

# Approved Building Consent Documents

**Please Note: A copy of the stamped approved documents must be available on site for all inspections.**

INSPECTION BOOKING TIMEFRAMES		
Telephone 03 347 2839		
Call received	<i>Before 3pm inspection will be done</i>	<i>After 3pm inspection will be done</i>
Monday	Wednesday	Thursday
Tuesday	Thursday	Friday
Wednesday	Friday	Monday
Thursday	Monday	Tuesday
Friday	Tuesday	Wednesday



**COMPUTER FREEHOLD REGISTER  
UNDER LAND TRANSFER ACT 1952**



*R. W. Muir*  
Registrar-General  
of Land

**Search Copy**

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**Identifier** **256438**  
**Land Registration District** **Canterbury**  
**Date Issued** 15 December 2005

**Prior References**

217764

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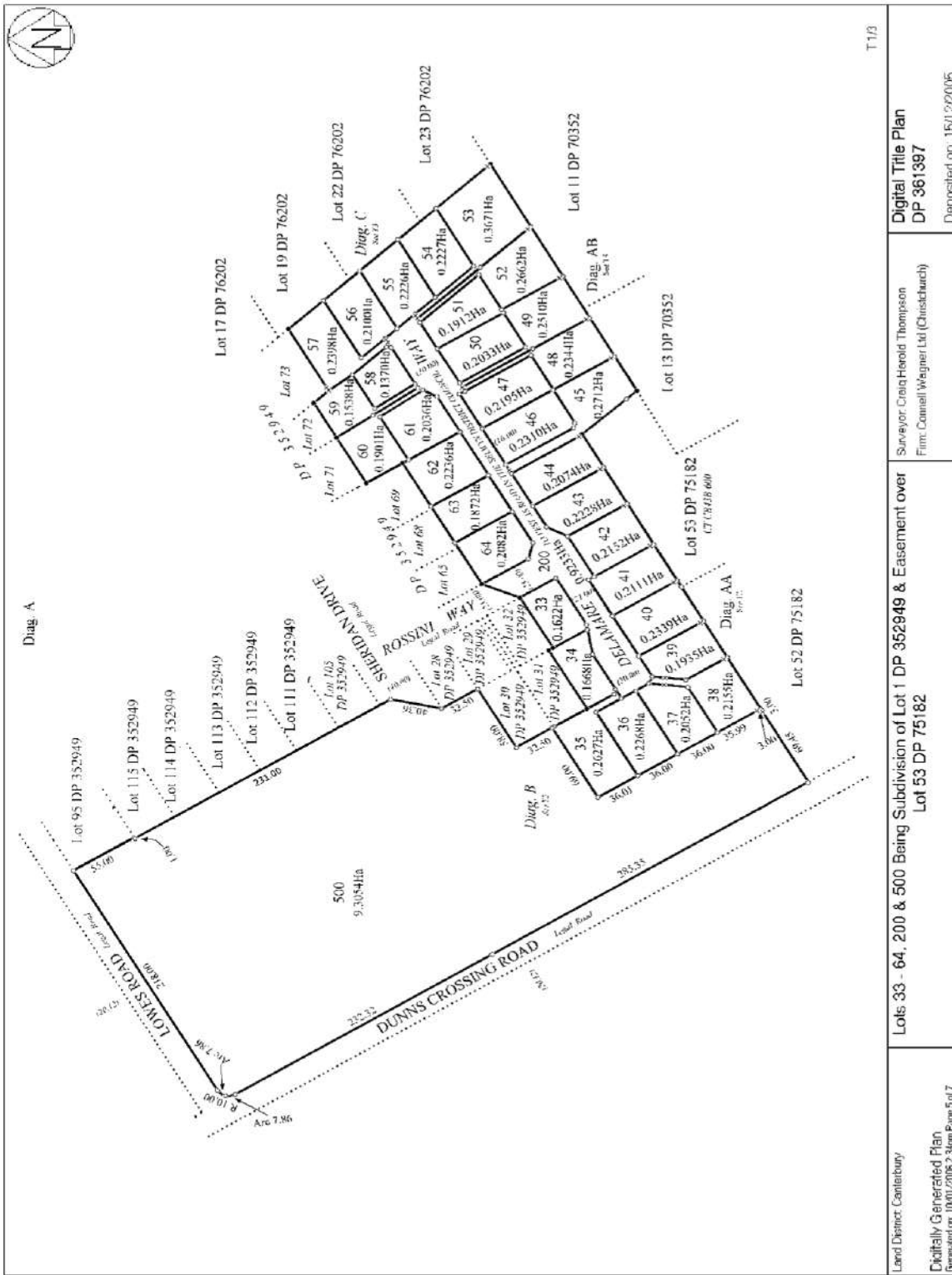
**State** Fee Simple  
**Area** 2036 square metres more or less  
**Legal Description** Lot 61 Deposited Plan 361397

**Proprietors**

Alan James McAuley and Chelsea Elizabeth McAuley

**Interests**

Subject to Part IV A Conservation Act 1987  
 Land Covenant in Transfer A317957.12 - 17.9.1997 at 3.00 pm and varied A360164.1 - 13.7.1998 at 1.24 pm  
 Land Covenant in Easement Instrument 6691810.11 (Limited as to Duration) - 15.12.2005 at 9:00 am  
 10367913.2 Mortgage to Westpac New Zealand Limited - 31.3.2016 at 1:52 pm



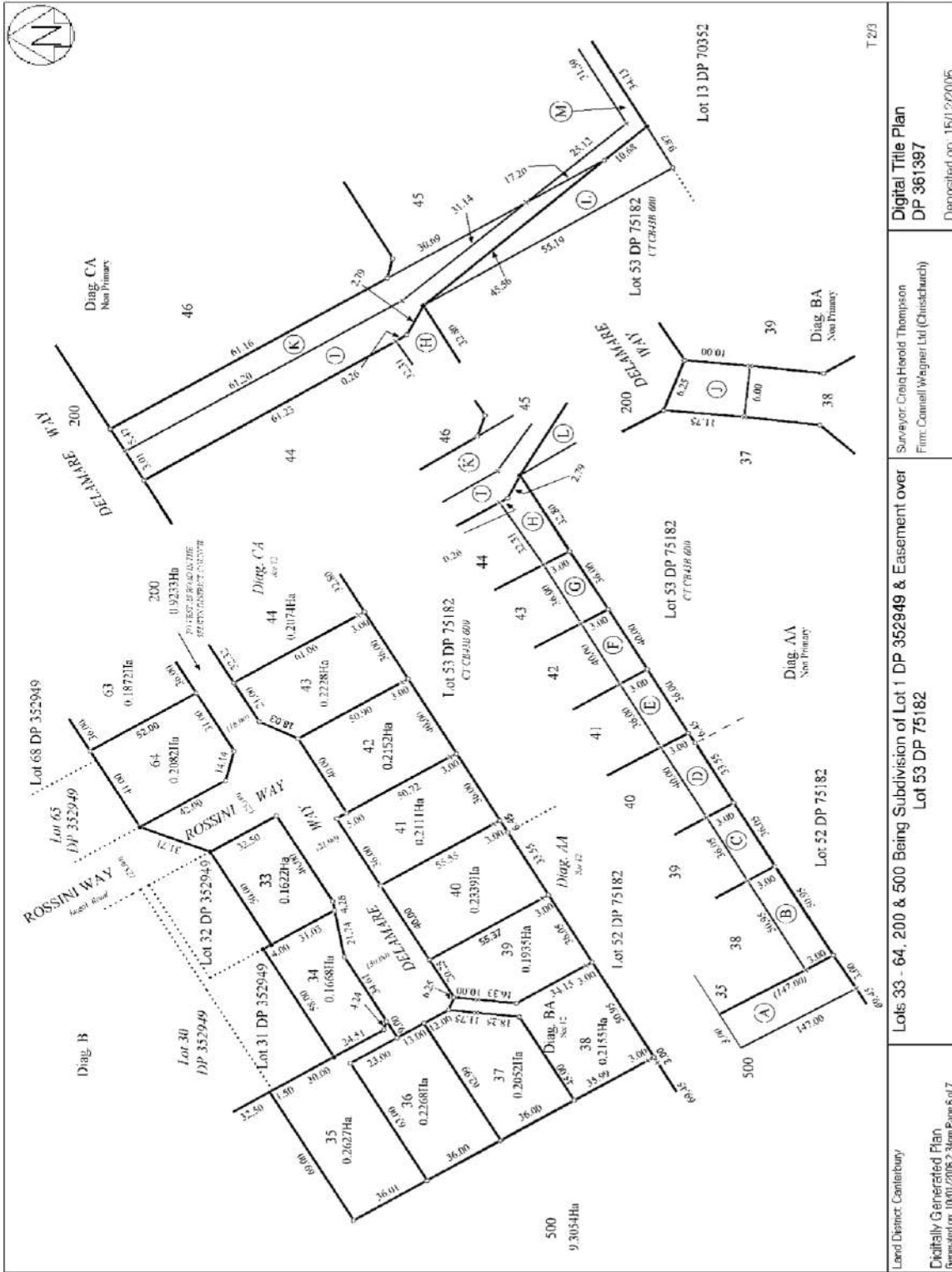
T-113  
 Digital Title Plan  
 DP 361387  
 Deposited on: 15/12/2005

Surveyor: Craige Harold Thompson  
 Firm: Connell Wagner Ltd (Christchurch)

Lot 33 - 64, 200 & 500 Being Subdivision of Lot 1 DP 352949 & Easement over Lot 53 DP 75182

Land District: Canterbury  
 Digitally Generated Plan  
 Generated on: 10/01/2005 2:34pm Page 5 of 7

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T 29

Land District: Canterbury  
 Digitally Generated Plan  
 Generated on: 10/01/2008 2:34pm Page 6 of 7

Surveyor: Craia Harold Thompson  
 Firm: Connell Wagner Ltd (Christchurch)

Diag. CA  
 Non Primary

Diag. BA  
 Non Primary

Diag. AA  
 Non Primary

Diag. B  
 Non Primary

Diag. C  
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Diag. D  
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Diag. E  
 Non Primary

Diag. F  
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Diag. G  
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Diag. H  
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Diag. I  
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Diag. J  
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Diag. K  
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Diag. L  
 Non Primary

