R: 171065
14/7/05
SWB

ENVIRONET

CONSULTANCY PTY LTD
ACN 075 195 078
ENVIRONMENTAL, BUILDING & PLANNING CONSULTANTS

CONSTRUCTION CERTIFICATE

No. 116-05

For

LOQUART VALLEY SCHOOL

Premises

1973 PITTWATER ROAD BAYVIEW

PO BOX 1003 ARTARMON, SYDNEY NSW 2064 PH (02) 9967 4422, FAX (02) 9967 4433 MOBILE 0419 660 222

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SECTION 1

CONSTRUCTION CERTIFCATE

CONSTRUCTION CERTIFICATE

Environet
Consultancy Pty Ltd
ACN 075 195 078

Peter Rossello
Accredited Certifier

P.O. Box 1003
Artarmon, NSW
2064

Ph. 99674422
Fax. 99674433

ENVIRONMENTAL PLANNING & ASSESSMENT ACT 1979
Notice to Applicant of determination of Construction Certificate

Pursuant to Section 109C(1)(b) and 81A(2) of the Environmental Planning and Assessment Act 1979, notice is hereby given that your construction certificate application dated 1.7.05 has been determined and approved as follows.

SCHEDULE OF WORKS:	Alterations & additions to existing school building (music rooms)
Development Consent No.	DA 803/04
Date of determination:	28 February 2005
Section 96 modification	DAN0803/04
Date of determination:	28 June 2005
Expiry date of Development Consent:	28 February 2007
Documentation relied upon:	Refer to documents outlined in section 2

CERTIFYING AUTHORITY DETAILS

Name of Accredited Certifier:	Peter S. Rossello
Address:	P.O. Box 1003 Artarmon, NSW 2064
Accreditation No.	BSAP 4493
Level of Accreditation	Level 2
Building Classification	Class 9b, (school building)
Contact No.	Bs. 99674422 fax. 99674433 mobile 0419 660 222
Construction Certificate No.	**116-05**
Property details:	Lot 20, DP 635214

Insurance: Insurance has been issued pursuant to Part 6 of Home Building Act, 1989 & clause 98 of the EP&A Regulations. (Not applicable)

Long service leave Levy Statement: Paid- refer to section 6

The work completed in accordance with the documentation accompanying the application for a construction certificate as outlined in Section 2, will comply with the requirements of Section 81A(5) of the Environmental Planning & Assessment Act 1979.

Signature:

Peter Rossello
Accredited Certifier

19 JUL 2005

Determination date:

SECTION 2

DOCUMENTS RELIED UPON

SCHEDULE OF DOCUMENTS RELIED UPON

1. **Architectural Plans prepared by P.D. Mayoh Architects**

   Drawing No S96-151G,150G, 101A, 102A, 103A, 150A, 151A, 700A, 701A, 701A, 002A, 010A, 100A, 010F, 002F, 001F.

2. **Structural engineering Plans prepared by Utech structural engineers.**

   Drawing no.s

   SO-1A-A, SO-2A-A, SO-2A-A, SO-3A-A, SO-4A-A,

3. **Hydraulic services prepared by Harris Page & Associates**

   Drawing No- H00B, H01C, H02-B H03-B, H04-B, H05-B, H06-B, H07-B

5. **4 Mechanical services prepared by Shelmerdines consulting engineers**

   Drawing No. 4292-MS-1A&2A, ES-1A,ES-2A, ES-3A

6. **Architectural drawings Prepared by P.D. Mayoh architects**

   Drawing No.
   A001F,002F,010F,A100G,A101F,A102F,A103F,A130F,A130F,A150F,A151G, A300D,A301D, A302D,A500F.

7. **Specifications prepared by P.D. Mayoh Architects P/L dated February 2005**

8. **Hydraulic specification dated 15 February 2005 prepared by Harris Page & Associates**

9. **Electrical services specification dated June 2005 prepared by Shelmerdines consulting engineers.**

10. **Mechanical services specification dated 3 June 2005 prepared by Shelmerdines consulting engineers.**

SECTION 3

COPY OF CONSTRUCTION CERTIFICATE APPLICATION FORM

Application for Construction Certificate

Made under the Environmental Planning & Assessment Act 1979, Section 109C(1)(6), 81A(2) & 81A(4)

Peter Rosselle
Accredited Certifier & PCA
Accreditation No. 4493
P.O Box 1003
Artarmon, NSW 2064
Ph. 99674422
Fax. 99674433

SECTION 1. APPLICANT'S DETAILS

Applicant: Mr. ✓ Mrs. Ms. Other

Family name; or (company name) CARTREU ~~LOGAN VALLEY ANGLICAN PREP SCHOOL~~

Given Names; or (ACN) ARTHUR

Postal address: No. ~~60~~ 60 Street: ~~PITTWATER ROAD~~ STRATHALLEN AVE Suburb: ~~BAYVIEW~~ NORTH BRIDGE

Post Code: ~~2104~~ 2062 Phone: Hm ( ) Wk(02) 99580488 Fax. 99586424

Fax. Contact person: ARTHUR CARTREU

SECTION 2: LOCATION OF PROPERTY

Site address: No. 1973 Street: PITTWATER ROAD Suburb: BAYVIEW

Unit No. ✓ Real Property Description(e.g. lot/DP, etc) LOT 20 DP 635214

SECTION 3: BUILDING CLASSIFICATION UNDER THE BUILDING CODE OF AUSTRALIA (BCA)

BCA Classification: CLASS 9b School

SECTION 4: DEVELOPMENT CONSENT

Development Consent No. 803/04 Date of determination: 28 - FEB - 2004

MODIFICATION 28 - JUNE 2005

SECTION 5: ESTIMATED COST OF WORK

Estimated cost of work: ~~$2,230,000~~ $634,000

SECTION 6: OWNERS CONSENT

Owner: SYDNEY ANGLICAN SCHOOLS CORPORATION Address SUITES 102 & 104, 9 GLOUCESTER ROAD HURSTVILLE, NSW, 2220

As the owner of the land to which this application relates, I consent to this application

Signature _____ Date 1 · 7 · 2005

SITE DEVELOPMENT MANAGER

Affix company seal in this location in the case of a company

SECTION 7: BUILDERS DETAILS

Name: PRIME INTERIORS **License No.** 35077 **Owner/builders Permit:** —

SECTION 8: DESCRIPTION OF WORKS

Description of building works: INFILLING UNDERCROFT TO EXISTING MAIN HOUSE AND ACCESS RAMP FROM CAR PORT TO NEW INFILL

Number of storeys (including below ground): 2 Gross floor area of building:

Gross site area of land: Number of existing dwellings to be demolished —

No. of new dwellings: — Is the new dwelling attached to an existing dwelling —

Is the new building to be attached to any new building YES Does the land contain any dual occupancy NO

Materials to be used in construction to be indicated (Please tick as appropriate)

Walls	**Code**	**Roof**	**Code**
Brick (double)	11	Tiles	10
Brick (Veneer)	(12)	Concrete or slate	20
Concrete or stone	20	Fibre Cement	30
Fibre Cement	(30)	Steel	(40)
Timber	40	Aluminum	50
Curtain glass	50	Other	60
Steel	60	Not Specified	70
Aluminum	70		
Other	80		
Not specified	90		

Floor		**Frame**	
Concrete	(20)	Timber	40
Timber	40	Steel	(60)
Other	80	Aluminum	70
Not Specified	90	Other	80
		Not specified	90

SECTION : 9

I apply for approval to carry out building works described in this application. I declare that all the information in the application and checklist is, to the best of my knowledge, true and correct.

I also understand that if the information is incomplete the application may be delayed or rejected or more information may be requested. I acknowledge that if the information provided is misleading any approval granted may be void.

Signature: [redacted] **Date:** 1. 7. 2005.

SECTION 10: DETAILS TO BE SUBMITTED WITH AN APPLICATON FOR A CONSTRUCTION CERTIFICATE

Please read and complete this section carefully.

In order for your application to be processed it will be necessary for the following information/details to be provided.

		Yes	No
1.	**Plans**		
	4 copies of appropriate building work plans illustrating the following:	✓	---
1.1	A plan of each floor section of the building	✓	---
1.2	A plan of each elevation of the building	✓	---
1.3	The levels of the lowest floor and any yard or unbuilt upon area belonging to that floor and the levels of the adjacent ground.	✓	---
1.4	The height, design, construction and provision for fire resistance (if any)	---	---
2.	**Specification**		
	4 copies of specifications for the development		
2.1	that describe the construction and materials of which the building is to be built and the method of drainage, sewage and water supply.	✓	---
2.2	That state whether the materials used will be new or second hand and give particulars of materials to be used.	✓	---
3.	**Building Code Of Australia (BCA)**		
	A statement as to how the performance requirements of the BCA are to be complied with if an alternative solution is to be used.	N/A	---
4.	**Accredited components**		
	A description of any accredited components, process or design sought to be relied upon	---	---
5.	**Certificates**	✓ Structural	
	Copies of any compliance certificates to be relied upon	---	---
6.	**Alterations to existing buildings**		
	If the development involves building work to alter, expand or rebuild an existing building, a scale plan of the existing building.	✓	---
7.	**Copies of approved development consent conditions and plans**	✓	---

SECTION 11: Confirmation that all required documents have been submitted with the application.

P. J. [signature] 29/06/05

SIGNITURE OF ARCHITECT/PERSON PREPARING SUBMISSION DATE

SECTION 4

COPY OF PCA/COMMENCEMENT OF WORK APPLICATION FORM

APPOINTMENT OF PRINCIPAL CERTIFYING AUTHORITY

(Under section 81A(2)(b)(i)&(ii) Environmental Planning and Assessment Act; 1979)

NOTICE TO COMMENCE BUILDING WORK

(Under section 81A(2)(c)of the Environmental Planning and Assessment Act; 1979)

Environet
Consultancy Pty. Ltd
(A.C.N. 075 195 078)
Peter Rossello
Accredited Certifier & PCA
P.O Box 1003
Artarmon, NSW
2064
Ph. 99674422
Fax. 99674433

SECTION 1: The following notification is given by:

Mr. ✓ Ms. Mrs. Other

Name: GARTRELL

Address: 60 STRATHALLEN AVE NORTH BALGOWLAH 2062.

SECTION 2: Description of building work

INFILLING UNDERCROFT TO EXISTING MAIN HOUSE AND ACCESS RAMP FROM CARPARK TO NEW INFILL

SECTION 3: Address of land to which building work is to be carried out:

No. 1973 Street: PITTWATER RD Suburb: BAYVIEW

SECTION: 4 Relevant development consent

Development Consent No. 803/04 Date: 28/FEB/2004 } 28/JUNE/2005 }

Construction Certificate No. 116/05 Date: 13/7/05

SECTION: 5 Appointment of Principal Certifying Authority (PCA)

I/we have satisfied all conditions of the development consent that are required to be satisfied prior to building work commencing.
I/we have appointed the following person as the Principal Certifying Authority.

Name: PETER ROSSELLO (Accredited Building Surveyor) Accreditation NO. 4493 Address P.O. BOX 1003 ARTARMON, NSW 2064. (02) 9967 4422 fax (02) 9967 4433 Mobile 0419

I consent to being appointed as Principal Certifying Authority
Peter Rossello (Accredited Certifier)

Name of accreditation Body: Building Surveyors and Allied Professions Accreditation Board (BSAP)

Home Building Act 1989 Builder PRIME INTERIORS. Builders License no 35077

Insurance issued pursuant to Part 6 of Home Building Act, 1989 & Clause 98 of EP& A Act – Yes ✓ No

Date on which work is intended to commence: 16.7.05

Signature: **Date:** 14.7.05.

SECTION 5

COPY OF DEVELOPMENT CONSENT

Pittwater Council

ABN 61 340 837 871 **Telephone** (02) 9970 1111 **Facsimile** (02) 9970 7150
Postal Address: P.O. Box 882, Mona Vale NSW 1660, DX 9018 Mona Vale

pittwaterlga.com.au **e-mail:** pittwater_council@pittwater.nsw.gov.au

Business Hours:
8.00am to 6.00pm, Monday to Thursday
8.00am to 5.00pm, Friday

DA No: N0803/04

28 June 2005

LOQUAT VALLEY ANGLICAN PREP SCHOOL
1973 PITTWATER ROAD
BAYVIEW NSW 2104

Dear Sir/Madam

Modification of Development Consent N0803/04 for Infilling undercroft to existing main hall structure and access ramp from carpark to new infill at LOQUAT VALLEY SCHOOL 1973 PITTWATER ROAD BAYVIEW NSW 2104.

Your request for modification has been considered by Council and it has been agreed to modify the Consent.

Please find attached the consent as modified.

If there are any matters that require further clarification, please do not hesitate to contact me.

Yours faithfully

Andrew Pigott

Andrew Pigott
SENIOR DEVELOPMENT OFFICER

Pittwater Council

ABN 61 340 837 871 **Telephone** (02) 9970 1111 **Facsimile** (02) 9970 7150
Postal Address: P.O. Box 882, Mona Vale NSW 1660, DX 9018 Mona Vale

pittwaterlga.com.au **e-mail:** pittwater_council@pittwater.nsw.gov.au

MODIFICATION OF DEVELOPMENT CONSENT NO: N0803/04

ENVIRONMENTAL PLANNING & ASSESSMENT ACT, 1979

NOTICE TO APPLICANT OF DETERMINATION

OF A DEVELOPMENT APPLICATION

Applicant's Name and Address:

LOQUAT VALLEY ANGLICAN PREP SCHOOL
1973 PITTWATER ROAD BAYVIEW NSW 2104

Being the applicant in respect of Development Application No N0803/04

Pursuant to section 81 of the Act, notice is hereby given of the determination by Pittwater Council, as the consent authority, of this Development Application for: -

Modification of Development Consent N0803/04 for Infilling undercroft to existing main hall structure and access ramp from carpark to new infill

At:-

Lot 20 DP 635214

1973 PITTWATER ROAD
BAYVIEW NSW 2104

Decision:

The Development Application has been determined by the granting of consent based on information provided by the applicant in support of the application, including the Statement of Environmental Effects, and in accordance with plans numbered DA-010-1-A, DA-101-A, DA-102-A, DA-103-A, DA-700-A, DA-701-A, DA-702-A, dated 18/10/04 prepared by P D Mayoh Pty Ltd; Arborist's Report dated November 2004 prepared by Tree Wise Men Australia Pty Ltd, **S96-002 – F dated 13/5/05 prepared by P D Mayoh Pty Ltd S96-100-G dated 11/5/05 prepared by P D Mayoh Pty Ltd, S96 – 150 – F dated 13/5/05 prepared by P D Mayoh Pty Ltd, S96 – 151-G dated 13/5/05 prepared by P D Mayoh Pty Ltd** as amended in red (shown clouded) or as modified by any conditions of this consent.

The reason for the imposition of these conditions is to ensure that the development consented to is carried out in such a manner as to achieve the objectives of the Environmental Planning and Assessment Act, pursuant to section 5(a) of the Act, having regard to the relevant matters for consideration contained in section 79C of the Act and the Environmental Planning Instruments applying to the land, as well as section 80A of the Act which authorises the imposing of the consent conditions.

Note: For ease of reference, all of the previous conditions have been re-listed. Those conditions amended or deleted have been highlighted.

Endorsement of date of consent 28/02/2005 (Modified 28/6/2005)

Dennis Baker
ACTING GENERAL MANAGER
Per: Andrew Pigott

Pittwater Council

ABN 61 340 837 871 **Telephone** (02) 9970 1111 **Facsimile** (02) 9970 7150
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CONDITIONS OF DEVELOPMENT CONSENT

This Consent is not an approval to commence building work. The works associated with this consent can only commence following the issue of the Construction Certificate.

A. PRESCRIBED CONDITIONS

A1. All works are to be carried out in accordance with the requirements of the Building Code of Australia.

A2. In the case of residential building work for which the Home Building Act 1989 requires there to be a contract of insurance in force in accordance with Part 6 of that Act, there is to be such a contract in force.

A4. To allow a principal certifying authority or another certifying authority time to carry out critical stage inspections required by the principal certifying authority, 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 critical stage inspection is required before the commencement of the work, in accordance with clause 162 of the Environmental Planning and Assessment Regulation 2000.

A5. Critical stage inspections are to be carried out in accordance with clause 162A of the Environmental Planning and Assessment Regulation 2000.

A6. A sign must be erected in a prominent position on any site on which building work, subdivision work or demolition work is being carried out:

a. showing the name, address and telephone number of the principal certifying authority for the work, and

b. showing the name of the principal contractor (if any) for any building work and a telephone number on which that person may be contacted outside working hours, and

c. stating that unauthorised entry to the work site is prohibited.

A7. Any such sign is to be maintained while the building work, subdivision work or demolition work is being carried out, but must be removed when the work has been completed.

A8. Residential building work within the meaning of the Home Building Act 1989 must not be carried out unless the principal certifying authority for the development to which the work relates (not being the council) has given the council written notice of the following information:

a. in the case of work for which a principal contractor is required to be appointed:

i. the name and licence number of the principal contractor, and

ii. the name of the insurer by which the work is insured under Part 6 of that Act.

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b. in the case of work to be done by an owner-builder:

i. the name of the owner-builder, and

ii. if the owner-builder is required to hold an owner-builder permit under that Act, the number of the owner-builder permit.

A9. If arrangements for doing the residential building work are changed while the work is in progress so that the information notified under subclause (2) becomes out of date, further work must not be carried out unless the principal certifying authority for the development to which the work relates (not being the council) has given the council written notice of the updated information.

A10. Conditions A8 and A9 do not apply in relation to Crown building work that is certified, in accordance with section 116G of the Act, to comply with the technical provisions of the State's building laws.

B. MATTERS TO BE SATISFIED PRIOR TO ISSUE OF CONSTRUCTION CERTIFICATE

NOTE: The issue of partial or limited Construction Certificates is not permissible under the terms of this consent unless otherwise specifically stated. All outstanding matters referred to in this section are to be submitted to the accredited certifier together. Incomplete Construction Certificate applications/details can not be accepted.

B4. The approved plans must be submitted to a Sydney Water Quick Check agent or Customer Centre to determine whether the development will affect Sydney Water's sewer and water mains, stormwater drains and/or easements, and if further requirements need to be met. The approved plans will be appropriately stamped. For Quick Check agent details please refer to "Your Business" section of Sydney Water's web site at www.sydneywater.com.au <http://www.sydneywater.com.au> then see Building & Renovating under the heading Building & Developing, or telephone 13 20 92.

The consent authority or a private accredited certifier must ensure that a Quick Check agent/Sydney Water has appropriately stamped the plans before the issue of any Construction Certificate.

B10. Three sets of detailed working drawings that comply in all respects with the Building Code of Australia and the conditions of the Development Consent are to be submitted prior to the release of the Construction Certificate.

B11. Drawings are required to show how the infill addition and access ways will comply with the requirements of AS 1428 Design for Access and Mobility.

B13. In accordance with Clause 94 of the Environmental Planning and Assessment Regulation 2000, plans are to be submitted with the Construction Certificate application demonstrating how the building will be brought into full conformity with fire and spread of fire requirements of the Building Code of Australia.

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B20. Three sets of Drainage details showing **site stormwater management** are to be submitted prior to the release of the Construction Certificate. Such details are to be accompanied by a certificate from either a Licensed plumber or qualified practising Civil Engineer with corporate membership of the Institute of Engineers Australia (M.I.E), or who is eligible to become a corporate member and has appropriate experience and competence in the related field, that the stormwater management system complies with the requirements of section 3.1.2 "Drainage" of the Building Code of Australia Housing Provision and AS/NZS 3500.3.2 - Stormwater Drainage. The details shall include disposal of site stormwater to a public system (if the site is in a known slip area the stormwater disposal system must comply with the recommendations of a Civil (Geotechnical) Engineer's report).

B29. Three copies of an Erosion and Sediment Management Plan are to be submitted with the Construction Certificate application. Control over discharge of stormwater and containment of run-off and pollutants leaving the site/premises shall be undertaken through the installation of erosion control devices such as catch drains, diversion drains, energy dissipaters, level spreaders and sediment control devices such as hay bale barriers, filter fences, filter dams, sedimentation basins. Such plan is to be a accompanied by a certification from an appropriately qualified person, that the plans/ details have been designed in accordance with the requirements of the N.S.W. Department of Land and Water Conservation's "Urban Erosion and Sediment Control" manual.

B29a. The plan is to include specific details required to remove clay from vehicles leaving the site so as to maintain public roads in a clean condition.

B60. Three sets of Structural Engineering details relating to the slabs, footings, retaining walls, structural framing are to be submitted prior to release of the Construction Certificate. Each plan/sheet is to be signed by a qualified practising Structural Engineer with corporate membership of the Institute of Engineers Australia (M.I.E), or who is eligible to become a corporate member and has appropriate experience and competence in the related field.

B62. Three copies of a Certificate from a qualified practising Structural Engineer with corporate membership of the Institute of Engineers Australia (M.I.E), or who is eligible to become a corporate member and has appropriate experience and competence in the related field, certifying the adequacy of the existing structure to support the additional loading.

C. MATTERS TO BE SATISFIED PRIOR TO COMMENCEMENT OF WORK

NOTE: It is an offence to commence works prior to issue of a Construction Certificate.

Nil

D. CONDITIONS TO MINIMISE THE IMPACT OF THE DEVELOPMENT ON THE NATURAL AND BUILT ENVIRONMENT

D11. Any proposed demolition works shall be carried out in accordance with the requirements of AS2601-1991 "The Demolition of Structures".

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Amongst others, precautions to be taken shall include compliance with the requirements of the WorkCover Authority of New South Wales, including but not limited to:

1. Protection of site workers and the general public.
2. Erection of hoardings where appropriate.
3. Asbestos handling and disposal where applicable.
4. Any disused service connections shall be capped off.

Council is to be given 48 hours written notice of the destination/s of any excavation or demolition material. The disposal of refuse is to be to an approved waste disposal depot.

D20. Temporary sedimentation and erosion controls are to be constructed prior to commencement of any work to eliminate the discharge of sediment from the site.

D21. Sedimentation and erosion controls are to be effectively maintained at all times during the course of construction and shall not be removed until the site has been stabilised or landscaped to the Principal Certifying Authority's satisfaction.

D23. Adequate measures shall be undertaken to remove clay from vehicles leaving the site so as to maintain public roads in a clean condition.

D25. If the soil conditions require it, retaining walls associated with the erection or demolition of a building or other approved methods of preventing the movement of the soil, must be provided with adequate provision made for drainage.

D34. All excavations and backfilling associated with the erection or demolition of a building must be executed safely and in accordance with appropriate professional standards.

D35. All excavations associated with the erection or demolition of a building must be properly guarded and protected to prevent them from being dangerous to life or property.

D38. The finished surface materials shall be in keeping with the following: roof – Colorbond – Mountain Blue; walls – dark earthy tones.

D60. The footpath and adjacent roadway is to be kept free of obstruction by building materials and/or plant. All concrete trucks, pumps and associated plant are to be kept wholly within the site. No concrete or slurry is to be discharged into the street or the street drainage system.

D61. If approved works are likely to cause pedestrian or vehicular traffic in a public place to be obstructed or if works involve the enclosure of a public place, then a hoarding or fence must be erected between the work site and the public place.

If necessary, an awning or other structure is to be erected, sufficient to prevent any substance from, or in connection with, the work falling into the public place. Further, the work site must be kept lit between sunset and sunrise if it is likely to be hazardous to persons in the public place.

Any such hoarding, fence or awning is to be removed when the work has been completed.

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NOTE: Hoardings and temporary awnings erected on or over public places are required to be subject to a separate approval from Council.

D74. A sign is to be erected in a prominent position on the site stating that unauthorised entry to the work site is prohibited and showing the name of the person in charge of the work site and a telephone number at which that person may be contacted outside working hours. No sign is required where works are internal only or where the premises are occupied continuously during and outside working hours.

D75. Toilet facilities are to be provided at or in the vicinity of the work site during the duration of the development.

D76. A stamped copy of the approved plans is to be kept on the site at all times, during construction.

D80. This approval/consent relates only to the new work nominated on the approved consent plans and does not approve or regularise any existing buildings or structures within the property boundaries or within Council's road reserve.

D81. The installation of in-sink food waste disposal units is prohibited due to the increased loading placed on the Warriewood Sewage Treatment Plant particularly during wet weather.

D89. The hours of construction are restricted to between the hours of 7.00am and 5.00pm Monday - Friday and 7.00am to 1.00pm on Saturdays. No works are to be carried out on Sundays or Public Holidays. Internal building work may be carried out at any time outside these hours, subject to noise emissions from the building or works not being audible at any adjoining boundary.

D105. The landscaping is to be maintained for the life of the development.

D122. All declared noxious weeds under the Noxious Weeds Act 1993 together with other environmental weeds are to be removed and/or controlled using an appropriate technique.

D195. Tree guards are to be provided around all trees as indicated on Tree Plan prepared by Tree Wise Men other than where Council's prior written consent has been obtained, or where after approval of the relevant Construction Certificate Application/s, trees stand within the envelope of approved buildings or within the alignment of approved permanent paved vehicular access roads and parking areas. The tree guards are to be installed prior to the commencement of any work on the site. No works, including utility installations (eg water, sewer, telephone, drainage), are to be undertaken within 4 metres of the trunk of any such trees. The tree guards shall be a minimum 1200mm high at least four (4) metres from the base of the nominated tree/s and constructed from timber posts and rails or posts and suitable plywood panels.

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pittwaterlga.com.au **e-mail:** pittwater_council@pittwater.nsw.gov.au

D198. The developer or contractor will take all measures to prevent damage to trees and root systems during site works and construction activities including provision of water, sewerage and stormwater drainage services. In particular, works, erection of structures, excavation or changes to soil levels within 5 metres of the trunks of trees to be retained are not permitted unless part of the development as approved, and the storage of spoil, building materials, soils or the driving or parking of any vehicle or machinery within 5 metres of the trunk of a tree to be retained, is not permitted.

NOTE: Trees that are part of an Endangered Ecological Community or are habitat for threatened species and endangered populations must comply with the requirements of the Threatened Species Conservation Act, 1995. Failure to do so may result in a penalty up to a maximum of $250,000.00 and jail sentences.

Failure to comply with the requirements of the Pittwater Council Tree Preservation and Management Order may result in a penalty up to a maximum of $20,000.00.

D199. All works within 5 metres of the existing trees to be retained including pruning, demolition, excavation, civil works, fencing and the like must be carried out by hand under the supervision of an experienced and qualified Arborist. Should roots larger than 50mm be encountered all excavation works are to cease immediately and a qualified Arborist is to advise on the impacts of the roots' removal on the tree's survival and report to Council's Landscape Architect.

If tree roots are present a pier and beam method of footing construction is to be adopted so as to bridge/span any identified lateral roots.

D201. Advise contractors and visitors to the site of the purpose for the tree/native vegetation/habitat protection/exclusion fencing installed in accordance with this consent by the placement of a suitable warning sign.

D206. In keeping with the recommendations contained in the Arborist's Report prepared by Tree Wise Men dated November 2004, T1, T2, T3, T6 are to be removed. T4 and T5 are to be retained. It is also recommended that the small Camphor Laurel behind T3 is also removed.

D207. Replace the 3 trees removed along Pittwater Road with 5 locally indigenous advanced plantings.

D209. Replace T1 and T2 with four locally indigenous species within the school grounds.

D219. No skip bins or materials are to be stored on Council's Road Reserve.

D220. A clearly legible "Site Management Sign" is to be erected and maintained throughout the course of works on the site. The sign is to be centrally located on the main street frontage of the site and is to state in clearly legible lettering the following: -

- Builder's name, builder's telephone contact number during work hours.
- No other works are to be carried out in Councils Road Reserve without its approval.
- No skip bins or materials are to be stored on Council's Road Reserve.

Pittwater Council

ABN 61 340 837 871 **Telephone** (02) 9970 1111 **Facsimile** (02) 9970 7150
Postal Address: P.O. Box 882, Mona Vale NSW 1660, DX 9018 Mona Vale

pittwaterlga.com.au **e-mail:** pittwater_council@pittwater.nsw.gov.au

D221. Replacement canopy tree plantings to meet Council's 3:1 canopy tree replacement policy. Suitable replacement species include – Eucalyptus paniculata, Corymbia maculata, Angophora costata, Banksia integrifolia/serrata.

D222. Placement of nest boxes with anti myna device attached.

E. MATTERS TO BE SATISFIED PRIOR TO ISSUE OF OCCUPATION CERTIFICATE

NOTE: The issue of interim or partial Occupation Certificates is not permissible within the terms of this consent unless otherwise specifically stated. Prior to the issue of an Occupation Certificate the principal certifying authority is to ensure that Council's assets, including road, kerb and gutter and drainage facilities adjacent or near to the site have not been damaged as a result of the works. Where such damage has occurred, it is to be repaired to Council's written satisfaction prior to the issue of an Occupation Certificate or suitable arrangements put in place to effect those repairs at a future date to Council's written satisfaction. Should this process not be followed, Council will pursue action against the principal accredited certifier in relation to the recovery of costs to effect such works.

NOTE: It is an offence to occupy the building or part thereof to which this consent relates prior to issue of an Occupation Certificate.

E10. A certificate prepared by an appropriate qualified person is to be submitted for the following building components, certifying to the principal certifying authority that the nominated works have been carried out in accordance with the Building Code of Australia, relevant Australian Standards and any conditions of Development Consent. Works are not to progress past this point until the principal certifying authority has confirmed that this condition has been satisfied (see copy of form attached).

E10a. Ground floor levels FL-1

E10c. External Finishes EF-1

E10e. Excavation and/or filling EX-1

E16. On completion of the erection of the building, the Owner of the building shall submit to Council or the accredited certifier a **Fire Safety Certificate** with respect to each essential fire safety measure installed in association with the building - as listed on the Fire Safety Schedule. Such certificate must be received by Council or the accredited certifier prior to occupation of the building.

Copies of the Fire Safety Certificate(s) must also be forwarded by the Owner to the Commissioner of the NSW Fire Brigades, and copies displayed in a prominent location specified in the schedule, within the building.

The owner must also submit a copy of the Fire Safety Certificate to Council and the Commissioner of the NSW Fire Brigades on an annual basis from the date of issue of the Occupation Certificate.

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pittwaterlga.com.au **e-mail:** pittwater_council@pittwater.nsw.gov.au

E86. The **building** is not to be occupied or used until an Occupation Certificate has been issued, confirming that the project complies with the relevant standards and the conditions of development consent. The request for an Occupation Certificate is to be accompanied by a copy of all of the Compliance Certificates required by the conditions of development consent (see copy of form attached).

F. MATTERS TO BE SATISFIED PRIOR TO ISSUE OF SUBDIVISION CERTIFICATE

Nil

G. ADVICE

G1. You are reminded of your obligations under the provisions of the Disability Discrimination Act.

G5. This approval does not prejudice any action in respect of upgrading the building pursuant to the provisions of the Section 121B of the Environmental Planning and Assessment (Amendment) Act, 1997.

G23. Failure to comply with the relevant provisions of the Environmental Planning and Assessment Act, 1979 (as amended) and/or the conditions of this Development Consent may result in the serving of penalty notices (on-the-spot fines) under the summary offences provisions of the above legislation or legal action through the Land and Environment Court, again pursuant to the above legislation.

G24. The applicant is also advised to contact the various supply and utility authorities, ie Sydney Water, Sydney Electricity, Telstra etc. to enquire whether there are any underground utility services within the proposed excavation area.

G25. It is the Project Manager's responsibility to ensure that all of the Component Certificates/certification issued during the course of the project are lodged with Council. Failure to comply with the conditions of approval or lodge the Component Certificates/certification will prevent Council from issuing the Occupation Certificate or the Building Certificate.

G26. In accordance with Section 80A(1)(d) and (e) of the Act, any consent given shall be void if the development to which it refers is not commenced within two (2) years after the date of approval, provided that Council may, if good cause be shown, grant an extension of renewal of such consent beyond such period.

NOTE: Council may be prepared to consider an extension of this Consent period for a further 12 months, however, the request for extension would have to be received during the initial 2 year period.

G27. To ascertain the date upon which the determination becomes effective, refer to Section 83 of the Environmental Planning and Assessment Act, 1979 (as amended).

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pittwaterlga.com.au **e-mail:** pittwater_council@pittwater.nsw.gov.au

G28. Should any of the determination not be acceptable, you are entitled to request reconsideration under Section 82A of the Environmental Planning and Assessment Act, 1979. Such request to Council must be made in writing together with a $500 fee, within 1 year from the date of determination.

G29. If you are dissatisfied with this decision, Section 97 of the Environmental Planning and Assessment Act, 1979, gives you a right of appeal to the Land and Environment Court within 12 months of the date of endorsement of this Consent.

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G28. Should any of the determination not be acceptable, you are entitled to request reconsideration under Section 82A of the Environmental Planning and Assessment Act, 1979. Such request to Council must be made in writing together with a $500 fee, within 1 year from the date of determination.

G29. If you are dissatisfied with this decision, Section 97 of the Environmental Planning and Assessment Act, 1979, gives you a right of appeal to the Land and Environment Court within 12 months of the date of endorsement of this Consent.

SECTION 6

LONG SERVICE LEAVE LEVY PAYMENT BONDS ETC

Pittwater Council

ABN: 61340837871

TAX INVOICE

OFFICIAL RECEIPT

01/07/2005 Receipt No 170527

To STEPHEN WELSH

1973 PITTWATER ROAD
BAYVIEW NSW

Qty/ Applic	Reference	Amount
	DLSL-Bull	$1,268.00
GL Rec	I X D/A800/04	
1	CCBST-CCa	$11.53
GL Rec	I X	
	GST	$1.15
GL Rec		
To GL Receipt:		

Total Amount:	$1,280.68
Includes GST of:	$1.15

Amounts Tendered

Card	$1,280.68
Total	$1,280.68
Rounding	$0.00
Change	$0.00
Nett	$1,280.68

Printed 01/07/2005 12:35:51 PM
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SECTION 7

DESIGN STATEMENTS

4675

HARRIS PAGE
& Associates
Pty. Limited
ACN 008 548 098
ABN 79 008 548 098
HYDRAULIC &
FIRE SERVICES
CONSULTANTS
Level 2
92 Carrington Street Sydney
NSW Australia 2000
Ph (02) 9262 1600
Fax (02) 9262 6385
Email info@harrispage.com.au

DESIGN CERTIFICATION

1 July 2005

P.D. Mayoh Pty Ltd
Architects
60 Starathallen Avenue
Northbridge NSW 2063

Facsimile: 9958 6424

Attention: Charlotte E Hunyor

Consent No: NO803/04

RE: **LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL**
1973 PITTWATER ROAD
BAYVIEW NSW 2104

FIRE HYDRANT & FIRE HOSE REEL SERVICES
DESIGN CERTIFICATION

We wish to advise that the Fire Hydrant and Fire Hose Reel Services Documentation for the above project has been designed in accordance with the following Standards.

Engineering Service	Standard, Code or Authority Requirements
Cold Water Supply	New South Wales Code of Practice Plumbing and Drainage Edition No. 2– July 1999 AS 3500 National Plumbing and Drainage Code AS 3500.1.1 Water Supply – Performance requirements AS/NZS 3500.1.2 Acceptable Solutions
Engineering Service	**Standard, Code or Authority Requirements**
Fire Hydrant System	Building Code of Australia AS 2419.1 – 1994 Fire hydrant installations Part 1 System Design, Installation and Commissioning Part 2 Fire Hydrant System
Fire Hose Reel System	Building Code of Australia AS 1221 – 1997 Fire Hose Reels AS 2441-1998 Installation of Fire Hose Reels

Engineering services drawings and specifications, which are subject to this certification, are listed below:

../2

➤ HYDRAULIC SERVICES DRAWINGS

Drawing No	Title	Revision	Date
H – 00	Cover Sheet, Legend and Drawing Schedule	B	30.06.05
H – 01	Ground Floor Plan Inground Drainage Services	C	30.06.05
H – 02	Ground Floor Plan Hydraulic Services	B	30.06.05
H – 03	First Floor Hydraulic Services	B	30.06.05
H – 04	Second Floor Hydraulic Services	B	30.06.05
H – 06	Existing Hydraulic Services	B	30.06.05

➤ HYDRAULIC SERVICES SPECIFICATION

Specification No	Issue	Date
4675H	Tender	15.02.05

HARRIS PAGE & ASSOCIATES PTY LIMITED

utech engineers

May 16, 2005

Ms. Charlotte E Hunyor
Mayoh Architects
60 Strathallen Avenue
Northbridge, NSW 2063

Fax: 9958 6424 (2 pages)

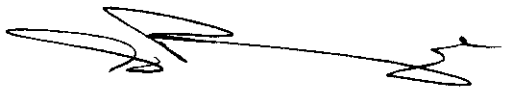
Dear Charlotte,

RE: LOQUAT VALLEY ANGLICAN SCHOOL

This is to certify that the structural design and documentation reflected on **utech** engineers drawings 04066-S1(3), 04066-S2(3), 04066-S3(3), and 04066-S4(4) are in accordance with relevant Australian Standards, in particular AS 4100, AS 3600, AS 1170.1 and AS 1170.2, and common engineering practice.

Yours Sincerely,

for and on behalf of **utech** engineers



Dr. Sia Parsanejad,
FIEAust NPER

level 4, suite 236
813 pacific hwy
chatswood 2067
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tel . 612 . 9884 9885
fax . 612 . 9884 9887
utech@utech.com.au

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abn . 21 003 242 635

4675.2

HARRIS PAGE
& Associates
Pty. Limited

ACN 008 548 098
ABN 79 008 548 098

HYDRAULIC &
FIRE SERVICES
CONSULTANTS

Level 2
32 Carrington Street Sydney
NSW Australia 2000

Ph (02) 9262 1600
Fax (02) 9262 6385
Email info@harrispage.com.au

DESIGN CERTIFICATION

13 July 2005

P.D. Mayoh Pty Ltd
Architects
60 Starathallen Avenue
Northbridge NSW 2063

Facsimile: *9958 6424*

Attention: **Charlotte E Hunyor**

Consent No: No. 803/04

RE: LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
1973 PITTWATER ROAD
BAYVIEW NSW 2104

STORMWATER DRAINAGE
DESIGN CERTIFICATION

We wish to advise that the Stormwater Drainage Documentation for the above project has been designed in accordance with the following Standards and complies with Pittwater Council DA Conditions B20 and B29.

Engineering Service	Standard, Code or Authority Requirements
Stormwater Drainage	AS 3500 National Plumbing and Drainage Code AS/NZS 3500.3.2 Stormwater Drainage – Acceptable Solutions Stormwater Management Policies of Pittwater Council, Clauses B5.2 and B5.3 Building Code of Australia Part 3.1.2 Drainage
Subsoil Drainage	AS 3500 National Plumbing and Drainage Code AS/NZS 3500.3.2 Stormwater Drainage – Acceptable Solutions Building Code of Australia Part 3.1.2 Drainage
Rainwater Downpipes and Roof Gutters	AS/NZS 3500.3.2 Stormwater Drainage – Acceptable Solutions and requirements of Pittwater Council

Engineering services drawings and specifications, which are subject to this certification, are listed below:

../2

➤ HYDRAULIC SERVICES DRAWINGS

Drawing No	Title	Revision	Date
H – 00	Cover Sheet, Legend and Drawing Schedule	B	30.06.05
H – 01	Ground Floor Plan Inground Drainage Services	C	30.06.05
H – 02	Ground Floor Plan Hydraulic Services	B	30.06.05
H – 03	First Floor Hydraulic Services	B	30.06.05
H – 04	Second Floor Hydraulic Services	B	30.06.05
H – 05	Roof Floor Hydraulic Services	B	30.06.05
H – 06	Existing Hydraulic Services	B	30.06.05
H – 07	Sediment Control Plan	B	30.06.05

➤ HYDRAULIC SERVICES SPECIFICATION

Specification No	Issue	Date
4675H	Tender	15.02.05

HARRIS PAGE & ASSOCIATES PTY LIMITED

SECTION 8

FIRE SAFETY SCHEDULE

DESCRIPTION OF FIRE SAFETY MEASURE	MINIMUM STANDARDS OF PERFORMANCE
1. Exit Signs	1. AS 2293 (Part 1)(E4.8, E4.5, BCA)
2. Emergency Lighting	2. AS 2293 (Part 1) (E4.4, E4.2, BCA)
3. Fire hydrant	3. AS 2419.1-1994
4. Portable fire extinguishers	4. AS 2444
5. Fire hose reels	5. AS 2441-1988, (E1.4, BCA)

EXISTING FIRE SAFETY MEASURES

Description of fire safety measure	Minimum Standards of performance
1. Exit Signs 2. Emergency Lighting 3. Fire hydrant 4. Portable fire extinguishers 5. Fire hose reels	1. AS 2293 (Part 1)(E4.8, E4.5, BCA) 2. AS 2293 (Part 1) (E4.4, E4.2, BCA) 3. AS 2419.1-1994 4. AS 2444 5. AS 2441-1988, (E1.4, BCA)

PROPOSED FIRE SAFETY MEASURES

Description of fire safety measure	Minimum Standards of performance
1. Exit Signs 2. Emergency Lighting 3. Fire hydrant 4. Portable fire extinguishers 5. Fire hose reels	1. AS 2293 (Part 1)(E4.8, E4.5, BCA) 2. AS 2293 (Part 1) (E4.4, E4.2, BCA) 3. AS 2419.1-1994 4. AS 2444 5. AS 2441-1988, (E1.4, BCA)

LOQUAT VALLEY

ANGLICAN PREPARATORY SCHOOL

SCOPE OF WORKS
CONSTRUCTION CERTIFICATE / TENDER ISSUE

P.D. MAYOH PTY LTD
Architects
60 Strathallen Avenue
NORTHBRIDGE 2063

Tel: 9958.0488
Fax: 9958.6424

February 2005

INDEX

JOB No 0414

Loquat Valley Anglican Preparatory School

SCHEDULE OF C.C. DRAWINGS:

DWG NAME	SCALE	DWG No
Survey Plan	1:200	CC.001
Site Plan	1:200	CC.002
Demolition Plans	1:100	CC.010
Ground Floor Plan	1:100	CC.100
First Floor Plan	1:100	CC.101
Second Floor Plan	1:100	CC.102
Roof Plan	1:100	CC.103
Reflected Ceiling Plan	1:100	CC.130
East & South Elevation	1:100	CC.150
Sections	1:100	CC.151
Ramp, Balustrade & Handrail Detail	1:50 / 1:10	CC.300
Section A Detail	1:20	CC.301
Section C Detail	1:20	CC.302
Window Schedules	1:500	CC.500
~~Shadow Diagrams – Winter~~	~~1:200~~	~~A.700~~
~~Shadow Diagrams – Equinox~~	~~1:200~~	~~A.701~~
~~Shadow Diagram – Summer Solstice~~	~~1:200~~	~~A.702~~
Stormwater Concept plan	1:100	H-01
Sediment Control Plan	1:100	H-02

1. DEMOLITION WORKS

- Demolish existing concrete disabled access ramp and remove railing. Store for reuse and recycling.
- Remove 2 existing Eucalyptus trees on the east of the hall and two Camphor Laurels on northern boundary. Grub out roots.
- Remove post and beam treated pine fencing on eastern boundary.
- Remove part of asphalt tennis court (western end) to make ready for excavation works for new concrete block retaining wall.
- Remove existing fences, including tennis court fence, to the extent shown on drawings and as required for new gates as indicated on drawings.
- Demolish part asphalt car park and kerbing.
- Remove hot water unit and air conditioning equipment in existing sub-floor space adjacent to Administration Office.
- Remove and relocate services associated with hot water unit and air conditioning equipment as required.
- ~~Remove double door entry suite to existing Art Room.~~
- ~~Demolish brickwork as required for new location of doorway to Staff Room.~~
- Demolish brickwork to form new entry to Sick Bay Door D6.01.
- Remove and relocate down pipe on Grid 6 on Hall evaluation - east. Make good gutter at Grid 6 as indicated on drawing.
- Demolish existing conc. block retaining wall at Tennis Court north.

2. SUB-STRUCTURE

GROUND WORKS

- Allow to clear site. Strip all concrete paving as noted on drawings.
- Remove trees noted on drawing.
- Remove all shrubs and bushes to prepare site.
- Bulk excavate site as required – refer to Geotech Report and Structural Engineer's drawings. Assume rock as per Geotech Report.
- Excavate for foundations, piers and footings. Refer to Structural Engineer's drawings, details and specification.
- Excavate as necessary to achieve bermed soil to pathways on northern end.
- Excavate as necessary to positioning of storm water tank located in accordance with Structural and Hydraulic Drawings.
- Termite spray for full extent of building site. Provide warranties and reports as required by Regulatory Authorities in relation to termite spraying works.
- Provide and fix slab underlay including sand blinding, waterproof membranes etc to slab on ground.
- Excavate as necessary for stormwater lines indicated on Hydraulic Drawings.
- Provide drainage lines and backfilling, all in accordance with Hydraulics and Structural Engineer's specifications, details and drawings.

3. SEDIMENT CONTROL

- Provide soil and water management as required including fences, fabric; all in accordance with The Urban Erosion and Sediment Control Handbook published by the Department of Conservation & Land Management. Refer to Hydraulic Engineer's drawings and details.

4. CONCRETE

- Refer to Structural Engineer's drawings, details and specification.
- Formwork, concrete, construction joints and surface finishes to be in accordance with Structural Engineer's specification.
- Provide concrete footings edge beams and slab on ground and suspend slabs with reinforcement and surface finish as per Engineer's drawings, details and specification.
- Provide hobs to walls as shown on Engineer's and Architect's sections and concrete profile drawings.
- Provide concrete disabled ramp as per Structural Engineer's and Architect's drawings. Provide and fix finish in accordance with concrete finishes schedule.
- Provide concrete slab on ground as base slab to brick paving indicated on structural drawings and in accordance with engineer specification.
- Refer to concrete finishes schedule.

SLIP RESISTANT FINISH TO RAMP & WALKWAYS

- All horizontal surfaces of walkway and ramp shall be finished with 'Suregrip' by Latham Australia Pty Ltd.
  The product shall be broadcast onto the wet cement at 1kg / sqm in accordance with manufacturer's written instructions.

5. STRUCTURAL STEEL

~~UPPER FLOOR~~
~~MEZZANINE FLOOR~~

- ~~Provide posts and beams for mezzanine floor support as per Structural Engineer's drawings and details.~~
- ~~Allow to key into existing structure.~~

ROOF FRAMING

- Provide steel roof framing, including beams and purlins and all associated connections to eastern façade.
- Refer to Engineer's detailed drawings and Architectural Section.
- Steel works shall be galvanized.
- Steel works shall be painted, except for concealed surfaces.
- Provide steel framing to sunscreen on western façade.

RETAINING WALLS

- Provide reinforced concrete block walls where indicated on Architectural drawings; all in accordance with Structural Engineer's drawings, specification and details.
- Backfill to walls as per Structural Engineer's details.

- Refer to Architectural floor plan drawings.

To all concrete block retaining walls and slab beams below, the surfaces shall be covered with torch applied, polyester reinforced, polymer modified bituminous waterproofing membrane. The membrane shall have a weight of 3 kg / m^3, be reinforced with non-woven polyester fabric and be based on distilled bitumen and polymers such as ARGO P as supplied by PARCHEM. Areas shall be prepared and the membrane applied in accordance with the current ARGO P data sheet, paying attention to priming requirements. Prepare surface, prime and apply waterproofing in accordance with PARCHEM written specification.

On completion of the membrane installation, all exposed perimeter edges shall be mechanically fixed or terminated under a flashing .

The under floor concrete slab membrane shall be turned up and secured over the membrane installation.

The membrane application shall be protected from mechanical damage prior to backfilling with TEMA TEFOND drainage protection system from PARCHEM.

The entire application system shall be co-ordinated with the hydraulics / sub-soil drainage subcontract.

WALL TYPE SCHEDULE

WALL TYPE 1

- 290 Concrete Block Reinforced Wall

WALL TYPE 2

- 190 Concrete Block Reinforced Wall

WALL TYPE 3

- 190 Concrete Block – Split face external
  Face rendered and painted internal
- Provide half block split face conc. Block. Band to window sill of north wall.

WALL TYPE 4

- To base of covered walkway: downturn concrete beam with single skin face brick to match existing face bricks on Hall.
  Refer to Structural Engineer's drawings.

WALL TYPE 5

- Face brick infill under concrete ramp
  Refer to Structural Engineer's drawings. Face brick to match existing face bricks on Hall.

NOTE: Builder is to note that head track of all stud walls throughout are to be fixed to u/s of concrete soffit of floor above.
All insulating materials and wall linings are to be carried for the full height of the stud framing.
Ceilings are to be fitted between fully lined, insulated walls.

- **Finish plaster board / C.F.C. panel linings 10mm (max) below soffit of concrete slab and fully seal between plaster board and concrete on both sides of metal stud head and base tracks.**
- **Ensure that all penetrations for services are fully sealed to maintain the sound attenuation integrity of the wall system.**

WALL TYPE 6

- 96mm stud wall at 600mm crs (max) with 2 layers of 13mm ImpactCheck plaster board to internal face and 32mm top hats with autoclaved 9mm C.F.C. express panels with expressed joints externally.
- Provide all sarking, flashings, backing rods, sealants in accordance with C.S.R. Expresswall System manufacturer's written instructions. Insulation shall be Thermofoil 730 Sarking plus Bradford R1.5 Gold Batts in cavity.

WALL TYPE 7

- 96mm 'V' stud walls lined both sides with two layers of ImpactCheck plaster board. Insulate cavity with S2.0 insulation. For Staff W.C. replace IMPACTCHECK with moisture resistant plaster board.

SPECIFICATION FOR EXPRESS WALL SYSTEM – FOR WALL TYPE 6

The Contractor shall furnish all materials, labour and equipment for the installation of the C.S.R. Express Wall System where indicated on the drawings.

MATERIALS

All external lining shall be C.S.R. Express Panels as manufactured by C.S.R. Fibre Cement.

All steel frame components shall include C.S.R. Express Wall Top Hats as supplied by C.S.R. and Intermediate Top Hat No 255 as manufactured by Rondo Pty Ltd.

Sarking shall be Bradford Thermofoil 730 (R1.6). Cavity Infill shall be Bradford R1.5 Gold Insulation.

All system components shall be those detailed and specified by C.S.R. Fibre Cement in Brochure No FC 126 C.S.R. Express Wall System.

The internal side of the framing shall be lined with 2 layers of 13mm ImpactCheck Gyprock Plaster Board. Class 3 Express Wall Screws must be used. All screw heads in the Express Panel System shall be countersunk and epoxy filled to match panel colour.

All horizontal and vertical joints are to be completely filled with sealant.
Panel layout shall be as shown on Architectural Drawings.

Provide Colorbond flashing colour: 'Mountain Blue' at concrete floor hob to be fixed in accordance with Fig. 33 of Brochure No FC 126.

All epoxy sealants shall be black.

Allow for P.V.C. domed cap cover at all screw heads. Adhesive fix to sheeting after epoxy sealing countersunk screw head.
P.V.C. cap to match colour of walling.

- Insulation to Wall Type 6 shall be Thermofoil 730 Sarking plus Bradford R1.5 Gold Batts in cavity.

RENDER

- Render – 10mm min – all internal faces of concrete block walls. Seal and paint. See Finishes Schedule.

~~ACOUSTIC WALL LINING~~

- ~~To northern wall of Staff Room, including Mezzanine Level, provide and fix perforated acoustic wall panels fixed to top hat sections. Acoustic panels to start at 1000mm above existing floor level. Acoustic panels to be SUPAWOOD WALL PANEL SYSTEM SW 200 as supplied by Supawood (tel: 4735.4994). Black screws are to be direct fixed through black slots in the panel into the furring channel.~~
  ~~Acoustic slotting to be Supawood Product Type S5610/130 (Slot Width 13mm to 1200 x 2400mm panels).~~
  ~~Panels to be 9mm with 'Decorative Finish'. Grain horizontal – colour 'Beech'.~~
- ~~Provide waterproof membrane to floor and all tiled areas of Staff Toilet.~~

7. ROOFING

- Refer to Architectural Drawings – Sections, Elevations and Roof Plan.

STEEL STRUCTURE

- Provide and fix steel beams, purlins, angles – refer to Structural Engineer's drawings and Structural Steel items.

ROOFING MATERIAL

- Provide and fix Colorbond Custom Orb Roofing where shown on drawings. For colour refer to Finishes Schedule.
- Provide and fix Colorbond Zincalume flashing and overflashing in existing masonry wall for full extent of roofing.
- Provide and fix double sided Colorbond Custom Orb Roofing to eastern end of roof where underside is exposed to view.
- Provide Colorbond gutters and downpipes where indicated on drawings. Connect to existing downpipes and stormwater line and/or Rainwater tank. Refer also to Hydraulic's drawings.
- Securely seal and waterproof roofing where support system penetrates roof sheeting.

INSULATION & SARKING

- Sarking = Bradford Thermofoil Moisture Barrier.
- Insulation: Anticon R2 Batts by Bradford Insulation. Allow for 25mm ventilation space between top of batt and underside of thermofoil.

EAVES LINING

- Provide and fix Versilux eaves lining where indicated on architectural drawings.
- Prime and paint. Refer to Finishes Schedule.

8. CEILINGS

CEILING SYSTEMS

C.T.1. TYPE 1
ECOPHON CEILING

Panels:	Master A / alpha, white 010, sound absorption Class A, EDGE A
Panel size:	600 x 600 x 40mm thick
Fixing:	Hangers at 1200mm crs
	Main runners 120mm crs
	Connect cross tees
	Angle trims at wall junctions
	Type connect shadow-line
	Trim 8152

C.T.2 TYPE 2

- PLASTERBOARD – C.S.R. Gyprock AQUACHEK – 13mm thick solid plaster board ceiling fixed to Rondo Suspension System with Rondo Shadowline at wall junctions.

C.T.3 TYPE 3

Ceiling line 2 sides.

~~Ceiling joists to be lined:~~

- ~~Upper side: 1 layer of 25mm GYPROCK SHAFT LINER PANEL~~
- ~~Underside: 2 layers of 13mm plaster board~~
- ~~Perimeter joints at wall junctions to be caulk sealed.~~
- ~~Line full extent of 2 layers of 13mm GYPROCK with 50mm Bradford 'S2' 350g/m² Insulation prior to fixing upper layer.~~
- ~~Paint finish in accordance with Finishes Schedule.~~

~~C.T.4. TYPE 4~~

- ~~13mm plaster board fixed to furring channels.~~
- ~~Furring channels clipped to C.S.R. Resilient Mounts fixed to u/s of floor slab.~~
- ~~Paint finish in accordance with Finishes Schedule.~~

C.T.5 TYPE 5

- C.S.R. perforated plaster board sheets – fully perforated 3600 x 1200 x 13mm sheets.
- Tape joint edges and finish with setting cement.
- Fix to concealed suspended ceiling grid system.
- Insulation for full extent of panels shall be 50mm BRADFORD Polyester 'S2' (350g/m²).
- Paint finish in accordance with Finishes Schedule.

C.T.6 TYPE 6

Villaboard ceiling

- Screw fix C.S.R. Villaboard Lining to furring channels.
- Set joints.
- Paint finish in accordance with Finishes Schedule.

C.T.7 TYPE 7

- Solid 13mm plaster board surround as perimeter edging to Type 5 ceiling.
- Fixed to concealed suspended ceiling grid system.

9. FLOORING

FLOORING – Refer to Finishes Schedule

- Provide and fix 1000 x 2000mm LATHAM DIRT CONTROL Entry Mat to Music Classroom Entry. Clear anodised sections with carpet insert – colour Rust. (tel: Latham 9879.7888).
- Tiling: Refer to Finishes Schedule.

SKIRTINGS

- Provide and fix 120m x 20mm high finger jointed pine skirtings throughout. Pencil rounded top edge. Screw fixed to substrate. Counter sink screw holes, fill, sand and make ready for paint finish.
- Paint all skirting in 2 coats of semi-gloss acrylic to match wall colour of substrate wall.
- Tiled skirting to Staff W.C.: refer to Finishes Schedule.

10. WINDOWS & DOORS

WINDOWS & DOORS INTERNAL – SOUND INSULATION

- Refer to Architectural drawings.
- Provide and fix aluminium framed powder coated glazed windows. Sections shall be 100mm wide frame and 50mm wide sashes – Series 613 Alternative VANTAGE Aluminium Joinery – tel: 9756.6828.

- Supply and fit 102mm LOUVRE FRAME: VANTAGE Aluminium Series 525 Adjustable Glass Louvre System.
- Provide and fix powder coated aluminium framed flyscreens to all operable windows – VANTAGE ALUMINIUM fitted within frame line.
- Provide and fix 9mm C.S.R. EXPRESS PANEL fixed into bottom sashes where indicated on Architectural drawings. Panels to be autoclaved pre-painted on all sides and edges. Refer to Finishes Schedule for colour.
- Provide and fix solid core hinged doors to aluminium frame suite where indicated on drawings. Three hinges per door.
- Provide and fix all related trims, flashings and door and window hardware. Note all windows and doors to be key lockable and master keyed.
- Paint plaster board walls in accordance with Finishes Schedule.
- Provide 2 layers of IMPACTCHECK to boxing in of existing downpipes. Wrap downpipes in sound insulation material similar to R.20 value.

INTERNAL DOORS

- Refer to Door Schedule.
- Provide and fix solid core doors to steel frames or to top hung, heavy duty sliding door tracks where indicated on drawings.
- Provide and fix 150 x 20mm thick M.D.F. pelmets to cover sliding door tracks. Paint.
- Paint doors and frames or line with pinboard material in accordance with Finishes Schedule.

11. BALUSTRADING and HANDRAILS

EXTERNAL

- Relocate part of existing balustrade on eastern façade to edge of new concrete landing. Weld end of hand drill to existing to form continuous to rail. Core drill upright into new concrete slab and epoxy fill.
- Provide and fix CHS Galvanised M.S. handrails and balusters to external ramp and walkway on eastern façade. CHS uprights shall be core drilled and epoxy filled into concrete slab. – Refer to drawings.
- Prime and paint with 2 coats of Dulux Semi-Gloss Exterior Enamel. See Finishes Schedule.
- Infill to balustrade shall be chain wire 50mm normal mesh, 2.50mm galvanized core with black P.V.C. coating.

~~INTERNAL~~

- ~~Provide and fix 60mm diam. s.s. C.H.S. handrail to stair to Mezzanine.~~
- ~~Balusters shall be profiled from 10mm s.s. flat bar.~~
- ~~Railing to stair and landing shall be stainless steel strands 3.2mm wire. Fix strands to balusters using M5 jaw/swage bottle screw and M6 eyelets. All components shall be marine grade G316 stainless steel.~~

~~12. STAIRS~~

~~EDGE TRIM & CONCRETE STAIR SOFFIT TO MEZZANINE LEVEL~~

- ~~Provide and fix 'boxed section' edge trim to edge of stair stringer – East. Boxed section shall be 9mm SUPAWOOD 1200 x 600 panel cut to suit with 10mm expressed joint. See File Detail.~~
  ~~Supawood to be Decorative Finish Panel, mitre jointed as per detail and finish 'Beech'.~~
- ~~Provide and fix Supawood Panel Soffit Lining to stair.~~
- ~~Soffit lining joints to align with stringer joint.~~

~~STAIR RISERS & TREADS~~

- ~~To concrete risers and treads to Mezzanine Level provide Armstrong Nylex Combined Stair Tread & Nosing – cut to suit. Colour: black. Adhesive fix to concrete.~~
- ~~To western side of concrete stair to Mezzanine, provide and fix Armstrong Nylex Stair Stringer with tapered edge. Colour: black.~~
- ~~Provide and fix Supawood boxed section trim to concrete edge of Mezzanine slab. Refer to File Detail. Supawood to match stair stringer.~~

13. JOINERY

Refer to File Details 1 and 2.

~~Upper Floor~~

- ~~Provide and fix Kitchenette to Staff Room. Refer to Architectural Drawings and File Details. Provide shop drawings to Architect for approval.~~
- ~~Connect to services – refer to Hydraulic's drawings.~~
- ~~Refer to Fixtures & Fittings Schedule.~~

Lower Floor

- Provide and fix Tea Room cupboards. Refer to Architectural Drawings and File Details. Provide shop drawings to Architect for approval. Provide S.S. sink and ZIP Hot Water Unit to Tea Room. Refer to Schedule.

Vanity Unit

- Provide and fix vanity unit to Staff W.C. Refer to Architect's drawings. Provide shop drawings to Architect for approval.

14. FIXTURES & FITTINGS

Refer to Schedule.

15. METALWORK

- Refer to Architectural drawings.
- Provide and fix powder coated aluminium sunscreen for extent shown on drawings.
- The drawings depict the design intent of the shade device. Verification of the integrity of the sunscreen support is the responsibility of the sunscreen contractor.
- Sunscreen type shall be Hy-Light Industries SS403/60 Screens and supports shall be powder coated in colour as nominated in External Finishes Schedule.

SECURITY GATE TO CORRIDOR – GROUND FLOOR

- Provide and fix gate 2000 x 1000 approx wide to Corridor in location shown on Floor Plan.
- Gate to be welded tubular steel by ARC Fences, style: 'Oxley Ring'. Rings to top and at mid rail level.
- Gate is to be hinged and fitted with key lock and latch system, with a 150mm stay fixed to wall to hold gate in the open position.
- Gate is to be galvanized and powder coated black.
  Provide shop drawing of gate and locks for submission to Architect for approval.
- Product available from SMORGONSTEEL PTY LTD.

16. GLAZING & MIRRORS

- Refer to Kitchenette Drawings and Vanity Unit in Staff W.C.
- Provide and fix colour-backed laminated glass splashback where indicated on drawings or specified in Schedule.
- Provide and fix pencil round edged mirror for the extent shown on drawings – Staff Toilet.
- Provide s.s. chrome domed cap to screw fixing.
- Provide and fix 600 x 400mm wide mirror to UNISEX TOILET; all as for Staff W.C.
- Provide toughened glass shower screen to Staff W.C. where indicated on drawing. Fix to wall with patch fittings. Provide patch hinges to glass door. Provide all hinges, knobs and fixings as required.

17. DOOR HARDWARE

- Furnish Architect with Door Hardware Schedule from Keeler Door Hardware.
- Provide and fix door hardware as required.
- Key to School Master Key.

18. ELECTRICAL WORKS

Provide works to:

- Emergency lighting
- Lighting: internal and external
- Power
- Data
- Television

all in accordance with Electrical Engineer's drawings and specification.

HAND DRYERS

- To Staff Room Toilet – Ground Floor, Unisex Toilet on Level 1: Supply and fix MIRAGE D8 Model No AMIR D8 electric hand dryer. Location t.b.a.

19. HYDRAULIC WORKS

Provide and fix:

- All work relating to existing service lines
- New Hot and Cold water lines
- Stormwater connections
- Fixtures and fittings as per Schedule; all in accordance with Hydraulic Engineer's drawings and specification.

20. EXTERNAL WORKS

Refer to Site Plan.

- Grade site to prepare for concrete paths, brick paths and asphalt car parking.
- Provide concrete paths from car park to new tennis court gate along eastern side of building. Provide construction joints. Assume broomed finish.
- Provide brick paving on northern end of building from new concrete verandah to join up with existing brick paving. Brick pavers to match existing and to be laid in similar pattern.
- Provide landscape in accordance with landscape drawings.
- Providing fencing and gates where indicated on plans. Details to be advised.
- Fences to northern boundary to be tubular steel ARC Fencing from Smorgon Steel, type 'Oxley Ring'. Height 1200mm. Fencing to be galvanized and powder coated 'black'. Provide gates in Oxley Ring style - 2 x 1.0m wide and pair 2.0m wide each in locations shown on drawings.
- Provide new chain wire hinge mesh gate to south-west corner of tennis court gate to be 1m x 2.0m high.
- Refer also to external balustrading.
- Provide ashphalt to car parking area. Extent is shown on Site Plan.
- Provide ashphalt paving on northern side of building adjacent to northern fencing. Extent is shown on Site Plan.

21. LANDSCAPE

Refer to Site Plan -

- Prepare site and provide turf to the area indicated on the NORTH/EAST side of Hall, adjacent to Pittwater road.
- Prepare site, provide soil and plants to landscaped area adjacent to tennis court and ramped area.

PINBOARDS

- Provide and fix a 1200mm wide x 1200mm high Pinboard to each Tutorial Room (5 off).
  Fabric over Canite with anodised aluminium frame, concealed fixing to walls. Fabric in accordance with Pinboard Schedule.

- Provide and fix a 4 panel chequer board Pinboard to the Music Classroom wall north and Ensemble Room west. Each panel to be 900mm high x 1200mm wide fabric over canite. Wrap fabric over edges of each canite board and fix to back of board.
- Butt join each panel to form a four board chequeboard design.
- Refer to Pinboard Schedule for fabric colours.
- Fix to north wall of Music Classroom and west wall of Ensemble Room.

WHITE BOARD

- Provide and fix S22 Omniplate White Board by Charles Tims Pty Ltd. Board to have anodised aluminium frame and full width pen ledge. Size 2400mm W x 1200mm H. Fix in location as directed on site.

