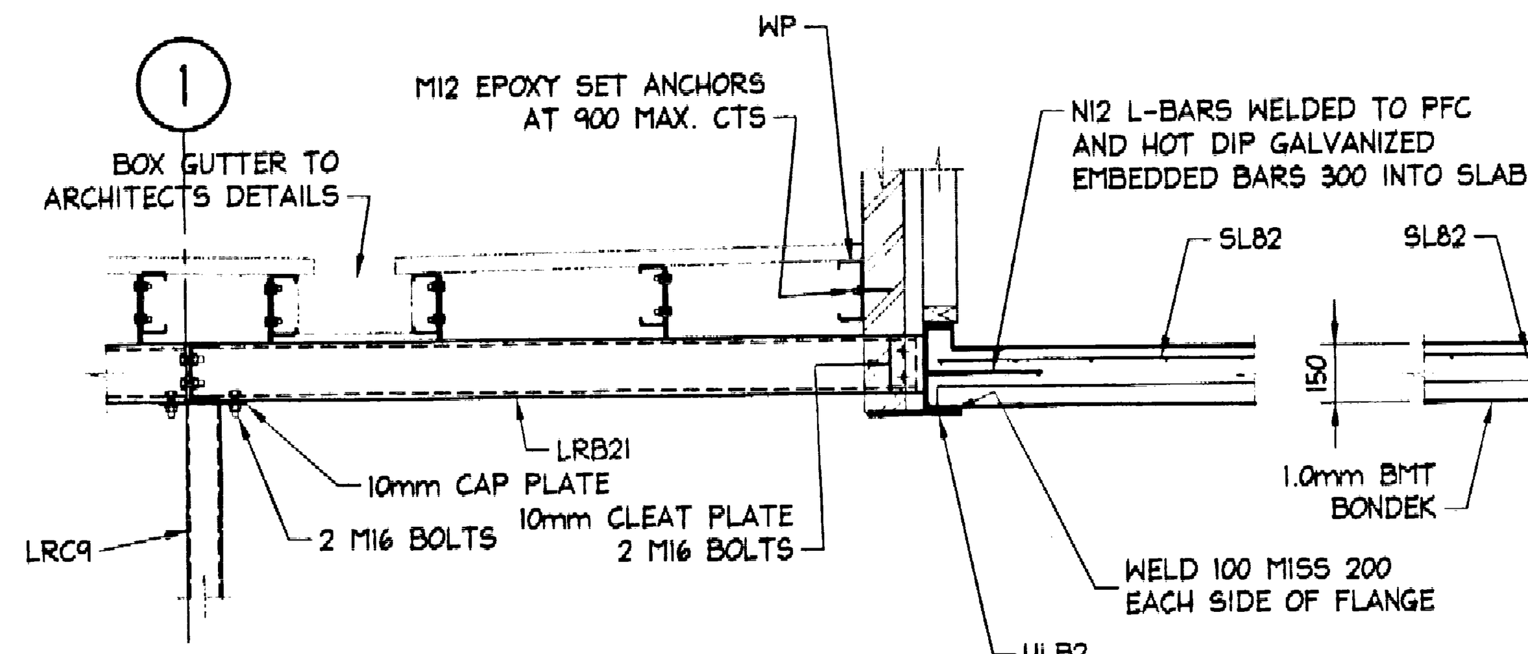

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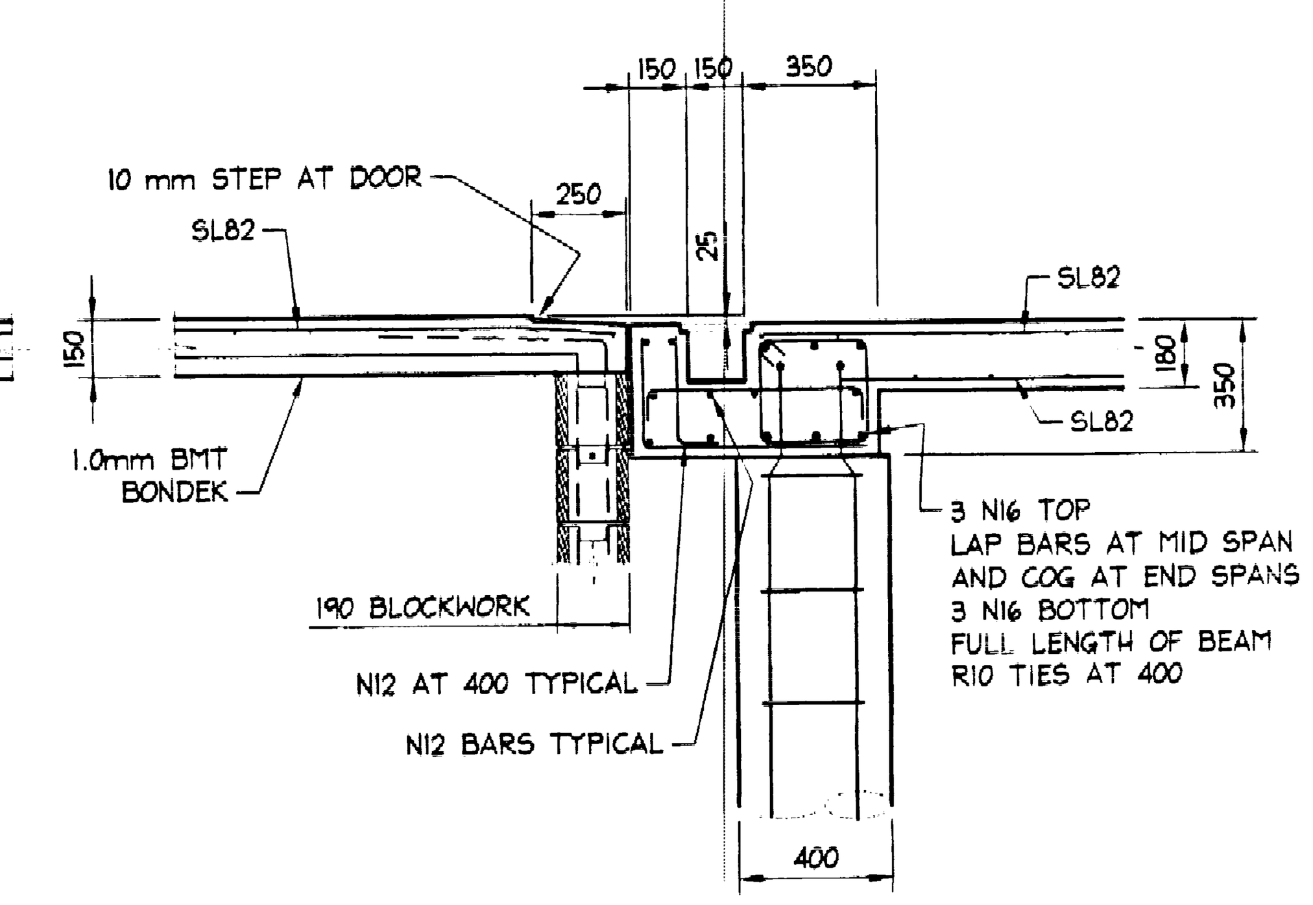

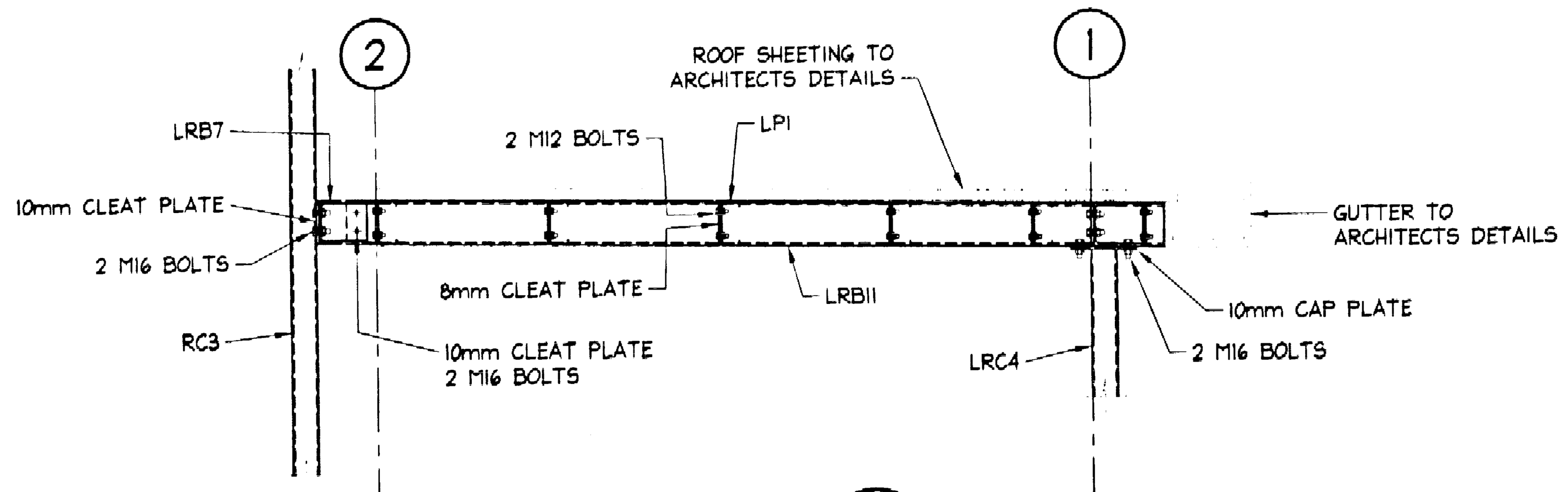

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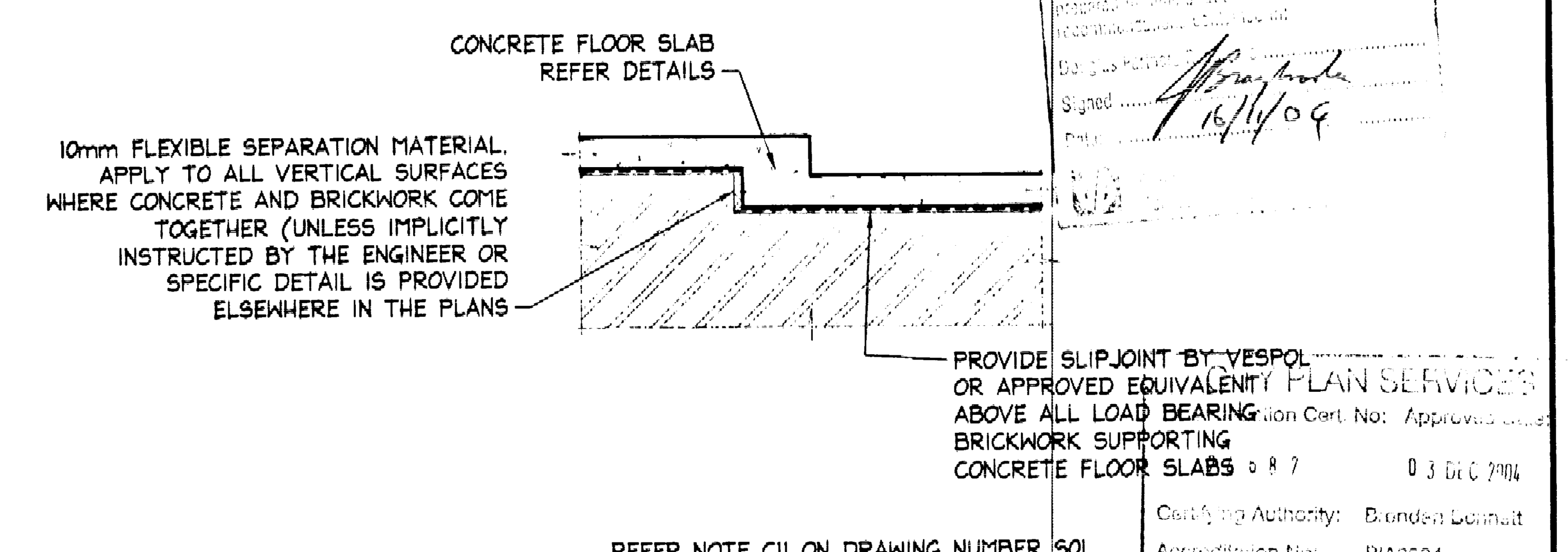
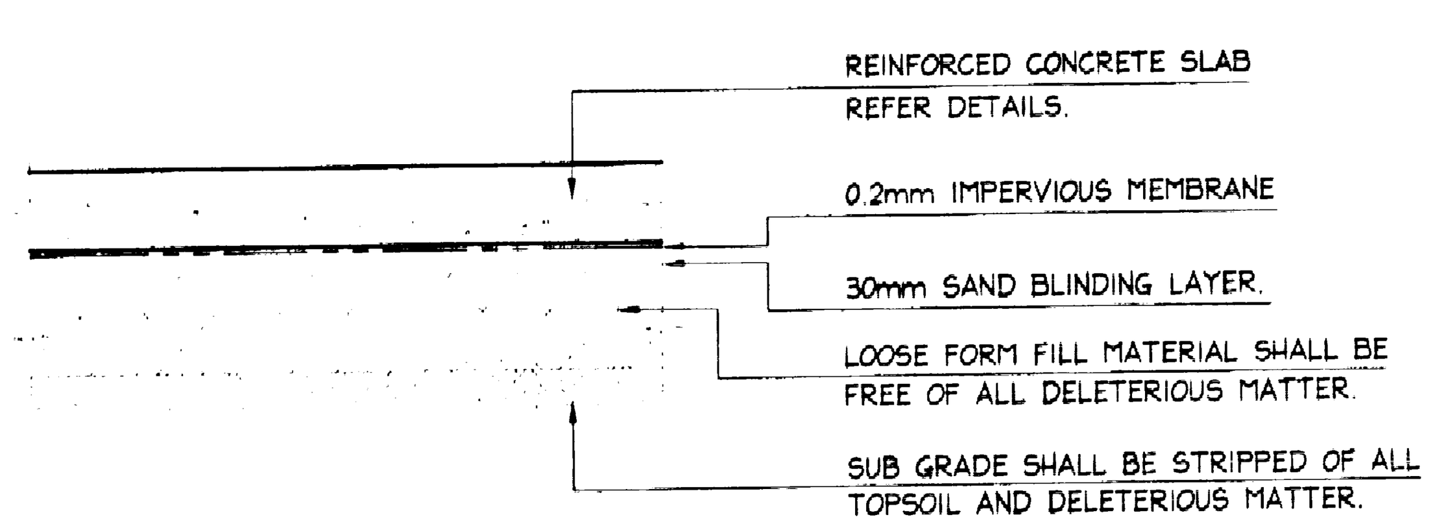
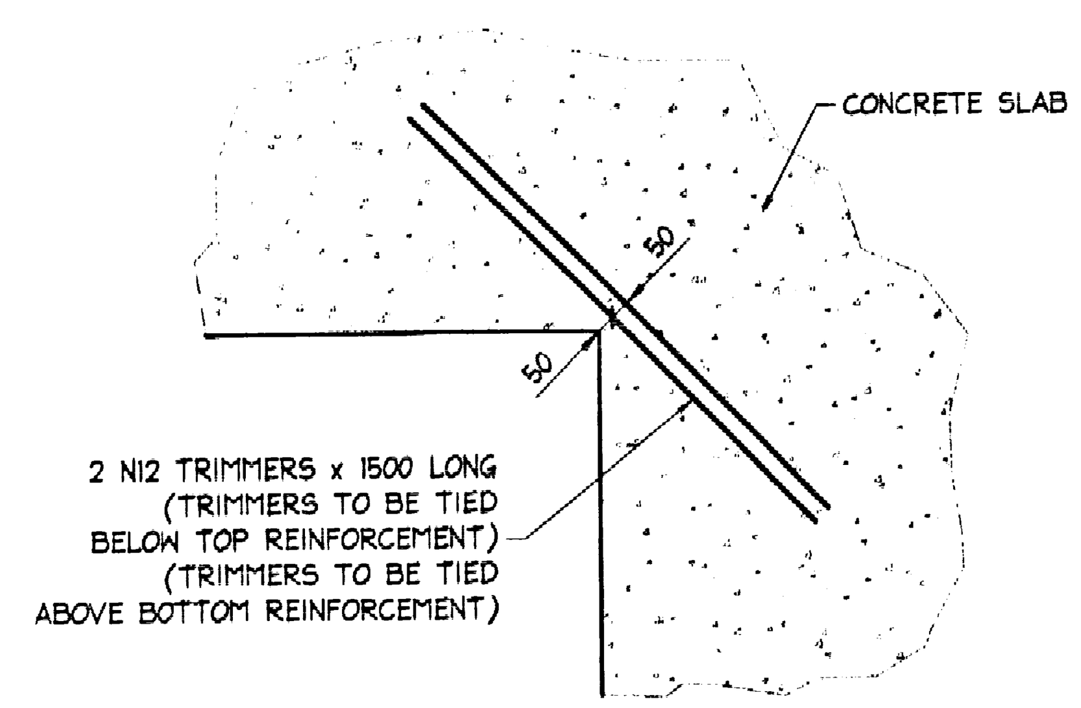