Diag. M  
 Non Primary

Lot 68 DP 352949

Lot 65 DP 352949

Lot 64 DP 352949

Lot 63 DP 352949

Lot 62 DP 352949

Lot 61 DP 352949

Lot 60 DP 352949

Lot 59 DP 352949

Lot 58 DP 352949

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Lot 36 DP 352949

Lot 35 DP 352949

Lot 34 DP 352949

Lot 33 DP 352949

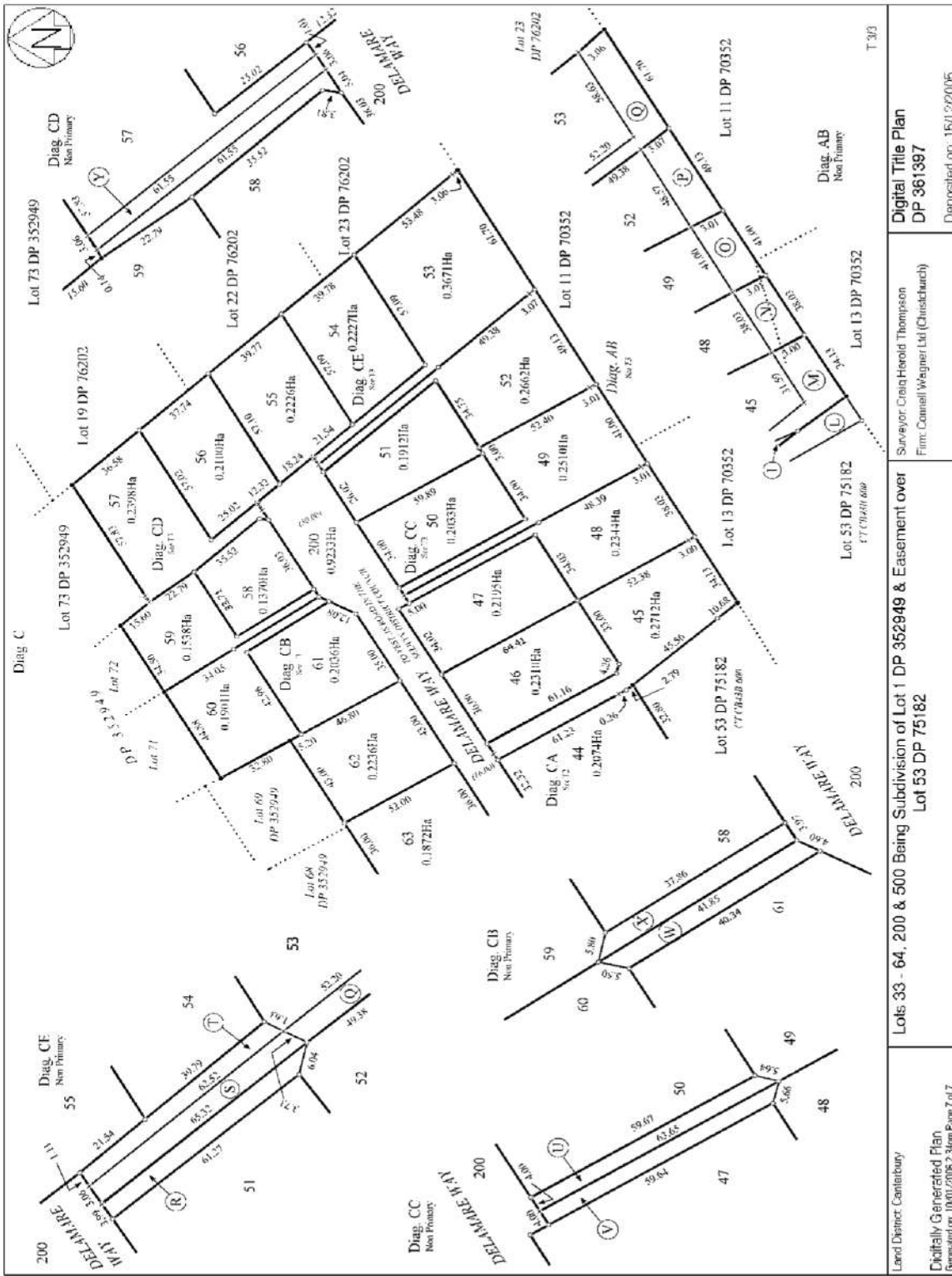
Lot 500 DP 75182

Lot 53 DP 75182

Lot 52 DP 75182

Lot 13 DP 70352

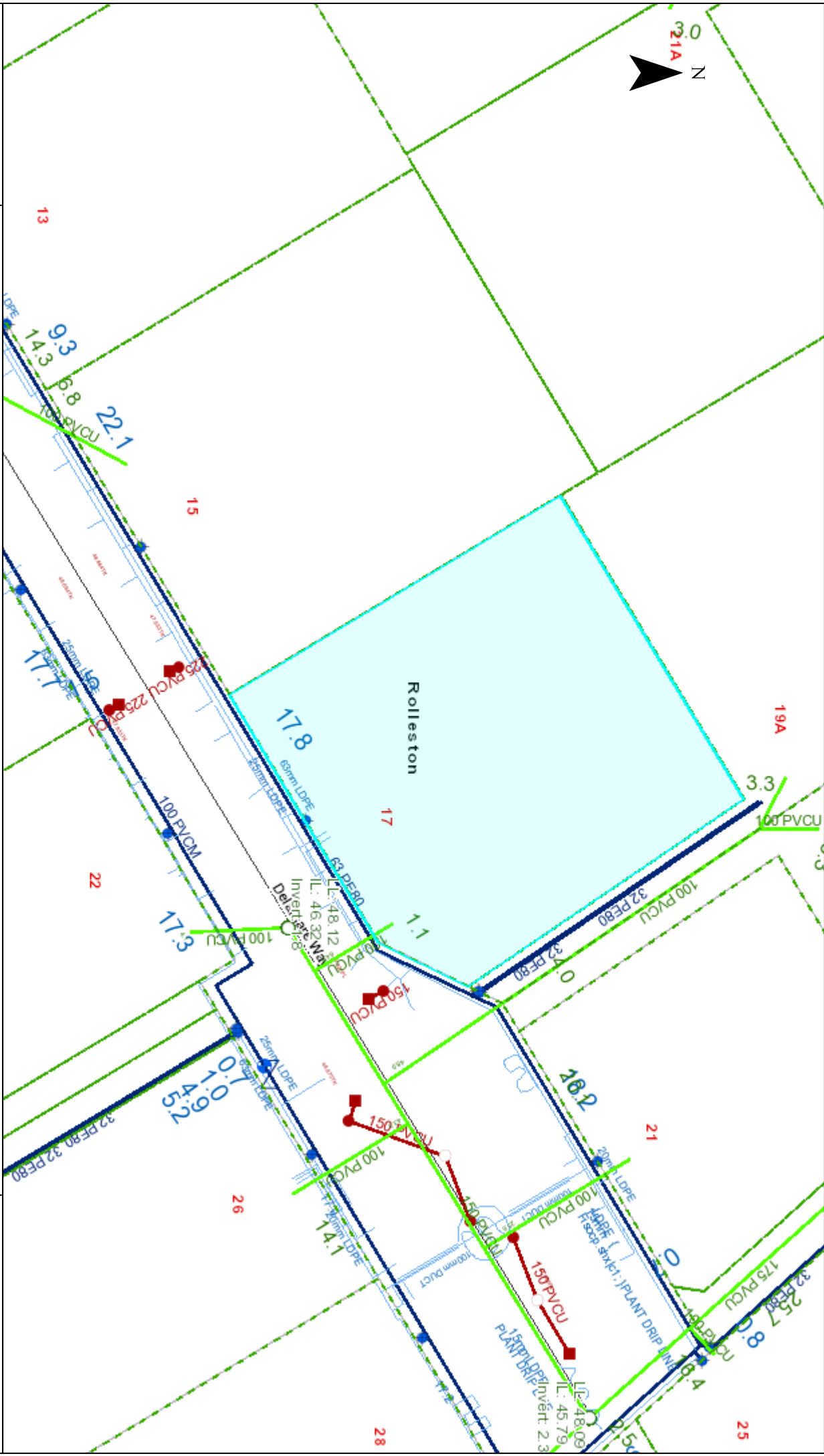
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Land District: Canterbury	Surveyor: Craik Harold Thompson Firm: Connell Wagner Ltd (Christchurch)	Digital Title Plan DP 361397	Deposited on: 15/12/2005
Digitally Generated Plan Generated on: 10/01/2008 2:34pm Page 7 of 7		Lots 33 - 64, 200 & 500 Being Subdivision of Lot 1 DP 352949 & Easement over Lot 53 DP 75182	



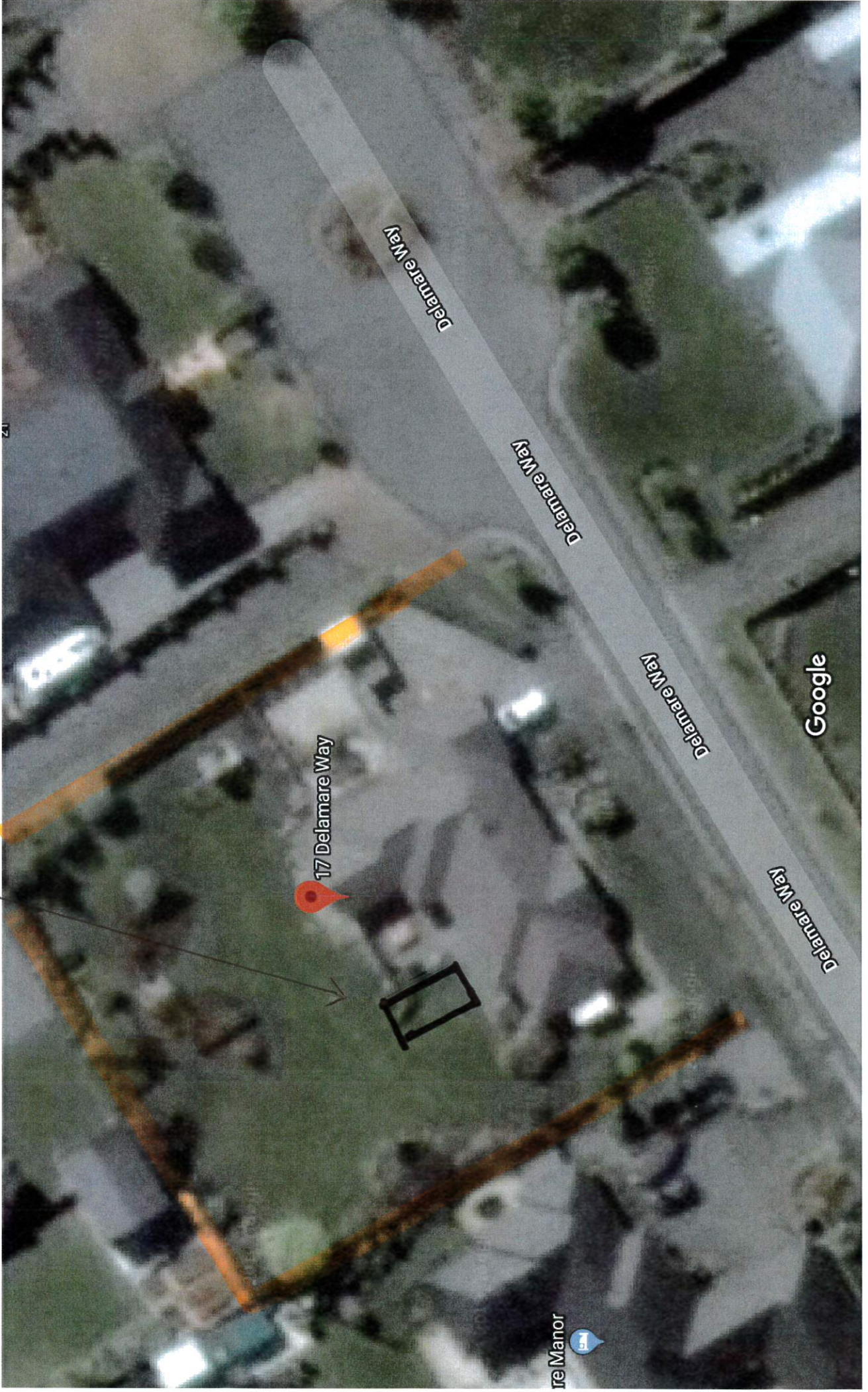
25/05/2018  
 Cadastral information derived from Land Information New Zealand's Digital Cadastral Database (DCDB) CROWN COPYRIGHT RESERVED  
 Approved for internal reproduction by Selwyn District Council  
 Digital Licence No. 133562-01  
 All Protection: NZGD2000 New Zealand Transverse Mercator



Google Maps

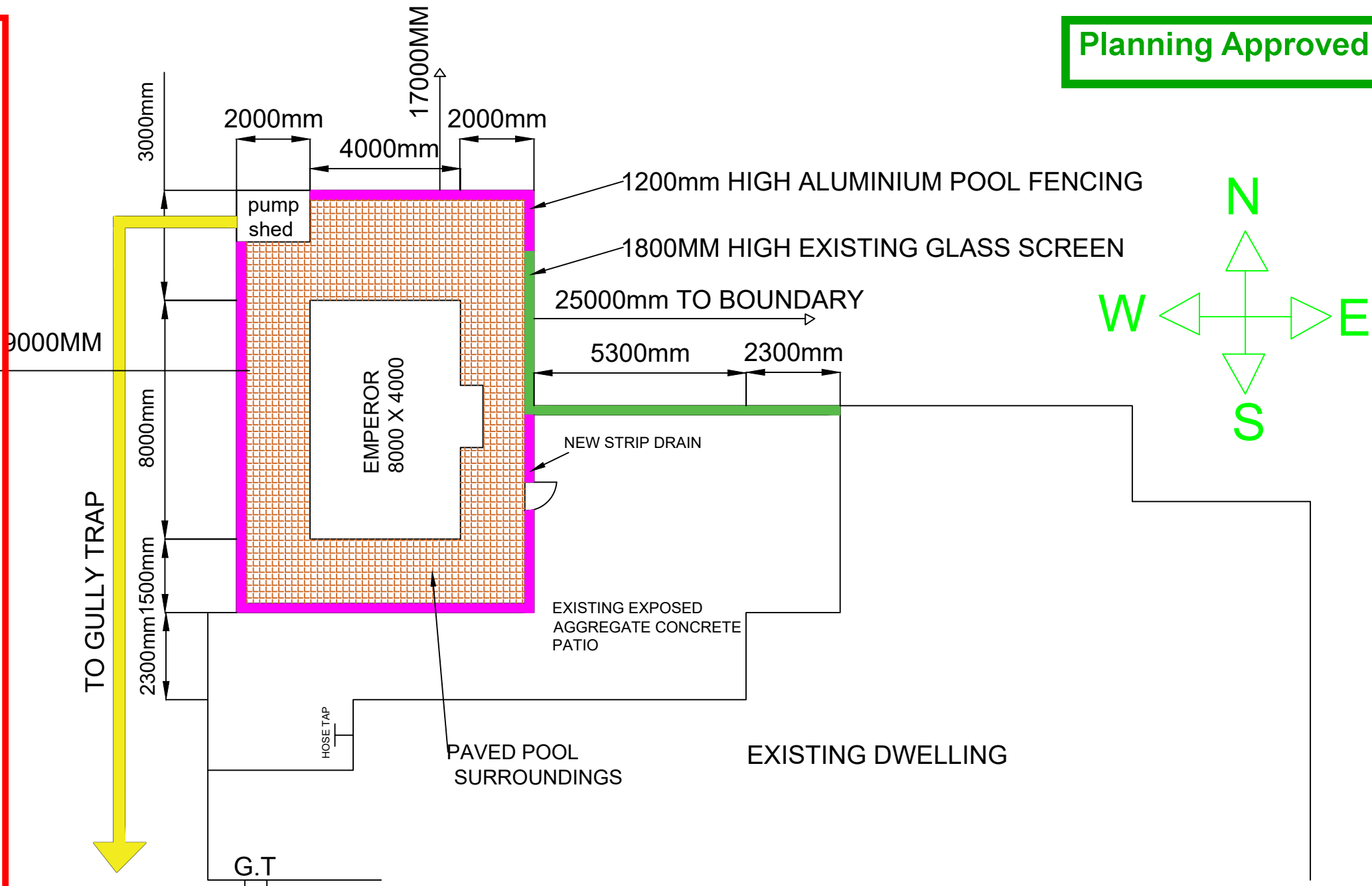
17 Delamare Way

PROPOSED POOL PLACEMENT



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Planning Approved



REV	DESCRIPTION	DATE	BY

PROJECT: 17 DELAMARE WAY, ROLLESTON  
 LOT: 61 . DP : 361397

DRAWN BY: NITHIN R  
 DATE: 15-5-2018  
 SIZE: N/A  
 SCALE: NOT TO SCALE

TITLE	
DWG NO	

File No: 34834

9 February 2018

The Composite Group Ltd  
187 Dyers Road  
Bromley  
**CHRISTCHURCH**

**Attention: Peter Eden**

Email: [petere@thecompositegroup.co.nz](mailto:petere@thecompositegroup.co.nz)

Dear Peter

**SWIMMING POOL PERIMETER BOND BEAM DESIGN  
– EMPEROR 8 IN SELWYN REGION**

Please find attached the revised design package which includes the PS1 and Inspection Schedule and Calculations for a generic Emperor 8 swimming pool bond beam in the Selwyn region.

Yours faithfully

**DAVIS OGILVIE & PARTNERS LTD**



**ALASTAIR WOOD**

Technical Director - Structural Engineer  
BEng (Hons), CMEngNZ, CPEng

Email: [Alastair@do.nz](mailto:Alastair@do.nz)

File No: 34834

9 February 2018

The Composite Group  
187 Dyers Road  
Bromley  
**CHRISTCHURCH**

**Attention: Peter Eden**

Email: petere@thecompositegroup.co.nz

Dear Peter,

**SWIMMING POOL PERIMETER BOND BEAM DESIGN  
- EMPEROR 8 IN SELWYN REGION**

**1. Design Parameters**

<b>Specific Pool Dimensions:</b>	8m x 3.9m x varying depth of 1.1-1.5m
----------------------------------	---------------------------------------

<b>Assumed Geotechnical Conditions</b>	
<b>Assumed Soil Type:</b>	Loose Granular Soil (Silt)
<b>Assumed Bulk Unit Weight (kN/m<sup>3</sup>):</b>	17
<b>Assumed Friction Angle (Degrees):</b>	26
<b>Note:</b> Geotechnical parameters are based on drained conditions and are derived from correlations presented in the "Handbook of Geotechnical Investigation and Design Tables" by Burt Look	

<b>Loading Assumptions</b>	
<b>Assumed perimeter surcharge (kPa):</b>	2
<b>Governing Load on beam (kN/m):</b>	Variable, ranging from 5.3kN/m to 8kN/m

<b>Perimeter Beam Design</b>	
<b>Minimum Beam Dimensions:</b>	Minimum 650mm between longitudinal bars
<b>Longitudinal Bar Type:</b>	Minimum 1/HD12 on interior, 1/HD12 on exterior typically
<b>Shear Reinforcement Type:</b>	Minimum R8 Stirrups at 600 centres

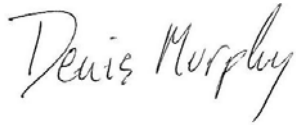
## 2. Conclusion

We consider that this design complies with all of the relevant codes and standards, please find our producer statement attached accordingly.

If you have any questions regarding the information contained within the report please feel free to contact the undersigned.