DOOR SCHEDULE

GROUND FLOOR

DOOR No	TYPE	FRAME	DOOR SIZE	FINISH
D01	Glass double doors with parliament hinges	Powder coated aluminium frame	2100 x 1000 x 40 2100 x 1000 x 40	
D02	Solid core	Powder coated aluminium frame	2040 x 820 x 40	Painted
D03	Solid core	Powder coated aluminium frame	2040 x 1020 x 40	Painted
D04	Solid core	Powder coated aluminium frame	2040 x 820 x 40	Painted
D05	Solid core	Powder coated aluminium frame	2040 x 820 x 40	Painted
D06	Solid core	Powder coated aluminium frame	2040 x 820 x 40	Painted
D07	Solid core half glazed	Steel frame single rebate	2040 x 820 x 40	Door & frame painted
D08	Solid core door panels	Top hung	1570 (approx) x 2100mm high x 30mm thick. Check dimensions on site. 22mm thick & 150mm deep	Painted edges & lined with FORBO Bulletin Board '2185' both sides painted
D09	"	"	"	"
D10	Solid core half glazed	Steel frame single rebate	2040 x 820 x 40	Door & frame painted
D11	"	"	"	"
D12	Solid core half glazed (10mm glass)	Steel frame single rebate	2040 x 820 x 40	Door & frame painted
D13	Half glazed solid core double doors with parliament hinges	Powder coated aluminium frame	2040 x 820 x 40 2040 x 820 x 40	Painted

~~LEVEL 1~~

~~D1~~	~~Solid core~~	~~Powder coated aluminium frame~~	~~2040 x 820 x 40~~	~~Painted~~
~~D2~~	~~Solid core~~	~~Powder coated aluminium frame~~	~~2040 x 820 x 40~~	~~Painted~~
~~D3~~	~~Glass sliding~~	~~Powder coated aluminium frame~~	~~2040 x 820~~	

~~LEVEL 2~~

~~D1~~	~~Solid core~~	~~Steel frame~~	~~2040 x 750 x 40~~	~~Painted~~

SCHEDULE OF JOINERY FINISHES

GROUND FLOOR

TEA ROOM

BENCH:	33mm HMR/MDF	Laminex 'Expresso'
CUPBOARD FRONTS:	20mm HMR/MDF	Laminex 'Curley Beech'
WALL MOUNTED SHELF UNIT:	20mm HRM/MDF	Laminex 'Expresso'
SPLASHBACK:	18mm HMR/MDF	Laminex 'Expresso'
CUPBOARD HANDLES:	Silver Anodised	Hettich Aluminium Handles

VANITY UNIT STAFF TOILET

TOP & FRONTS:	33mm HMR/MDF	Laminex 'Expresso'
GLASS/MIRROR FROM BENCHTOP TO CEILING:		Silicone seal between bench & mirror

~~LEVEL 1~~

~~KITCHENETTE JOINERY – STAFF ROOM~~

~~END PANELS & DOOR FRONTS:~~	~~20mm HMR/MDF~~	~~Laminex 'Curly Beech'~~
~~TOP:~~	~~33mm HMR/MDF~~	~~Laminex 'Expresso'~~
~~SKIRTING:~~	~~20mm HMR/MDF~~	~~Laminex 'Expresso'~~
~~WALL MOUNTED OPEN SHELVING:~~	~~20mm HMR/MDF~~	~~Laminex 'Expresso'~~
~~SPLASHBACK:~~	~~9mm Laminated Glass~~	~~Back painted white~~
~~CUPBOARD HANDLES:~~	~~Silver Anodised~~	~~Hettich Aluminium Handles~~

SCHEDULE OF WALL TYPE LOCATIONS

ROOM NAME	WALL LOCATION	WALL TYPE
MUSIC CLASSROOM	• NORTH WALL	• WALL TYPE2 & WT 7 ABOVE SOLID CORE DOUBLE DOORS
	• EAST WALL	• WALL TYPE 7
	• SOUTH WALL	• WALL TYPE 6 & ALUMINIUM WINDOW SUITE
	• WEST WALL	• WALL TYPE 7
TUTORIAL ROOM 1	• NORTH WALL	• WALL TYPE 7
	• EAST WALL	• AL. WINDOW SUITE OVER WT2 & WT6
	• WALL SOUTH	• WT6 & ALUMINIUM WINDOW SUITE
	• WALL WEST	• WALL TYPE 7
TUTORIAL ROOM 2	• NORTH WALL	• WALL TYPE 7
	• EAST WALL	• WALL TYPE 7
	• SOUTH WALL	• WT6 & AL. WINDOW SUITE
	• WEST WALL	• WALL TYPE 7
ENSEMBLE ROOM	• WEST WALL	• WALL TYPE 7
	• SOUTH WALL	• WALL TYPE 7
	• EAST WALL	• AL. WINDOW SUITE OVER WALL TYPE 2
	• NORTH WALL	• WALL TYPE 7
TEA ALCOVE	• NORTH WALL	• WALL TYPE 2
	• EAST WALL	• WALL TYPE 7
	• SOUTH WALL	• WALL TYPE 7
	• WEST WALL	• WALL TYPE 7
TUTORIAL ROOM 3	• NORTH WALL	• WALL TYPE 7
	• EAST WALL	• WALL TYPE 7
	• SOUTH WALL	• WALL TYPE 6 & ALUMINIUM WINDOW SUITE
	• WEST WALL	• WALL TYPE 7
DEPUTY OFFICE	• NORTH WALL	• WALL TYPE 7
	• EAST WALL	• WALL TYPE 7
	• SOUTH WALL	• WALL TYPE 6 & AL. WINDOW TYPE
	• WEST WALL	• EXISTING
STAFF TOILET	• NORTH WALL	• WALL TYPE 2
	• EAST WALL	• WALL TYPE 2
	• SOUTH WALL	• WALL TYPE 7
	• WEST WALL	• WALL TYPE 2
PIANO	• NORTH WALL	• WALL TYPE 2
	• EAST WALL	• WALL TYPE 7
	• SOUTH WALL	• WALL TYPE 7
	• WEST WALL	• EXISTING

ROOM NAME	WALL LOCATION	WALL TYPE
DRUMS	• NORTH WALL • EAST WALL • SOUTH WALL • WEST WALL	• WALL TYPE 2 • WALL TYPE 2 • WALL TYPE 7 • WALL TYPE 7
STORE 1	• NORTH WALL • EAST WALL • SOUTH WALL • WEST WALL	• WALL TYPE 2 • WALL TYPE 2 • WALL TYPE 7 SOLID CORE DOUBLE DOORS • WALL TYPE 2
STORE 2	• NORTH WALL • EAST WALL • SOUTH WALL • WEST WALL	• WALL TYPE 2 • WALL TYPE 2 • WALL TYPE 7 ABOVE SOLID CORE DOUBLE DOORS • WALL TYPE 2

SCHEDULE OF WALL FINISHES / COLOURS

ROOM NAME	LOCATION	SUBSTRATE	COLOUR	CODE
DEPUTY OFFICE	• Wall: North	Plaster board	Dulux 'Burning Brier'	P07.D8
	• Wall: East	Plaster board	Dulux 'Light Rice'	P13.D1
	• Wall: South	Plaster board	Dulux 'Light Rice'	P13.D1
	• Door & door frame Wall: South		Dulux 'Light Rice'	P13.D1
	• Wall: West	Plaster board	Dulux 'Light Rice'	P13.D1
STAFF W.C.	• Wall: North	Mirror above vanity cement render & set (Tiles to Shower)	Dulux 'Light Rice'	P13.D1
	• Wall: West	Cement render & set Tiled Skirting	Dulux 'Light Rice'	P13.D1
	• Wall: South	Tiled skirting Plaster board	Dulux 'Light Rice '	P13.D1
	• Wall: East	Tiled skirting plaster board	Dulux 'Light Rice'	P13.D1
	• Wall tiles	Johnsons Waringa 100 x 100 to Shower walls	'Cappuccino'	
	• Skirting	100 x 100	'Cappuccino'	
TUTORIAL 1	• Wall: North	Plaster board	Dulux 'Burning Brier'	P07.D8
	• Wall: East	Plaster board	Dulux 'Light Rice'	P13.D1
	• Wall: South	Plaster board (Powder coated al. frame window set)	Dulux 'Light Rice'	P13.D1
	•	Door	Dulux 'Alfa Centuri'	P41.E7
	• Wall: West	Plaster board	Dulux 'Light Rice'	P13.D1

SCHEDULE OF WALL FINISHES / COLOURS (cont)

ROOM NAME	LOCATION	SUBSTRATE	COLOUR	CODE
TUTORIAL 2	• Wall: North	Plaster board	Dulux 'Burning Brier'	P.07.D8
	• Wall: South	Plaster board (Powder coated al. framed window set)	Dulux 'Light Rice'	P13.D1
	•	Door	Dulux 'Alfa Centuri'	P41.E7
	• Wall: East	Plaster board	Dulux 'Light Rice'	P13.D1
	• Wall: West	Plaster board	Dulux 'Light Rice'	P13.D1
TUTORIAL 3	All as for Tutorial 2			

SCHEDULE OF WALL FINISHES / COLOURS (cont) – page 2

ROOM NAME	LOCATION	SUBSTRATE	COLOUR	CODE
MUSIC CLASSROOM	• Wall: North	Cement Render & Set	Dulux 'Light Rice'	P13.D1
	• Sliding doors in North Wall		Dulux 'Alfa Centuri'	P41.E7
	• MDF Pelmet to sliding door track		Dulux 'Light Rice'	P13.D1
	• Wall: East	Plasterboard	Dulux 'Burning Brier'	P07.D8
	• Door in East Wall		Dulux 'Alfa Centuri'	P41.E7
	• Wall: South (Powder coated Al. frame windows) C.F.C. panels in frame	C.F.C.	Dulux 'Alfa Centuri'	P41.E7
	• Wall South	Plaster board	Dulux 'Light Rice'	P13.D1
	• Wall West	Plaster board	Dulux 'Light Rice'	P13.D1
	• Door in West Wall		Dulux 'Alfa Centuri'	P41.E7
TEA ALCOVE	• Wall: East	Plaster board	Dulux 'Burning Briar'	P07.D8
	• Door in East Wall		Dulux 'Alfa Centuri'	P41.E7
	• Wall: South	Plaster board	Dulux 'Light Rice'	P13.D1
	• Wall: West	Plaster board	Dulux 'Light Rice'	P13.D1
DRUMS	• Wall: North	Cement render & set	Dulux 'Light Rice '	P13.D1
	• Wall: East	Cement render & set	Dulux 'Light Rice'	P13.D1
	• Wall: South	Plaster board	Dulux 'Light Rice'	P13.D1
	• Wall: West	Cement render & set + plaster board	Dulux 'Light Rice'	P13.D1
	• Door in West Wall		Dulux 'Alfa Centuri'	P41.E7

SCHEDULE OF WALL FINISHES / COLOURS (cont) – page 3

ROOM NAME	LOCATION	SUBSTRATE	COLOUR	CODE
ENSEMBLE	• Wall: North	Plaster board	Dulux 'Burning Brier'	P07.D8
	• Wall: South	Plaster board	Dulux 'Light Rice'	P13.D1
	• Wall: East	Cement render & set	Dulux 'Light Rice'	P13.D1
	• Wall: West	Plaster board	Dulux 'Light Rice'	P13.D1
STORE 1	• Wall: North	Cement render	Dulux 'Light Rice'	P13.D1
	• Wall: South – Pelmet to door track	Plaster board (above doors) MDF	Dulux 'Light Rice'	P13.D1
	• Wall: East	Cement render	Dulux 'Light Rice'	P13.D1
	• Wall: West	Cement render	Dulux 'Light Rice'	P13.D1
STORE 2	ALL AS FOR STORE 1			
PIANO	• Wall: North	Cement render & set	Dulux 'Light Rice'	P13.D1
	• Wall: East	Plaster board	Dulux 'Light Rice'	P13.D1
	• Wall: South	Plaster board	Dulux 'Light Rice'	P13.D1
	• Doors in Wall East		Dulux 'Alfa Centuri'	P41.E7
NOTE: (FOR SLIDING DOOR, SEE WALL FINISHES)				
COLUMNS	Existing concrete	Render & set	Dulux 'Light Rice'	P13.D1

SCHEDULE OF WALL FINISHES / COLOURS (cont) – page 4

ROOM NAME	LOCATION	SUBSTRATE	COLOUR	CODE
LEVEL 1				
STAFF ROOM	• Wall: North	Cement render	DULUX 'Smooth Beech'	P.13.E3
	• Wall: East	Cement render	DULUX 'Smooth Beech'	P.13.E3
	• Wall: South	Plaster board	DULUX 'Smooth Beech'	P.13.E3
	• Wall: West	Plaster board	DULUX	50 BB13/136
DEPUTY	• Wall: North	Plaster board	DULUX 'Smooth Beech'	P.13.E3
	• Wall: East	Cement render	DULUX 'Smooth Beech'	P.13.E3
	• Wall: South	Cement render	DULUX	50 BB 13/136
	• Wall: West	Cement render	DULUX	50 BB13/136
LEVEL 2				
STAFF ROOM MEZZANINE	• Wall: North	Cement render	DULUX 'Smooth Beech'	P.13.E3
	• Wall: East	-	-	-
	• Wall: South	Cement render	DULUX 'Smooth Beech'	P.13.E3
	• Wall: West	Plaster board	DULUX	50 BB13/136
STORE ROOM	• Wall: North	Plaster board	DULUX 'Smooth Beech'	P.13.E3
	• Wall East	Plaster board	DULUX 'Smooth Beech'	P.13.E3
	• Wall: South	Plaster board	DULUX 'Smooth Beech'	P.13.E3
	• Wall: West	Existing blockwork	DULUX 'Smooth Beech'	P.13.E3

SCHEDULE OF EXTERNAL FINISHES & COLOURS

ITEM	SUBSTRATE	FINISH	COLOUR	CODE/COMMENTS
1.	CONC. BLOCK: BORAL 195 x 390 x 190	Split face	Almond	Provide split end - end blocks on eastern end
2.	CONC. BLOCK: BORAL 95 x 390 x 90 (half height)	Split face Band (at windows)	Charcoal	
3.	CONC. BLOCK RETAINING WALL	Smooth Face	Almond	
4.	ALUMINIUM WINDOW FRAMES except WG11:	Powder coated Powder coated	DULUX 'Mountain Blue' DULUX 'Patina'	83249 51041
5.	STEEL BEAMS, ANGLES RETAINING TO ROOFING	DULUX Super Enamel Exterior High Gloss	DULUX to match 'Mountain Blue'	
6.	METAL ROOFING FLASHINGS, ROOF TRIMS, GUTTERS / DOWNPIPES	ZINCALUME CUSTOM ORB	COLORBOND 'Mountain Blue'	Visible roofing to be double-sided Colorbond
7.	ALUMINIUM SUNSCREEN	Powder coated	DULUX 'Pottery'	33662
8.	C.F.C. PANELS IN WINDOW FRAMES	PRE-PAINTED 9mm C.F.C. PANELS	DULUX Semi-Gloss	50 B513/131
9.	C.F.C. PANELS WALL LINING	2 coats x DULUX Super Exterior Acrylic	DULUX 'Burning brier' Semi-Gloss	P.07.08
10.	SOLID CORE DOORS	2 coats x DULUX Super Exterior Acrylic	DULUX Semi-Gloss	50 BB 13/136
11.	EAVES LINING: VERSILUX	2 coats DULUX Super Exterior Acrylic	DULUX 'Arava'	P.13.05
12.	CONCRETE COLUMNS (existing)	1 coat primer/sealant 2 coats x DULUX Super Exterior Acrylic	DULUX 'Arava'	P.13.05
13.	CONCRETE WALKWAY	Broom finish with 80mm smooth edge surround joints & smooth banding to align with existing conc. centres		
14.	CONCRETE UPSTAND BELOW WALL & WINDOW SUITES	1 x coat primer/sealant 2 coats x DULUX Super Exterior Acrylic	DULUX to match 'Mountain Blue'	

SCHEDULE OF EXTERNAL FINISHES & COLOURS (cont)

ITEM	SUBSTRATE	FINISH	COLOUR	CODE/COMMENTS
15.	GALV. STEEL C.H.S. RAILING & BALUSTER TO RAMP & HANDRAILING TO WALKWAY CHAIN MESH P.V.C. BLACK COATED INFILL TO BALUSTRADE	DULUX Super Enamel Exterior High Gloss to match powder coat DULUX 'Patina'		51041
16.	SECURITY GATE	Powder coated	Black	

SCHEDULE OF FLOOR FINISHES

GROUND FLOOR

ROOM NAME	FINISH	TYPE	CODE	COMMENTS
DEPUTY OFFICE	(C) Carpet 100% solution dyed B.C.F. OLEFIN	EDWARDSTOWN CARPETS 'OSCAR TWEED'	SPUN TOFFEE CT6	Direct stick to concrete floor Contact: 1800 882 187
TEA ALCOVE	(V) Rubber Flooring	ACTIVA	CLASSIC BR 239 ROYAL	PRF AUST P/L Tel: 9672.8388
STAFF W.C.	Tiles	JOHNSONS KERASTAR 200 x 200	ATHENA GRIPFOOT	
	Provide a 100 x 100mm CONCRETE HOB to SHOWER AREA. Tiles to hob shall be 50mm x 25mm VITRIFIED TILES – TYPE JN 6302 from ARTE DOMUS (Tel: 9557.5060) Grout: 'white'			
TUTORIAL 1	(C) Carpet 100% solution dyed B.C.F. OLEFIN	EDWARDSTOWN CARPETS 'OSCAR TWEED'	SPUN TOFFEE CT6	Direct stick to concrete floor Contact: 1800 882 187
TUTORIAL 2	(C) Carpet 100% solution dyed B.C.F. OLEFIN	EDWARDSTOWN CARPETS 'OSCAR TWEED'	SPUN TOFFEE CT6	Direct stick to concrete floor Contact: 1800 882 187
TUTORIAL 3	(C) Carpet 100% solution dyed B.C.F. OLEFIN	EDWARDSTOWN CARPETS 'OSCAR TWEED'	SPUN TOFFEE CT6	Direct stick to concrete floor Contact: 1800 882 187
PIANO	(C) Carpet 100% solution dyed B.C.F. OLEFIN	EDWARDSTOWN CARPETS 'OSCAR TWEED'	SPUN TOFFEE CT6	Direct stick to concrete floor Contact: 1800 882 187
DRUMS	(C) Carpet 100% solution dyed B.C.F. OLEFIN	EDWARDSTOWN CARPETS 'OSCAR TWEED'	SPUN TOFFEE CT6	Direct stick to concrete floor Contact: 1800 882 187
ENSEMBLE	(C) Carpet 100% solution dyed B.C.F. OLEFIN	INTERFACE 600 x 600 CARPET SQUARE	CHENILLE TIME 'REVOLUTION'	Lay in brick bond stripes in one direction running N/S. Contact: Lisa Wong tel: 9698.3303
CORRIDOR	(V) Rubber Flooring	ACTIVA	CLASSIC BR 239 ROYAL	PRF AUST P/L Tel: 9672.8388
MUSIC CLASSROOM	(C) Carpet 100% solution dyed B.C.F. OLEFIN	INTERFACE 600 x 600 CARPET SQUARE	CHENILLE TIME 'REVOLUTION'	Lay in brick bond stripes in one direction running N/S. Contact: Lisa Wong tel: 9698.3303

SCHEDULE OF FLOOR FINISHES (cont)

GROUND FLOOR (cont)				
ROOM NAME	**FINISH**	**TYPE**	**CODE**	**COMMENTS**
STORE 1	(C) Carpet 100% solution dyed B.C.F. OLEFIN	INTERFACE 600 x 600 CARPET SQUARE	CHENILLE TIME 'REVOLUTION'	Lay in brick bond stripes in one direction running N/S. Contact: Lisa Wong tel: 9698.3303
STORE 2	(C) Carpet 100% solution dyed B.C.F. OLEFIN	INTERFACE 600 x 600 CARPET SQUARE	CHENILLE TIME 'REVOLUTION'	Lay in brick bond stripes in one direction running N/S. Contact: Lisa Wong tel: 9698.3303

~~LEVEL 1~~				
~~Staff Room~~	~~(C) Carpet 100% solution dyed B.C.F. OLEFIN~~	~~INTERFACE 600 x 600 CARPET SQUARE~~	~~CHENILLE TIME 'RUM REBELLION'~~	~~Lay in brick bond stripes in one direction running E/W.~~
~~Kitchenette~~	~~Sheet P.V.C.~~	~~FORBO~~	~~SAFESTEP R No 7499~~	~~For 600mm strip to front of cupboards~~
~~Unisex Toilet~~	~~Sheet P.V.C.~~	~~FORBO~~	~~SAFESTEP R No 7499~~	
~~Deputy~~	~~(C) Carpet 100% solution dyed B.C.F. OLEFIN~~	~~INTERFACE 600 x 600 CARPET SQUARE~~	~~CHENILLE TIME 'RUM REBELLION'~~	~~Lay in brick bond stripes in one direction running E/W.~~

~~LEVEL 2~~				
~~Mezzanine Staff Room~~	~~(C) Carpet 100% solution dyed B.C.F. OLEFIN~~	~~INTERFACE 600 x 600 CARPET SQUARE~~	~~CHENILLE TIME 'RUM REBELLION'~~	~~Lay in brick bond stripes in one direction running E/W.~~

~~**LEVELS 1 & 2:**~~

~~Stair to Mezzanine Staff Room:~~

- ~~Treads & Risers: 'ACTIVA' STUDDED RUBBER Stair treads with integral nosing~~

- ~~Skirtings: NYLEX Stair Skirtings – Black~~

SCHEDULE OF FIXTURES & FITTINGS – Refer to Hydraulic's Specification for details

STAFF BATHROOM / W.C. – GROUND FLOOR	
VANITY BASIN:	PARISI 'BOX' semi recessed (Harvey Norman Commercial)
TOILET SUITE:	FOWLER NEWPORT TOILET SUITE (Harvey Norman Commercial)
MIXER TAP TO BASIN:	DORF 'AVANTI' basin mixer – has a red/blue indicator
SHOWER SET:	DORF 'VENUS' shower set
TOILET ROLL HOLDER:	AXUS 'STREAMLINE' PLAZA PZ11 (chrome finish)
TOWEL RAIL:	AXUS 'STREAMLINE' PLAZA PZ03 60cm long
SOAP DISH (for shower):	AXUS 'STREAMLINE" PLAZA CC 01

TEA ALCOVE – GROUND FLOOR	
SINK:	FRANKE 'ONDA' ONX 611 stainless steel 790L x 500 wide (single bowl), single tap hole
SINK MIXER:	MATTSSON 4L 00 SINK MIXER
HOT WATER UNIT & ZIP HYDRO TAP	ZIP BC100/125 440 x 495 x 339

SICK BAY	
BASIN:	CAROMA CORNER WALL BASIN / 1 TAP HOLE
MIXER TAP:	MATTSON BASIN MIXER chrome plated with blue & yellow indicators

SCHEDULE OF COLOURS FOR PINBOARDS

- COLOURED FOR PINBOARDS TO TUTORIAL ROOMS
  - MELDED FABRICS: PRELUDE

TUTORIAL 1	:	'PESTO'
TUTORIAL 2	:	'MERLIN'
TUTORIAL 3	:	'OLIVE'
DEPUTY OFFICE	:	'DEEP SEA BLUE'
PIANO	:	'PESTO'
ENSEMBLE	:	'DEEP SEA'.

- CHEQUER BOARD PATTERN TO CLASSROOM & ENSEMBLE ROOM

  COLOURS:

PRELUDE	:	'DEEP SEA'
PRELUDE	:	'MERLIN'
PRELUDE	:	'PESTO'
PRELUDE	:	'OLIVE'

SCHEDULE OF DOWNPIPES

No.	LOCATION	COMMENT
1	Existing D.P. on Hall elevation at Grid 4A	Remove lower half of D.P at new roof. Provide colorbond spreader to bottom of D.P at new roof level.
2	Existing D.P on Hall elevation on Grid 6	Remove and relocate D.P as indicated on drawings. Provide new colourbond spreader to base of D.P at new roof level.
3	Existing D.P on Hall elevation on Grid 8	Remove lower part of D.P. Divert D.P to new Rain Water tank.
4	New colorbond D.P on Grid 4A	To gutter on new roofing.
~~5~~	~~New colorbond D.P on Grid 6~~	~~To gutter on new roofing~~
6	New colorbond D.P on Grid 8	Divert water from new gutter to storm water tank.

SCHEDULE OF WORKS RELATED TO HYDRAULIC SERVICES

The following schedule is issued as a guide to work associated with the hydraulic services' works.

BUILDER

1. Datum and grid line set outs at each floor level and for external set out.
2. Service ducts and access panels throughout the building.
3. Fire hose reel cupboard.
4. Bench and cupboard units with suitable openings for the installation of sinks and basins.
5. Waterproof membrane to walls and floors.
6. Upturned flashing of roof penetrations.
7. Metal roof gutters and flashings.
8. Forming of trench drains (supply and fixing of grating, checking set-out, overview of concrete placement and leveling of falls by Hydraulic).
9. Removal and replacement of ceilings.
10. Dishwashing machine.
11. Removal and replacement of bitumen road surface and concrete pathways where pipes are to be installed.
12. Concrete platform to support water tank.

ELECTRICAL

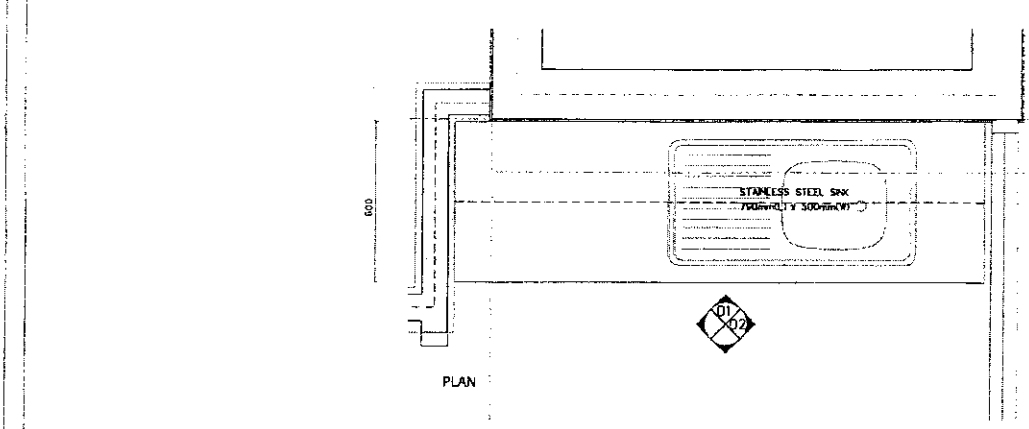
1. Wiring to hot water heater.
2. GPO for dishwashers.
3. GPO for boiling water and chilled water units.

ROOFER

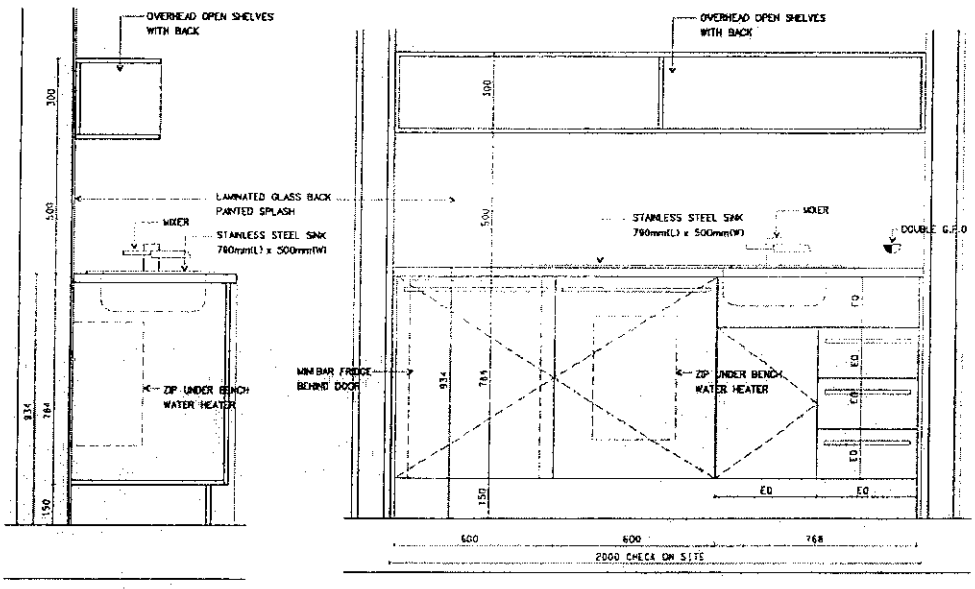
1. Provision and fixing of all roof flashings where vent, flue or other pipes / services pass through roof covering.
2. Hanging straight and hanging stepped roof flashings.
3. All eaves gutters.
4. All external rainwater downpipes excepting rainwater downpipes directed into rainwater tank.

MECHANICAL SERVICES

1. Extension of condensate drainage from AC equipment and plant to tundishes or floor wastes provided in the Hydraulics work.



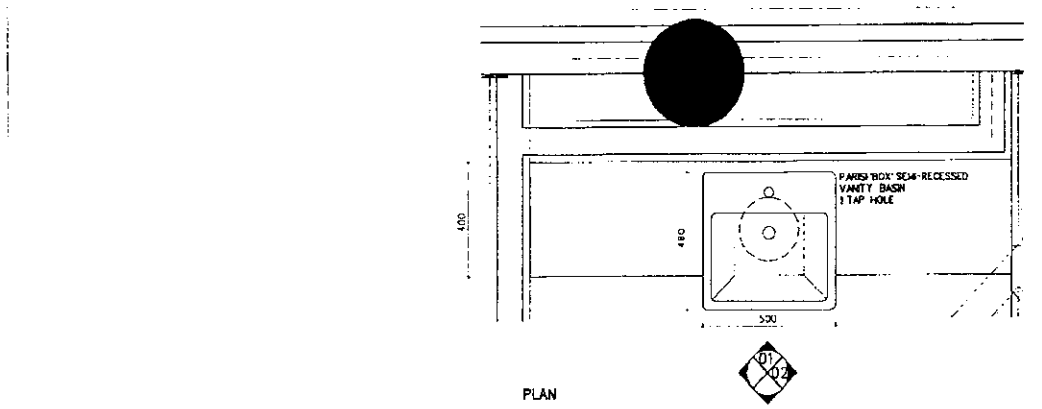
PLAN



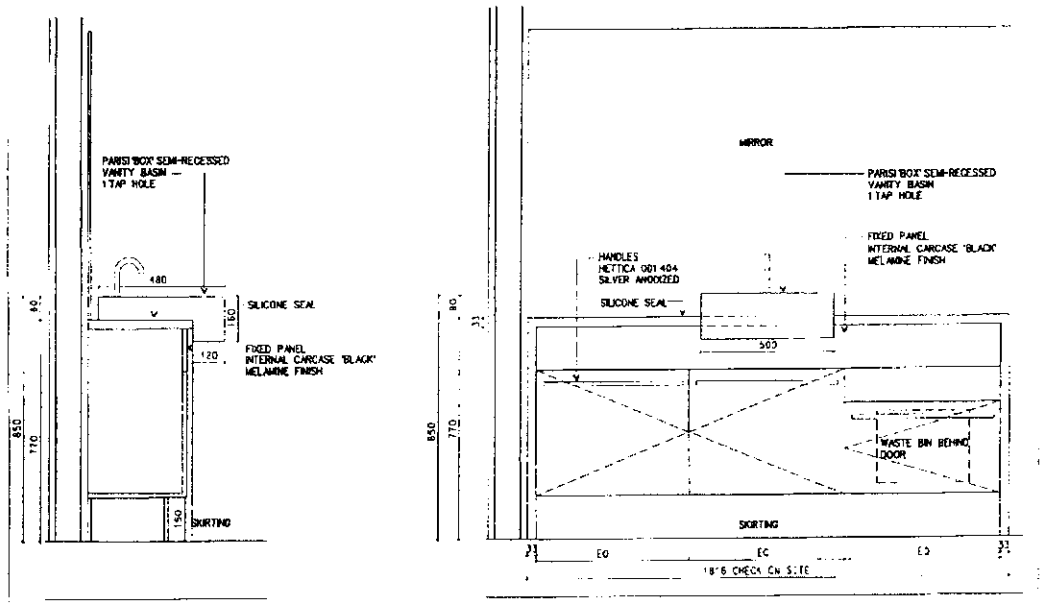
ELEVATION 2

ELEVATION 1

Project: LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL PITTWATER ROAD BAYVIEW	PD MAYOH PTY LTD
Job No: 0414	
Detail: TEA ALCOVE	Scale: 1:20 Issue: A FD .01
	Date: 10 SEP 2004



PLAN



ELEVATION 2

ELEVATION 1

Project: LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL PITTWATER ROAD BAYVIEW

Job No: 0414

Detail: STAFF TOILET: VANITY UNIT

PD MAYOH PTY LTD

Scale: 1:20 Issue: A

Date: 10 SEP 2004

FD . 02

LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD, BAYVIEW, NSW
MUSIC ROOM UNDER EXISTING HALL
TENDER SCHEDULE
HYDRAULIC SERVICES

I/We: .....

hereby tender for the supply, delivery, installation, commissioning and testing of the Hydraulic Services installation associated with the project in accordance with the drawings and specification prepared by Harris Page & Associates Pty. Ltd.

ITEMISED LUMP SUM TENDER PRICE

		FIXED PRICE $
1	EARLY WORKS SERVICES DIVERSIONS	
2	CONCRETE ENCASEMENT OF 300MM DIAMETER SYDNEY WATER SEWER MAIN	
3	SUBSOIL WATER DRAINAGE	
4	SANITARY DRAINAGE SYSTEM INCLUDING TRADE WASTE PRE-TREATMENT STRUCTURE	
5	STORMWATER DRAINAGE SYSTEM INCLUDING RAINWATER TANK	
6	DOMESTIC HOT, WARM AND COLD WATER SYSTEMS	
7	SANITARY PLUMBING SYSTEM	
8	SANITARY FIXTURES AND TAPWARE	
9	COUNCIL STORMWATER DRAINAGE AND P & D INSPECTION FEES. SYDNEY WATER P & D INSPECTION FEES	
10	"AS BUILT" DRAWINGS AND OPERATING INSTRUCTIONS MANUALS	

TOTAL TENDER PRICE	
G.S.T.	
TOTAL TENDER PRICE INCLUDING G.S.T.	

Total Price Including G.S.T (in words): .....

.....

I/We unconditionally guarantee the performance of the installation and completion of the works in accordance with this specification and accompanying drawings.

COMPANY: .....

SIGNATURE: .....

WITNESS: .....

DATE: .....

Specification

FOR

Hydraulic Services

Loquat Valley Anglican Preparatory School Pittwater Road, Bayview, NSW

Architect:
P.D. MAYOH PTY LTD
ARCHITECTS & LANDSCAPE CONSULTANTS
60 STRATHALLEN AVENUE
NORTHBRIDGE NSW 2063
TELEPHONE: (02) 9958 0488
FACSIMILE: (02) 9958 6424

Prepared by:
HARRIS PAGE & ASSOCIATES PTY LIMITED
LEVEL 2
32 CARRINGTON STREET
SYDNEY NSW 2000
TELEPHONE: (02) 9262 1600
FACSIMILE: (02) 9262 6385
SPEC NO: 4675H
DATE: 15.02.05
ISSUE: TENDER

GENERAL REQUIREMENTS & STANDARDS

1.1 SCOPE OF WORK

The work specified shall comprise the supply of all labour, materials, tools of trade, plant and equipment necessary for the supply, coordination, installation, testing, commissioning and certification of the following services in accordance with the drawings and specification, to the requirements of the relevant Authorities:-

- Subsoil Water Drainage
- Sewer Drainage
- Trade Waste Drainage
- Stormwater Drainage
- Sanitary Plumbing
- Sanitary Fixtures, Tapware and Gas Outlets
- Recycled Water Services
- Cold Water Services
- Hot and Warm Water Services
- Fire Hydrant and Fire Hose Reel System
- Liquefied Petroleum Gas Services

These services shall be handed over completed, tested, approved and fully operative.

Carry out all installations in accordance with the contract documents and detail design including all final certifications of systems installed. Provide all temporary fire fighting services during the constructions as required by the Authority.

1.2 EARLY WORKS HYDRAULIC SERVICES DIVERSIONS

All work relating to existing hydraulic services diversions and reconnection shall be carried out after hours so that existing buildings will not be affected by the interruption of the services. Coordinate with and obtain approval from the School Headmaster for the shut-down of existing services prior to commencing works.

Allow to carry out all diversions work after hours.

1.3 DEFINITIONS

Approved: Means approved or selected by the Consultant Engineer. Approval by the Consultant Engineer of drawings, samples, prototypes, workmanship methods, or other matters in respect of the works in no way relieves the Hydraulic Contractor of responsibility in respect of the Works or Hydraulic Contract.

Equal, Approved: Means materials, workmanship or equipment approved by the Consultant Engineer as equal to that specified and substituted by the Hydraulic Contractor at his request.

The Consultant Engineer approval of these substitutions in no way relieves the Hydraulic Contractor of responsibility in respect of the works or Contract. Should any saving in cost result from such substitution the amount of the saving shall be deducted from the Contract Sum.

1.4 AUTHORITIES AND STANDARDS

All work shall be carried out by or under the full supervision of fully licensed tradesmen, in accordance with the drawings and specification to the standards and regulations of the Authorities having jurisdiction over the works.

Provide new materials, the best of their kinds in accordance with the specification, the Australian Standard Codes and the Authorities' requirements.

Obtain certificates from the Authorities having jurisdiction to prove completion of the services before application for final payment.

1.5 APPROVALS

Submit and gain all Authority approvals necessary for the design and installation of the works in adequate time so as not to cause delays in the construction works.

1.6 MATERIALS AND WORKMANSHIP

Wherever possible pipes shall be run parallel with walls and slabs and with each other, minimise crossovers and unsightly groupings. All services shall be free of each other and easily replaceable. Pipes shall be so arranged with inspection openings, valves, and similar items of equipment placed to be accessible. All pipes shall be accurately set out and fully coordinated prior to commencing fabrication and installation.

Allow for all necessary fittings, pipes, offsets and bends etc as required to coordinate with structure and all other services.

All pipework shall be concealed in walls and ceilings, co-ordinate final location of all access panels as required for the final installation.

Where directed, samples of each kind of material to be used shall be labelled and submitted for approval detailing manufacture and source of supply. After approval the materials delivered to the works shall be in accordance with the approved samples.

In the event of materials being a mixed description and quality, the Principal shall have power to order to have those portions of the materials which are suitable for the works, picked out, marked and stacked where directed and all defective or unsuitable materials removed from the site.

During construction, leave all unfinished work in a safe condition, protecting the works against damage or loss through any cause whatsoever, seal off open ends of pipes in such a manner as to prevent the entry of foreign matter into the lines, until the works have been handed over on completion.

1.7 SETTING OUT

Thoroughly examine the tender documentation, check all figured dimensions immediately after the Contract is awarded, and obtain such information and measurements as may be required to carry out the work.

Give all work careful supervision, lay out and check all work and do all levelling and measuring necessary to properly place the works.

Determine the location of openings to be provided by others.

Under no circumstances shall payment be made for reinstallation, alteration or work incorrectly placed due to insufficient supervision and checking by the Contractor.

1.8 PROGRAM

All works shall be in accordance with work program and in conjunction with the phasing plan.

1.9 CONTRACT MANAGEMENT

Provide all necessary on site personnel and off site back up personnel and facilities necessary to enable the works to be properly executed in accordance with the construction program. On request from the Principal, supply the names, positions, and authority of persons with responsibility for execution of all or part of the Contract works.

1.10 LABOUR, DIRECTION, CO-ORDINATION AND CO-OPERATION

Provide all necessary labour for the carrying out and completion of the works in accordance with the provisions of this Contract including properly qualified personnel such as Managers, Foremen, Leading Hands and all other staff such as may be necessary to ensure constant and competent direction and superintendence of all trades in all phases and parts of the works to comply with the required standards of this Contract.

Be responsible for the proper co-ordination of all works of this Contract. Superintend all components expressly made for the works manufactured, stored or stockpiled off site.

1.11 NOISE AND VIBRATION

Be entirely responsible for the elimination of system noise, vibration and water hammer. Special care shall be taken to avoid transmission of vibration using anti-vibration inserts and special purpose support brackets and frames to isolate the pipes.

1.12 ACOUSTIC TREATMENT

Provide acoustic treatment / insulation to all pipework, plant, equipment and associated fixings and in accordance with the Architect's requirements, Building Code of Australia and Authorities requirements. Insulation shall be complete with continuous vapour barrier over wrap.

1.13 ELECTRICAL WORK

All electrical work to be installed under this contract shall be carried out by a licensed electrician and in accordance with the electrical requirements for this project, the S.A.A. Wiring Rules and the requirements of the local supply Authority.

1.14 SITE MANAGEMENT AND WORKMEN

Appoint a suitably qualified and experienced person, acceptable to the Principal as Manager of the project. This person shall be present on site during normal working hours and at all times when work is being performed on site.

All instructions given to the Manager shall be deemed to have been given to the Contractor.

The Manager, so far as is practicable, shall be the same person throughout performance of the Contract and he shall not be removed from the works without the prior knowledge and consent of the Principal and then only for some good reason of discipline or competence and not as a measure of cost saving in wages paid by the Contractor.

The Manager shall be required on the works from the commencement of the works until the date of practical completion and at such times thereafter as may be necessary for the satisfactory completion of the works.

Provide all workmen of required skills for the performance of the works.

1.15 MANUFACTURER'S DIRECTIONS

Manufactured articles, materials and equipment are to be supplied, stored, installed, connected, erected, used, cleaned and commissioned in strict conformity with manufacturer's printed directions unless otherwise specified. In any case, the Contractor is to obtain from the Supplier, agreement that the product as used or specified is being used or specified in accordance with the manufacturer's requirements and practice. Retain manufacturer's directions of such articles on site for the Principal's reference.

1.16 QUALITY OF WORK BY OTHERS

Where the proper execution of the works of the Contractor is dependent on or appreciably affected by the quality of any such work to be carried out or that has been carried out by another Contractor, then such work shall be to the reasonable satisfaction of this Contractor insofar as it may affect this Contractor in the execution of his works.

If he shall consider that its quality or the manner of its execution or the time of execution is likely to obstruct or hinder him unduly in the carrying out of his Contract then he must notify the Principal accordingly in writing and supply particulars immediately on becoming aware thereof or when he should reasonably become aware thereof stating in what respect the work in question is not to his satisfaction.

1.17 PRECAUTIONS IN CARRYING OUT THE WORK UNDER THE CONTRACT

Observe the appropriate current Australian Standards published by the Standards Association of Australia in respect of storage, transport and use of materials, explosives, plant and equipment and for work processes and for safety precautions, except where such Standard conflicts with any statutory requirement in which case the latter shall apply.

Where the contract does not specify precautions to be observed and in the absence of any statutory requirements or relevant Australian Standard, the Contractor shall ensure that suitable precautions are followed and all proper care is taken.

1.18 DAMAGE TO SERVICES

Before work commences, check the location of all services, immediately notify the Principal and the Officer of the relevant Authority in charge of the area in the event of damage to any water, gas, electric, drainage, sewerage, telephone, fire alarm, control cable, optic fibre or other services in the area. Render any assistance required in connection with any such incident, but otherwise work in that vicinity shall be stopped immediately and not recommence until instructed by the Principal.

1.19 PROTECTION

Be entirely responsible for all apparatus, equipment and appurtenances in connection with the work, and special care shall be taken to protect all parts thereof in such a manner as may be necessary or as directed. This protection shall include covers, crating, sheds, stores, or other means to protect the apparatus, equipment and materials from the weather and to prevent dirt, grit, plaster or other foreign substances from entering the working parts of machinery or equipment.

Special care shall be taken to keep all open ends of pipes, ducts, flues, etc. closed while in storage or during course of installation.

Protect all parts of the building and the work of other trades from damage which may be caused by the Contractor's workmen or Contractors. Be responsible for making good any such damage.

1.20 APPROVED CONTRACTORS

Submit for approval the names of Contractors to whom it is proposed to sub-let portions of the Contract.

Non approval by the Principal shall not constitute grounds for a variation to the Contract sum.

1.21 INSPECTION AND TESTS

The complete installation shall be tested in the presence of the Principal, or his representative, and approved by all governing authorities having jurisdiction therein. Prior to handing over the completed works, deliver to the Principal two (2) copies of all approval and test certificates issued by and/or to the Authorities. The Principal shall be given seven (7) days written notice of commencement of tests.

Provide all fees, labour, materials and instruments required for the purpose of carrying out tests.

Be responsible for the costs of any power or fuel consumed during any re-testing of plant or systems which is necessary due to any unsatisfactory tests carried out initially.

1.22 WARRANTY

All plant, equipment and materials supplied under this Contract shall be covered by twelve (12) months warranty against faulty manufacture, workmanship and/or materials. Be responsible for the design, rectification and/or replacement of any portion of the installations.

The warranty period shall commence as from the date of practical completion or replacement, as applicable but extension of the period shall be made in respect of replaced portions only.

1.23 DEFECTS LIABILITY

Be responsible for the rectification of all defects in the work due to faulty materials and/or workmanship for the duration of the twelve (12) month defects liability period commencing from the date of practical completion. Such defects shall be made good immediately on receipt of advice of defect.

Any defects discovered during the defects liability period which are due to default, negligence, performance or observance of any obligations shall extend the period to enable such defects to be made good and to allow the whole work after being made good in every way to be proved satisfactory.

1.24 TRADE NAME REFERENCES

Any reference in the tender documents to trade names or to a particular manufactured product should not be interpreted to mean that the particular article or product is the only one to be supplied or used.

The reference is given as an indication of the quality, class, type and finish of the items to be used and as information on the amount to be allowed for the items concerned.

Articles or products of equal type and quality produced by the other manufacturers may be submitted by the Tenderer to the Principal for approval in the course of the work. The reference "equal to" shall be taken in all cases to be the same as the reference "equal in all respects to".

1.25 SITE INSPECTIONS

The Tenderer acknowledges that he has visited and inspected the site and the existing and/or adjacent structures prior to tendering to fully acquaint himself with its nature, means of access, working space, note levels and local conditions and has made due allowance within the Contract sum all necessary works implied but not documented in either the specification and/or drawings. The Tenderer acknowledges that he has inspected the site and that he has become conversant with all (visible and latent) existing conditions, access to the site for building purposes and with services shown on the Contract documents and has allowed for such factors in the Contract sum.

No claims arising from the neglect of the foregoing on the grounds of ignorance of the amount and kind of work involved and the conditions under which the works will be executed will be allowed.

1.26 SAMPLES

When required or specified, submit to the Principal identified duplicate samples of any materials or items specified to be used in the works. One each of the approved samples shall be signed by the Principal and returned to the Contractor and the other shall be kept on the works in a safe place and available for inspection.

Where due to the nature of materials or item concerned, the above procedure is impractical, make reasonably available an identified sample for the Principal's inspection.

1.27 SITE REPRESENTATIVE

The hydraulic services site representative shall have sufficient command of English language and of Australian construction and technical terminology to be able to read, converse and receive instructions in English and shall be committed to attendance on site for all hours while the subject contract works are in progress

The representative shall be required to attend site meetings between himself, the site manager and his consultants for the duration of the Contract, at a time nominated by the site manager. The purpose of the meetings is to assist in attaining full co-operation between all concerned, as well as checking works in progress and co-ordination.

1.28 IMPORTED MATERIALS

If any imported materials are specified or necessary, which are not readily available from local sources, make or cause to be made, early application for import licenses to the appropriate Authority and take all requisite steps to ensure that deliveries are made to conform to the time and progress schedule.

Tender price shall include price allowance for Customs Duty (where it applies) and any other import costs on all imported goods, materials and fittings required for or used in or forming part of the completed work of the Contract.

1.29 DRAWINGS AND DIMENSIONS

Hydraulic Contract Drawings

Pipe work and levels indicated on drawings are recommended only. Check on site before excavation or installation of pipework to ensure correct cover and fall. Submit proposed alterations to inverts and obtain approval before starting work.

Check dimensions on site before work is put in hand or prefabricated.

The drawings are issued as a guide only and shall be considered to be diagrammatic and approximate. The drawings and Specification are intended to be mutually explanatory and complete, but all work called for by one, even if not by the other, shall be fully executed. Should the documents be in conflict, it shall be deemed to have been included for the larger quantity and/or the more expensive components, as applicable.

Ensure that adequate detailed and dimensioned drawings have been co-ordinated with all other services and have the approval received of the Principal before the commencement of any trenches, pipework, fixtures and fittings etc. All costs for failure to meet these requirements will be borne by the Contractor.

Workshop Drawings
Be responsible for the preparation of all necessary co-ordinated manufacturing and installation workshop drawings covering the works. Confirm final installation dimensions by site measurement, to ensure satisfactory set out and coordination with the structure and new or existing services.

All workshop drawings shall be CAD Microstation drafted and submitted in reproducible negative and paper print form on the Principal's standard title block in quantities as required. Such drawings shall be submitted to the Main Contractor for checking.

Manufacture and/or installation as applicable shall not be commenced prior to the Principal's approval of the workshop drawings.

The workshop drawings to be prepared and submitted shall be 1:100 scale for floor plans and 1:50 / 1:20 scale for plantrooms and equipment details and shall include the following:

a. Manufacturer's drawings of purpose made equipment.

b. Drawings showing the extent of the Principal's work requirements.

c. Detailed plans and sections showing the services installation including position of control equipment.

d. Wiring and schematic diagrams of each item of equipment.

e. Any other drawings that may be required by the Principal.

The Principal shall not be regarded as the checking agents. Approval of work shop drawings shall be given in principle only without prejudice to the responsibility for the proper co-ordination, installation and operation of the services.

The preparation of workshop drawings shall be scheduled to enable the necessary approvals to be gained and to comply with the program for installation of the services.

Submit a copy negative of the approved workshop drawings and two (2) prints to the Architect and submit to the appropriate Authorities as necessary for their approval.

As-installed Drawings
Prior to substantial completion of the Contract works, supply four (4) CAD discs, four (4) sets of hard copy prints and one (1) set of sepias showing the complete services installation as-installed complete with detailed dimensions of all services and branch lines. Also provide four (4) sets of prints of such drawings A1 size and included within the operating and maintenance instructions.

The drawings shall be to the same scale as specified for "Workshop Drawings" and shall record details of the work actually installed and titled "As Installed".

In order to achieve accurate drawings, all relevant information relating to the Contract work shall be entered onto working drawing prints immediately it has been carried out. The information shown on prints and final records shall be actually physically measured from permanent buildings, boundaries or other permanent features.

1.30 MAINTENANCE MANUAL

Prepare four (4) copies of an instruction manual prior to the issued of Certificate of Practical Completion which shall include the following sections and information:

a. A general description of services under all modes of operation.

b. Location(s) of all mains connection points.

c. Emergency procedures.

d. A fully detailed preventative maintenance procedure and maintenance schedules.

e. Maintenance information and manufacturer's brochures for all fixtures, valves, items of plant, etc.

f. Recommended spare parts and contacts for supply.

g. Locations of all systems controls.

h. Wiring diagrams of all electrically powered hydraulics equipment.

i. "As Installed" hydraulics drawings clearly identifying pipework and equipment.

j. Methods for basic fault finding.

k. Certification of systems by the relevant Authorities and/or installer.

l. Recommended maintenance procedures and equipment maintenance intervals.

The manuals shall be A4 size and each page of the manual shall be heavy quality paper. The hard cover shall be light plastic material and shall secure each page at a minimum of four (4) points. Submit a draft copy of the manual and drawings for approval before distribution.

The manuals shall be clearly identified as Loquat Valley Anglican Preparatory School Hydraulic Services.

1.31 FLUSHING OF PIPELINES

On completion of each section of the work or part thereof and prior to the installation of any valves or appliances, the relevant service pipeline shall be thoroughly flushed out to remove all debris and foreign material. Thoroughly flush out existing services prior to connection.

1.32 EXCAVATION

1. **General**
Allow for all excavation to be in MATERIALS AS FOUND. A copy of the Geotechnical Report is included in the specification. Allow for excavation to required depths in material identified.

2. **Precaution and Safeguards**
Carry out the work in a careful, secure, safe and tidy manner and take all precautions against damage whether arising from bad workmanship, breakage of machinery or plant, inefficient timbering, flooding or any other cause whatsoever. Provide, erect and maintain warning signs, temporary fences, barriers and night lights adjacent to any works such as trenches and excavations or stacks of material which could be considered a danger to persons or traffic of any kind.

   Obey all directions given with regard to the provisions of lighting and barriers, and be responsible for any accident or damage. Obtain permission from Authorities, when required, for placement of barricades.

3. **Use of Explosives**
The use of explosives will NOT be permitted.

4. **Trench Excavation**
Excavate in the form of trenches to enable various pipe lines to be constructed. Trenches shall be excavated at uniform grades and in straight lines.

   Provide adequate de-watering equipment to maintain trenches free of water. Ground water shall be pumped to discharge clear of the excavation area.

No earth, rubbish or materials shall be unnecessarily deposited upon pavements, footways or crossings.

5. **Hoisting and Removal of Spoil**
Allow to hoist spoil and remove from site.

1.33 SURFACE REINSTATEMENT

Reinstate all surfaces or make good as directed by the Principal those surfaces that are damaged or removed as part of the installation works. Reinstatement work shall be carried out so as to match the surrounding surfaces and shall be left in a condition at least equal to that in which it was prior to the installation works, including reinstatement of existing turf.

1.34 BACKFILLING

Prior to any backfilling being placed the drainage lines shall be inspected by the Principal and/or representative who, if satisfied, shall indicate that backfilling may proceed.

Placing and Cover – backfilling shall be carefully packed and consolidated by mechanical means.

All trench backfill in trafficable areas shall be consolidated with approved material to 98% modified ABASH.

All pipes shall have a minimum cover of 500mm, except where a cover of structurally designed reinforced concrete is provided.

1.35 SAW CUTTING OF EXISTING SURFACES

Saw cut existing concrete and bitumen surfaces as required to install new pipelines. Obtain approval of Structural Engineer prior to commencement of work. Break up and remove spoil from site.

1.36 EXISTING SERVICES

Determine the exact location and position of all existing services on and adjacent to site prior to commencing work.

Allow for the disconnection, alteration, sealing off, connection to or from, extension of or removal of services to maintain supply to existing buildings and fixtures.

Prior to disconnection or sealing off, or modification to any service, a thorough check shall be made on site to ensure no service which is required to be retained is adversely effected.

Prior to any site modifications, diversions and/or disconnection, provide all temporary pipes, fittings, valves and sundry items necessary to maintain supply to existing buildings.

All shutdowns and connections shall be performed in a way to ensure minimal inconvenience to the existing users.

1.37 ELECTRICAL CABLES

Prior to excavation, clearly identify the location of existing cables and services and exercise due care to ensure damage does not occur.

1.38 REDUNDANT SERVICES

Disconnect and remove redundant services and to the approval of the Authority having jurisdiction.

Report all site modifications, diversions and/or disconnections affecting the work. Provide necessary assistance for the resolution of such difficulties in conjunction with the Principal.

Prior to any site modifications, diversions and/or disconnections, provide all temporary pipes, fittings, valves and sundry items necessary to maintain the supply to the building.

1.39 RAFT SLAB SUPPORTS

Where required, support all external inground pipelines on a continuous reinforced concrete raft to the Authorities requirements or tied into the concrete slab over in accordance with AS 3500.

1.40 PENETRATIONS AND SLEEVES

Set out all work and be responsible for accurate positioning and installation of all penetrations, core holes, water stop flanges and sleeves in conjunction with the fixing of form work and/or placing of concrete, brickwork and concrete cutting or core drilling.

To prevent weakening of the building structure, all penetrations shall be approved by the Structural Engineer.

Generally all major penetrations in pipe ducts and shafts shall be purpose made to the required size and accurately positioned and supported. All others shall be core hole "Slabseal" plastic water stop assemblies accurately positioned and symmetrically provided for all pipes passing through floors.

Water stop flanges shall be provided to all pipes, plantroom sumps, roof outlets, floor wastes and pipes passing through floors and walls including basement perimeter walls, or wherever the possibility exists for water leakage. Each water stop flange shall be of the same material as the pipe served with an external diameter twice the diameter of the pipe. The flange shall be integral to the casting or welded, brazed, silver soldered or sealed as applicable.

Sleeves shall be fitted to all pipes passing through walls, floors and beams. Sleeves shall be 25mm diameter larger than the outside diameter of the pipe being served and project 50mm above finished floor level in ducts and 10mm from walls. The space between pipes and sleeves shall be caulked and sealed with an approved fire rated material.

All penetrations shall be fire rated to an equivalent rating of floor or wall. Ensure all required fire and acoustic ratings are achieved with the selected installation method.

1.41 CERTIFICATE OF FIRE STOPPING

At the conclusion of the work, provide a written guarantee that all fire stopping of penetrations have been carried out in accordance with the manufacturer's directions, and do not impair the fire resistance performance of the building element in which it is installed.

1.42 PLANT AND EQUIPMENT SUPPORT PLINTHS

All pumps, plant and equipment shall be mounted onto a correctly aligned 150mm high concrete plinth. The concrete plinth shall be supported by a 1.6mm thick galvanised steel perimeter frame complete with 45 degree bevelled edges.

1.43 BRACKETING AND SUPPORTS

a. Pipes shall be adequately supported and secured in an approved manner.

b. Pipes shall not be fixed to, supported by, or welded to other pipes.

c. Pipework must be free to move without causing stresses in the pipework or pipe joints. Where provision has been made for movement in mains, the branch lines shall be unrestrained and in the case of copper tube, annealed for a minimum of 1500 mm from the main. Where this is not achievable, some other approved provision for movement shall be made. Vertical pipes passing through floors shall be supported at maximum 2400mm centres.

d. Support all pipes with galvanised concrete inserts, channels, pipe clamps, and pipe hangers, etc., in accordance with the manufacturer's instructions and complying with the catalogue regarding spans and loads.

e. Secure all supports and necessary sanitary fixtures with "Dynabolt" or equal approved metallic anchors.

f. Power-driven fixings, wooden plugs or screw-ins shall NOT be used.

g. Fixing and supports shall generally comply with the following:

Pipe Hangers
Hangers for supporting piping shall be of rolled steel sections of minimum dimensions as follows:

Pipe Size	Hanger Dimensions
up to 65 mm	10 mm diameter
66 mm to 125 mm	12 mm diameter
126 mm to 225 mm	16 mm diameter
over 225 mm	to Australian Standard

Where vertical pipes are exposed in rooms, they shall be secured at floor and ceiling and shall have at least one intermediate support.

Span of Supports for Pipes
The distance between both horizontal and vertical pipe supports shall not exceed the following:

UPVC and HDPE Pipes	:	900mm
Stainless Steel Pipes	:	1800mm
Copper Pipes	:	1800mm
Cast Iron Pipes	:	1800mm

1.44 PAINTING AND IDENTIFICATION

Except where otherwise specified or directed all internal exposed piping throughout, adjacent to plumbing fixtures including traps and fittings shall be chromium plated. Where exposed pipes pass through a finished wall, floor or ceiling they shall be fitted with approved chromium plate.

All piping shall be cleaned free of cement droppings, etc. All piping shall be provided with a 450 mm long colour band to the requirements of AS 1345.

Colour bands shall be at a maximum of 3000 mm centres. Fit markers at all colour bands similar to "3M Safetyman" manufacture or approved equal.

Markers shall nominate type of service and direction of pipe flow.

Additional markers are to be installed:

a. on both sides of wall or partition through which a pipe passes;

b. adjacent to tees, valves, outlets, pumps, etc;

c. on both legs of a bend;

d. on both sides of a pipe which can be approached from two or more directions;

e. on pipes at the inlet and outlet of each piece of plant equipment;

f. on riser pipes at each floor level.

Valves are to be labelled with a circular plate of traffolyte material engraved with their respective function and mounted in an approved manner on top of valve spindles with brass ring.

The service colour coding shall be:

Item	Colour (AS 1345 - 1985)
Soil Wastes + Vents & Rising Main	Black
Stormwater Drainage & Rising Main	Dark Admiralty Grey No. 632
Landscape Drainage	Smoke Grey No. 692

Cold Water	Emerald Green No. 220
Hot Water Flow	Brilliant Green No. 221
Hot Water Return	Eau-de-nil No. 216
Gas	Yellow Ochre
Fire Services	Signal Red No. 537
Bracketing	To match pipe it is supporting

1.45 TESTING

All tests set out in the specification or as required by the respective governing Authority shall be carried out to approval. Supply all plugs, apparatus and sundries necessary for the test. Enclosed work shall not be covered or concealed from view until it has been inspected, tested and approved.

On completion, all works shall be tested under normal working conditions, in accordance with the Authority's requirements and as may be further directed to prove compliance with the specified requirements of the works. All defects are to be remedied immediately and the test reapplied until a satisfactory result is obtained.

Sanitary Plumbing	-	Hydrostatic Test
Water Services	-	Hydrostatic Test Up to 2100 kPa
Gas Service	-	Inert Gas Hydrostatic Test

All test results shall be recorded and made available at the site office upon request.

1.46 C.C.T.V.

On completion all drainage shall be C.C.T.V. surveyed and two (2) video copies of this survey shall be provided in V.H.S. format to the Contract Administrator for review complete with a locality drawing with each video section clearly marked for cross reference.

1.47 SURVEY

On completion provide an "As Built" Drawing from a registered surveyor of the installed stormwater drainage pipe system and certifying pipe sizes, invert levels and capacities meet with the Authorities' requirements.

1.48 CHASES AND ENCASING

All internal walls are face brick and shall not be chased unless approval has been requested and approved. Obtain approval of Structural Engineer prior to commencement of work.

Cut all chases with a mechanical saw. Do not chase reinforced concrete work without approval.

Pipes chased into masonry or encased in concrete shall not cross any movement joint and shall be insulated so that expansion and contraction can take place without damage to the pipe or to the material or surface finish of the surrounding element.

All wall chases shall be vertical, horizontal chases not permitted.

Conduit pipes encased in concrete shall have a minimum cover of 25mm of concrete and shall be in continuous lengths without fittings unless the fittings are permanently accessible.

Refill chased cavities with 2:1 cement mortar mix or approved equal after pipe has been installed.

1.49 ACCESS DOORS, DUCTS AND OPENINGS

All access doors, ducts and openings are to be checked to ensure their correct size and location and to ascertain they meet the local Authorities' requirements.

Prior to installation, coordinate actual sizes and locations of all access panels and openings.

1.50 DISSIMILAR METALS

Special care shall be taken to avoid contact of dissimilar materials likely to cause corrosion. Separate all pipes from dissimilar metal bracketing with a 3mm thick rubber strip or similar approval material. Adhesive tape will not be accepted.

1.51 CAPPING OFF

During construction, temporarily seal floor wastes, open ends of pipes and valves to prevent the entry of foreign matter into pipe systems. Provide fitted covers of pressed steel or plastic. Do not use rags, paper or wood plugs.

DRAINAGE SYSTEMS

2.1 EXTENT OF WORK

The work specified in this section comprises the modification, supply, installation and testing of the various drainage systems including all necessary accessories, testing and commissioning of the systems.

The work includes the supply of all necessary fittings, inspection openings, and sundry items including dewatering of the ground. Make any necessary application to the Authorities and pay all fees and charges associated with the installation, testing and supervision of the work.

Sanitary Drainage System – comprises connection and extension from the existing sewer drainage to all fixtures and fittings.

Trade Waste Drainage System – comprises pre-treatment structures such as grease arrestor, general purpose pit, dilution pit including HDPE pipe drains and vent pipes.

Stormwater Drainage System – comprises connection to stormwater drainage system and reticulation.

Subsoil Drainage – comprises the supply and installation of a system of perforated pipes and fittings laid in blue metal backfilled trench excavations. The system shall relieve ground water pressure from structures and roads.

2.2 MATERIAL SCHEDULE

Pipes and fittings shall be in materials as follows:-

Service	*Size*	*Material*
Sanitary Drainage (Gravity)	100 – 150	P.V.C. (DWV). Solvent welded UPVC under building and rubber ring jointed UPVC for external sewer main drains. Exposed waste pipework to be copper and chrome plated.
Trade Waste Drainage including drains from food technology, art science laboratories and photography rooms	100	Sewer Grade HDPE pipe and fittings all jointed with electrofusion socket fittings. Exposed waste pipework to be copper and chrome plated.
Stormwater Drainage	100 – 225	PVC
Stormwater Drainage	300 and Over	FRC Class 2
Sub-Soil Drainage	100	UPVC/FRC
Sub-Soil Drainage (>1m deep)	100	VCP/FRC/UPVC (water main quality)

2.3 P.V.C. PIPES AND FITTINGS

Pipes and fittings shall be P.V.C. (DWV) sewer quality and shall conform to the Authorities' requirements having jurisdiction and to AS 1260, AS 1462, and AS 2032.

2.4 REINFORCED CONCRETE PIPES

Reinforced concrete pipes shall conform to AS 1342, AS 3725 and AS 4058 Precast Concrete Drainage Pipes. All concrete pipes shall be spigot and socket type and be fitted with rubber joint rings. The pipes are to be of the class specified on the approved drawings or Class 3 if not so specified.

2.5 POLYETHYLENE (HDPE) PIPES AND FITTINGS

HDPE pipe and fittings for gravity sewer or trade waste drainage shall be sewer grade jointed with electro-fusion socket type fittings.

2.6 SUBSOIL PIPES

Subsoil drainage pipelines shall be constructed using 100mm perforated pipes and shall be jointed with solvent cement. Horizontal branches shall be made at 45 degrees to the main line.

All subsoil pipes shall be complete with 150 mm thickness of blue metal aggregate. Fully wrap the blue metal back fill with continuous "Geofabric" material (Geofabric Australia Pty Ltd manufacture Bidim A14) or approved equal complete with a minimum 250mm overlap at all joins.

Sub soil drainage pipes shall be installed with invert of pipe at high end 500 mm below finished floor of building to adjacent pavement and then slope at 1% gradient.