REFER NOTE C11 ON DRAWING NUMBER S01

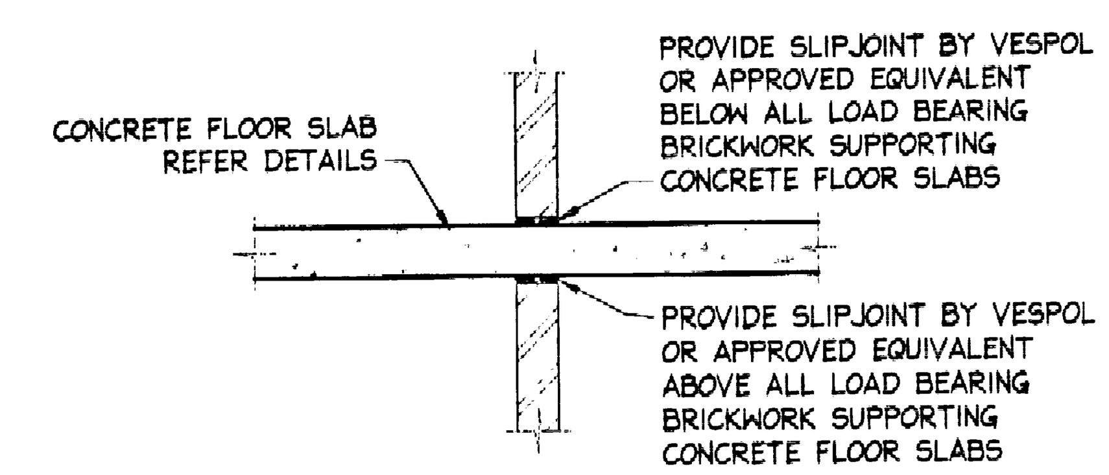
TYPICAL VERTICAL SHRINKAGE CONTROL JOINT DETAIL FOR LOAD BEARING BRICK WALLS
SCALE = 1 : 20



TYPICAL SLAB PREPARATION TYPE B
SUSPENDED SLAB ON LOOSE FORM FILL
N.T.S.



TYPICAL TRIMMER DETAIL
SCALE = 1 : 20



TYPICAL SLIP JOINT DETAIL FOR LOAD BEARING BRICK WALLS
SCALE = 1 : 20

NOT FOR CONSTRUCTION
ISSUED FOR TENDER

A1		
-	-	-
Date	Rev	Amendment

DOCUMENT CERTIFICATION
Date: AUG 03' Rick G. Wray (Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil),CPEng,MIEAust.,NPER. Institute of Engineers Membership No. 803938. I hereby state that this drawing is in compliance with the conditions of the development consent, the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

NORTHERN BEACHES Consulting Engineers P/L.
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DEE WHY N.S.W. 2099
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e-mail: nb@nbconsulting.com.au

Project: HOUSE 2
1148-1152 Barrenjoey Road
56 Palm Beach Road
Palm Beach
Raypond Development

Drawing Title: UPPER LEVEL SLAB AND AND LOWER ROOF FRAMING DETAILS

Date:	Design:	Drawn:	Checked
Aug 2003	R.G.W.	Paul R Bruce (MIEAust., MIDDAust.)	
Job No: 030703		Drawing No: S09	Rev: -

NOTES:

1. ORGANIC TERMITE TREATMENT TO BE CARRIED OUT TO PERIMETER OF ENTIRE BUILDING AND SUB-FLOOR AREAS. ANNUAL INSPECTIONS AND TREATMENT AS REQUIRED SHALL BE THE RESPONSIBILITY OF THE PROPRIETOR.
2. WALL FRAMING SHALL BE IN ACCORDANCE WITH AS 1684 TIMBER FRAMING CODE AND NSW TIMBER FRAMING MANUAL. 90x45 MGP 12 STUDS AT 450 CTS.
3. BRACE WALLS AND ROOF IN ACCORDANCE WITH AS 1684 TIMBER FRAMING CODE AND NSW TIMBER FRAMING MANUAL.
4. TIE DOWNS TO ROOF RAFTERS AND BEAMS SHALL BE IN ACCORDANCE WITH AS 1684 TIMBER FRAMING CODE AND AS 1170.2 WIND LOADING CODE.
5. TRIM ROOF OPENINGS WITH EQUIVALENT RAFTER SIZES UNLESS NOTED OTHERWISE.
6. EXTERNAL/EXPOSED HYSPAN LVL OR TASBEAM MEMBERS TO BE SUITABLY PRESERVATIVE TREATED TO H3 LEVEL (AS 1604) THEN STAINED OR PAINTED.
7. EXTERNAL/EXPOSED HARDWOOD MEMBERS TO BE DURABILITY CLASS 2 OR BETTER (AS 1604) THEN STAINED OR PAINTED.
8. ENGINEER TO INSPECT AND CERTIFY ALL FRAMING AND BRACING PRIOR TO SHEETING.

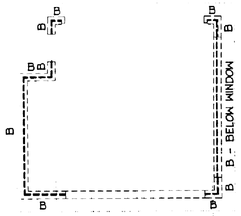
MEMBER SCHEDULE

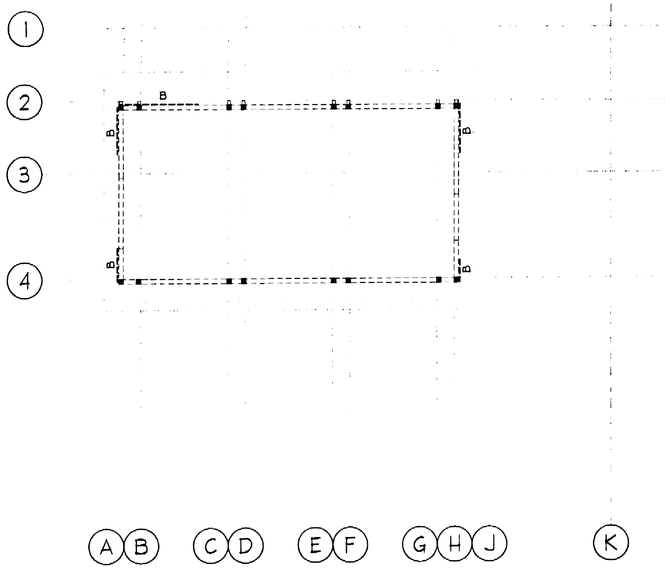
MARK	MEMBER	REMARKS
GARAGE ROOF FRAMING		
GRL1	180 PFC	LINTEL
GRL2, GRL4	240x63 HYSPAN LVL	LINTEL
GRL3	230 PFC	LINTEL
GSF1, GSF2	300x50 F7	STRUCTURAL FASCIA
GR1	300x50 F7	RAFTERS AT 600 CTS
GJR1	300x50 F7	JACK RAFTERS AT 600 CTS
UPPER ROOF FRAMING		
RC1 - RC16 incl	90x90x5 SHS	COLUMN
URB1 - URB8 incl	200 UB 22	ROOF BEAM
UWH1 - UWH14 incl	200 PFC	WINDOW HEAD
UOR1 - UOR4	200 PFC	OUT RIGGER
USF1, USF2	200x50 F7 or C20016	STRUCTURAL FASCIA
URE1, URE2	100x75x6 UA	STRUCTURAL EAVES
URP1	200x50 F7 or C20016	PURLINS AT 600 CTS
URP2	150x50 F7 or C15016	PURLIN
GENERAL FRAMING		
SB	PRYDA STRAP BRACING WITH TENSIONERS TO UNDER SIDE OF RAFTERS WHERE INDICATED ON PLAN	
B	PLY BRACING REFER TYPICAL DETAILS	
X	2 STUDS NAIL LAMINATED or 90x90 F7 POST	LOAD CONCENTRATION POINT

NOTE:
1. ASTERISK (*) BESIDE MEMBER SIZE INDICATES MEMBERS DESIGNED TO SUIT ARCHITECTS REQUIREMENTS FOR MINIMUM SIZE, SPACING AND LOCATION OF MEMBERS.
2. MGP 12 MAY BE SUBSTITUTED FOR F7 SOFTWOOD OR LESS. MGP 15 MAY BE SUBSTITUTED FOR F11 SOFTWOOD OR LESS. MGP MUST NOT BE USED AS A SUBSTITUTE WHERE HARDWOOD IS SPECIFIED.
3. ALL HARDWOOD SHALL BE KILN DRIED, DO NOT USE GREEN HARDWOOD.
4. ALL H3 AND H4 TREATED TIMBER TO BE KILN DRIED AFTER TREATMENT.

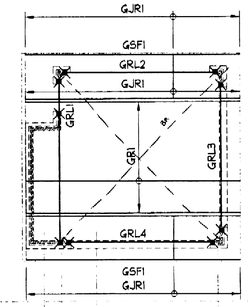
NOTES:

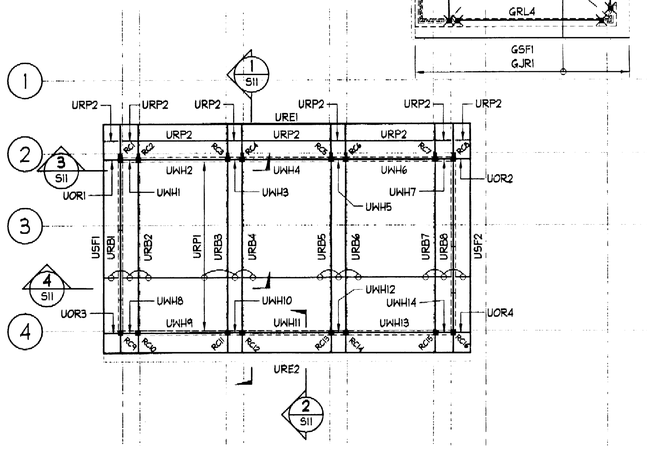
1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.





UPPER ROOF FRAMING PLAN
SCALE = 1 : 100





UPPER ROOF FRAMING PLAN
SCALE = 1 : 100

CITY PLAN SERVICES
Construction Cert. No: Approved
24 o 8 7 03 Dec 2003
Certifying Authority: Brendon Blackett
Accreditation No: BPA3004

NOT FOR CONSTRUCTION
ISSUED FOR TENDER

A1

Date:	Rev:	Amendment:
-	-	-

DOCUMENT CERTIFICATION
Date : Aug 03'
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER.
Institute of Engineers Membership No. 803938
I hereby state that this drawing is in compliance with the conditions of the development consent, the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

NORTHERN BEACHES Consulting Engineers P/L.
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Project: HOUSE 2
1148-1152 Barrenjoey Road
56 Palm Beach Road
Palm Beach
Raypond Development

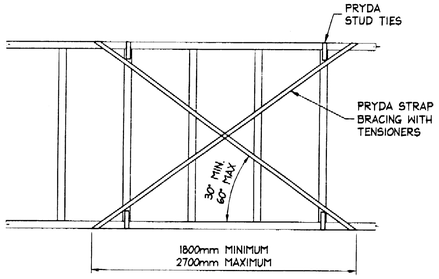
Drawing Title: UPPER ROOF FRAMING PLAN

Date:	Design:	Drawn:	Checked:
Aug 2003	R.G.W.	Paul R Bruce CMIEAust., MIDDAust.	