Yours faithfully

**DAVIS OGILVIE & PARTNERS LTD**



Prepared by:

**DENIS MURPHY**

Graduate Structural Engineer  
BSc. (Hons), ME, MEngNZ

Email: denis@do.co.nz

Reviewed by:

**ALASTAIR WOOD**

Technical Director - Structural Engineer  
BEng (Hons), CEngNZ, CPEng

Email: alastair@do.co.nz

### Enclosed:

- 1 x Design Limitation Report - Issue (A);
- 1 x Producer Statement;
- 1 x Inspection Schedule;
- 1 x Structural Sketches;

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# SWIMMING POOL PERIMETER BEAM

34834 / EMPEROR 8 - SELWYN / THE COMPOSITE GROUP LTD

0800 999 333  
[hello@do.nz](mailto:hello@do.nz)

Level 1, 24 Moorhouse Avenue, Addington  
PO Box 589, Christchurch 8140  
[www.do.nz](http://www.do.nz)

## DESIGN LIMITATION REPORT FOR SWIMMING POOL PERIMETER BEAM

### 1. Introduction

Davis Ogilvie & Partners Ltd has been commissioned by The Composite Group Ltd to develop a specification and design for construction of a swimming pool perimeter beam in the Selwyn region.

The purpose of this project is to prepare a structural design for the construction of a swimming pool perimeter beam in accordance with current New Zealand building codes and standards, in particular New Zealand Building Code B1/VM1, NZS 3101:2006, AS/NZS 1838:1994 and NZS 4441:2008.

This report has been prepared solely for the purposes of The Composite Group Ltd. The information contained herein is confidential, and shall not be passed on to any third party, other than the local Building Consent Authority, without prior written permission of Davis Ogilvie & Partners Ltd. No responsibility is accepted for any use outside the scope of this report.

### 2. General

Davis Ogilvie does not accept liability for the design of temporary works and it is the responsibility of the contractor to correctly install and maintain all temporary works to ensure the strength and stability of the structure and adjacent ground for the duration of construction works.

This report does not cover weather-tightness, slope stability, suitability of the site (e.g. flooding), or potential future liquefaction of the site.

Refer to Structural Specification attached to this report for pool loading assumptions.

### 3. Geotechnical Considerations

There shall be a minimum of 3m of level, stable ground around the pool. The Engineer shall assess the surcharge implications of any structure within 2m of the pool.

The pool liner is to be surrounded with sand/cement backfill mixed at 16:1 by volume. This is considered to be a solid material which does not contribute to lateral earth pressures.

The soil outside of the proposed location of the sand/cement backfill is assumed to be of the type and standard noted in the Structural Specification attached to this report. This assumption shall be confirmed by a suitably qualified geotechnical engineer.

#### 4. Structural Design Limitations

This design and specification has been prepared for the perimeter beam of the swimming pool described in the Structural Specification attached to this design report. Any pools of a different type or size are not covered by this specification.

The drawings and specification cover the structural design of the reinforced concrete bond beam to the perimeter of the pool only and exclude temporary works, excavations, tiling, fibreglass liner, plumbing and/or drainage. The design of the connection between the fibreglass pool walls and the perimeter bond beam is also by others.

The perimeter bond beam has been designed to resist the lateral load resulting from the reaction at the top of the fibreglass pool walls due to the combination of active earth pressure, and seismically-induced pressures.

Loading from hydrostatic pressure due to groundwater has not been considered because it is assumed that the pool will not be emptied below the water table level at any time.

Derivation of lateral earth pressure was based on conservatively assumed values of the soil outside of the sand/cement backfill. The assumed values of the soil adopted during design are outlined in the Structural Specification attached to this design statement.

The geotechnical conditions at the site shall be tested prior to the commencement of works. If soil conditions are found to differ from the assumptions listed in the Specification, the design shall be amended or revised.

Although allowances have been made in the bond beam design for seismic loading on the pool wall, issues relating to liquefaction including liquefaction-induced loading and settlement are considered to be outside the scope of this report.

Work shall be undertaken and/or overseen by a competent qualified experienced contractor.

## 5. Materials

Concrete construction shall be in accordance with NZS 3109.

### Material Summary

Structural concrete	25MPa;
Longitudinal reinforcement	500MPa;
Stirrups	300MPa;
Pool shell	As per manufacturers specifications

Further information on material specifications is shown on Structural Drawings;

## 6. Hydrostatic Relief Valve

Hydrostatic relief valves shall be installed at the lowest point of all in-ground pools in accordance with NZS 4441:2008. The design, detailing and location of the hydrostatic relief valves are considered to be the responsibility of the pool liner supplier.

## 7. Conclusion

We consider that this design complies with all of the relevant codes and standards. Accordingly, please find a signed structural specification and producer statement attached.

## PRODUCER STATEMENT – PS1 – DESIGN

(Guidance notes on the use of this form are printed on page 2)

**Issued by:** Davis Ogilvie & Partners Ltd **Job/ File No:** 34834  
**To:** The Composite Group Ltd  
**To be supplied to:** Selwyn District Council  
**In respect of:** Swimming Pool Perimeter Beam Design  
**In:** Selwyn Region  
**Lot:** **DP:**

We have been engaged by the owners/developer referred to above to provide **Structural Engineering Design** services in respect of the requirements of Clause(s) **B1** of the Building Code for  All or  Part only (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

Compliance Documents issued by Ministry of Business, Innovation & Employment **B1/VM1**  
or  Alternative solution:

The proposed building work covered by the producer statement is described on the drawings by The Composite Group Ltd titled “**D-PO-EMP8-200**”, **Revision F, dated 8/16** and “**D-PO-0000-010**”, **Revision G dated 12/17** or **sketches provided by Davis Ogilvie Sketch 34834/EMP8/SK01, dated 15/12/17**; together with specification (where in addition to the notes on drawings), and other documents as set out in our design features report.

**On behalf of Davis Ogilvie & Partners Ltd, and subject to:**

- (i) Site verification of the following design assumptions:
  - **Geotechnical assumptions made in the report. (If conditions on site do not match assumptions, beam design will need to be amended)**
  - **Suitable fill under bond beam to provide continuous support**
- (ii) **Unless specifically noted, compliance of the drawings to Non Specific codes such as NZS 3604 and NZS 4229 have not been checked by this practice**
- (iii) **This certificate does not cover weather-tightness, nor the stability, suitability or potential liquefaction of the site**
- (iv) Please refer to the attached **inspection schedule** for the inspections that we require;
- (v) All proprietary products meeting their performance specification requirements;
- (vi) This PS1 should be read in conjunction with our design features report and inspection schedule.

I believe on reasonable grounds that a) the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code and that b), the persons who have undertaken the design have the necessary competency to do so.

I also recommend the following level of construction monitoring/observation: (refer page 4) for guidance notes on ‘CM’ categories)

CM1 CM2 CM3 CM4 CM5

**Davis Ogilvie & Partners Ltd** holds a current policy of Professional Indemnity Insurance no less than \$200,000\*, and is a member of ACENZ.

I, **Alastair Wood**, am CPEng 245811, am a Member of EngNZ and hold the following qualifications: **BEng(Hons), CMEngNZ, CPEng**



**SIGNED ON BEHALF OF DAVIS OGILVIE & PARTNERS LTD**

**Date: 9 February 2018**

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$200,000\*.

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.

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## GUIDANCE ON USE OF PRODUCER STATEMENTS

Producer statements were first introduced with the Building Act 1991. The producer statements were developed by a combined task committee consisting of members of the New Zealand Institute of Architects, Institution of Professional engineers New Zealand. The original suit of producer statements has been revised at the date of this form as a result of enactment of the Building Act (2004) by these organisations to ensure standard use within the industry.

The producer statement system is intended to provide Building Consent Authorities (BCAs) with reasonable grounds for the issue of a Building Consent or a Code Compliance Certificate, without having to duplicate design or construction checking undertaken by others.

**PS1 Design** Intended for use by a suitably qualified independent design professional in circumstances where the BCA accepts a producer statement for establishing reasonable grounds to issue a Building Consent;

**PS2 Design** Intended for use by a suitably qualified independent design professional where the BCA accepts an independent design professional's review as the basis for establishing reasonable grounds to issue a Building Consent.

**PS3 Construction** Forms commonly used as certificate of completion of building work are Schedule 6 of NZS 3910:2013 or Schedules E1/E2 of NZIA's SCC 2001<sup>2</sup>.

**PS4 Construction Review:** Intended for use by a suitably qualified intendant design professional who undertakes construction monitoring of the building works where the BCA requests a producer statement prior to issuing a Code Compliance Certificate.

This must be accompanied by a statement of completion of building work (schedule 6).

The following guidelines are provided by ACENZ, IPENZ and NZIA to interpret the producer statement.

### Competence of Design Professional

The statement is made by a Design Firm that has undertaken a contract of services for the services named, and is signed by a person authorised by that firm to verify the processes within the firm and competence of its designers.

A competent design professional will have a professional qualification and proven current competence through registration on a national competence based register, either as a Chartered Professional Engineer (CPEng) or a Registered Architect.

Membership of a professional body, such as the Institution of Professional Engineers New Zealand (IPENZ) or the New Zealand Institute of Architects (NZIA), provides additional assurance of the designer's standing within the profession. If the design firm is a member of the Association of Consulting Engineers New Zealand (ACENZ), this provides additional assurance about the standing of the firm.

Persons or firms meeting these criteria satisfy the term "suitably qualified independent design professional".

## Professional Indemnity Insurance

As part of membership requirements, ACENZ requires all member firms to hold Professional Indemnity Insurance to a minimum level.

The PI Insurance minimum stated on the front of this form reflects standard, small projects. If the parties deem this inappropriate for large projects, the minimum may be up to \$500,000.

## Professional Services during Construction Phase

There are several levels of service which a Design Firm may provide during the construction phase of a project (CM1-CM5) for Engineers<sup>3</sup>). The Building Consent Authority is encouraged to require that the service to be provided by the Design Firm is appropriate for the project concerned.

## Requirement to provide Producer Statement PS4

Building Consent Authorities should ensure that the applicant is aware of any requirement for producer statement for the construction phase of building work at the time the building consent is issued as no design professional should be expected to provide a producer statement unless such a requirement forms part of the Design firm's engagement.

## Attached Particulars

Attached particulars referred to in this producer statement refer to supplementary information appended to the producer statement.

## Refer Also:

1. Conditions of Contract for Buildings and Civil Engineering Construction NZS 3910:2013
2. NZIA Standard Conditions of Contract SCC 2011
3. Guideline on the Building and Engagement for Consulting Engineering
4. PN Guidelines on Producer Statements

[www.acenz.org.nz](http://www.acenz.org.nz)

[www.ipenz.org.nz](http://www.ipenz.org.nz)

[www.nzia.co.nz](http://www.nzia.co.nz)

## GUIDANCE ON CONSTRUCTION MONITORING LEVELS

Construction monitoring is a service which provides the client with independent verification (to the extent of the consultant's engagement) that the works have been completed in accordance with specified requirements.

Most construction projects are unique, but unlike manufactured products which are often thoroughly tested and evaluated during construction and prior to being brought into service, the completed project is rarely tested against all design requirements. Construction works are also complex in detail and skilled professional involvement is necessary for the successful execution of such projects.

Five levels of construction monitoring service are defined. The decision as to which level is appropriate will be project dependent.

Factors influencing the level of construction monitoring for a project are:

- The size of the project
- The complexity of the construction works
- The importance of the project
- The experience and demonstrated skill in quality management of the constructor

The primary responsibility for completing the contract works in accordance with the requirements of the plans and specifications is the constructor's.

The involvement of the consultants is important during the construction phase to ensure that;

- The design is being correctly interpreted
- The construction techniques are appropriate and do not reduce the effectiveness of the design; and
- The work is completed generally in accordance with the plans and specifications

The risk of non-compliance can be reduced by increasing the involvement of the consultant. Because the cost of monitoring increases with increasing levels of service the client should consider all factors before deciding upon the most appropriate level of construction monitoring for the project. The table below sets out the five levels of construction monitoring, describes the types of review and indicates where a particular level of monitoring is appropriate. An increase in the quality monitoring of the project works by the consultant significantly reduces the risk that the materials or components do not meet specified requirements, the design has been incorrectly interpreted, and/or poor quality workmanship has been incorporated in the project.

Level	Review	Comment
CM1	Monitor the outputs from another party's quality assurance programme against the requirements of the plans and specifications. Visit the works at a frequency agreed with the client to review important materials of construction critical work procedures and/or completed plant or components. Be available to advise the constructor on the technical interpretation of the plans and specifications	This level is only a secondary service. It may be appropriate where: - For the design consultant when another party is engaged to provide a higher level of construction monitoring or review during the period of construction or - When the project works are the subject of a performance based specification and performance testing is undertaken and monitored by others.
CM2	Review, preferable at the earliest opportunity, a sample of <u>each</u> important work procedure, material of construction and component for compliance with the requirements of the plans and specifications and review a representative sample of <u>each</u> important completed work prior to enclosure or completion is appropriate. Be available to provide the constructor with technical interpretation of the plans and specification.	This level of service is appropriate for smaller projects of a routine nature being undertaken by an experienced and competent constructor and where a higher than normal risk of non-compliance is acceptable. It provides for the review of a representative sample of work procedures and materials of construction. The assurance of compliance of the finished work is dependent upon the constructor completing the work to at least the same standard as the representative sample reviewed.
CM3	Review, to an extent agreed with the client, <u>random samples</u> of important work procedures, for compliance with the requirements of the plans and specifications and review <u>important</u> completed work prior to enclosure or on completion as appropriate. Be available to provide the constructor with technical interpretation of the plans and specifications.	This level of service is appropriate for medium sized projects of a routine nature being undertaken by an experienced constructor when a normal risk of non-compliance is acceptable.
CM4	Review, at a frequency agreed with the client, <u>regular samples</u> of work procedures, materials of construction and components for compliance with the requirements of the plans and specifications and review the <u>majority</u> of completed work prior to the enclosure or on completion as appropriate.	This level of services is appropriate for projects where a lower than normal risk of non-compliance is required.
CM5	Maintain personnel on site to <u>constantly</u> review work procedures, materials of construction and components for compliance with the requirements of the plans and specifications and review completed work prior to enclosure or on completion as appropriate.	This level of service is appropriate for - Major projects -Projects where the consequences of failure are critical -Projects involving innovative or complex construction procedures. The level of service provides the client with the greatest assurance that the completed work complies with the requirements of the plans and specifications.

Davis Ogilvie will normally expect construction monitoring services to have been completed to a minimum level of CM3 in order to issue a PS4, although we may change this on a project specific basis, at the discretion of the engineer signing the PS1/PS4.