2.7 FIBRE REINFORCED CEMENT (FRC) PIPES AND FITTINGS (STORMWATER)

FRC Pipes and fittings shall be manufactured and tested in accordance with Australian Standard AS 4139 -1993, fibre reinforced concrete pipes and fittings. FRC pipes and fittings for stormwater systems in locations other than under roads or parking areas shall be Class 2. Where pipes and fittings are located under roads or parking areas they shall be Class 3.

JOINTING: FRC pipes and fittings shall be jointed using Adcol rubber rings as manufactured by James Hardie FRC Pipes. FRC pipes and fittings are to be tested and shall bear the Australian Standards stamp.

The pipes are to be installed with bedding, side support and refill material over the pipes and fittings, in accordance with Australian Standard AS 3725 "Loads on Buried Concrete Pipes.

2.8 RAINWATER OUTLETS (RO)

Location	*Model*	*Body Material*	*Grate Finish*
Paved Areas	SPS Model Q200N/100C (100mm outlet) Q200N/150C (150mm outlet)	Cast Iron	Finished Nickel-Bronze 200mm square
Planter Boxes	SPS Model TIA100F2 (100mm outlet)	Cast Iron	Galvanised Cast Iron Flat

2.9 DRAINAGE TURN UPS

Each D.T.U. shall consist of a UPVC plastic to clay pipe adaptor fitting.

Install drainage turn up in spoon drains by terminating pipe collar at the invert of the spoon drain. Cast aluminium grates are to be provided in each drainage turn up.

Encase drainage turn up riser in 150mm thickness concrete surround.

2.10 DOWNPIPE CONNECTORS TO STORMATER DRAINAGE

The drainage turn up shall be of the same diameter as the down pipe. Provide drainage turn up directly under down pipe terminating with VCP to UPVC adaptor and with loose aluminium grate inside. Downpipe shall terminate directly over grate with adequate clearance for the removal of loose grate.

2.11 STORMWATER PITS, STORMWATER SUMPS, STORMWATER KERB ENTRY PITS, STORMWATER GRATED DRAINS AND OTHER INGROUND STRUCTURES

Kerb entry lintels shall be equal to "Beresford Concrete" manufacture, steel reinforced precast one piece kerb entry unit (Order Code: KEU 01200) with entry opening length of 1200mm (overall length 1500mm) complete with galvanised lintel bar.

Kerb entry lintels located over pit 1200mm or greater shall be specially designed and certified by manufacturer for required wheel loadings. Submit manufacturer's certification to Hydraulic Engineer and include within Maintenance Manuals. Stormwater pits located under lintels shall be minimum 900 x 900 unless noted otherwise and shall conform to the Australian Standards for minimum internal dimensions.

Alternative insitu construction of stormwater pits shall be complete with 150mm thickness reinforced concrete and subject to approval from a Structural Engineer.

Where pipes join pits cut holes with mechanical saw both sides of the wall. Do not hammer out with percussion blows, so that wall faces are fractured and reinforcement exposed.

After pipes have been positioned in the side of pit walls fill gaps with 2:1 cement mortar mix fully around pipes for the full thickness of pit walls.

Allow packing between underside of KEU's and top of storm water pits with 2:1 cement mortar for entire pit wall thickness so that the KEU's achieve the matching heights required by adjacent kerbs.

Final reduced levels shall be confirmed with the Architect and Civil Engineer. Coordinate between all disciplines for final level and position. Each kerb inlet unit shall be positioned to match adjoining kerb levels.

Kerb inlet pit grates shall be 900 x 450mm (plan dimension) galvanised steel complete with galvanised steel frame surround, be hinged bolt down and push bike safe type:

Model WG6	-	suitable for buses and truck wheel loads
Model WG5	-	in locations nominated as non bus/truck routes

DUTY OF GRATES AND FRAMES: Duty of grates and frames shall be;

-	Class A	Internal pedestrian precincts only. No vehicular traffic
-	Class B	External areas including footpaths, footways, light vehicular only
-	Class D	Cars, trucks (highway traffic) and commercial vehicular traffic
-	Class E	Heavy duty forklifts and earthmoving equipment.

BENCHING
Bench the base within each stormwater pit so that a formed channel is created from one side of pipe entry to outlet pipe or from side of pits to outlet pipe. Top of benching at pit sides shall be equal to centreline of out going pipe. Material for benching shall be concrete.

SUBSOIL DRAINAGE AROUND PITS
Provide and install 100mm diameter subsoil drainage for 2m upstream of storm water drainage connection to concrete pit structures. Incorporate subsoil drainage through wall of pits.

2.12 TUNDISHES

Provide 50 x 40 (unless noted otherwise) chrome plated copper concentric reducers complete with pipe drainage connection to the sewer drainage system.

Tundishes shall be chrome plated complete with screwed outlet and cover dome at wall and floor penetrations.

All tundishes are to be located so they are not subject to mechanical damage.

2.13 GRAVEL DRAINS

Excavate behind each set down wall for a horizontal distance of 600mm and to a depth of 200mm below the invert of sub-soil drainage pipes.

Lay sub soil drainage pipes and fittings in the trench complete with 20mm x 20mm blue metal surround backfill to the underside of floor slab or ground surface. Fully wrap the blue metal backfill with continuous "Geofabric" material (Geofabric Australia Pty Ltd manufacture Bidim A24 or approved equal) complete with a minimum 250mm overlap at all joins.

2.14 DRAINAGE CELLS

Provide and install drainage cell for use vertically behind walls, extending for full height of wall to ground level. Drainage cell shall be Atlantis Drainage Cell System 40mm thick pre-wrapped with Bidum 14 geotextile fabric front and back. Fixing to be in accordance with manufacturer's recommendation.

Overlap geotextile minimum 300mm and ensure geo fabric is turned up at edges and tape sealed.

PLANTER DRAINAGE CELL: Drainage cell for use in planter areas shall be Atlantis Drainage Cell System 15mm thick pre-wrapped with Bidum 14 geotextile fabric top and bottom.

2.15 PIPES AND FITTINGS

All pipes and fittings shall conform to the Authorities' requirements and to the Australian Standards.

2.16 TRENCHES

Trenches for drains shall be parallel with the design invert of the drains. Additional material below the bottom of the drain shall be excavated as necessary to provide the required bedding conditions. Trenches shall be excavated to such width as to provide a minimum space of 150mm between the innermost face of the trench and the outside edge of the drain. Where collared pipes are used, the width shall not exceed 1.4 times the external diameter of the pipe plus 300mm.

2.17 TERMITE PROTECTION

Provide at each drainage bend which extends from ground vertically through concrete slabs above ground, a 150mm surround of "GRANITE GUARD' termite prevention. The protection shall extend from 100mm below invert level of bends to earth surface.

Where drainage pipe work turns into soil from an on ground concrete slab in these cases provide 'GRANITE GUARD" termite prevention to all pipe turn-ups.

2.18 PIPE BEDDING

a. **Sewer Drainage** - pipes shall be laid on a bed of uniform crushed hard stone or blue metal with maximum aggregate of not less than 75mm depth below the barrel of the pipe and extend for the full width of the trench all to the requirements of the Sydney Water Corporation and AS 3500.2.

b. **Stormwater and Sub Soil Drainage** - stormwater pipework shall be laid on a continuous underlay of 20mm aggregate, not less than 100mm thick after compaction. Grade the under-lay to the required gradient of the pipeline. The blue metal shall be extended to a minimum 150mm above the collar of the pipe. Blue metal pipe surround shall be wrapped with "Geofabric" type material for the full length of the trench. Overlap joints a minimum of 300mm.

2.19 PIPE LAYING

General - all drains shall be laid and jointed accurately to lines, grades and levels. All pipes shall be laid so that the pipe barrels and box drain bases have solid bearing throughout their length.

Setting out - all pipes shall be set out and laid so that the intersection of the centreline (in the plan view) occurs at the downstream pit face.

Unless otherwise approved, laying shall commence at the low points of the drainage line and proceed uphill, with the spigot end of the pipe located downstream from the socket end.

Jointing - All pipes fitted with approved rubber joint rings shall be installed to the manufacturer's specifications.

Spacing - the distance between pipes in multiple pipelines shall be at least one third (1/3) the external diameter of the pipe, or 300mm, whichever is the greater.

2.20 BACKFILLING

Inspections - prior to any backfilling being placed the drainage lines shall be inspected by the Construction Manager's representative who, if satisfied, shall indicate that backfilling may proceed.

All pipes shall have a minimum cover of 300mm, except where a cover of structurally designed reinforced concrete is provided.

2.21 DRAINAGE PIPES PASSING THROUGH CONCRETE GROUND BEAMS

Where drainage pipes pass through concrete ground beams install the pipes after footing trench is dug then provide and install Bradford white polystyrene sectional pipe insulation (telephone Bradford 02 9735 1480) over the pipe. Insulation shall be 25 mm thickness and shall be provided in two (2) SEMI CIRCULAR HALVES. Insulation shall extend 100 mm past concrete ground beams each side. Tape along joints with 75 mm reinforced tape.

2.22 RAFT SLAB SUPPORTS

All sanitary and trade waste drainage pipelines located on unstable ground shall be fully supported on a continuous reinforced concrete raft suspended from structural slab over, or supported on a sub base certified by a qualified engineer, as required, to the Authorities' requirements all in accordance with AS 3500.

2.23 USE OF CONCRETE

Provide 20 Mpa concrete not less than 100mm thick with exposed surface cement rendered as follows:-

a. around pipes and fittings as required by the regulatory Authority.
b. around and under traps and gullies.
c. around exposed pipes and fittings.
d. under and around bases of inclined junctions and bends.

Where regulation cover cannot be provided over drains, surround pipes with 150mm of 1:2:4 concrete.

2.24 MANHOLES AND STRUCTURES

Manholes and structures shall be equal to "Beresford" concrete. manufacture and constructed in accordance with approved precast systems to the required dimensions, depth and levels complete with approved cast iron covers and frames. Alternate insitu construction shall be complete with minimum 150mm thickness reinforced concrete and subject to approval from a Structural Engineer.

All pits and structures in paved areas shall be furnished with brass edge strips to allow paving to occur within the cover to match the surrounding finishes.

2.25 DIFFERENTIAL SETTLEMENT

To allow for future possible settlement of drainage structures such as concrete sewer access chambers and trade waste pits, the hydraulic subcontractor is to allow to install two (2) flexible rubber ring joints on each drain entering the drainage structure. These flexible joints are to be located adjacent the wall external of the structure and have a length of pipe between the two flexible joints not exceeding 600mm.

2.26 FLOOR WASTES

In positions indicated "FW" provide 100mm "P" trap floor wastes with riser extended to 100mm CP brass drainage grate set at a level to suit floor grading.

Plant drain floor wastes (PD/FW) shall be fitted with "Speciality Plumbing Services" manufacture galvanised flat and cast iron body with membrane flange.

2.27 VINYL FLOOR WASTES (VFMW)

Provide and install SPS manufacture chrome plated, all bronze model LG100 CPA, Push-in Sheet Vinyl Floor Wastes where floor wastes are in areas with vinyl floors excepting where model SS VFW is required by notation on the drawings.

2.28 BUCKET TRAP FLOOR WASTES

Bucket trap floor wastes shall be polished stainless steel as manufactured by " Speciality Plumbing Services" or equal with fixed grate under a removable bucket and grate assembly. Provide vinyl clamp to floor wastes where there are vinyl floors.

2.29 FLOOR MEMBRANE SEALING TO FLOOR WASTE RISERS

Floor waste risers (other than Plant Drain Floor Waste PLFW and Vinyl Floor waste) shall be complete with a UPVC riser. Terminate at the floor level a UPVC clay pipe to UPVC adaptor fitting finished level with rough concrete floor to allow for the floor membrane to be turned down into the collar.

2.30 SURCHARGE GULLY

The surcharge gully shall comprise of a "P" trap and removable loose grate, all at approved height above finished ground level.

2.31 CLEAROUTS

Install 100mm diameter chrome plated brass clear outs at finished floor level as necessary for rodding maintenance of the drainage lines.

Clear outs shall be extended at 60 degrees from the horizontal drainage and be chrome plated where located internally.

Where vinyl floor sheeting is laid, provide SPS manufacture, 100mm push-in sheet vinyl floor clear out.

Clear outs for sub soil drainage shall consist of UPVC DWV grade sewer socket with thread then screw on loose sewer inspection cap terminated 150mm below finished ground level.

Clearouts located in concrete pavement or brick paver shall be terminated flush with finished levels complete with UPVC bolted trap screws.

2.32 PIT COVERS AND FRAMES

Covers and frames shall be ductile iron equal to "Havestock" manufacture complete with frames set into rebates to conform with finished levels. Covers and grate shall be of adequate local rating to conform to AS 3996 and generally as follows:

Internal Pedestrian Traffic (no vehicles)	-	Class A	-	(10 kN)
Pedestrian-ways	-	Class B	-	(80kN)
Roadways/car parks	-	Class D	-	(210kN)
Heavy Duty Forklifts & Earthmoving Equipment	-	Class E	-	(400kN)

Provide brass machined edge trim strips to ALL pits located within paved and tiled areas.

Covers shall be bolt down type where any back pressure / over flow surcharge may occur or where located subject to vehicular traffic.

The alignment of these pits, with respect to the adjacent walls, finishes and patterns shall be fully coordinated on site prior to any installation proceeding.

Provide and install 100 mm subsoil drainage for 2 m upstream and 2 m downstream of same.

2.33 INLET PITS

Inlet pits and structures shall be precast type or constructed from approved 150mm thick reinforced concrete to required depths and with rebates ready to receive approved grates and frame having the required clear openings and set flush with finished concrete surface level.

2.34 GRATING AND FRAMES FOR SUMPS AND GRATED TRENCHES

Gratings shall be complete with frames and shall be C.S. 'Crouch' manufacture galvanised steel gratings and frames, each grating and frame shall be set flush with the finished surface levels. Grating sizes and type shall be as indicated on the Hydraulics Services. All gratings shall be push bicycle safe type. Each grate and or section of grating shall be bolted down.

2.35 STAINLESS STEEL GRATED TRENCHES

Where shown on the hydraulic drawings provide and install Stainless Metalcraft manufacture (Tel. 9756 4977) stainless steel gratings and frame. Each grate shall be heel guard and bicycle proof. Bolt each grating section down to frame.
Concrete trenches with rebates shall be constructed by the concreter trade.

2.36 ACO POLYCRETE GRATED CHANNELS GRATES AND FRAME

Where shown on the hydraulic drawings provide and install Aco Polycrete manufacture (Tel. 9630 2788) Model K 200S stepped channel system with bolt down galvanised steel grate and frame.

Install Polycrete formed sections on compacted 10 mm blue metal aggregate and additionally provided the same aggregate at both sides of the channel up to ground level.

2.37 HALF ROUND SPOON DRAINS

Where shown on the hydraulic drawings provide and install Hardie FRC 225 diameter half round spoon drain, aligned to an even gradient at sides of half round pipe on 75 mm thickness of 10 mm blue metal aggregate. Provide this aggregate at sides of half round pipe up to ground level.

2.38 REFLUX VALVES

Reflux valves shall be of cast iron material connecting to the drainage system located within a dedicated precast concrete reflux valve pit complete with cover and frame.

2.39 ELECTRICAL CONDUIT

Provide electrical conduits with draw wire and sufficient electrical draw pits.

2.40 VALIDATION OF STORMWATER DRAINAGE

The hydraulic services design drawings have been approved by Council. Construction of the drainage pipework system is expected to be the same as the design drawings.

On completion of the stormwater drainage system the hydraulic trade is required to engage the services of a registered surveyor to validate the following:

1. Invert levels of all drainage pipes.
2. Location, dimensions and depth all stormwater pits.

Pay fees and costs to surveyor to write onto hydraulic services design drawings all the above data, items 1 – 2 and submit to hydraulic engineers for determination of adequate compliance and recommendation for acceptance by Council.

The surveyor is required to sign the validation drawing prints.

2.41 TESTING

Supply all apparatus and materials necessary for the test and carry out all tests required by the regulatory Authorities.

Do not cover or conceal from view underground or enclosed work until it has been inspected, tested and approved by the Architect and the relevant Authority.

Apply the following tests to all sanitary, trade waste and stormwater drainage lines:

- Water test the system by hermetically sealing all openings below the top of the section to be tested and filling the section with water under a head equal to the maximum head which would result from a chokage in the section under test or three (3) times the pump head in the case of rising mains, for a period of twenty four (24) hours.

2.42 FLUSHING OUT DRAINAGE LINES

Before handover, video film record condition of drainage pipelines, wash out all storm water and sewer drainage pipelines with high-pressure water spray. Remove earth and other debris material from pits and detention structures.

2.43 RECORDS OF INGROUND DRAINAGE SYSTEMS

During construction submit progressive 'Work as Executed' drawings for all the services specified in this section, showing the locations and depths of pipes and fittings including inspection openings, pits, inverts of underground services, positions of control valves and the like. Give coordination dimensions where applicable. At the completion of the contract prepare fully detailed 'Work as Executed' drawings and maintenance manual as previously specified.

2.44 ON COMPLETION

Clear and clean the following:

- Pits
- Grated trenches
- Bottom of each floor waste 'P' trap

WATER SERVICES

3.1 EXTENT OF WORK

The work specified in this section comprises supply, installation, testing and commissioning of the potable cold water, potable hot and warm water and recycled water services.

3.2 MATERIAL SCHEDULE

Service	*Size*	*Material*
Domestic Cold Water	15 – 80 100	Copper Pipe UPVC Blue Brute Class 16. Provide green, copper wire detectable marker tape over, with words "Potable Water"
Domestic Hot and Warm Water	15 – 50	Copper Pipe
Recycled Cold Water Mains	100	Lilac vinyl iron UPVC. Provide detectable marker tape over, with words "Recycled Water Do Not Drink"
Potable Water Service Branches Chased into Masonry Walls	15 – 25	Copper Pipe with Kemlag plastic cover
Potable Water Service Branches in Stud Walls	15 – 25	Copper Pipe / Rehau XLP Pipe
Pipes Under Concrete Floor	15 – 25	Rehau XLP within flexible conduit
Exposed Water Pipes	15 – 25	Chrome plated copper tube and fittings

3.3 PIPE BEDDING AND TRENCH REFILL

Pipes shall be laid on coarse river sand 75mm depth below the pipes and extend for full width of the trench. After pipes have been installed and tested, refill trench to 100mm depth above top of pipes with coarse river sand. Compact sand and then refill trench with selected excavated material.

3.4 COPPER PIPES AND FITTINGS

Pipework

Shall be installed in a neat workmanlike manner and shall include all necessary sets and be complete with sufficient unions, flanges and isolating valves for satisfactory removal of piping and fittings for maintenance or repairs, whether or not such items are shown on the drawings or specified.

In addition to general provisions for installation of copper pipe, pipes shall be fixed in continuous lengths wherever practicable and bent at changes of direction in preference to using fittings.

Copper Tube

Shall conform to Australian Standard AS 1432 Type B.

Joints

Braze copper and brass with silver brazing alloy containing not less than 5% silver. Use oxy-acetylene heating for all brazing.

Where copper to copper joints are made the pipe shall be softened and expanded with a proper tool to form a slip joint to the following table.

Nominal Pipe Size	Length of Slip Joint
15mm to 20mm	9mm
25mm to 32mm	12mm
40mm to 50mm	15mm
40mm to 65mm	15mm
65mm to 150mm	20mm

Fittings

Manufactured fittings shall be of approved type either non-dezinctifiable brass or correctly formed large radius copper refrigeration type with long socketed enlargements approved by the Authorities having a wall thickness not less than the piping material being served.

Where branches of smaller size from main pipe occur, "T" joints shall be drilled, softened and flared to form a slip joint of at least 9mm.

Flushing
Water mains and water services shall be flushed as thoroughly as possible with the water pressure and outlets available. Flushing shall be done after the pressure test has been carried out.

3.5 CROSS LINKED HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS (PE-X)

Requirements: Cross linked polyethylene pipe and fittings (PE-X) for hot and cold water system, shall be first quality and in accordance with AS 2492.

Water Services Pipes:	Not less than Class 20 to AS 3500
Fittings:	Brass Dezincification Resistant to AS 3688.
Jointing Method:	As per manufacturer's instructions.
Tube in Concrete Slabs:	Tubes which are to be installed within concrete slabs are to be installed in conduits and shall comply with the requirements of the appropriate building authority (AS 3500).
Conduits:	100 diameter sewer grade UPVC with two (2) 45^{0} bends at each end turn-up point.
Prohibited Areas:	Cross Linked Polyethylene will not be used in areas as specified in AS 3500.

3.6 WATERMAIN TAPPING BANDS

Provide and install 25 mm diameter BSP off take size, bronze tapping bands for branch off takes from potable and recycled water mains. Drill hole in UPVC water main pipes.

3.7 WATER CONNECTIONS TO BASINS AND SINKS

Provide and install 15mm BSP brass male thread at the wall for both cold and hot water points.

Provide and install chromium plated cover plate at wall for cold and hot water points.

Provide and install approved stainless steel braided flexible connector, "Aquaconnect" or equal.

Cold and hot water connections to wall basins shall be carried out with annealed, 15mm diameter, chromium plated Type B copper tube. Join the tube to fitting threads at the wall and at the tap sets complete with chromium plated brass kinco nuts and formed Kinco Knurl ("olives" connection shall not be used)

3.8 COVER DOMES

Cover domes are to be a snug fit around the pipe of which they surround, sit hard against the wall or floor and be chrome plated.

3.9 FLANGES AND UNIONS

Disconnecting unions shall be utilized to connect pipework up to 50mm diameter and flanges are to be utilized to connect pipework (50mm diameter and larger) to items of valves, plant and equipment, so all plant and valves can be easily removed and maintained.

3.10 PRESSURE GAUGES

Gauges shall be K.D.G. type. The faces on the gauges shall be 100 mm diameter. Gauges shall be graduated in metres head and kilo Pascal.

Gauges shall register one-third kPa more than the maximum possible pressure obtainable from the system served.

Each gauge shall be complete with bronze ball valve and sufficient copper piping for connection to the pipe work.

3.11 FIRE HOSE REELS

Each fire hose reel shall be wall mounted with swivel hose guide complete with all fittings including globe valve and containing 36m length of 20mm internal diameter fabric reinforced nonkinking rubber hose.

The hose reel shall conform to AS 1221 complying with the type approved by the local fire brigade. The reels shall be painted and finished with the colour no. 537 Signal Red in accordance with the Australian Standards. The mounting plate shall be secured in a rigid workmanlike manner without damage to the surrounding areas in an approved manner using galvanised steel or nonferrous metal bolts or other approved fixing methods sufficient to withstand, with an adequate margin of safety the fixing test and the minimum static and dynamic loads likely to be applied to the fixing.

3.12 EXTERNAL HOSE TAPS

Provide and install Type B copper tube extended to hose tap points.

Depth of pipe work shall be 300mm minimum below finished levels.

Provide loose jumper stop tap in riser pipe to hose taps.

Hose taps shall be vandal resistant key operated rough brass finish 20mm diameter screwing size.

Support each hose tap standpipe by securing brass back plate elbow to 100 x 50mm treated pine post concreted (minimum 150mm concrete base and surround) into the ground behind each hose tap. Secure each back plate elbow to post with three (3) round head brass screws, 25mm in length.

Supply and fix with brass screws adjacent to each recycled water hose tap an approved sign with the words "Not Suitable For Drinking" and in accordance with Authorities requirements.

Where hose taps are shown on the drawings to be fixed to external walls, provide brass back plate elbow and secure with three (3) stainless steel screws into expansion fastenings.

3.13 UNDERGROUND PIPE WARNING TAPE

Plastic warning tape 150mm wide shall be laid above all underground water service pipes. Tape shall be 100mm wide with colour to comply with AS 1345 printed with the appropriate water service words. Tape shall contain copper wire fixed each end at ground surface.

3.14 URINAL FLUSHING WATER CONSERVATION CONTROL

Urinal flushing control shall be complete with RBA Group Pty Ltd Model WMS 6 sensor control with solenoid valve and senor movement detector and transformer.

Provide ball valve and DR brass strainer before the solenoid valve.

3.15 EXPANSION BENDS AND ANCHORAGES

In lines subject to thermal expansion and contraction, provide approved pipe anchors and expansion loops or other proprietary type provisions arranged to avoid any strain on the piping system, plant and equipment.

3.16 LINE MARKING FIXING BLOCKS AND IDENTIFICATION PLATES FOR UNDERGROUND PIPE WORK SERVICES

Provide and install Line Marking Fixing Blocks and Identification Plates for Underground Cold Water pipe work. Different identification plates shall be provided for each water service. Plates shall be 100mm x 100mm x 3mm thick stainless steel screw fixed to concrete with stainless steel expansion fastenings. Engrave details onto plates.

3.17 INSULATION

Insulate pipe works generally as detailed hereunder.

All hot water piping concealed in ducts and ceilings spaces shall be insulated with 25mm thickness Thermotec 4 Zero type sectional lagging incorporating aluminium foil wrap and overlap secured as below and to approval.

All water, hot water and warm water piping concealed in brickwork shall be insulated with expanded vinyl equal to "Kembla" or "Crane" Prelag. Over wrap all joints to approval.

Prior to application of insulation materials, all surfaces shall be thoroughly cleaned to remove scale, grease, oil, dirt and any other foreign matter, and where subject to condensation shall be protected against corrosion. All insulation material shall be of best quality in their respective types.

Irrespective of the method of attachment, all insulating materials shall be in close contact with the surfaces to which they are applied. Where performed sectional insulation is used, the edges and ends of sections shall be arranged to butt up close to one another over the whole insulated surface. Edges or ends of section shall be cut or shaped at site where necessary.

Pre-formed sections shall be complete with a sisal covering connected to the entire external surface. The covering shall be installed to provide a lap of not less than 25mm at all longitudinal and circumferential joints. The insulation thus applied shall be further secured with bands of non-corrosive metal. Metal bands shall be not less than 19mm wide, installed generally on 450mm centres and at all points where insulation has been cut or shaped.

At flanges, valves and other similar connections, the insulation shall be bevelled and cut back to provide adequate access to bolts and fittings. Valves, flanges and unions, are not required to be insulated.

No insulation shall be applied prior to pressure testing of the respective parts of the installation. Insulation shall be applied in an approved manner.

Approved wood blocks, the same external diameter as the insulation material shall be provided at all bracket points. The blocks shall be in two halves and shall be a minimum of 25mm wide.

3.18 VALVES

All valves shall be have "Standards Mark" certified to the relevant Australian Standard and compliant to MP52 Specification.

All valves installed in hot water or heating water systems shall be bronze for all pipe sizes.

Valves up to and including 80mm diameter shall be all bronze. Valves 150mm or over may be cast iron with bronze trim, excepting when installed in hot water or heating water pipelines, in which case they shall be 100% bronze or stainless steel.

Valves to pump connections, main branch lines and outlet positions shall be butterfly type.

Valves shall be tested to a pressure of 2,100 kPa by and approved testing Authority.

A. **FLANGED VALVES**: Valves 65mm and over shall be flanged. All other valves shall be screwed complete with union connection located on the outlet side of the valve.

B. **BALANCING VALVES** shall be "Tour and Anderson" manufacture "STAD" type screwed up to 50mm in diameter and "STAF" type flanged 65mm and larger diameter.

Above ground valves shall be complete with hand wheel unless they are lever operated ball valves or butterfly valves.

C. **BRONZE SCREWED BALL VALVES**: Valves 10mm up to and including 50mm shall be either:

- Pegler Beacon Australia Fig No. 350G, 350DR, 353DK.
- All Valve Industries CIMBERIO Fig No. 11-CR 10mm to 50mm.
- Austral Engineering ISIS DZR 10mm to 80mm.

Valves to be brass construction approved for use with hot and cold water supply systems.

D. **BUTTERFLY VALVES** shall be either:

- All Valve Industries Keystone cast iron butterfly valves, wafer style to suit Table "E" flanges.

Austral Engineering Valve Butterfly Valves Fig 725 Wafer Style or 755 Lugged design, working pressure 16 bar, AS 2129 Table E, disc, 316 stainless steel, one piece shaft, square disc drive with no locating bolts on taper pins.

Components of these valves shall be manufactured from the following materials:

Body – Cast Iron
Shaft – Chrome and stainless steel
Disc – Cupro – Aluminium
Liner – E.P.D.M.

E. **BRONZE SCREWED GATE VALVES:** Bronze screwed gate valves for valves up to 50mm in diameter shall be either:
- Pegler Beacon Australia Fig No. 1070M DZR brass gate valves, 10mm to 100mm screwed.
- Austral Engineering Toyo tested AS 1628-1999 Gate and Check valves, 15mm to 100mm screwed.

F. **BRONZE FLANGED GATE VALVES**: Bronze flanged gate valves for valves from 65mm to 100mm in diameter shall be either:
- Pegler Beacon Australia Fig No. 1035E.
- Austral Engineering Braemar Fig No. T60M

G. **GLOBE VALVES**: Bronze screwed globe valves for valves up to 50mm in diameter shall be either:
- Pegler Beacon Australia Fig No. 5, GL-5BSP
- Austral Engineering Fig No. RHB-3 screwed bronze globe valves 10mm to 50mm.

H. **CAST IRON FLANGED GATE VALVES**: Cast iron flanged gate valves for 100mm diameter and above shall be local water authority approved.

I. **UNDERGROUND VALVES**: 100 diameter and above shall be local water authority approved "Sluice Valves" to AS 2638 Class 21, flanged Table F. Provide 150mm diameter UPVC pipe as riser to ground surface with hinged cast iron (SV) path box and concrete surround.

J. **CHECK VALVES**: Bronze screwed swing check valves for valve up to 40mm in diameter shall be either:
- All Valve Industries 15mm to 80mm
- Austral Engineering Fig No. C236A 15mm to 80mm screwed.

Check valves on outlet connections to all pumps to be " Mission Duo" check II. Water check: Valves style C, Fig G, 15 BMF, Bronze Alloy 952 body with Vulcanized Buna 'N' seal.

Bronze flanged wafer check valves for valves 50mm and above shall be Austral Engineering Fig No. 301E 50mm to 300mm.

With the exception of loose jumper type valves, spindles shall be non-rising type and must not project into the bore of the valve when the valve is in the fully open position. The bore shall be clear and unobstructed when in this position.

Underground loose jumper type valves shall be path taps, which shall have the bonnet locked into position with the valve body with a bronze set screw. Provide 100 diameter UPVC pipe as riser to ground surface with hinged cast iron (W) path box and concrete surround.

At project practical completion provide to the Superintendent valve keys, suitable for each kind of valve spindle head installed underground inside valve surface boxes.

Each valve key shall consist of a socket suitable to fit over the spindle head, a length of steel rod or pipe and Tee handle.

Valve keys shall be hot dip galvanised.

The internal seats and washes of the valves must be cleaned of all foreign material during installation. Any valve faces or seats found damaged on completion of the installation shall be replaced.

3.19 PATH BOXES

Valves located below ground shall be supplied with cast iron path boxes complete with hinged lid to allow for later access and clearly marked for their respective service type complete with 150mm P.V.C. riser conduit from valve spindle and bedded in minimum 150mm concrete base and surround to finish flush with finished ground or paving level. Maintain 75mm minimum clearance between the top of the valve spindle and the underside of the lid of the box.

3.20 FLOW CONTROL VALVES

Supply and install the following:

- Preceding cold and hot water connection to basin taps, sink taps and laboratory tap sets fit "Conserv" mixer fixer, Model TE090. Flow rate shall be 9 litres per minute. Where wall recessed tap bodies provided with loose jumper tap washers then fit "Conserv" meter beater flow device Model No. MB045 to each tap. Where quarter turn SBA's are required fit "Conserve" meter beater flow device Model No. MB047 to each tap.

- Preceding cold water connection to water closet cisterns fit "Conserv" mixer fixer, Model AF050 Wisperloo screwed to outlet of each right-angled cistern tap. Flow rate shall be 6 litres per minute.

- Provide demonstration taps and fit with specified flow control device. Allow in tender to substitute a different flow rate control device if the specified flow rate is considered inadequate. Do this without incurring a cost variation to the project.

  Availability – Conserv Pty Limited Tel (07) 3856 4411.

3.21 REDUCED PRESSURE ZONE VALVES INSTALLED OUTSIDE BUILDINGS

Reduced Pressure Zone Device Valves shall be of the following manufacture and Code Number, complete with stainless steel chain formed from 6mm diameter rod and 50mm bronze Lockwood padlocks, all keyed alike.

PIPE SIZE	CODE	DESCRIPTION
15 – 50mm	VT RPZ98	Keystone Tyco screwed RPZD with two (2) bronze ball valves and strainer.
65 – 100mm	VT RPZE	Keystone Tyco flanged RPZD with two (2) butterfly valves and strainer.

In all cases the diameter of the valves shall be the same as the diameter of the incoming water service.

3.22 REDUCED PRESSURE ZONE DEVICES, VALVE CONTROL GROUPS - RPZD/VCG

Reduced pressure zone assemblies (RPZ) shall be Enware manufacture complete with:

- Model Code ZBP 2500 dual RP3

- Special stainless steel box enclosure.

- Tray drain: a 80 x 50 CP copper reducer with 50mm CP copper trap.

- Screw fixed signage on cover of box:
  "This valve requires regular service by a qualified tradesperson"

- Metal disc with valve number engraved fixed to inside box on back wall.

Test and certify all RPZD installations.

3.23 THERMOSTATIC MIXING VALVES / VALVE CONTROL GROUPS (TMV/VCG)

Thermostatic mixing valves (TMV) shall be Enware manufacture complete with:

- Code ATMS 7000 BS Aqua Blend 1500, 4 points with valve control group TMV/VCG.
- Special stainless steel box enclosure.
- Box cover epoxy paint coated by Enware to colour selected by Architect from the Dulux colour range.
- Provide screw fixed signage on cover of box, "Thermostatic Mixing Valve, this valve requires regular servicing by a qualified tradesperson". Submit sample for approval.
- Metal disc with valve number engraved and fixed to inside box on back wall.
- As the boxes are 70mm deep then cut brickwork with masonary chasing machine to this depth.

3.24 PIPEWORK PROTECTION

Install all external, inground copper pipework in polyethylene green sleeve protection bag conforming to AS 3680 with joints lapped 600mm and tape sealed.

3.25 WATER HEATERS - MAINS PRESSURE, ELECTRIC

Mains pressure electric water heater shall be complete with:

- Pipework connections, ball valves, check valves, pressure relief valve, copper relief drain to DTU and unions at each pipe connection.
- Relief drain terminated 25mm above drainage turn-up or 100mm above ground if outside the building.
- TP & R valve fitted and checked for correct operation.
- "Pressure Limiting Valve" in cold water supply when water pressure is over 500 kPa.
- Copper safe tray manufactured from 0.6mm copper sheet and with joints soft soldered. Fold upper edge of sides to form safety edge. Provide 50mm drain outlet in one corner discharging over drainage turn-up.
- A "Baytak" manufacture polypropylene heater base of the type end appropriate diameter for the diameter of heater cylinder positioned under each heater and within safe tray.

3.26 WATER HEATERS - SINGLE PHASE INSTANTANEOUS

Single phase instantaneous water heaters shall be STIEBEL ELTRON manufacture Model DHC8 single-phase instantaneous water heaters. Relief drains are not required.

Electrical Connection: 9.6kW, 40Amps, 240V.

3.27 WATER HEATERS – OPEN VENTED TYPE

Open vented water heaters shall be STIEBEL ELTRON (AUST) PTY LTD manufacture push through water heater complete with specially designed and manufactured open vented single lever taps in accordance with the following schedule: -

Basins	Hot water heater model SNU 5 S installed under side of basin. Fit basin with Model MEW Single Lever Basin Mixter tap.
Sinks	Hot water heater model SNU 10 S installed in cupboard under sink. Fit sink with Model MES Single Lever Sink Mixter tap.

Electrical requirements for each hot water heater is 2kW plugged into an adjacent 240V GPO.

3.28 WATER HEATERS – INSTANTANEOUS GAS

Provide and install two (2) Rinnai instantaneous, liquefied petroleum gas fired water heaters.

Unit 1 Specialist Block A1
Rinnai Infinity V – Series 32 external with RBOX02 with RBOX02F semi recessed frame installed 1500mm above ground level to underside of heater and minimum of 1500 horizontally from openings in wall.

3.29 LINE MARKING FIXING BLOCKS AND IDENTIFICATION

Provide and install line marking fixing blocks and identification plates for underground pipe work. Different identification plates shall be provided for each water service. Plates shall be 3mm thick stainless steel screw fixed to concrete with stainless steel expansion fastenings. Engrave details onto plates.

3.30 THRUST BLOCKS

Provide and install concrete thrust blocks constructed in a wedge shape set into the trench sides and base a minimum of 150mm, with sufficient anchorage to adequately prevent movement of pipework due to the effects of water pressure and water hammer.

Install thrust blocks in the following locations:
- changes of direction.
- changes in pipe size in the direction of the smaller pipe.

SANITARY PLUMBING SYSTEMS

4.1 EXTENT OF WORK

The work specified in this section comprises the design, supply installation testing and commissioning of the soil, waste and vent pipes and including all bends, offsets, branches, brackets and other items necessary to complete the installation.

The work shall commence from the point of connection to the sanitary drainage system, and shall be carried out as hereunder scheduled and to the satisfaction of the Authorities.

4.2 MATERIAL SCHEDULE

Pipes and fittings shall be in materials as follows:-

Service	*Size*	*Material*
Soil wastes and vents	100 – 150	PVC
Waste pipes and vents	32 – 80	PVC
Food Technology, Science Laboratories and Photographic waste and vent pipes	50 - 100	HDPE with electrofusion socket fittings and traps

4.3 P.V.C. PIPES AND FITTINGS

P.V.C. pipes and fittings shall be approved manufacture "DWV" Class comply with AS 1260 Parts 1–5.

Pipes and fittings shall be jointed by using approved solvent welded joints.

All workmanship and materials used shall comply with all local conditions and regulations imposed and/or required by the local Authorities having jurisdiction.

4.4 GRADIENTS

Soil and waste pipes shall be installed at the minimum gradients approved by the Authorities.

4.5 EXPANSION JOINTS

Expansion joints shall be provided at intervals to comply with Authorities' requirements and in positions to prevent stress in pipework. Provide expansion joints between fixed points more than 2m apart and at a minimum of 6m centres where there are not fixed points.

4.6 INSPECTION OPENINGS AND GATES

Inspection openings shall be provided and built in so that each section of pipework is accessible in at least one direction all in accordance with AS 3500.

Provide 100 diameter testing gates at the foot of each stack and stack offset.

Locations of all inspection openings to be co-ordinated and then approved by the Architect.

4.7 FIXTURE TRAPS

Wherever possible fixtures shall have integral traps. Concealed traps shall be polypropylene, Universal "S" or "P" type and have self-cleaning characteristics, and be of the same size as the outlet of the fitting. Fixture traps shall have a 75mm deep seal.

Basin traps shall be 40 diameter chrome plated copper 'P' trap with 40 waste pipe in wall.

All waste pipes concealed within brickwork or concrete shall be insulated with expanded vinyl equal to Kemlag or Prelag. Over-wrap all joints to approval.

4.8 TUNDISHES

Where indicated on the hydraulic services drawings provide and install 50 x 40mm chrome plated copper reducer tundishes with pipe drainage connected to the sanitary plumbing system. Provide where indicated on the hydraulic drawings chrome plated tundishes of a larger size.

4.9 RECESSED TUNDISHES (RTD)

Where indicated on the drawings by symbol RTD provide and install Mod-Tec in wall tundish manufactured from 316 Grade Stainless Steel. Code No. IWT SS standard IW tundish. Available from DORMIC Pty Ltd, 63A Hunter Street, Hornsby NSW 2077, telephone (02) 9630 1527.

4.10 FLOOR WASTES

Floor wastes shall comprise 100 diameter gullies, complete with chrome plated brass grate set at a level to ensure correct drainage of floor areas. 80mm diameter floor waste risers are not acceptable. Provide UPVC finishing collar at rough floor level to receive membrane.

Provide and install 100 mm diameter stainless steel floor grate "Stainless Metal Craft" Model FW – 4 manufacture removable grate where indicated on drawings (Tel. 02 9756 4977).

4.11 VINYL FLOOR WASTE (VFW)

Provide and install SPS manufacture chrome plated, all bronze model LG100 CPA, Push-in Sheet vinyl floor wastes where floor wastes are in areas with vinyl floors excepting where Model SS VFW is required by notation on the drawings.

4.12 ACOUSTIC INSULATION

Supply and install acoustic pipe insulation 25mm wall thickness in preformed sections or flat sheets formed to shape (Insulwrap Suppressor or equal).

Acoustic Insulation shall be applied to the manufacturers specification. The minimum overlap of the pressure sensitive reinforced aluminium foil tape is 50mm. The Acoustic Insulation shall be fitted as a one piece preformed section or where required flat sheets cut to size and wrapped completely around fittings and sealed with pressure sensitive reinforced aluminium foil tape with a minimum width of 75mm.

4.13 VENT TERMINATIONS

All vents passing through roofs shall be fitted with neoprene rubber waterproof seal. The flashings shall be clamped to the pipe with a stainless steel band and fixed to the roofing material with an aluminium steel plate.

Provide over flashing, neatly dressed down and formed to shape to provide not less than 50mm cover to the sleeve extending from the roof.

All exposed vents shall be P.V.C. and provided with a cowl.

4.14 ON COMPLETION

On completion flush and remove all debris within the systems, remove all external labels and polish all chrome plated finish to remove any marks.

Clear all drainage lines with suitable automatic drain cleaning machine to ensure blockages will not occur prior or during the twelve (12) months warranty period.

Maintain the entire plumbing system during the first twelve (12) months of operation after Practical Completion including attendances should problems arise through blockages in the piping system.

SANITARY WARE APPLIANCES TAPWARE AND GAS OUTLET SCHEDULE

5.1 SANITARY WARE, APPLIANCES TAPWARE AND GAS OUTLET SCHEDULE

Provide and install the sanitary ware, appliances, tapware and gas outlets.

FIXTURE / LOCATION	MAKE / MODEL	
Water Closet Student Toilets & Staff Toilets Male & Female Maintenance Building	Make: Model: Colour: Tapware: Cistern:	Caroma Trident Sovereign 2000 dual flush with Pedigree seat White pan/cistern, double flap white seat Enware VP 303, finished in bright chromium plate Caroma Vitreous China "Vandal Resistant Sovereign 2000"
Wall Basins Student Toilets Male & Female	Make: Model: Colour: Tapware:	Caroma Concorde 500 with 1 taphole White "PRESTO 605 S Security" hob mounted chrome plated, push button taps incorporating automatic time delay shut off 15 seconds. Provide blue indicators Ref. 34612. Tap available from Thornwaite Technologies – Telephone: 9417 4466
Wall Basins Staff Toilets Male & Female, Laundry, Food Tech	Make: Model: Colour: Tapware:	Caroma Concorde 500 with 1 taphole White Mattsson Basin Mixer, chrome plated. Connect to cold and warm water. Provide blue and yellow indicators.
Wall Basin Maintenance Building	Make: Model: Colour: Tapware:	Caroma Flora 500 with 1 taphole White Mattsson Basin Mixer, chrome plated. Connect to cold and warm water. Provide blue and yellow indicators.
Shower Maintenance Building	Model:	Mattsson shower mixer with Enware SP263 all directional shower. Connect to warm and cold water. Provide yellow and blue indicators.
Drinking Trough	Make: Bubblers:	2240 long stainless steel drinking trough, PWD Wallsend pattern complete with assembly. Stainless steel splashback as per standard Dept. of Public Works and Services drawings. Measure on site and confirm with Architect before ordering. Five (5) x Enware BUB224 per 1800 long trough complete with fountain tap and guard, adjustable body regular Type 48 with spring cam action and vandal proof school pattern handle all finished in bright chromium plate installed at 450 centres.
Double Bowl Laundry Tub	Make: Fixture: Tapware:	Britex (Telephone: 9531 2100) stainless steel 70 litre double tub unit with stainless steel cabinet and doors. Special product Model DBLC-C1. Provide 1 taphole in top of tub flange for each compartment. Two (2) x Mattsson CP mixer tap, single level, for single sink. Connect hot and cold to cold water. Provide blue indicators.
Single Bowl Laundry Tub Washing Machine	Make: Model: Tapware: Tapware:	Britex (Telephone: 9531 2100). Model 45 litre stainless steel tub and stainless steel cabinet with rinse bypass. Mattsson CP mixer, single lever tap. Connect to hot and cold water. Provide Red and Blue Indicators. Enware hot and cold Model VP 313 washing machine taps. Connect to hot and cold water. Provide red and blue Indicators.

FIXTURE / LOCATION	MAKE / MODEL	
Safety Shower and Eyewash	Make: Model:	Enware EC240 free standing hand operated shower and eye/face wash
Internal Hose Taps	Tapware:	20mm in diameter Enware VPK351C with loose key handle all finished in bright chromium plate.
External Hose Taps	Tapware:	Enware VPK355, 20mm diameter with loose key handle, brass. Fix with stainless steel screws to structure.
Laboratory Sinks	Make: Tapware: Gas Valves:	"To be supplied as part of Joinery Contractors works" as required by Dept. of Public Works and Services drawings as specified by Architect. Enware LF109 laboratory outlet type 16, fixed swan neck, spout with 150mm outreach, all finished in bright chromium plate with aerator. Provide stainless steel brackets to fix outlet back to adjacent wall. Allow to remove two (2) Enware LF109 laboratory taps from kindergarten craft sinks and reinstall to laboratory sinks in Specialist Block A1. Allow to provide and install two (2) new Enware LF109 LH left handed to kindergarten craft sinks. Enware Type 40 RANR two (2) way gas turret 90° type LF128 with cut-off regulator and gas ball valve.
Sinks with Drainer in Laboratories	Make: Tapware:	"To be supplied as part of Joinery Contractors works" as required by Dept. of Public Works and Services drawings as specified by Architect. Mattsson single lever CP sink mixer. Connect to cold water. Provide blue indicator.
Food Tech Sinks	Make: Tapware:	"To be supplied as part of Joinery Contractors works" as required by Dept. of Public Works and Services drawings as specified by Architect. Mattsson single lever CP sink mixer taps. Connect to warm and cold water. Provide yellow and blue indicators.
Pantry Sink	Make: Tapware:	"To be supplied as part of Joinery Contractors works" as required by Dept. of Public Works and Services drawings as specified by Architect. Mattsson single lever CP sink mixer tap. Connect to hot and cold water. Provide red and blue indicators.
Food Technology Teachers Desk Sink	Make: Model: Tapware:	Clark 4002F with 1 taphole Mattsson single lever CP sink mixer taps. Connect to warm and cold water. Provide yellow and blue indicators.
Maintenance Building Sink	Make: Model: Tapware:	Clark 1003F with 1 taphole Mattsson single lever CP sink mixer taps. Connect to hot and cold water. Provide yellow and blue indicators.
Art Trough	Make: Model: Tapware:	Britex (Telephone: 9531 2100). CAT 120-CB Art trough PWD design wall mounted with 300mm splashback and 50mm waste with 50mm ball valve. Three (3) x Enware LF 110W type 16 wall mounted swivel gooseneck outlet with aerator. Connect to cold water. Provide blue indicator.

FIXTURE / LOCATION	MAKE / MODEL	
Art Trough with Hand Held Spray Art Classroom near Dark Room in Specialist Block B	Make: Model: Tapware:	Britex (Telephone: 9531 2100). CAT 120-CB Art trough PWD design wall mounted with 600mm splashback and 50mm waste with 50mm ball valve with 33mm hole in hob on left hand side of trough for hand held water spray. Three (3) x Enware LF 110W type 16 wall mounted swivel gooseneck outlet with aerator. Connect to cold water. Provide blue indicator One (1) x hand held water spray hob mounted Enware Model VP346 shampoo set for cold water only with right angled stop tap.
Bucket Sink Three (3) off in Specialist Block A2	Make: Model: Tapware:	Britex (Telephone: 9531 2100) 45 litre stainless steel tub with stainless steel cabinet 700mm high rim. Special product Model CS-CAB. Three (3) x Enware BUB208 bib taps to be removed from Stage 1 – Secondary Block – Science & Art Classroom and to be reinstalled in Specialist Block A2, one at each of the bucket sinks. Allow to remove three (3) bib taps from Stage 1 and provide and install to Art trough in Science and Art Classroom – Stage 1 – Secondary Building. Three (3) x Enware LF 110W type 16 wall mounted swivel goose neck outlet with aerator. Connect to cold water. Provide blue indicator.
Boiling Water Unit above bench Specialist Block A 1 Prep. Room	Make: Model:	Rheem Lazer 771075 with CP tundish and remote Lazer tap part no. 809908 above sink bowl.

5.2 ITEMS RELATING TO SANITARY FIXTURES AND TAPWARE PURCHASE AND INSTALLATION

Mattsson single lever mixer taps shall be of the following models:

- Single bowl sinks and tubs Model 4LOO, 160mm long spout.
- Double bowl sinks Model 4LOO, 240mm long spout.
- Basins Model 4L50.
- Showers, Model 4L75 – 7070 concealed bath / shower mixer.

Provide CP right angle stop taps (mini type) at rough in point preceding connection to lever mixer taps. Taps, water and gas outlets and other fittings shall be bright chromium plated.

Drill and tap (thread) all tap bodies to receive Conserve Meter Beater Model MB047 flow control seat insert. Fit to each tap body Conserve Meter Beater flow control seat inserts.

Tap ware handles shall be anti-vandal type and the colour of the indicator shall be in accordance with the following: -

Standard Tap Handles:		
Cold Water Taps	-	Blue
Hot Water	-	Red
Warm Water Taps	-	Yellow
Mattsson Lever Mixer Taps:		
Two Cold Water Leads	-	Blue
Cold & Warm Leads	-	Blue and Yellow
Cold and Hot Leads	-	Blue and Red

Provide and install to all wall mounted and hob mounted taps, extension spindles of sufficient length to enable top cover plates to be screwed onto spindles. In determining the length check thickness of wall finishes and benches described in the architectural drawings and specification section.

Provide and install to each tap spindle and bonnet assembly where within dry and masonry walls a "Water Bar" tap penetration flange designed for the purpose of preventing water entering the wall. Provide these flanges to all taps and outlets at baths, showers, sinks and tubs.

Water outlets shall be the aerated type unless otherwise specified to be spray type or without aerator or spray nozzle.

Seal sanitaryware, wall surfaces, bench/counter tops with white anti-fungal silicone sealant.

Plugs and washers for basins shall be 40mm diameter chrome plated brass, complete with approved type plastic plug, grey in colour. Plug and washers for stainless steel sinks shall be stainless steel on plastic type complete with approved type plastic plug, grey in colour. Plastic plug and washers in wash basins are not acceptable. Set each plug and washer in position with clear anti fungi Silicone Sealant.

The number of tap holes in sanitary fixtures must be the same number of outlets required by the Tapware Schedule.

Water closet pans shall be set to the floor with 2:1 cement mortar mix. Pure white sand and off-white cement shall be used in the mortar mix.

FIRE HYDRANT AND FIRE HOSE REEL SYSTEMS

6.1 EXTENT OF WORK

The work specified in this section comprises the diversion, design supply, installation, testing and commissioning of the fire hydrant system and fire hose reel systems all in accordance with the specification and to the satisfaction of the Authorities and the N.S.W. Fire Brigade.

6.2 MATERIAL SCHEDULE

Service/ Location	*Size*	*Material*
Fire Hydrant System	100mm & 150mm	UPVC Blue Brute Class 18. Provide red coloured, copper wire detectable market tape over, with words "Fire Main Below"
Fire Hose Reel System	25 – 50 O.D.	Copper Tube Type B to AS 1432
FH/External (above ground)	100 O.D.	Copper Tube AS 1432 Type B

Bolts and nuts used underground and above ground shall be 316 grade stainless steel.

6.3 FIRE HYDRANTS

Fire Hydrant valves shall comprise 65mm nominal diameter standard landing valves (all bronze components) with approved aluminium "Storz" quick couplings and suitable for connection by the local fire brigade.

Position fire hydrant valve centreline 750mm above finished level and allow to direct outlets to meet with the approval of the Authorities.

The valve outlet is to be fitted with red plastic cap, and stainless steel chain which shall be attached to the cap and the valve body.

Allow for the handwheel of the valve to be 100mm clear of any obstruction.

The outlet of the landing valve is to be:

- at right angles to the face of a wall, if any, immediately behind, or
- if horizontal or sloping, not more than 35 degrees below the horizontal.

Landing valves are to be entirely of brass construction. No other type of construction will be accepted.

6.4 FIRE HOSE REELS

Each fire hose reel shall be wall mounted with swivel hose guide complete with all fittings including globe valve and containing 36 m length of 20 mm internal diameter fabric reinforced nonkinking rubber hose.

The hose reel shall conform to AS 1221 complying with the type approved by the local fire brigade. The reels shall be painted and finished with the colour No. 537 Signal Red. The mounting plate shall be secured in a rigid workmanlike manner without damage to the surrounding areas in an approved manner using galvanised steel or non – ferrous metal bolts or other approved fixing methods sufficient to understand, with and adequate margin of safety the fixing test and the minimum static and dynamic loads likely to be applied to the fixing. Provide detailed fabrication drawings of fire hose reel support bracket for fixing to stud walls in cupboards for approval prior to construction.

6.5 UNDERGROUND PIPE WARNING TAPE

Plastic warning tape 150mm wide shall be laid above all underground water service pipes. Tape shall be 100mm wide with colour to comply with AS 1345 printed with the appropriate water service words. Tape shall contain copper wire fixed each end at ground surface.

6.6 PRESSURE GAUGES

Gauges shall be K.D.G. type. The faces on the gauges shall be 100 mm diameter. Gauges shall be graduated in metres head and kilopascal's

Gauges shall register one – third kPa more that the maximum possible pressure obtainable from the system served.

Each gauge shall be complete bronze ball valve. Gauges shall be installed on the suction and discharge sides of pumps and elsewhere as indicated on the Hydraulic services drawings

6.7 CAST IRON SURFACE BOXES

Supply and install 300 mm square cast iron surface boxes marked S.V. over underground valves, which are located under pathways or roads.

6.8 THRUST BLOCKS

Provide and install concrete thrust blocks constructed in a wedge shape set into the trench sides and base a minimum of 150 mm, with sufficient anchorage to adequately prevent movement of pipe work due to the effects of water pressure and water hammer.

Location:

- Thrust blocks shall be installed in the following location:
- Changes of direction,
- Changes in pipe size in the direction of the smaller pipe,
- The termination of any pipeline,
- Valves installed in the pipeline,
- Curved sections of the pipeline,
- At the back tees.

Thrust blocks shall not be installed in such a manner as to transmit movement or pressure at the water main where a tee and valves is installed.

6.9 LINE MARKING FIXING BLOCKS AND IDENTIFICATION PLATES FOR UNDERGROUND PIPE WORK SERVICES

Provide and install Line Marking Fixing Blocks and Identification Plates as for Underground Cold Water pipe work. Different identification plates shall be provided for each water service. Plates shall be 100mm x 100mm x 3mm thick stainless steel screw fixed to concrete with stainless steel expansion fastenings. Engrave details onto plates.

6.10 PAYMENT OF AUTHORITY FEES

Pay all fees and charges and engage the services of Authority officers to wire and seal each external fire hydrant valve.

6.11 BLOCK PLANS

Provide Block Plan as required by AS2419.1 of minimum dimensions 450 long and 300 high located adjacent the existing fire brigade booster valve assembly.

Block plan shall be 1.6 mm thick 316 grade stainless steel with complete pipe system engraved thereon submit paper sample for approval prior to manufacture.

Where there are no walls to fix the block plan provide two (2) 50 mm equal stainless steel angle section concreted into ground and secure plan with stainless steel bolts and nuts.

6.12 CERTIFICATION

Allow in Tender and pay fees for approved, Registered Certifier to attend the site to carry out tests on the Fire services and to provide a certification for the complete installation. Such a firm and personnel shall produce documentation to provide evidence as being accredited to undertake the work required.

The certifying company shall provide typewritten results of flow test, static pressure test and flow pressure test at each fire hydrant in the project.

At completion provide filled out and signed originals of all certification forms required by Authorities.

6.13 CLEANING AND TESTING OF PIPEWORK

All cleaning and testing of pipework shall be carried out as early as possible after testing of each section of the piping and before any points are concealed, ceilings installed, or finishing trades have commenced their work.

All services pipework shall be thoroughly washed out and the system operated with a full flow of water until all foreign matter is removed. Temporary conditions to supply and drain shall be carried out as required and all equipment shall be bypassed during the cleaning and testing period.

Hydrant pipework shall be tested hydraulically to 800kPa and maintained for a minimum period of eight (8) hours.

LIQUEFIED PETROLEUM GAS SERVICES

7.1 EXTENT OF WORKS

The work specified in this section comprises diversion, design, supply, installation, testing and commissioning of the liquefied petroleum gas services.

7.2 MATERIAL SCHEDULE

Pipes and fittings shall be in materials as follows:

Service	*Size*	*Material*
Liquefied Petroleum Gas	15 – 100	Copper

7.3 GAS FITTING RULES

The Australian Standard "As Installations AS5601–2000 and AG601–2000 shall be considered to be part of this specification.

All work shall be carried out in accordance with these rules and by LPG approved installer.

7.4 INSPECTION TESTING AND COMMISSIONING

Arrange for the supply of all necessary equipment and apparatus, and carry out all tests required by the Authorities having jurisdiction. Any material or work found defective by testing shall be removed, replaced and retested until satisfactory. Provide complete operational testing of all connected appliances and pay all associated fees and charges.

7.5 COPPER PIPE AND FITTINGS

Copper tubing and fittings shall be Type "B" tubing in accordance with AS 1432 and Authority requirements. Copper and brass fittings shall be in accordance with AS 1585.

Cut pipes square and remove sharp edges and burrs from the bore of the pipe with a reamer.

Permanent Joints: Use silver brazed capillary type joints with copper pipe. Filler rods for silver brazing shall comply with AS 1167 and Authority requirements.

Demountable Joints: Acceptable demountable joints are as follows:

- hexagon shaped unions up to 40mm, but only where necessary to connect piping to screwed fittings, valves or appliances.

- Flared compression fitting up to 20mm.

Flared compression joints shall be kept to a minimum and used only when necessary to connect piping to appliances provided with this type of connection.

Union Type Joints: Unions shall be a dezincification-resistant copper alloy designed for use with silver brazed joints, complying with AS 1585.

Union joints shall be kept to a minimum but where it is necessary to connect up to screwed fittings and/or valves a socketed copper alloy adaptor shall be silver brazed to the piping.

Flared Compression Joints: Flared compression fittings shall comply with AS 1645, Type 2. Do not make compression joints using an "olive" ring.

Jointing material shall be of a preformed proprietary manufacture of approved type, suitable for LP gas.

Unless otherwise approved, support gas piping up to 50mm outside diameter by saddles fixed to building members of supporting structure and/or on hangers and brackets to match the supports provided for other adjacent piping systems.

Saddles shall be of approved proprietary manufacture and of the same material as the pipework.

Use wood screws for fastening supports to timber, expanding type fixing to masonry or concrete.

7.6 GAS SYSTEM

Test gas systems to the satisfaction of the regulatory gas Authority. The minimum standard shall be as follows:

Seal the gas system after removing all items of plant or equipment liable to damage at the test pressure. Attach a pressure graph plotter to the system to indicate the applied pressure. Apply the appropriate test pressure in the following table and maintain for twenty four (24) hours or until testing is satisfactorily completed.

Operating Pressure (kPa)	Test Pressure (mPa)	Test Medium
Up to 210 kPa	4.2	
Up to 100 kPa	2.4	
Up to 7 kPa	2.1	Nitrogen

Remedy defects found in the system and re-apply test as required.

7.7 JOINTING

Copper tubing shall be slipped and silver soldered using 5% silver all as specified under Water Services section.

7.8 GAS CONTROL VALVES

All valves shall be manufactured to meet the requirements of the Authority and Australian Gas Company (AGL).

A gas master control valve is required to each branch pipeline.

Any valves having packed glands shall have an approved packing suitable for natural gas.

Each valve shall be clearly labelled with "ON" AND "OFF" positions.

7.9 APPLIANCE INSTALLATION

Appliances and auxiliary equipment shall only be connected to the gas supply after they have been approved by the company and by the authorities having jurisdiction.

Pipework and fittings used in connecting appliances shall be assembled in a tradesman like manner essential for grade, appearance and finish. Control valves and unions or other approved fittings to provide easy means of appliance connection and disconnection shall be installed at all gas connections.

7.10 UNDERGROUND PIPING

Unless otherwise approved, gas piping external to the building shall be installed below ground.

During backfilling lay a warning tape approximately 150mm above and extending the full length of all gas pipes.

7.11 WARNING TAPES

Warning tapes shall be not less than 100mm in width, of approved durable plastic material in colour to comply with AS 1345, marked with the following sign repeated continuously for the full length of the tape:

" GAS PIPE UNDER "

At any change of direction and at the end of any gas line provide an engraved brass plate, mounted on a concrete block installed flush with the ground level, after grading, or let in flush with the surface of new concrete paths or the like installed over the trench.

Provide a sample of engraving for approval prior to placing of orders and installation.

7.12 SECOND STAGE GAS REGULATORS

Provide and install "Rego" manufacture second stage regulators, available from Gameco (NSW) Pty Ltd Tel. 9648 5856.

1. Specialist Block A1 – Rego model LV 5503 B6 (1000mj/hr)

Provide bronze ball valve preceding each regulator and a bronze union each side of regulator.

GEOTECHNICAL REPORT

8.1 SCOPE OF EXCAVATION

Trenches excavated in the ground as required for hydraulic services shall be excavated in materials as found and as described in the test pit report prepared by Douglas Partners, a copy of which is included in this specification.

SCHEDULE OF WORKS RELATED TO HYDRAULIC SERVICES

The following schedule is issued as a guide to work associated with the hydraulic services works.

BUILDER

1. Datum and grid line set outs at each floor level and for external set-out.
2. Service ducts and access panels throughout the building.
3. Fire hose reel cupboards.
4. Bench and cupboard units with suitable openings for the installation of sinks and basins.
5. Waterproof membrane to walls and floors.
6. Upturned flashing of roof penetrations.
7. Metal roof gutters and flashings.
8. Forming of trench drains (supply and fixing of grating, checking set-out, overview of concrete placement and levelling of falls by Hydraulic).
9. Removal and replacement of ceilings.
10. Dishwashing machines and clothes washing machines.
11. Hinged metal boxes with frame and door lock to contain master ball valve for each building.
12. Removal and replacement of bitumen road surface and concrete pathways where pipes are to be installed.

ELECTRICAL

1. Wiring to hot water heaters.
2. GPO for dishwashers and clothes washing machines.
3. GPO for boiling water and chilled water units.
4. GPO for urinal microwave beam units.

ROOFER

1. Provision and fixing of all roof flashings where vent, flue or other pipes/services pass through roof covering.
2.. Hanging straight and hanging stepped roof flashings.
3. All eaves gutters.
4. All external rainwater down pipes.

MECHANICAL SERVICES

1. Extension of condensate drainage from AC equipment and plant to tundishes or floor wastes provided in the Hydraulics work.

LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD, BAYVIEW, NSW

TENDER SCHEDULE
HYDRAULIC SERVICES

I/We: .....

hereby tender for the supply, delivery, installation, commissioning and testing of the Hydraulic Services installation associated with the project in accordance with the drawings and specification prepared by Harris Page & Associates Pty. Ltd.

ITEMISED LUMP SUM TENDER PRICE

		FIXED PRICE **$**
1	EARLY WORKS SERVICES DIVERSIONS	
2	SUBSOIL WATER DRAINAGE	
3	SANITARY DRAINAGE SYSTEM INCLUDING TRADE WASTE PRE-TREATMENT STRUCTURES	
4	STORMWATER DRAINAGE SYSTEM	
5	DOMESTIC HOT, WARM AND COLD WATER SYSTEMS	
6	RECYCLED WATER SUPPLY SYSTEM	
7	FIRE HYDRANT AND FIRE HOSE REEL SYSTEMS	
8	SANITARY PLUMBING SYSTEM	
9	SANITARY FIXTURES, TAPWARE AND GAS OUTLETS	
10	LIQUEFIED PETROLEUM GAS SERVICE	
11	COUNCIL STORMWATER DRAINAGE AND P & D INSPECTION FEES. SYDNEY WATER P & D INSPECTION FEES	
12	"AS BUILT" DRAWINGS AND OPERATING INSTRUCTIONS MANUALS	

TOTAL TENDER PRICE	
G.S.T.	
TOTAL TENDER PRICE INCLUDING G.S.T.	

Total Price Including G.S.T (in words):
.....

I/We unconditionally guarantee the performance of the installation and completion of the works in accordance with this specification and accompanying drawings.

COMPANY: .....
SIGNATURE: .....
WITNESS: .....
DATE:

LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD, BAYVIEW, NSW

TENDER SCHEDULE
HYDRAULIC SERVICES

I/We: .....

hereby tender for the supply, delivery, installation, commissioning and testing of the Hydraulic Services installation associated with the project in accordance with the drawings and specification prepared by Harris Page & Associates Pty. Ltd.

ITEMISED LUMP SUM TENDER PRICE

		FIXED PRICE **$**
1	Safety shower and eyewash including supply pipework.	
2	Irrigation supply pipework from dam pump set to vehicle wash bay and sewer pump station.	
3	Sewer drainage from outlet of plate seperator to existing main sewer.	
4	Coalescing plate seperator, diaphragm pump, float switch, set of suction and delivery pipework, electrical controls and wiring, high level float switch and flashing alarm light.	
5	Precast concrete general purpose pit, grate and cover, including lift out basket.	
	TOTAL TENDER PRICE	
	G.S.T.	
	TOTAL TENDER PRICE INCLUDING G.S.T.	