Job No:	Drawing No:	Rev
030703	S10	-

METAL TENSION STRAP BRACING:

PRYDA STRAP BRACING WITH TENSIONERS
FIXED WITH TWO GALVANISED FLATHEAD NAILS
Ø3.15mm x 30mm LONG TO EACH STUD, AND THE
FACE OF THE TOP AND BOTTOM PLATE.
AND FOUR GALVANISED FLATHEAD NAILS
Ø3.15mm x 30mm LONG TO THE STRAP RETURN
OVER THE TOP PLATE ABD UNDER THE BOTTOM PLATE.

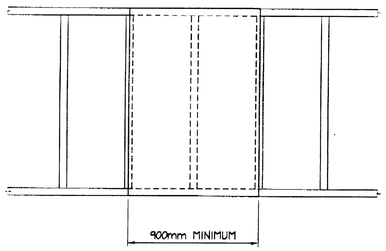


NOTES:
1. FOR POWER DRIVEN NAILS AND STAPLES REFER ABOVE.
2. NOGGINGS HAVE BEEN OMITTED FOR CLARITY.

TYPE A - WALL BRACING UNIT
SCALE = 1 : 20

PLYWOOD BRACING:

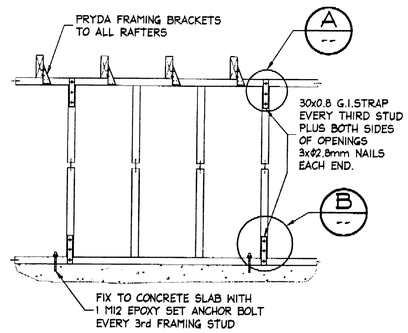
FIX PLYWOOD PANELS WITH GALVANISED FLATHEAD NAILS
Ø2.8mm x 30mm LONG MINIMUM OR EQUIVALENT AT 50mm
CENTRES ALONG TOP AND BOTTOM PLATES, 150mm CENTRES
ALONG VERTICAL EDGES AND 300mm CENTRES ALONG
INTERMEDIATE STUDS.
NAILS SHALL BE LOCATED A MINIMUM OF 7mm FROM PANEL EDGES.
POWER DRIVEN GALVANISED NAILS OR COATED STAPLES MAY BE
USED WHERE THEY PROVIDE AT LEAST THE EQUIVALENT STRENGTH
TO HAND DRIVES Ø2.8mm x 30mm LONG GALVANISED CLOUTS
OR FLATHEAD NAILS. IN THE CASE OF POWER DRIVEN STAPLES,
STAPLE SPACING SHALL BE 35mm CENTRES AT TOP AND BOTTOM
PLATES, 100mm CENTRES AT VERTICAL PLYWOOD EDGES AND
200mm CENTRES ALONG INTERMEDIATE STUDS.



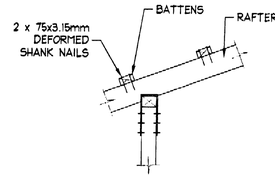
PLYWOOD THICKNESS		
PLYWOOD STRESS GRADE	PLYWOOD THICKNESS MAXIMUM STUD SPACING	
	450mm	600mm
F8	7.0mm	9.0mm
F11	6.0mm	7.0mm
F14	4.0mm	6.0mm
F27	4.0mm	4.5mm

NOTES:
1. FOR PLYWOOD THICKNESS REFER TO TABLE.
2. FOR POWER DRIVEN NAILS AND STAPLES REFER ABOVE.
3. PANEL EDGES SHALL BE SUPPORTED BY STUDS.
4. NOGGINGS HAVE BEEN OMITTED FOR CLARITY.

TYPE B - WALL BRACING UNIT
SCALE = 1 : 20



TYPICAL TIE DOWN DETAIL
SCALE = 1 : 20



DETAIL A
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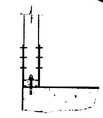

DETAIL B
SCALE =1:20

NOTES:
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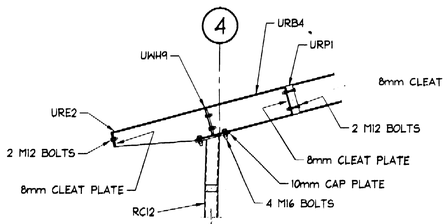
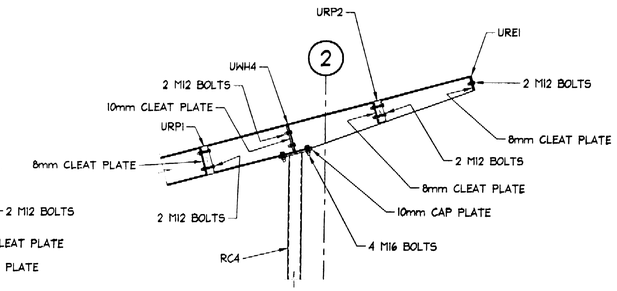
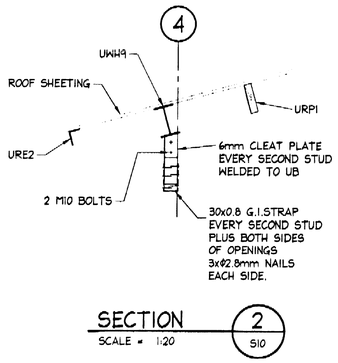
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.





SECTION 1 / S10
SCALE = 1:20



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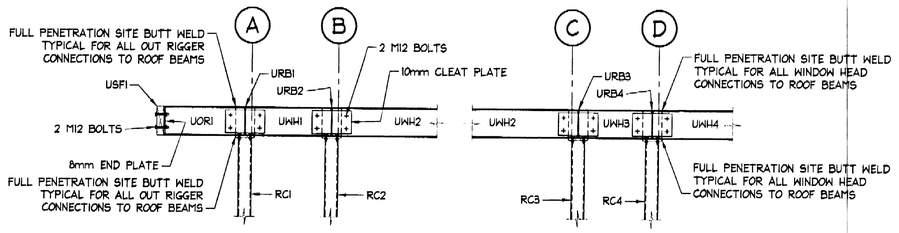

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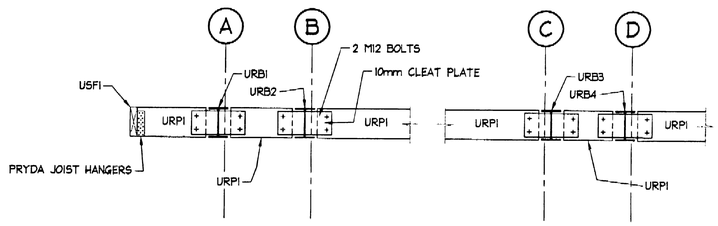

SECTION 4 / S10
SCALE = 1:20

CITY PLAN SERVICES
Construction Cert. No: Approved
24887 03 DEC 2003
Certifying Authority: Brendan Bennett
Accreditation No: PIA3004

NOT FOR CONSTRUCTION
ISSUED FOR TENDER

A1

Date:	Rev:	Amendment:
-	-	-

DOCUMENT CERTIFICATION
Date : Aug 03
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

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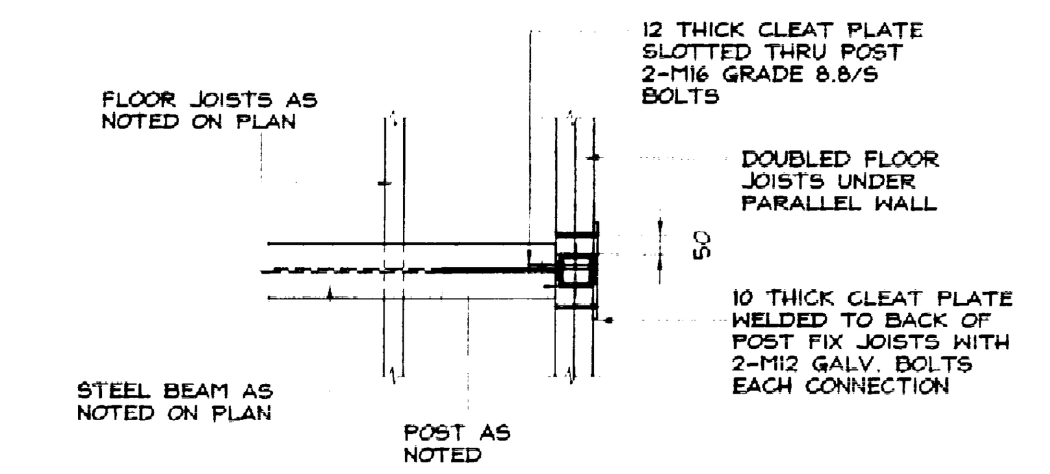
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail : nb@nbconsulting.com.au

Project: HOUSE 2
1148-1152 Barrenjoey Road
56 Palm Beach Road
Palm Beach
Raypond Development

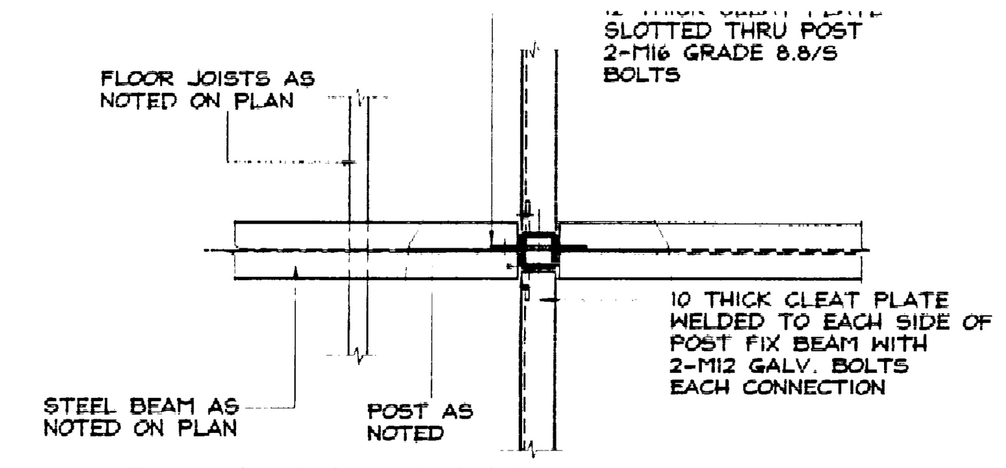
Drawing Title: LOWER AND UPPER ROOF FRAMING DETAILS

Date:	Design:	Drawn:	Checked:
Aug 2003	R.G.W.	Paul R Bruce MIEAust.,MIDDAust.	

Job No:	Drawing No:	Rev:
030703	S11	-



PLAN ON CONNECTION



PLAN ON CONNECTION

NOTES:

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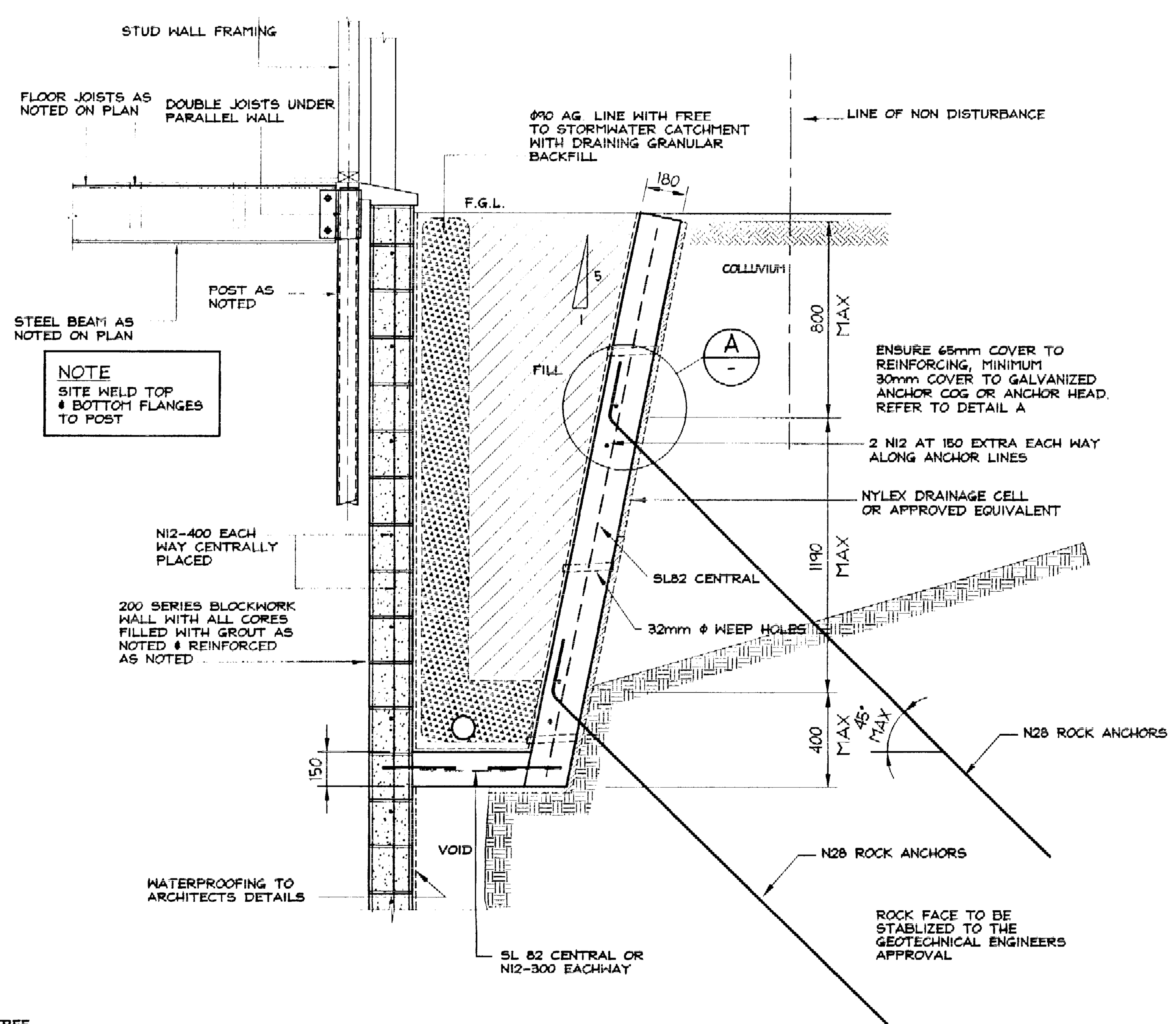
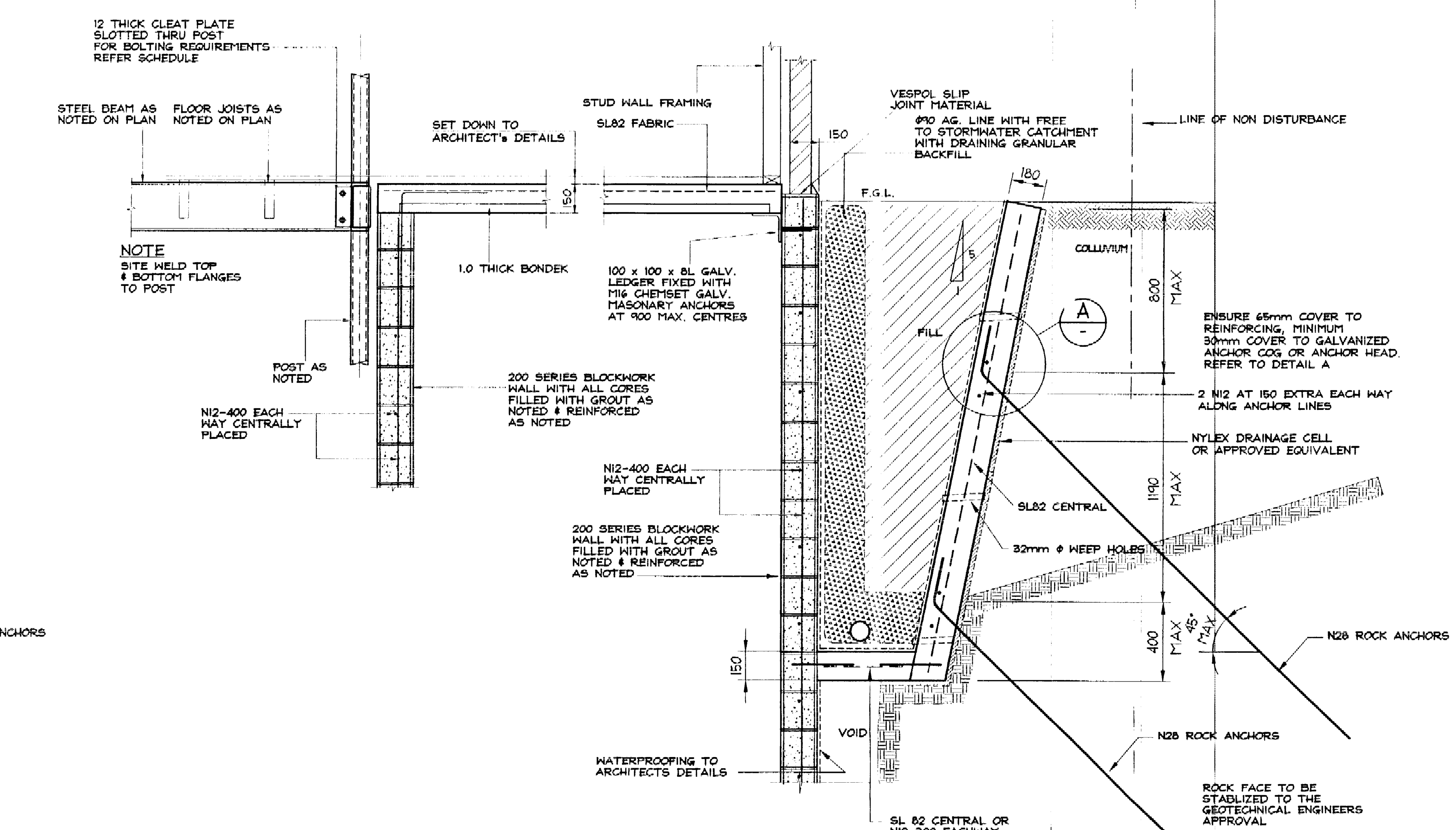
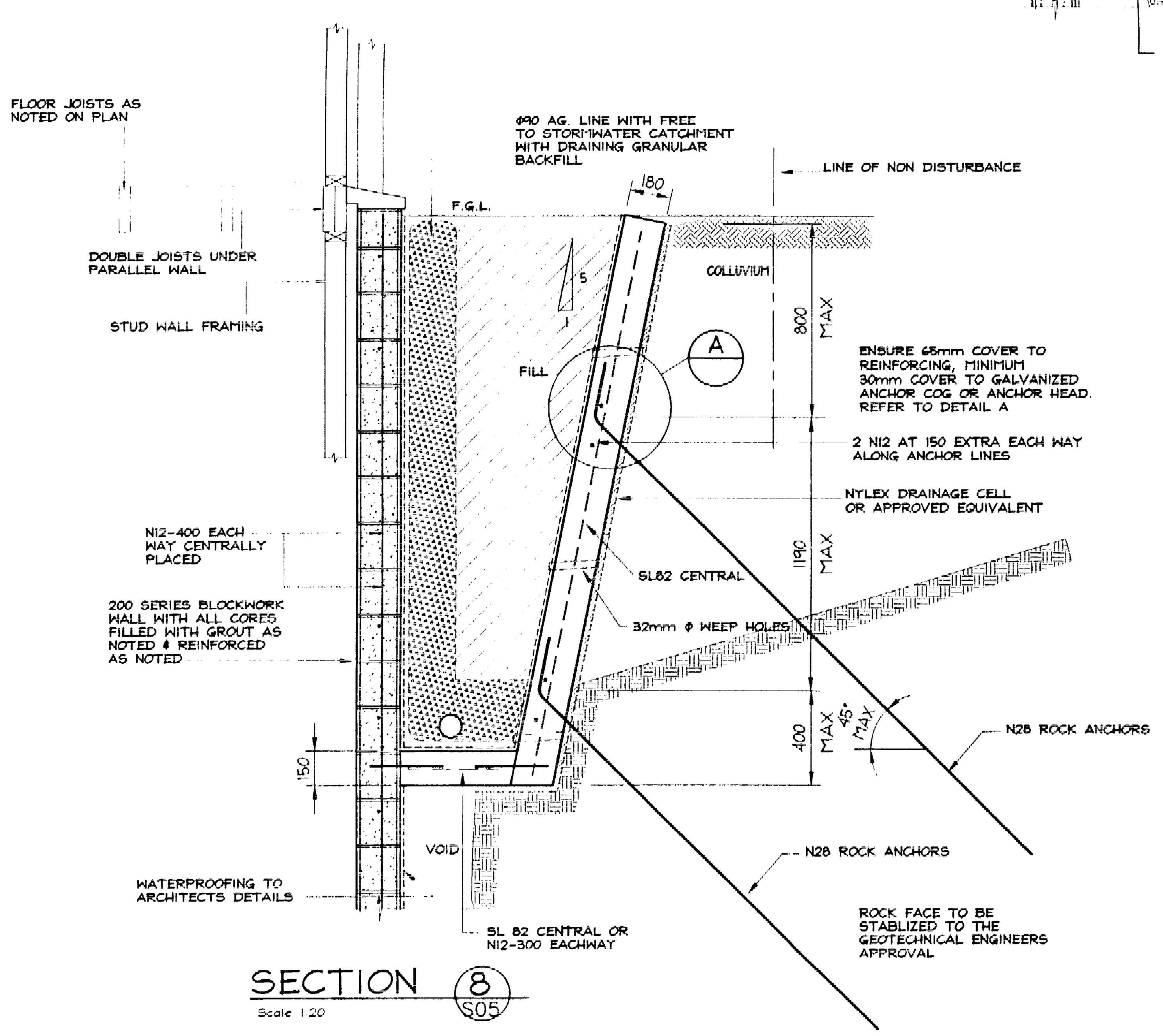
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.



SECTION 9 / S05
Scale 1:20



SECTION 10 / S05
Scale 1:20



SECTION 8 / S05
Scale 1:20

ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

A1

Date:	Rev.	Amendment:
-	-	-

DOCUMENT CERTIFICATION

Date Nov 04'

Rick G. Wray ....

(Director Northern Beaches Consulting Engineers)

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Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail: nb@nbconsulting.com.au

Project: PROPOSED NEW DWELLING AT BARRENJOEY & PALM BEACH ROADS PALM BEACH for: RAYPOND DEVELOPMENT

Drawing Title: HOUSE No.2 SHORING SECTIONS

Date:	Design:	Drawn:	Checked:
AUG. 2003	R.G.W.	MC	

Job No:	Drawing No:	Rev:
030703	S12	-

DOWEL SCHEDULE

MATERIAL	SLOPE HEIGHT (H)	BOLTING REQUIREMENTS
COLLUVIUM AND RESIDUAL SOIL	UP TO 1.5m	2.5m LONG GALV. N28 COGGED DOWEL SPACED AT 2.0m CENTRES HORIZONTALLY & DIPPING AT 45°. INSTALLED IN 75ø HOLE BLOWN CLEAN & FULLY GROUTED.
	1.5m TO 2.0m	3.0m LONG GALV. N28 COGGED DOWEL SPACED AT 2.0m CENTRES HORIZONTALLY & DIPPING AT 45°. INSTALLED IN 75ø HOLE BLOWN CLEAN & FULLY GROUTED.
SILTSTONE/SANDSTONE EXTREMELY WEATHERED HIGHLY WEATHERED AND MODERATELY WEATHERED SILTSTONE	-	2.0m LONG GALV. N24 COGGED DOWEL SPACED AT 1.5m CENTRES BOTH HORIZONTALLY & VERTICALLY & DIPPING AT 10°. INSTALLED IN 75ø HOLES BLOWN CLEAN & FULLY GROUTED.
SILTSTONE SLIGHTLY WEATHERED FRESH	-	1.0m LONG GALV. N24 COGGED DOWEL SPACED AT 1.5m CENTRES BOTH HORIZONTALLY & VERTICALLY & DIPPING AT 10°. INSTALLED IN 75ø HOLES BLOWN CLEAN & FULLY GROUTED.

ANCHOR BOLTING SCHEDULE FOR BATTER IN ROCK

MATERIAL	SLOPE HEIGHT (H)	BOLTING REQUIREMENTS
SANDSTONE/SILTSTONE MEDIUM TO HIGH STRENGTH WITH 60° DAYLIGHTING JOINTS	2.5m	2.5m LONG 24ø CT BOLT (R24HT OR APPROVED EQUIVALENT) INSTALLED AT 2.0m CENTRES DIPPING AT 10°, INSTALLED IN 45ø HOLES, BLOWN CLEAN & FULLY GROUTED & TENSIONED TO 50kN.
SANDSTONE/SILTSTONE MEDIUM TO HIGH STRENGTH WITH 60° DAYLIGHTING JOINTS	3.0m	2.5m LONG 24ø CT BOLT (R24HT OR APPROVED EQUIVALENT) INSTALLED AT 1.5m CENTRES DIPPING AT 10°, INSTALLED IN 45ø HOLES, BLOWN CLEAN & FULLY GROUTED & TENSIONED TO 50kN.
SANDSTONE/SILTSTONE MEDIUM TO HIGH STRENGTH WITH 60° DAYLIGHTING JOINTS	4.5m	3.0m LONG 24ø CT BOLT (R24HT OR APPROVED EQUIVALENT) INSTALLED AT 1.5m CENTRES DIPPING AT 10°, INSTALLED IN 45ø HOLES, BLOWN CLEAN & FULLY GROUTED & TENSIONED TO 50kN.
SANDSTONE/SILTSTONE MEDIUM TO HIGH STRENGTH WITH 60° DAYLIGHTING JOINTS	6.0m	3.0m LONG 24ø CT BOLT (R24HT OR APPROVED EQUIVALENT) INSTALLED AT 1.5m CENTRES DIPPING AT 10°, INSTALLED IN 45ø HOLES, BLOWN CLEAN & FULLY GROUTED & TENSIONED TO 50kN.
SANDSTONE/SILTSTONE MEDIUM TO HIGH STRENGTH WITH 60° DAYLIGHTING JOINTS	9.0m	3.0m LONG 24ø CT BOLT (R24HT OR APPROVED EQUIVALENT) INSTALLED AT 1.3m CENTRES DIPPING AT 10°, INSTALLED IN 45ø HOLES, BLOWN CLEAN & FULLY GROUTED & TENSIONED TO 50kN.

NOTE:
ELEVATION OF ROCK STRATUM, EXTENT OF SHOTCRETE AND STABILISATION OF CUT BATTERS, REPRODUCED FROM ADVICE PROVIDED BY 'DOUGLAS PARTNERS'.

CONSTRUCTION SEQUENCE FOR BATTER IN COLLUVIUM SOIL

1) EXCAVATE COLUVIUM AND PIN STRIP DRAINS.
2) PLACE 60mm THICK "SHOTCRETE"
3) INSTALL MESH AS DETAILED ON DRAWING No's C07 & C08.
4) APPLY SECOND PASS OF "SHOTCRETE" TO DEPTHS ON DRAWING No's C07 & C08.
   NOTE: MINIMUM 180 THICK OVER TEMPORARY SHOTCRETE

NOTE:
GALVANIZED CT BOLTS COMPLETE WITH MECHANICAL ANCHOR, DIMPLED SHEATH AND GALVANIZED BALL WASHER, NUT AND PLATES

NOTE: ROCK ANCHORS
REFER TO : 'SPECIFICATION FOR PERMANENT ROCK ANCHORS' BY DOUGLES PARTNERS.