Further information of Construction Monitoring can be found at:  
<http://www.ipenz.org.nz/ipenz/practicesupport/endorsedinfo/codes>

## INSPECTION SCHEDULE

**Job No:** 34834  
**Job Name:** Swimming Pool Perimeter Beam Design  
**Client:** The Composite Group Ltd  
**Job Region:** Selwyn Region  
**Date:** 9 February 2018  
**Refer to:** Producer Statement - PS1 - Design attached

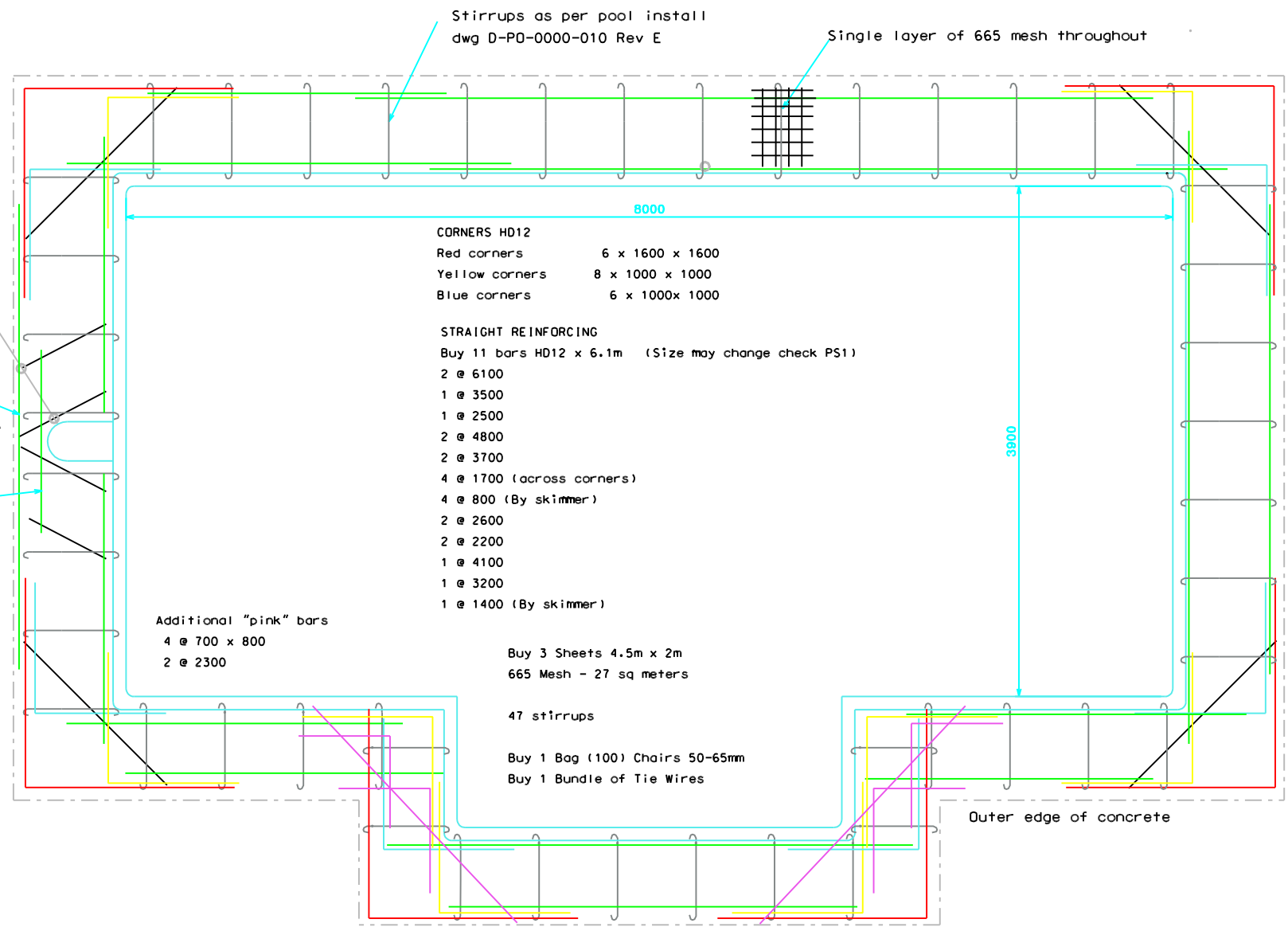
	DOP to Complete	Work by Others	Notes//Date Completed
• Inspection to confirm <b>Geotechnical Assumptions</b> prior to commencement of work	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
• Inspection of <b>Perimeter Bond Beam Reinforcement</b> prior to each concrete pour	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
• <b>Final Inspection</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
• A <b>Producer Statement – PS4 – Construction Review</b> will be issued for the works detailed on the PS1 subject to the satisfactory completion of the work, inspected as detailed in the schedule above	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
• <b>Other</b>	<input type="checkbox"/>	<input type="checkbox"/>	_____

**Please Note:**

- 48 hours' notice is required for inspections
- Inspections can be carried out simultaneously, where possible, depending on progress.
- Standard designs as per NZS 3604:2011 Timber Framed Buildings and NZS 4229:2013 Concrete Masonry Buildings to be inspected by others unless specified
- This Inspection Schedule is to be read in conjunction with the attached Producer Statement PS1 Design

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Distance between longitudinal bars - 650mm

Main reinforcement bars- HD12

Minimum 700mm overlap on all rebar

Minimum overlap of 665 mesh 350mm

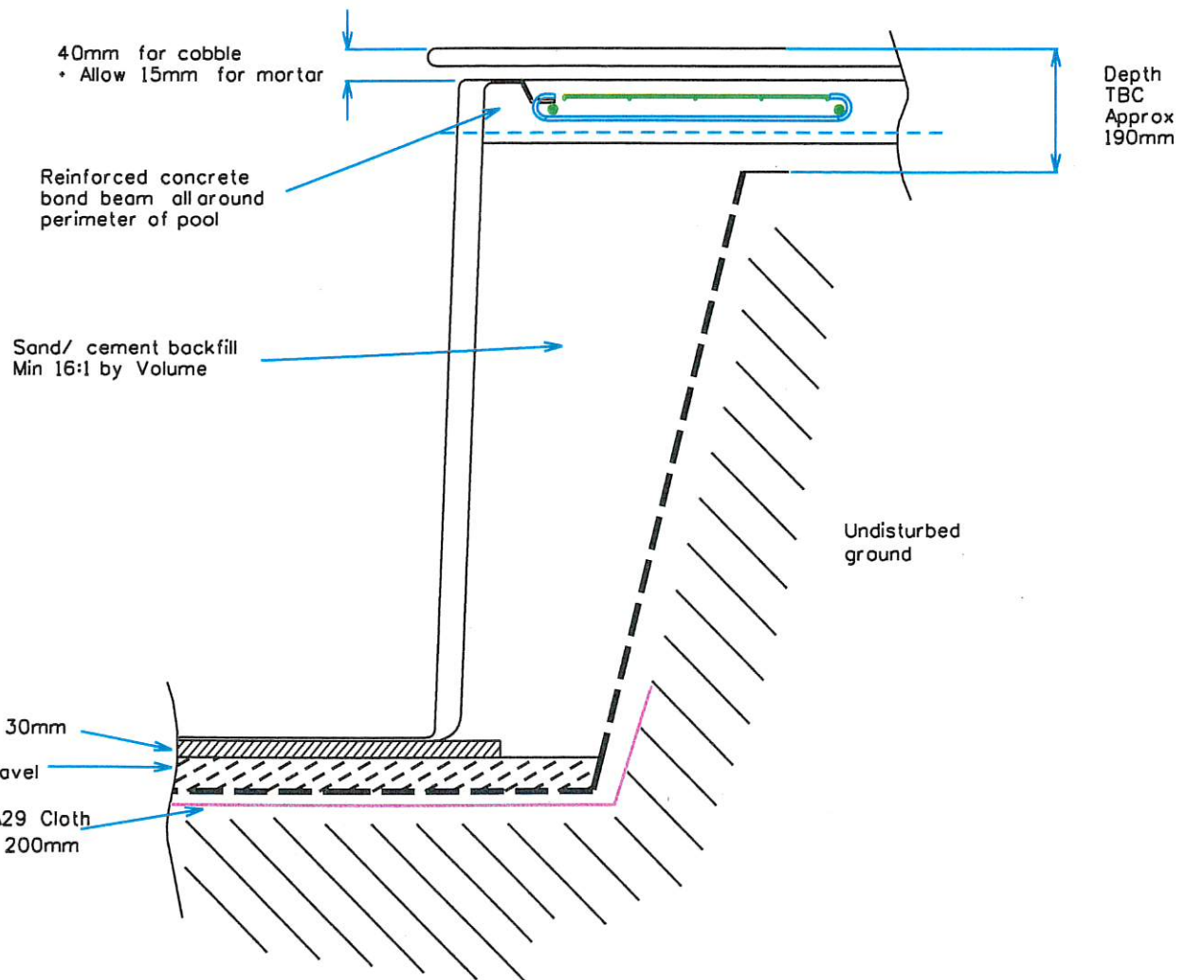
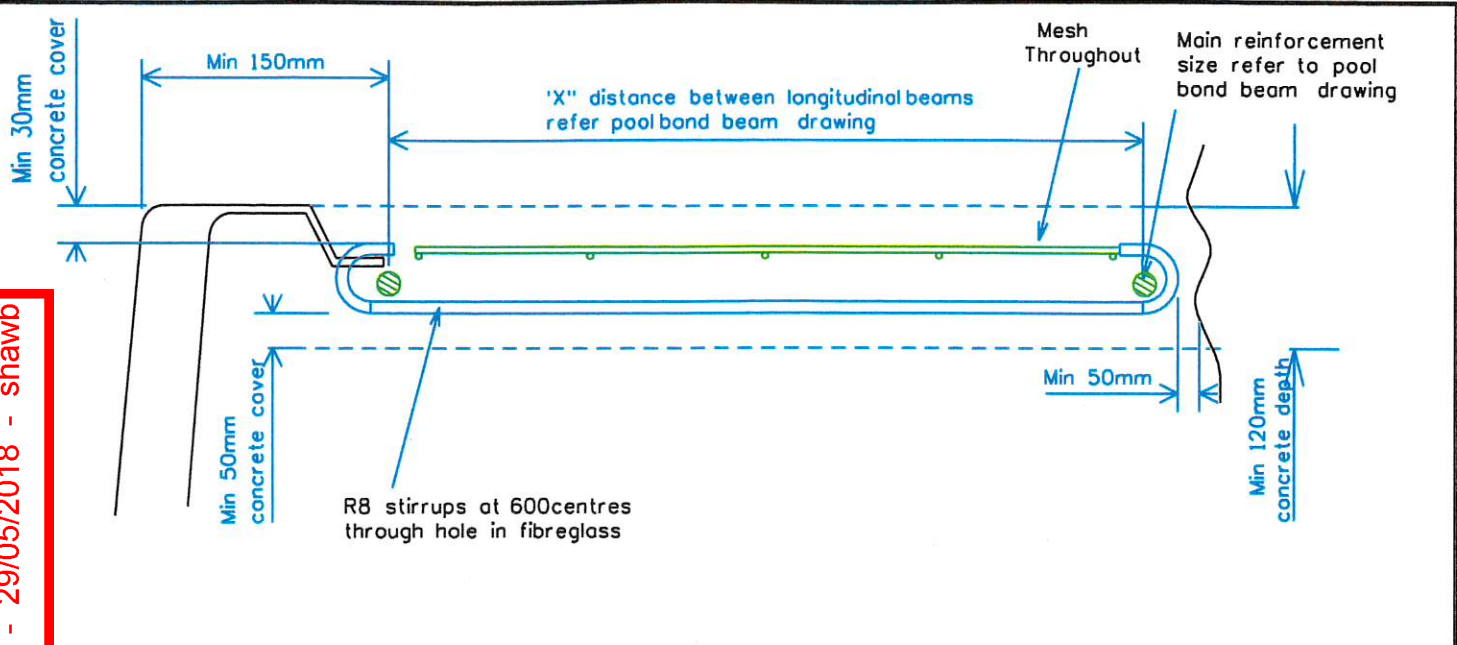
Note:  
Colours of rebar & gaps  
between shown  
for clarity only

F	Additional "pink" bars added	10/8/16
E	Additional bar added at skimmer end	13/4/16
D	updated with new bar size, new PS1	16/12/15
C	Dimensions Altered	30/10/13
REV	DESCRIPTION	DATE

TITLE		Bond beam Emperor 8	
DRAWING NO	D-PO-EMP8-200	DRAWN BY	T Wenborn
DATE	30/4/13	SCALE (A4)	NTS
DESIGN APPROVED		PAGE NO	



Issued for Checking  
13/4/16



Reinforced Concrete to be Grade 25 MPa  
 Min concrete cover 30mm over steel where exposed to air  
 Min concrete cover 50mm over steel where exposed to ground  
 Concrete to be well vibrated and compacted

G Concrete grade changed from 20 MPa to 25 MPa 22/12/17

F	Warding changed cover over steel to top of Bond Beam	12/10/16
E	Updated with new bar size new design PSI	1/12/15
D	Updated for 8m pools	30/10/13
REV	DESCRIPTION	DATE
TITLE		Pool Install Instructions
		All Sizes
DRAWING NO	0-P0-00000-010	RE-DRAWN BY
DATE	8/4/13	SCALE (A4)
DESIGN		PAGE NO
APPROVED		



# MARKED-UP STRUCTURAL ENGINEERING SKETCH

Project Generic Detail

Title: Bond beam step down option

Scale: - Job No: 34834 Dwg no: EMP8

Date: 15/12/17 Eng: DoM Rev: A

589, Christchurch 8140

**do** DAVIS OGILVIE  
ENGINEERS / SURVEYORS / PLANNERS



11 Deans Ave, Addington //  
P O Box 589, Christchurch 8140  
T. 0800 999 333 // E. admin@do.co.nz //

www.do.co.nz

Sheet No:

Surveyor:

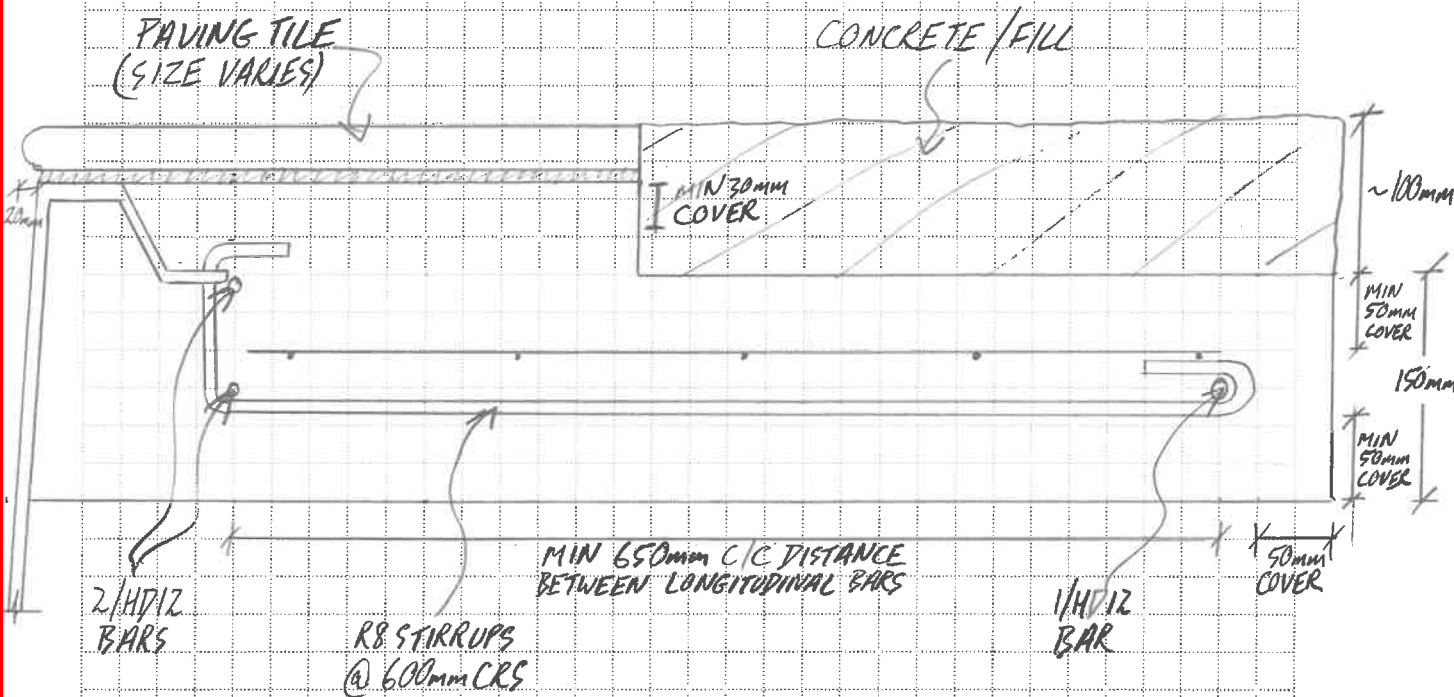
Job No:

1:

Revision:

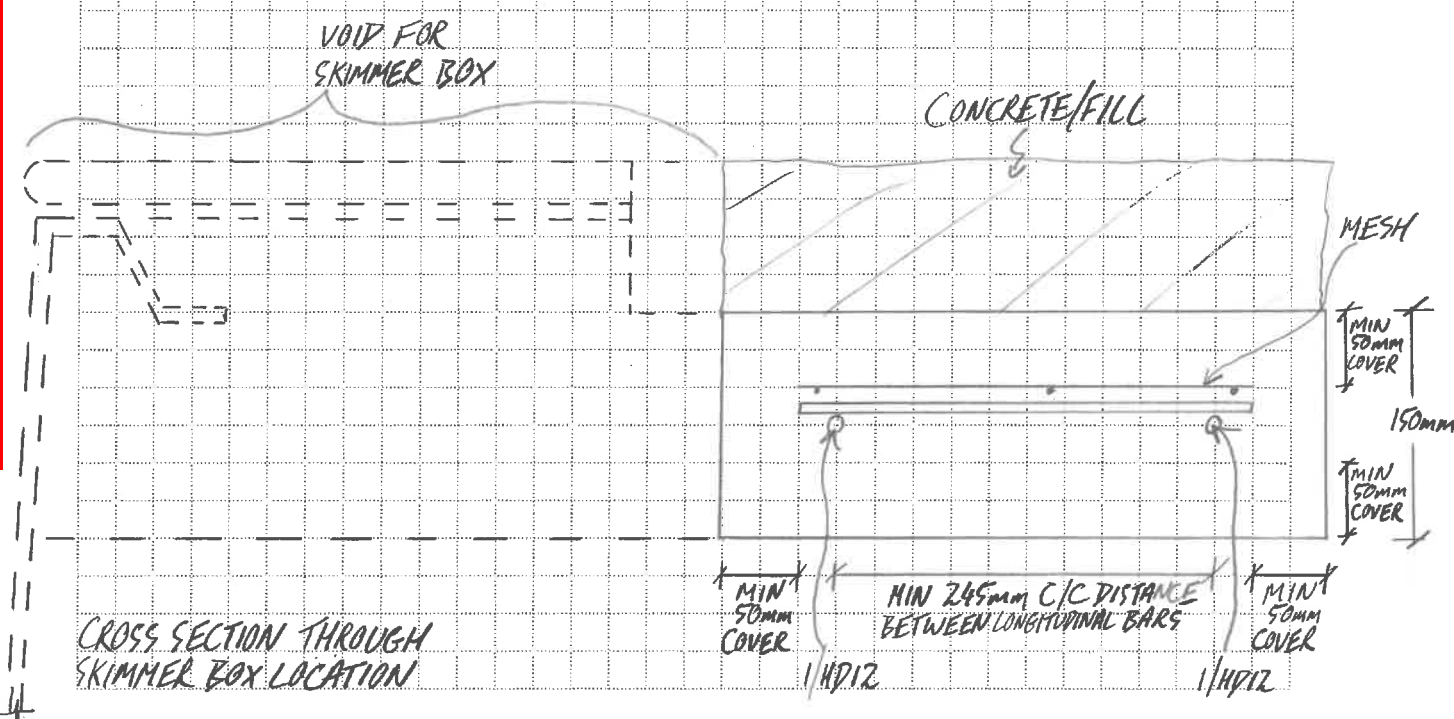
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BOND BEAM OPTION WITH STEP DOWN AND ON MAIN REINFORCING LAYER - MAX 8m LONG POOL



TYPICAL CROSS SECTION

MINIMUM 50mm COVER TO ALL REINFORCEMENT (EXCEPT FOR 30mm TOP COVER BELOW PAVING TILE)



CROSS SECTION THROUGH SKIMMER BOX LOCATION

Date: 24/10/16

Project:

Job No:

Engineer: JEM

Sheet No:

Revision:

Description:

CALCULATION  
SKETCH  
SHEET

CRESTA BEAM DESIGN

FOR IMPORTANCE LEVEL 1 STRUCTURE WITH A 50 YEAR  
SERVICE LIFE (REQUIRED PFAE = 1/100)

$$C_o = C_w(T)(Z)R N(T,D)$$

WHERE  $C_w(T) = 1.33$   
 $Z = 0.3$   
 $R = 0.5$   
 $N(T,D) = 1$

$$\Rightarrow C_o = 0.1995$$

$$\phi' = 26^\circ \quad \alpha = \tan^{-1}(C_o) = 11.28^\circ \quad (\phi - \alpha) = 14.72^\circ$$

$$K_{AE} = \frac{\cos^2(\phi - \alpha)}{\cos^2(\alpha) \left[ 1 + \frac{\sin(\phi) \sin(\phi - \alpha)}{\cos(\alpha)} \right]^2} = \frac{(0.9357)}{(0.9617)(1.787)} = 0.564$$

$$K_A = 0.3901$$

$$K_{AE} - K_A = 0.154$$

Date: / /

Project:

Job No:

Engineer: DGM

Sheet No:

Revision:

# CALCULATION SKETCH SHEET

Description: BEAM DESIGN - FOR 1.7m END

STATIC LOAD CASE (LOAD FACTOR = 1.0) TAKE H = 1.7m (4.27)  $\gamma = 17 \text{ KN/m}^3$

$K_A = 0.3901$   
 $S_u = 2 \text{ kPa}$

$$\text{HORIZONTAL THRUST} = \left[ (0.5) K_A \gamma H^2 + K_A (S_u) H \right] (CF) = \left[ 9.58 + 1.33 \right] (1.0) = 10.91 \text{ KN/m}$$

$$F_H = 11 \text{ KN/m}$$

$$\text{HEIGHT OF FORCE} = \left[ \frac{(0.5) K_A \gamma H^3}{3} + \frac{K_A (S_u) H^2}{2} \right] \frac{(CF)}{F_H} = \left[ \frac{9.58(1.7)}{3} + \frac{1.33(1.7)}{2} \right] \frac{(1.0)}{(11)}$$
$$= 0.599 \text{ m} \approx 0.6 \text{ m FROM BASE}$$

FACTOR OF SAFETY = 2

$$\therefore \text{FACTORED } F_H = 22 \text{ KN/m}$$

SEISMIC LOAD CASE LOAD FACTOR = 1

$$\text{UNFACTORED HORIZONTAL THRUST} = 9.58 + 1.33 = 10.91 \text{ KN/m} \leftarrow \text{DUE TO STATIC PRESSURE}$$

$$K_{A2} - K_A = 0.154$$

$$\text{HORIZONTAL THRUST COMPONENT} = (0.5) (K_{A2} - K_A) \gamma H^2 + (K_{A2} - K_A) (S_u) H = 3.783 + 0.5236 = 4.3066$$
$$= 4.31 \text{ KN/m}$$

$$\text{TOTAL SEISMIC HORIZONTAL THRUST } (F_{H20}) = 10.91 + 4.31 = 15.22 \text{ KN/m}$$

FACTOR OF SAFETY = 1.25

$$\text{FACTORED } F_{EQH} \approx 19.1 \text{ KN/m}$$

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Date: / /  
 Engineer:  
 Description:

Project:  
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Job No:  
 Revision:

**CALCULATION  
 SKETCH  
 SHEET**

SWIMMING POOL: EQ ACTIONS ON WATER - NZS 3106:2009 SECTION A2

$C_d(T_i) = C_d(T_i) K_d(\eta, \xi) S_p$        $C_d(T_i) = C_d(T_i) Z R N(T, D)$

- For CONVECTIVE MODE:

CONVECTIVE WAVE HEIGHT (FOR SLOSHING)

$d_{max} = \rho C_d(T_i)$  FOR RECTANGULAR TANKS/POOLS

WHERE  $\rho$  = HALF LENGTH OF TANK IN DIRECTION BEING CONSIDERED

$C_d(T_i) = C_d(T)$  BASED ON  $\eta = 1$      $\xi = 0.5\%$

$C_d(T) = 0.1995$  - FROM PREV

$K_d = 1.67$  FOR  $\eta = 1 + \xi = 0.5\%$   
 $1.3 - (0.3)\eta = 1$

$C_d(T_i) = 0.333165 \approx 0.34$

FOR 10m LONG, MAX 5m WIDE POOL - IN EITHER DIRECTION

$d_{max_1} = (0.5)(10)(0.34) = 1.7m$

$d_{max_2} = (0.5)(5)(0.34) = 0.85m$



FOR 8m LONG, MAX 4m WIDE POOL - IN EITHER DIRECTION

$d_{max_1} = (0.5)(8)(0.34) = 1.36m$

$d_{max_2} = (0.5)(4)(0.34) = 0.68m$

THESE VALUES ARE SUFFICIENT HOWEVER FOR A 1.1m DEEP POOL, IT WOULD BE BETTER TO IGNORE HYDROSTATIC CONTRIBUTIONS ENTIRELY FOR THE SEISMIC CASE

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Date: / /

Project:

Job No:

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Revision:

Description: FOR 1.7m END

**CALCULATION  
 SKETCH  
 SHEET**

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HYDROSTATIC PRESSURE:

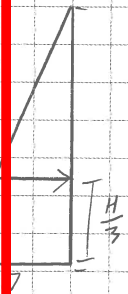
$\gamma_w = 10 \text{ kN/m}^3$        $H = 1.7 \text{ m (MAX)}$

$p = (10)(1.7) = 17 \text{ kPa}$       TAKING A 1m WIDE SECTION.       $p = 17 \text{ kN/m}$

$P^* = 1.5(17)(1.7) = 14.45 \text{ kN}$       ACTING AT A HEIGHT OF  
 0.57m ABOVE BASE ( $\approx 0.6 \text{ m}$ )

AS IT IS BENEFICIAL, FACTOR BY 0.9

$\phi P^* = 13 \text{ kN}$



COUNTERACTING STATIC CASE LOADING:

STATIC FORCE = 2.2 kN @ 0.6m FROM BASE — ALLOWING FOR FOS OF 2  
 HYDROSTATIC FORCE = 13 kN @  $\approx 0.6 \text{ m}$  FROM BASE

RESULTANT = 9 kN/m ACTING @ 0.6m FROM BASE

PORTION OF LOAD TAKEN BY BOND BEAM  
 $= \frac{(0.6)(9)}{1.7} = 3.17 \text{ kN/m} \approx 3.2 \text{ kN/m}$

COUNTERACTING SEISMIC CASE LOADING:

CONSIDER NO WATER IN POOL, TO ALLOW FOR SPLASH

SEISMIC FORCE = 19.1 kN/m @ 0.711m FROM BASE — INCLUDING FOS OF 1.25

PORTION OF LOAD TAKEN BY BOND BEAM:  
 $= \frac{(19.1)(0.71)}{1.7} = 7.988 \approx 8 \text{ kN/m}$

∴ SEISMIC CASE GOVERNS : LOAD ON BEAM = 8 kN/m

Date: / /

Project:

Job No:

Engineer:

Sheet No:

Revision:

Description: FOR 1.1m END

CALCULATION  
SKETCH  
SHEET

STATIC LOAD CASE:  $H = 1.1m$   $S_u = 2kPa$   $K_u = 0.3901$   $\delta = 17kN/m^3$

HORIZONTAL THRUST =  $\left[ (0.5 \cdot 0.3901)(17)(1.1)^2 + (0.3901)(2)(1.1) \right] = 4.871 \approx 4.9 kN/m$

HEIGHT OF FORCE =  $\left[ \frac{(0.5 \cdot 0.3901)(17)(1.1)^3}{3} + \frac{(0.3901)(2)(1.1)^2}{2} \right] \left( \frac{1}{4.9} \right) = \frac{(1.471 + 0.4719)}{4.9} = 0.397m \approx 0.4m$

$F_{0.9} = 2$

FACTORED  $F_H = 9.8 kN/m$

HYDROSTATIC LOAD =  $\phi P = (0.9)(0.5)(10)(1.1)(1.1) = 5.445 \approx 5.4 kN$

RESULTANT FORCE =  $4.4 kN$  - TOTAL  $F_H$  - ACTS @  $\sim H/2 = 0.37m$

PORTION OF LOAD TAKEN BY BOND BEAM =  $\frac{(0.37)(4.4)}{1.1} = 1.48 \approx 1.5 kN/m$

SEISMIC LOAD CASE

FACTORED THRUST DUE TO STATIC =  $4.9 kN/m$

$K_{A.2} - K_A = 0.154$

EQ THRUST =  $F_{EQ} = (0.9)(0.154)(17)(1.1)^2 + (0.154)(2)(1.1) = 1.59 + 0.34 = 1.93 kN/m \approx 2 kN/m$

TOTAL EQ THRUST =  $4.9 + 2 = 6.9 kN/m$

$F_{0.5} = 1.25$

FACTORED THRUST =  $8.625 \approx 8.7 kN/m$  - APPLIED @  $0.6H = 0.66m$

PORTION OF LOAD TAKEN BY BOND BEAM =  $\frac{(0.66)(8.7)}{1.1} = 5.22 \approx 5.3 kN/m$

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Date: / /

Project:

Job No:

Engineer:

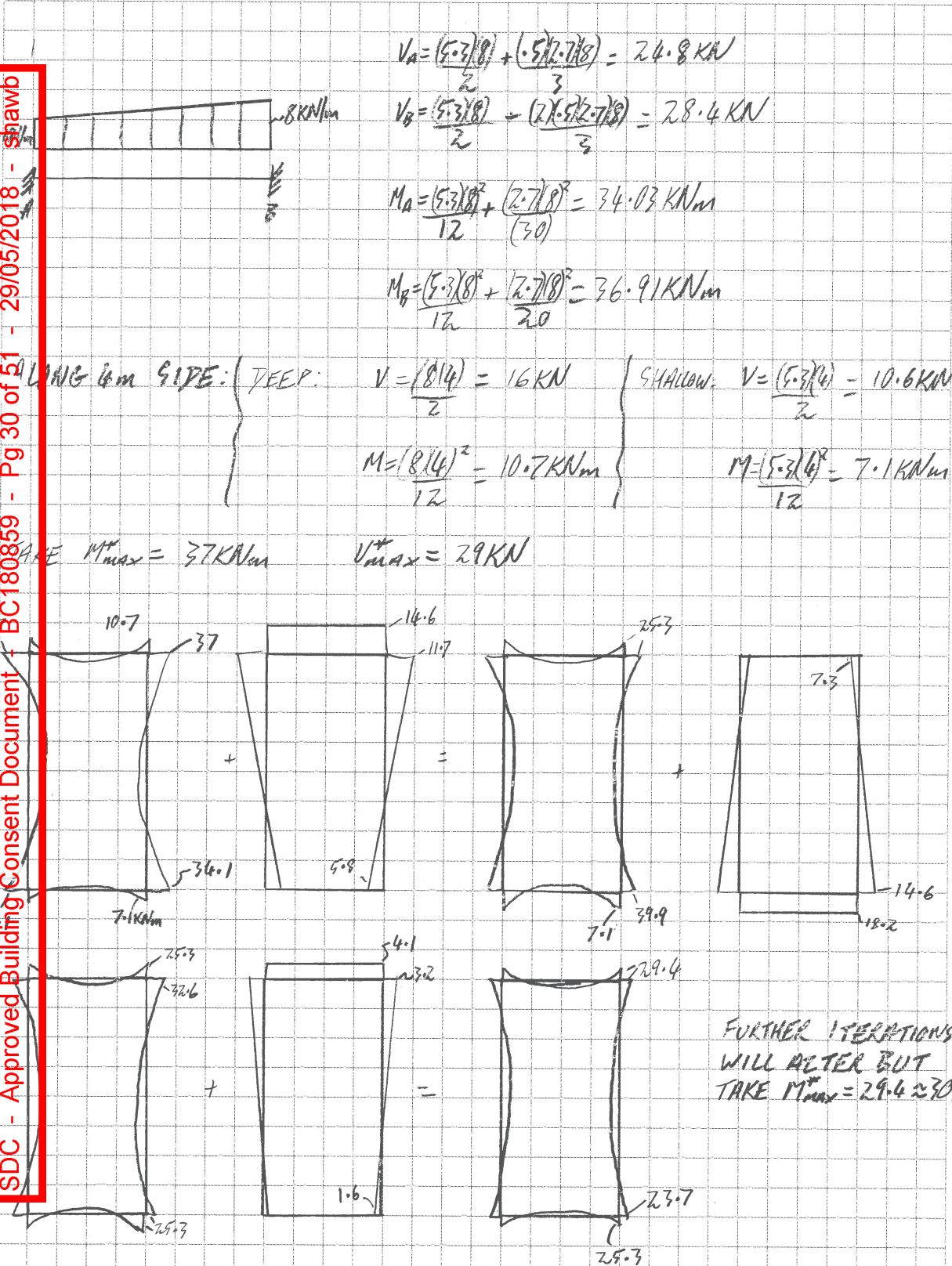
Sheet No:

Revision:

**CALCULATION  
 SKETCH  
 SHEET**

Description: POOL BOND BEAM DESIGN - 8m LONG, 4m WIDE

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FURTHER ITERATIONS  
 WILL AFFECT BUT  
 TAKE  $M_{max} = 29.4 \approx 30 \text{ kNm}$

MAX REDISTRIBUTED MOMENT  $\approx 30 \text{ kNm}$

MAX SHEAR = 28.4  $\approx 29 \text{ kN}$

Date: / /  
 Engineer:  
 Description:

Project:  
 Sheet No:

Job No:  
 Revision:

**CALCULATION  
 SKETCH  
 SHEET**

POOL DESIGN - FOR 8m POOL - MIN 50 BETWEEN BARS  
 $\therefore d = 650 + 50 = 700$

$R_s = 70 \text{ mm}$   
 $d = 700 \text{ mm}$   
 $f_y = 500 \text{ N/mm}^2$   
 $M^* = 30 \text{ kNm}$   
 $V^* = 29 \text{ kN}$

BENDING:

$K = 0.026$       $j_d = .95d$       $A_{sreq} = \frac{M^*}{\phi f_y j_d} = 106.2 \text{ mm}^2$

1/HD12 PROVIDES  $113 \text{ mm}^2$

SHEAR

$V_c = \left(\frac{400}{700}\right)^{2.5} (1) (0.1)(\sqrt{20})(120)(700)(10^{-3}) = 37.65 \text{ kN}$

$V_s = \left(\frac{300(50)}{600}\right) (10^{-3}) = 17.5 \text{ kN}$      - R8 STIRRUPS @ 600 CRS

$(V_c + V_s) = 37.6 \text{ kN} > V^*$

$v_c = (0.07 + 10p_w) \sqrt{f_c}$   
 $p_w = \frac{(2)(113) + (4)(47)(500)}{(120)(700)}$   
 $= 0.00355$

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Date: 30/11/15  
 Engineer: DOM

Project: 32687  
 Sheet No: 9

Job No:  
 Revision:

**CALCULATION SKETCH SHEET**

Description: CALCS FOR BAR DEVELOPMENT LENGTH - FOLLOWING JACOUI'S Q ON 30/11

FROM NZS 3101:2006 - EQ 8.2:

$$l_{db} = \frac{(0.5 \alpha_a f_y)}{\sqrt{f_c}} d_b$$

- WHERE  $\alpha_a = 1 \rightarrow 1.3 \Rightarrow$  TAKE  $\alpha_a = 1.3$   
 ↳ COMMENTARY EXPLAINS THAT  $\alpha_a$  FOR UPPER BARS IS HIGHER, BUT THIS IS NOT APPLICABLE FOR BARS AT ONE LEVEL

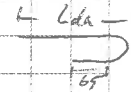
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FOR HD12 BARS IN 20MPA CONCRETE

$$l_{db} = \frac{(0.5)(1)(500)(12)}{(120)} = 671.2 \approx 672 \text{ mm}$$

TAKE LAP LENGTH = 700 mm

FOR R8 STIRRUPS IN 20MPA CONCRETE - BAR TERMINATES IN A HOOK



$$l_{dh} = \frac{(0.24 \alpha_s) (\alpha_1) (\alpha_2) f_y d_b}{\sqrt{f_c}} \geq 8 d_b$$

$$= \frac{(0.24)(0.5) \cdot 7(1)(300)(8)}{4.47} = 45.1 \quad \left\{ \begin{array}{l} 8 d_b = 64 \text{ mm} \end{array} \right.$$

$\alpha_s = A_{sp} / A_{cp} \leq 0.5$  SHEAR STEEL NOT REQ'D MUCH  
 $\alpha_1 = 0.7 \quad \alpha_2 = 1$

(CONSERVATIVE)

$$\therefore l_{dh} = 64 \text{ mm}$$

∴ PROVIDED LENGTH IS SUFFICIENT

# CALCULATION SKETCH SHEET

Date: / /

Sheet No:

Engineer/Surveyor: DOM

Job No:

Description:

Revision:

Project: STANDARD POOL DESIGN

## COVER REQUIREMENTS

THE POOL IS CONSIDERED TO BE AN IMPORTANCE LEVEL 2 STRUCTURE WITH A DESIGN LIFE OF 50 YEARS.

NOTE THAT THE WATER FROM THE POOL COULD BE CONSIDERED TO BE CHEMICALLY AGGRESSIVE (DUE TO CHLORINE AND PH BALANCING AGENTS SUCH AS HYDROCHLORIC ACID).

HOWEVER, THE TOP SURFACE OF THE BOND BEAM IS PROTECTED FROM EXPOSURE BY 15mm OF MORTAR AND A 40mm THICK COBBLE.

THE ONLY TIME THIS TOP SURFACE WILL BE EXPOSED IS DURING CONSTRUCTION IN THE INTERIM BETWEEN COMPLETION OF CONCRETE POUR AND INSTALLATION OF COBBLES. ALTHOUGH THE POOL WILL BE FILLED WITH WATER DURING THIS PERIOD, IT WILL NOT BE IN USE SO WATER SPLASHING ONTO BOND BEAM IS UNLIKELY.

THUS, 30mm COVER TO TOP SURFACE IS ACCEPTABLE FOR 50 YEAR DESIGN LIFE IF IT IS ASSUMED THAT THE BEAM IS ADEQUATELY PROTECTED BY THE MORTAR AND COBBLES ON TOP.

FOR THE SIDES EXPOSED TO THE GROUND:

THE GROUND IMMEDIATELY BELOW THE BEAM SHALL BE A SAND/CEMENT MIX

THE GROUND OUTSIDE THE POOL WILL BE NATURAL SOIL OR FILL. HOWEVER, THERE MAY BE SOME SPLASHING OF POOL WATER, SO TREAT THIS GROUND TO BE MILDLY OR MODERATELY AGGRESSIVE SOIL / GROUNDWATER

FROM NZS 3101:2016, TABLE 3.4, FOR XA1 AND XA2 SOILS, THE MINIMUM COVER IS 50mm.

THEREFORE:

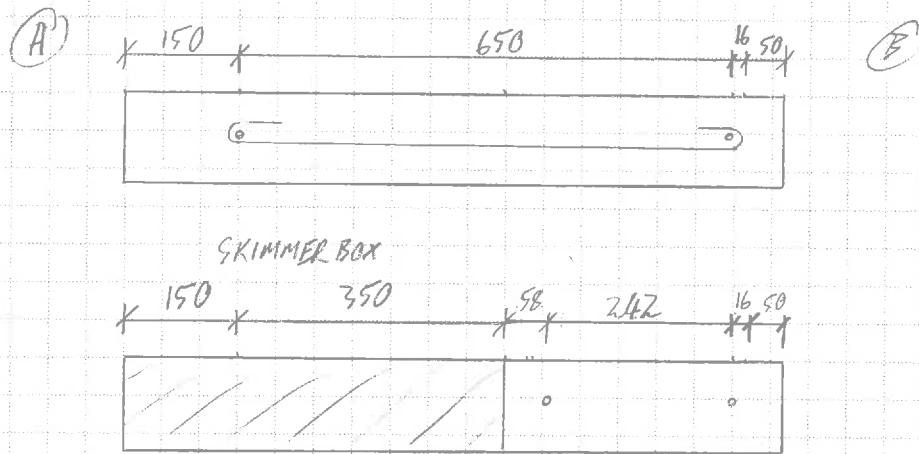
30mm COVER TO TOP SURFACE

50mm COVER TO SURFACES IN CONTACT WITH GROUND

# CALCULATION SKETCH SHEET

Date: / /  
Engineer:  
Description:  
Project:

Sheet No:  
Job No:  
Revision:



EFFECTIVE BAR DEPTH ADJACENT TO SKIMMER BOX

WHEN MEASURING FROM SIDE A) = 300mm

WHEN MEASURING FROM SIDE B) = 308mm

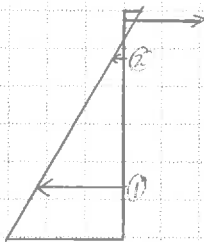
# CALCULATION SKETCH SHEET

Date: / /  
 Engineer:  
 Description:  
 Project:

Sheet No:  
 Job No:  
 Revision:

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FOR 8m POOL BEAM : ADJACENT TO SKIMMER BOX :  $H = 366\text{mm}$   $d_{min} = 300\text{mm}$   
 $x = 0.11d = 33\text{mm}$   $\frac{z}{y}(x) = 22\text{mm}$



	$y_i^*$	$y_i$	$y_i^* y_i$
①	267	289	77163
②	33	55	1815
			78978 = $\Sigma y^* y$

$$F_T = \frac{(M^* 267)}{78978} = (M^*) (0.0034) 11$$

FOR  $M^* = 13.4 \times 10^6 \text{Nmm}$   $F_T = 45,560 \text{N} \approx 46 \text{KN}$

FOR HD12 BAR :  $F_{BAR} = (500)(113)(10^{-3}) = 56.5 \text{KN}$

CAPACITY > DEMAND



# Design Report

FRP In-ground pools for earthquake prone regions  
(Christchurch TC1, 2 and 3 areas)

**Document Number:** DR-PO-FRP00-001

## Revision control

Revision: 4

Issued: 23 November 2016

Original Prepared by: N Heatly, and G Harper, 12<sup>th</sup> August 2013

Original Approved by: G Harper

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## Designs covered:

Bermuda Senator 8 and 10	D-PO-SEN8-300, D-PO-SEN10-300
Bermuda Emperor 8 and 10	D-PO-EMP8-300, D-PO-EMP10-300
Bermuda President	D-PO-PRES-D-300
Bermuda Statesman	D-PO-STATE-
Bermuda Executive	D-PO-EXIT-300
Bermuda Lap Pool	D-PO-LAP-300
Cresta Form – Up to 25m length by 6m width and 1.7m deep	D-PO-CFXXX-000

The Composite Group LP  
187 Dyers Rd  
Eastgate  
Christchurch

## Description

This design report covers the basis of design as well as the summary of the analysis carried out to confirm the designs for the pools listed above.

## Limitations and responsibility of “the Engineer”

***The pool design only covers the strength of the pool structure, it does not cover the strength of the surrounding concrete bond beam or floor structure, in the case of an in-door pool. The pool structure has been designed to accommodate loads from the surrounding soils and other structures that meet or exceed the swimming pool code NZS4441 and accommodate soils conditions and seismic loads typically found in Christchurch.***

***Separate geotechnical assessments, designs and analysis are required to confirm that the ground conditions and seismic loads imposed on the side of the pool are less than the loads assumed below.***

## Design loads:

Design loads assumed for the pool structure.

Seismic load – pool side walls 10.0 kPa uniform distribution

\*While a small pressure variation is calculated over the height of the side wall, the conservative approach of designing to the maximum pressure value applied uniformly over the full depth.

Loads were assessed according to section 5.3 of AS/NZS 1838. The load requirements of AS/NZS 1838 are applied.

The requirements of the rule:

- |   |  |
|---|--|
| 1. Clause 5.2.1 – Soil loading              | 6.6 kPa per metre depth<br>(applied without (3)) |
| 2. Clause 5.2.1 – Surcharge loading         | 2.0 kPa uniform<br>(applied with (1) and (3))    |
| 3. Hydrostatic pressure                     | -10.0 kPa per metre depth<br>(applied with (3))  |
| 4. Clause 7.1.1 – Deflection limit – wall   | h/35   |
| 5. Clause 7.1.1 – Deflection limit – coping | L/150  |

Cresta/The Composite Group has completed preliminary analysis on a range of typical soils within the Christchurch area and using Mononobe-Okabe analysis has determined that most soils within TC1, 2 and 3 areas are likely to result in static and seismic loads greater than the minimum required above but less than 10kPa.

## Civil Design Loads

A 10kPa load has therefore been assumed for the structural analysis performed in preparing this design report. A professional assessment of the expected geotechnical and seismic loads must be performed for each pool site to confirm that these assumed loads will not be exceeded.

Seismic loads are assumed to occur with the pool full.

**Safety factors:**

Seismic loads are ultimate loads thus a factor of safety (FoS) of 1.0 is applied to this load type.

AS/NZS 1838 does not specify minimum safety factors but is assumed ultimate load type. Thus a FoS of 1.0 is also applied.