Total Price Including G.S.T (in words):

.....

I/We unconditionally guarantee the performance of the installation and completion of the works in accordance with this specification and accompanying drawings.

COMPANY: .....

SIGNATURE: .....

WITNESS: .....

DATE: .....

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Shelmerdines
Consulting Engineers

SPECIFICATION

of work to be done and materials to be used in connection with the provision of

ELECTRICAL SERVICES

for

MUSIC ROOMS UNDER EXISTING HALL

at

LOQUAT VALLEY
ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD, BAYVIEW

Prepared by:

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June 2005
4292ESP
TENDER ISSUE – 31 MAY 2005

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SUBSECTION 001 GENERAL

01. SCOPE OF WORK

OUTLINE DESCRIPTION: The works covered by this section of the specification include the following:

- Demolition and removal of redundant existing electrical installation.
- Modifications to existing distribution board.
- Submains cabling
- Luminaires, lamps and tubes
- Final subcircuits for lighting and power
- Emergency and EXIT lighting
- Ceiling fans and controllers
- Security alarm system alterations and additions
- Period bell system alterations and additions
- Voice/data cabling system alterations and additions
- Sundry minor works as specified herein.

All works shall be carried out generally as shown on the accompanying drawings and shall comply with the relevant clauses of this specification. The complete installation shall meet all requirements of the Governing and Statutory Authorities.

02. NOTICE TO TENDERERS

The services form a vital aspect of this contract and it is imperative that when seeking electrical services prices, tenders are obtained from companies experienced in electrical services installations for Schools.

Tenderers will be required to complete the Schedule of Prices and Schedule of Technical Data to allow the proper assessment of the tender submission.

03. GOODS AND SERVICES TAX

The goods and services tax (GST) will be applicable to the equipment, materials and services incorporated in this contract. Allow for the collection and payment of the relevant GST and for maintaining and supplying all records and certificates required by legislation.

04. WORKS BY OTHERS

REQUIREMENT: The following works will be carried out by the School:

- Supply and installation of computer/data active head end equipment.
- Supply and installation of PABX equipment and telephone handsets.
- All necessary patching at the voice/data patch panels.
- All necessary jumpering on existing and new telephone frames as required to activate new telephone outlets.

05. WORKS BY OTHER TRADES

REQUIREMENT: The Building Contractor shall allow to have the following works carried out by other trades within the contract to facilitate works by the Electrical Trade.

- Trimmed openings in ceilings for recessed luminaires
- Biscuit cutting of brickwork where necessary to conceal conduits within face brickwork walls
- Additional framing in false ceiling spaces where necessary to enable the fixing of ceiling fans.
- Openings in the building structure to details to be provided by the Electrical Subcontractor.
- Signwriting of "Danger" and other notices required by regulations.
- Supply and installation in position of fixed electrical appliances.

Works by Hydraulic Services Subcontractor:

- Supply and installation of water heaters and boiling water units

Works by Mechanical Services Subcontractor:

- Supply and installation of exhaust fans.
- Supply and installation of air–conditioning control panels and equipment.

All other work associated with the electrical services installation shall be carried out by the Electrical Trade.

06. ELECTRICAL INSPECTIONS

REQUIREMENT: The Contractor shall carry out all tests on completion of the electrical works, provide certification in accordance with Authority requirements that all works have been inspected and tested and comply with the regulations.

Copies of all compliance certification shall be included in the as-installed documents.

Testing shall include mandatory and optional tests outlined in Section 6 of AS/NZS 3000:2000 and AS/NZS 3017:2001 as applicable to the contract works.

Certification shall be provided for those sections of the electrical installation which require Authority or independent inspections and sections which may be inspected and certified by the Installation Contractor.

All parts of the electrical installation shall be inspected and certified by an independent and qualified Electrical inspector. Self certification by the Installation Contractor is not acceptable.

The name of the proposed inspector shall be submitted to the Superintendent for approval prior to the commencement of any inspections. Copies of all inspection reports shall be provided and any defects found corrected prior to the issue of Practical Completion certification.

07. TENDER DRAWINGS

REQUIREMENT: The drawings as scheduled are issued as a guide only and shall be considered to be diagrammatic and approximate. The drawings and specification are intended to be mutually explanatory and complete, but all work called for by one, even if not by the other, shall be fully executed. Should the documents be in conflict, the Contractor will be deemed to have included for the larger quantity and/or the more expensive component(s), as applicable.

08. WORKSHOP DRAWINGS

REQUIREMENT: The Contractor shall be responsible for the preparation of all necessary co-ordinated manufacturing and installation shop drawings covering the services included under this contract. Confirm the final installation dimensions by site measurement, to ensure satisfactory set out and co-ordination with the structure and new or existing services.

All shop drawings shall be on A1 size sheets and one (1) copy shall be submitted in plain paper format. Such drawings shall be submitted to the Architect for comments and approval. Manufacture and/or installation as applicable shall not be commenced prior to written approval of the drawings.

The Architect is not to be regarded as the Contractor's checking agent. Approvals of shop drawings will be given in principle only and without prejudice to the responsibility of the Contractor for the proper co-ordination, installation and operation of the services.

The preparation of shop drawings shall be scheduled to enable the necessary approvals to be gained and for the Contractor to comply with the building programme for installation of the services. Delays caused by late submission, incorrectness or inadequacy of shop drawings will not be recognised as a reason for variations to the Contract time or Contract sum.

One (1) copy of the approved shop drawings shall be submitted for distribution and further copies shall be submitted to the appropriate Authorities as necessary for their approval.

09. AS-INSTALLED DRAWINGS

REQUIREMENT: On completion of the works, and prior to the issue of the notices of practical completion, the Contractor shall supply one (1) set of approved plain paper drawings and one (1) CD Rom compatible with AutoCAD 2002 showing the complete electrical services installation "as-installed".

The drawings shall be to the same scale as those specified for "Workshop Drawings" and shall record details of the work actually installed and titled "as-installed".

Symbols legends shall be drawn on all "as-installed" drawings.

In order to achieve accurate drawings, all relevant information relating to the contract works shall be entered onto drawing prints immediately it has been carried out. The "as-installed" drawings shall appear "as new".

No previous approval stamps, hand written notes or erase markings shall be evident. New drawings shall be provided if necessary. The preparation of the drawings shall proceed during the installation of the works as each section is completed. To ensure these requirements, the Consulting Engineer shall be allowed to inspect the drawings on request.

The information shown on prints and final records shall be actually physically measured from permanent building boundaries or other permanent features and accurate distances shall be shown where deemed necessary by the Architect.

10. INFORMATION SUPPLIED ON ELECTRONIC STORAGE MEDIA

REQUIREMENT: The provision of one copy of the tender documents in electronic form may be provided by E.Shelmerdine & Partners Engineering Pty Ltd subject to the following:

- All drawings will be supplied in Auto CAD format and/or Adobe PDF format as may be determined by Shelmerdines Consulting Engineers suitable for use with an IBM compatible computer.
- Errors resulting from the accuracy of any information supplied in electronic form for any reason will be the responsibility of the recipient.
- The information supplied by Shelmerdines Consulting Engineers is copyright, shall be used solely for this project and is not to be disclosed or sold to other parties.
- The information supplied by Shelmerdines Consulting Engineers electronically may or may not form part of the contract documents as may be agreed by all parties.
- A charge of $30.00 per drawing will be levied with a minimum charge of $175.00 for the issue of drawings in electronic form.

Shelmerdines Consulting Engineers reserves the right to withhold the issue of electronic documentation of part or all of the information which forms part of these documents for any reason they may determine.

11. OPERATING AND MAINTENANCE INSTRUCTIONS

REQUIREMENT: The supply of all necessary information for the satisfactory operation and maintenance of the services shall form part of this Contract.

The Contractor shall provide Operating and Maintenance Instruction Manuals which shall comprise a description of each installation, its operation and the regular operating and maintenance routines to be adopted.

After obtaining the Consulting Engineer's approval, the Contractor shall arrange for the Operating and Maintenance Instruction Manuals to be handed over to the Architect prior to the issue of a Certificate of Practical Completion.

Three (3) sets of these Instruction Manuals shall be provided on A4 size paper adequately bound to the Architect's approval into volumes with rigid covers of plastic finish to withstand continual usage.

Manuals shall include:

i) Manufacturer's Literature

Include manufacturer's data or maintenance and operation of all equipment installed. Do not include irrelevant data that does not pertain to the model of equipment actually installed. Such irrelevant information shall be erased from data sheets etc.

ii) Miscellaneous

Include any miscellaneous charts, description, data etc. needed for complete maintenance and operation of all systems and equipment installed.

iii) Spare Parts

Prior to the issue of a Certificate of Practical Completion, the Contractor will be required to submit a schedule of the spare parts that he recommends and should be supplied together with their individual current prices.

These parts may or may not be ordered.

iv) As-Installed Drawings

Provide A3 copies of the as-installed drawings bound into the operating and maintenance instruction manuals.

12. CO-ORDINATION

REQUIREMENT: The Contractor shall liaise with all trades on site, as applicable, to ensure that the works are co-ordinated for the complete erection of equipment and material. Failure to comply with this requirement will render the Contractor liable for any rectification work necessary, at no additional cost.

13. CUTTING AWAY AND MAKING GOOD

REQUIREMENT: The Contractor shall do all cutting away and chasing as necessary for the proper execution of the work of his contract but only in locations approved by the Architect.

- All conduits shall be concealed, inclusive of single leaf double face internal walls.
- Surface conduits may be run in stores and cupboards, but only in locations approved by the Architect.

Chasing shall be marked out on site and approved by the Architect prior to commencing work.

Patching and making good of finished work shall also be the responsibility of the Electrical Trade.

Making good shall be interpreted as restoration to the original dimension by the use of a composition material consistent with good trade practice, prior to the provision of final finishes by the Contractor.

Wherever possible, the Electrical Trade shall arrange for the provision of suitable openings by the Contractor. The Contractor shall bear the cost of any alterations and making good of building works which are due to other than good trade practice on the part of the Contractor.

All items of plant and equipment or fixings to be built in shall be provided by the Contractor when requested by the Architect.

14. FIXINGS AND SUPPORTS

REQUIREMENT: Provide fixings necessary for attaching equipment, conduit, ducting, brackets, lighting fittings and similar items to floors, ceilings walls or structure as applicable. All fixings adopted shall be of an approved type and pattern.

Drill neatly all fixings holes in concrete or brickwork to a depth equal to the length of plug to be used, excluding plaster or other soft cladding finish. Fixings shall not be into joints between brick or blockwork.

The fixings for all load-bearing fixings shall be sized of appropriate size for the anticipated load plus a 50% safety factor. All fixings shall be corrosive resistant and shall be the same or of more noble material so that they will not be preferentially corroded.

Ensure that all supports shall:

- Be electro galvanised threaded rod hangers
- Galvanised steel brackets
- Approved for the purpose intended

Ensure that nuts and bolts shall:

- Have hexagonal shaped heads
- Use flat washers
- Have metric threads
- Be of sufficient length to show at least one full thread beyond the nut when tightened to correct tension

The following fixings are not acceptable:

- Fixings made by the use of explosive powered tools
- Fixings made in the mortar joint in block or brickwork
- Fixings made into timber infills of concrete floor slabs
- Fixings into plasterboard, fibre cement, ceiling tiles or similar friable material
- Self tapping screws into sheet metal
- Nails
- Fixings which rely on expanding elements of nylon, plastics or similar synthetic material for wiring and equipment associated with emergency systems
- Nylon ties for all power sub-mains and feeders except where run in horizontal plane and weight of submains are directly supported by cable tray or ladder rack.

15. PRECAUTIONS

REQUIREMENT: The Contractor shall ensure that all conduits or conductors forming part of his electrical installation do not contact pipes or telephone and other wiring systems.

16. SAFETY FACILITIES

REQUIREMENT: Installations carried out under this section of the contract shall be provided with all normal safety facilities, for protection against personal hazard and damage to equipment and complying with the requirements of all Authorities having jurisdiction over the works.

Facilities shall include guards, housings, shrouds, electrical overload devices, warning notices and similar provisions.

17. EQUIPMENT MANUFACTURE

REQUIREMENT: All electrical and mechanical control equipment and fittings supplied under this contract shall, within their respective type, be of the same manufacture throughout the works.

Where applicable, each piece of apparatus shall be fitted with a rating plate giving particulars of manufacturer's type number and serial number or other means of identification, together with full details of plant and equipment in readily visible and approved positions.

18. SAMPLES

REQUIREMENT: The Contractor shall submit samples of selected equipment and fittings proposed for use in the works for the approval of the Architect.

19. LABELLING

REQUIREMENT: All switchboards and equipment including circuit breakers, switches, fuses, contactors, relays, circuits and similar items shall be labelled in an approved manner to clearly indicate their respective functions.

LABELS: Unless otherwise specified or instructed labels shall consist of black engraved lettering in polished white Traffolyte or similar approved materials. The sizes of all labels and lettering thereon shall be to approval. Labels shall be secured by adhesive and screw fixed to approval.

Where deemed necessary stand-off type labels shall be used.

NAMEPLATES: Nameplates of the Contractor and equipment manufacturers used in the works shall be strictly to approval with respect to size and design and shall only be mounted in approved locations.

20. COLOUR CODE

REQUIREMENT: The following colour code shall be used throughout the installation:

Busbars and cabling within switchboards, and all submains cores and polyphase subcircuits shall be coloured red, white and blue in accordance with the Supply Authority's phase rotation.

Single-phase subcircuits for lighting and power shall be coloured as follows:

Active conductors	-	red, white, blue
Neutral conductors	-	black
Switchwires	-	grey
Earth conductors	-	green/yellow

(where applicable)

No departure from the colour code specified will be permitted without written approval.

21. PAINTING

REQUIREMENT: All switchboards and other sheetmetal enclosures shall be paint finished as detailed in the relevant clauses of this specification.

Unless otherwise specified, all wiring trunking, ducting, cable tray, brackets, supports, racks, fittings and conduit where exposed shall be three coat paint finished to approval.

STEEL SUPPORTS: All steel supports, brackets, racks and similar fittings for attachment to the building structure shall be thoroughly cleaned free from rust and scale and painted in one (1) coat of rust-inhibiting primer and one (1) undercoat before fixing.

GALVANISED SURFACES: Unless otherwise specified all galvanised surfaces shall be etch-primed before paint finishing. The finishing colour for all metalwork shall be to approval.

22. EARTHQUAKE RESISTANCE

REQUIREMENT: The building and all services are to be constructed to withstand earthquake loads in accordance with AS1170.4. In this regard, all major items of electrical services plant and equipment including switchboards, control panels, cable trays and luminaires together with the associated fixings shall be designed and installed to withstand horizontal forces as set out in AS1170.

23. ELECTROMAGNETIC COMPATIBILITY COMPLIANCE

REQUIREMENT: All equipment and/or appliances provided under this section of the Contract shall meet the requirements of the Australian Communications Authority (ACA) for Electromagnetic Compatibility (EMC) framework to prevent Electromagnetic Interference (EMI), by complying with the relevant standards nominated by the ACA relevant to the products and where required by the ACA, and are labelled with the C Tick mark to establish compliance with the EMC Framework.

24. MATERIALS AND WORKMANSHIP

REQUIREMENT: Unless indicated otherwise the whole of the material used in this work shall be new, of first quality and of approved manufacture and type. All materials shall be to the approval of the Architect. No approval of the Architect shall be deemed an acceptance of materials or workmanship not complying with the requirements of this contract.

The whole of the workmanship shall be first class, neat and substantial and to the entire satisfaction of the Architect.

The installation throughout shall comply in every respect with the various codes published by the Standards Association of Australia together with any additional requirements which may be specified herein.

25. REDUNDANT WIRING

REQUIREMENT: Disconnect and remove all existing electrical services made redundant by the new installation. Any materials which the Principal wishes to retain shall be placed in storage where directed on site. All other materials shall be removed from the property and disposed of in an approved manner by the Contractor at his expense.

26. EXISTING SERVICES

REQUIREMENT: Existing services encountered, obstructed or damaged in the course of performing these works are to be dealt with as follows:

- If the service is to be continued: repair, divert, re-locate as required
- If the service is to be abandoned: cut and seal or disconnect and make safe.

The Contractor shall advise the Architect of all existing services encountered and obtain approval of his proposed method of dealing with these services prior to commencing the work.

27. MAINTAIN SUPPLY

REQUIREMENT: The School will continue in operation throughout the construction period and supply shall be maintained for all purposes as far as practicable. Any unavoidable disconnection of supply shall be of minimum duration and shall only be carried out at times acceptable to the School.

In this regard the Contractor shall provide the Architect with five (5) days notice in writing of any planned disconnection of supply and shall not proceed with the disconnection without the approval of the Architect.

The Contractor shall carry out all works that are required to be performed out of hours in order to comply with this clause.

28. REGULATIONS, FEES AND NOTICES

REQUIREMENT: The services installation specified in this section , shall be complete with all equipment necessary for their satisfactory operation, control, maintenance and safety under all normal conditions of service, and shall comply in every respect with the Regulations and By-Laws of all Authorities having jurisdiction, including the latest requirements of the following, as applicable:

- Waringah Council
- Workcover Authority
- Sydney Water
- SAA Wiring Rules
- Energy Australia
- Insurance Council of Australia
- New South Wales Fire Brigade
- Austel

29. COMPLETION

REQUIREMENT: The Contractor shall fully clean down the works of this contract on completion. Cleaning down shall include the removal of all cement, paint droppings, plaster and other foreign matter from conduit and pipework, plant equipment and fittings. All damaged finishes shall be made good.

30. COMMISSIONING

REQUIREMENT: The Contractor shall be responsible for the commissioning of the installations carried out under this Contract. Commissioning shall include all adjustments necessary to tube and lampholders, and to overload device settings and fuse cartridge ratings to suit the characteristics of the final loadings.

31. ALTERNATIVES

REQUIREMENT: Generally, Tenderers shall adhere to the types of plant and equipment detailed in the drawings and specification. Where these requirements preclude Tenderers from offering plant of their standard manufacture, alternatives may be submitted for approval.

Unless such alternatives are accepted in writing by the Architect, the Contractor shall comply with the detailed requirements of the specification.

Tenderers shall submit a fully conforming tender allowing for the plant and equipment detailed in the specification and drawings. Tenderers may, if so desired, tender also for similar type equipment of recognised and approved manufacture, but as an ALTERNATIVE.

When alternatives to the base tender are submitted for approval, the submission shall include the following information which shall accompany the tender:

- Revised total lump sum tender price.
- Fully detailed comparison of the alternative item of plant or equipment offered with the specified item listing all areas of non-compliance.

SUBSECTION 002 SUPPLY

01. SOURCE OF SUPPLY

REQUIREMENT: Supply shall be 415 volt 3 phase and shall be derived from the existing School distribution system as shown on the drawings.

02. EARTHING

REQUIREMENT: Supply and install a complete system of Multiple-Earth-Neutral (MEN) earthing to earth effectively new distribution boards, conduits, cables, ducts, fixed and general purpose outlets, metal flush plates and lighting fittings and otherwise as required by the SAA Wiring Rules and Energy Australia.

Earth continuity shall be maintained throughout the installation and test certificates of earth continuity and resistance, measured at each switchboard and at each item of plant and equipment shall be supplied to the Superintendent prior to handing over the works.

The size of earth conductors shall not be less than those required by the SAA Wiring Rules and as determined by the full current carrying capacity of the submains cables and the subcircuit concerned. Earthwires shall be run within the conduits.

03. METERING

GENERAL: Supply Authority metering in existing and shall be retained.

SUBSECTION 003 SWITCHBOARDS AND EQUIPMENT

01. SWITCHBOARD MANUFACTURE

REQUIREMENT: New distribution boards provided under this contract shall be manufactured by one (1) of the following companies.

K E Brown Pty Ltd, Sydney

Harwal Industries Pty Ltd, Sydney

Relec Pty Ltd, Sydney

The Contractor will be held completely responsible by the Superintendent for all aspects of the supply of the boards including submission of shop drawings, manufacture to specification requirements, co-ordination of Energy Australia and installation requirements and delivery to meet the building programme.

Accordingly tenderers are advised to assure themselves of the capacity of their selected manufacture to meet the contract requirements.

02. MODIFICATIONS TO EXISTING DISTRIBUTION BOARDS

REQUIREMENT: Carry out modifications and additions to existing distribution boards as shown on the drawings.

New equipment shall match existing in manufacture.

03. CIRCUIT BREAKERS

Circuit breakers shall be of the moulded case thermal magnetic type and of manufacture to match existing. Circuit breakers shall be of current ratings as indicated on the drawings.

04. CIRCUIT BREAKERS WITH INTEGRAL EARTH LEAKAGE PROTECTION

Circuit breakers with integral earth leakage protection shall be equal to Merlin Gerin 'Combined RCD/MCB' circuit breakers and have rated tripping current of 30mA.

05. HRC FUSES

HRC fuse cartridges shall be of approved manufacture and shall comply with AS 2005. Fuses shall be suitable for the fault level of the installation and shall discriminate properly with other protective equipment. Fuse I^2t values shall suit the protected equipment.

Fault current limiter cartridges shall be held in approved holders. Where fuse extraction handles are required, they shall be clipped inside the cubicle adjacent to the fuse. Where fuses are located behind more than one cover, one handle shall be provided behind each cover.

06. CONTACTORS

Contactors shall be of Sprecher and Schuh or equal approved manufacture and shall comply with AS 1029. All contactors shall be of the block style, electromagnetic, air break type. The rated duty of all contactors shall be uninterrupted type for non-ventilated enclosure and the AS utilisation category shall be AC-3 minimum. Series or parallel contacts shall not be used to achieve the required rating. All contactors shall be quiet in operation.

07. LABELLING

All circuit breakers and equipment installed on switchboards shall be clearly labelled to indicate their respective function. Labels shall comply with Clause 1.20 of this specification.

08. CIRCUIT SCHEDULES

Provide typed circuit schedules adjacent to the modified switchboard listing the function of each subcircuit. The schedule shall be mounted behind a clear plastic sheet in a metal frame installed adjacent to the switchboard.

SUBSECTION 004 RETICULATION AND WIRING

01. SUBMAINS

Supply and install submains cabling of the size and type shown on the drawings. Cabling shall generally be installed in accordance with the relevant detail and shall follow routes agreed with the Superintendent.

Phase out and terminate all submains cables.

02. SUBCIRCUIT CABLING

GENERALLY: Except where otherwise specified, subcircuit cabling shall comprise PVC insulated cables enclosed in rigid PVC conduit which shall be concealed wherever possible by enclosure in concrete slabs, masonry walls and false ceiling spaces.

SUBCIRCUIT CABLING IN STUD WALLS, FALSE CEILINGS AND ROOF SPACES: Subcircuit cabling installed in stud walls, false ceilings and roof spaces shall comprise TPS cables which shall be securely fixed to the building structure. Where dropping in masonry walls to outlets and switches the cabling shall be enclosed in rigid PVC conduit.

SUBCIRCUIT CABLING IN PLANT AREAS: Subcircuit cabling in Plant Areas shall be surface run and enclosed in rigid PVC conduit.

SUBCIRCUIT CABLING IN FACEBRICK AND BLOCK WALLS: Subcircuit cabling enclosed in facebrick and block walls shall be enclosed in rigid PVC conduit which shall be concealed by the building into the brickwork or blockwork as applicable. In this regard 'biscuit' cutting of brickwork to accommodate the conduits will be carried out by other trades.

03. UNDERGROUND CABLING AND CONDUIT

INSTALLATION: All trenching included in the works shall be excavated to an even surface, free from sharp projections.

Conduits shall be bedded on 50mm minimum of clean sand and covered by a further 50mm of clean sand before backfilling the trench.

After laying of the conduits the trench shall be backfilled with spoil removed from the trench, and all excess spoil removed from the site.

MARKER TAPE: A 150mm wide yellow or orange marker tape bearing the words 'WARNING - ELECTRIC CABLE BURIED BELOW" or similar shall be laid in each trench 150mm below ground for the entire length.

PENETRATIONS IN EXTERNAL WALLS: Where underground conduits penetrate external walls of a building, the penetration shall be effectively sealed against ingress of moisture by an approved non-setting bitumen compound.

04. MARKING PLATES FOR UNDERGROUND CABLING

GENERAL: The Contractor shall provide approved engraved brass marker plates to indicate the routes of underground cabling. Each plate shall be 75mm x 75mm and of minimum thickness 1mm and shall be screw fixed to a concrete block approximately 150 x 150 x 300 deep located immediately above the cable. The plates shall be installed in the following locations.

1 Where underground cables enter a building

2 At each change in direction of underground cabling

3 Where spare underground conduits are terminated

INDICATION OF CABLE ENTRY TO A BUILDING: At the point at which an underground cable enters or leaves the building the marker plate shall be engraved with an arrow pointing in the direction in which the cable is laid and the words 'ELECTRIC CABLE'.

INDICATION OF DIRECTIONAL CHANGES: At each change of direction two (2) marker plates shall be installed. Each plate shall be engraved with an arrow pointing in the direction in which the cable is laid and the words 'ELECTRIC CABLE'.

INDICATION OF TERMINATION OF UNDERGROUND CONDUIT: At the point at which an underground conduit is terminated, the marker plate shall be engraved with the words "SPARE CONDUIT TERMINATED BELOW".

05. CONDUIT

GENERAL: Unless otherwise indicated, conduit shall be of the rigid PVC type.

All conduit shall be concealed wherever possible by enclosure in concrete slabs, masonry walls etc. and by installation in false ceiling spaces. Surface run conduit shall be installed true and straight and aligned to perpendicular and lateral building elements.

The entire works shall be carried out on the draw-in principle.

Conduits shall be securely fixed to wall boxes by means of conduit clamps. Elbows and tees shall only be used where specifically approved by the Superintendent and only where readily accessible at all times.

All conduit joints shall be free from burrs and rough edges and adequate precautions shall be taken at all times to prevent entry of moisture or foreign matter into the conduit systems.

The use of flexible conduit shall be kept to a practical minimum.

All flexible conduit shall be corrosion resistant and fully weatherproof and of Sealflex manufacture. Positive type screwed fittings shall be used at all terminations of flexible conduits.

All conduits for future use shall be complete with polypropylene draw-cords.

PVC CONDUIT: PVC conduit shall comprise light duty UPVC conduit in compliance with AS 2053. The conduit shall be of minimum size 20mm diameter and shall be complete with moulded PVC conduit fittings fixed with approved adhesive cement. All fittings and wall boxes used in conjunction with the conduit shall be of the same manufacture and material as the conduit.

Corrugated PVC conduit shall only be installed with the prior approval of the Superintendent.

HEAVY DUTY UPVC CONDUIT: HD UPVC conduit shall comply with AS 2053 and with 'Category A' enclosures as defined in the SAA Wiring Rules. All fittings shall be of the material specified for the piping and all joints shall be made with an approved adhesive cement.

STEEL CONDUIT: Steel conduit and fittings shall be galvanised to meet the requirements of 'medium protection' as set down in AS2052. Joints shall be painted with an approved paint to protect against corrosion. Steel conduits shall be electrically and mechanically continuous.

06. PVC INSULATED CABLES

All PVC insulated and PVC insulated and sheathed cables shall be of approved manufacture with multi-strand copper conductors and of V75, 0.6/1 kV grade. All cables shall be delivered to site in their original packages.

The minimum sizes of subcircuit cables shall be as follows:

General power subcircuits	-	2.5mm^2
Lighting subcircuits	-	2.5mm^2

The final sizes of subcircuit cables shall be determined to suit the respective voltage drop requirements. As a minimum requirement power and lighting circuits with route lengths in excess of 30 metres shall be wired with cables of 4.0mm^2 size.

07. CABLE TRAYS

Cable trays shall be of perforated metal in standard Admiralty pattern and of Ductall or approved equal manufacture. All trays shall have a cold rolled galvanised finish and shall be machine press formed, with both edges returned a minimum of 50mm for stiffening. Tray shall be formed in 2.5 metre lengths and shall be of the following minimum gauges:

Width of Tray	**Thickness of Material**
75, 100, 150 mm	1.0 mm
225 mm	1.2 mm
300 mm	1.6 mm

The tray width selected with each application shall allow 30% spare space for future cables.

Tray shall be complete with galvanised perforated fishplates, bends and galvanised fixings, all to manufacturer's recommendations.

INSTALLATION: Tray shall be secured to the structure to approval and shall be installed with sufficient clearance to permit installation of cable clips and other cable fixings. Supports shall be evenly spaced to ensure that tray is true and straight. Spacing of supports shall be within the manufacturer's recommendations for the loading concerned and in any case not less than two (2) supports shall be provided per length of tray.

Supports shall be of substantial fabricated hot-dip galvanised steel construction.

The complete installation shall be free of any distortion or bowing.

All cable trays and supports where exposed shall be painted in accordance with Clause 1.22.

08. CABLE TROUGHING

Cable troughing and fittings shall be of approved manufacture and shall be complete with clip-on type covers, formed true and straight and returned not less than 10mm over the sides of the troughing.

Cable troughing shall be fixed to walls or supported in an approved manner at minimum 1200mm centres. Each length of troughing shall have at least two (2) fixings or supports.

Retaining clips shall be installed to retain the wiring at intervals not exceeding 1000 in all locations except where cable troughing is run horizontal with covers uppermost.

PLASTIC TROUGHING: Plastic troughing shall be UPVC. The troughing and covers shall be robustly constructed from heavy gauge material to avoid sagging between supports and to avoid warping. All associated fittings shall be of similar material to the troughing.

METAL TROUGHING: Metal troughing shall be of approved design and construction. The troughing and covers shall be of galvanised sheet steel or aluminium of minimum 0.8mm thickness and shall be free from burrs and sharp edges.

09. MINIATURE WIRING DUCT

Miniature wiring duct shall be of the extruded PVC type equal to Aussie Duct finished in selected colour. All corners, tees etc shall be of matching make, type and colour to the duct.

10. CIRCUITING

Circuiting of all outlets is shown on the drawings and no variations will be permitting without prior written approval from the Superintendent.

The completed installation shall be balanced over three (3) phases to the approval of the Energy Australia. Any modification necessary to the specified circuiting to achieve this balance shall be to the approval of the Superintendent and any such variations shall be noted on the 'as installed' drawings.

11. MINERAL INSULATED METAL SHEATHED CABLES

MIMS cables shall have copper conductors and copper sheath and shall comply with AS 3187.

The cable manufacturer's seals shall be maintained intact until the joint or termination is about to be made; a termination shall be fitted at each end of a cable run as soon as the cable has been cut to length and stripped back and the moisture driven out.

A temporary bitumen seal shall be applied to the open end of any coil after cutting, if the cable is not to be used immediately.

Screw on pot-type seals using medium cement compound rated at 150°C shall be used for terminations. Heat shrink seals with PVC sleeving for insulation, may be used instead of screw on pot-type seals.

Terminations of MIMS cable entering metal enclosures, e.g. switchboards, shall be by universal glands screwed into a non-ferrous plate secured to the enclosure. The sheath shall be earthed to this plate via suitable locknuts and washers. Where the sheath terminates at the plate, the conductors shall be fully insulated, properly colour coded and adequately cleated to the enclosure.

Conductor terminations to electrical equipment, e.g. switchgear, shall be made with cone-grip lugs or other approved lugs or connectors.

The metal sheaths of single core cables in a multi-phase circuit shall be bonded using proprietary earth bonding clips or clamps.

Bare MIMS cables shall be separated by a minimum of 25 mm from TPS cables and PVC conduits.

Unless otherwise indicated, MIMS cables shall be mounted on cable trays. Cables shall be securely fixed in position by non-ferrous metal clips or saddles. The spacing between clips or saddles on horizontal runs shall be not greater than 450 mm.

Dissimilar metals shall not be allowed to touch the cable sheath. Where dissimilar metals are likely to touch the cable sheath, a protective barrier of paint or PVC or similar material shall be provided between them.

The insulation resistance of MIMS cables shall be tested at the time of termination, and 24 hours later, the resistance shall be not less than 100 megohms.

Where the sheath of MIMS cable is used as a return conductor the cable shall be installed strictly in accordance with the SAA Wiring Rules and the requirements of Energy Australia.

12. PENETRATIONS IN FIRE RATED WALLS AND SLABS

REQUIREMENT: Supply and install plated sheet steel sleeves around all cables and conduits which pass through such walls and slab. Filling in of the vacant space around the cables and conduits where they pass through the walls will be carried out by other Subcontractors.

SUBSECTION 005 LUMINAIRES AND ACCESSORIES

01. LUMINAIRES

Supply and install all luminaires as detailed on the drawings. The manufacturers' names listed against luminaires on the drawings are to be considered as a guide only and tenderers may, if so desired, tender also for similar type fittings of recognised and approved manufacture, but as an alternative.

Before placing any orders for luminaires, the successful tenderer will be required to submit for approval illustrations and detailed information, clearly stating manufacturers' names and manufacturers' type number of capacitors and ballasts. The successful tenderer will also be required to submit both add and deduct unit rates and total price against each nominated fitting. Orders shall not be placed until approval of the proposed fittings has been obtained from the Superintendent.

ACCESSORIES: The luminaires shall be complete with all metalware, accessories and auxiliary equipment. All auxiliary equipment shall be of the quick connect type.

All fluorescent luminaires shall be fitted with electronic ballasts of Atco or approved equal manufacture.

All low voltage tungsten halogen luminaires shall be equipped with electronic transformers equal to OSRAM HTM–Mouse.

02. LAMPS AND TUBES

GENERAL: Supply and install all lamps and fluorescent tubes to suit the number and types of luminaires as shown on the drawings.

FLUORESCENT LAMPS: Fluorescent tubes shall be of the tri–phosphor energy saving type equal to Philips TLD/84 and 4100°K colour temperature. All fluorescent tubes shall have a guaranteed life of not less than 3500 hours and the Contractor shall be responsible for the replacement of tubes having a lesser life.

COMPACT FLUORESCENT LAMPS: Compact fluorescent lamps shall be equal to Philips manufacture and of 4000°K colour temperature. All lamps shall have a guaranteed life of not less than 3500 hours and the Contractor shall be responsible for the replacement of lamps having a lesser life.

EXTRA LOW VOLTAGE LAMPS: Extra low voltage tungsten halogen lamps shall be of GEC sealed beam type or approved equal manufacture of a type selected to suit the respective luminaire. The lamps shall have a nominal colour temperature of 3000°K and an average life of 2000 hours.

03. INSTALLATION OF LUMINAIRES

GENERAL: All screws, battens, noggings, trim, packing etc. necessary for the proper fixing of luminaires shall be provided by the Contractor as part of the works whether individually specified or not.

Packing pieces of approved materials shall be fitted where required to level the luminaires and to prevent distortion of the luminaires.

Where painted surfaces are damaged, they shall be made good. Such repairs shall be of the same standard as the original paintwork.

Luminaires are to be erected subject to the agreement and approval of the Superintendent immediately prior to the application of the finishing coat of paint to the ceiling.

SURFACE MOUNTED LUMINAIRES: Luminaires shall be securely fixed to structural members of the ceiling or walls, or fixed by hangers, brackets or the like which are themselves securely fixed to building members.

Wiring to surface mounted luminaires shall be terminated on terminal blocks installed within the luminaires.

RECESSED LUMINAIRES: Recessed luminaires shall be fitted with flexible cords and 3-pin plugs. The flexible cord shall be of approved manufacture, PVC insulated, 3 core with 30/0.25 conductors and of suitable length to enable the connection to be made before the luminaire is fixed to the support.

The plug socket shall be fixed to suit the wiring system and shall be not more than 500mm from the edge of the ceiling aperture.

RECESSED DOWNLIGHTS: Recessed fluorescent downlights shall be complete with separate ventilated enclosed control gear box which shall be connected to the supply by means of plug and socket. The luminaires shall also be connected to the respective control gear box by means of a plug and socket and shall be arranged such that the luminaire can be unplugged and removed without disturbing the control gear. The control gear and luminaire plug sockets shall not be interchangeable.

POLE MOUNTED LUMINAIRES: Pole mounted luminaires shall be designed for baseplate mounting and shall be secured by means of a rag-bolt assembly cast into a substantial concrete footing. The top of the footing shall finish approximately 30mm above finished ground level. After installation of the poles the space between the baseplate and the top of the footing shall be filled with grout.

04. LIGHTING OUTLETS

The position of lighting outlets shown on the drawings are provisional only and outlets shall be installed in accordance with final architectural details. Any variations necessary to lighting outlet positions shall be carried out by the Contractor at no extra cost to the Proprietor provided that variations are within three (3) metres of indicated locations and are advised prior to installation.

05. SELF CONTAINED EMERGENCY LIGHTING UNITS

Emergency luminaires and exit signs shall comply with AS 2293. Duration of operation shall not be less than two (2) hours. Each emergency lighting unit shall be of the maintained self contained type complete with sealed nickel cadmium batteries, battery chargers, invertor, test switch and light emitting diode to indicate that the charger is operating.

Where emergency lighting units are contained within normal luminaires, the batteries and associated control equipment shall be housed in a separate metal enclosure attached to the luminaire and located so that the batteries are not affected by the high temperatures generated within the luminaires during normal operation.

06. LIGHTING SWITCHES

Lighting switches shall be HPM 'Excel' Series type or approved equal incorporating 10 amp rated switch mechanisms specifically designed to reduce the arcing associated with switching fluorescent lamps. Switches and flushplates shall be of approved colour and shall be mounted in flush boxes set in walls or surface mounted bases as applicable.

Unless otherwise specified, install all switches on the lock side of the doors irrespective of the position shown on the drawings.

The Contractor shall submit samples of all lighting switches to the Superintendent for approval prior to commencing installation.

SUBSECTION 006 POWER OUTLETS AND ACCESSORIES

01. GENERAL PURPOSE POWER OUTLETS

General purpose power outlets shall be of matching type and of the same manufacture as lighting switches and to approved sample and colour. Outlets shall be of the combination flush type mounted in flush boxes set in walls or on surface mounting bases as applicable.

Outlets shall be to approved sample and of colour to be selected by the Superintendent.

WEATHERPROOF OUTLETS: Weatherproof general purpose outlets shall be equal to Clipsal "56 Series" Industrial Switchgear and shall be complete with a lockable switch.

MOUNTING HEIGHT: The mounting height of all GPOs shall be confirmed on site with the Superintendent.

VARIATIONS: Any variations necessary to positions of general purpose power outlets shall be carried out by the Contractor at no extra cost to the Proprietor, provided that variations are within three (3) metres of indicated locations and are advised prior to installation.

02. SWITCHED PLUG SOCKETS

Switched plug sockets shall be of the five pin type equal to Clipsal "56 Series" Industrial Switchgear and shall be complete with plug top. Install a neutral conductor to each outlet.

03. FIXED POWER OUTLETS

Supply and install wiring to fixed power outlets generally as shown on the drawings and complete with isolating switches and a neutral conductor.

Fixed power outlet appliances will be supplied and placed in position by the Superintendent.

Final locations of all fixed power outlets shall be confirmed with Superintendent prior to installation of any cabling.

04. LABELLING OF POWER OUTLETS

Each power outlet shall be labelled to indicate the subcircuit to which it is connected.

GPO's shall be of the type which incorporates space for an additional switch. A blanking insert and clear cap shall be inserted in this space with a typed label.

Weatherproof GPO's shall be labelled with traffolyte labels.

05. HAND DRYERS

Supply and install hand dryers equal to JD Macdonald Engineering Co Pty Ltd manufacture where shown on the drawings. Hand dryers shall generally be installed at a height of 1200mm AFFL. Supply and install a GPO behind each hand dryer and plug the dryer into the GPO with a lead shortened to the minimum possible length.

06. PERIOD BELL SYSTEM

REQUIREMENT: The Contractor shall carry out modifications and additions to the existing School period bell system. The work shall include the following:

- Supply and install new period bells in the building as shown on the drawings.
- Extend existing period bell cabling to the building as required to connect new bells to existing.
- Carry out any modifications required to the existing period bell programme controller to control the additional bells.
- Commission and test the completed installation to the complete satisfaction of the Superintendent.

07. CEILING FANS

REQUIREMENT: Supply and install ceiling fans and controllers in the locations as shown on the drawings.

Equipment shall be selected to minimise noise where multiple fans are controlled by the one controller.

Where fan noise is considered excessive, the fans and controllers shall be replaced with new equipment.

This requirement shall be rigidly enforced.

08. SECURITY ALARM SYSTEM

REQUIREMENT: The Contractor shall carry out modifications and additions to the existing security alarm system as shown on the drawings.

The Contractor shall engage and pay for the work to be carried out by the existing security maintenance Contractor–Chubb Security.

The work shall include the following:–

- Modifications and re–programming of the existing security alarm panels as required to allow for the connection of new detectors.
- Supply and installation of new passive infra–red detectors and associated wiring.
- Commissioning and testing of the completed installation to the complete satisfaction of the Superintendent.

MOTION DETECTORS: Motion detectors shall be of the passive infra-red "dual–tech" type enclosed in an approved high impact PVC case. The orientation and characteristics of each detector shall be selected to suit the individual area.

The positions of motion detectors as shown on the drawings are provisional only. The final positions shall be determined to suit the characteristics of the detectors offered and to provide the maximum coverage in the area.

09. VOICE/DATA CABLING SYSTEM

REQUIREMENT: The contractor shall supply and install cabling to facilitate the later installation of telephones and data equipment by the School, all as shown on the drawings.

All work shall be carried out by a suitably accredited and experienced Subcontractor who shall be employed and paid by the Contractor.

The work shall include the following:–

- Supply and installation of telephone outlets and cabling connected to the existing telephone distribution frame located on the level above. Terminate all cabling.
- Supply and installation of a Category 5e data cabling in conduit from the main server in the Library to the D–link data equipment location in the new building. All equipment installation and cable termination will be carried our by the School. Leave minimum 3 metre cable tails at each location

SCHEDULE OF ELECTRICAL SERVICES DRAWINGS

Drawing No	Title
4292-ES-1	Legend
4292-ES-2	Power Layout
4291-ES-3	Lighting Layout

SCHEDULE OF WORKSHOP DRAWINGS

Workshop drawings to be submitted by the Contractor under this section of the contract shall include, but not be limited, to the following:

1 Building provisions

SCHEDULE OF PRICES
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
MUSIC ROOM UNDER EXISTING HALL
ELECTRICAL SERVICES

The following schedule is to be completed and returned with the Tender Form and will be used in the assessment of tenders and administration of the Contract.

ITEM		**FIXED PRICE**
1	Modifications to existing distribution board	$
2	Submains cabling	$
3	Luminaires, lamps, and tubes	$
4	Lighting and power subcircuit cabling	$
5	Voice/data cabling system alterations and additions	$
6	Security alarm system alterations and additions	$
7	Period bell system alterations and additions	$
8	Provision of 'as installed' drawings	$
9	General installation	$_____
	TOTAL VALUE OF ELECTRICAL SERVICES WORKS	$
	GST	$_____
	TOTAL (INCLUDING GST)	$ ==========

Note: A nett figure is to be shown against each item except for item 8 which all include all mark up and profit items.

Company: .....

Signature: .....

Witness: ..... Date: .....

SCHEDULE OF RATES
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
MUSIC ROOM UNDER EXISTING HALL
ELECTRICAL SERVICES

The following schedule is to be completed and returned with the Tender Form and will be used in the assessment of variations to the value of the contract.

		ADDITION	DELETION
1	Supply and installation of wiring for one (1) only lighting outlet wired in TPS cabling on an existing circuit within five (5) metres of an existing outlet.	$	$
2	Erection of one (1) only lighting fitting (excluding supply of lighting fitting).	$	$
3	Supply and installation of one (1) only wall mounted GPO wired in concealed conduit and looped in from an existing outlet within ten (10) metres run. Cost to include building in of conduit to concrete structure and masonry wall.	$	$
4	Installation of one (1) only circuit breaker within an existing spare space (excluding supply of circuit breaker).	$	$
5	Supply and installation of one (1) additional PIR detector.	$	$
6	Percentage mark-up on materials cost to be used in calculating variation costs.		%
7	Labour rate to be used in calculating variation cost	$ per hour	

Company: .....

Signature: .....

Witness: ..... Date: .....

Shelmerdines
Consulting Engineers

SPECIFICATION

of work to be done and materials to be used in connection with the provision of

MECHANICAL SERVICES

for

MUSIC ROOMS UNDER EXISTING HALL

at

LOQUAT VALLEY
ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD, BAYVIEW

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4292MSP
TENDER ISSUE – 3 JUNE 2005

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Revision	**Date**	**Description**
A	3.06.2005	TENDER ISSUE

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SUBSECTION 001 GENERAL

01. GENERAL

The contract provides for the supply, installation, testing and commissioning of mechanical services required for the alterations and additions at Loquat Valley Anglican Preparatory School, Pittwater Road, Bayview.

The contract includes the provision of all materials, labour, cartage, freight, tools, plant, appliances and all other works necessary, though not specifically mentioned, to the true intent and meaning of this specification and the accompanying drawings, to the entire satisfaction of the Superintendent.

All works shall be carried out generally as shown on the accompanying drawings and shall comply with the relevant clauses of this specification. The complete installation shall meet all requirements of the Governing and Statutory Authorities.

02. REFERENCE TO PRELIMINARIES

The mechanical services section of the specification shall be read in conjunction with the Preliminaries and all other relevant sections.

03. NOTICE TO TENDERERS

The services form a vital aspect of this contract and it is imperative that when seeking mechanical services prices, tenders are obtained from companies experienced in Educational Facility Mechanical Services.

Tenderers will be required to complete the Schedule of Prices and Schedule of Technical Data to allow the proper assessment of the tender submission.

04. DRAWINGS

TENDER DRAWINGS: The drawings as scheduled are issued as a guide only and shall be considered to be diagrammatic and approximate. The drawings and specification are intended to be mutually explanatory and complete, but all work called for by one, even if not by the other, shall be fully executed. Should the documents be in conflict, the Contractor will be deemed to have included for the larger and/or the more expensive component/s as applicable.

SHOP DRAWINGS: Prepare all necessary co-ordinated manufacturing and installation shop drawings covering the services included under this contract. Confirm final installation dimensions by site measurement, to ensure satisfactory set out and co-ordination with the structure and new or existing services.

All shop drawings shall be submitted in reproducible negative form. Such drawings shall be submitted to the Superintendent for comments and approval. Manufacture and/or installation as applicable shall not be commenced prior to the Superintendent's written approval of the drawings.

The Superintendent shall not be regarded as the Contractor's checking agents. Approvals of shop drawings will be given in principle only and without prejudice to the responsibility of the Contractor for the proper co-ordination, installation and operation of the services.

The preparation of shop drawings shall be scheduled to enable the necessary approvals to be gained and for the Contractor to comply with his programme for installation of the services. Delays caused by late submission, incorrectness or inadequacy of shop drawings will not be recognised as a reason for variations to the contract time or contract sum.

Copies of the approved shop drawings shall be submitted to the appropriate authorities as necessary for their approval.

AS-INSTALLED DRAWINGS: Show the complete services installations as-installed on the drawings. Supply to the Superintendent one microfilm set and two sets of prints of the as-installed drawings. The Contractor shall provide also three (3) sets of prints of these drawings, bound into the Operating and Maintenance Instructions.

05. MATERIALS AND WORKMANSHIP

Unless indicated otherwise the whole of the material used in this work shall be new, of first quality and of approved manufacture and type. All materials shall be to the approval of the Superintendent. No approval of the Superintendent shall be deemed an acceptance of materials or workmanship not complying with the requirements of this contract.

The whole of the workmanship shall be first class, neat and substantial and to the entire satisfaction of the Superintendent.

The installation throughout shall comply in every respect with the various codes published by the Standards Association of Australia together with any additional requirements which may be specified herein.

06. SAMPLES

The Contractor shall submit to the Superintendent samples of selected equipment and fitting to be used in the works for approval.

07. INSPECTION AND TESTS

The Superintendent may at any time during the progress of the works, test and examine any material used and inspect the workmanship employed, and may reject any material and workmanship that is not in accordance with the specification and drawings.

The Contractor shall provide such assistance as may be required by the Superintendent to carry out tests, including facilities for inspection at works.

On completion the installation shall be tested in the presence of the Superintendent and passed by the authorities having jurisdiction over the works.

Two (2) copies of all approvals and test certificates issued by the authorities shall be submitted.

All plant and equipment having electrical connections shall be tested for insulation and earth resistance, and passed by the Supply Authority. The Superintendent shall be given seven (7) days written notice of commencement of final tests.

08. OPERATING AND MAINTENANCE INSTRUCTIONS

The supply of all necessary information for the satisfactory operation and maintenance of the services shall form part of this contract.

In addition to the "as-installed" drawings required the Contractor shall supply to the Superintendent, three (3) copies of approved detailed operating and maintenance instructions. Instructions shall be supplied with the "as-installed" drawings in approved bindings and shall be supplemented by diagrams and spare parts schedules.

09. ALTERNATIVES

Generally, Tenderers shall adhere to the types of plant and equipment detailed in the drawings and specification. Where these requirements preclude Tenderers from offering plant of their standard manufacture, alternatives may be submitted for approval.

Unless such alternatives are accepted in writing by the Superintendent, the Contractor shall comply with the detailed requirements of the specification.

10. PERFORMANCE GUARANTEE

By accepting the contract, the Contractor will be deemed to have guaranteed the performance of the installation under normal working conditions for a period of twelve (12) months from the date of practical completion of the works.

Should the installation or any part thereof fail to fulfil the requirements of this specification, performance of the relevant equipment will be corrected by the Contractor at his own expense or the equipment will be liable for rejection.

The Contractor shall be responsible for the replacement of any portion of the installations so rejected and for all costs incurred thereby, including the costs of any associated works of other trades. The guarantee period for the replaced portion shall then be extended to cover twelve (12) months trouble free performance.

11. WARRANTY

All plant, equipment and materials supplied under this contract shall be covered by twelve (12) months warranty against faulty manufacture, workmanship and/or materials. The Contractor shall be responsible for the rectification and/or replacement of any portion of the installation which fails under warranty.

The warranty period shall commence as from the date of practical completion or replacement, as applicable, but extension of the period shall be made in respect of replaced portions only.

12. DEFECTS LIABILITY

The Contractor shall be responsible for the rectification of all defects in the work due to faulty materials and/or workmanship for a period of twelve (12) months after all work is completed and handed over. Such defects shall be made good immediately on receipt by the Contractor of advice from the Superintendent.

Any defects discovered during the defects liability period which are due to default or negligence of the Contractor in the performance or observance of any of his obligations shall extent the period to enable such defects to be made good by the Contractor, and to allow the whole work after being made good in every respect to be proved satisfactory.

13. REGULATIONS, FEES AND NOTICES

The services installation covered by this contract, shall be complete with all equipment necessary for their satisfactory operation, control, maintenance and safety under all normal conditions of service, and shall comply in every aspect with the Regulations and By-Laws of all Authorities have jurisdiction, including the latest requirements of the following, as applicable.

The Contractor shall obtain and fill in all notices required by the various authorities when necessary and pay all fees in connection therewith and shall submit for approval all necessary drawings and obtain all consents required to permit execution of the works.

14. PROTECTION OF PLANT AND MATERIALS

The Contractor shall be entirely responsible for all apparatus, equipment and appurtenances furnished by him or his Subcontractors in connection with the works.

Special care shall be taken to protect all such goods in a suitable manner.

The protection shall include covers to prevent moisture, grit plaster or other foreign substances from entering the working parts of plant and equipment. Seal and protect all open ends of ductwork, piping and conduit (as applicable) while in storage and during the course of installation and protect adequately all electrical and control equipment.

All materials, goods and equipment forming part of this Contract must be complete, intact and in new order when the Proprietor takes over the responsibility for the works and it shall be the liability of the Contractor to safeguard such materials, goods and equipment until then.

15. MAINTENANCE SERVICE CONTRACT

Carry out regular preventative maintenance during the warranty and defects liability period, on a monthly basis. Carry out maintenance routines to ensure proper operation of the equipment in accordance with the manufacturer's requirements and good practice. Provide all minor miscellaneous materials required in carrying out the works.

SUBSECTION 002 EXTENT OF WORK AND GENERAL REQUIREMENTS

01. EXTENT OF WORK

The works to be carried out under this contract comprise the supply, delivery, installation, testing and commissioning of the complete mechanical services installation complying with the detailed requirements specified herein and generally as shown on the drawings.

- One (1) multi–head reverse cycle air cooled air conditioning system serving two (2) wall mounted and four (4) ceiling suspended type indoor units.
- One (1) reverse cycle air cooled ceiling cassette air conditioning system.
- One (1) wall mounted toilet exhaust fan.
- All drains from the equipment, piped to discharge over a tundish or drain point.
- All sheet metal ductwork for the ventilation, supply, outside air ducting complete with all diffusers, registers, grilles, volume controls, dampers a access panels, flexible connections, flexible ductwork, drain connections, gaskets, flashing collars, hangers, fittings and the like to form complete air distribution systems.
- Positioning and fixing of all holding down bolts, sleeves conduits and any other fittings required to be built-in during construction.
- Provision of detailed drawings of all plinths, kerbs, drain points, penetrations, access panels, eye bolts and the like and any other items required to be provided by other trades on behalf of the Contractor.
- Labelling of the complete installation as specified.
- All electronic/electric controls system complete with all controls and safety devices, necessary for completely automatic, unattended and safe operation.
- All electrical and control conduit and cabling between each item of mechanical services equipment and the respective mechanical services switchboard or isolation switch.
- Painting of the complete mechanical services installation as specified.
- Provision of twelve (12) months operational maintenance service.
- Provision of as-installed drawings, completed tests reports and equipment data, operating and maintenance instructions at practical completion.
- Testing and commissioning of all equipment installed under this contract.
- All ancillary items necessary to fully commission all the mechanical service plant associated with this contract.

02. ASSOCIATED WORKS

- All normal cutting, patching and making good of the building structure for the clear passage of pipes, ducts conduits, grilles etc.
- Tundish in the location shown on the drawings.
- Supply, installation, termination and connection of 415/240 volt, power supply submains to isolating switches adjacent to mechanical services equipment..
- Removable tile ceilings for access to equipment where shown.

- Provision of penetration in walls for the passage of ductwork, piping, conduits etc.
- Concrete plinths for external plant as indicated on the drawings.
- Provision of louvres as indicated on the drawings.

03. AIR CONDITIONING SYSTEM DESIGN CONDITIONS

OUTSIDE DESIGN CONDITIONS:

Summer 32°C DB 23°C WB at 3pm December

Winter 7°C DB at 9am July

INSIDE DESIGN CONDITIONS:

Summer	Winter
24 °C±1	21°C±1

04. SYSTEM PERFORMANCE GUARANTEE

By accepting the contract, the Contractor will be deemed to have guaranteed that the installed mechanical services installation will meet the plant performance requirements as detailed in this specification, when operating within the design references as stated in Clause 03 in Section B, and that the systems installed will automatically maintain specified conditions throughout the air conditioned areas under all conditions of summer, winter and between seasons loading.

05. SYSTEM RESISTANCES

The capacity of plant, particularly fans shall be as specified when operating against the actual installed system resistances.

The system resistances stated in this specification are given as a guide only and the Contractor shall be responsible for the proper matching of all plant performances in accordance with the final systems resistance resulting from the use of his plant, and ductwork reticulations.

06. SAFETY FACILITIES

Installations carried out under this contract, shall be provided with all normal safety facilities, for protection against personal hazard and damage to equipment and complying with the requirements of all Authorities having jurisdiction over the works.

Facilities shall include guards, housings, shrouds, electrical overload devices, warning notices and similar provisions.

07. FIXINGS

Fixings necessary for attaching equipment, conduit, ducting, brackets, and similar items to floors, ceilings and walls shall be Rawl, Sebco or approved equal adjustable metal-expansion devices, of the type installed in pre-drilled holes. Wooden plugs and explosion set fixings will not be allowed.

08. BEARINGS AND LUBRICATION

All bearings and methods of lubrication shall be of approved type in each instance, and suitable for continuous operation.

All lubricators shall be readily accessible and shall be protected against the entry of dust.

All bearings shall be checked during tests and any necessary adjustments shall be made prior to handing over.

09. LABELS AND IDENTIFICATION

All items of plant equipment, mechanical services switchboard, miscellaneous equipment and services shall be clearly identified by means of approved type labels, identification tags, stencilling and colour code paint finishing.

The sizes of all labels and nameplates, and the lettering and wording thereon shall be to approved schedule and sample.

All identification lettering and all markings shall conform with those shown on the as-installed drawings. The locations and sizes of labels and wording, where applicable, shall be shown on the respective shop drawings.

Items of plant and equipment shall be identified by means of 75 mm high black stencilled block lettering on background colour panels of appropriate size.

Ductwork and pipework shall be finished, colour-banded and identified generally in accordance with AS 1345.

Colour bandings shall be accompanied by directional arrows where applicable. Arrows shall be 75 mm long for pipes of 50 mm diameter and under, and 150 mm long on larger pipes and ductwork.

Generally, labels shall be of laminated Traffolyte, with polished white surfaces, bevelled edges and black engraved block type lettering, and shall be secured by an approved surface adhesive and screw fixed.

Each valve shall be identified by means of punched lettered and numbered 25 mm diameter brass tag, secured to the handwheel by a brass chain link.

Identification shall include system identification prefixes followed by valve numbers and shall correspond with markings used on the as-installed drawings.

10. NOISE AND VIBRATION

GENERAL: Control of the noise output and vibration from the installed plant is required.

The plans and specification indicate the extent of acoustic treatment and vibration isolation required to obtain the noise level rating in the occupied areas as specified hereafter calculated on the basis of the sound power levels of the individual items of equipment specified or as nominated in the Manufacturer's Catalogue data.

Where noise limitation and reduction is critical then the maximum sound power levels of the individual items of equipment are specified.

Where alternative brands of equipment are offered, or equipment which has a greater sound power level than the brand of equipment or the sound power level specified then the acoustic treatment provided shall be examined in the light of the particular equipment selection and any additional treatment necessary to maintain the noise levels within the specified limits shall be provided.

The maximum noise level due to the plant in any part of the building other than Plantrooms or unoccupied utility rooms have been designed not to exceed the noise rating curve set for the following areas:

Air Conditioned areas - NR40 General

Mechanically Ventilated Areas - NR 45

Areas not nominated to be evaluated according to the Australian Standard AS 2107. The noise environment outside the building shall be evaluated using the State Pollution Control Commission's "Environmental Noise Control Manual 1985".

Equipment and plant shall be installed and adjusted in accordance with the specification and the manufacturer's recommendations. The installation, balancing and adjustment of all air, refrigeration and water systems shall be carried out in such a way as to avoid noise generation at dampers and valves due to incorrect balancing procedure or incorrect installation or adjustment of splitter dampers, guide vanes and the like.

NOISE MEASUREMENT: If noise from the plant is obviously excessive due to noisy bearings or scraping of rotating parts in guards or housings or other similar malfunctions, then the equipment shall be repaired or replaced without first carrying out noise measurements.

Noise measurement shall only be required if excessive noise is evident, in which case the noise measurement tests shall be carried out by the Contractor. If such measurements show that noise from items of equipment exceeds the sound power levels specified, or alternatively if no sound power level is specified and the noise exceeds the manufacturer's catalogue data, then the cost of noise measurement shall be the Contractor's responsibility, at no extra cost to the Principal.

Noise measurements shall be made at the completion of the installation and after the system has been balanced. Noise measurements shall be made with a sound level meter and octave band filter set of approved manufacture.

The meter shall be calibrated prior to and after noise measurements.

Noise measurements shall be made no closer than one (1) metre from any air outlet or intake or wall, and at a height of at least one (1) metre from the floor.

VIBRATION: The following minimum precautions shall be taken to prevent the generation and transmission of vibration to the building structure.

MACHINERY: Machinery shall be statically and dynamically balanced and shall be isolated from the building structure as required.

Vibration isolators shall be selected with due regard to the weight and speed of the equipment to be isolated and shall have isolating efficiencies as specified for the particular equipment or in any case, not less than 95%. Springs shall be selected to have a length when loaded approximately equal to their diameter.

Where inertia blocks are required, the selection of vibration isolators and the mass of the inertia block shall be co-ordinated to give the required isolation efficiency.

CONNECTIONS: The connection of electrical cables, piping and ductwork to vibrating machinery shall be sufficiently flexible to prevent transmission of vibration.

PIPING: Piping shall be designed to have sufficient flexibility where connected to vibrating machinery and shall be effectively isolated from the building structure where necessary to prevent the transmission of vibration.

DUCTWORK: All ductwork and fittings shall be designed and constructed so as to prevent any excessive generation of air noise, vibration of fittings, or drumming of ductwork.

PARTICULAR REQUIREMENTS: The following list summarises the vibration isolation requirements for the equipment in this project:

- Fan coil units and inline centrifugal fans

  Spring mounting with neoprene cups, 25 mm static deflection and tie bars or snubbers where necessary.

- Air cooled condensing units

  Neoprene waffle pads

11. PAINTING

Except where otherwise specified, all exposed parts of the installation shall be three (3) coat paint finished to the approval of the Superintendent.

The term 'exposed' shall be taken to be:

- Surfaces exposed to view or exposed to weather.

Prior to painting, all surfaces shall be cleaned-down to remove all grease and rust from the surface.

Concealed ungalvanised ferrous surface shall be given one (1) coat of approved rust-inhibiting primer prior to installation. Galvanised surfaces shall be etch primed before paint finishing.

All damaged paintwork and joints shall be touched up after installation.

All ductwork interiors and volume control dampers exposed to view behind the diffusers, registers, grilles, etc, shall be finished in matt black paint.

SUBSECTION 003 MAJOR ITEMS OF EQUIPMENT

01. AIR CONDITIONING EQUIPMENT

Operating Conditions

Provide equipment which operates within an ambient temperature range of 0° to 45°C, without excessive head pressure, unstable operation or icing.

Equipment Enclosures:

Outdoor Location: Provide enclosures, materials and finishes which are corrosion-resistant, and weatherproof if necessary.

Construction: Assembled and reinforced to prevent flexing and drumming. Provide for removal of major components.

Access: Provide access for inspection and maintenance.

- Access panels: Readily removable with positive re-useable fasteners and soft gaskets which provide an airtight seal.

Insulation: Insulate enclosures to prevent external surface condensation under operational conditions.

Condensate Trays

General: Provide a tray under each cooling coil section, extending downstream to collect water carry over, and under components on which condensation can occur.

Material: Corrosion-resistant.

Insulation: Insulate trays to prevent condensation internally and on external surfaces of the unit enclosure, under operational conditions.

Reverse Cycle Units: If reverse cycle outdoor units do not have drain connections, locate condensate trays below units.

Condensate Drains: Connect condensate trays to nearest drain points by means of trapped minimum DN 20 drain lines.

Hermetic compressors

Refrigeration Service: Provide facilities for access to suction and discharge sides of refrigeration circuits.

Installation of Condensers

Provide clearance around units for condenser air flow and maintenance access.

Internal Refrigeration System
Standard: To AS 1677.

Piping: Copper pipe to AS/NZS 1571.

Insulation: Elastomeric foam

Reverse cycle units: Provide:

- effective outdoor coil defrost facility; and
- refrigerant reversing valve.

02. MULTI-HEAD REVERSE CYCLE SYSTEM

General

The multi-head reverse cycle systems shall be a Daikin Super Multi Plus heat pump system or equal approved manufacturer.

The system shall be air cooled, split multi-system air conditioner consisting of outdoor units, Branch Controllers and indoor units as noted in the equipment schedule.

The nominated indoor units shall be controlled and grouped as scheduled.

Outdoor units shall contain an inverter controlled scroll compressor suitable for R407c refrigerant.

Branch Controllers shall be provided to connect indoor and outdoor units and efficiently distribute refrigerant in accordance with the heating and cooling modes.

The system operating temperature range capability shall be:

- Cooling: -5°C DB to 43°C DB
- Heating: -12°C WB to 15°C WB

PACKAGED OUTDOOR UNIT

The unit shall be factory assembled and tested. The cabinet housing shall be weatherproof rust resistant steel construction with an acrylic paint finish. Condenser air will discharge vertically upwards with air inlets positioned front and rear.

The outdoor unit shall feature the following:

- The sound level shall not be greater than 57/58 dB(A) when measured 1 metre from unit and 1.5 metres above ground level.

Compressor – Inverter

The compressor shall be a high efficiency hermetic scroll design, suitable for inverter control. Capacity load variations from 16% to 100% shall be achieved by compressor speed changing to match cooling and heating demands.

The inverter linear control shall be stepless.

Heat Exchange Coils

The condenser coil shall be constructed from refrigerant quality copper tubing mechanically expanded into aluminium fins.

Refrigeration System

The refrigeration circuit shall include accumulators, sub-cool heat exchanger, service access, isolating and solenoid valves.

An oil recovery system shall be provided to maintain optimum system performance with long pipe runs.

R407c Refrigeration System

A refrigerant composition sensing circuit shall be included to sense the refrigerant blend, composition and system control.

INDOOR UNIT

The nominated indoor units shall provide continuous refrigerant control by electronic expansion valve. The variable refrigerant flow rate will match room cooling and heating requirements.

The supply fan shall be a forward curve direct driven by a single phase induction motor.

The control address for each indoor unit shall be individual/group control as noted.

Remote controls shall be used as noted to provide individual control and be capable of simultaneous operation and control of up to 10 indoor units if required.

Indoor units are to be individually remote controlled.

Indoor units shall be complete with integral condensate pump with minimum lift of 750 mm.

BRANCH CONTROLLER

Branch Selectors (BS) shall be supplied as shown. The unit shall be ceiling mounted as noted on the drawings.

BS control system shall interface with outdoor and indoor unit control systems to achieve heating and cooling as required.