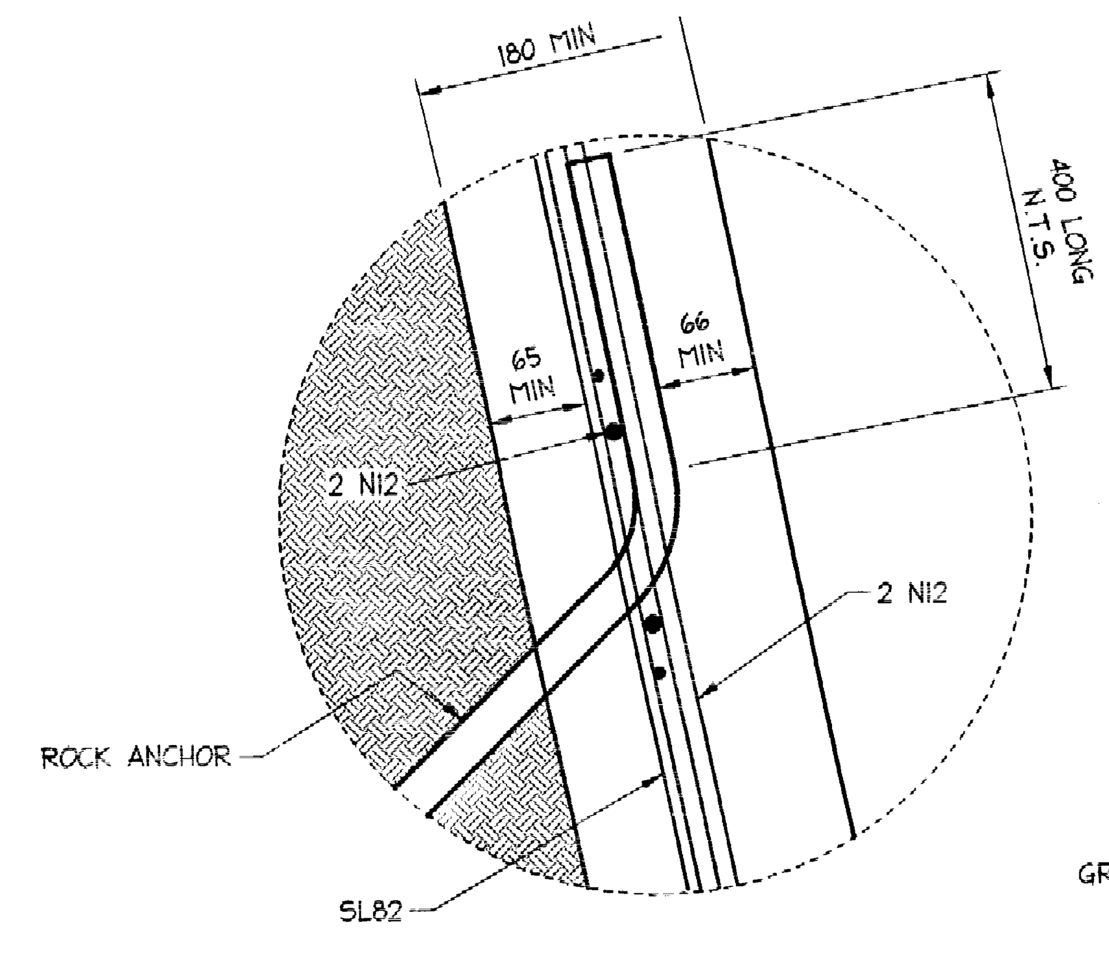
NOTES: SPRAYED CONCRETE WALLS

REINFORCEMENT:
Allowance to be made for texture application.
Minimum cover to all reinforcement to be:
65 mm to exposed face.
50 mm to face cast against ground.
All welded fabric shall be lapped as follows: 300mm minimum lap.
Mild steel rods denoted N12 are 12mm diameter D500 Grade deformed bars with 450mm minimum lap and 65mm minimum concrete cover.
Reinforcement to be held in its correct position at 800mm centres.

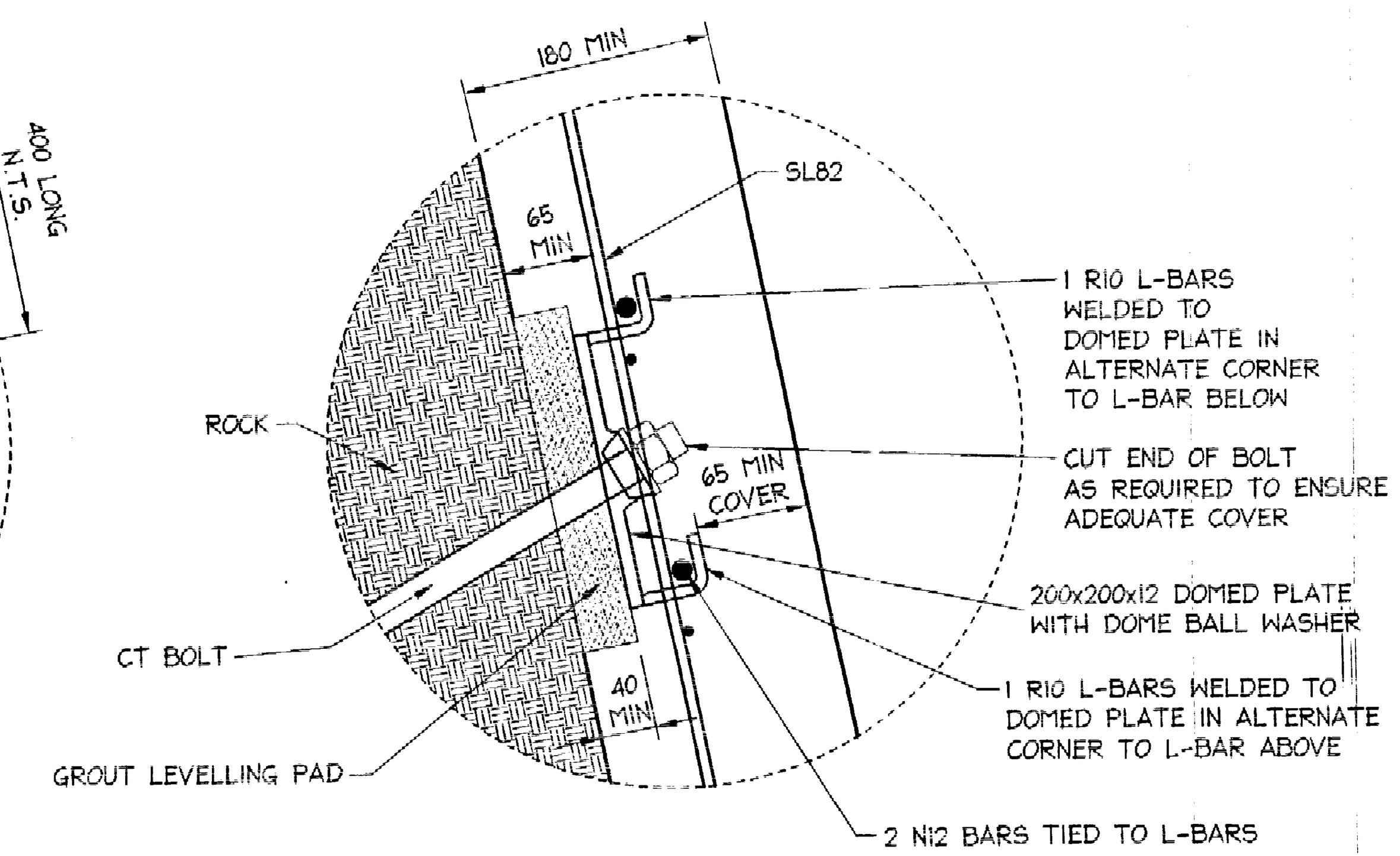
CONCRETE:
All workmanship and materials shall be carried out in accordance with AS 3600. Concrete design strength (F'c) at 28 days to be : 32 MPa.

NOTE:
ANCHOR LENGTH, TYPE AND CENTRES TO BE SPECIFIED AND APPROVED ON SITE BY THE GEOTECHNICAL ENGINEER. REFER TO ANCHOR BOLTING SCHEDULE ON DRAWING No. C20 FOR ANCHOR LENGTH AND SPACING.