**Codes and Standards**

NZS 4441:2008 - Swimming pool Design Standard

AS/NZS 1838:1994, Premoulded fibre-reinforced plastics - Design & Fabrication

Material properties – ISO 12215

**Quality and Construction**

Pool to be constructed to lay up drawings:

D-PO-SEN10-100 Rev A

D-PO-SEN08-100 Rev C

D-PO-EXIT-100 Rev 0

D-PO-LAP-100 Rev 0

D-PO-STATE-100 Rev A

Concrete attachment minimum requirements:

- Reinforcing bar loops must be installed at not more than 650mm centres (Updated as per Davis Ogilvie engineers revised bond beam design 2016)
- The edge clearance (between hole edge and flange edge) must be not less than 25mm.

The Composite Group quality management plan to be followed.

**Description:**

Holes are drilled in the flange of the as designed pool flange, reinforcing bar is looped through these holes at discreet intervals; the reinforcing bar loops is set into the concrete bond beam when pored. This arrangement effectively ties the pool flange to the bond beam restricting lateral deflection of the pool edge.

For the purposes of analysis, rotational movement of the flange and pool edge is also assumed to be restrained by this arrangement, although practically some degree of rotation is likely to occur at the full design load, the effect being to reduce load on the panel and this edge.

**Design Assumptions:**

- Concrete bond beam construction – refer civil engineers design report
- Pool flange laminate is – per existing design, 3300g/m<sup>2</sup> of SR at 50% weight fraction, t= 6.6mm
- The hole provided to loop the reinforcing bar though the flange is assumed to be a close fit with the bar.

### Analysis Summary

Structural analysis was completed by engineering first principals' analytical methods and by computational 3D beam model. Good correlation between the two methods was found. Refer appendix for analysis details.

#### Side wall panel bending strength:

Requirement	3.53 Nm/mm (assuming partially fixed -worst case)
Achieved	3.63 Nm/mm

#### Side wall panel shear strength:

Requirement	0.19 MPa (at 40mm thickness)
Achieved	0.25 MPa (data sheet required)

#### Side wall deflection:

Requirement	< 37 mm (at h/35)
Achieved	36 mm

#### Side coping reaction:

Requirement	7515 N/m (assuming fully fixed – worst case) 4885 N/loop (unclamped bearing)
Achieved	6144 N/loop (unclamped bearing)

#### Side coping bending strength:

Requirement	38.0 kNm
Achieved	200.0 kNm

#### Side coping shear strength:

Requirement	20.5 MPa (at 340mm wide)
Achieved	66.0 MPa

#### Side coping deflection:

Requirement	< 67 mm (at L/150)
Achieved	57mm

Based on the above analysis the pool construction meets or exceeds all stated rule and seismic requirements.

Please refer to the drawings for laminate specifications and details.





# Producer Statement PS1

DuraPanel™ Balustrade for Stairs, Landings and Retaining Walls



Building Code Clause(s).....B1, B2, F4.....

# PRODUCER STATEMENT – PS1 – DESIGN

(Guidance notes on the use of this form are printed on page 2)

ISSUED BY:.....Hadley Consultants Ltd.....  
(Design Firm)

TO:.....Terranota Ltd.....  
(Owner/Developer)

TO BE SUPPLIED TO:.....Various.....  
(Building Consent Authority)

IN RESPECT OF:.....Boundaryline Durapanel Balustrade for Stairs Landings and Retaining Walls (excluding external balconies) serving one dwelling. ....  
(Description of Building Work)

AT:.....Non-specific.....  
(Address)

..... LOT..... DP..... SO.....

We have been engaged by the owner/developer referred to above to provide:

Structural design checking for the Boundaryline Durapanel Balustrade for Stairs Landings and Retaining Walls (excluding external balconies) serving one dwelling.....  
(Extent of Engagement)

services in respect of the requirements of Clause(s) ..B1, B2 and F4.....of the Building Code for:

All  or Part only  (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

Compliance Documents issued by the Ministry of Business, Innovation & Employment ..B1/VM1.....or  
(verification method / acceptable solution)

Alternative solution as per the attached schedule.....

The proposed building work covered by this producer statement is described on the drawings titled:

attached product installation sheet titled 'Boundaryline Durapanel Specifications – for Producer Statement and Installation: For stairs, landings and retaining walls..... and numbered .....

together with the specification, and other documents set out in the schedule attached to this statement.

On behalf of the Design Firm, and subject to:

(i) Site verification of the following design assumptions:

- the ground at the site providing a minimum allowable bearing capacity of 100kPa and meeting the definition of good ground as set out in NZS3604;
  - the structure supporting the fencing to be in accordance with the Building Code Acceptable Solutions or subject to specific design;
  - and the engineering work covered by this statement being carried out strictly in accordance with the manufacturer's installation specifications;
- (ii) All proprietary products meeting their performance specification requirements;

I believe on reasonable grounds that a) the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code and that b), the persons who have undertaken the design have the necessary competency to do so. I also recommend the following level of construction monitoring/observation:

CM1 CM2 CM3 CM4 CM5 (Engineering Categories) or  as per agreement with owner/developer (Architectural)

I, .....Andrew Duncan Morris..... am: CPEng .....237078.....# Reg Arch.....#  
(Name of Design Professional)

I am a Member of :  IPENZ  NZIA and hold the following qualifications: BE(Hons) MIPENZ CPEng.....

The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than \$200,000\*.

The Design Firm is a member of ACENZ:

SIGNED BY ...A D Morris..... ON BEHALF OF .....Hadley Consultants Ltd.....  
(Design Firm)

Date.....28 July 2017..... (signature).....

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$200,000\*.

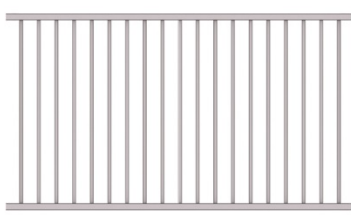
This form is to accompany Form 2 of the Building (Forms) Regulations 2004 for the application of a Building Consent.

SDC - Approved Building Consent Document - BC180859 - Pg 42 of 51 - 29/05/2018 - shawb

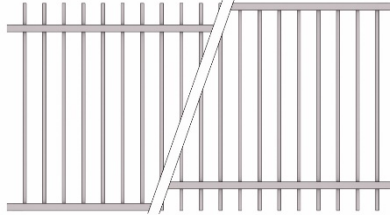
SDC - Approved Building Consent Document - BC180859 - Pg 43 of 51 - 29/05/2018 - shawb

## Boundaryline DuraPanel Specifications - for Producer Statement and Installation:

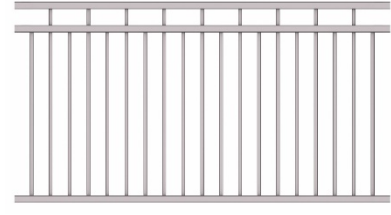
For stairs, landings and retaining walls



Eco/Delta



Vecta



Polo

Table 1.	Maximum Post Spacing (centre-to-centre)	
	Post: 50x50x3.0mm SHS	Post: 65x65x2.5mm SHS
DDP9522 Delta 950 DDR9522 Delta 950 Raking	1175mm	1175mm
DEP1222 Eco 1200 DDP1222 Delta 1200 DVP1222 Vecta 1200 DVP1522 Vecta 1500	-	1175mm
DPP1222 Polo 1200 DPP1522 Polo 1500 DPP1822 Polo 1800	-	1745mm
All DuraPanel panels, posts, and brackets are manufactured from aluminum		

Panel to post fixing with DuraPanel bracket DSB4040  
**Fig A**

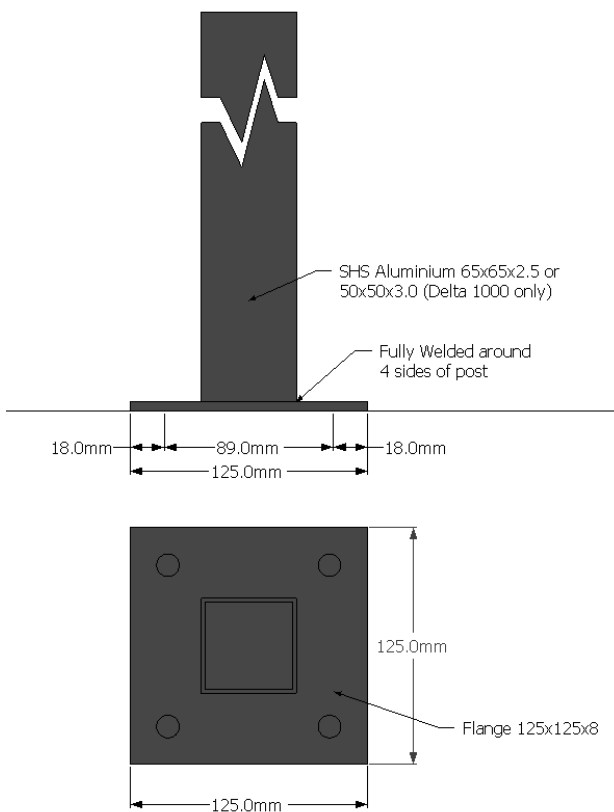


### Post installation details:

#### Bolt-down post:

DuraPanel 50x50x3.0 DFP5113 or DFP5116  
DuraPanel 65x65x2.5 DFP6513 or DFP6516

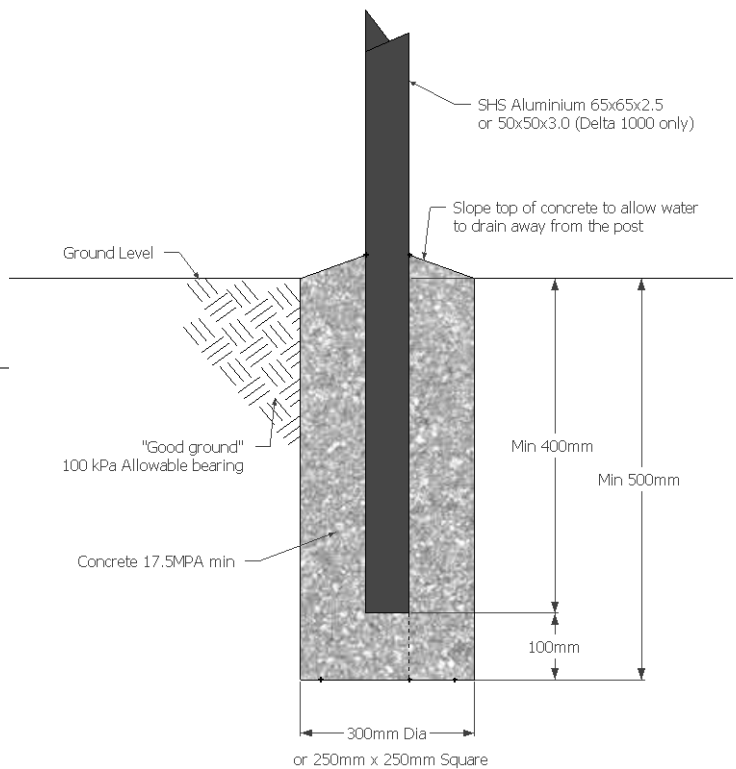
**Fig B**



#### In-ground post:

DuraPanel 50x50x3.0 DIP5118 or DIP5121 or DIP5124  
DuraPanel 65x65x2.5 DIP6518 or DIP6521 or DIP6524

**Fig C**



#### Fixings:

In concrete: 4 x M12 HILTI HST stud anchor or similar with min 70mm embedment.

In timber: 4 x 12mm coachscrews with min 120mm embedment.

#### Note:

Posts to be installed in "Good ground" as defined by NZS3604

# Pool Fence & Gate Design Specifications 2

SDC - Approved Building Consent Document - BC180859 - Pg 44 of 51 - 29/05/2018 - shawb

## D&D MAGNA LATCH

### INSTALLATION INSTRUCTIONS ENGLISH - International

For swimming and other child safety gates, most safety standards specify the following minimum height requirements above the finished ground/fixing surface:  
 1) latch release knob 'F' at not less than 1500mm (4'11"); 2) latch height of between 1200mm & 1500mm (4' & 5')  
 Always confirm these and other requirements with the appropriate pool or safety authority in your area and install this latch in accordance with the local fence/barricade codes and regulations. Also, pool gates must open outwards, away from the pool, so this latch must be fitted to the outside of a pool gate. Tools: Electric or cordless drill, drill bits, Phillips No. 2 screwdriver (hand & powered types). Note: For heavy gauge steel sections it is advisable to pre-drill the holes to prevent screw breakage.

### MAGNA LATCH™

#### Installation Procedure

1. The gap between gate frame and latch post must be between 16mm (1/2") and 32mm (1 1/8"); 17mm (1/2") is ideal.

2. Determine the location of the hole for Mounting Bracket 'A' by measuring up 1050mm (3' 5 1/8") from the finished ground/fixing surface.

Place Mounting Bracket 'A' on the post as shown, and, using one of the 25mm (1") self-drilling screws, fix the bracket to the post - through the side fixing hole. Now install two more of these screws through the front of the bracket.

3. To locate Mounting Bracket 'B' measure up from bracket 'A' 340mm (1' 1 3/8"). Mark this point.

**NOTE:** For 1200mm (4') fences without an extra-high post, this measurement should be 116mm (4 5/8").

Place the Bracket 'B' so that the holes are centered on the marked line. The bracket entry slots serve as for Bracket 'A'. **NOTE:** In some applications it may be necessary to add a spacer to clear a pool cap. Spacers S1, S2 & S3 are for this purpose and should be inserted behind the mounting brackets during installation.

4. Take the main LATCH BODY 'C' and slide it down onto the Mounting Bracket 'B', ensuring the rear track of the latch aligns over brackets 'B', then 'A'.

5. Slide the Latch Body until the bottom of the latch aligns exactly with the lower end of Bracket 'A' (see dashed line 'E'). Take the single 10mm (3/8") counter-sink screw 'D' and secure the Latch Body - **DO NOT** use a power or cordless drill - to Bracket 'A'.

6. The final post to be installed is the STRIKER BODY 'D'. Note that the Striker Body slides on a channel track within the Mounting Plate (P1, P2) and is operated by an internal adjustment screw; **NEVER** use a power drill to adjust this screw. See Diagrams 'E', locate the Striker Body assembly into the post as shown. Position the Striker Body to obtain a 3mm (1/8") gap between the lower part of the latch and the top of the Striker Body, as shown. Maintain this gap and fix the two 25mm (1") screws through the two main holes of the Striker Body. The two small (self-tapping) brass plugs supplied should now be pressed into the screw holes.

7. a) Open the gate and secure two more screws through the side leg of the Mounting Plate. **NOTE:** If the width of the gate frame is 38mm (1 1/2") or greater, follow step 7b...

b) With the gate open, adjust the Striker Body using the screwdriver in the adjustment screw. Turn counter-clockwise until the two holes are exposed, as in Diagram (P2). Fix the two remaining screws to secure the Mounting Plate.

8. Use the screwdriver to adjust the Striker Body to align with the Latch Body, as shown in Diagram 'E'. Open and close the gate to check the latch operates correctly. Adjust as necessary at any time after installation to ensure safe operation of the latch.