Internal refrigeration system

Standard: To AS 1677.

Piping: Copper pipe to AS/NZS 1571.

Insulation: Elastomeric foam.

Reverse cycle units: Provide:

- effective outdoor coil defrost facility; and
- refrigerant reversing valve.

03. CONDENSING UNITS

GENERAL: Provide packaged condensing units consisting of refrigerant condensers, compressors and associated piping and electrical connections, mounted within the condenser enclosure.

MULTIPLE COMPRESSOR UNITS: Provide separate control and electrical circuits for each refrigerant circuit.

PRESSURE CUT-OUTS: Provide a manual reset high pressure and an auto reset low pressure cut-out for each compressor.

MOTOR PROTECTION: Provide short circuit protection by means of high rupture coefficient (HRC) fuses or circuit breakers and a contactor (with manual reset thermal overload) for each compressor and each 1 phase motor.

SHORT CYCLE TIMER FUNCTION: To limit compressor starts.

04. FAN COIL UNITS – CEILING MOUNTED

GENERAL: Provide ceiling mounted fan coil units of the cassette type having perimeter supply outlets and central return air.

REQUIREMENT: Provide manufacturers standard filter accessible through hinged down panel.

CONDENSATE: Provide condensate pump having minimum lift of 350mm

CONNECTION: Provide knock out panels in cabinet suitable for attachment of flexible ductwork and remote diffuser.

CONTROLS: Wired type including temperature sensor capable of providing following functions:

Mode selector	-	cooling
	-	fan
	-	heating
	-	air pattern
Timer switch	-	process timer
Fan speed switch	-	high
	-	medium
	-	low

05. WALL MOUNTED EXHAUST FANS

Wall mounted exhaust fans shall be Fantech Stylevent or equal approved.
QUALITY: Test:

Fan performance: To BS 848:1

Fan sound power levels: To BS 848.2

Balancing: Impeller and motor assembly to be statically and dynamically balanced at the factory.

CONSTRUCTION: Impellor:

Material: Galvanised steel

Type: Axial

MOTOR: Type: External rotor

Power rating: At least the power required by the fan when the airflow is increased 10% above the specified design air flow against the corresponding increased system resistance.

Bearings: Provide bearings sealed for life.

HOUSINGS: Weather and impact resistant housing with integral shutters.

06. WEATHERPROOF LOUVRES

Louvres shall be Air Grilles OAL–100 or equal approved manufacture, single stage, weatherproof louvres.

Louvres shall be of extruded aluminium construction with powdercoat/anodised finish to architects approval, complete with vermin proof mesh.

Louvres shall have a minimum free area of 55%.

SUBSECTION 004 PIPEWORK AND ACCESSORIES

01. GENERAL REQUIREMENTS

The material to be used and installation requirements relating to pipework installations to be carried out are described in the following subclauses.

The drawings indicate the general run of pipes and valve requirements of the systems. Final pipe sizes are dependent on plant offered. The sizes shall be confirmed prior to installation.

Valves and fittings normally provided as an integral part of the various items of plant to be supplied are not specifically detailed but allowance shall be made for such.

All pipework shall be so constructed that it will be free for expansion movements and so that it will not, in moving, damage any other work or itself.

Special care shall be taken in the arrangement of piping to ensure neat and workmanlike appearance and true alignment and grade. Horizontal lines of piping shall be graded in the direction of flow or against as necessary.

Pipes shall be laid out as far as possible to minimise cross-overs and shall be co-ordinated in this regard with services of other trades. The set-out of all piping shall be approved by the Builder prior to installation.

All pipes and fittings shall be delivered to the job unpainted and shall be thoroughly cleaned before erection, removing scale, burrs, fins and obstructions.

02. REFRIGERANT PIPING

Piping materials to be used for the respective services shall be as follows:

Service	Material
Refrigerant	Copper to AS1432 Type B

03. REFRIGERANT PIPING AND FITTINGS

Pipes

Standard: To AS1571

Temper designation: H temper. 0 temper may be used for pipes <DN 25 or for pulled bends or flared joints.

Pipe wall thickness:

Pipes = DN 50: To AS1432 Type B.

Pipes >DN 50: 1.6 mm, minimum

Bends

Pulled bends: Form bends without flattening the cross section or wrinkling the inside radius.

Pipes < DN 18:

- Minimum inside radius: 3 pipe diameters.
- Minimum included angle: 90°

Pipe Fittings

Copper alloy fittings: To AS3688, dezincification resistant

Flared fittings: To SAE J533. Use flare coupling nuts designed for high pressure refrigeration work.

Preformed fittings: Preformed refrigerant capillary line tees, bushes, couplings and elbows. Wherever possible make reductions at elbows, tees, line devices or equipment connections using reducing fittings; otherwise use reducing bushes or reducing couplings.

Compression fittings: Use flareless twin ferrule, torque free, mechanical grip fittings which can be gauged using a precision ground and hardened metal gap inspection gauge.

Brazed Joints

General: Use preformed capillary fittings or form capillary unions by expanding one pipe end. Prevent flux and brazing alloy from entering pipes. Use dry nitrogen to purge air from pipes before brazing. During brazing, maintain a flow of dry nitrogen through pipes to prevent oxidation.

04. REFRIGERANT PIPING TESTING

PRESSURE TESTING: On completion of erection the refrigerant circuit except for pressure gauges, controls, compressors which may be valved off, shall be pressure tested with dry inert gas to the following pressures. Carbon dioxide shall not be used.

High Pressure side 2000 kPa (gauge)

Low Pressure side 1200 kPa (gauge)

Test pressure shall be maintained for a sufficient period to permit examination of the system to the full satisfaction of the Consulting Engineer.

All joints, flanges and the like shall be tested for leaks with soapy water mixture. Any leaks shall be repaired.

EVACUATION: The system shall be evacuated to a pressure of less than 25 Pa absolute and held at this pressure for 6 hours. I The vacuum shall be broken with clean dry nitrogen, the pipework evacuated again and held for 3 hours.

The vacuum shall then be broken with clean dry refrigerant. A third evacuation shall be carried out and the system charged with the correct quantity of refrigerant and oil and tested for leaks with a halide torch.

At no time shall refrigerant be relieved to atmosphere.

05. CONDENSATE DRAINS

Condensate drains within the building shall be UPVC.

Condensate drains run outside of the building on walls etc shall be copper (unpainted).

06. IDENTIFICATION OF PIPEWORK

- Pipework shall be painted as specified.
- Fluid carried description labels (ie refrigerant R22 suction line) to be applied.
- Direction of flow chevrons to be applied.
- Labels and markers to be precoated with an aggressive pressure sensitive adhesive.
- Markers shall incorporate a ground colour black.
- Positions and quantities of labels and markers shall be as directed by the Builder.

SUBSECTION 005 INSULATION AND SHEATHING

01. DESCRIPTION

Supply, deliver and install insulation and sheathing as detailed below and as shown on the drawings.

PIPEWORK INSULATION:

- Refrigerant suction and liquid pipework

SHEATHING:

- Refrigeration pipework exposed to weather or outside building

02. GENERAL

The insulation work specified shall be carried out by experienced personnel.

Where there is any anomaly between the scope or intent of this specification and the drawings, allow for the most expensive arrangement.

The extent of insulation is shown on the drawings using markings detailed on the legend.

Submit samples of insulation materials, adhesives and vapour barriers, together with certificates detailing Combustibility and Early Fire hazard Properties in terms of AS 1530 Parts I and III, and details of fastening methods, for each type of pipe and duct insulation, and obtain approval prior to commencing work.

Insulation of pipe supports shall be provided with wood blocks or pre-formed insulation sections. It is stressed that vapour seals (and sheathing where applicable) on below ambient temperature piping shall be continuous through underneath all pipe support brackets and clamps.

All internal insulating or acoustical materials used within ductwork, shafts, attenuating chambers, and the like shall be non-combustible in terms of AS 1530 Part I and under conditions of fire or intense heat shall not give off toxic emissions, and shall have Early Fire hazard Properties not exceeding the following Indices when tested in accordance with AS 1530 Part III.

Spread of Flame	0
Ignitibility	0
Heat Evolved	0
Smoke Developed	3

All insulation materials used externally on ductwork, chambers, pipework and equipment shall be non-combustible in terms of AS 1530 Part I.

All adhesives, vapour barriers, breather coatings used on ductwork, plant and services, shall have Early Fire Hazard Properties not exceeding the above Indices when tested in accordance with AS 1530 Part III.

All adhesives, vapour coatings and sealers shall be selected and applied in accordance with the manufacturer's recommendations for the application to give a permanent bond and/or seal under conditions of installation and operations.

Alternative methods and materials to those specified hereafter shall have been submitted and accepted at the time of tendering in accordance with the Conditions of Tendering. They shall achieve overall heat transfer co-efficients and moisture vapour permeance not greater than the methods and materials specified. In addition, alternative methods and materials shall comply with the non-combustible non-flammable and Early Fire hazard Properties specified and shall be approved for use in the particular application by the relevant Authorities.

03. REFRIGERANT PIPEWORK

Refrigerant shall be insulated with Armaflex or approved equal closed cell foam tubular pipe insulation. The insulation shall be slipped along the pipework during installation and shall not be slit and glued. Butt joints in insulation shall be glued and taped with self adhesive foil tape.

Where exposed to weather, pipes shall be sheathed in 0.6mm zincanneal formed to suit. For small pipes and multiple pipes accessible sheetmetal ducts may be used.

SUBSECTION 006 ASSOCIATED ELECTRICAL WORKS

01. DESCRIPTION

Supply, deliver, install, test and commission all electrical works associated with the Mechanical Services section of this contract. The installation shall be complete in all respects and shall incorporate the following:

- All power cabling between each item of mechanical services equipment and the associated isolating switch shall be provided by the mechanical trade.
- All necessary electrical control wiring as detailed under Section 'Automatic Controls'.

02. REGULATIONS

REQUIREMENT: The complete electrical installation shall comply with the requirements of Australian Standard AS3000 Parts 1 & 2 and the local Supply Authority.

03. BALANCE OF LOAD

REQUIREMENT: As far as is possible, the load shall be balanced between the individual phases of supply.

04. COLOUR CODE AND IDENTIFICATION

REQUIREMENT: The following colour code shall be used throughout the installation.

Busbars and cabling within switchboards and all submains cores and polyphase subcircuits shall be coloured red, white and blue in accordance with the Supply Authority's phase rotation.

Circuits and subcircuits for power shall be coloured as follows:

Multiphase circuit active conductors	red, white, blue
Single phase circuit active conductors	red
Neutral conductors	black
Earth conductors	green yellow
Cable identification within switchboards:	
Active conductors	red, white blue
240V Neutral conductor	black
Voltmeter, Ammeter wiring	red, white, blue and black
240V control (isolator controlled)	grey
240V control (non-isolator controlled)	orange
ELV AC active	brown/red
ELV AC common	brown/white
ELV devices	brown
ELV DC positive	blue/red
ELV DC negative	blue/white

Earth	green/yellow

No departure from the colour code specified will be permitted without the written approval of the Superintendent.

Control wiring shall be colour coded as appropriate to the installation and in a manner designed to clearly identify the individual types of conductors (eg active, common, signal).

For systems having twelve (12) or more control circuits, the control wiring shall be numbered where joining switchboard terminal strips. In addition, control wiring to be terminated in control panels or switchboard provided by other Trade Contractors shall be numbered at their origin and termination. The numbering shall be by means of crimp-on plastic ferrules with engraved or moulded numbers or other approved means. All terminal strips shall be numbered for each wiring connection.

Numbers on the ferrules and terminal strips shall correspond with the identification marking on circuit diagrams forming part of the as-installed drawings.

05. EARTHING

REQUIREMENT: Supply and install a complete system of Multiple-Earth-neutral (MEN) earthing to earth effectively the main switchboards, distribution boards, conduits, cables, ducts, fixed and general purpose outlets, metal flushplates and lighting fittings and otherwise as required by the SAA Wiring Rules and Integral Energy.

Earth continuity shall be maintained throughout the installation and test certificates of earth continuity and resistance, measured at each switchboard and at each item of plant and equipment shall be supplied to the Superintendent prior to handing over the works.

The size of earth conductors shall not be less than those required by the SAA Wiring Rules and as determined by the full current carrying capacity of the submains cables and the subcircuit concerned. Earthwires shall be run within the conduits.

06. SWITCHBOARD MANUFACTURE

REQUIREMENT: The Contractor will be held completely responsible by the Superintendent for all aspects of the supply of the boards including submission of shop drawings, manufacture to specification requirements, co-ordination of Integral Energy and installation requirements and delivery to meet the building programme.

Accordingly tenderers are advised to assure themselves of the capacity of their selected manufacturer to meet the contract requirements.

07. SWITCHBOARDS

REQUIREMENT: Supply and install switchboards of approved manufacture.

The Contractor shall confirm requirements for the switchboard enclosures in relation to dimensions, access, construction etc.

The switchboards shall be of the wall mounted top connected type and shall be manufactured in accordance with Australian Standard 3439.1-1993 and the additional requirements set out in this specification. The switchboards shall be of the totally enclosed steel cubicle type and of Form 1 construction as defined in AS 3439.1.

Switchboard cubicles shall be manufactured and finished at works, complete with all internal busbars and wiring, and shall be tested and passed by the Superintendent prior to delivery.

The finish of the switchboards shall be to the entire satisfaction of the Superintendent.

The front of the switchboard shall incorporate a removable panel at the top of the switchboard for mounting main isolating units and hinged panels housing all stop/start switches, pilot lights and meters. All other equipment shall be mounted within the cubicle, accessible through hinged lockable doors.

Construction

Switchboard cubicles shall be manufactured in first-quality sheet steel, equal to Lysaght CRCDQ and of 2.0 mm minimum thickness, and shall be constructed as integral units of pressed metal panels and with angle iron or equal structural members. Front openings visible with doors in the open position or with covers removed shall be returned so that raw edges cannot be seen. Cubicles shall present flush surfaces free from screws, bolts and similar projections. All corners and edges shall be radiused to the extent necessary to prevent fracture of metal folds.

The assemblies shall be of sound and rigid construction, free from any sag, deformation or twisting, and shall be designed to withstand normal operating stresses and the prospective fault conditions of <6kA at 415 volt AC symmetrical. The rigidity of the switchboards shall not be dependent on access doors or panels being in the closed position. Cubicles shall be vermin-proof, drip-proof and substantially dust-proof. The degree of proofing (protection) shall be minimum standard IP44 as defined in AS 1939. External covers shall be dust-proofed by a neoprene or similar gasket fixed in a channel formed on all edges.

Escutcheon panels shall be provided to all moulded case circuit breaker enclosures. Metering equipment shall be installed on drop down panels complete with chrome plated hinges. Access to cabling and busbar compartments shall be by means of removable panels.

All panels shall be secured by means of captive C.P. bolts screwed into a thickness equivalent to at least four (4) full threads.

All steelwork and equipment fixing nuts, bolts and washers shall be plated or otherwise treated to approval to prevent corrosion.

When steel sections are mated by bolting or welding, an approved rust-inhibiting protection treatment shall be applied prior to such bolting or welding.

Following completion of the frame, burrs shall be removed from all edges and drillings, and the assembly thoroughly cleaned down, degreased and treated with an approved rust inhibitor. Any blemishes on external surfaces shall be filled flush. After the application of suitable undercoats, inside surfaces of cubicles shall be spray-paint finished in two (2) coats of gloss white enamel and outside surface in three (3) coats of X-15 orange to AS2700.

The switchboards shall be mounted on a black painted 75mm galvanised steel channel base.

Busbars

Busbars shall be of high conductivity copper throughout and shall comply in all respects with AS 2067. All internal connections within switchboards (except for control cabling) shall be by busbars.

Cross sectional areas of busbars shall be adequate to carry maximum load currents continuously without exceeding temperature rises and allowable voltage drops as specified in the relevant Australian Standards and the SAA Wiring Rules.

Phase rotation and identification markings of busbars shall be in accordance with Supply Authority requirements and the Contractor shall maintain phase rotation throughout the installation.

Bus design shall be such that all busbars including line-side take-offs to functional units are of minimum lengths and are spaced, located and supported to withstand the prospective short-circuit fault conditions of not less than <6kA at 415 volts AC symmetrical with insignificant permanent distortion.

Busbars shall be supported by Permali. Alternatively, third grade paper bakelite will be acceptable where tests using such material for supports on identical busbar arrangements have proved successful. In no case shall individual busbars be encircled by a complete loop of magnetic material.

The main busbar compartments shall be entirely separate from the switchgear and outgoing cabling. There shall be no circuit wiring within the busbar area with the exception of metering cables which are to be as short as possible and effectively clipped in position.

Busbarring which may occur on the load side of equipment and which passes through the main busbarring zone shall be fully insulated over its entire length within the zone with a minimum thickness of 1 mm.

The switchboards and busbar arrangements shall be suitable for future extensions without adversely affecting the current carrying capacity of the busbars or the ability of the support system to withstand the applicable fault conditions. In addition, busbars shall be designed such that any future additions do not require the drilling or bending of the existing busbars.

Where space is specified for future equipment, spare busbars with connections and escutcheon-panel cut-outs shall be provided. Spare cut-outs shall be fitted with screwed metal cover plates or other approved covers.

Small Wiring

Small wiring, as necessary for the wiring of relays, instruments and indicators shall be PVC insulated and sheathed throughout and suitably coloured for ready identification of circuits.

Approved terminal blocks of moulded insulating material shall be provided for the termination of small wiring and all incoming and outgoing control and alarm-circuit wiring. Ratings shall be not less than 30 amperes. Blocks shall be readily accessible for inspection and circuit testing purposes and shall be labelled and numbered to approval. Wiring shall be identified by means of clearly engraved thimbles near the points of termination. Numbers or letters on the thimbles shall correspond with identification markings on circuit diagrams forming part of the 'as installed' drawings.

Small wiring shall be standard conductor of minimum size 7/0.50mm. Flexible connections to door mounted equipment shall be 30/0.025mm flexible cord.

Wherever possible small wiring shall be enclosed in approved PVC cable duct. Where enclosure is not practicable wiring shall be neatly run on internal surfaces and secured by cable clips.

Panels

Panels for equipment mounting shall be of approved non-hygroscopic insulating material of not less than 20 mm thickness. Panels shall have 10 mm chamfer on all front edges and shall be securely attached within cubicles by chromium plated hexagon head bolts, tapped into approved fixings.

Panels shall be sealed with front surfaces and edges finished to approval in high gloss black lacquer. Rear surfaces shall be finished in flat black. All cut-outs and drillings shall be neatly made without flaking or other damage to finish.

Alternatively sheet metal panels of minimum 2mm thickness may be used.

Labels and Designations

All cubicles, panels and control equipment shall be labelled in accordance with the requirements of Section 2.7.

Display Drawings

The Contractor shall supply and install the following B1 plastic laminate drawings wall mounted adjacent to the respective switchboard.

- Elevations of the main switchboards detailing the layout of all functional units, together with the arrangement and sizing of all busbars.
- Single line diagrams of the main switchboards showing the size of all functional units together with the sizes, types and functions of all cabling entering and leaving the switchboards.

08. CIRCUIT BREAKERS

Requirement

Circuit breakers shall be of the moulded case thermal magnetic type and of Cutler Hammer, Terasaki, or approved equal manufacture. Circuit breakers shall be of current ratings as indicated on the drawings.

09. HRC FUSES

Manufacture

HRC fuse cartridges shall be of approved manufacture and shall comply with AS 2005. Fuses shall be suitable for the fault level of the installation and shall discriminate properly with other protective equipment. Fuse I^2t values shall suit the protected equipment.

10. CONTACTORS

Requirement

Contactors shall be of Sprecher and Schuh or equal approved manufacture and shall comply with AS 1029. All contactors shall be of the block style, electromagnetic, air break type. The rated duty of all contactors shall be uninterrupted type for non-ventilated enclosure and the AS utilisation category shall be AC-3 minimum. Series or parallel contacts shall not be used to achieve the required rating. All contactors shall be quiet in operation.

11. ALTERNATING CURRENT MOTOR STARTERS

Selection

Unless regulatory limitations on starting currents preclude their use, provide direct-on-line starters.

Minimum Rated Values

Rated operational current: The full load current of the load controlled.

Rated Duty: Intermittent class 0.1.

Utilisation category: AC-3.

Mechanical endurance: 3.

THERMISTOR PROTECTION RELAYS

Standard: AS 1023.1.

Thermistor control unit: Compatible with thermistor installed in the motor.

Contacts: Provide at least one normally-open and one normally-closed set of contacts rated at the starter control circuit voltage and minimum 4 A. Connect contacts to open the starter at the setting temperature.

Utilisation category: AC-11.

Type: Automatic reset following power failure. Arrange the circuit so that thermistor failure, failure of other control system components, or excessive winding temperature, causes the motor circuit to trip.

Reset: Manual, to restore the motor circuit when tripped due to excessive winding temperature.

Light emitting diode indication: Provide on the thermistor control unit, to indicate that circuit is in normal operating mode.

12. MISCELLANEOUS SWITCHBOARD COMPONENTS

Control and Test Switches

Standards: To AS 3947.5.1 and AS 3947.1.

Rated operational current: Utilisation category: AC-22 to AS 3947.1.

Degree of protection: At least the degree of protection for the assembly.

Push-buttons: Type: Oil-tight, minimum 22 mm diameter, or 22 x 22 mm.

Rated operational current: At least 4 A at 240 V a.c.

Marking: Identify functions of each push-button. For latched "STOP" or "EMERGENCY STOP" push-buttons, state instructions for releasing latches.

Colour code: To AS 3947.5.1.

Illuminated push-buttons: Comply with Indicator lights, in the Measurement accessories subsection.

Rotary Switches

General: Cam operated type with switch positions arranged with displacement of 60°.

Off position: Locate at the 12 o'clock position. Test positions must spring return to off position.

Rated operational current: At least 6 A at 240 V a.c.

Escutcheon plates: Provide rectangular plates securely fixed to the assembly panel. Identify switch position and function.

Control Relays

Standards: To AS 3947.5.1 and AS 2481.

Operation: Suitable for continuous operation.

Construction: Latch plug-in types to receptacle bases using captive clips which can be applied and released without using tools.

Contact Elements

Type: Electrically separate, double break, silver alloy, non-welding contacts.

Duty level: IIIA.

Configuration: For standard relays, provide assemblies with at least 2 sets of contacts and expandable to 8 sets of contacts in the same assembly. Provide at least one normally-open and one normally-closed contact.

On site conversion: Provide contact blocks readily convertible to either normally-open or normally-closed contacts.

Time delay relays: Adjustable over the full timing range with timing repeatability within ñ 12.5% of nominal setting.

Indicator Lights

Standard: To AS 3947.5.1.

Degree of protection: At least that of the assembly/operating face.

Incandescent Indicators

Type: Incandescent oil tight type minimum 22 mm diameter or 22 x 22 mm.

Lamps: Changeable from front of panel without removing the holder.

Lamp rating: 1.2 - 5 W.

Press-to-test: Compartments/subsections with < 5 indicating lights: Provide each indicating light with a fitted integral press-to-test lamp actuator.

Compartments/subsections with ò 5 indicating lights: Provide a common press-to-test lamp push-button.

13. ELECTRIC MOTORS

Minimum enclosure requirements -

IP54 enclosure requirements

ICO141 motor cooling

Minimum label sizes: 80mm x 50mm

Require thermistors in windings where the output is equal to or greater than 15kW.

Thermistors Type

Protection type classification: TPI

Tripping: to Class B winding temperature rise requirements

Testing requirements:

Motor size	up to 40kW	above 40kW
Performance test	not required	
Routine check test	required	required

Design Parameters

Operating environment: indoor plantrooms

Ambient temperature range:	Max	50°C
	Min	5°C
Design Ambient	40°C	

14. WIRING METHODS

REQUIREMENT: Except where otherwise specified, cabling shall comprise PVC insulated cables enclosed in rigid PVC conduit which shall be concealed by enclosure in concrete slabs and walls chasing into masonry wall, running in false ceiling spaces etc.

In plantrooms and in Carpark areas: Cabling shall be installed in cable troughing, or cable trays.

In roof space generally: PVC insulated cables in rigid PVC conduit.

Low voltage control cable: Low voltage control cable shall be segregated and shielded from line voltage power and control circuits.

Dropping on walls and columns in occupied areas: PVC insulated conductors in PVC conduit concealed by enclosure within the building fabric.

Essential cabling: MIMS cabling installed on cable tray.

15. CONDUIT

General: Unless otherwise indicated, conduit shall be of the rigid PVC type.

All conduit shall be concealed wherever possible by enclosure in concrete slabs, masonry walls etc. and by installation in false ceiling spaces. Surface run conduit shall be installed true and straight and aligned to perpendicular and lateral building elements.

The entire works shall be carried out on the draw-in principle.

Conduits shall be securely fixed to wall boxes by means of conduit clamps. Elbows and tees shall only be used where specifically approved by the Superintendent and only where readily accessible at all times.

All conduit joints shall be free from burrs and rough edges and adequate precautions shall be taken at all times to prevent entry of moisture or foreign matter into the conduit systems.

The use of flexible conduit shall be kept to a practical minimum.

All flexible conduit shall be corrosion and UV resistant and fully weatherproof and of Sealflex manufacture. Positive type screwed fittings shall be used at all terminations of flexible conduits.

All conduits for future use shall be complete with polypropylene draw-cords.

PVC Conduit: PVC conduit shall comprise light duty UPVC conduit in compliance with AS 2053. The conduit shall be of minimum size 20mm diameter and shall be complete with moulded PVC conduit fittings fixed with approved adhesive cement. All fittings used in conjunction with the conduit shall be of the same manufacture and material as the conduit.

Corrugated PVC conduit shall only be installed with the prior approval of the Superintendent.

Heavy Duty UPVC Conduit: HD UPVC conduit shall comply with AS 2053 and with 'Category A' enclosures as defined in the SAA Wiring Rules. All fittings shall be of the material specified for the piping and all joints shall be made with an approved adhesive cement.

16. PVC INSULATED CABLES

REQUIREMENT: All PVC insulated and PVC insulated and sheathed cables shall be of approved manufacture with multi-strand copper conductors and of V75, 0.6/1 kV grade. All cables shall be delivered to site in their original packages.

17. CABLE TRAYS

REQUIREMENT: Cable trays shall be of perforated metal in standard Admiralty pattern and of Ductall or approved equal manufacture. All trays shall have a cold rolled galvanised finish and shall be machine press formed, with both edges returned a minimum of 50mm for stiffening. Tray shall be formed in 2.5 metre lengths and shall be of the following minimum gauges:

Width of Tray	**Thickness of Material**
75, 100, 150 mm	1.0 mm
225 mm	1.2 mm
300 mm	1.6 mm

The tray width selected with each application shall allow 25% spare space for future cables. This requirement shall be rigidly enforced.

Tray shall be complete with galvanised perforated fishplates, bends and galvanised fixings, all to manufacturer's recommendations.

Installation: Tray shall be secured to the structure to approval and shall be installed with sufficient clearance to permit installation of cable clips and other cable fixings. Supports shall be evenly spaced to ensure that tray is true and straight. Spacing of supports shall be within the manufacturer's recommendations for the loading concerned and in any case not less than two (2) supports shall be provided per length of tray.

Supports shall be of substantial fabricated hot-dip galvanised steel construction.

The complete installation shall be free of any distortion or bowing.

18. CABLE TROUGHING

General: Cable troughing and fittings shall be of approved manufacture and shall be complete with clip-on type covers, formed true and straight and returned not less than 10mm over the sides of the troughing.

Cable troughing shall be fixed to walls or supported in an approved manner at minimum 1200mm centres. Each length of troughing shall have at least two (2) fixings or supports.

Retaining clips shall be installed to retain the wiring at intervals not exceeding 1000 in all locations except where cable troughing is run horizontal with covers uppermost.

Plastic Troughing: Plastic troughing shall be UPVC. The troughing and covers shall be robustly constructed from heavy gauge material to avoid sagging between supports and to avoid warping. All associated fittings shall be of similar material to the troughing.

Metal Troughing: Metal troughing shall be of approved design and construction. The troughing and covers shall be of galvanised sheet steel or aluminium of minimum 0.8mm thickness and shall be free from burrs and sharp edges.

SUBSECTION 007 AUTOMATIC CONTROLS

01. DESCRIPTION

Supply, deliver, install, test and commission all manual and automatic controls required for the proper operation and control of the mechanical services installation for the proposed building, generally as shown on the drawings and/or as specified.

The Contractor shall study the method of control outlined hereafter and shall satisfy himself that his controls can perform the functions specified within the limits of the specified design conditions. He shall be responsible for the selection of equipment and detailed engineering of the systems suitable for the application.

Detailed control diagrams for each system shall be submitted to suit the particular manufacturer's equipment, for approval by the Superintendent before commencing installation of the controls.

No instrument shall be located where they will interfere with the operation or removal of equipment, nor shall conduits or piping be run so as to interfere with access to any equipment. The complete system shall be adjusted and calibrated for sequence of operation of controlling devices in accordance with the conditions to be maintained as specified. The Contractor shall make any further changes and adjustments to the equipment furnished under this contract that may be necessary to ensure continuous satisfactory automatic control and operation of the air conditioning plant.

A skilled serviceman shall be provided without additional charge, to instruct the operating personnel in the operation of the controls system at arranged times during commissioning or during the maintenance period.

Four service visits shall be made at three monthly intervals during the defects liability period to check on the system operation and calibration.

A detailed report shall be forwarded to the Superintendent after each visit.

02. CONTROL SYSTEM

The automatic control system proposed is basically of the electronic type with electric components where necessary or appropriate.

03. CONTROL EQUIPMENT

GENERAL: The control system shall be complete including but not limited to all necessary thermostats, relays, contactors, switches, control valves, damper motors and other accessories necessary to perform all control functions to the satisfaction of the Superintendent. Where necessary to achieve fire integrity, control equipment shall be selected to conform to the requirements of the authorities.

ROOM TEMPERATURE SENSORS: Room temperature sensors shall be of the two wire temperature sensitive resistance type.

Each sensor shall have a removable blank cover with no exposed control knobs or dials and mounted securely on insulating pads approximately 1500 above floor.

ROOM TEMPERATURE CONTROLLERS: Room temperature controllers shall be suitable for track mounting in the switchboard and shall provide the correct temperature sensitive signal to operate the associated equipment.

AIR FLOW SWITCHES: The air flow switch shall be of the differential pressure two position electric type.

HIGH LIMIT THERMOSTATS: These thermostats shall be of the electric immersion type suitable for mounting on ductwork and having a manual reset device.

RELAYS AND SWITCHES: Relays shall be of the positive and gradual acting type to suit the particular duty requirements.

Switches shall be equipped with suitable indicating plates.

04. FUNCTIONS AND NORMAL OPERATING SEQUENCES

General

Requirement: Provide the operating functions, sequencing and interlocking of the various electrical systems are described in the following subclauses.

Multi-or Single Head Air Conditioning Systems

Normal Operation

Manual operation via manufacturers "wired" remote controllers to provide following functions:

- On/Off.
- Heating or cooling.
- Temperature set point.
- Fan speed

Toilet Exhaust Fans – EF-1

Toilet exhaust fans shall be switched via lights with 2 minute run-on timers. Switching shall be provided by the electrical trade. Run-on timers shall be provided by the mechanical trade.

LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD, BAYVIEW, NSW
MUSIC ROOM UNDER EXISTING HALL
HYDRAULIC SERVICES

LEGEND

- RISER
- SERVICE TYPE (VP)
- SERVICE SIZE (50)
- DROPPER
- EXISTING SERVICE INDICATOR (eDP1 / 150)
- DETAIL NUMBER (D3)
- DRAWING NUMBER (HO1)

SERVICES

——S——	SEWER DRAINAGE
——S——	SANITARY PLUMBING - SEWER DRAINAGE
——TW——	TRADE WASTE DRAINAGE
——V——	VENT PIPE
——STW——	STORMWATER DRAINAGE
—/—SS—/—	SUBSOIL WATER DRAINAGE
——WW——	WARM WATER SERVICE
——HW——	HOT WATER
——FHR——	FIRE HOSE REEL
—x—x—•—x—x—	EXISTING SERVICE TO BE DISCONNECTED AND REMOVED

SYMBOLS

- PIPE DROPPER
- CAPPED END
- PIPE RISER
- SERVICE CONTINUATION
- DIRECTION OF FLOW
- STOP VALVE
- STOP VALVE IN PATH BOX
- RECESSED STOP VALVE
- FW — FLOOR WASTE
- PD/FW — PLANT DRAIN FLOOR WASTE
- OFG — OVERFLOW GULLY
- TD — TUNDISH
- MH — MANHOLE
- SHOWER TAP SET
- TAP SET
- SINGLE LEVER MIXER TAP
- HWU — HOT WATER UNIT
- TMV/VCG — THERMOSTATIC MIXING VALVE/VALVE CONTROL GROUP
- RPZD — REDUCED PRESSURE ZONE DEVICE
- SERVICE CONNECTION
- GRATED PIT
- PLV

SPECIFICATION & NOTES

1. READ PLANS TOGETHER WITH ARCHITECTURAL DRAWINGS.
2. INSTALL STORMWATER DRAINAGE WITH REQUIREMENTS OF AS-3500.3.
3. MINIMUM GRADES FOR STORMWATER DRAINAGE:

PIPE DIAMETER IN mm	100	1%
PIPE DIAMETER IN mm	150	1%
PIPE DIAMETER IN mm	225	0.5%
PIPE DIAMETER IN mm	300	0.4%
PIPE DIAMETER IN mm	375	0.35%

4 RAINWATER DOWNPIPES SHALL BE 100mm UNLESS NOTED OTHERWISE.

5. SEWER DRAINAGE SHALL BE 100mm.

6. SIZES OF SANITARY PLUMBING PIPES:

	PIPE DIAMETER IN mm
-SST	- 100
-B	- 40
-SK	- 50
FW (NO FIXTURES OR 'B' ONLY CONNECTED)	- 100x50 POT GULLY
FW (WITH ANY FIXTURES OTHER THAN 'B' CONNECTED)	- 100x50 POT GULLY
STACK	- 100
RV	- 65
VP	- 50
TD WASTE PIPES	- 40

7. HB 40mm WASTE PIPES
8. BASIN WASTES 40mm CP 'P' TRAP WITH CP COVER PLATE AND WITH WASTE PIPE CONCEALED IN WALL CHASE.
9. PROVIDE ACOUSTIC INSULATION TO SANITARY PLUMBING PIPES
10. PROVIDE 350 kPa PRESSURE LIMITING VALVE TO EACH WATER CONNECTION TO DISWASHERS, HWU's AND ZIP CHILLED/BOILING WATER UNITS.
11. PROVIDE 20 DIA. CU PIPE CLIPPED TO UNDERSIDE OF BENCH TOP AND CONNECT DISHWASHER WASTE HOSE EACH END.
12. STRUCTURAL ENGINEER TO REVIEW AND APPROVE ALL PIPE PENETRATIONS THROUGH FLOOR SLABS AND BEAMS.
13. EXISTING SERVICES LOCATIONS ARE APPROXIMATE ONLY. ALLOW TO LOCATE ON SITE PRIOR TO COMMENCEMENT WORKS.
14. PROVIDE ACCESS PANEL IN EACH HYDRAULIC SERVICES DUCT AT 450(CENTRE LINE) ABOVE FFL.
15. WATER PIPES TO BE CONCEALED IN FACE BRICK WALLS. COORDINATE WITH BRICK LAYING TRADE.
16. TYPICAL WATER (PIPES) TO BE CONCEALED IN FACE BRICK LAYING TRADE.
17. PROVIDE UNSEALED CORE HOLE THROUGH CONCRETE WITH 10mm CLEARANCE TO DP.
18. ALL VERTICAL STACKS TO BE ACOUSTICALLY INSULATED AS SPECIFIED.
19. ALL PIT LOCATIONS AND RL'S ARE APPROXIMATE ONLY.
20. ALLOW TO CO ORDINATE ON SITE WITH CIVIL & ARCHITECTURAL DRAWINGS.
21. REFER TO ARCHITECTURAL, STRUCTURAL & CIVIL DRAWINGS FOR CO-ORDINATION.
22. DRAINAGE CELL – ATLANTIS DRAINAGE CELL WRAPPED IN BIDIM A14 GEOTEXTILE FABRIC.
23. SUB SOIL DRAINAGE INSTALLED AT MIN. 1% GRADE AND STARTING AT IL-500 BELOW FINISHED SURFACE LEVEL

SCHEDULE OF DRAWINGS

DRG No	SCALE	TITLE
H-00	N.T.S.	COVER SHEET, LEGEND AND DRAWING SCHEDULE
H-01	1:100	GROUND FLOOR PLAN INGROUND DRAINAGE SERVICES
H-02	1:100	GROUND FLOOR PLAN HYDRAULIC SERVICES
H-03	1:100	FIRST FLOOR HYDRAULIC SERVICES
H-04	1:100	SECOND FLOOR HYDRAULIC SERVICES
H-05	1:100	ROOF FLOOR HYDRAULIC SERVICES
H-06	1:100	EXISTING HYDRAULIC SERVICES
H-07	1:200	SEDIMENT CONTROL PLAN

ABBREVIATIONS

A/C	AIR CONDITIONING
B	BASIN
CI	CAST IRON
CO	CLEAR OUT
CP	CONTROL PANEL
CS	CLEANERS SINK
CU	COPPER
CW	COLD WATER
DB	DISABLED BASIN
DIA	DIAMETER
DP	DOWN PIPE
EX.	EXISTING
FHR	FIRE HOSE REEL
FRC	FIBRE REINFORCED CEMENT
FW	FLOOR WASTE
G	GAS
GBV	GAS BALL VALVE
HL	HIGH LEVEL
HT	HOSE TAP
HW	HOT WATER
HWU	HOT WATER UNIT
IL	INVERT LEVEL
IO	INSPECTION OPENING
KS	KITCHEN SINK
L/s	FLOW IN LITRES PER SECOND
N.T.S.	NOT TO SCALE
NG	NATURAL GAS
OGG	OVERFLOW RELIEF GULLY
RL	REDUCED LEVEL
RPZD	REDUCED PRESSURE ZONE DEVICE
SK	SINK
SMH	SEWER MANHOLE
SS	SUBSOIL PIPE
ST	STOP TAP
STW	STORMWATER
SVB	SEMI RECESSED VANITY BASIN
SV	STOP VALVE
SWP	STORMWATER PIT
TD/AC	TUNDISH FOR AIR CONDITIONING UNIT
TTD/AC	TRAPPED TUNDISH FOR AIR CONDITIONING UNIT
TD/HWU	TUNDISH FOR HOT WATER UNIT
TMV	THERMOSTATIC MIXING VALVE
UNO	UNLESS NOTED OTHERWISE
UPVC	UNPLASTICISED POLYVINYL CHLORIDE
VP	VENT PIPE
WC	WATER CLOSET
WW	WARM WATER

THIS DOCUMENT IS REFERRED TO IN CONSTRUCTION CERTIFICATE
NO. 116 / 05
DATE 13 JUL 2005
CONSULTANCY PTY. LTD.
PETER ROSSELLO
ACCREDITED CERTIFIER No. 4493

ISSUE	AMENDMENT	DATE
B	FOR CONTRACT SIGNING	30.06.05
A	TENDER ISSUE	28.02.05
1	PRELIMINARY ISSUE	15.02.05

ARCHITECT
PD MAYOH PTY LTD
ARCHITECTS & LANDSCAPE CONSULTANTS
MAYOH ARCHITECTS

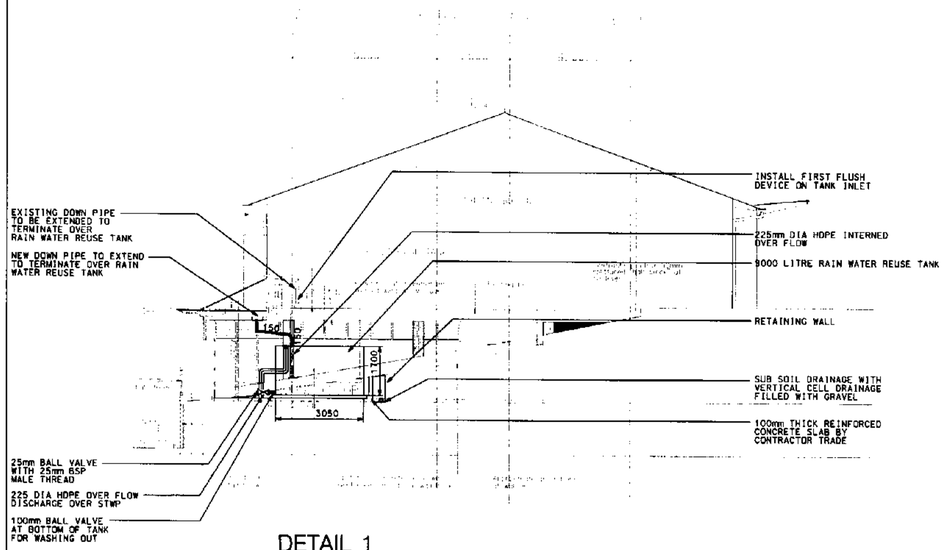
HYDRAULIC & FIRE CONSULTANTS
HARRIS PAGE & Associates PTY LIMITED
HYDRAULIC & FIRE CONSULTANTS
Level 2, 32 Carrington Street, Sydney 2000

PROJECT
MUSIC ROOM UNDER EXISTING HALL
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW

TITLE HYDRAULIC SERVICES
COVER SHEET, LEGEND & DRAWING SCHEDULE

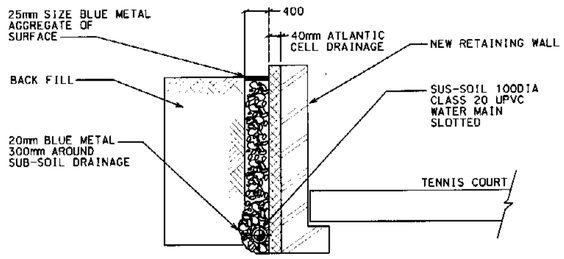
REF	JOB NUMBER
4675/MODEL/H-00	4675

SCALE	APPROVED	DRAWING NUMBER	REV.
NTS	BS	H-00	B
DATE: Feb.2005	DRAWN: SW		



DETAIL 1
EAST ELEVATION

SCALE 1:100



SECTIONAL ELEVATION

SUB-SOIL BEHIND RETAINING WALL DETAIL

NTS

ALL LEVELS AND DIMENSIONS ARE TO BE VERIFIED ON THE SITE BEFORE COMMENCING ANY FABRICATION

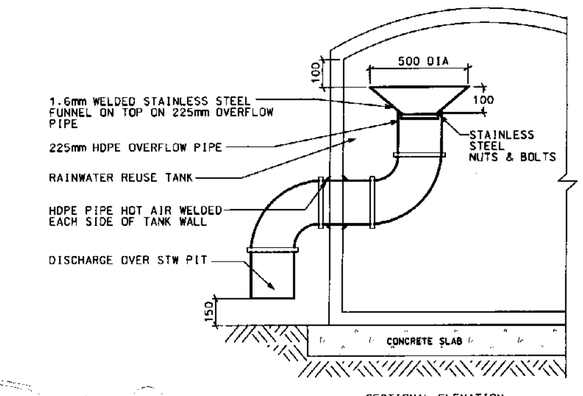
FIGURED DIMENSIONS ARE TO BE USED IN PREFERENCE TO SCALED MEASUREMENTS

NOTES

READ IN CONJUNCTION WITH THE ARCHITECTURAL AND ASSOCIATED SERVICES DRAWINGS

ALL WORK TO BE IN ACCORDANCE WITH THE SPECIFICATION, AUTHORITY'S REQUIREMENTS AND AS3500

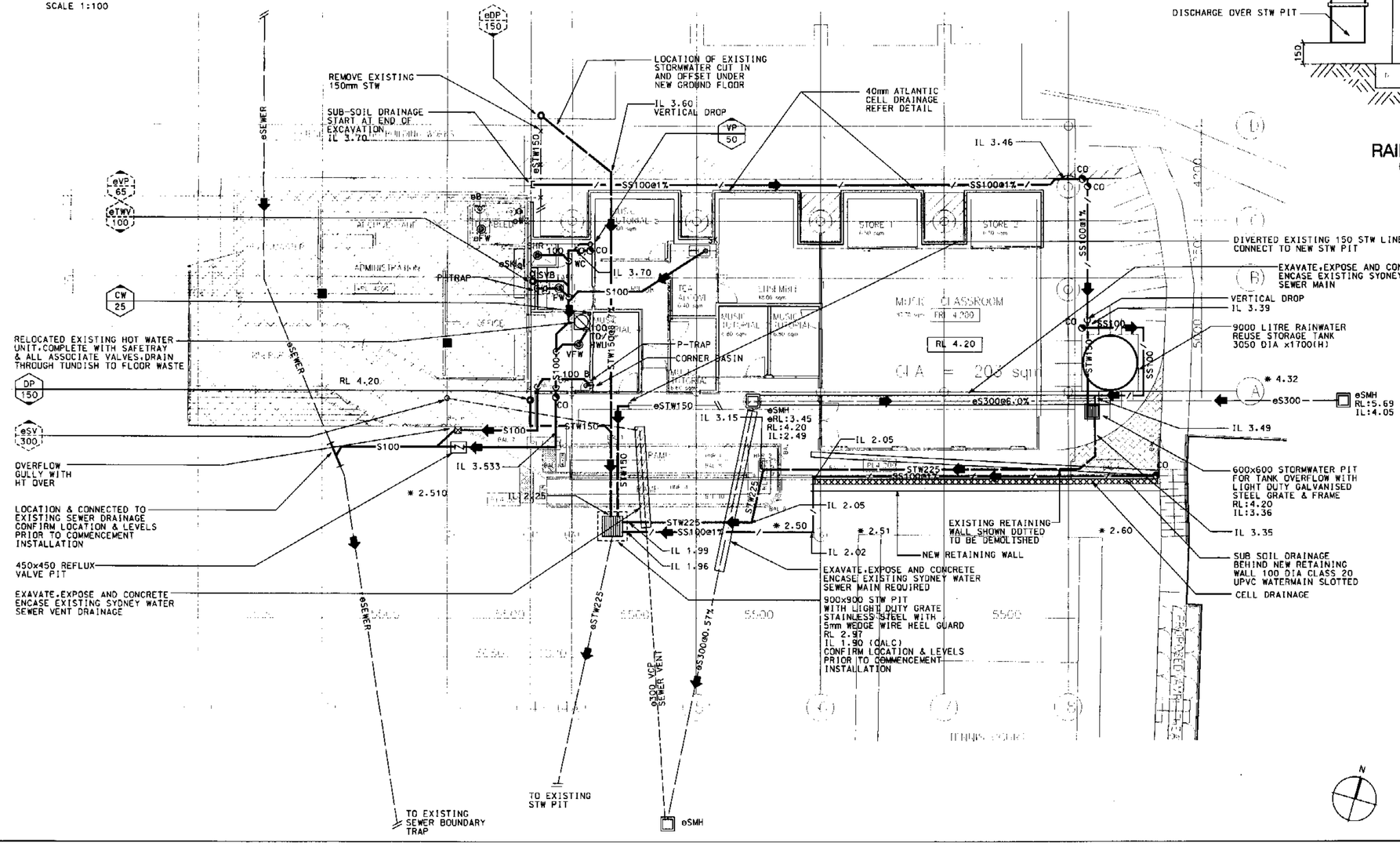
CONFIRM LOCATION SIZE AND LEVELS OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORK



SECTIONAL ELEVATION

RAINWATER REUSE TANK OVERFLOW DETAIL

NTS



THIS DOCUMENT IS REFERRED TO IN CONSTRUCTION CERTIFICATE NO. 316/05 DATE 13 JUL 2005 ENVIRONET CONSULTANCY PTY LTD. PETER ROSELLO ACCREDITED CERTIFIER No. 4403

ISSUE	AMENDMENT	DATE
C	FOR CONTRACT SIGNING	30.06.05
B	AMENDED TENDER ISSUE	08.03.05
A	TENDER ISSUE	25.02.05
1	PRELIMINARY ISSUE	15.02.05

ARCHITECT

PD MAYOH PTY LTD
ARCHITECTS & LANDSCAPE CONSULTANTS
MAYOH ARCHITECTS

HYDRAULIC & FIRE CONSULTANTS

HARRIS PAGE & Associates PTY LIMITED
HYDRAULIC & FIRE CONSULTANTS

PROJECT

MUSIC ROOM UNDER EXISTING HALL

LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL

PITTWATER ROAD BAYVIEW

TITLE HYDRAULIC SERVICES

GROUND FLOOR PLAN INGROUND DRAINAGE SERVICES

FILE	4675/MODEL/H-01
JOB NUMBER	4675
SCALE	1:100
APPROVED	BS
DRAWING NUMBER	H-01
REV.	C
DATE	Feb.2005
DRAWN	SW

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FIGURED DIMENSIONS ARE TO BE USED IN PREFERENCE TO SCALED MEASUREMENTS

NOTES

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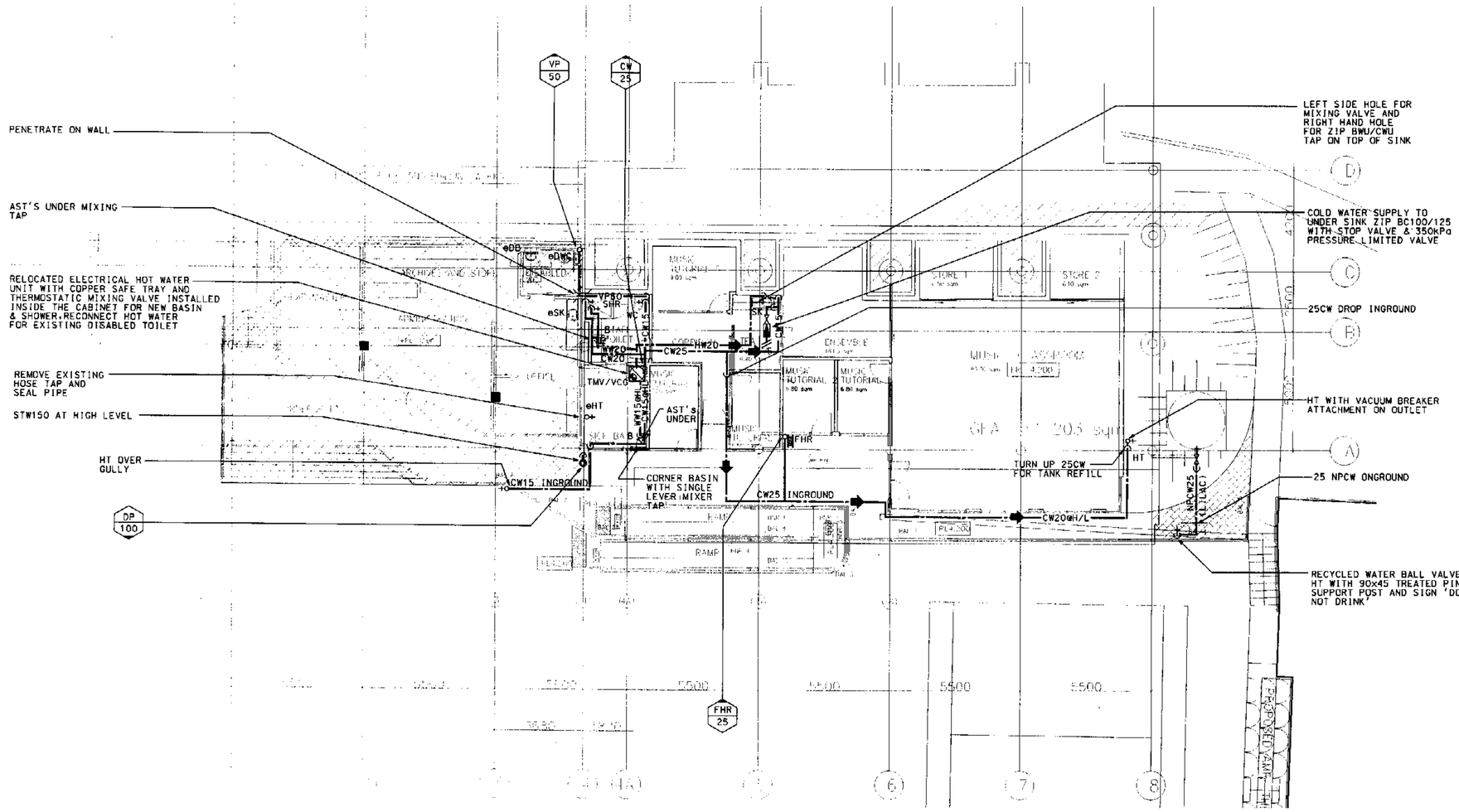
ALL WORK TO BE IN ACCORDANCE WITH THE SPECIFICATION, AUTHORITY'S REQUIREMENTS AND AS3500

CONFIRM LOCATION SIZE AND LEVELS OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORK



THIS DOCUMENT IS REFERRED TO IN CONSTRUCTION CERTIFICATE NO. 116/05 DATE 13 JUL 2005
ENVIRONET CONSULTANCY PTY. LTD.
PETER ROSSELLO ACCREDITED CERTIFIER No. 4403

B	FOR CONTRACT SIGNING	30.06.05
A	TENDER ISSUE	28.02.05
1	PRELIMINARY ISSUE	15.02.05
ISSUE	AMENDMENT	DATE

ARCHITECT
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MAYOH ARCHITECTS

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HARRIS PAGE & Associates PTY LIMITED
HYDRAULIC & FIRE CONSULTANTS

PROJECT
MUSIC ROOM UNDER EXISTING HALL
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW

TITLE HYDRAULIC SERVICES
GROUND FLOOR PLAN HYDRAULIC SERVICES

REF 4675/MODEL/H-02		JOB NUMBER 4675	
SCALE 1:100	APPROVED BS	DRAWING NUMBER H-02	REV. B
DATE Feb.2005	DRAWN SW		

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FIGURED DIMENSIONS ARE TO BE USED IN PREFERENCE TO SCALED MEASUREMENTS

NOTES

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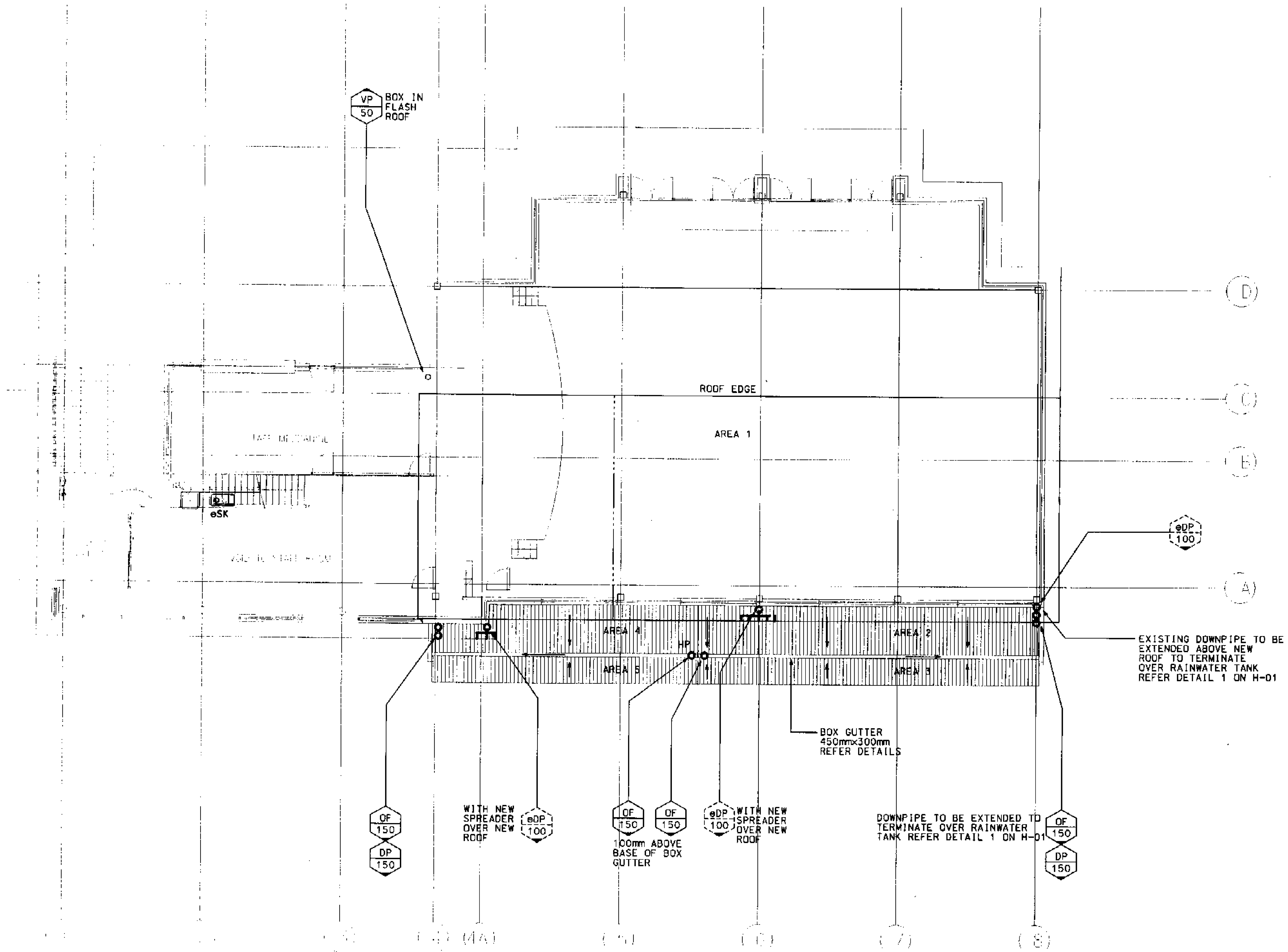
CONFIRM LOCATION SIZE AND LEVELS OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORK



RAINWATER TANK CALCULATION SUMMARY

AREA 1 = 157.5(m^2) EXISTING ROOF

AREA 2 = 26.0 (m^2) NEW ROOF

AREA 3 = 13.0 (m^2) NEW ROOF

TOTAL AREA TO RAINWATER TANK:

(AREA 1,2 & 3) 196.5(m^2)

NEW HARD SURFACE AREA:

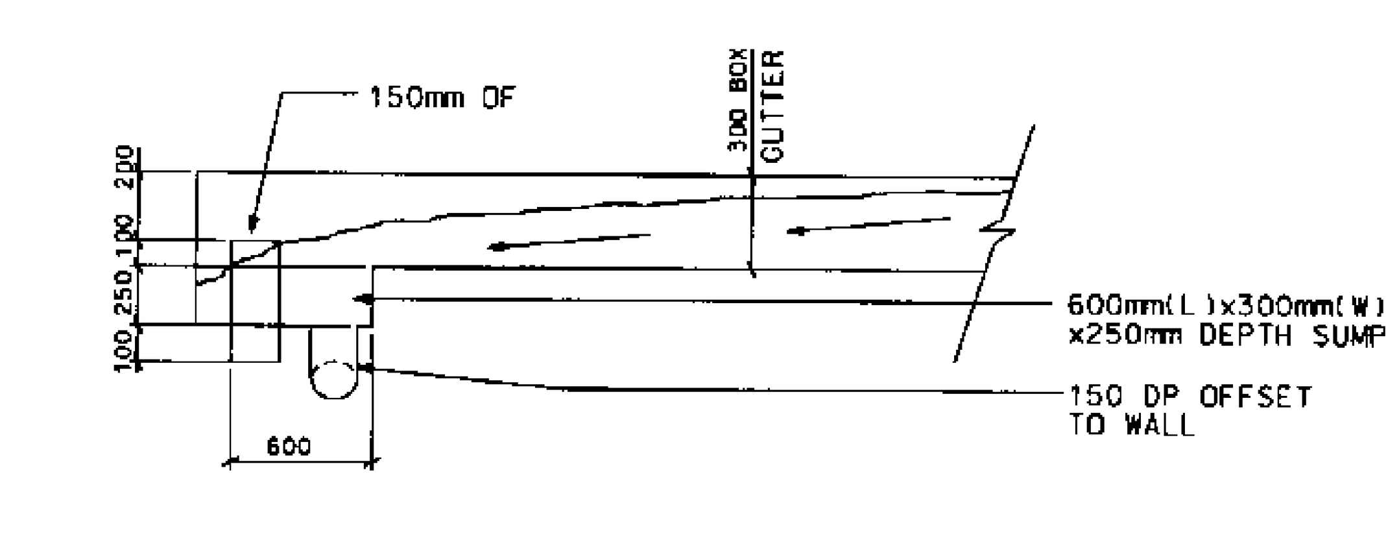
(AREA 2,3,4 & 5) 66.0(m^2)

TOTAL NEW HARD SURFACE AREA: 66(m^2)

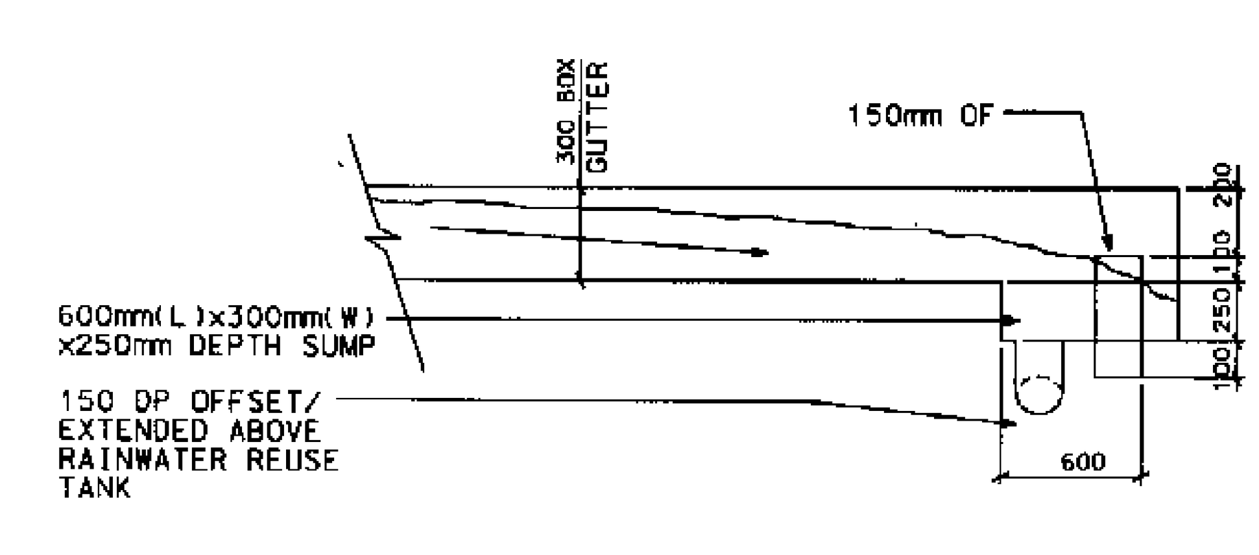
DCP REQUIRES 3000 LITRE TANK STORAGE CAPACITY + 6000 LITRE OF OVERSIZE TO BE USED AS OSD CREDIT

DOCUMENT IS REFERRED TO IN CONSTRUCTION CERTIFICATE
NO 116 / 051
DATE 13 JUL 2005
ENVIROCERT CONSULTANCY PTY. LTD.
PETER [illegible]SELLO
ACCREDITED CERTIFIER No. 4403

ISSUE	AMENDMENT	DATE
B	FOR CONTRACT SIGNING	30.06.05
A	TENDER ISSUE	28.02.05
1	PRELIMINARY ISSUE	15.02.05



GUTTER SUMP & OVERFLOW PIPE
SECTION & ELEVATION
NTS



GUTTER SUMP & OVERFLOW PIPE
SECTION & ELEVATION
NTS

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MAYOH ARCHITECTS

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HYDRAULIC & FIRE CONSULTANTS

PROJECT
MUSIC ROOM UNDER EXISTING HALL
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW

TITLE HYDRAULIC SERVICES
FIRST FLOOR
HYDRAULIC SERVICES

REF	4675/MODEL/H-03	JOB NUMBER	4675
SCALE 1:100	APPROVED BS	DRAWING NUMBER H-03	REV. B
DATE Feb.2005	DRAWN SW		

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NOTES

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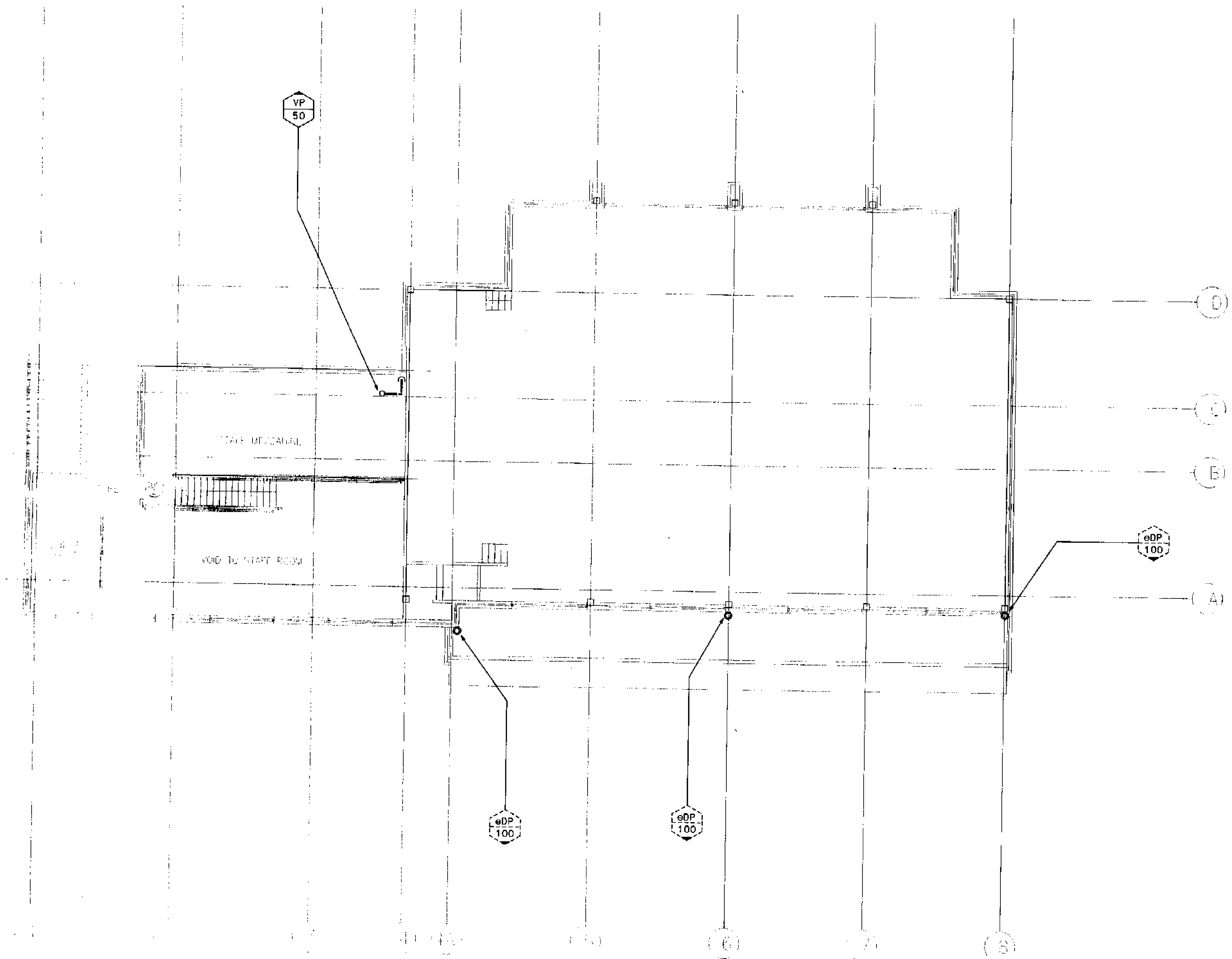
ALL WORK TO BE IN ACCORDANCE WITH THE SPECIFICATION, AUTHORITY'S REQUIREMENTS AND AS3500

CONFIRM LOCATION SIZE AND LEVELS OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORK



ISSUE	AMENDMENT	DATE
B	FOR CONTRACT SIGNING	30.06.05
A	TENDER ISSUE	28.02.05
1	PRELIMINARY ISSUE	15.02.05

ARCHITECT

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PROJECT

MUSIC ROOM UNDER EXISTING HALL

LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW

HYDRAULIC SERVICES

SECOND FLOOR HYDRAULIC SERVICES

REF 4675/MODEL/H-04		JOB NUMBER 4675	
SCALE 1:100	APPROVED BS	DRAWING NUMBER H-04	REV. B
DATE Feb.2005	DRAWN SW		

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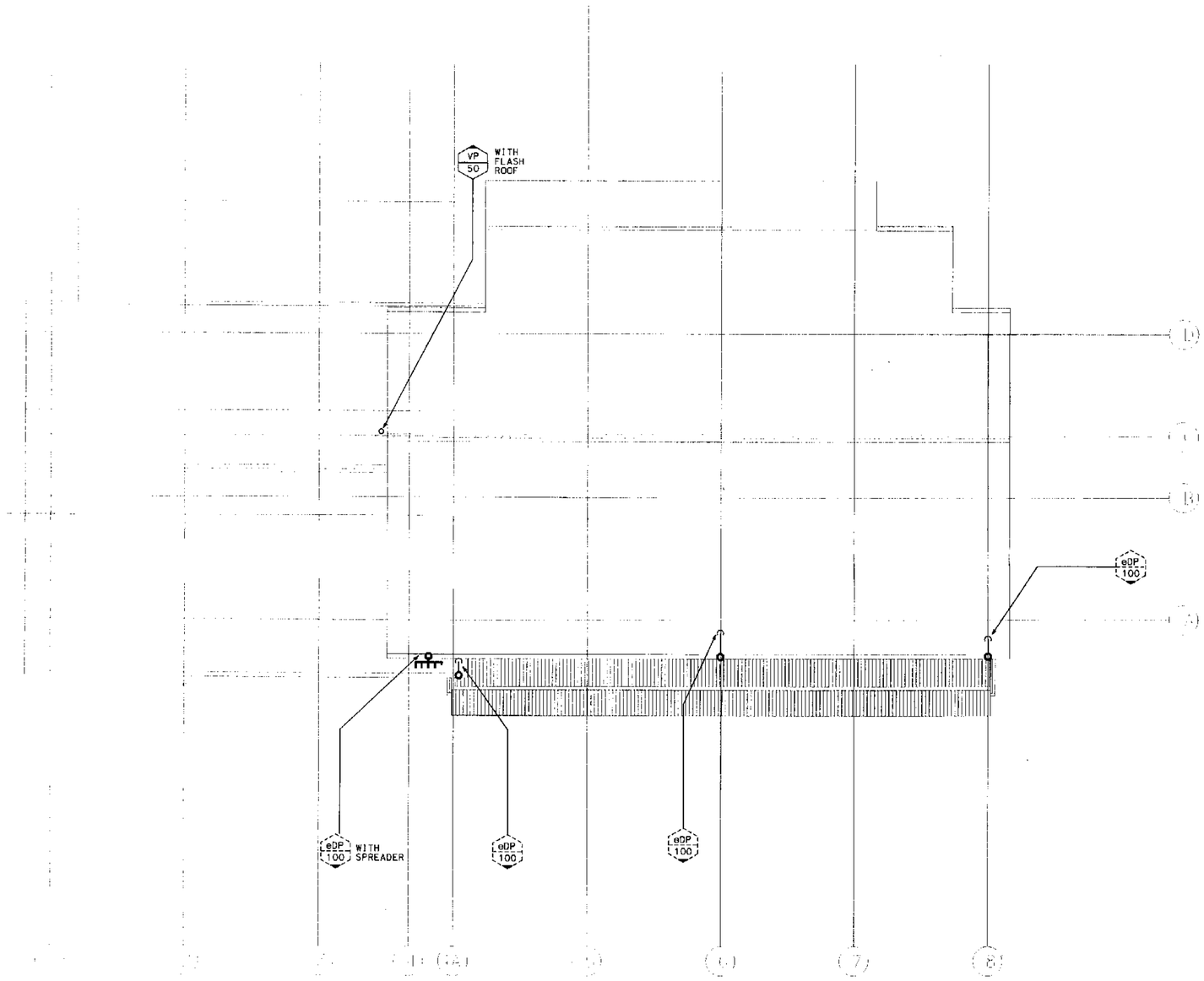
CONFIRM LOCATION SIZE AND LEVELS OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORK



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NO. 116 / 05
DATE 13 JUL 2005

B	FOR CONTRACT SIGNING	30.06.05
A	TENDER ISSUE	28.02.05
1	PRELIMINARY ISSUE	15.02.05
ISSUE	AMENDMENT	DATE

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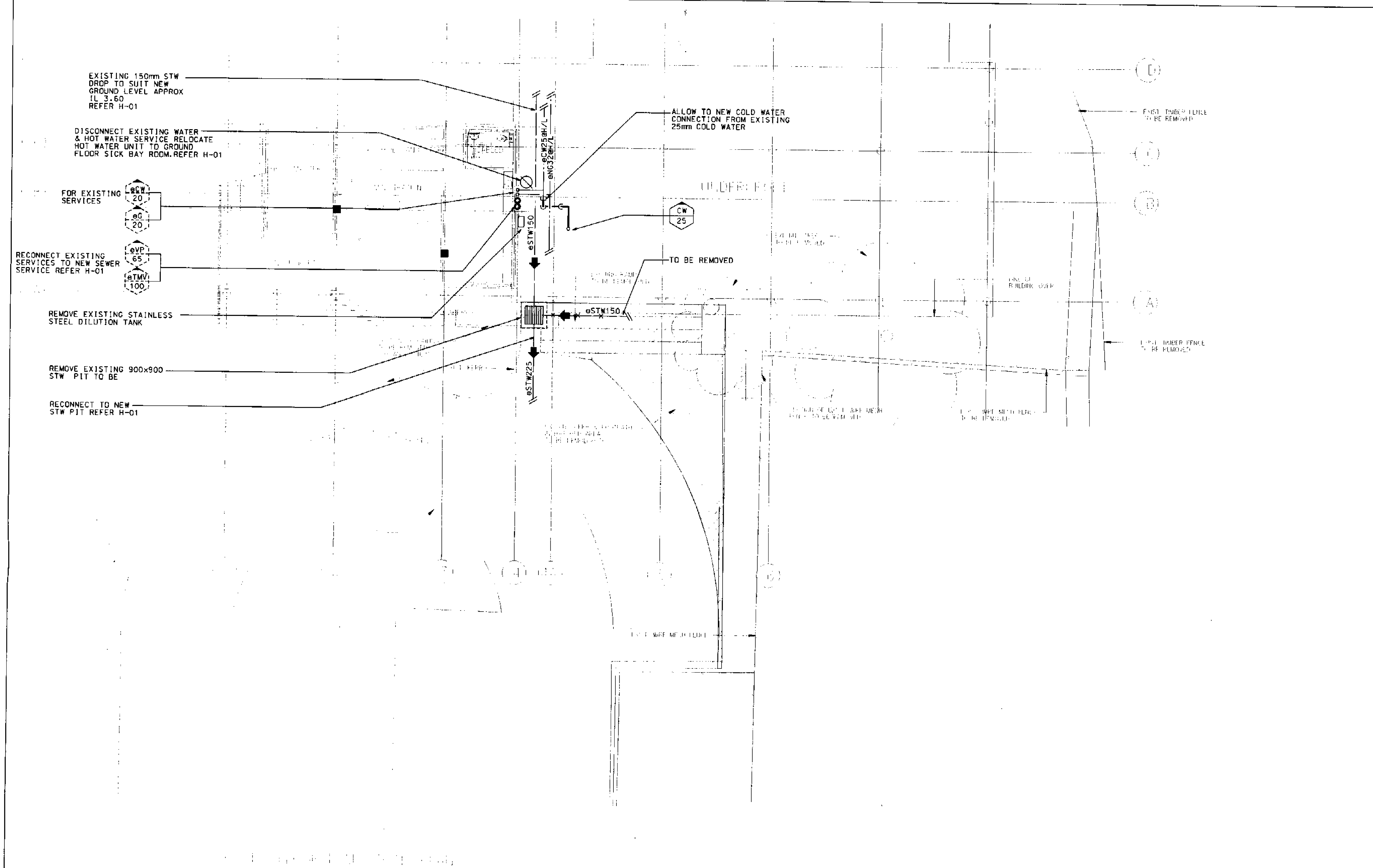
HYDRAULIC & FIRE CONSULTANTS

PROJECT
MUSIC ROOM UNDER EXISTING HALL
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW

TITLE HYDRAULIC SERVICES
ROOF FLOOR HYDRAULIC SERVICES

N

REF 4675/MODEL/H-05		JOB NUMBER 4675	
SCALE 1:100	APPROVED BS	DRAWING NUMBER H-05	REV. B
DATE Feb.2005	DRAWN SW		



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NOTES

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ALL WORK TO BE IN ACCORDANCE WITH THE SPECIFICATION, AUTHORITY'S REQUIREMENTS AND AS3500

CONFIRM LOCATION SIZE AND LEVELS OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORK

DISCONNECT AND REMOVE ALL EXISTING SERVICES TO THE AUTHORITY'S APPROVAL

PROVIDE SEWER DRAINAGE TO ALL MECHANICAL UNITS AS REQUIRED WHETHER SHOWN OR NOT *REFER ALSO MECHANICAL SERVICES DOCUMENTS*

ALL SUBSOIL CONNECTIONS TO PITS SHALL BE COMPLETE WITH INLET FLAP VALVES

THIS DOCUMENT IS REFERRED TO IN CONSTRUCTION CERTIFICATE NO 116 / 051 DATE 13 JUL 2005

B	FOR CONTRACT SIGNING	30.06.05
A	TENDER ISSUE	28.02.05
1	PRELIMINARY ISSUE	15.02.05

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HARRIS PAGE & Associates PTY LIMITED
HYDRAULIC & FIRE CONSULTANTS

MUSIC ROOM UNDER EXISTING HALL

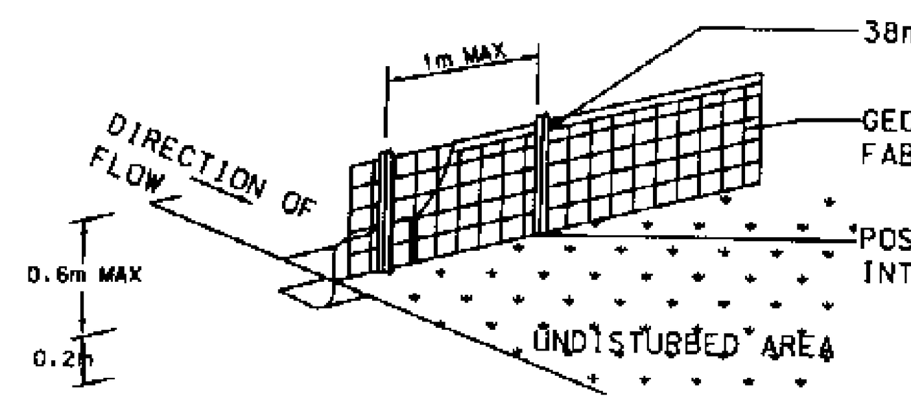
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW

HYDRAULIC SERVICES

EXISTING HYDRAULIC SERVICES

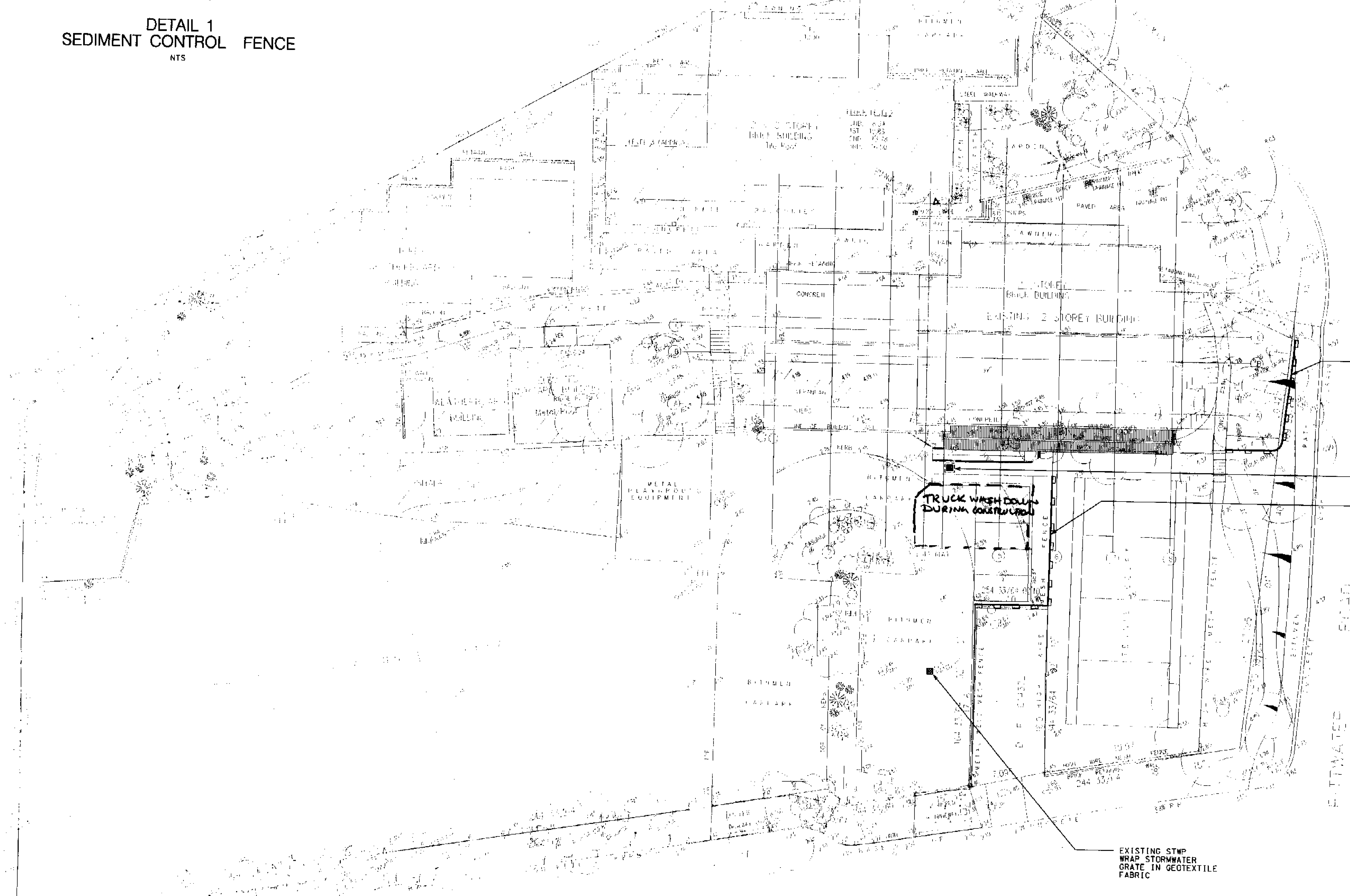
4675/MODEL/H-06 | 4675

SCALE	DESIGNED	DRAWING NUMBER	REV.
1:100	BS	H-06	B
Feb.2005	SW		



DETAIL 1
SEDIMENT CONTROL FENCE

NTS



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NOTES

READ IN CONJUNCTION WITH THE ARCHITECTURAL AND ASSOCIATED SERVICES DRAWINGS

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CONFIRM LOCATION SIZE AND LEVELS OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORK

THIS DOCUMENT IS REFERRED TO IN CONSTRUCTION CERTIFICATE
NO. 116 / 05
DATE ....
ENVIROCERT CONSULTANCY PTY. LTD.
PETER ROSSELLO
... FFR No. 4493

ISSUE	AMENDMENT	DATE
B	FOR CONTRACT SIGNING	30.06.05
A	TENDER ISSUE	28.02.05
1	PRELIMINARY ISSUE	15.02.05

ARCHITECT
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ARCHITECTS & LANDSCAPE CONSULTANTS
MAYOH ARCHITECTS

HYDRAULIC/FIRE CONSULTANTS
HARRIS PAGE & Associates PTY LIMITED
HYDRAULIC & FIRE CONSULTANTS

PROJECT
MUSIC ROOM UNDER EXISTING HALL
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW

TITLE HYDRAULIC SERVICES

SEDIMENT CONTROL PLAN

REF		JOB NUMBER	
4675/MODEL/H-07		4675	
SCALE 1:200	APPROVED BS	DRAWING NUMBER H-07	REV. B
DATE Feb.2005	DRAWN SW		

DRAWING LIST :

ARCHITECTURAL DRAWINGS

	COVER SHEET
A001	SURVEY
A002	SITE PLAN
A010	DEMOLITION PLAN

FLOOR PLANS 1:20 / 100

A100	GROUND FLOOR PLAN
A101	FIRST FLOOR PLAN
A102	SECOND FLOOR PLAN
A103	ROOF PLAN
A130	REFLECTED CEILING PLAN

ELEVATIONS / SECTIONS 1:20 / 100

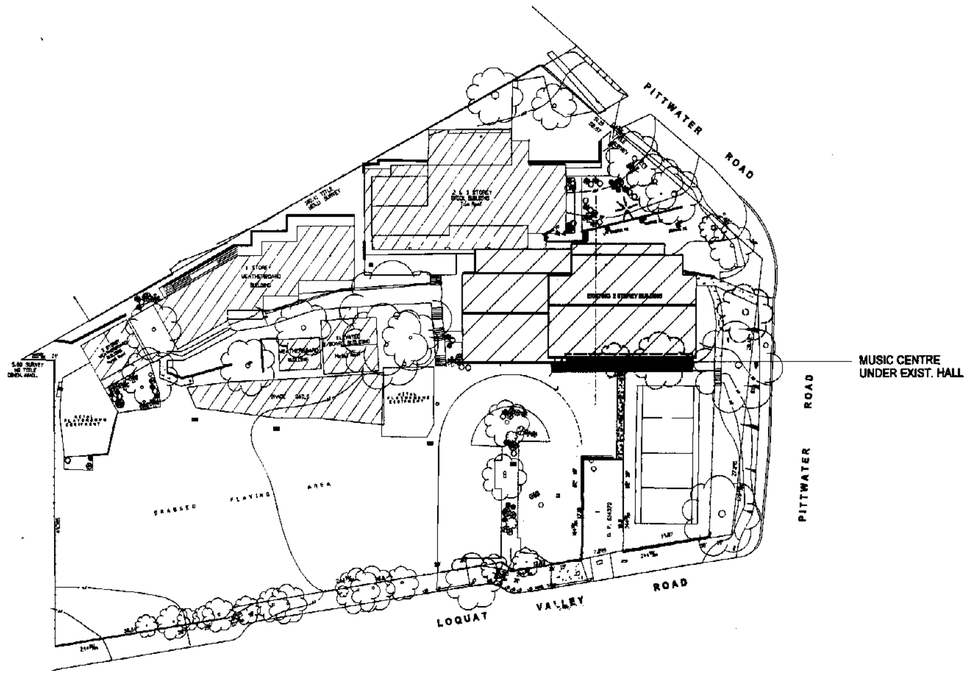
A150	ELEVATIONS
A151	SECTIONS

DETAIL 1:5 / 10 / 20 / 50

A300	RAMP, BALUSTRADE & HANDRAIL
A301	SECTION A
A302	SECTION C & E

ELEVATIONS / SECTIONS 1:50

A500	WINDOW SCHEDULE



LOCATION PLAN
SCALE 1:500

FOR CONSTRUCTION ISSUE - 27.06.05

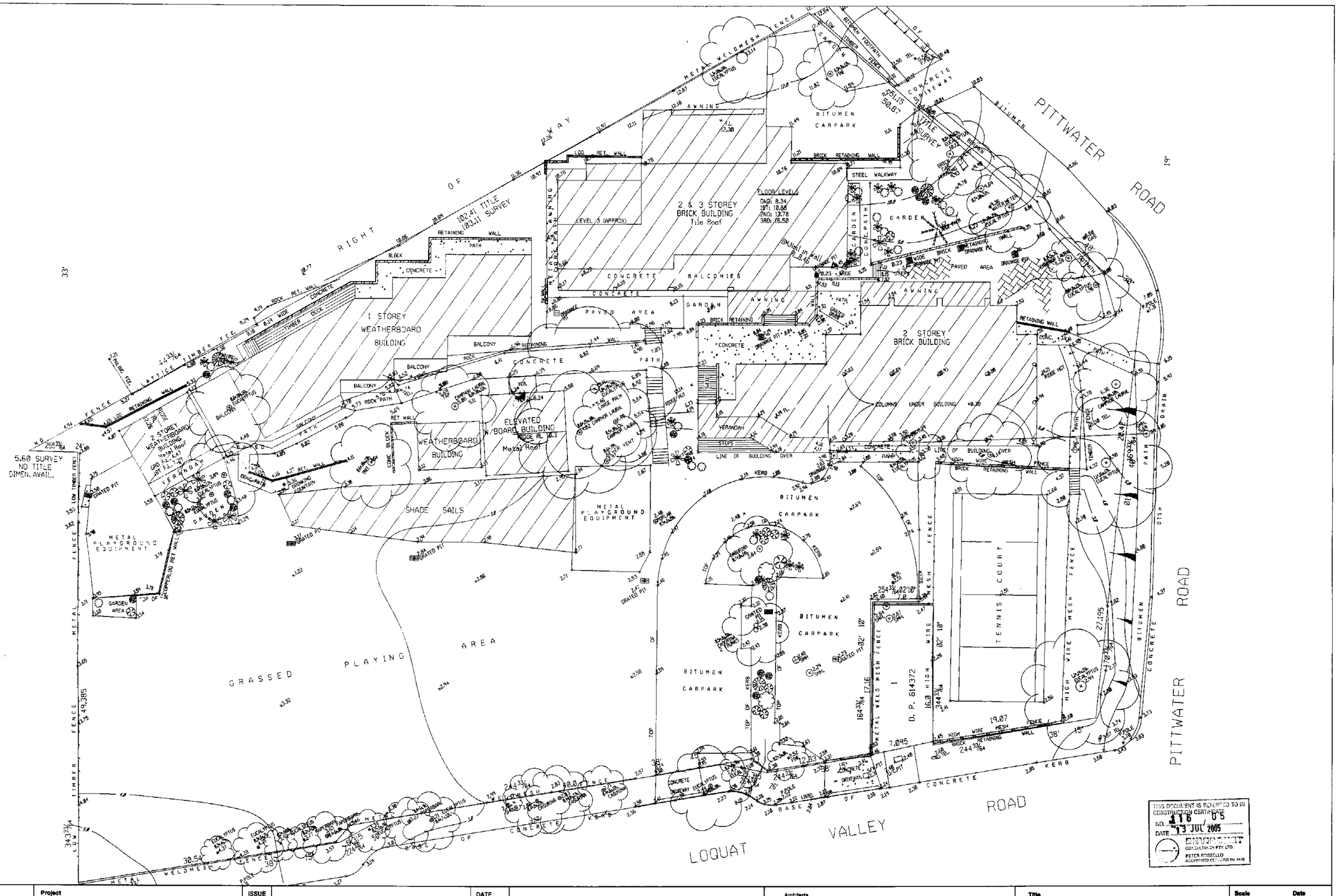
MUSIC ROOM UNDER EXISTING HALL

LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL

PITTWATER ROAD BAYVIEW

PROJECT No. 0414
DATE : 18.10.04

Architects
PD MAYOH PTY LTD
ARCHITECTS & LANDSCAPE CONSULTANTS
MAYOH ARCHITECTS
60 Strathallen Ave. Northbridge NSW 2063
Phone: (02) 9958 0488 Fax: (02) 9958 6424
Email: mayoh@pdmayoh.com.au



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DATE 13 JUL 2005
CONSULTANCY PTY. LTD.
PETER ROSSELLO
ACCREDITED CERTIFIER No. 4410

True North	Project	ISSUE		DATE
	MUSIC ROOM UNDER EXISTING HALL LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL PITTWATER ROAD BAYVIEW	A	DEVELOPMENT APPLICATION	18.10.04
		B	CONSTRUCTION CERTIFICATE CONSULTANTS ISSUE	4.2.05
		C	CONSTRUCTION CERTIFICATE PRELIMINARY	17.2.05
		D	TENDER ISSUE	28.2.05
		E	REVISED TENDER ISSUE	10.5.05
		F	FOR CONSTRUCTION	27.6.05

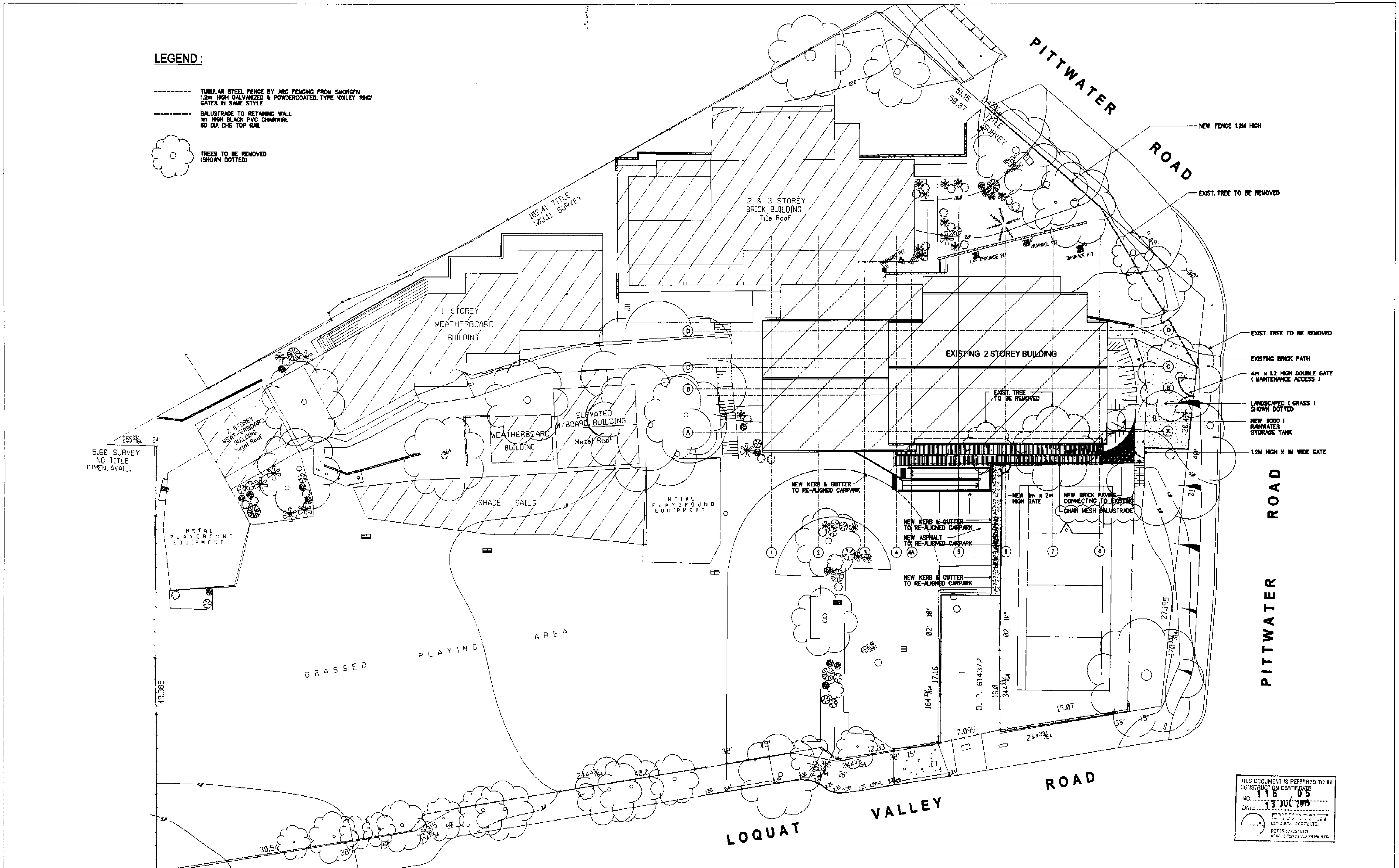
FOR CONSTRUCTION
27 JUN 2005

Architects
PD MAYOH PTY LTD
ARCHITECTS & LANDSCAPE CONSULTANTS
MAYOH ARCHITECTS
80 Strathallan Ave. Northbridge NSW 2063
Phone: (02) 9958 0488 Fax: (02) 9958 6424
Email: pdmayoh@netsfr.com.au

Title
SURVEY PLAN

Scale	Date
1:200	18.10.04
Drawn	
RC/RW	
Dwg No	Issue
A001	F
Job No	Plot date
0414	27 JUN 2005

CAD PATH: f:\0414\plot\001.dgn


LEGEND:
TUBULAR STEEL FENCE BY ARC FENCING FROM SMORGEN 1.2m HIGH GALVANIZED & POWDERCOATED. TYPE 'OXLEY RING' GATES IN SAME STYLE
BALUSTRADE TO RETAINING WALL 1m HIGH BLACK PVC CHAINWIRE 60 DIA CHS TOP RAIL
TREES TO BE REMOVED (SHOWN DOTTED)
PITTWATER ROAD
LOQUAT VALLEY ROAD
2 & 3 STOREY BRICK BUILDING Tile Roof
1 STOREY WEATHERBOARD BUILDING
EXISTING 2 STOREY BUILDING
2 STOREY WEATHERBOARD BUILDING Metal Roof
WEATHERBOARD BUILDING
ELEVATED W/BOARD BUILDING Metal Roof
SHADE SAILS
METAL PLAYGROUND EQUIPMENT
GRASSED PLAYING AREA
102.41 TITLE
103.11 SURVEY
5.60 SURVEY NO TITLE DIMEN. AVAIL.
D. P. 614372
NEW FENCE 1.2M HIGH
EXIST. TREE TO BE REMOVED
EXISTING BRICK PATH
4m x 1.2 HIGH DOUBLE GATE (MAINTENANCE ACCESS)
LANDSCAPED (GRASS) SHOWN DOTTED
NEW 9000 l RAINWATER STORAGE TANK
1.2M HIGH X 1M WIDE GATE
EXIST. TREE TO BE REMOVED
NEW KERB & GUTTER TO RE-ALIGNED CARPARK
NEW ASPHALT TO RE-ALIGNED CARPARK
NEW 3m x 2m HIGH GATE
NEW BRICK PAVING CONNECTING TO EXISTING
CHAIN MESH BALUSTRADE
THIS DOCUMENT IS REFERRED TO IN CONSTRUCTION CERTIFICATE
NO. 116 05
DATE 13 JUL 2005

True North	Project	ISSUE		DATE
	MUSIC ROOM UNDER EXISTING HALL LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL PITTWATER ROAD BAYVIEW	A	DEVELOPMENT APPLICATION	18.10.04
		B	CONSTRUCTION CERTIFICATE CONSULTANT'S ISSUE	4.2.05
		C	CONSTRUCTION CETIFICATE PRELIMINARY. NOTES ADDED;	17.2.05
		D	TENDER ISSUE	28.2.05
		E	REVISED TENDER ISSUE	10.5.05
		F	FOR CONSTRUCTION	27.6.05

FOR CONSTRUCTION

27 JUN 2005

Architects
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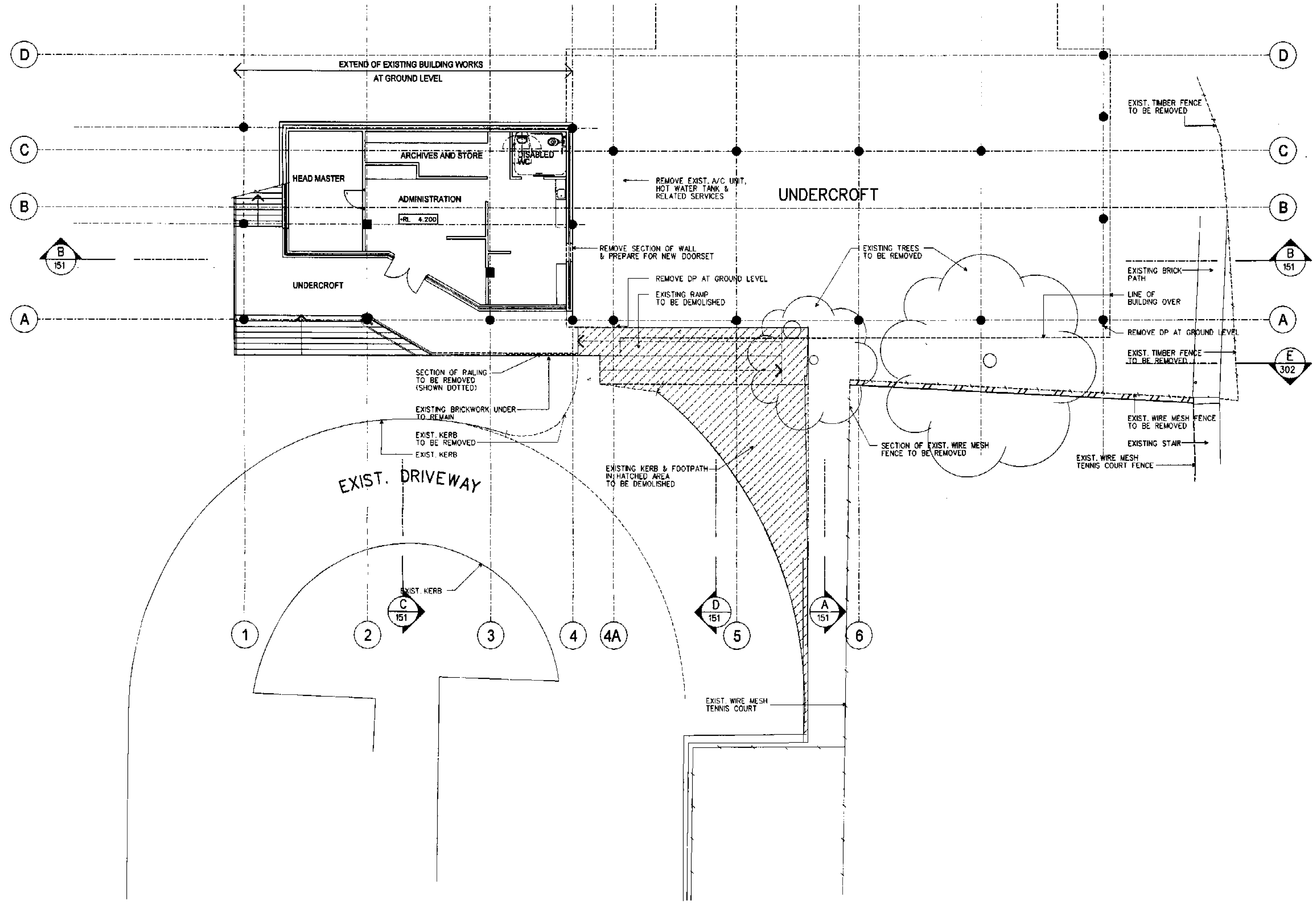
Title

SITE PLAN

Scale	Date
1:200	18.10.04
Drawn	
RC/RW	
Dwg No	Issue
A002	F
Job No	Plot date
0414	27 JUN 2005

CAD PATH: f:\0414\plot\002.dgn



THIS DOCUMENT IS REFERRED TO IN CONSTRUCTION CERTIFICATE
NO. 116 / 05
DATE 13 JUL 2005
CONSULTANCY PTY. LTD.
PETER ROBSELLO

True North

Project	ISSUE		DATE
MUSIC ROOM UNDER EXISTING HALL	A	DEVELOPMENT APPLICATION	18.10.04
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL	B	CONSTRUCTION CERTIFICATE CONSULTANT'S ISSUE	4.2.05
PITTWATER ROAD BAYVIEW	C	CONSTRUCTION CERTIFICATE PRELIMINARY ISSUE. NOTES & SECTION D ADDED; FIRST FLOOR DEMOLITION PLAN DELETED; DOOR SWINGS UPDATED.	17.2.05
	D	TENDER ISSUE	28.2.05
	E	REVISED TENDER ISSUE	10.5.05
	F	FOR CONSTRUCTION	27.6.05

FOR CONSTRUCTION

27 JUN 2005

Architects
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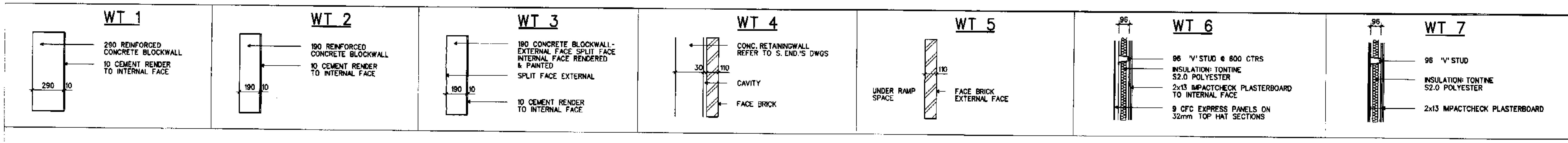
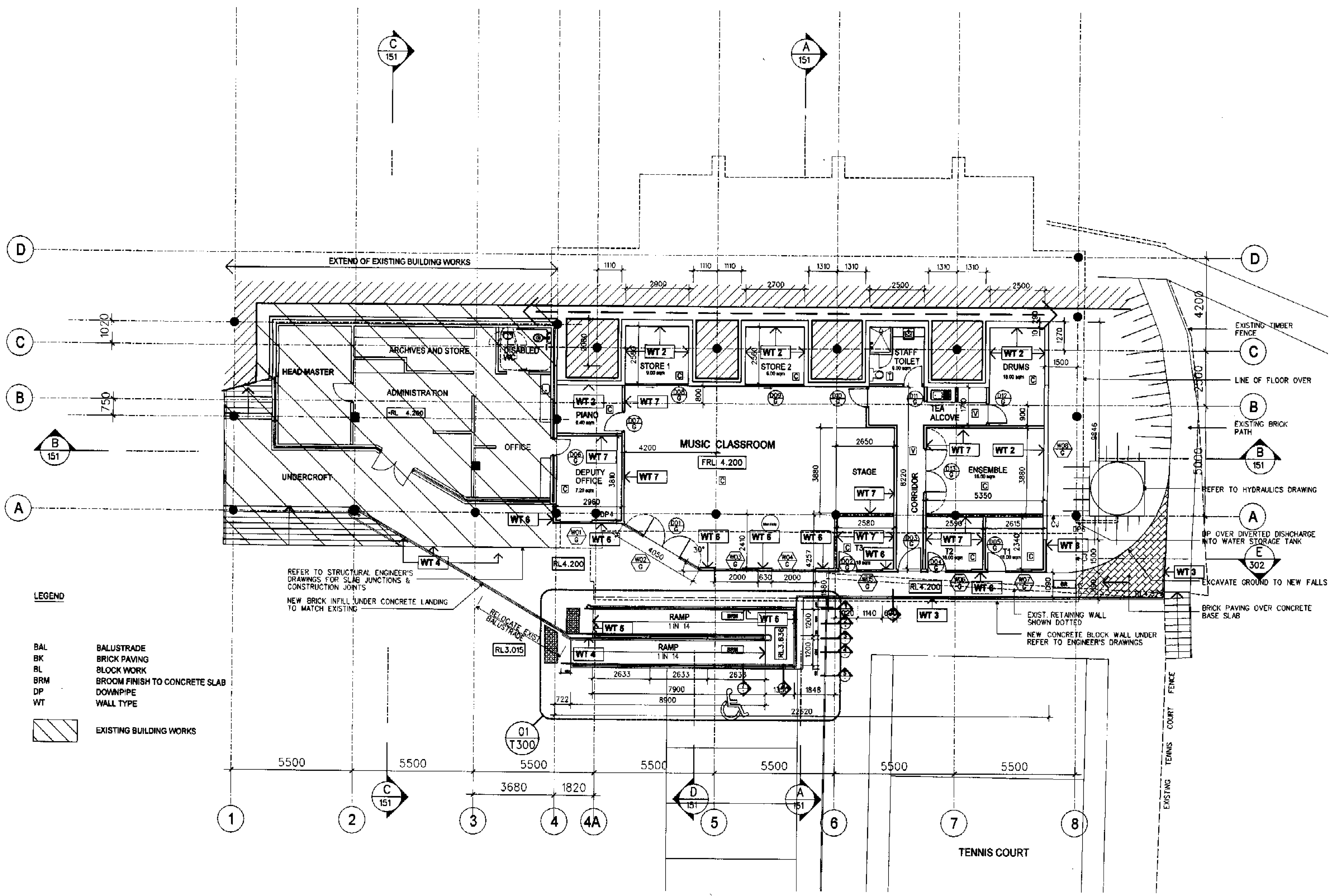
Title
DEMOLITION GROUND FLOOR PLAN

Scale 1:100	Date 18.10.04
Drawn RC/RW	
Dwg No A010	Issue F
Job No 0414	Plot date 27 JUN 2005

CAD PATH: f:\0414\plot\010.dgn





THIS DOCUMENT IS REFERRED TO IN CONSTRUCTION CERTIFICATE NO. 116 05 DATE 13 JUL 2005

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Project

MUSIC ROOM UNDER EXISTING HALL

LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL

PITTWATER ROAD BAYVIEW

ISSUE		DATE
A	DEVELOPMENT APPLICATION	18.10.04
B	CONSTRUCTION CERTIFICATE CONSULTANT'S ISSUE	4.2.05
C	AMPI-THEATRE SEATING & WATER TANK RELOCATED; TIMBER SEAT ADDED; DRAINAGE LINE TBC.	8.2.05
D	AMPI-THEATRE & TIMBER SEAT DELETED; STORAGE TANK RELOCATION DELETED; ADDED: CONC. KERB TO WALKWAY NEAR GRID 8, BALUSTRADE NUMBERS, SECTION D. SECTION A RELOCATED. RAMP CO-ORDINATED TO ENG. DETAIL	17.2.05
E	TENDER ISSUE	28.2.05
F	REVISED TENDER ISSUE	10.5.05
G	FOR CONSTRUCTION	27.6.05

FOR CONSTRUCTION

27 JUN 2005

Architects

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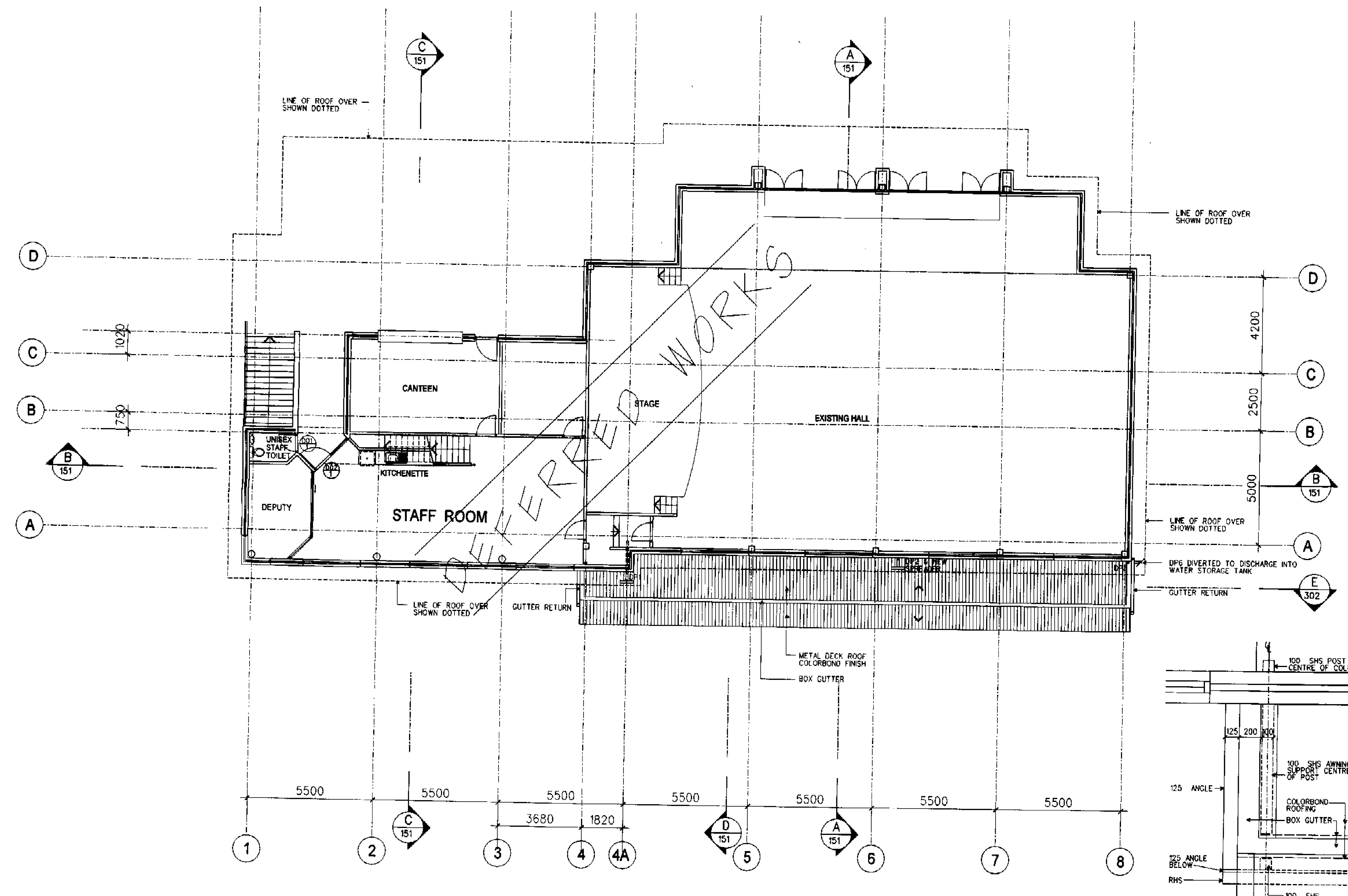
Title

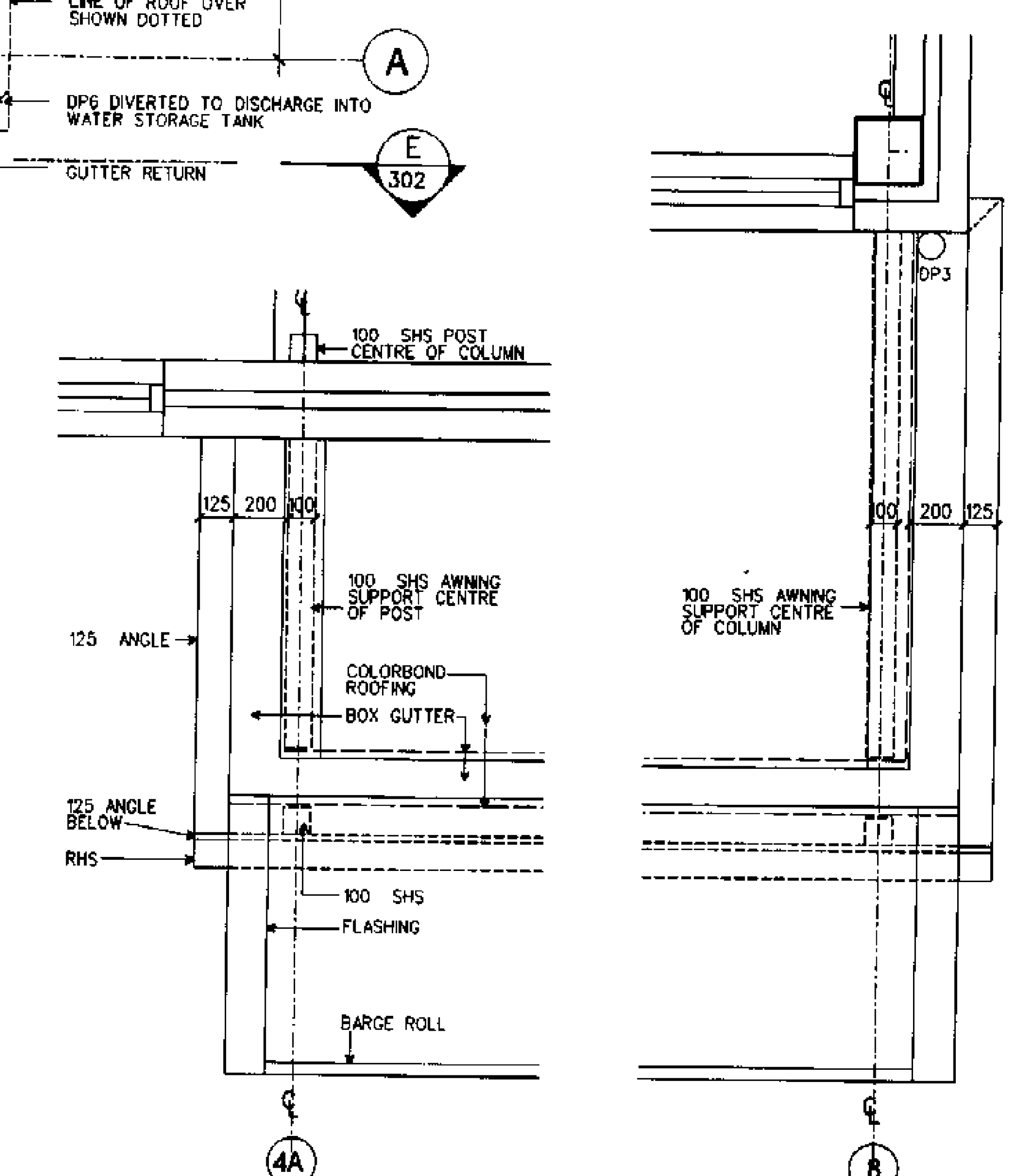
GROUND FLOOR PLAN

Scale	Date
1:100	18.10.04
Drawn	
RC/RW	
Dwg No	Issue
A100	G
Job No	Plot date
0414	27 JUN 2005

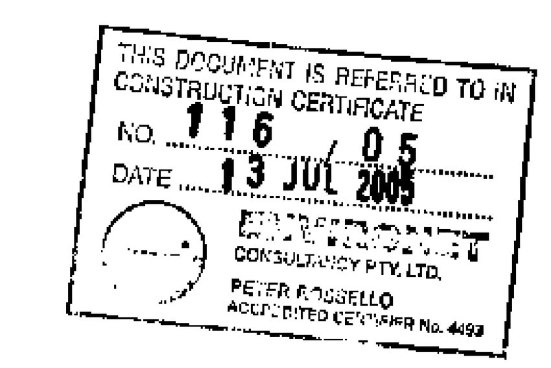
CAD PATH: f:\0414\plot\100.dgn



01 FIRST FLOOR PLAN
1:100



02 DETAIL GUTTER RETURN
1:20



True North

Project

MUSIC ROOM UNDER EXISTING HALL

LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW

ISSUE		DATE
A	DEVELOPMENT APPLICATION	18.10.04
B	CONSTRUCTION CERTIFICATE CONSULTANT'S ISSUE	4.2.05
C	CONSTRUCTION CERTIFICATE PRELIMINARY. FIRST FLOOR DEFERRED WORKS; ADDED- NOTES, SECTION D, DP'S & SPREADER; SECTION A RELOCATED.	17.2.05
D	TENDER ISSUE	28.2.05
E	REVISED TENDER ISSUE	11.5.05
F	FOR CONSTRUCTION	27.6.05

FOR CONSTRUCTION
27 JUN 2005

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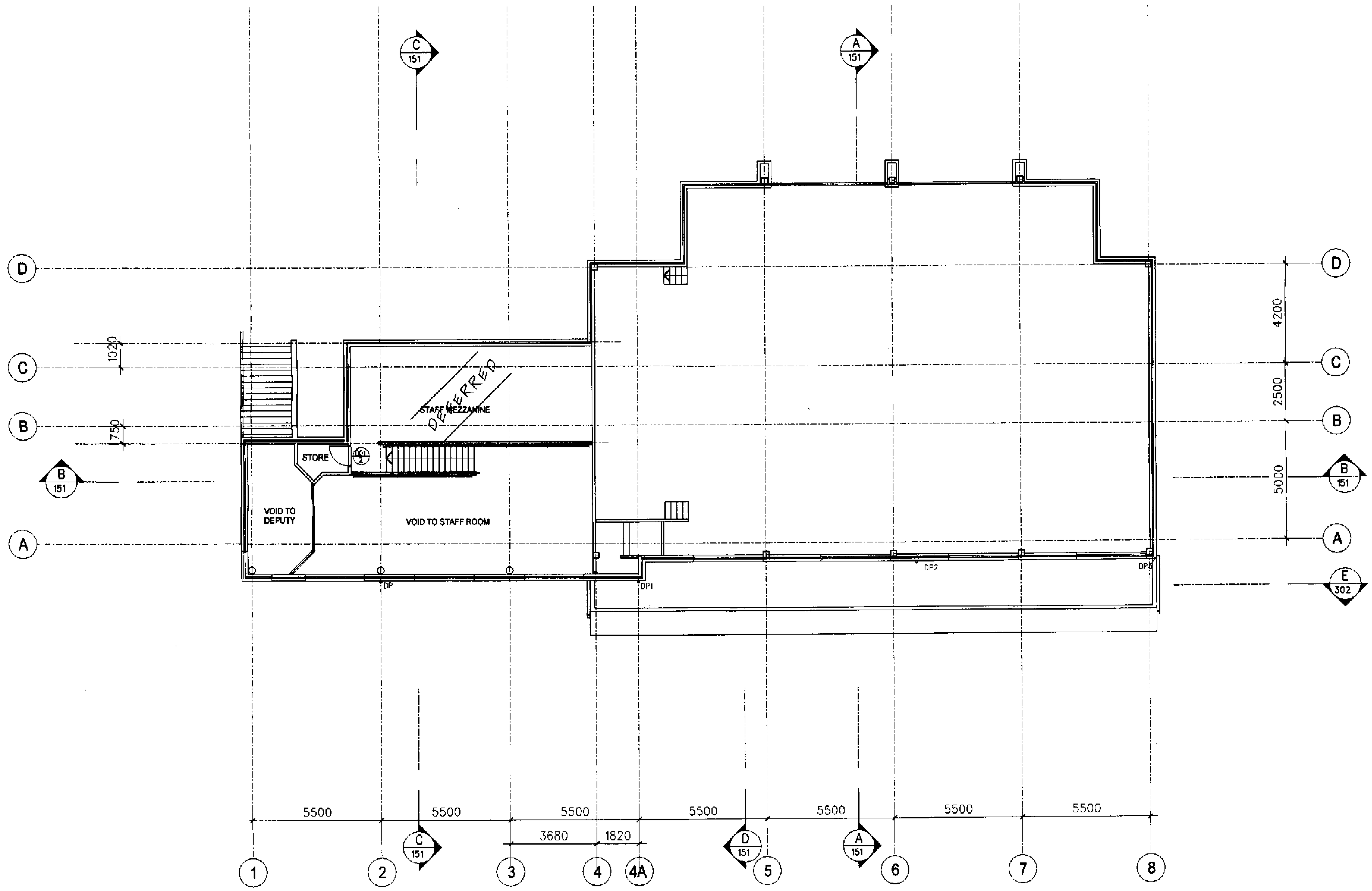
Title

FIRST FLOOR PLAN & GUTTER DETAIL
DEFERRED WORKS

Scale 1:20, 100
Date 18.10.04
Drawn RC/ RWTL
Dwg No A101
Issue F
Job No 0414
Plot date 27 JUN 2005

CAD PATH: f:\0414\plot\101.dgn



True North

Project

MUSIC ROOM UNDER EXISTING HALL

LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL

PITTWATER ROAD BAYVIEW

ISSUE		DATE
A	DEVELOPMENT APPLICATION	18.10.04
B.	CONSTRUCTION CERTIFICATE CONSULTANT'S ISSUE	4.2.05
C	CONSTRUCTION CERTFICATE PRELIMINARY, DP NUMBERS & SECTION D ADDED; SECTION A & DP 2 RELOCATED	17.2.05
D	TENDER ISSUE	28.2.05
E	REVISED TENDER ISSUE	11.5.05
F	FOR CONSTRUCTION	27.6.05

FOR CONSTRUCTION

27 JUN 2005

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Title

SECOND FLOOR PLAN

Scale 1:100
Date 18.10.04
Drawn RC/RW
Dwg No A102
Issue F
Job No 0414
Plot date 27 JUN 2005

CAD PATH: f:\0414\plot\102.dgn

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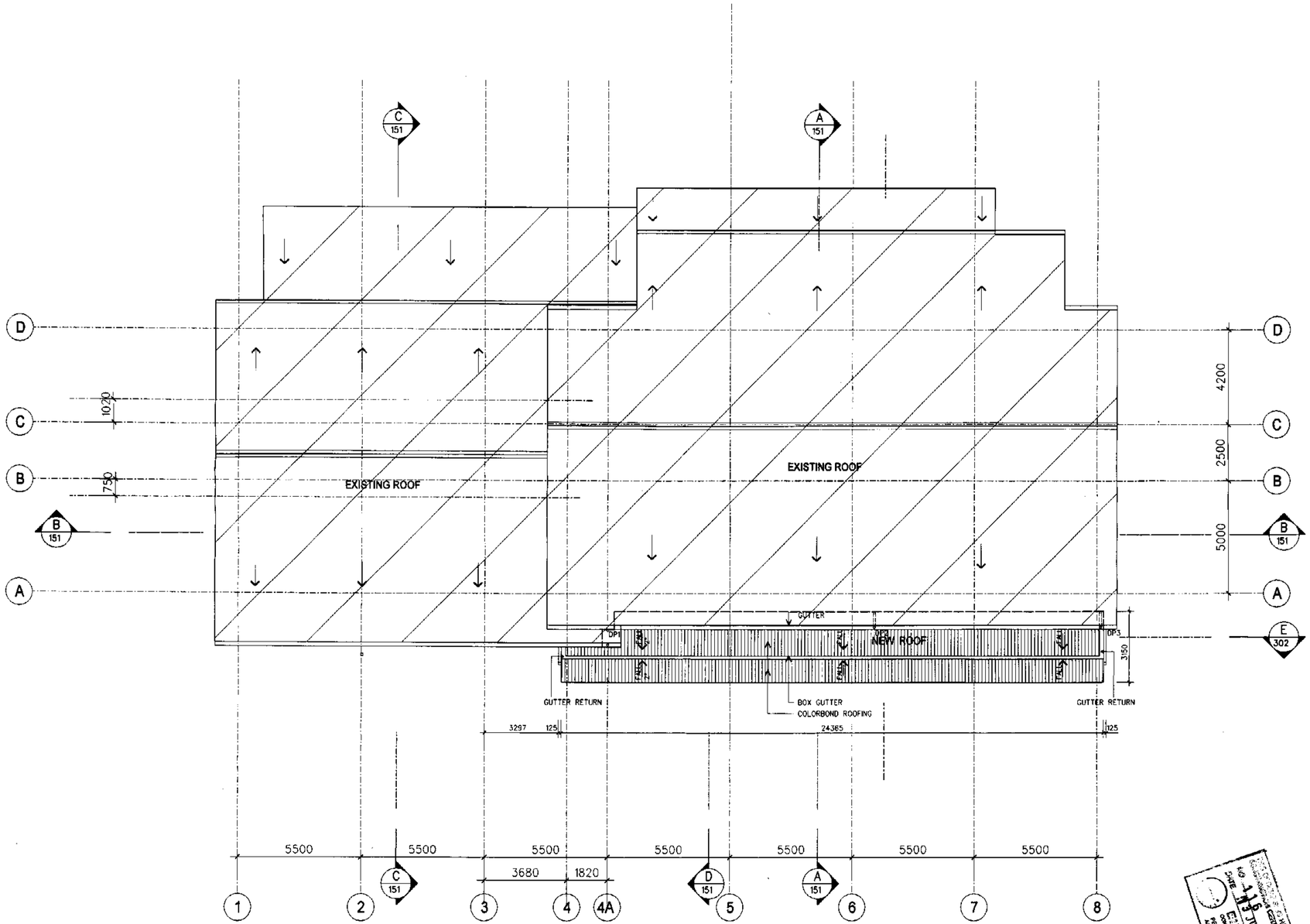
CONSULTANCY PTY. LTD.
PETER ROSSELLO ACCREDITED CERTIFIER No. 4493



LEGEND :

EXISTING ROOF

PROPOSED ROOF

True North	Project: MUSIC ROOM UNDER EXISTING HALL LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL PITTWATER ROAD BAYVIEW	ISSUE		DATE	FOR CONSTRUCTION 27 JUN 2005
		A	DEVELOPMENT APPLICATION	18.10.04	
		B	CONSTRUCTION CERTIFICATE CONSULTANT'S ISSUE	4.2.05	
		C	CONSTRUCTION CERTIFICATE PRELIMINARY. ADDED- NOTES, EXISTING ROOF HATCH, SECTION D, DP'S & SPREADER; SECTION A RELOCATED;	17.2.05	
		D	TENDER ISSUE	28.2.05	
		E	REVISED TENDER ISSUE	11.5.05	
		F	FOR CONSTRUCTION	27.6.05	

Architects
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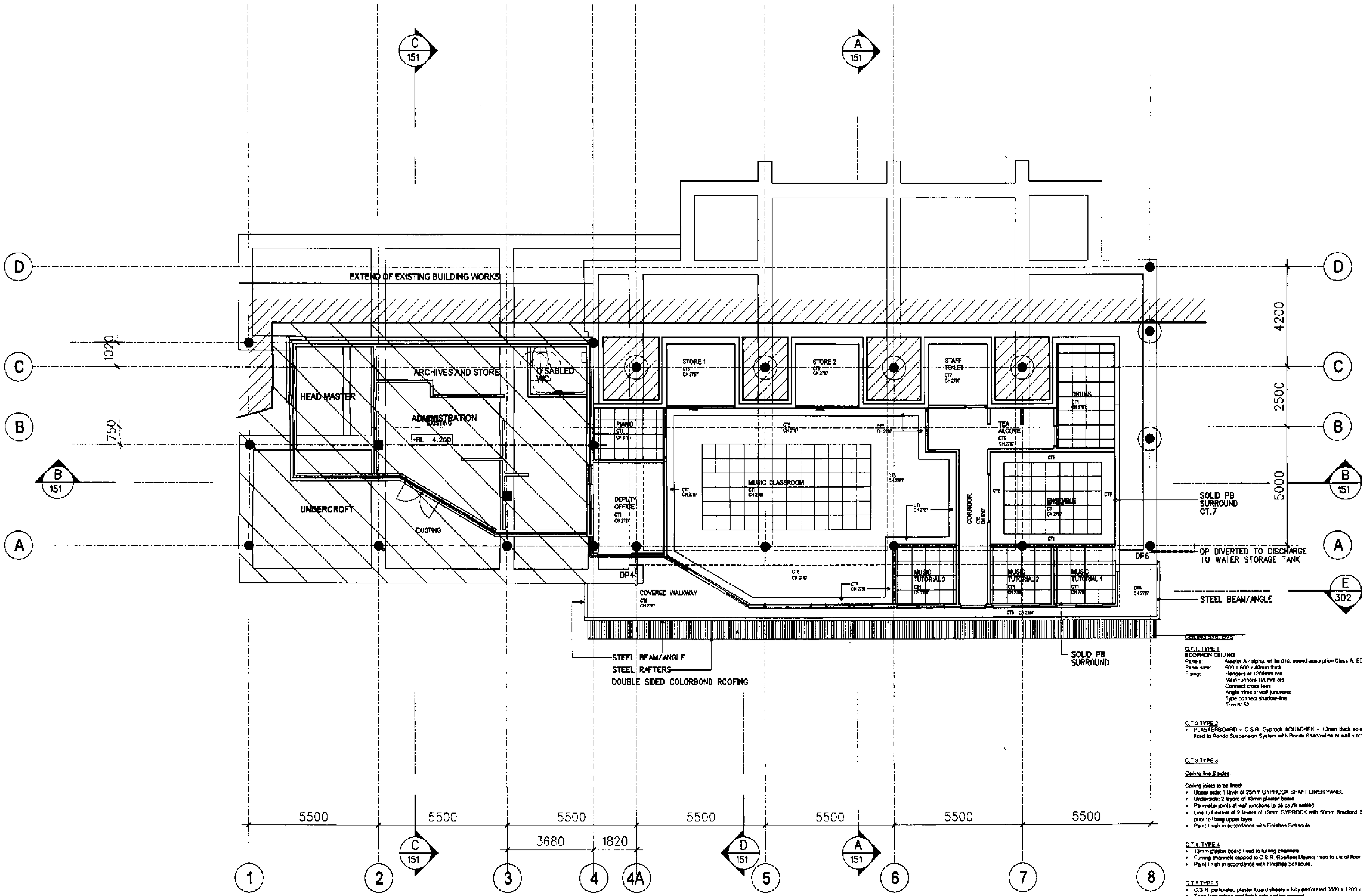
Title: ROOF PLAN

Scale 1:100	Date 18.10.04
Drawn RC/RW	
Dwg No A103	Issue F
Job No 0414	Plot date 27 JUN 2005

CAD PATH: f:\0414\plot\103.dgn



C.T.1. TYPE 1
ECOPHON CEILING
Panels: Master A / alpha, white 010, sound absorption Class A, EDGE A
Panel size: 600 x 600 x 40mm thick
Fixing: Hangers at 1200mm crs
Main runners 1200mm crs
Connect cross tees
Angle trims at wall junctions
Type connect shadow-line
Trim A152

C.T.2 TYPE 2
- PLASTERBOARD - C.S.R. Gyprock AQUACHEK - 13mm thick solid plaster board ceiling fixed to Rondo Suspension System with Rondo Shadowline at wall junctions.