NOTES:
1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

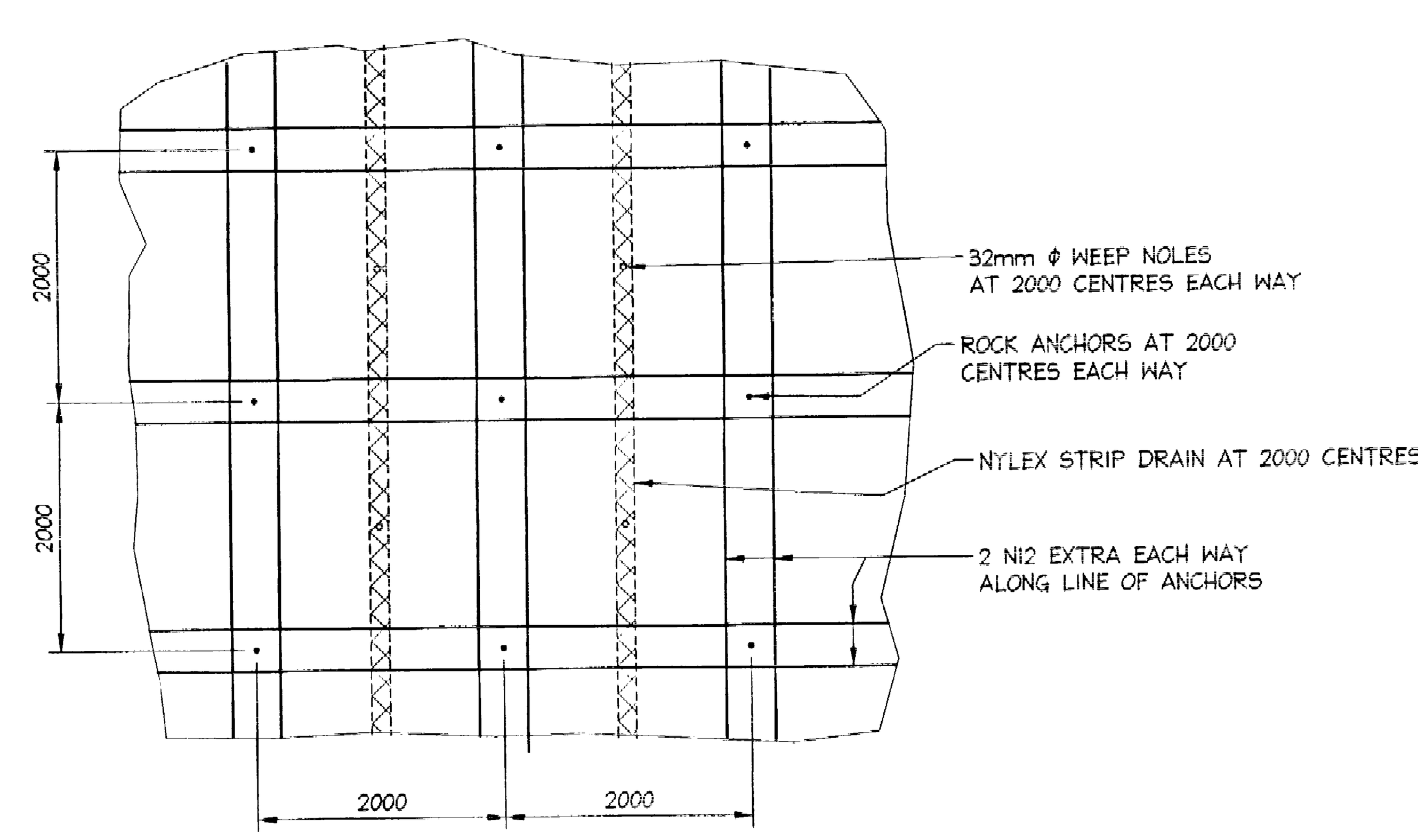


N24 ROCK ANCHOR

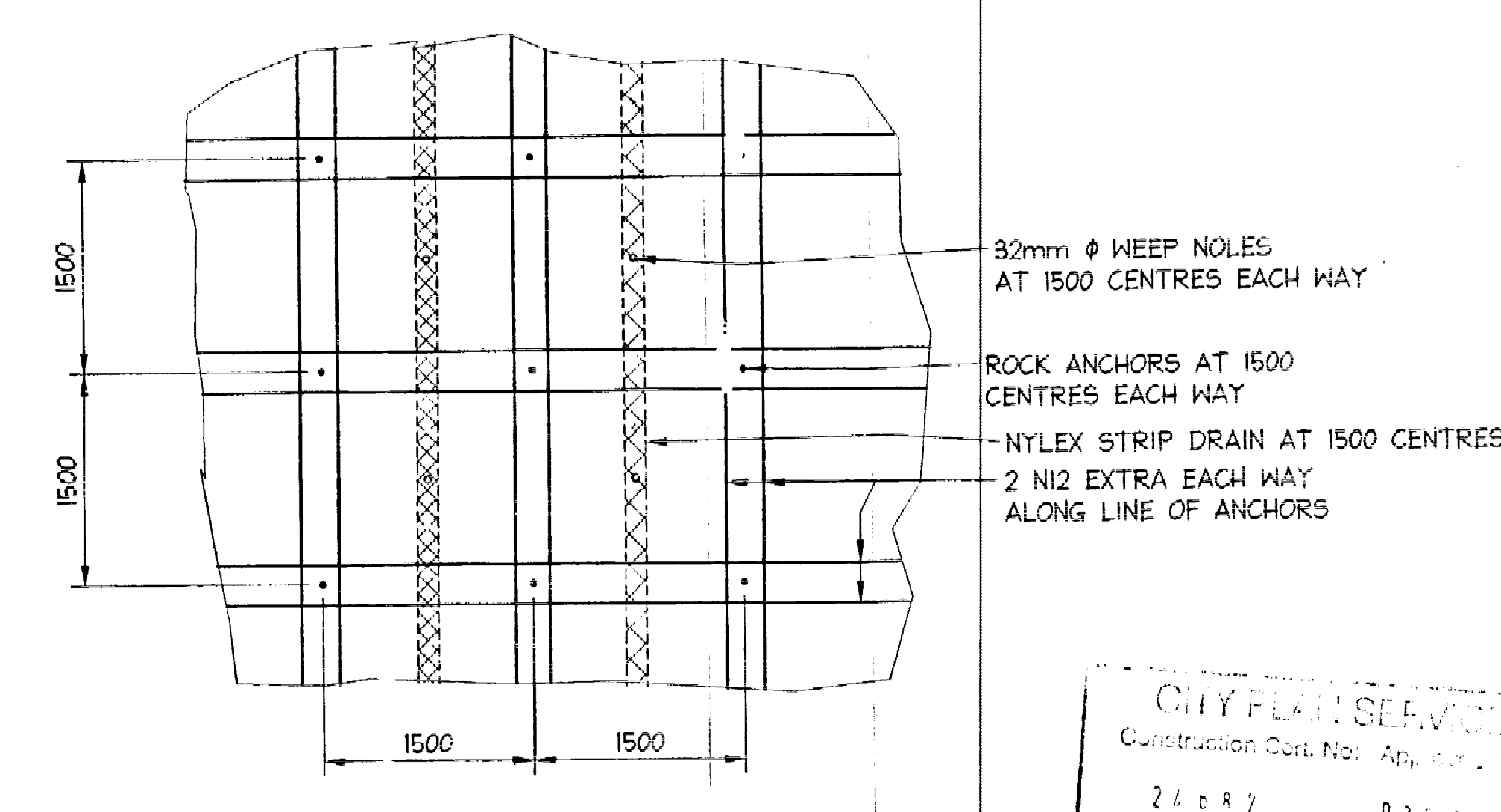


CT BOLT

DETAIL A (C07,08)
SCALE = 1:5



ANCHOR SETOUT ELEVATION TYPE A
SCALE = 1 : 50



ANCHOR SETOUT ELEVATION TYPE B
SCALE = 1 : 50

ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

A1		
Date:	Rev.	Amendment

DOCUMENT CERTIFICATION
Date Nov 04'
Rick G. Wray ....
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil), CPEng, MIEAust., NPER. Institute of Engineers Membership No. 803938. I hereby state that this drawing is in compliance with the conditions of the development consent, the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

NORTHERN BEACHES Consulting Engineers P/L.
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Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
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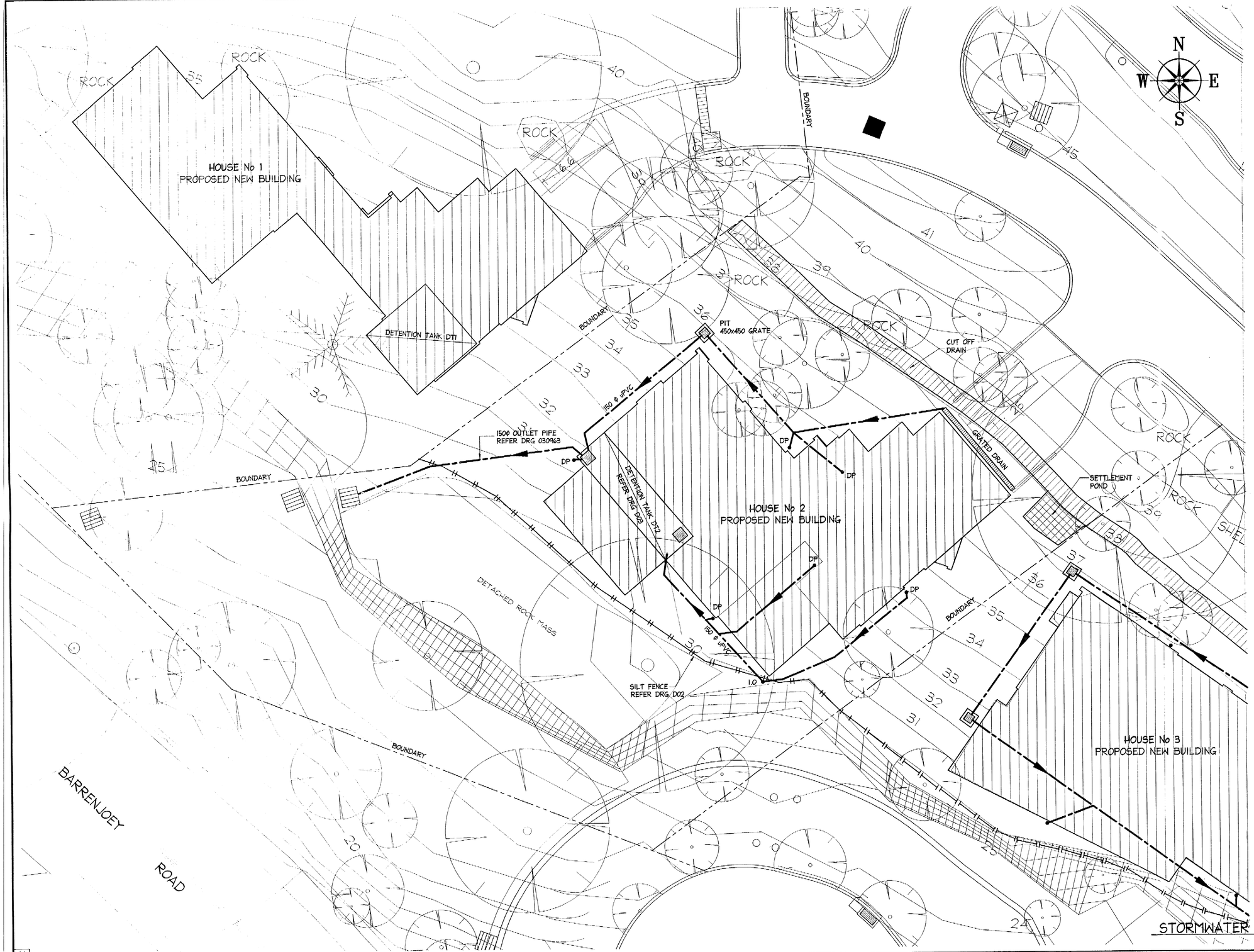
Project:
PROPOSED NEW DWELLING AT BARRENJOEY & PALM BEACH ROADS PALM BEACH
for: RAYPOND DEVELOPMENT

Drawing Title:
HOUSE No.2
ANCHOR DETAILS

Date:	Design:	Drawn:	Checked:
SEPT 2004	R.G.W.	MC	

Job No:	Drawing No:	Rev:
030703	S13	-



NOTES:

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2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

Tank / Basin Name	DT2
Total Site Area, m^2	972
Area Draining To OSD, m^2 (Area)	442
Existing Impervious Area, m^2 *(P)*	0
Increase in Impervious Area m^2 *(I)*	300
Area Draining To OSD, % *(T)*	45
Existing Impervious Area, % *(P)*	0
Increase in Impervious Area, % *(D)*	31
(A)	0.0323
(B)	0.00091
(C)	0.00053
SSR	21
PSD	15

STORMWATER AND EROSION CONTROL PLAN

SCALE = 1 : 100

A1

Date:	Rev.	Amendment:
-	-	-

DOCUMENT CERTIFICATION

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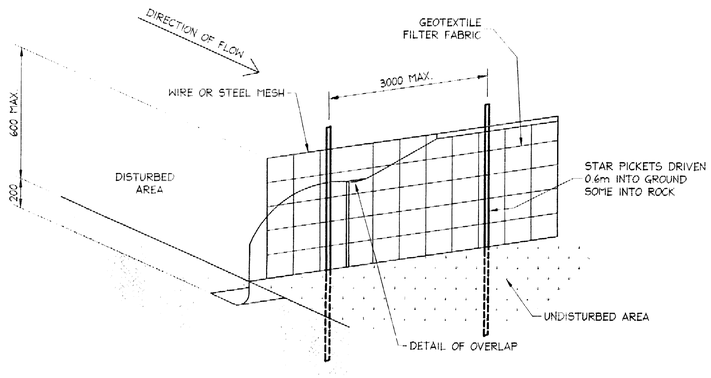
Project:
PROPOSED NEW DWELLING AT
BARRENJOEY & PALM BEACH ROADS
PALM BEACH
for: RAYPOND DEVELOPMENT

Drawing Title:
HOUSE No.2
STORMWATER AND EROSION CONTROL PLAN

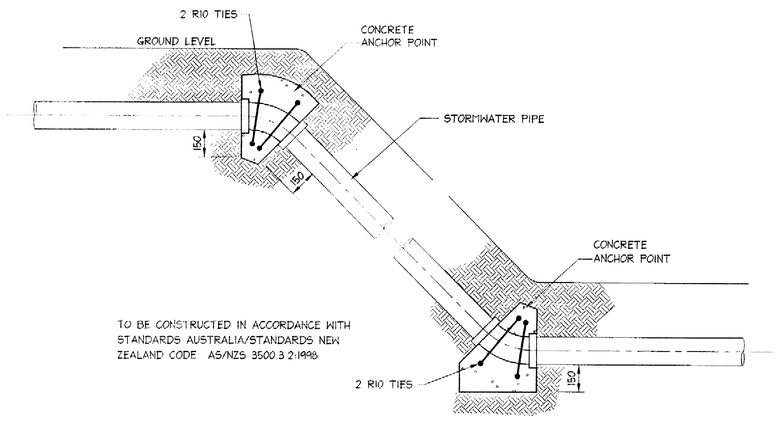
Date:	Design:	Drawn:	Checked:
SEPT 2004	RGW	MC	
Job No:		**Drawing No:**	**Rev:**
030703		D01	-

SEDIMENT CONTROL:

1. INSTALL SEDIMENT CONTROL STRUCTURES IN LOCATIONS INDICATED ON DRAWINGS AND AS OTHERWISE REQUIRED TO CONTROL SEDIMENT DURING ALL EXCAVATIONS AND WHILST AREAS OF THE SITE ARE EXPOSED TO EROSION.
2. CONTROL STRUCTURES TO BE AS DETAILED OR AS OTHERWISE REQUIRED BY CERTIFYING AUTHORITY.
3. REVIEW CONTROL MEASURES AND MAINTAIN STRUCTURES DURING CONSTRUCTION.
4. IF ADDITIONAL MEASURES ARE REQUIRED FOR EROSION CONTROL OR BY COUNCIL REQUIREMENTS REFER TO "URBAN EROSION AND SEDIMENT CONTROL" GUIDELINES PREPARED BY THE DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT.



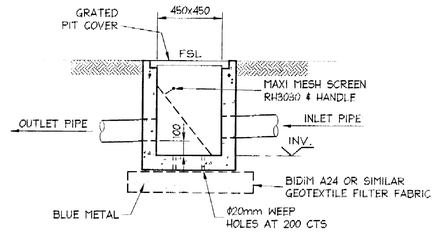
SILT FENCE DETAIL
SCALE = N.T.S



TO BE CONSTRUCTED IN ACCORDANCE WITH STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND CODE AS/NZS 3500.3.2:1998

ANCHOR BLOCKS TO BE LOCATED AT THE BEND OR JUNCTION AT THE TOP AND BOTTOM OF THE INCLINED SITE STORMWATER DRAIN AND AT INTERVALS NOT EXCEEDING 3.0m

CONCRETE ANCHOR POINT DETAIL FOR EARTH SLOPE GREATER THAN 1 V. TO 3 H.
SCALE = 1 : 20

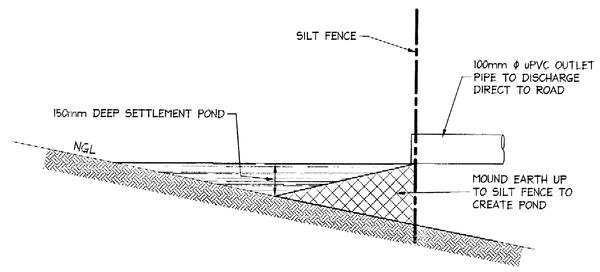


PRECAST OR CAST INSITU PIT
REFER STORMWATER NOTES

450x450 PIT DETAIL
SCALE = 1 : 20

SCHEDULE OF WORKS:

1. SILT FENCE AND ASSOCIATED WORKS INCLUDING INTERCEPTOR DRAIN IS TO BE INSTALLED BEFORE THE COMMENCEMENT OF ANY EXCAVATION.
2. CUTS TO BE EXECUTED TO THE REQUIRED LEVEL USING CONVENTIONAL EXCAVATION MACHINERY. INITIALLY THE DEPTH OF FILL/CLAY IS TO BE ESTABLISHED TO ENSURE NEIGHBOURING PROPERTIES ARE NOT ADVERSELY AFFECTED. EARTH BATTERS TO BE A MAXIMUM SLOPE OF 1.0 m VERT. TO 1.7 m HORIZ. (AS PER GEOTECHNICAL REPORT). ANY BATTERS GREATER THAN 1.0 m VERT. TO 1.7 m HORIZ. ARE TO BE ADEQUATELY SHORED IN ACCORDANCE WITH THE ENGINEERS DETAILS AND INSTRUCTIONS.
3. ANY PERMANENT RETAINING STRUCTURE IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE ENGINEERS DETAILS AND INSTRUCTIONS.
4. ALL PERMANENT RETAINING STRUCTURES ARE TO BE COMPLETED WITH MINIMUM DELAY FOLLOWING EXCAVATION.



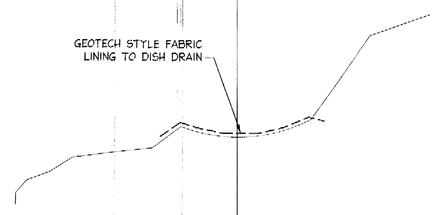
TYPICAL SECTION THROUGH SETTLEMENT POND
SCALE = N.T.S.

NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

STORMWATER NOTES:

1 - ALL PIPES TO BE 90mm Ø UNLESS NOTED OTHERWISE.
2 - ALL PIPES TO BE uPVC TO AS 1254-1993 UNLESS NOTED OTHERWISE.
3 - ALL PIPES TO BE LAYED AT 1% MINIMUM GRADE UNLESS NOTED OTHERWISE.
4 - ALL PIPES SHALL BE LAID ON A 75mm SAND BED, COMPACTED TO 100% S.M.D.D. BELOW PAVEMENTS.
(NO COMPACTION REQUIRED BELOW LANDSCAPING)
COVER TO SURFACE FROM TOP OF PIPE TO BE 300mm MINIMUM.
BACKFILL TO BE ADEQUATELY CONSOLIDATED AROUND PIPES BY METHOD OF RAMMING AND WATERING IN. TRENCHES TO BE FILLED WITH GRANULAR MATERIAL AS SPECIFIED.
5 - ALL DOWN PIPES TO BE 90mm Ø UNLESS NOTED OTHERWISE.
6 - DOWN PIPE LOCATIONS ARE INDICATIVE ONLY. LOCATIONS TO BE CONFIRMED WITH ARCHITECT PRIOR TO COMMENCEMENT WITH WORK.
7 - PROVIDE CLEANING EYES AT ALL DOWNPIPES.
8 - ALL PITS TO BE CAST INSITU OR. IF PRECAST, APPROVED BY ENGINEER. CAST INSITU PITS TO HAVE 150m m THICK CONCRETE WALLS AND BASE. WALLS TO BE REINFORCED WITH N12 TOP TIE UNLESS NOTED OTHERWISE. CAST INSITU PITS GREATER THAN 1000 DEEP TO BE MINIMUM 900x600 AND TO HAVE 150mm THICK CONCRETE WALLS AND BASE. WALLS TO BE REINFORCED WITH N12 AT 300 EACH WAY UNLESS NOTED OTHERWISE.
9 - ALL PITS GREATER THAN 1000mm DEEP SHALL HAVE STEP IRONS AS PER COUNCIL STANDARDS.
10 - ALL WORK TO BE IN ACCORDANCE WITH LOCAL COUNCIL STANDARDS AND SPECIFICATIONS.
11 - PRIOR TO COMMENCING ANY SITE WORKS THE CONTRACTOR SHALL IMPLEMENT EROSION CONTROL MEASURES TO EPA GUIDELINES AND COUNCIL SPECIFICATIONS. ALL MEASURES TO REMAIN IN PLACE UNTIL COMPLETION AND STABILIZATION OF THE SITE TO COUNCIL SATISFACTION.
12 - ALL LEVELS SHOWN ARE TO AHD
13 - ENSURE THAT ALL PITS AND STORMWATER PIPES ARE LOCATED CLEAR FROM TREE ROOT SYSTEMS.
14 - ALL EXISTING EARTHENWARE PIPES TO BE UPGRADED TO uPVC.
15 - ALL WORKS TO BE IN ACCORDANCE WITH AS 3500-1990 NATIONAL PLUMBING DRAINAGE CODE PART 3 - STORMWATER DRAINAGE.



TYPICAL SECTION THROUGH CUT OFF DRAIN
SCALE = N.T.S.

A1

Date	Rev.	Amendment
-	-	-

DOCUMENT CERTIFICATION
Date : Nov 04' R Wray
Rick G. Wray .....
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer
I hold the following qualifications:
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Institute of Engineers Membership No. 803988
I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards

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DEE WHY N.S.W. 2099
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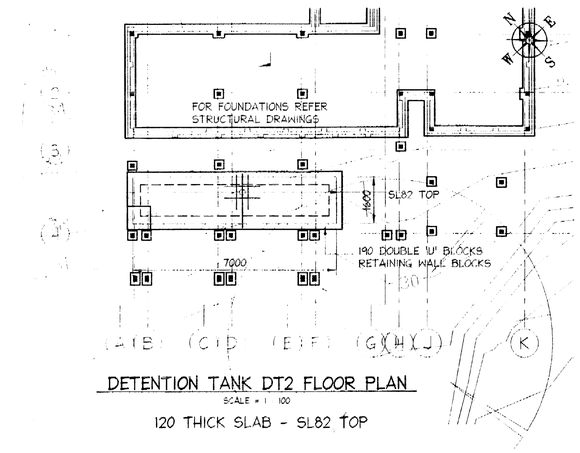
Project.
PROPOSED NEW DWELLING AT BARRENJOEY & PALM BEACH ROADS PALM BEACH
for: RAYPOND DEVELOPMENT

Drawing Title:
HOUSE No.2
STORMWATER AND EROSION CONTROL DETAILS

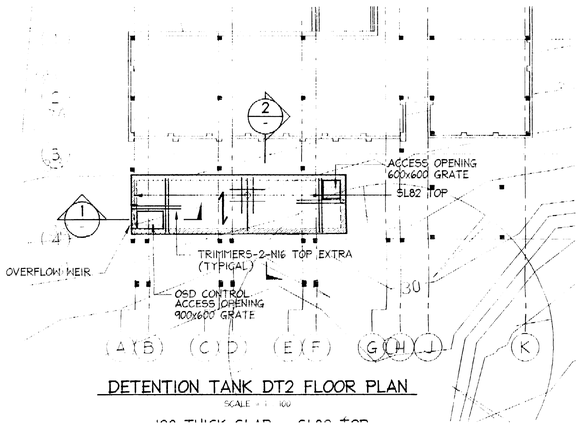
Date:	Design.	Drawn:	Checked:
SEPT 2004	RGW	Paul R Bruce MIEAust.	
Job No.		Drawing No:	Rev:
030703		D02	-



DETENTION TANK DT2 FLOOR PLAN

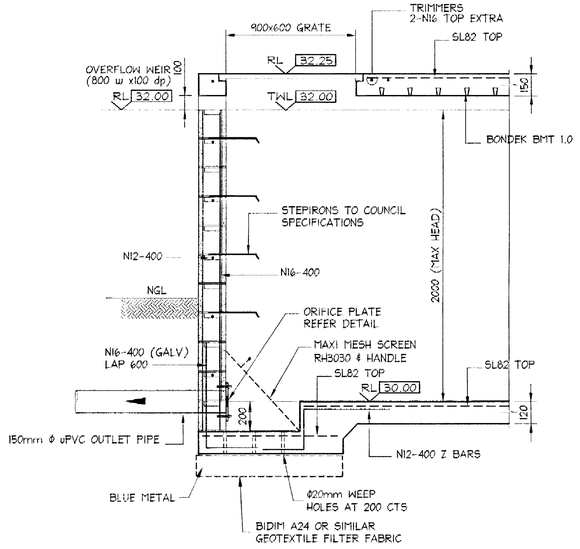
SCALE = 1 : 100

120 THICK SLAB - SL82 TOP



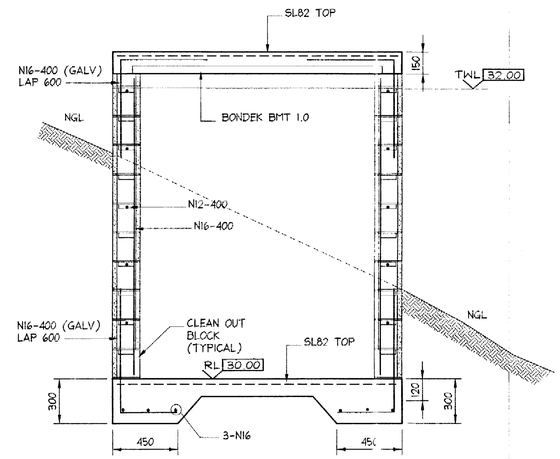
DETENTION TANK DT2 FLOOR PLAN

SCALE = 1 : 100



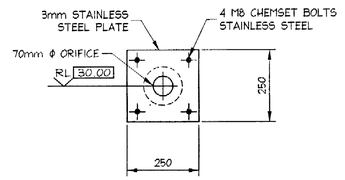
SECTION 1

SCALE = 1:20



SECTION 2

SCALE = 1:20



ORIFICE PLATE DETAIL

NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

A1

Date:	Rev:	Amendment:
-	-	-

DOCUMENT CERTIFICATION

Date Nov 04 R. Wray

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Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
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Project:
PROPOSED NEW DWELLING AT
BARRENJOEY & PALM BEACH ROADS
PALM BEACH
for: RAYPOND DEVELOPMENT

Drawing Title:
HOUSE No.2
OSD TANK DT2 DETAILS

Date:	Design:	Drawn:	Checked:
SEPT 2004	RGW	MC	

Job No:	Drawing No:	Rev:
030703	D03	-

HOUSE 2 CC TREE SUMMARY

All previously numbered and surveyed trees within Lot 2 boundaries are listed below, with the exception of some weed species. List compiled with reference to:

- Pittwater Council DA Conditions B8 & C7,
- PSB Tree Protection Plan TP13A dated 15/11/2002,
- PSB Landscape Plan 00137/L06A, dated 25/05/2001,
- Stamped, approved Tree Survey TP05B, dated 8/01/2002,
- PSB Pre-Construction Tree/Vegetation Report, Subdivision Works, dated 10 April 2003.
- Urban Forestry Arboricultural Assessment dated November 2004.

1. Trees that have been approved for removal for the subdivision works due to their location within, or proximity to the road. These trees are not shown on Landscape Plan LP13A. Previous issues of Tree Plans/Surveys, may be referred to if required:
T66, T67, T70, T71, T72, T73, T74, T75, T76, T78, T79, T92, T105, T347, T348, T350, T437, T440, T442, T443, T448, T449, T452, T453, T704.

2. Trees to be retained, protected and bonded as part of the subdivision, as per DA Condition C7;
T103, T104, T182, T199, T200, T201, T202. Shown on Landscape Plan LP13A.

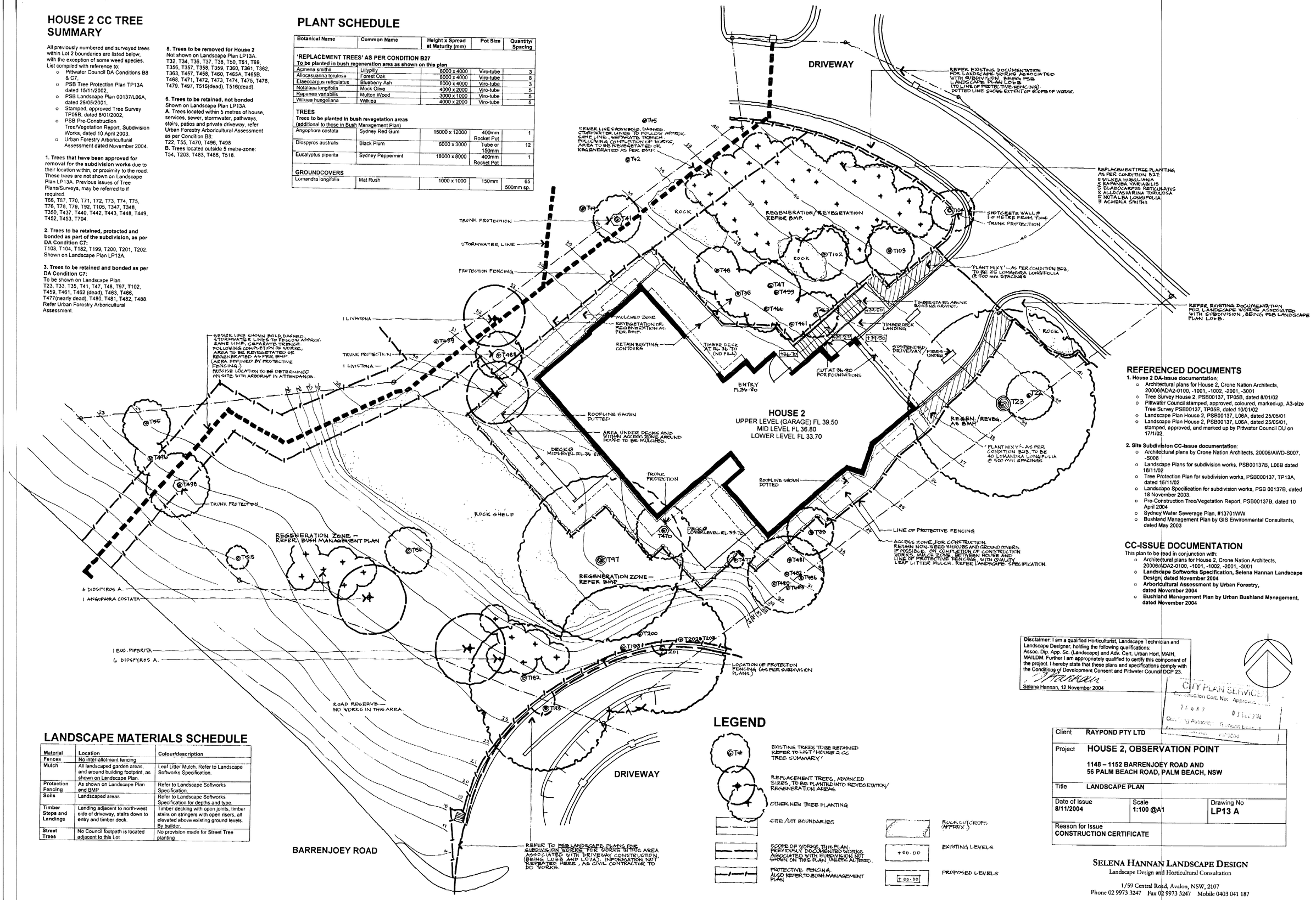
3. Trees to be retained and bonded as per DA Condition C7:
To be shown on Landscape Plan.
T23, T33, T35, T41, T47, T48, T97, T102, T459, T461, T462 (dead), T463, T466, T477(nearly dead), T480, T481, T482, T488. Refer Urban Forestry Arboricultural Assessment.

5. Trees to be removed for House 2
Not shown on Landscape Plan LP13A.
T32, T34, T36, T37, T38, T50, T51, T69, T356, T357, T358, T359, T360, T361, T362, T363, T457, T458, T460, T465A, T465B, T468, T471, T472, T473, T474, T475, T478, T479. T497, T515(dead), T516(dead).

6. Trees to be retained, not bonded
Shown on Landscape Plan LP13A
A. Trees located within 5 metres of house, services, sewer, stormwater, pathways, stairs, patios and private driveway, refer Urban Forestry Arboricultural Assessment as per Condition B8:
T22, T55, T470, T496, T498
B. Trees located outside 5 metre-zone:
T54, T203, T483, T486, T518.