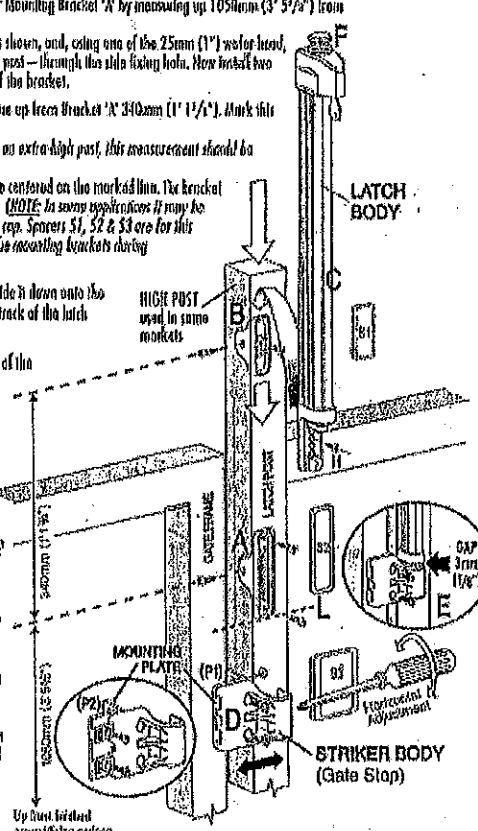
**NOTE:** Future vertical adjustment of the latch can be achieved by removing the screw 'D', sliding the Latch Body up or down the post to obtain correct operational alignment, then inserting the screw into the appropriate hole.

Warning: Pool fence, gate and latch are not suitable for ACH regulation. It is not suitable for use on existing pool gates, or on all types of pool enclosure by safety regulations.

The latch will operate properly only if installed and maintained in accordance with these instructions. MAINTENANCE: REMOVE ALL DEBRIS FROM THE LATCH. Do not lubricate the latch with petrol and avoid oil, grease and other substances which could block the latch. Do not use any lubricant on the latch. Do not use any oil, grease or other substances which could block the latch. Do not use any power tools to adjust the latch. Do not use any power tools to adjust the latch. Do not use any power tools to adjust the latch.

WARRANTY & LIMITATION OF REMEDY: THIS WARRANTY ("WARRANTY") applies only to the latch and its components. The original purchaser may claim the latch, latch post, or other parts of the latch or its components if they are found to be defective. This warranty shall not apply to the latch if it has been altered, repaired, or otherwise modified. The original purchaser shall be responsible for the maintenance and repair of the latch. The original purchaser shall be responsible for the maintenance and repair of the latch. The original purchaser shall be responsible for the maintenance and repair of the latch.

NO PART SHALL BE HELD LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES. No warranty is given that the latch will be suitable for use on any other type of pool enclosure. The original purchaser shall be responsible for the maintenance and repair of the latch. The original purchaser shall be responsible for the maintenance and repair of the latch. The original purchaser shall be responsible for the maintenance and repair of the latch.



# Pool Fence & Gate Design Specifications 2

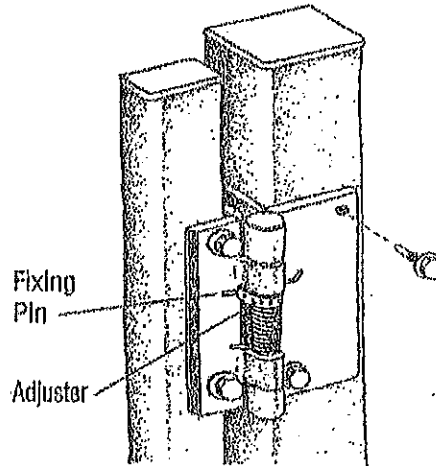
## ADJUSTABLE SPRING HINGE

The Adjustable Self-Closing Spring Hinges are designed to assist in the closing of Swimming Pool and Pathway Gates.

This product conforms to Pool Safety Standards provided all other fencing materials, manufacturing and installation methods also conform to the same standards.

The Manufacturer cannot accept responsibility for an accident where this device is used.

Ultimately, pool safety is the responsibility of the owner.



*Designed and Manufactured in Australia*

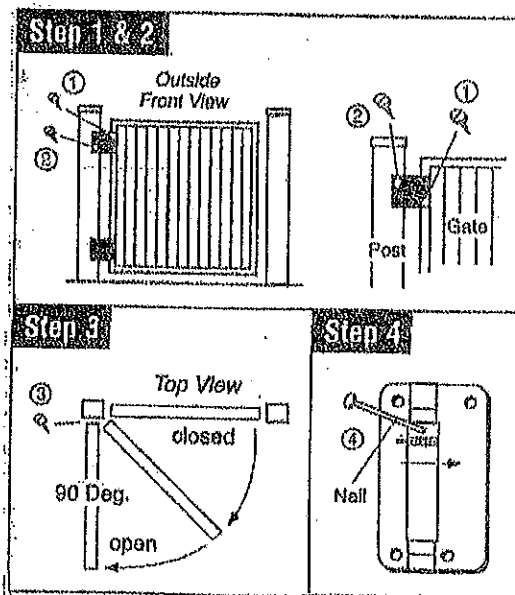
## FIXING PROCEDURE

### NOTE:

Swimming Pool Gates must be hinged so they self-close and open outwards from the Pool enclosure.

1. Before fixing the hinges, hold the gate in position and decide which way the gate will swing, then mark the location of where the hinges are ideally fixed on. Fix outside screws of both hinges to gate.
2. Fasten other outer hinge flaps to gate post. This has now automatically aligned gate to gatepost.
3. Open gate to 90deg. and fix all inside screws.
4. Adjust tension of both hinges using nail provided. Turn the adjuster (direction shown) and put fixing pin in hole on both hinges until the gate will close by itself.

**NOTE:** For hinges used on Swimming Pool Gates, the tension must be adjusted so gate will self-close from 25mm of closed position.



*For Heavy Gates It is recommended to fit 3-4 Hinges*



## SEDIMENT CONTROL PLAN FOR INSTALLATION OF BERMUDA SWIMMING POOLS

As the pool hole is excavated, the soil is placed directly into the truck and removed from site. The pool is installed as soon as the hole is excavated, approximately 5 hours later. No excavated material is stored on site.

Every effort will be made to keep the truck tyres clean, so that no dirt becomes lodged in the kerbing or makes its way to water ways.

**TEST REPORT**

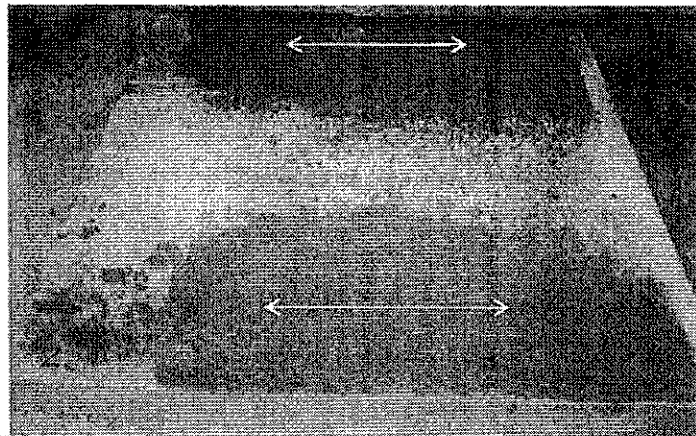
Project : Quality Assurance  
 Location : Surfacing Trials  
 Client : Urban Paving & Landscape Supplies Limited  
 Contractor : Urban Paving & Landscape Supplies Limited  
 Sampled by : Dan Batchelor  
 Date sampled : 6 April 2011  
 Sampling method : AS/NZS 3661.1:1993 (Appendix A)  
 Sample description : Textured Sandstone, Natural Concrete Paver  
 Sample condition : Air dry as received  
 Ambient Temperature: 18°C



Project No :	6-JUPLS.11/006LC
Lab Ref No :	5769
Client Ref No :	Textured Natural Paver

**Test Results**


		Coefficient of Friction	
Site 1	Pedestrian Slip Resistance (dry)		1.24
	Pedestrian Slip Resistance (wet)	AS/NZS 3661.1:1993	0.65
Site 2	Pedestrian Slip Resistance (dry)		1.10
	Pedestrian Slip Resistance (wet)	AS/NZS 3661.1:1993	0.81
		Mean BPN	
Site 1	Average Pedestrian Slip Resistance (dry)		96.4
	Average Pedestrian Slip Resistance (wet)		59.0
Site 2	Average Pedestrian Slip Resistance (dry)		88.6
	Average Pedestrian Slip Resistance (wet)		70.2



Note: All above readings were performed with a pendulum type friction tester in the Laboratory

Date tested : 14 April 2011  
 Date reported : 14 April 2011

This report may only be reproduced in full

Approved   
 Designation : Laboratory Manager  
 Date : 14 April 2011



187 Dyers Rd, Bromley  
PO Box 24 024, Christchurch 8062  
Ph: (03) 384 9482

Email: [info@thecompositegroup.co.nz](mailto:info@thecompositegroup.co.nz)  
[www.thecompositegroup.co.nz](http://www.thecompositegroup.co.nz)

I Chelsea + Ivan McAuley would like to appoint The Composite Group to be my agent for building consent of a new swimming pool at 17 Delamare way, Rolleston

Name: Chelsea McAuley

Signature: [Handwritten Signature]

Date: 1:5:18



## SPECIFICATIONS FOR BERMUDA EMPEROR 8 SWIMMING POOL

**MATERIAL:** One piece moulded fibreglass swimming pool

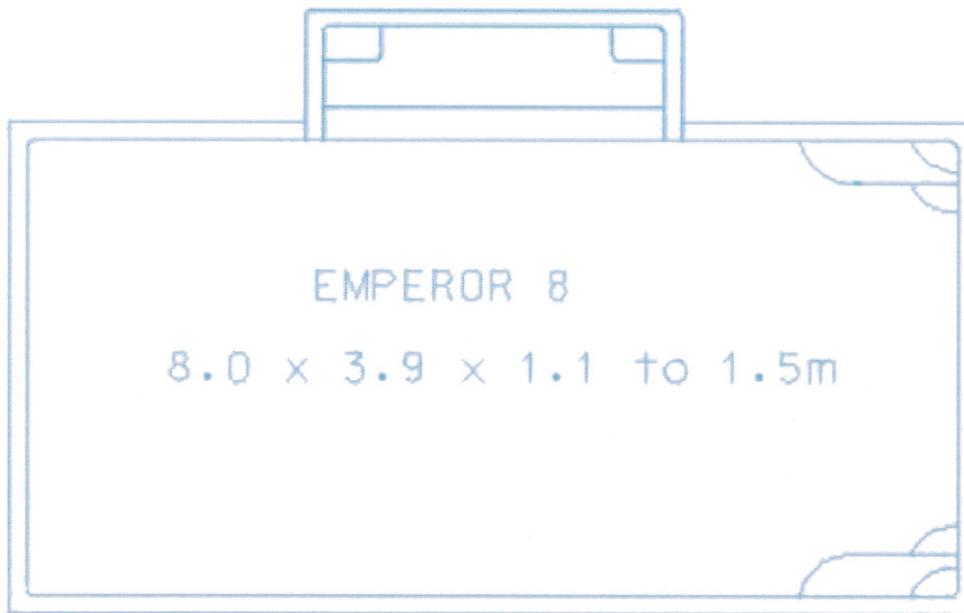
**SHAPE:** As below

**LENGTH:** 8m

**WIDTH:** 3.9m

**DEPTH:** 1.1 to 1.5m

**STEP:** 3.0 x 1.0m



**Note:**

-Refer to confidential Cresta manufacturing manual for manufacturing standards

Drawing#:	D-PO-EMP08-000
Rev	0
Date	7 Feb 2013
Approved:	GH

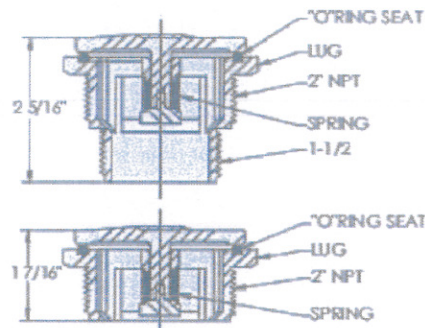
## HYDROSTATIC VALVE SPECIFICATIONS FOR BERMUDA FRP MOULDED SWIMMING POOL

**MATERIAL:** One piece moulded fibreglass (FRP) swimming pool  
**MODEL:** Emperor 8  
**LENGTH:** 8.0m long x 3.9m wide x 1.1 to 1.7m deep  
**SIDE STEP:** 3.0 x 1.0m

### HYDROSTATIC VALVE:

All Cresta manufactured pools are fitted with 1 x Hydrostatic valve (Part No. SP1056). This is normally fitted in the deep end of the pool in one corner.

## Hydrostatic Relief Valve



Model Number	Size	Description
SP1056	1 1/2", 2"	Spring Loaded

### LIFE OF POOL STRUCTURE:

All Cresta manufactured fibreglass (FRP) pools have a 25+ year life.

Watts AquaGuard

Hose Connection Vacuum Breaker Device (BHCV)

<b>Sizes</b>	To suit 15mm and 20mm hose taps
<b>Hazard Rating</b>	Low
<b>Must be registered</b>	No
<b>Standard</b>	AS2845.1
<b>Testable</b>	No
<b>Protection against back pressure and back-siphonage?</b>	Back-siphonage only, however AquaGuard will withstand small amounts of back pressure that could occur if the end of the hose is higher than the hose tap

**COMPACT  
HIGH FLOW DESIGN**

- Pressure & Temperature**
- Working Pressure: 1400kPa
  - Test Pressure: 2000kPa
  - Maximum Working Temperature: 42°C
- Testing & Maintenance requirements** No testing required. Check regulatory Authority requirement.

**Specific Installation Requirements**

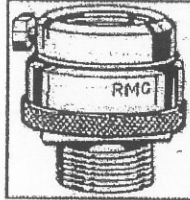
**Features**

- Large flow passages
- Foolproof design reduces chance of disabling through closing off vent holes
- Far Exceeds the requirements of AS2845.1 for flow capacity and pressure loss

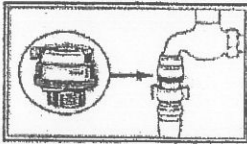
**Specific Installation Requirements**

- Shall not, under normal operation, be subject to continuous pressure
- To be vented to atmosphere
- If the device is removed, another device of equal or greater hazard rating to be installed in the water supply
- Have no Isolation valves located downstream of the vacuum breaker. (This includes solenoids, shut off devices and automatic valves)
- Not to be subject to freezing temperatures
- For use with Irrigation sprinkler heads less than 150mm above ground level. The AquaGuard should be located 450mm above the highest outlet. Not to be used with Injection systems.

**AQUAGUARD MODEL BHCV50**



**TYPICAL INSTALLATION**



COMPLIES WITH AS3500.1 (TABLE 4.2) FOR USE ON ALL EXTERNAL HOSE TAPS

**RMC™ GIVES YOU THE BEST FLOW RATES FOR THIS TYPE OF VALVE (36 l/min at 175kPa)**