C.T.3 TYPE 3

Ceiling line 2 sides.

Ceiling joists to be lined:
- Upper side: 1 layer of 25mm GYPROCK SHAFT LINER PANEL
- Underside: 2 layers of 13mm plaster board
- Perimeter joints at wall junctions to be caulk sealed.
- Line full extent of 2 layers of 13mm GYPROCK with 50mm Bradford 'S2' 350g/m² insulation prior to fixing upper layer
- Paint finish in accordance with Finishes Schedule.

C.T.4. TYPE 4
- 13mm plaster board fixed to furring channels.
- Furring channels clipped to C.S.R. Resilient Mounts fixed to u/s of floor slab.
- Paint finish in accordance with Finishes Schedule.

C.T.5 TYPE 5
- C.S.R. perforated plaster board sheets – fully perforated 3600 x 1200 x 13mm sheets.
- Tape joint edges and finish with setting cement.
- Fix to concealed suspended ceiling grid system.
- Insulation for full extent of panels shall be 50mm BRADFORD Polyester 'S2' (350g/m²).
- Paint finish in accordance with Finishes Schedule.

C.T.6 TYPE 6

Villaboard ceiling
- Screw fix C.S.R. Villaboard Lining to furring channels.
- Set joints.
- Paint finish in accordance with Finishes Schedule.

CT.7
SOUTH P. B. CEILING SURROUND TO TYPE CT.5 CEILING FIXED TO CONCEALED SUSPENDED GRID SYSTEM.

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True North

Project
MUSIC ROOM UNDER EXISTING HALL
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW

ISSUE		DATE
A		18.10.04
B	CONSTRUCTION CERTIFICATE CONSULTANT'S ISSUE	4.2.05
C	CONSTRUCTION CERTIFICATE PRELIMINARY. FIRST FLOOR REFLECTED CEILING PLAN DELETED; ADDED- CT. 7, SECTION D, STEEL NOTES; DP 4 SHOWN; DP5 DELETED.	17.2.05
D	TENDER ISSUE	28.2.05
E	REVISED TENDER ISSUE	10.5.05
F	FOR CONSTRUCTION	27.6.05

FOR CONSTRUCTION
27 JUN 2005

Architects
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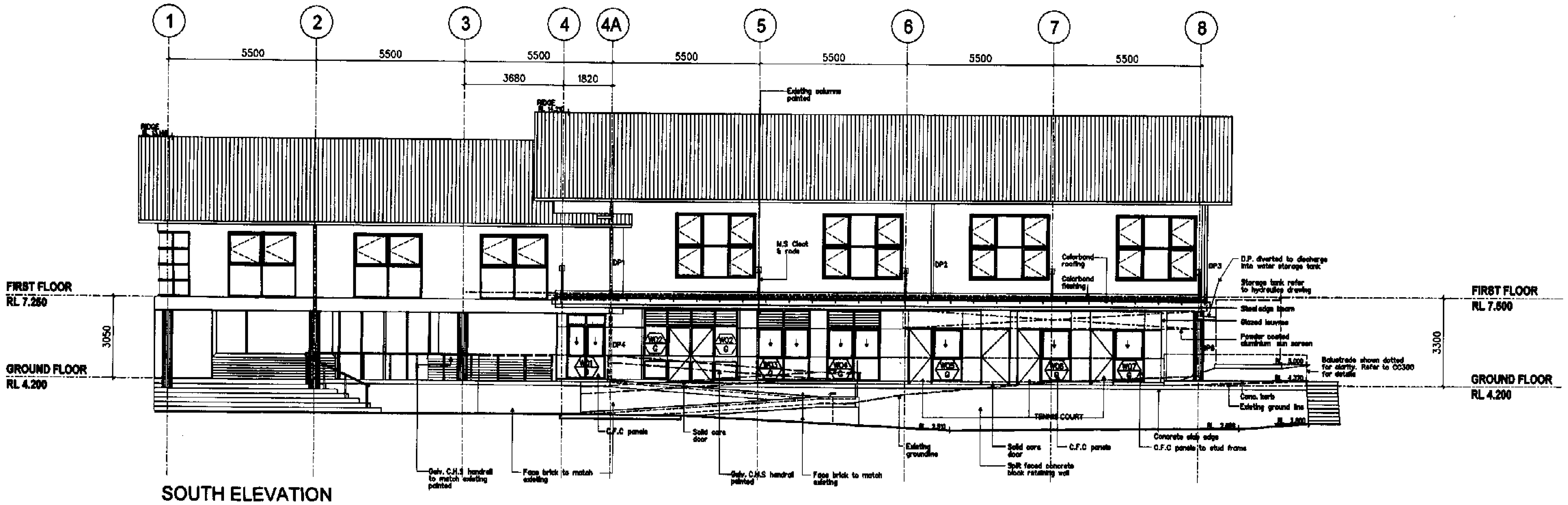
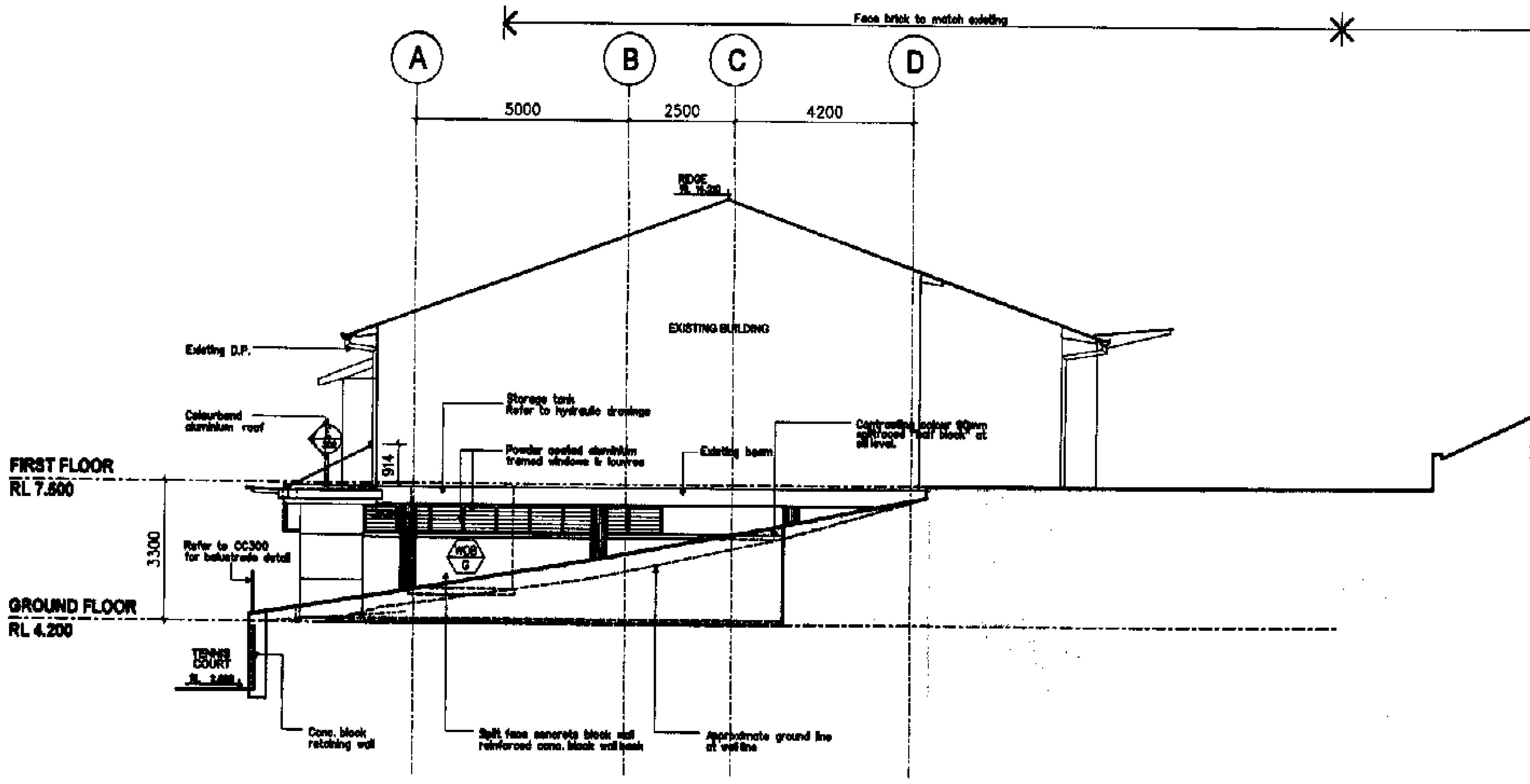
Title
REFLECTED CEILING PLAN GROUND FLOOR

Scale	1:100	Date	18.10.04
Drawn	RC/RW		
Dwg No	A130	Issue	F
Job No	0414	Plot date	27 JUN 2005

CAD PATH: f:\0414\plot\130.dgn



SOUTH ELEVATION



EAST ELEVATION

LEGEND

FG FIXED GLAZING

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NO. 116 / 05
DATE 13 JUL 2005

True North

Project

MUSIC ROOM UNDER EXISTING HALL

LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL

PITTWATER ROAD BAYVIEW

ISSUE		DATE
A	DEVELOPMENT APPLICATION	18.10.04
B	CONSTRUCTION CERTIFICATE CONSULTANT'S ISSUE	4.2.05
C	CONSTRUCTION CERTIFICATE PRELIMINARY. DP 5 DELETED; DP2 RELOCATED; DP'S NUMBERED; RAMP CO-ORDINATED WITH ENGINEER'S DWG; CONC. KERB TO WALKWAY NEAR GRID 8.	17.2.05
D	TENDER ISSUE	28.2.05
E	REVISED TENDER ISSUE	10.5.05
F	FOR CONSTRUCTION	27.6.05

FOR CONSTRUCTION

Architects

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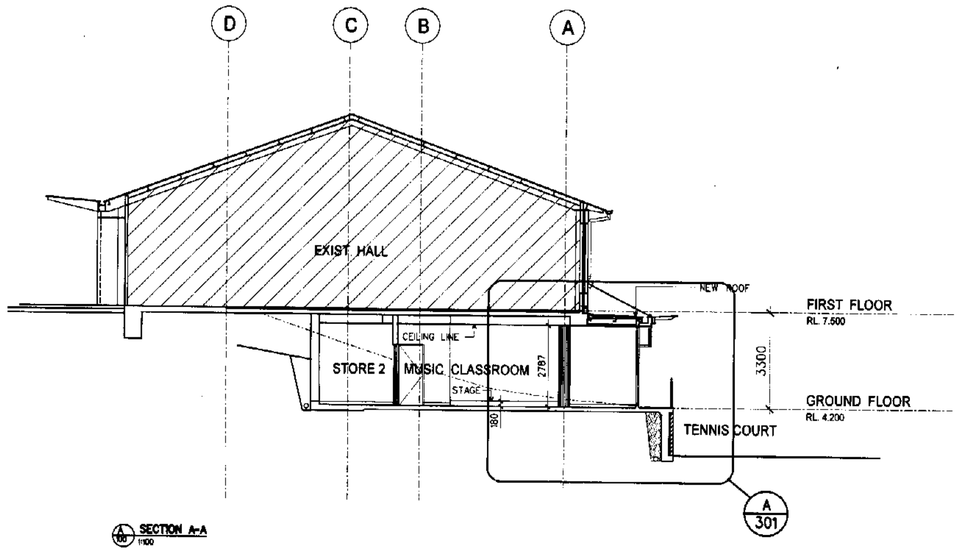
Title

ELEVATIONS

Scale 1:100	Date 18.10.04
Drawn RC/RW	
Dwg No A150	Issue F
Job No 0414	Plot date 27 JUN 2005

CAD PATH: f:\0414\plot\150.dgn



SECTION A-A
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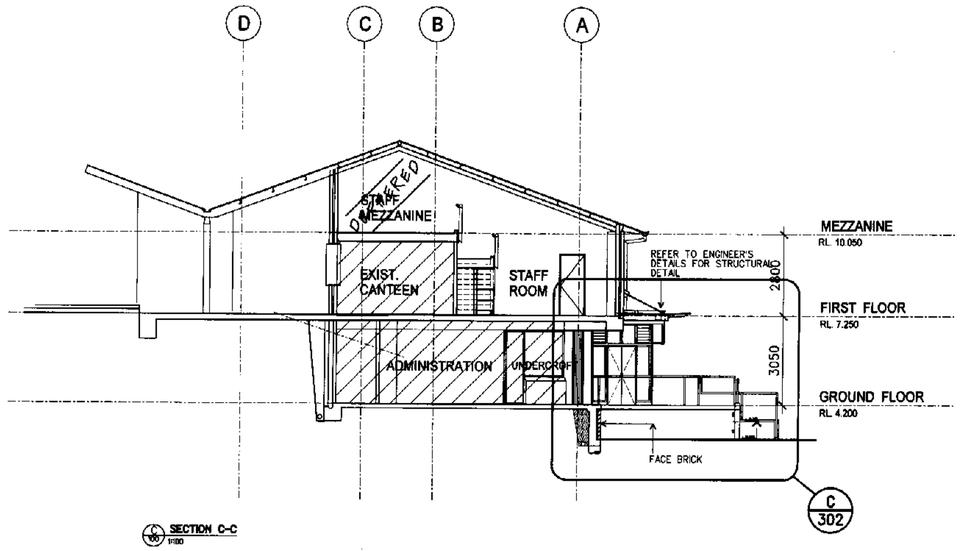

SECTION C-C
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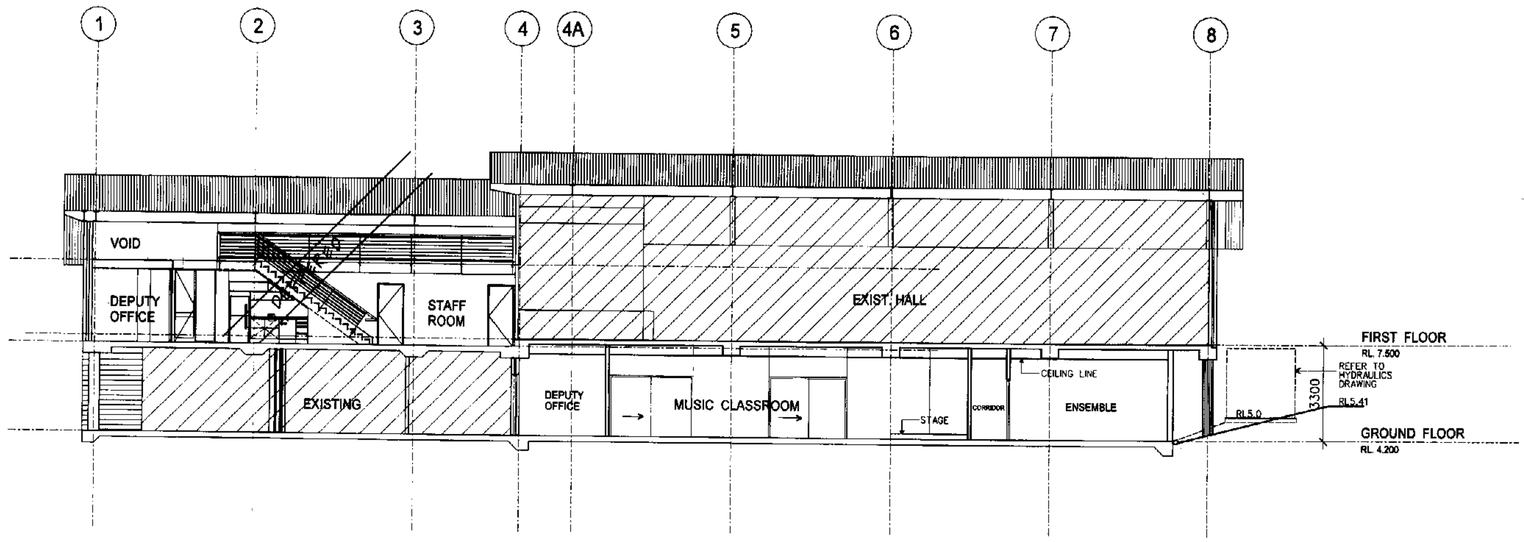

SECTION B-B
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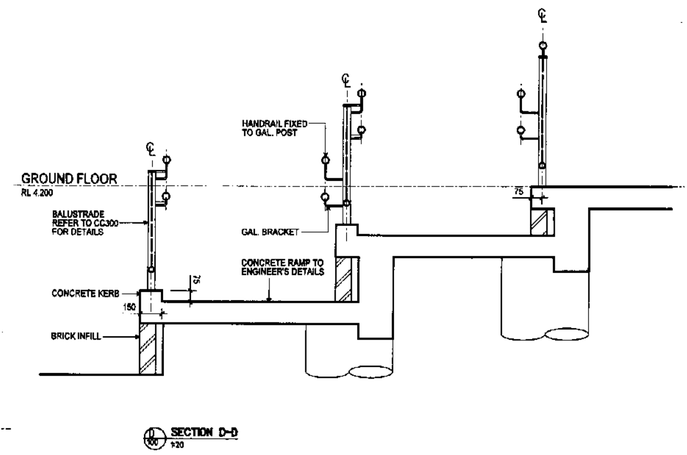

SECTION D-D
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DATE 13 JUL 2005
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PETER ROSSELLO
ACCREDITED CERTIFIER No 4435

True North

Project

MUSIC ROOM UNDER EXISTING HALL

LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL

PITTWATER ROAD BAYVIEW

ISSUE		DATE
A	DEVELOPMENT APPLICATION	18.10.04
B	CONSTRUCTION CERTIFICATE CONSULTANT'S ISSUE	7.2.05
C	MEZZANINE DEFFERED; RELOCATE AMPI-THEATRE SEATING	8.2.05
D	CONSTRUCTION CERTIFICATE PRELIMINARY. DELETE DP 5; SECTION THRU. RAMP ADDED; SECTION A RELOCATED; RAMP CO-ORDINATED WITH ENGINEER'S DETAIL	17.2.05
E	TENDER ISSUE	28.2.05
F	REVISED TENDER ISSUE	10.05.05
G	FOR CONSTRUCTION	27.6.05

FOR CONSTRUCTION

27 JUN 2005

Architects

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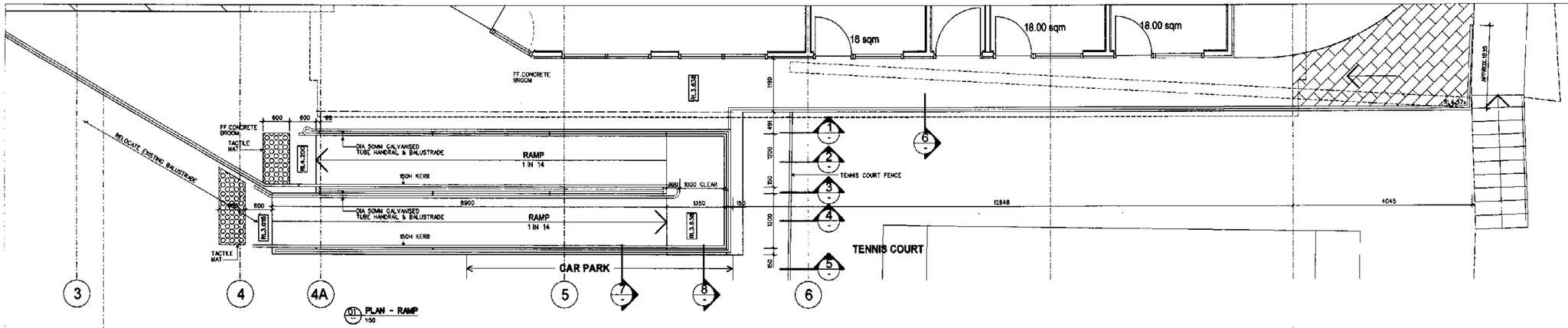
Title

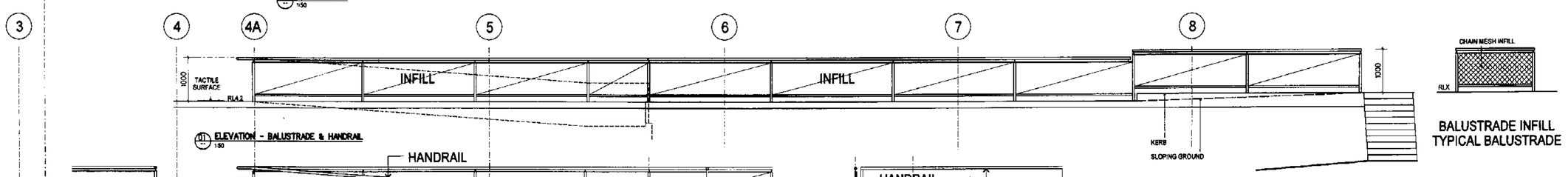
SECTIONS

Scale 1:20 / 100
Drawn RC / RW / TL
Date 18.10.04
Dwg No A151
Issue G
Job No 0414
Plot date 27 JUN 2005

CAD PATH: f:\0414\plot\151.dgn

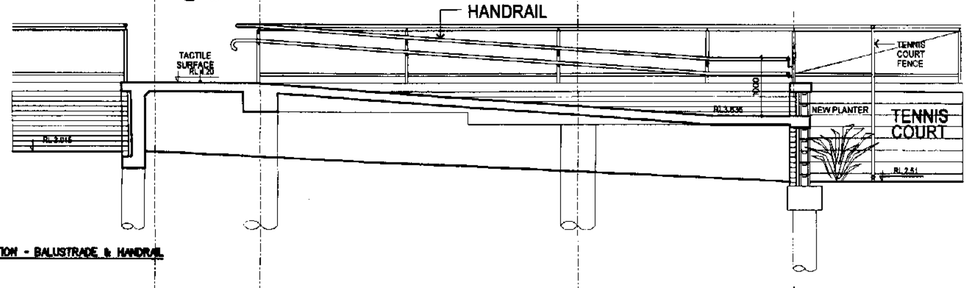


01 PLAN - RAMP 1:50



01 ELEVATION - BALUSTRADE & HANDRAIL 1:50

BALUSTRADE INFILL
TYPICAL BALUSTRADE



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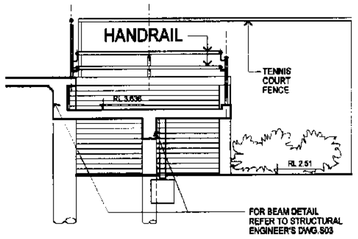
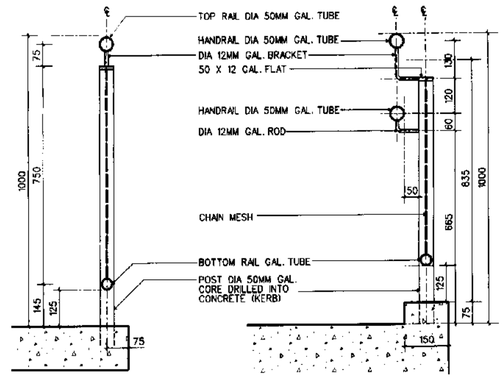
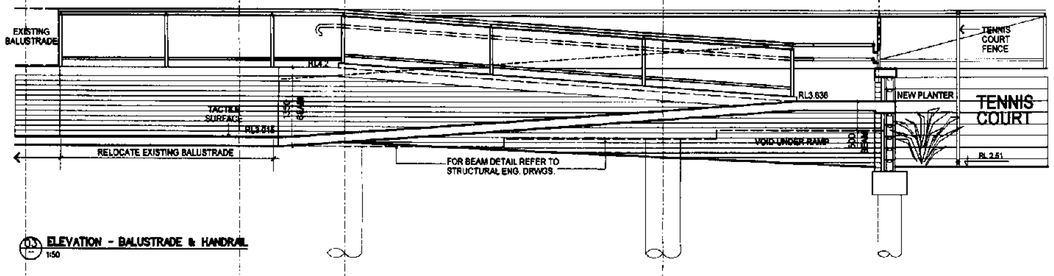


08 ELEVATION - BALUSTRADE & HANDRAIL 1:50

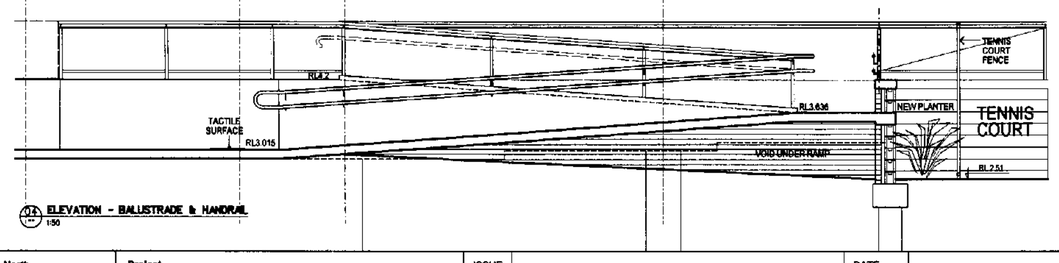


06 SECTION - BALUSTRADE 1:10

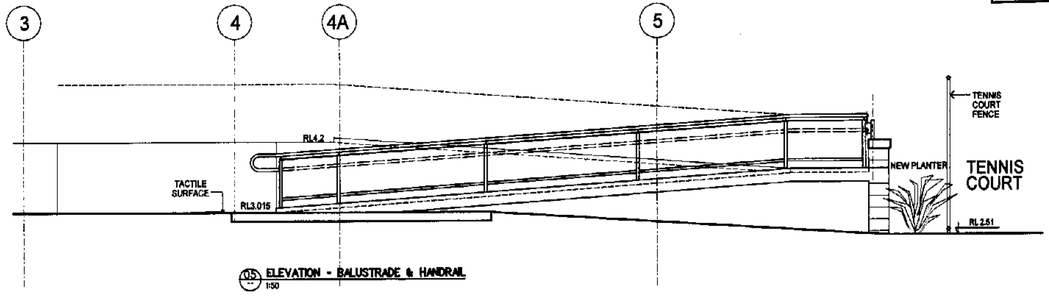
07 SECTION - RAMP BALUSTRADE 1:10



03 ELEVATION - BALUSTRADE & HANDRAIL 1:50



04 ELEVATION - BALUSTRADE & HANDRAIL 1:50



05 ELEVATION - BALUSTRADE & HANDRAIL 1:50

LEGEND

BAL	BALUSTRADE
DIA	DIAMETER
FF	FLOOR FINISH
GAL	GALVANISED
HNR	HANDRAIL

True North	Project	ISSUE		DATE
	MUSIC ROOM UNDER EXISTING HALL LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL PITTWATER ROAD BAYVIEW	A	CONSTRUCTION CERTIFICATE PRELIMINARY	17.2.05
		B	TENDER ISSUE	28.2.05
		C	REVISED TENDER ISSUE	10.5.05
		D	FOR CONSTRUCTION	27.6.05

FOR CONSTRUCTION
27 JUN 2005

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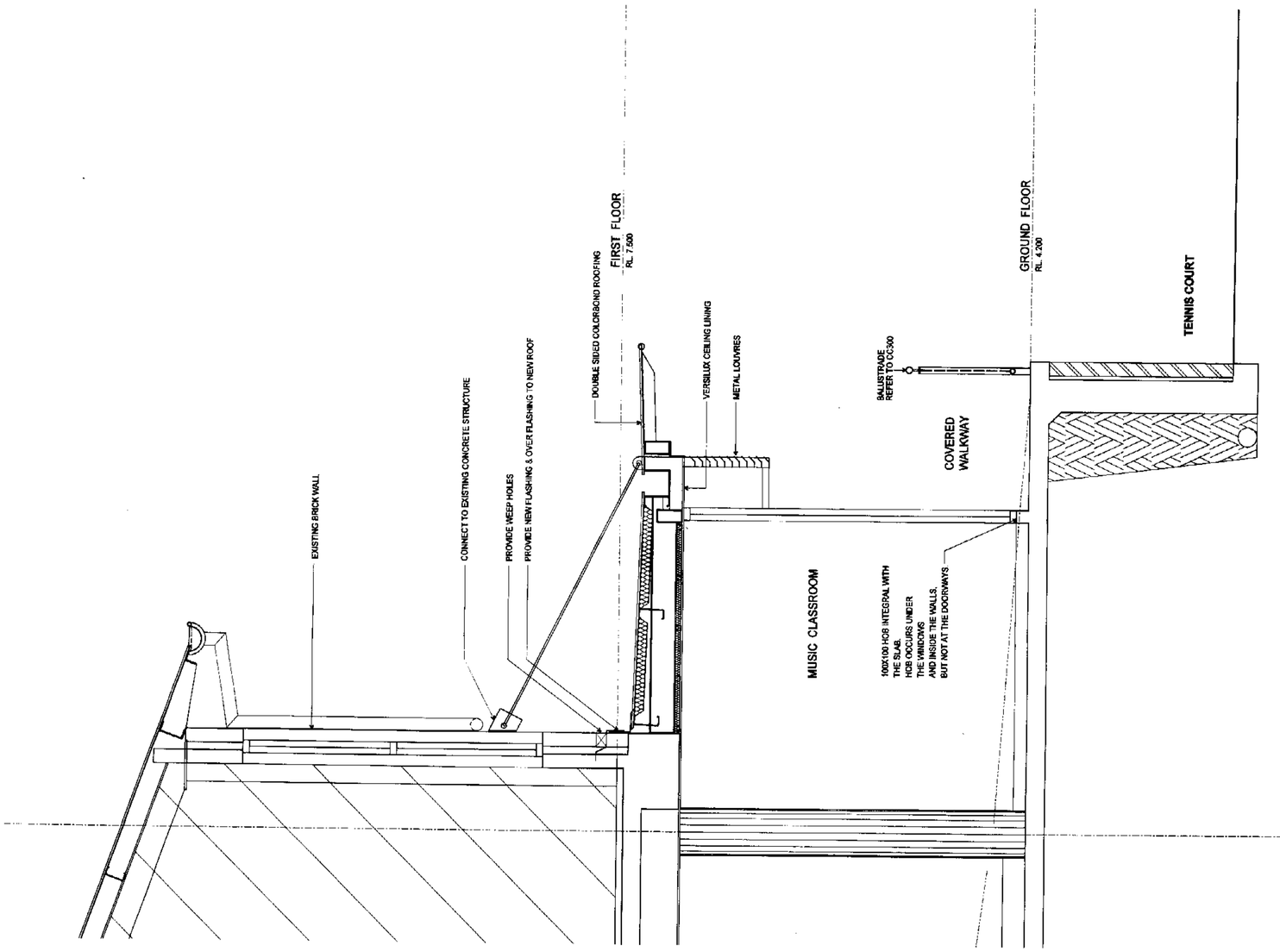
Title
DETAIL: RAMP, BALUSTRADE & HANDRAIL

Scale	Date
1:10 / 50	15.2.05
Drawn	
TL	
Dwg No	Issue
A300	D
Job No	Plot date
0414	27 JUN 2005

CAD PATH: f:\0414\plot\300.dgn



True North

Project

MUSIC ROOM UNDER EXISTING HALL

LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL

PITTWATER ROAD BAYVIEW

ISSUE		DATE
A	CONSTRUCTION CERTIFICATE PRELIMINARY	17.2.05
B	TENDER ISSUE	28.2.05
C	REVISED TENDER ISSUE	10.5.05
D	FOR CONSTRUCTION	27.6.05

FOR CONSTRUCTION

27 JUN 2005

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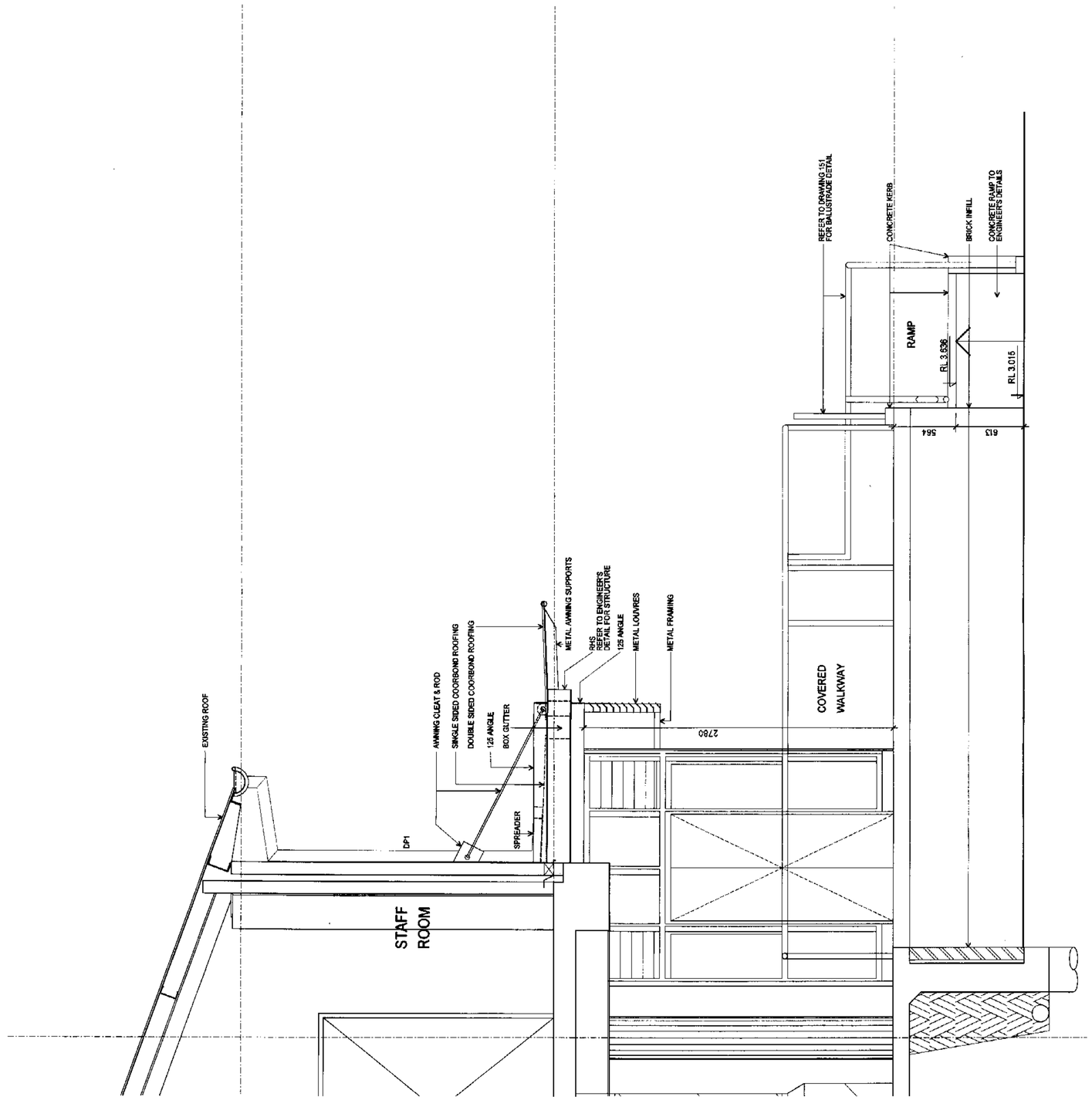
Title

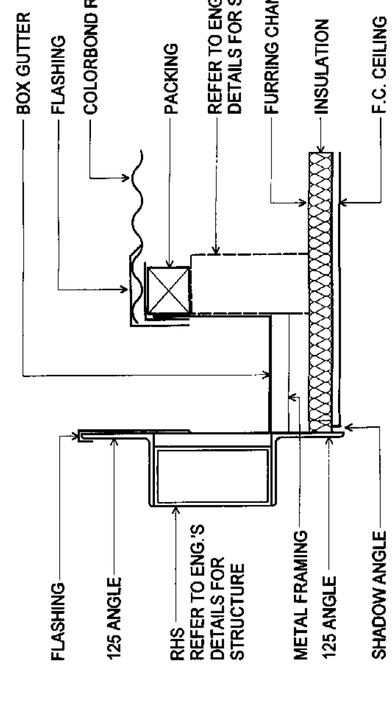
DETAIL SECTION A

Scale 1:20	Date 10.2.05
Drawn RC/RW /TL	
Dwg No A301	Issue D
Job No 0414	Plot date 27 JUN 2005

CAD PATH: f:\0414\plot\301.dgn



C 100 DETAIL SECTION C 1:20



E 100 GUTTER DETAIL SECTION E 1:5

THIS DOCUMENT IS ... TO THE CONSTRUCTION CERTIFICATE
NO. 116 / 05
DATE 13 JUL 2005

True North

Project
MUSIC ROOM UNDER EXISTING HALL
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW

ISSUE		DATE
A	CONSTRUCTION CERTIFICATE PRELIMINARY	17.2.05
B	TENDER ISSUE	28.2.05
C	REVISED TENDER ISSUE	10.5.05
D	FOR CONSTRUCTION	27.6.05

FOR CONSTRUCTION
27 JUN 2005

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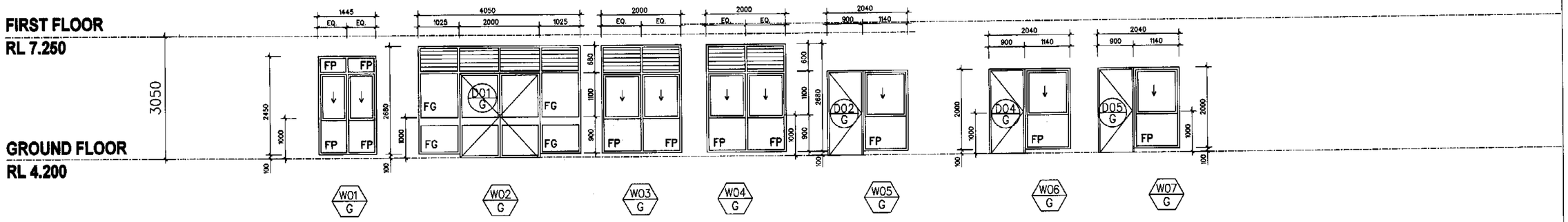
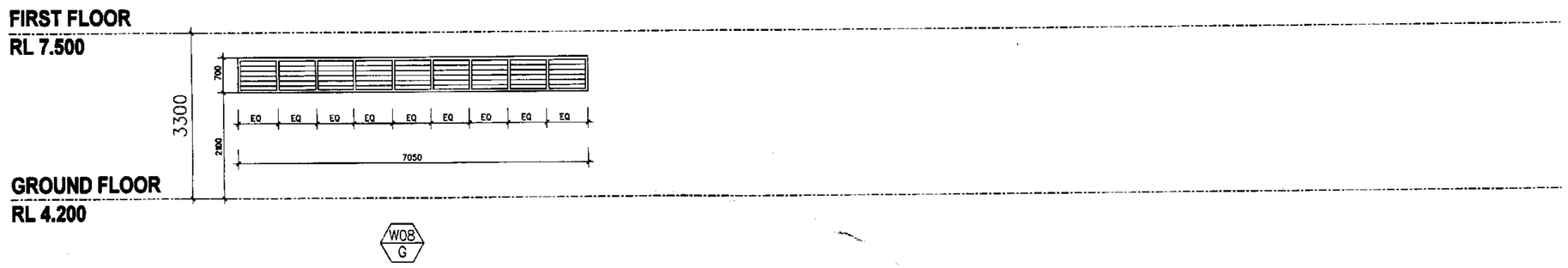
Title
DETAIL SECTION C & E

Scale 1:5, 20
Date 10.2.05
Drawn TL
Dwg No A302
Issue D
Job No 0414
Plot date 27 JUN 2005

CAD PATH: f:\0414\plot\302.dgn





NOTE:

- SITE CHECK ALL DIMENSIONS BEFORE STARTING MANUFACTURE
- DIMENSIONS SHOWN FOR EXISTING WINDOWS ARE NOMINAL AND SHALL BE CONFIRMEDON SITE

LEGEND:

FG FIXED GLASS
FP FIXED PANEL

THIS DOCUMENT IS REFERRED TO IN CONSTRUCTION CERTIFICATE
NO. 116 / 05
DATE 13 JUL 2005

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Project

MUSIC ROOM UNDER EXISTING HALL

LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL

PITTWATER ROAD BAYVIEW

ISSUE		DATE
A		18.10.04
B	CONSTRUCTION CERTIFICATE CONSULTANT'S ISSUE	4.2.05
C	CONSTRUCTION CERTIFICATE PRELIMINARY	17.2.05
D	TENDER ISSUE	28.2.05
E	REVISED TENDER ISSUE	10.5.05
F	FOR CONSTRUCTION	27.6.05

FOR CONSTRUCTION

27 JUN 2005

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MAYOH ARCHITECTS

Title

WINDOW SCHEDULE

Scale 1:50
Date 18.10.04
Drawn RC/RW
Dwg No A500
Issue F
Job No 0414
Plot date 27 JUN 2005

CAD PATH: F:\0414\plot500.dgn

AIR SYSTEM LEGEND

- PLAIN DUCTWORK
- EXTERNALLY INSULATED DUCTWORK 25mm THICK UNLESS SPECIFIED OTHERWISE
- INTERNALLY/ACOUSTIC INSULATED DUCTWORK 25mm THICK UNLESS SPECIFIED OTHERWISE (50) INDICATES 50mm THICK
- FLEXIBLE DUCT COMPLETE WITH BUTTERFLY DAMPER. SIZES AS SCHEDULED BELOW

SIZE	AIR QUANTITY
150ø	0 – 40 L/s
200ø	41 – 90 L/s
250ø	91 – 170 L/s
300ø	171 – 250 L/s
350ø	251 – 400 L/s
400ø	401 – 600 L/s
450ø	601 – 750 L/s

90 A4 — SUPPLY AIR DIFFUSER
NUMBER AFTER LETTER DENOTES DIRECTION OF BLOW

LETTER DENOTES NECK SIZE
A – 150 x 150　E – 450 x 450
B – 225 x 225　F – 600 x 300
C – 300 x 300　G – 600 x 600
D – 375 x 375　H – 1200 x 600

NUMBER BEFORE LETTER DENOTES SUPPLY AIR QUANTITY IN LITRES PER SECOND

60 B — RETURN AIR, RELIEF AIR OR EXHAUST AIR GRILLE

LETTER DENOTES GRILLE SIZE
A – 150 x 150　F – 600 x 300
B – 200 x 200　G – 600 x 600
C – 250 x 250　H –1200 x 600
D – 300 x 300
E – 400 x 400

NUMBER DENOTES EXHAUST AIR QUANTITY IN LITRES PER SECOND

(A) — DOOR GRILLE OR RELIEF AIR SLOT AT HIGH AND LOW LEVEL

LETTER DENOTES MINIMUM FREE CORE AREA IN SQUARE METRES
UC– 0.02 (19 mm UNDERCUT BY BUILDER)
A – 0.05 (600 x 200)
B – 0.08 (600 x 250)
C – 0.16 (600 x 600)
D – 0.22 (600 x 800)
E – 0.27 (600 x 900)

DOOR GRILLES TO BE PROVIDED & FITTED BY BUILDING TRADE

GENERAL NOTES

1. THIS SET OF DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE ASSOCIATED SPECIFICATION.
2. PIPES ARE SHOWN FOR CLARITY ONLY BUT THE ACTUAL POSITION OF THE PIPES AND FITTINGS WILL BE GOVERNED BY THE SATISFACTORY GRADING ETC ON SITE TO APPROVAL
3. ALL PIPE SIZES SHOWN ARE OUTSIDE PIPE DIAMETER FOR COPPER PIPES.
4. ALL DUCTWORK SIZES SHOWN ARE CLEAR AIRWAY SIZES UNLESS OTHERWISE SPECIFIED.
5. FOR EXACT POSITION OF DIFFUSERS, GRILLES, REGISTERS ETC AND RELATIONSHIP WITH LIGHT FITTINGS REFER TO ARCHITECTURAL REFLECTED CEILING PLAN.

GENERAL LEGEND

O.A	OUTSIDE AIR
R.A	RETURN AIR
S.A	SUPPLY AIR
A.P	ACCESS PANEL
L/s	LITRES PER SECOND
(T)	TEMPERATURE SENSOR / THERMOSTAT (LOCATION TO BE DETERMINED ON SITE)
TD	TUNDISH BY HYDRAULIC TRADE
P/W	PIPEWORK
AC–1	EQUIPMENT REFERENCE No AC – AIR CONDITIONING UNIT EF – EXHAUST FAN
— D —	CONDENSATE DRAIN
— RS+RL —	REFRIGERANT SUCTION AND LIQUID LINES
1/4	SECTION 1 ON DRAWING No. 4

SCHEDULE OF ASSOCIATED DRAWINGS

SHEET No.	TITLE
4292–MS–1	LEGEND, GENERAL NOTES & EQUIPMENT SCHEDULES
4292–MS–2	FLOOR PLAN

REVERSE CYCLE AIR CONDITIONING UNIT SCHEDULE

UNIT No.	AREA SERVED	COOLING CAPACITY TOTAL (kW)	COOLING CAPACITY SENSIBLE (kW)	ENTERING AIR °C DB	ENTERING AIR °C WB	SUPPLY AIR (L/s)	HEATING CAPACITY (kW)	PREFERRED MANUFACTURER–DAIKIN MODEL No	TYPE
AC–1	PIANO ROOM	2.5	1.9	27.0	19.0	125	2.5	FTX25JVEA (RMX140)	WALL MOUNTED
AC–2	DEPUTY OFFICE	2.5	1.9	27.0	19.0	125	2.5	FLX25HVEA (RMX140)	CEILING SUSPENDED
AC–3	DRUMS ROOM	2.5	1.9	27.0	19.0	125	2.5	FTX25JVEA (RMX140)	WALL MOUNTED
AC–4	T1 ROOM	2.5	1.9	27.0	19.0	125	2.5	FLX25HVEA (RMX140)	CEILING SUSPENDED
AC–5	T2 ROOM	2.5	1.9	27.0	19.0	125	2.5	FLX25HVEA (RMX140)	CEILING SUSPENDED
AC–6	T3 ROOM	2.5	1.9	27.0	19.0	125	2.5	FLX25HVEA (RMX140)	CEILING SUSPENDED
AC–7	ENSEMBLE ROOM	7.1	5.6	27.0	19.0	310	7.1	FHYCP71DVE/RZP71DV1	CEILING CASSETTE

NOTES:

1. HEATING CAPACITY BASED ON 21°C EDB AND 7°C DB AMBIENT.
2. COOLING CAPACITY BASED ON 35°C DB AMBIENT.
3. PROVIDE WALL MOUNTED HARD WIRED A/C UNIT CONTROLS.
4. CEILING CASSETTE & CEILING SUSPENDED UNITS SHALL BE COMPLETE WITH CONDENSATE PUMPS.

FAN SCHEDULE

FAN No.	FAN TYPE	AIR QUANTITY (L/s)	ESTIMATED SYSTEM STATIC PRESSURE (Pa)	MAX FAN SPEED (R/s)	MINIMUM FAN DIAMETER (mm)	MINIMUM MOTOR OUTPUT (kW) / PHASE ø	PREFERRED MANUFACTURER – FANTECH MODEL No.
EF–1	WALL MOUNTED AXIAL	65	30	30	200	0.05/1ø	HV–230

NOTES:

1. PROVIDE STARTING DEVICES, OVERLOADS & SAFETY CUTOUTS.

THIS DOCUMENT IS REFERRED TO IN CONSTRUCTION CERTIFICATE
DATE 13 JUL 2005
ENVIRONET

No.	Description	Drn by	Ckd by	Date
A	TENDER ISSUE	KM		3.06.05

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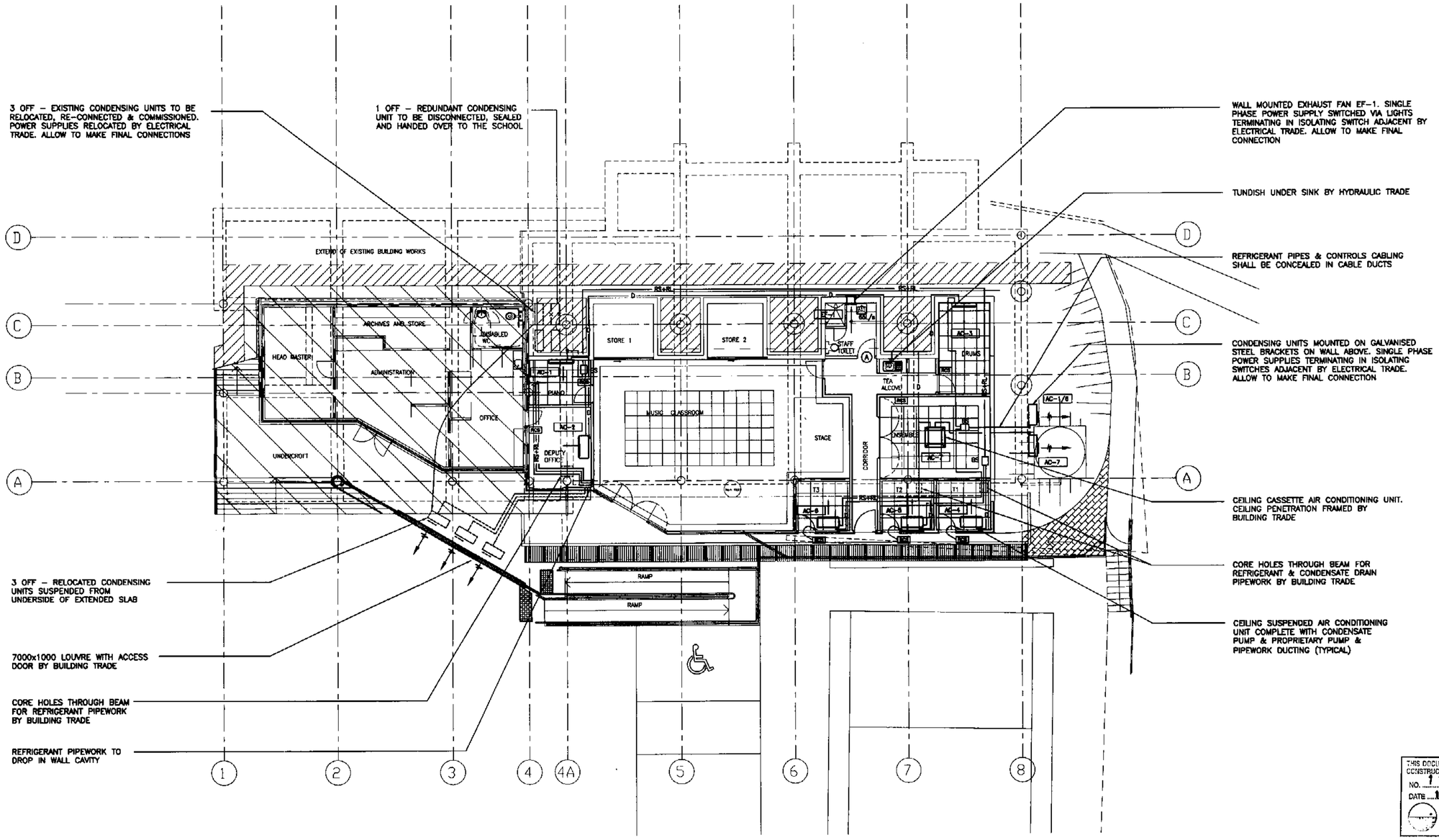
PROJECT
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW
MUSIC ROOMS UNDER EXISTING HALL

MECHANICAL SERVICES
LEGEND, GENERAL NOTES & EQUIPMENT SCHEDULES

DATE: MAR 2005	SCALE: NTS@A1
DRAWN: KM	CHECKED:
DRAWING No: 4292–MS–1	ISSUE No: A

NOTES:

1. FOR LEGEND & EQUIPMENT SCHEDULES REFER TO DRG. No. 4292–MS–1.



THIS DOCUMENT IS REFERRED TO IN CONSTRUCTION CERTIFICATE NO. 116/05 DATE 13 JUL 2005
ENVIRONET CONSULTANCY PTY. LTD.
PETER ROSSELLO
AFFIN No 4455

No.	Description	Drn by	Ckd by	Date
A	TENDER ISSUE	KM		3.06.05

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PROJECT
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW
MUSIC ROOMS UNDER EXISTING HALL

MECHANICAL SERVICES
FLOOR PLAN

DATE: MAR 2005	SCALE: 1:100@A1
DRAWN: KM	CHECKED
DRAWING No: 4292–MS–2	ISSUE No: A

LEGEND

EXISTING DISTRIBUTION BOARD

SINGLE GENERAL PURPOSE OUTLET
DOUBLE GENERAL PURPOSE OUTLET
CONDUIT OUTLET
No. DENOTES MOUNTING HEIGHT IN mm
B DENOTES MOUNTED ABOVE BENCH
REF – REFRIGERATOR OUTLET
BWU – BOILING WATER UNIT
AV – OUTLETS FOR AUDIO–VISUAL USE
C – DENOTES CEILING MOUNTED
A – ACOUSTIC WALL BOX

PERMANENTLY CONNECTED OUTLET
No. DENOTES NUMBER OF PHASES

PERMANENTLY CONNECTED OUTLET TO BE RELOCATED

EXISTING SECURITY ALARM SYSTEM DATA GATHERING PANEL

PASSIVE INFRA–RED DETECTOR

EXISTING TELEPHONE INTERMEDIATE DISTRIBUTION FRAME

TELEPHONE OUTLET

DATA CABLING D – LINK EQUIPMENT LOCATION
D – LINK EQUIPMENT INSTALLATION BY SCHOOL

PERIOD BELL SIMILAR TO EXISTING

HAND DRYER EQUAL TO J. D. MACDONALD PTY LTD "AUTOBEAM"

H – P2
SUBCIRCUIT DESIGNATION
SUBCIRCUIT NUMBER
P–POWER L–LIGHTING
ORIGINATING SWITCHBOARD

2A 18 WATT FLUORESCENT LUMINAIRE
2 D 36 WATT FLUORESCENT LUMINAIRE
No. DENOTES NUMBER OF FLUORESCENT LAMPS
LETTER DENOTES TYPE OF LUMINAIRE AS FOLLOWS :–
A – SURFACE MOUNTED ENCLOSED FLUORESCENT EQUAL TO PIERLITE "UNILUX"
B – BARE BATTEN FLUORESCENT EQUAL TO PIERLITE

EXISTING COMPACT FLUORESCENT EXTERNAL BULKHEAD LUMINAIRE TO BE RETAINED

Ⓐ NEW BULKHEAD LUMINAIRE TO MATCH ABOVE EXISTING LUMINAIRE

Ⓑ 26 WATT FLUORESCENT BOLLARD EQUAL TO EAGLE LIGHTING "WATCHTOWER" – COLOUR BLACK

CR 9 WATT FLUORESCENT RECESSED BRICKLIGHT EQUAL TO WE–EF CAT No. STG259

CA 18 WATT SURFACE MOUNTED SLIMLINE FLUORESCENT LUMINAIRE EQUAL TO THORN "ARROWSLIM" T8 DIFFUSER

Ⓔ 10 WATT TUNGSTEN HALOGEN RECESSED NON–MAINTAINED EMERGENCY LUMINAIRE EQUAL TO STANILITE CAT No SF10

EXA 4 WATT COLD CATHODE LONG LIFE FLUORESCENT EMERGENCY EXIT SIGN EQUAL TO STANILITE 'MILLENNIUM QUICKFIT'

1200mm DIAMETER CEILING FAN EQUAL TO WATTMASTER

F FAN SPEED CONTROLLER

EXISTING BUSBAR OR CABLE
NEW BUSBAR OR CABLE
No. OF STROKES DENOTES NUMBER OF PHASES

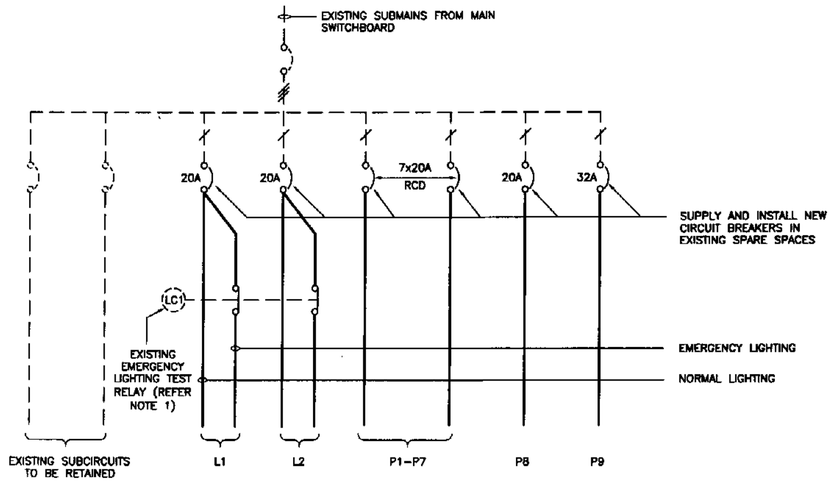
EXISTING CIRCUIT BREAKER

CIRCUIT BREAKER – RCD ADJACENT DENOTES INTEGRAL RCD UNIT – 30mA SENSITIVITY

(LC1) EXISTING EMERGENCY LIGHTING TEST RELAY

NORMALLY CLOSED CONTACT

SWITCH AND SWITCHWIRE
2W DENOTES 2 WAY
F DENOTES DOUBLE POLE SWITCH WITH EXHAUST FAN RUN–ON TIMER
A DENOTES ACOUSTIC WALL BOX



EXISTING DISTRIBUTION BOARD DBH SINGLE LINE DIAGRAM

NOTES: 1. MODIFY EXISTING EMERGENCY LIGHTING TEST EQUIPMENT AS REQUIRED TO ALLOW EXTENSION TO NEW LIGHTING CIRCUITS AS INDICATED.

THIS DOCUMENT IS REFERRED TO IN CONSTRUCTION CERTIFICATE
NO. 116 / 05
DATE 13 JUL 2005
ENVIRONET CONSULTANCY PTY LTD
PETER MARSELLO ACCREDITATION NUMBER No. 4413

No.	Description	Drn by	Ckd by	Date
A	TENDER ISSUE	DP	BK	2.06.05
P1	PRELIMINARY ISSUE	DP		

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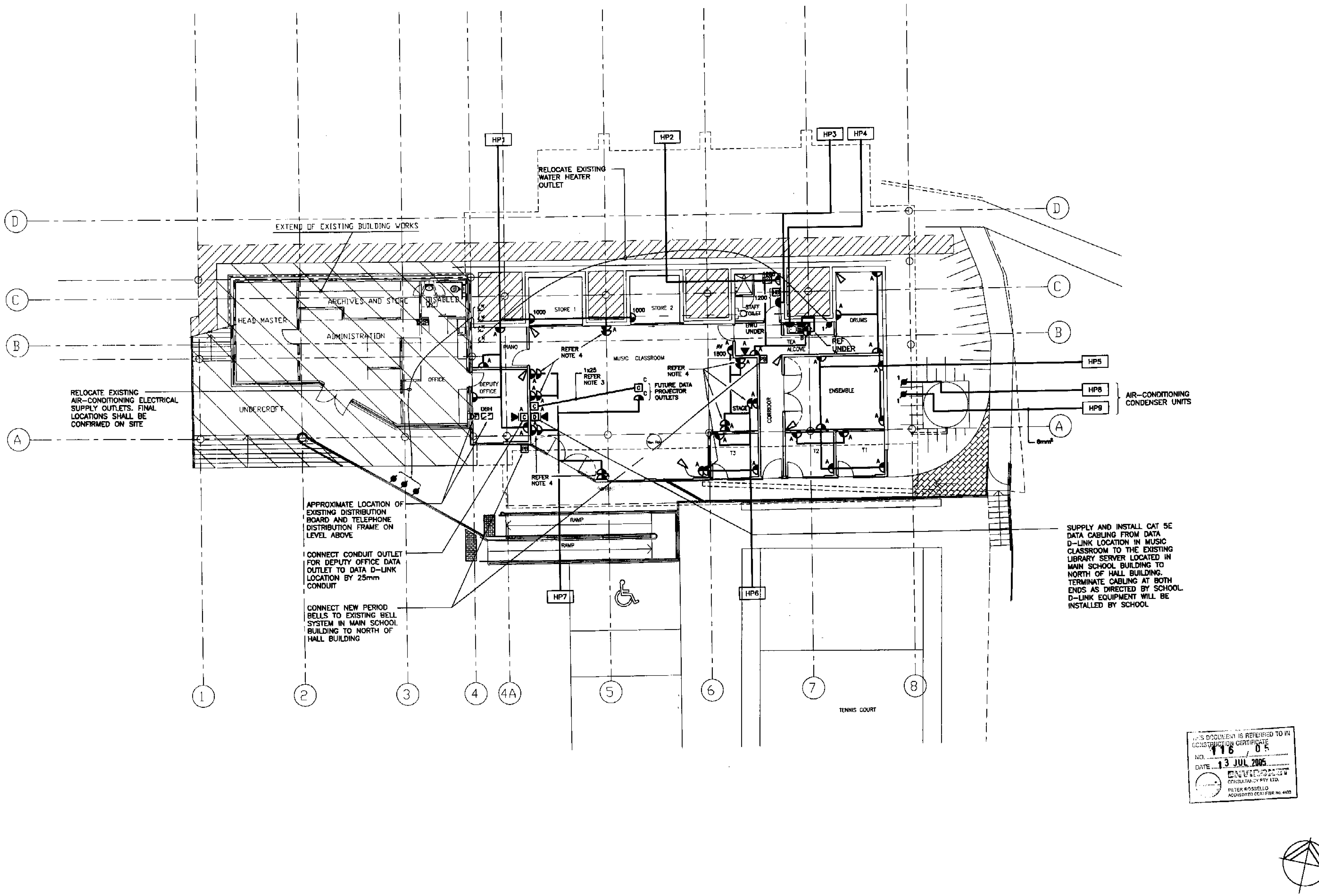
PROJECT
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW
MUSIC ROOMS UNDER EXISTING HALL

ELECTRICAL SERVICES
LEGEND & SINGLE LINE DIAGRAM

DATE JUNE 2005
SCALE NTS@A1
DRAWN DJP/KL
CHECKED
DRAWING No 4292–ES–1
ISSUE No A



No.	Description	Drn by	Ckd by	Date
A	TENDER ISSUE	DP	BK	2.06.05
P1	PRELIMINARY ISSUE	DP		

NOTES:

1. FOR LEGEND REFER TO DRAWING No. ES-1.
2. OUTLETS SHALL BE MOUNTED 300mm AFFL UNLESS OTHERWISE NOTED. CONFIRM THE FINAL LOCATIONS OF ALL OUTLETS ON SITE PRIOR TO INSTALLATION.
3. CONNECT CONDUIT OUTLETS FOR FUTURE DATA PROJECTOR VIDEO CABLING VIA 25mm CONDUIT.
4. POWER OUTLETS IN MUSIC CLASSROOM SHALL COMPRISE 4xGPO'S MOUNTED ON A 4 GANG FLUSHPLATE. SUBMIT SAMPLE FOR APPROVAL PRIOR TO INSTALLATION.