PLANT SCHEDULE

Botanical Name	Common Name	Height x Spread at Maturity (mm)	Pot Size	Quantity/ Spacing
'REPLACEMENT TREES' AS PER CONDITION B27 To be planted in bush regeneration area as shown on this plan				
Acmena smithii	Lillypilly	8000 x 4000	Viro-tube	3
Allocasuarina torulosa	Forest Oak	8000 x 4000	Viro-tube	8
Elaeocarpus reticulatus	Blueberry Ash	8000 x 4000	Viro-tube	3
Notaleaa longifolia	Mock Olive	4000 x 2000	Viro-tube	5
Rapanea variabilis	Mutton Wood	3000 x 1000	Viro-tube	5
Wilkiea huegeliana	Wilkiea	4000 x 2000	Viro-tube	5
TREES Trees to be planted in bush revegetation areas (additional to those in Bush Management Plan)				
Angophora costata	Sydney Red Gum	15000 x 12000	400mm Rocket Pot	1
Diospyros australis	Black Plum	6000 x 3000	Tube or 150mm	12
Eucalyptus piperita	Sydney Peppermint	18000 x 8000	400mm Rocket Pot	1
GROUNDCOVERS				
Lomandra longifolia	Mat Rush	1000 x 1000	150mm	65 500mm sp.



REFERENCED DOCUMENTS

1. House 2 DA-issue documentation:
- Architectural plans for House 2, Crone Nation Architects, 20006/ADA2-0100, -1001, -1002, -2001, -3001
- Tree Survey House 2, PSB00137, TP05B, dated 8/01/02
- Pittwater Council stamped, approved, coloured, marked-up, A3-size Tree Survey PSB00137, TP05B, dated 10/01/02
- Landscape Plan House 2, PSB00137, L06A, dated 25/05/01
- Landscape Plan House 2, PSB00137, L06A, dated 25/05/01, stamped, approved, and marked up by Pittwater Council DU on 17/1/02.

2. Site Subdivision CC-Issue documentation:
- Architectural plans by Crone Nation Architects, 20006/AWD-S007, -S008
- Landscape Plans for subdivision works, PSB00137B, L06B dated 18/11/02
- Tree Protection Plan for subdivision works, PSB000137, TP13A, dated 15/11/02
- Landscape Specification for subdivision works, PSB 00137B, dated 18 November 2003.
- Pre-Construction Tree/Vegetation Report, PSB00137B, dated 10 April 2004
- Sydney Water Sewerage Plan, #13701WW
- Bushland Management Plan by GIS Environmental Consultants, dated May 2003

CC-ISSUE DOCUMENTATION

This plan to be read in conjunction with:
- Architectural plans for House 2, Crone Nation Architects, 20006/ADA2-0100, -1001, -1002, -2001, -3001
- **Landscape Softworks Specification, Selena Hannan Landscape Design, dated November 2004**
- **Arboricultural Assessment by Urban Forestry, dated November 2004**
- **Bushland Management Plan by Urban Bushland Management, dated November 2004**

LANDSCAPE MATERIALS SCHEDULE

Material	Location	Colour/description
Fences	No inter-allotment fencing	
Mulch	All landscaped garden areas, and around building footprint, as shown on Landscape Plan.	Leaf Litter Mulch. Refer to Landscape Softworks Specification.
Protection Fencing	As shown on Landscape Plan and BMP	Refer to Landscape Softworks Specification.
Soils	Landscaped areas	Refer to Landscape Softworks Specification for depths and type.
Timber Steps and Landings	Landing adjacent to north-west side of driveway, stairs down to entry and timber deck.	Timber decking with open joints, timber stairs on stringers with open risers, all elevated above existing ground levels. By builder.
Street Trees	No Council footpath is located adjacent to this Lot	No provision made for Street Tree planting

LEGEND

- T# — EXISTING TREES TO BE RETAINED REFER TO LIST 'HOUSE 2 CC TREE SUMMARY'
- REPLACEMENT TREES, ADVANCED SIZES, TO BE PLANTED INTO REVEGETATION/ REGENERATION AREAS
- OTHER NEW TREE PLANTING
- SITE / LOT BOUNDARIES
- SCOPE OF WORKS THIS PLAN. PREVIOUSLY DOCUMENTED WORKS ASSOCIATED WITH SUBDIVISION NOT SHOWN ON THIS PLAN, UNLESS ALTERED.
- PROTECTIVE FENCING. ALSO REFER TO BUSH MANAGEMENT PLAN
- ROCK OUTCROPS (APPROX.)
- +00.00 EXISTING LEVELS
- +00.00 PROPOSED LEVELS

Disclaimer: I am a qualified Horticulturist, Landscape Technician and Landscape Designer, holding the following qualifications: Assoc. Dip. App. Sc. (Landscape) and Adv. Cert. Urban Hort, MAIH, MAILDM. Further I am appropriately qualified to certify this component of the project. I hereby state that these plans and specifications comply with the Conditions of Development Consent and Pittwater Council DCP 23.

Selena Hannan, 12 November 2004

CITY PLAN SERVICES
Construction Cert. No: Approved
22 DEC 04
Building Auth...

Client	RAYPOND PTY LTD		
Project	HOUSE 2, OBSERVATION POINT 1148 – 1152 BARRENJOEY ROAD AND 56 PALM BEACH ROAD, PALM BEACH, NSW		
Title	LANDSCAPE PLAN		
Date of Issue 8/11/2004	Scale 1:100 @A1	Drawing No LP13 A	
Reason for Issue CONSTRUCTION CERTIFICATE			

SELENA HANNAN LANDSCAPE DESIGN
Landscape Design and Horticultural Consultation
1/59 Central Road, Avalon, NSW, 2107
Phone 02 9973 3247 Fax 02 9973 3247 Mobile 0403 041 187

NOTES:
* Weed Assessment was carried out using a slightly modified version of Ku-ring-gai Council's Bushland Weed Assessment Guidelines (1995). Entire site was determined to have > 60% weed throughout
* For a full list of noxious and environmental weeds and native species recorded for the site - see Appendix 3 of this BMP
* For locations of trees to be retained, bonded and/or protected (including tree ID) - see Landscape Drawing # LP13A prepared by Selena Hannan Landscape Design
* Approximate Scale @ A1 - 1:100

Figure 3.1
Action Plan - Lot 2
Diagram A - Native Vegetation Under 3m & Weed Assessment

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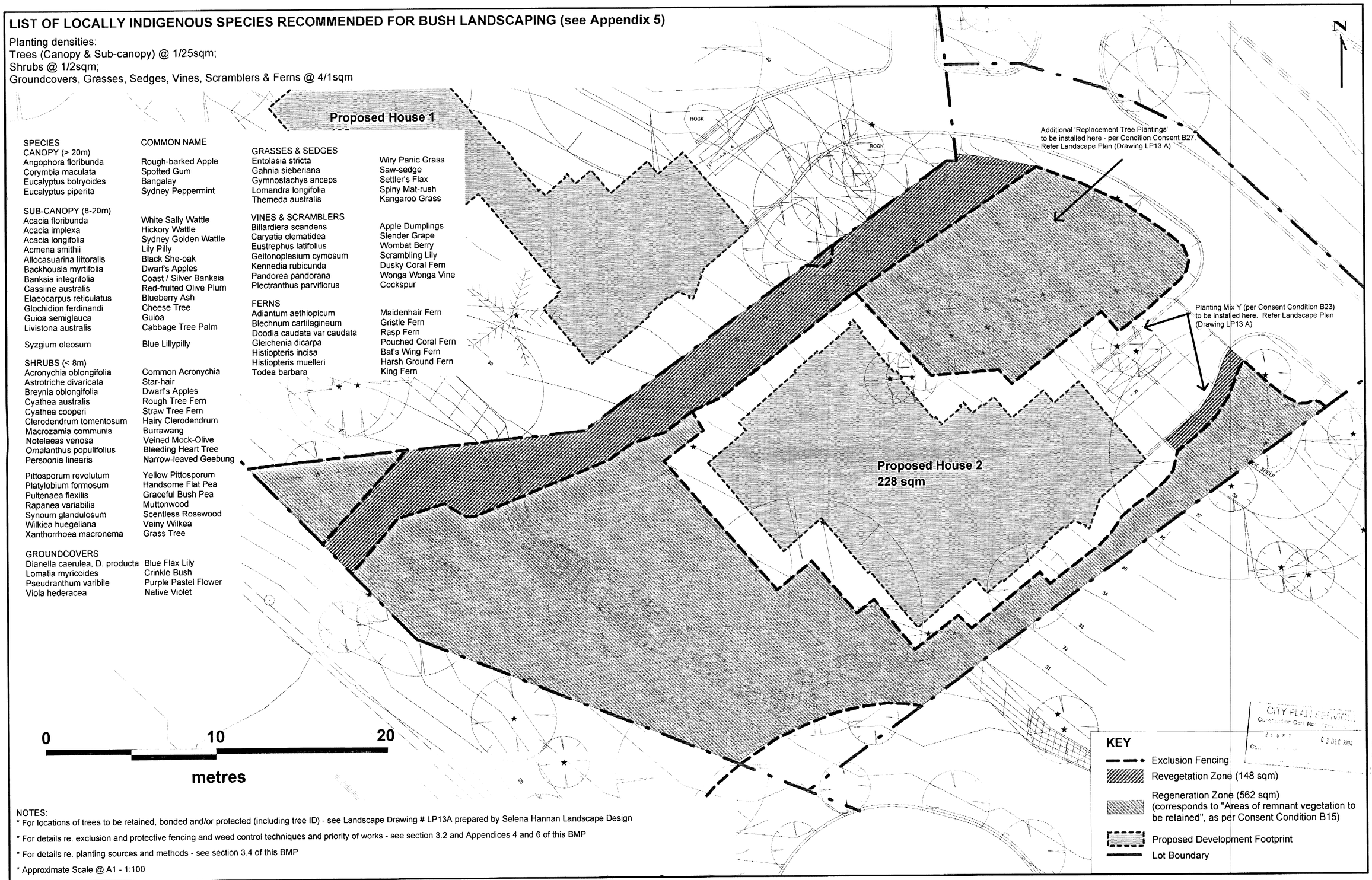
LIST OF LOCALLY INDIGENOUS SPECIES RECOMMENDED FOR BUSH LANDSCAPING (see Appendix 5)

Planting densities:
Trees (Canopy & Sub-canopy) @ 1/25sqm;
Shrubs @ 1/2sqm;
Groundcovers, Grasses, Sedges, Vines, Scramblers & Ferns @ 4/1sqm

SPECIES	COMMON NAME
CANOPY (> 20m)	
Angophora floribunda	Rough-barked Apple
Corymbia maculata	Spotted Gum
Eucalyptus botryoides	Bangalay
Eucalyptus piperita	Sydney Peppermint
SUB-CANOPY (8-20m)	
Acacia floribunda	White Sally Wattle
Acacia implexa	Hickory Wattle
Acacia longifolia	Sydney Golden Wattle
Acmena smithii	Lily Pilly
Allocasuarina littoralis	Black She-oak
Backhousia myrtifolia	Dwarf's Apples
Banksia integrifolia	Coast / Silver Banksia
Cassiine australis	Red-fruited Olive Plum
Elaeocarpus reticulatus	Blueberry Ash
Glochidion ferdinandi	Cheese Tree
Guioa semiglauca	Guioa
Livistona australis	Cabbage Tree Palm
Syzgium oleosum	Blue Lillypilly
SHRUBS (< 8m)	
Acronychia oblongifolia	Common Acronychia
Astrotriche divaricata	Star-hair
Breynia oblongifolia	Dwarf's Apples
Cyathea australis	Rough Tree Fern
Cyathea cooperi	Straw Tree Fern
Clerodendrum tomentosum	Hairy Clerodendrum
Macrozamia communis	Burrawang
Notelaeas venosa	Veined Mock-Olive
Omalanthus populifolius	Bleeding Heart Tree
Persoonia linearis	Narrow-leaved Geebung
Pittosporum revolutum	Yellow Pittosporum
Platylobium formosum	Handsome Flat Pea
Pultenaea flexilis	Graceful Bush Pea
Rapanea variabilis	Muttonwood
Synoum glandulosum	Scentless Rosewood
Wilkiea huegeliana	Veiny Wilkea
Xanthorrhoea macronema	Grass Tree
GROUNDCOVERS	
Dianella caerulea, D. producta	Blue Flax Lily
Lomatia myricoides	Crinkle Bush
Pseudranthum varibile	Purple Pastel Flower
Viola hederacea	Native Violet

GRASSES & SEDGES	
Entolasia stricta	Wiry Panic Grass
Gahnia sieberiana	Saw-sedge
Gymnostachys anceps	Settler's Flax
Lomandra longifolia	Spiny Mat-rush
Themeda australis	Kangaroo Grass
VINES & SCRAMBLERS	
Billardiera scandens	Apple Dumplings
Caryatia clematidea	Slender Grape
Eustrephus latifolius	Wombat Berry
Geitonoplesium cymosum	Scrambling Lily
Kennedia rubicunda	Dusky Coral Fern
Pandorea pandorana	Wonga Wonga Vine
Plectranthus parviflorus	Cockspur
FERNS	
Adiantum aethiopicum	Maidenhair Fern
Blechnum cartilagineum	Gristle Fern
Doodia caudata var caudata	Rasp Fern
Gleichenia dicarpa	Pouched Coral Fern
Histiopteris incisa	Bat's Wing Fern
Histiopteris muelleri	Harsh Ground Fern
Todea barbara	King Fern



NOTES:
* For locations of trees to be retained, bonded and/or protected (including tree ID) - see Landscape Drawing # LP13A prepared by Selena Hannan Landscape Design
* For details re. exclusion and protective fencing and weed control techniques and priority of works - see section 3.2 and Appendices 4 and 6 of this BMP
* For details re. planting sources and methods - see section 3.4 of this BMP
* Approximate Scale @ A1 - 1:100

Figure 3.1
Action Plan - Lot 2
Diagram B - Revegetation and Regeneration Areas

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