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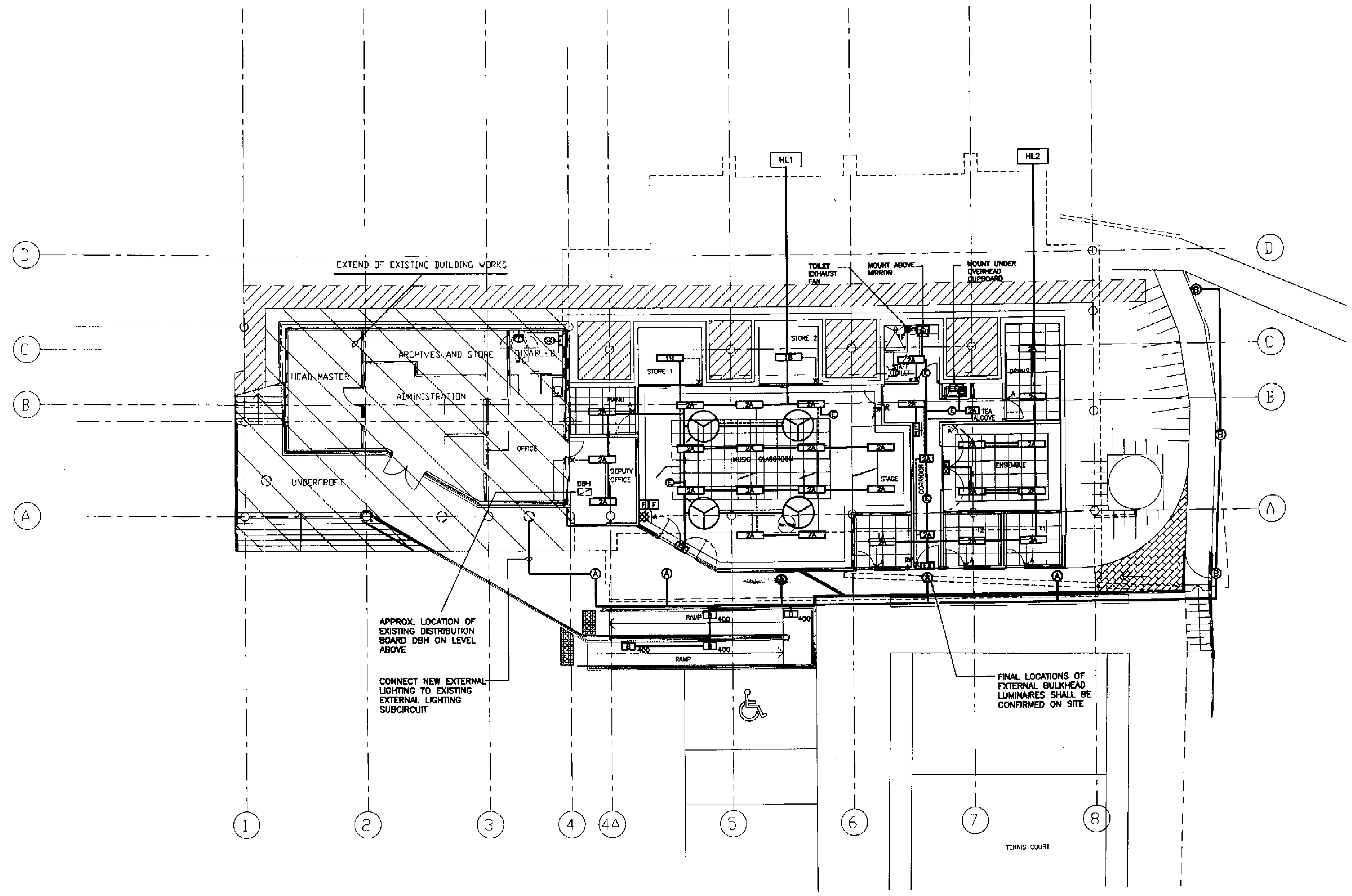
PROJECT
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW
MUSIC ROOMS UNDER EXISTING HALL

ELECTRICAL SERVICES
POWER LAYOUT

DATE	SCALE
JUNE 2005	1:100@A1
DRAWN DJP/KL	CHECKED
DRAWING No 4292-ES-2	ISSUE No A



No.	Description	Drn by	Ckd by	Date
A	TENDER ISSUE	DP	BK	2.08.05
P1	PRELIMINARY ISSUE	DP		

NOTES:

1. FOR LEGEND REFER TO DRAWING No. ES–1.
2. OUTLETS SHALL BE MOUNTED 300mm AFFL UNLESS OTHERWISE NOTED. CONFIRM THE FINAL LOCATIONS OF ALL OUTLETS ON SITE PRIOR TO INSTALLATION.
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PROJECT

LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL

PITTWATER ROAD BAYVIEW

MUSIC ROOMS UNDER EXISTING HALL

ELECTRICAL SERVICES

LIGHTING LAYOUT

DATE: JUNE 2005	SCALE: 1:100@A1
DRAWN: DJP/KL	CHECKED
DRAWING No: 4292–ES–3	ISSUE No: A

STRUCTURAL NOTES

GENERAL

G1 THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER WORKING DRAWINGS AND SPECIFICATIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ALL DISCREPANCIES AND VARIATIONS SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

G2 ALL WORK SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF ALL RELEVANT AND CURRENT CODES AND STANDARDS.

G3 ALL DIMENSIONS RELEVANT TO SETTING OUT AND OFF-SITE WORK SHALL BE VERIFIED BY THE BUILDER BEFORE CONSTRUCTION AND FABRICATION ARE COMMENCED.

G4 DIMENSIONS SHALL NOT BE OBTAINED BY SCALING THE STRUCTURAL DRAWINGS.

G5 DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART OF THE STRUCTURE SHALL BE OVERSTRESSED.

G6 PROPRIETARY ITEMISE SPECIFIED SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURE'S WRITTEN RECOMMENDATIONS AND SPECIFICATIONS.

G7 BUILDING FROM THESE DRAWINGS IS NOT TO COMMENCE UNTIL APPROVAL IS GIVEN BY RELEVANT AUTHORITIES & THE ISSUE OF CONSTRUCTION DRAWINGS.

G8 THERE MAY BE DESIGN FEATURES WE ARE NOT AWARE OF OR HAVE NOT ADDRESSED FOR A VARIETY OF REASONS. THE BUILDER/ARCHITECT SHALL SATISFY THEMSELVES THAT ALL NECESSARY INFORMATION IS OBTAINED PRIOR TO TENDER/CONSTRUCTION.

G9 THE STRUCTURAL WORK SHOWN ON THESE DRAWINGS HAVE BEEN DESIGNED FOR THE FOLLOWING SUPERIMPOSED LOADS:

A) WIND LOADS IN ACCORDANCE WITH AS 1170-2;
STRUCTURAL IMPORTANCE MULTIPLIER Mi = 1.0
TERRAIN CATEGORY Cq = 2.5
BASIC WIND SPEED Vu = 50 m/s
Vs = 38 m/s

B) LIVE LOADS, LL, (KPa)

ROOF (NON-TRAFFICABLE):	0.25	BALCONIES:	-	MEZZANINE:	-
ROOF (TRAFFICABLE):	-	PARKING:	-	FLOOR:	4.0 (3.0)
STAIRS:	4.0	STORAGE:	-	PLATFORM:	-

FOUNDATIONS

F1 NATURAL GROUND, ALLOWABLE BEARING PRESSURE.
MIN. 100 kPa ALLOWABLE BEARING PRESSURE.

SLABS:

PIERS: PIERS MIN. 300 INTO SOLID ROCK WITH MIN. 600 KPa ALLOWABLE BEARING PRESSURE, UNO.

MIN. 200 MM INTO SOLID ROCK WITH MIN. 600 KPa ALLOWABLE BEARING PRESSURE.

RETAINING WALL FOOTINGS:

F2 AFTER EXCAVATION AND PRIOR TO PLACEMENT OF CONCRETE ALL FOUNDING MATERIAL MUST BE CERTIFIED IN WRITING BY A QUALIFIED AND REGISTERED GEOTECHNICAL ENGINEER.

F3 WHERE ADDITIONAL EXCAVATION IS REQUIRED DUE TO UNSUITABLE FOUNDING MATERIAL, THE GEOTECHNICAL AND STRUCTURAL ENGINEERS ARE TO BE INFORMED.

F4 WHERE ISOLATED PIPES (MAX. 100 MM DIA) PENETRATE THROUGH GROUND BEAMS, PROVIDE A SLEEVE WITH A MINIMUM OF 20 MM CLEARANCE ALL AROUND AND SEAL THE ENDS OF THE SLEEVE WITH FLEXIBLE FILLERS. PIPES TO BE LOCATED AT MID-HIGHT OF FOOTINGS. FOR LARGER PIPES OR TWO OR MORE PIPES PENETRATING THROUGH ONE LOCATION CONSULT THE ENGINEER.

F5 THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH GEOTECHNICAL REPORT PREPARED BY GEOTECHNICAL ENGINEER. THE BUILDER MUST TAKE INTO ACCOUNT THE RECOMMENDATIONS OF THIS REPORT. THE GEOTECHNICAL ENGINEER IS TO BE CONSULTED AT ALL RELEVANT STAGES OF CONSTRUCTION. EXISTING RETAINING WALLS AND ANY OTHER LAND FEATURES ON SITE TO BE STABILISED TO GEOTECHNICAL ENGINEER'S REQUIREMENTS.

F6 DRAINAGE DETAILS SHOWN ON THESE DRAWINGS ARE SCHEMATIC ONLY. DRAINAGE MUST BE PROVIDED IN STRICT ACCORDANCE WITH THE HYDRAULIC ENGINEER'S DRAWINGS AND SPECIFICATIONS. THE HYDRAULIC ENGINEER IS TO BE CONSULTED AT ALL RELEVANT STAGES OF CONSTRUCTION.

F7 ALL DIMENSIONS AND RLs MUST BE TAKEN OFF THE ARCHITECT AND LANDSCAPE ARCHITECT DRAWINGS. THE STRUCTURAL DRAWINGS MUST UNDER NO CIRCUMSTANCES BE SCALED FOR ANY PURPOSE, TYPICAL.

F8 VIBRATION FROM EQUIPMENT USED ON SITE FOR PILING, EXCAVATION, CUTTING, CORING, ETC. MUST BE CAREFULLY MONITORED BY A QUALIFIED GEOTECHNICAL ENGINEER TO ENSURE THEIR COMPLETE SATISFACTION THAT NO DAMAGE TO EXISTING STRUCTURE WOULD RESULT. VERIFICATION MUST BE OBTAINED IN WRITING, TYPICAL.

TIMBER

T1 ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH AS 1720, AS 1684, AS 1749, AS 2082, AS 2440, AS 2858 AND NSW TIMBER FRAMING MANUAL.

T2 ALL SAPWOOD SUSCEPTIBLE TO LICTID BORER ATTACK SHALL BE IMMUNISED OR PRESERVED IN ACCORDANCE WITH AS 2082.

T3 THE IMPERFECTIONS PERMITTED BY THE GRADING RULES SHALL APPLY TO ERECTED TIMBER. TIMBER WILL BE REJECTED IF IMPERFECTION LIMITS ARE EXCEEDED.

T4 UNLESS NOTED OTHERWISE USE:
-M16 GRADE 4.6/S GALVANISED BOLTS WITH 55 DIA X 3.0 GALVANISED WASHERS UNDER THE HEAD AND NUT.
-M12 GRADE 4.6/S GALVANISED COACH SCREWS WITH 55 DIA. X 3.0 GALVANISED WASHERS UNDER HEAD.
-GALVANISED CONNECTOR PLATES COMPLYING WITH AS 1649.

T5 ALL TIMBER SHALL BE PROTECTED FROM THE ELEMENTS DURING FABRICATION AND CONSTRUCTION.

T6 ALL EXPOSED TIMBER SHALL BE APPROPRIATELY SEASONED AND TREATED.

T7 ALL BOLTS TO BE RETIGHTENED IMMEDIATELY PRIOR TO BEING BUILT-IN AND ALL ACCESSIBLE BOLTS ARE TO BE RETIGHTENED AND NAILS REDRIVEN AS CLOSE TO COMPLETION OF WORK AS POSSIBLE.

T8 ALL EXPOSED LINES OF BOLTS SHALL BE EVENLY AND EQUALLY SPACED AND SHALL ALIGN WITH ADJACENT EXPOSED BOLT GROUPS, U.N.O.

T9 THE DESIGN OF ROOF TRUSSES, THEIR ANCHORAGE AND THEIR BRACING IS THE RESPONSIBILITY OF THE ROOF TRUSS SUPPLIER.

T10 MAXIMUM DIFFERENTIAL DEFLECTION BETWEEN SIMILARLY POSITIONED AND ADJACENT TRUSSES IS NOT TO EXCEED 3 MM.

CLAY BRICK MASONRY

M1 WHERE SLABS OR BEAMS BEAR ON MASONRY, THE TOP COURSE SHALL BE LEVEL ,SMOOTH AND COVERED WITH SLIDING JOINT COMPOSED OF TWO LAYERS OF GALVANISED IRON SHEETS WITH GRAPHITE GREASE IN BETWEEN, OR EQUIVALENT.

M2 MASONRY WALLS SHALL NOT BE ERECTED ON SUSPENDED SLABS OR BEAMS UNTIL ALL PROPPING HAS BEEN REMOVED.

M3 BRICKS USED IN LOAD BEARING CONSTRUCTION SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH TO AS1225 OF 20 MPa, U.N.O.

M4 WHERE THE VERTICAL FACE OF MASONRY IS USED AS FORM WORK FOR CONCRETE A BOND BREAKER MEDIUM (e.g. SLIDING JOINT) SHALL BE USED AT THE INTERFACE BETWEEN THE MASONRY AND CONCRETE.

M5 EXPANSION/CONTRACTION JOINTS SHALL BE PLACED AT A MAXIMUM OF 9M FROM RETURN WALLS OR OTHER RESTRAINTS AND 8M GENERALLY, U.N.O.

M6 MASONRY TIES TO CONFORM TO AS 3700 WITH THE FOLLOWING MINIMUM SPACING:
-ADJACENT TO WINDOWS AND RETURN WALLS 300 MM VERTICAL AND HORIZONTAL
-FOR SOLID WALLS 400 MM VERTICAL AND HORIZONTAL.

M7 WHEN MASONRY ADJOINS STRUCTURAL STEEL OR PASSES A RETURN WALL PROVIDE TIES AT MAXIMUM OF 300 MM CENTERS.

M8 NON-LOAD BEARING WALLS SHALL FINISH 15 MM SHORT OF ABOVE SLAB SOFFIT AND SHALL BE FASTENED TO THE SLAB SOFFIT USING MFA-4 SLIDING TIES AT 400 MM CENTERS.

M9 ALL LINTELS SUPPORTING BRICK WORK ARE TO BE HOT DIPPED GALVANISED (HDG), OR ULTRAFLOOR CONCRETE LINTELS, TYPICAL.

M10 ALL BRICK MASONRY ANCHORS TO BE HILTI HIT HY20 CHEMICAL ANCHORS, U.N.O.

M11 MORTAR COMPOSITION (C:L:S) TO BE ONE OF THE FOLLOWS: 1:1:6, 1:0.5, 1:1/4:3

CONCRETE BLOCKWORK

B1 RETAINING AND BASEMENT BLOCK WALLS SHALL BE CONSTRUCTED WITH "DOUBLE U" RETAINING BLOCKS THROUGHOUT.

B2 MORTAR DROPPINGS AT JOINTS SHALL BE RODDED AND REMOVED FROM THE BOTTOM OF BLOCKS THROUGH CLEAN OUT OPENINGS PRIOR TO FILLING CORES.

B3 VERTICAL WALL REINFORCEMENT TO BE TIED TO STARTER BARS THROUGH CLEAN OUT OPENINGS.

B4 WHERE HORIZONTAL REINFORCEMENT IS USED, SPECIAL BLOCK UNITS WITH RECESSED WEBS SHALL BE USED.

B5 GROUT SHALL HAVE 28 DAYS COMPRESSIVE STRENGTH OF 20 MPa (MIN.) AND A SLUMP OF 230 MM, WITH A MAXIMUM AGGREGATE SIZE OF 10 MM.

B6 MORTAR SHALL BE COMPOSED OF ONE PART CEMENT, ONE TENTH PART LIME AND THREE PARTS SAND.

B7 WHERE VERTICAL REINFORCEMENT SHALL BE PROVIDED ON BOTH FACES, IT SHALL BE LOCATED IN ALTERNATE COURSES.

B8 WHERE HORIZONTAL REINFORCEMENT SHALL BE PROVIDED ON BOTH FACES, IT SHALL BE LOCATED IN STAGGERED COURSES.

B9 PROVIDE SOLID CAPPING BLOCKS FOR THE TOP COURSES OF ALL FREE-STANDING HOLLOW WALLS.

B10 NON-LOAD BEARING WALLS TO FINISH 15 MM SHORT OF SLAB SOFFIT AND SHALL BE FASTENED TO THE SOFFIT USING MFA-4 TIES AT 400 MM CENTERS, U.N.O.

B11 WHERE MASONRY ADJOINS STRUCTURAL STEEL OR PASSES A RETURN WALL, INSTALL GALVANISED TIES AT MAXIMUM 300 MM CENTERS.

B12 FOR CONTROL JOINTS IN UNREINFORCED CONCRETE BLOCKS SEE CLAY MASONRY NOTES.

B13 ALL REINFORCEMENT TO BE HOT DIPPED GALVANISED (HDG).

B14 VIBRATE AND ROD ALL REINFORCED COURSES.

B15 COVER TO BARS INDICATED ON THESE STRUCTURAL DRAWINGS INCLUDE SHELL THICKNESS.

B16 RETAINING WALLS HAVE NOT BEEN DESIGNED FOR HYDROSTATIC PRESSURE, TYPICAL.

B17 FOR RETAINING WALLS PROVIDE DRAINAGE FOR THE BACKFILL AND CONNECT TO SITE DRAINAGE SYSTEM. WORK MUST BE CARRIED OUT IN ACCORDANCE WITH THE HYDRAULIC ENGINEER DRAWINGS AND SPECIFICATIONS.

CONSTRUCTION VISITS

CS1 THE CONSTRUCTION VISITS CONDUCTED OCCASIONALLY IS TO ENSURE GENERAL CONFORMANCE WITH THE WORKING DRAWINGS AND SPECIFICATIONS AND IS NOT INTENDED FOR DETAILED ASSURANCE OF QUALITY (e.g. DIMENSIONS, SPACING OF BARS, LAP LENGTH, COVER, etc.). THE CONTRACTOR IS RESPONSIBLE FOR FULL CONFORMANCE OF THE CONSTRUCTION DETAILS WITH WORKING DOCUMENTATION. THE ENGINEER'S VISITS DO NOT IN ANY WAY RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY FOR QUALITY ASSURANCE.

CS2 THE CONSTRUCTION VISITS TO BE CONDUCTED UP ON REQUEST FROM THE CLIENT OR THE CLIENT'S REPRESENTATIVE.

CS3 CO-ORDINATION OF DRAWINGS AND OTHER DOCUMENTS IS BY OTHERS, UNLESS SPECIFICALLY CALLED FOR IN THE ENGINEER'S CONTRACT. THE ENGINEER SHALL BE NOTIFIED OF ANY CHANGES PRIOR TO ISSUING THE DOCUMENTS FOR CONSTRUCTION.

CONCRETE

C1 ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT EDITION OF AS 3600 EXCEPT AS VARIED BY CONTRACT DOCUMENTS.

C2 CEMENT SHALL BE OF TYPE "A" UNLESS SPECIFIED OTHERWISE. CONCRETE COMPONENTS AND QUALITY SHALL BE AS FOLLOWS:

CONCRETE CONTINUED

STRUCTURAL ELEMENT	f'c(MPa)	SLUMP	AGG. SIZE	DENSITY
FOOTINGS AND CAST IN PLACE PILES	25	80 mm	20 mm	2400 Kg/m3
ON GRADE SLABS	25	80 mm	20 mm	2400 Kg/m3
GRADE BEAMS	25	80 mm	20 mm	2400 Kg/m3
COLUMNS	32	80 mm	20 mm	2400 Kg/m3
BEAMS/SUSPENDED GRADE BEAMS	32	80 mm	20 mm	2400 Kg/m3
SUSPENDED SLABS	32	80 mm	20 mm	2400 Kg/m3
ALL EXPOSED SUSPENDED CONCRETE	32	80 mm	20 mm	2400 Kg/m3

C3 CLEAR CONCRETE COVER TO REINFORCEMENT, UNLESS NOTED OTHERWISE, SHALL BE:

ELEMENT	FORMED, NOT EXPOSED	FORMED, EXPOSED TO SOIL OR RAIN	POURED AGAINST MEMBRANE
SLABS	30	50	40
WALLS	30	50	40
BEAMS	30	50	40
COLUMNS	30	50	40
PEDESTALS	30	50	40
FOOTING		50	40

C4 CONSTRUCTION JOINTS SHALL BE PROPERLY FORMED AND USED ONLY WHERE SHOWN OR SPECIFICALLY APPROVED BY THE ENGINEER.

C5 NO HOLES, CHASES OR EMBEDMENT OF PIPES, OTHER THEN THOSE SHOWN OR SPECIFIED ON THE STRUCTURAL DRAWINGS, SHALL BE MADE WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ENGINEER.

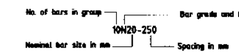
C6 SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN THE POSITIONS SHOWN ON THE STRUCTURAL DRAWINGS, OR AS OTHERWISE APPROVED BY THE ENGINEER.

C7 LAPPED FABRIC SPLICES SHALL BE SO MADE THAT THE OVERLAP, MEASURED BETWEEN THE OUTMOST WIRES OF EACH OF FABRIC, IS NOT LESS THAN 225.

C8 REINFORCEMENT IS SHOWN DIAGRAMMATICALLY AND NOT NECESSARILY SHOWN IN TRUE PROJECTION.

C9 ALL REINFORCEMENT FABRIC SHALL BE TO AS 1304. ALL REINFORCEMENT BARS SHALL BE TO AS 1302. SYMBOLS ARE AS FOLLOWS:
SL WIRE REINFORCEMENT MESH, 500 MPa
R STRUCTURAL GRADE ROUND BAR, 250 MPa
N HOT ROLLED HIGH STRENGTH DEFORMED BAR, 500 MPa
UNO UNLESS NOTED OTHERWISE

EXAMPLE OF DESIGNATION CODE FOR REINFORCING BARS:



Bb BOTTOM REINFORCEMENT LAID FIRST
Bt BOTTOM REINFORCEMENT LAID SECOND
Tb TOP REINFORCEMENT LAID FIRST
Tt TOP REINFORCEMENT LAID LAST

C10 WHERE TRANSVERSE TIE BARS ARE NOT SHOWN, PROVIDE N12-300. SPLICE WHERE NECESSARILY AND LAP FOR 500 MM.

C11 ALL CONCRETE SHALL BE PLACED AND CURED IN ACCORDANCE WITH AS 3600. WHERE CURING COMPOUND IS USED, IT MUST BE APPLIED ONTO SLAB WITHIN TWO HOURS OF FINISHING THE CONCRETE SURFACE AND ONTO WALLS AND COLUMNS IMMEDIATELY AFTER REMOVAL OF FORMWORK.

C12 FORM WORK SHALL BE STRIPPED WHEN APPROVED BY THE ENGINEER.

C13 ALL NON-BEARING ELEMENTS SHALL BE KEPT 15 MM CLEAR FROM SOFFIT OF THE STRUCTURAL ELEMENTS ABOVE, UNLESS SPECIFICALLY APPROVED BY THE ENGINEER IN WRITING.

C14 IN ABSENCE OF ANY DETAILS OR SPECIFICATIONS, ON GROUND SLABS SHALL BE POURED ON 50 MM FINE SAND OVERLAID BY A LAYER OF 0.2 POLYTHENE MEMBRANE, FULLY TAPPED AND SEALED.

C15 WHERE TIES OR STIRRUPS NOT SHOWN, SUFFICIENT NUMBER OF LIGS SHALL BE PROVIDED TO TIE THE TOP AND BOTTOM REINFORCEMENT IN BEAMS AND TO PREVENT ANY MOVEMENT DURING CONCRETING. THE LIGS SHALL IN NO CIRCUMSTANCE BE LESS THAN R10 AT 900 SPACING.

C16 PROVIDE 2-N12 TRIMMER BARS, 1500 MM LONG TOP AND BOTTOM AT ALL RE-ENTRANT CORNERS AND THE CORNERS OF ALL OPENINGS.

C17 SAMPLE AND TEST ALL CONCRETE IN ACCORDANCE WITH AS 3600.

C18 REINFORCEMENT MUST EXTEND PAST THE SUPPORTS. MESH REINFORCEMENT TO HAVE A CROSS WIRE OVER ALL SUPPORTS.

C19 SET DOWNS OR FALLS IN FLOOR SURFACES ARE NOT PERMITTED UNLESS SHOWN ON STRUCTURAL DRAWINGS OR NOTED OTHERWISE.

C20 CONSOLIDATE CONCRETE BY APPROPRIATE VIBRATION.

C21 DRIP GROOVES TO BE PROVIDED AS PER THE ARCHITECTS DETAILS AT ALL EXPOSED EDGES. COVER TO REINFORCEMENT IS TO COMPLY WITH NOTE C3.

C22 ALL EXPOSED HOLDING DOWN BOLTS WHICH ARE NOT COVERED BY AT LEAST 50 MM OF CONCRETE SHALL BE HOT DIPPED GALVANISED (HDG).

C23 UNO ALL MASONRY ANCHORS ARE TO CHEMICAL ANCHORS, (THE LONGEST VERSION).

C24 UNO PROVIDE A MINIMUM OF 40 X BAR DIAMETER LAP FOR REINFORCEMENT, TYPICAL.

C25 IN THE EVENT WHEN A CONSTRUCTION OR A COLD JOINT IS INTRODUCED DURING CONSTRUCTION THE BUILDER MUST ALLOW FOR PROVIDING BEST QUALITY WATER STOP, WATERPROOFING AND ANY OTHER REMEDIAL ACTIONS AS REQUIRED. ALL WORK MUST BE CARRIED OUT IN ACCORDANCE WITH SUPPLIERS SPECIFICATIONS AND RELEVANT AUSTRALIAN CODES AND STANDARDS. APPROVAL FROM THE CLIENT AND RELEVANT CONSULTANT MUST BE OBTAINED PRIOR TO INTRODUCTION OF SUCH JOINTS.

STRUCTURAL STEELWORK

S1 ALL WORKMANSHIP AND MATERIALS TO BE IN ACCORDANCE WITH AS 4100, AS 3678, AS 3679.1, AS 3679.2, AS 1163 AND AS 1397.

S2 UNLESS NOTED OTHERWISE, ALL STRUCTURAL STEEL SHALL BE OF GRADE 300 PLUS.

S3 ALL COMMERCIAL BOLTS AND SCREWS SHALL BE IN ACCORDANCE WITH AS 1111 AND HIGH STRENGTH BOLTS IN ACCORDANCE WITH AS 1252.

S4 BOLTS SHALL BE GRADE 8.8/S, M20 BOLTS U.N.O.
HOLDING DOWN BOLTS SHALL BE 4.6/S U.N.O.
ALL BOLTS , NUTS AND WASHERS SHALL BE GALVANISED.

S5 WELDING SHALL BE IN ACCORDANCE WITH AS 1554. UNLESS NOTED OTHERWISE WELDS SHALL BE 6 MM CONTINUOUS FILLET WELD OF SP CATEGORY. WHERE WELDS ARE NOT SPECIFIED THEY ARE TO ACHIEVE THE STRENGTH OF THE MEMBERS BEING JOINED.

S6 ALL BUTT WELDS TO BE COMPLETE PENETRATION BUTT WELD AS DEFINED IN AS 1514.

S7 BOLTS TO BE INSTALLED WITH ONE HARDENED WASHER UNDER THE NUT. LOAD INDICATOR WASHERS SHALL BE USED UNDER THE BOLT HEAD FOR ALL 8.8/TF AND 8.8/TB BOLTS.

S8 UNLESS NOTED OTHERWISE, ALL STRUCTURAL STEEL BEARING ON MASONRY SHALL BE BEDDED ON 15 MM THICK AND FULL WIDTH CEMENT MORTAR GROUT PAD.

S9 EXCEPT WHERE ENCLOSED IN CONCRETE OR NOTED OTHERWISE, ALL STRUCTURAL STEELWORK SHALL BE CLEANED TO REMOVE LOOSE MILL SCALE, RUST, DIRT, GREASE, etc. AND PAINTED AS FOLLOWS:

IF PROTECTED FROM WEATHER: IF > 15 KM FROM COAST, CLASS 1 CLEAN (MECHANICAL BRUSH) OR IF < 15 KM FROM COAST, 2.5 BLAST CLEAN, FOLLOWED WITH 70 MICRONS OF ZINC PHOSPHATE PRIMER (SP1-C IN AS 2312 IN METALLIC BLUE.

IF EXPOSED TO WEATHER IN COASTAL AREAS: CLASS 2.5 BLAST CLEAN AND HOT DIPPED GALVANISED TO AS 1650 WITH A MINIMUM ZINC COATING OF 600 G/M2. APPLY PRIMER AND TOP COAT AFTER GALVANISING (GZVLP,AS 2312).

IF EXPOSED TO WEATHER IN NON-COASTAL MILD ENVIRONMENT: CLASS 2.5 BLAST CLEAN WITH 70 MICRONS OF INORGANIC ZINC SILICATE (MP01-A, AS 2312) IN GREY COLOUR.

S10 ALL BURIED STEEL WORK SHALL BE WRAPPED IN F41 MESH AND ENCASED IN CONCRETE WITH A MINIMUM COVER OF 50 MM.

S11 PURLINS AND GIRTS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURE'S WRITTEN DIRECTIONS AND SPECIFICATIONS. USE WASHERS UNDER BOLT HEADS AND NUTS OR USE SPECIALLY SHAPED BOLTS AND NUTS.
PURLIN BOLTS SHALL BE:
M12 4.6/S FOR SECTIONS UP TO 250 MM DEEP U.N.O.
M16 4.6/S FOR SECTIONS OVER 250 MM DEEP, U.N.O.

S12 ALL PLATES AND STIFFENERS SHALL BE 10 MM THICK UNLESS NOTED OTHERWISE.
PURLIN CLEATS SHALL BE 8 MM THICK U.N.O.
GIRT CLEATS SHALL BE 10 MM THICK U.N.O.

S13 ALL CONNECTIONS TO A MINIMUM OF 2M20 BOLTS U.N.O.
CONNECTIONS SHOWN ARE TYPICAL U.N.O. FOR CONNECTIONS NOT DETAILED USE STANDARD STRUCTURAL CONNECTIONS BY AISC, WHERE APPLICABLE.

S14 LOCATION OF PURLINS AND GIRTS TO BE OBTAINED FROM ARCHITECTS DRAWINGS OR ROOF CONTRACTOR, U.N.O.

S15 PROVIDE SEAL PLATES TO ENDS OF ALL HOLLOW SECTIONS WITH VENT HOLES IF THEY ARE TO BE HOT DIPPED GALVANISED.

S16 MEMBER CENTROIDS TO INTERSECT AT ALL CONNECTIONS, U.N.O.

S17 ROOF BRACING TO BE HUNG FROM PURLINS AS REQUIRED TO AVOID SAGGING.

S18 ALL STEEL WORK IS TO BE TEMPORARY BUT SECURELY STABILISED UNTIL ALL FINAL BRACING, SHEAR WALLS, CLADDING, BOLTING AND STABILISING HAVE BEEN COMPLETED.

S19 THREE COPIES OF CHECKED WORKSHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER AND APPROVAL TO BE OBTAINED IN WRITING BEFORE FABRICATION IS COMMENCED. APPROVAL COVERS GENERAL CONFORMANCE OF THE WORKSHOP DRAWINGS WITH THE STRUCTURAL WORKING DRAWINGS ONLY AND DOES NOT RELIEVE THE FABRICATOR FROM THE RESPONSIBILITY FOR CORRECTNESS OF DIMENSIONS AND DETAILED CONFORMANCE.

LINTEL SCHEDULE

CLEAR SPAN	GALV. LINTEL SIZE (FOR EACH MASONRY LEAF)
900	100 X 10 FLAT
1200	100 X 100 X 8 ANGLE
1500	100 X 100 X 8 ANGLE
1800	150 X 100 X 8 ANGLE
2100	150 X 100 X 10 ANGLE
2400	150 X 100 X 10 ANGLE
3000	150 X 100 X 12 ANGLE
4000	CUT FROM 250 UC 72.9 BOTH LEAVES 

NOTES ARE APPLICABLE TO ALL STRUCTURAL DRAWINGS

THIS DOCUMENT IS REFERRED TO IN CONSTRUCTION CERTIFICATE NO. 116 DATE 13 JUL 2005 ENVIRONEST CONSULTANCY PTY. LTD. PETER ROSSELLO ACCREDITED CERTIFIER No 4493

Date	Issue	Amendment
31/05/05	A	ISSUED FOR CONSTRUCTION
23/05/05	01	ISSUED FOR ARCHITECT'S APPROVAL

CHECK ALL DIMENSIONS ON SITE PRIOR TO STARTING WORKSHOP DRAWINGS
REPORT ANY DISCREPANCIES IN THE DOCUMENTS TO ULTI-TECHNIQUE
TAKE FIGURED DIMENSIONS ONLY DO NOT SCALE

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Client:
LOQUART VALLEY ANGLICAN PREPARATORY SCHOOL

Project:
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW

Drawing Title:
GENERAL NOTES

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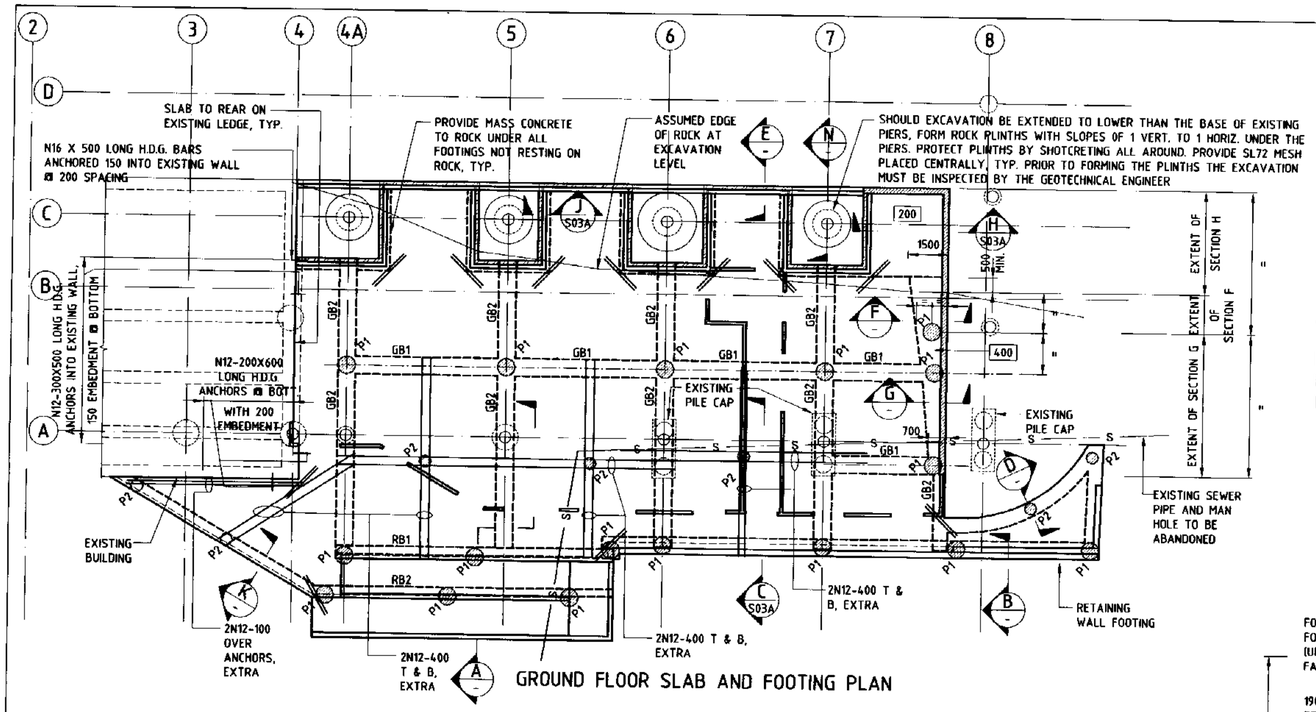
Date	Scale	Drawn	Certified
07/02/05	1:100,10	M.F.	Dr. S. Parsanejad FIEAust. NPER

Dwg. Size	Job. No.	Dwg. No.	Issue
A-1	04066	S01A	A



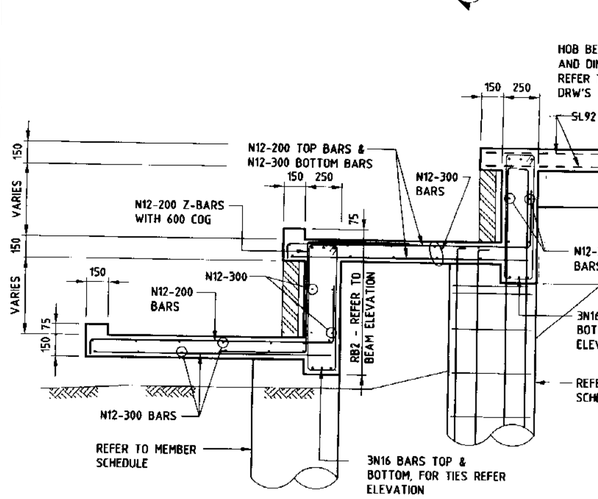
GROUND FLOOR SLAB AND FOOTING PLAN

MEMBER SCHEDULE

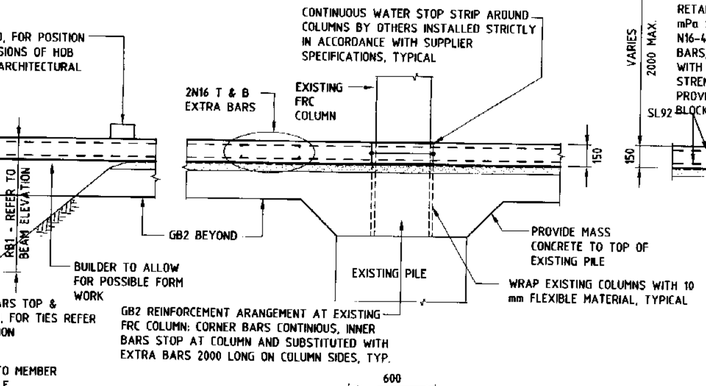
- UNLESS NOTED OTHERWISE 150 THICK SLAB REINFORCED WITH SL92 MESH THROUGHOUT TOP AND BOTTOM. LAY SLAB ON WATERPROOFING MEMBRANE OVER 50 SAND LEVELLING LAYER ON ROCK.
- P1 DENOTES 600 DIA CONCRETE PILE OR EQUIVALENT SQUARE PIERS WITH 6N16 BARS & R10-300 TIES FOUND MIN. 300 INTO ROCK WITH MIN. 600 kPa ALLOWABLE BEARING PRESSUR, TYP.
- P2 DENOTES 400 DIA CONCRETE PILE WITH 6N12 BARS & R10-300 TIES FOUND MIN. 300 INTO ROCK WITH MIN. 600 kPa ALLOWABLE BEARING PRESSURE.
- GB1 DENOTES 600 X 400 D CONCRETE BEAM WITH 4N20 TOP AND BOTTOM BARS AND R10-200 TIES
- GB2 DENOTES 600 X 400 D CONCRETE BEAM WITH 4N16 TOP AND BOTTOM BARS AND R10-200 TIES
- DENOTES RETAINING BLOCK WALL, OVER.
- DENOTES BRICK WALL
- 200 DENOTES CONCRETE SLAB THICKNESS
- DENOTES NEW PILES
- DENOTES EXISTING PILE AND COLUMN

NOTES:

- ALL EXCAVATIONS AND BEARING MATERIAL FOR FOOTINGS TO BE INSPECTED AND CERTIFIED BY A QUALIFIED AND PRACTICING GEOTECHNICAL ENGINEER.
- ALL PILES SHALL BE EMBEDDED MIN. 300 INTO BEDROCK WITH MIN. 600 kPa ALLOWABLE BEARING PRESSURE. THE ACCEPTABLE BEDROCK SHALL BE DETERMINED BY THE GEOTECHNICAL ENGINEER ON SITE AFTER EXCAVATION AND AT THE START OF PILE DRILLING.
- SHOULD EXCAVATION OF GRADE BEAMS REACH ACCEPTABLE BEDROCK LEVEL, PILING MAY BE ELIMINATED WITH PRIOR APPROVAL FROM THE ENGINEER.
- WHERE ADDITIONAL EXCAVATION IS REQUIRED DUE TO UNSUITABLE FOUNDING MATERIAL, THE GEOTECHNICAL ENGINEER IS TO BE INFORMED.
- HOBS TO BE PAVED INTEGRAL WITH THE SLAB, TYP.
- PILE REINFORCEMENT TO BE TERMINATED AT TOP OF CAPPING BEAMS, TYP.
- REFER TO HYDRAULIC ENGINEER DRAWINGS FOR DRAINAGE.
- ALL RETAINING WALLS SHALL BE WATERPROOFED (BY OTHERS) PRIOR TO BACKFILLING WITH DRAINABLE MATERIAL.
- ALL DIMENSIONS AND RLs MUST BE TAKEN OFF ARCHITECTURAL AND LANDSCAPE ARCHITECTURAL DRAWINGS. THE STRUCTURAL DRAWINGS MUST UNDER NO CIRCUMSTANCES BE SCALED FOR ANY PURPOSE, TYPICAL.
- U.N.O. ALL TRIMMER BARS SHALL BE 2N12 X 1500 LONG BARS TOP & BOTTOM, TYPICAL.
- NEW BEAMS AND SLABS PASSING OVER EXISTING PIERS ARE TO BE SUPPORTED ON THESE PIERS BY FILLING THE SPACE BETWEEN THEM WITH MASS CONCRETE.



SECTION A



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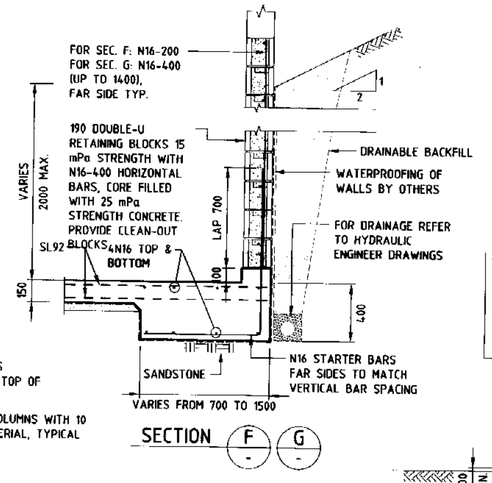

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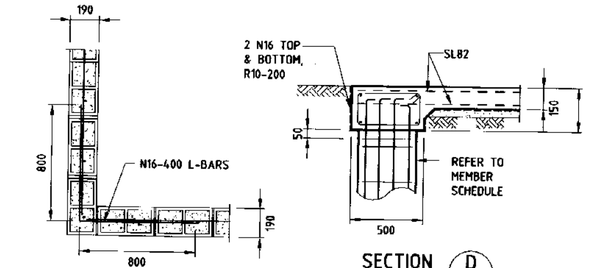
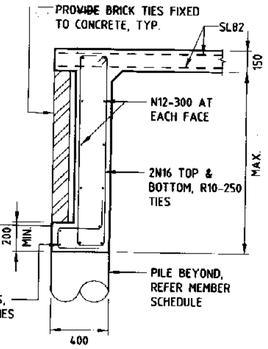


TYPICAL 190/190 WALL CORNER DETAILS

PLAN VIEW

SECTION D



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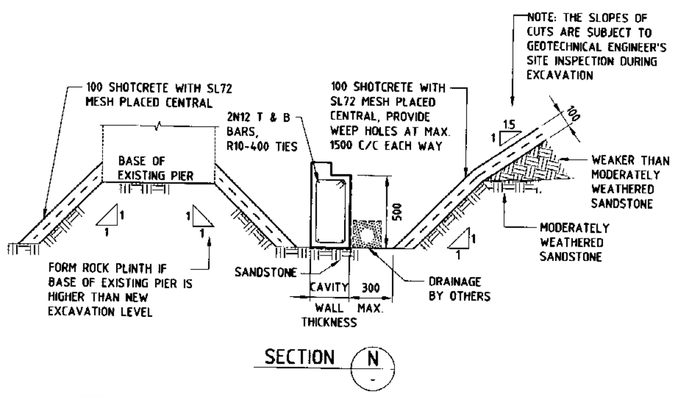

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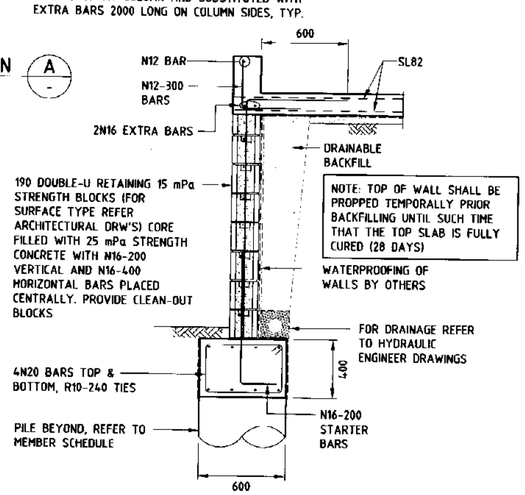

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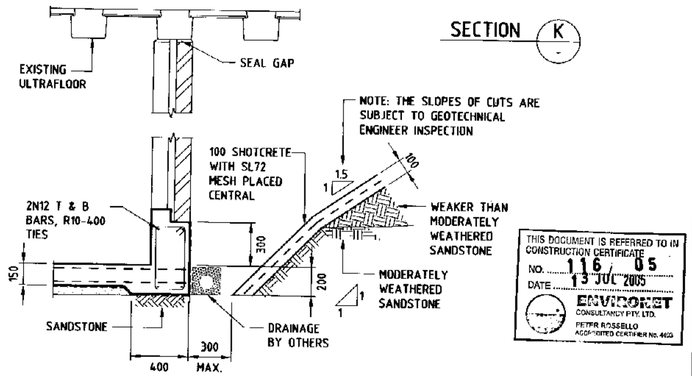

SECTION E

THIS DOCUMENT IS REFERRED TO IN CONSTRUCTION CERTIFICATE NO. 116/05 DATE 13 JUL 2005
ENVIRONET CONSULTANCY PTY LTD. PETER ROSSELLO ACCREDITED CERTIFIER No. 4403

NORTH

Date	Issue	Amendment
31/05/05	A	ISSUED FOR CONSTRUCTION
23/05/05	01	ISSUED FOR ARCHITECT'S APPROVAL

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Project:
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW

Drawing Title:
GROUND FLOOR SLAB AND FOOTING PLAN AND SECTIONS

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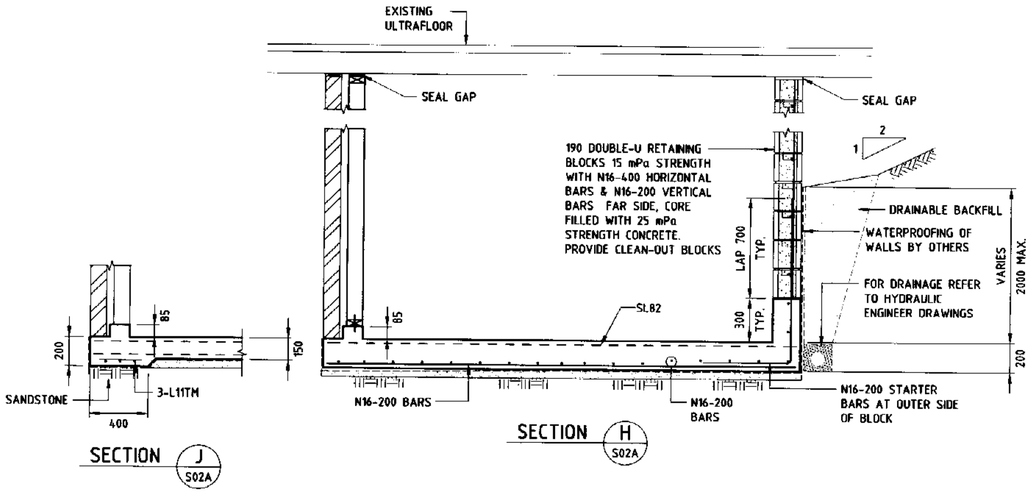
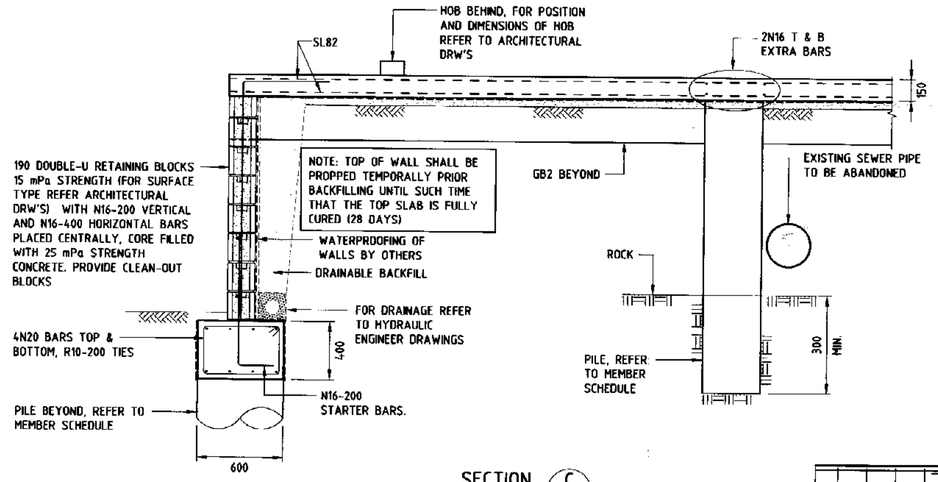
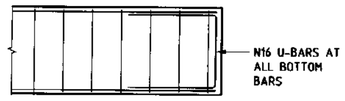
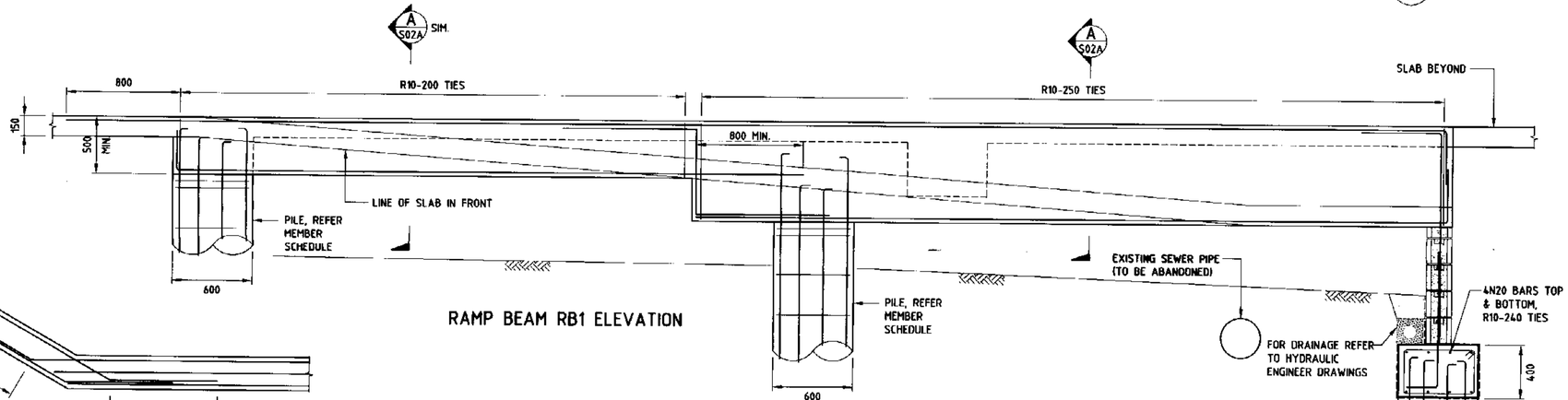
Date	Scale	Drawn	Certified
07/02/05	1:100,20	M.F.	Dr. S. Parsanejad FIEAust. NPER
Dwg. Size	Job. No.	Dwg. No.	Issue
A-1	04066	S02A	A



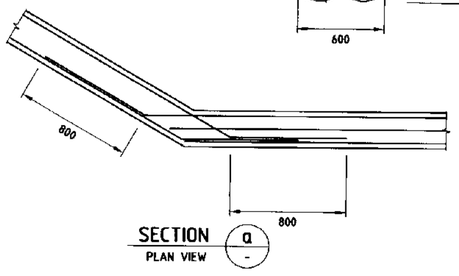


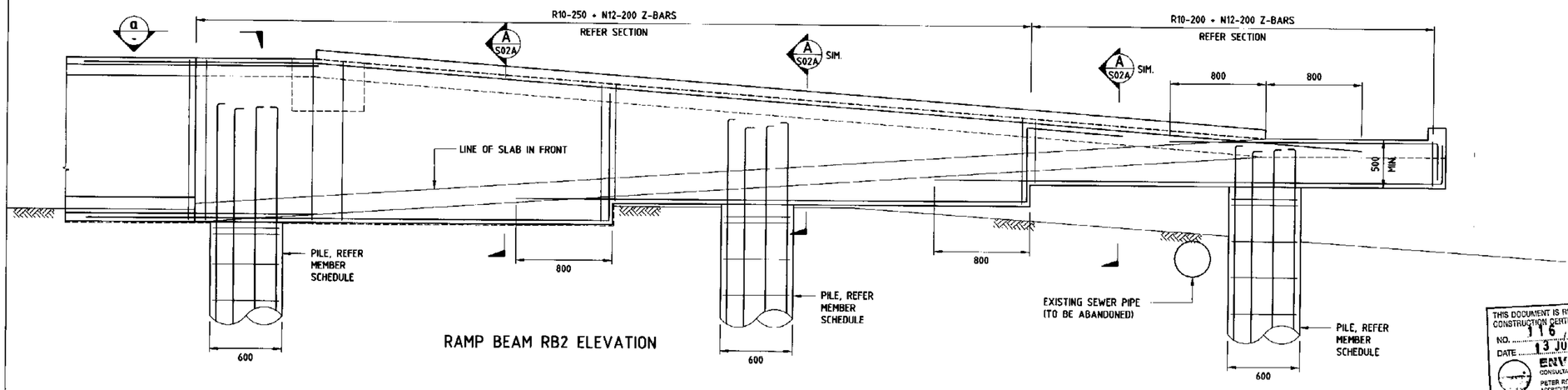


TYPICAL BEAM END DETAIL, UNO



RAMP BEAM RB1 ELEVATION





RAMP BEAM RB2 ELEVATION

THIS DOCUMENT IS REFERRED TO IN CONSTRUCTION CERTIFICATE NO. 116/05 DATE 13 JUL 2005
ENVIRONET CONSULTANCY PTY. LTD.
PETER ROSSELLO ACCREDITED CERTIFIER No. 4408

Date	Issue	Amendment
31/05/05	A	ISSUED FOR CONSTRUCTION
23/05/05	01	ISSUED FOR ARCHITECT'S APPROVAL

Architect:
PD MAYOH PTY LTD
ARCHITECTS & LANDSCAPE CONSULTANTS
60 Strathallen Ave.
Northbridge NSW 2063
Phone: (02) 9958 0488
Fax: (02) 9958 6424
Email: pdmayoh@nectar.com.au

Client:
LOQUART VALLEY ANGLICAN PREPARATORY SCHOOL

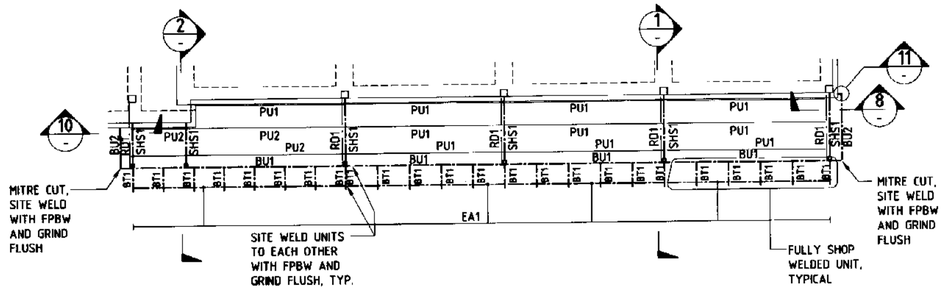
Project:
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW

Drawing Title:
GROUND FLOOR SECTIONS AND BEAM ELEVATIONS

utech engineers
Suite 236, 813 Pacific Highway,
Chatswood NSW 2067
Tel: 9884 9885
Fax: 9884 9887

Date	Scale	Drawn	Certified
16/02/05	1:100,20	M.I.	Dr. S. Parsanejad FIEAust. NPER

Dwg. Size	Job. No.	Dwg. No.	Issue
A 1	04066	S03A	A



CANOPY FRAMING PLAN

MEMBER SCHEDULE

- BU1 DENOTES BUILT UP SECTION OF RHS 200X100X6 + EA 125X125X8 β
- BU2 DENOTES BUILT UP SECTION OF RHS 200X100X6 + 2-EA 125X125X8 β
- PU1 DENOTES C20015 PURLIN WITH 2 ROWS OF BRIDGING
- PU2 DENOTES C20019 PURLIN WITH 3 ROWS OF BRIDGING
- EA1 DENOTES EA 50 X 50 X 5
- RD1 DENOTES 32 ø ROD, GRADE 350 MPa, GAL.
- RHS1 DENOTES RHS 150X100X6
- RHS1 DENOTES RHS 150X100X6
- SHS1 DENOTES SHS 100 X 100 X 9
- BT1 DENOTES MEMBER CUT FROM 100 BT 15
- FPBW DENOTES FULL PENETRATION BUTT WELD

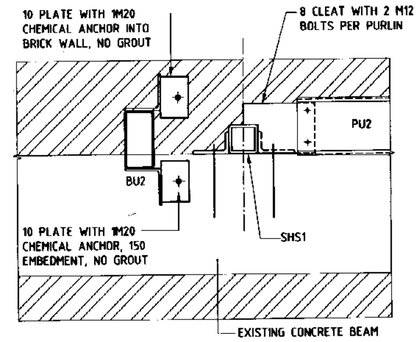
NOTES:

1. ALL BOLTS, NUTS AND WASHERS TO BE HOT DIPPED GALVANISED
2. PROTECTIVE COATING SYSTEMS SHALL COMPLY WITH AS2312:2002.

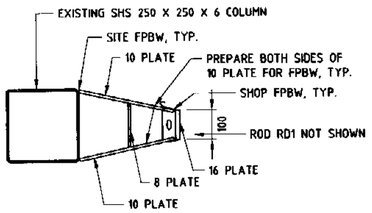
ALL SURFACES SHALL BE BLAST CLEANED.

FOR COATING SYSTEM REFER TO ARCHITECTURAL SPECIFICATION.

PROTECTIVE COATING SYSTEMS SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURERS WRITTEN SPECIFICATIONS.



SECTION 10



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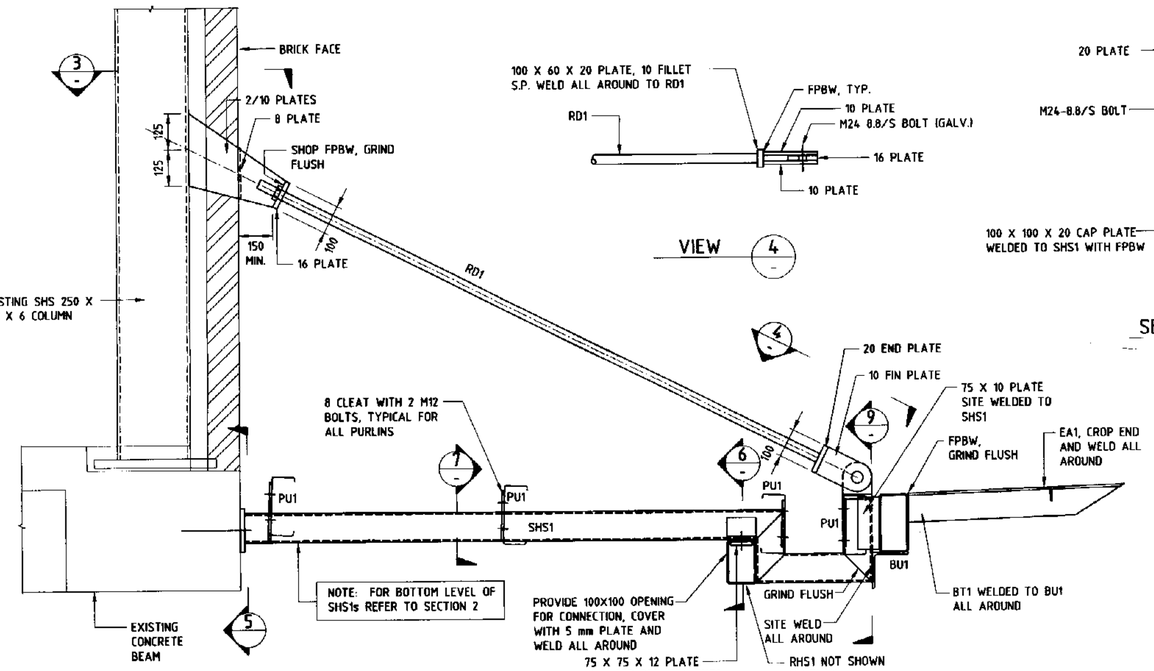
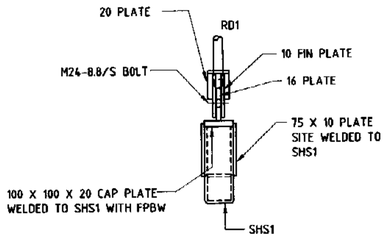
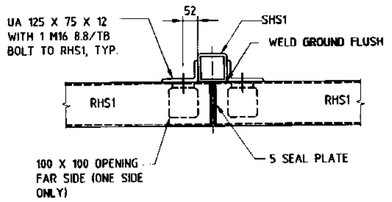


SECTION 1

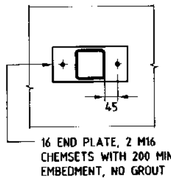
VIEW 4



SECTION 9



SECTION 6



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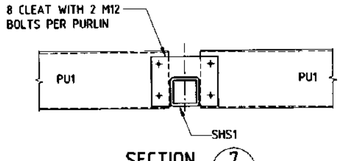
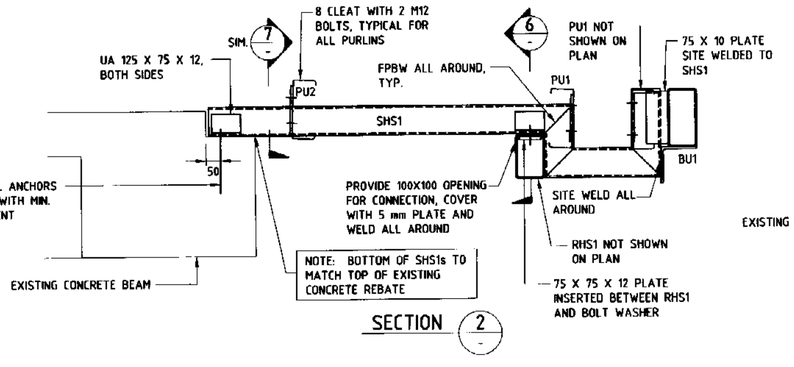
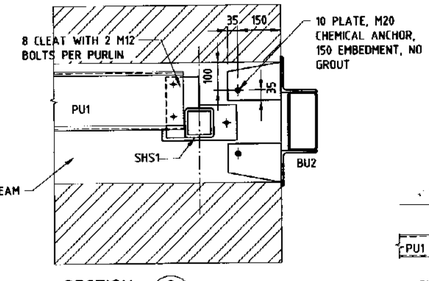


SECTION 7



SECTION 2



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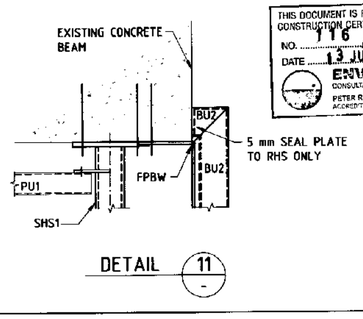

DETAIL 11

NORTH

Date	Issue	Amendment
31/05/05	A	ISSUED FOR CONSTRUCTION
23/05/05	01	ISSUED FOR ARCHITECT'S APPROVAL

CHECK ALL DIMENSIONS ON SITE PRIOR TO STARTING WORKSHOP DRAWINGS

REPORT ANY DISCREPANCIES IN THE DOCUMENTS TO ULTI-TECHNIQUE

TAKE FIGURED DIMENSIONS ONLY DO NOT SCALE

Architect:
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60 Strathallen Ave. Northbridge NSW 2063
Phone: (02) 9958 0488
Fax: (02) 9958 6424
Email: pdmayoh@nectar.com.au

Client:
LOQUART VALLEY ANGLICAN PREPARATORY SCHOOL

Project:
LOQUAT VALLEY ANGLICAN PREPARATORY SCHOOL
PITTWATER ROAD BAYVIEW

Drawing Title:
CANOPY FRAMING PLAN, SECTIONS AND DETAILS

THIS DOCUMENT IS REFERRED TO IN CONSTRUCTION CERTIFICATE NO. 116/05 DATE 13 JUL 2005
ENVIRONET CONSULTANCY PTY. LTD. PETER ROSSELLO ACCREDITED CERTIFIER No 4493

utech engineers
Suite 236, 813 Pacific Highway, Chatswood NSW 2067
Tel: 9884 9885
Fax: 9884 9887

Date	Scale	Drawn	Certified
07/02/05	1:100,10	M.F.	Dr. S. Parsanejad FIEAust. NPER

Dwg. Size	Job. No.	Dwg. No.	Issue
A-1	04066	S04A	A