



In reply please quote: 10382 Rev.6

8th June 2023

Duracrete
Attn: David Hepburn
Via email: david@duracrete.co.nz

BURIED CONCRETE TANK **SCHEDULE TO PS1**

The purpose of this schedule is to advise of Hawthorn Geddes engineers and architects ltd involvement in the above project. This PS1 supersedes the previously issued PS1, dated 22nd December 2021.

Hawthorn Geddes has carried out structural analysis of the following items:

1. A Duracrete proprietary concrete tank that conforms to the limits of the different load cases on the attached stamped and signed product data and installation sheets.

The durability statement is specific to the above features. Concrete specifications provided by Duracrete Products Ltd for their buried concrete tanks comply with the requirements of Table 3.4 of NZS 3101:Part 1: 2006 for a minimum design life of 50 years for an exposure classification XA2 (aggressive soils and groundwater attack).

Limitation

This schedule has been prepared solely for the benefit of our client Duracrete and the Building Council Authority in relation to the building consent application for which this schedule has been prepared. The comments in it are limited to the purpose stated in this schedule. No liability is accepted by Hawthorn Geddes engineers & architects ltd in respect of its use by any other person, and any other person who relies upon any matter contained in this schedule does so entirely at their own risk.

Anthony Barber
Hawthorn Geddes
engineers & architects ltd

Encl: Drawings
Calculations

PRODUCER STATEMENT – PS1 – DESIGN

ISSUED BY: Hawthorn Geddes engineers and architects Ltd
(Design Firm)

TO: Durecrete
(Owner/Developer)

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

IN RESPECT OF: (HG Ref 10382 - R6) Buried Concrete Tank
(Description of Building Work)

AT: any site in New Zealand where the loading and ground conditions are consistent with the attached sheets
(Address)

Town/City: **LOT** **DP** **SO**
(Address)

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

Structural engineering analysis services and design check as outlined in the attached calculations.
This statement supersedes the previous statement dated 22nd December 2021.

(Extent of Engagement)

services in respect of the requirements of Clause(s) **B1, B2** 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, VM4, B2**
(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:

.....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 loading and ground water meet the design criteria shown
- (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)

I, Anthony Barber am: ☒ CPEng # 224371 Auckland Author 122901
(Name of Design Professional)

I am a member of: ☒ Engineering New Zealand and hold the following qualifications: BE, CMEngNZ,

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 ACE New Zealand: ☒

SIGNED BY Anthony Barber (Signature) *Anthony Barber*
(Name of Design Professional)

ON BEHALF OF Hawthorn Geddes engineers and architects Ltd Date **08/06/2023**
(Design Firm)

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.
THIS FORM AND ITS CONDITIONS ARE COPYRIGHT TO ACE NEW ZEALAND AND ENGINEERING NEW ZEALAND

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 (now Engineering New Zealand), ACE New Zealand in consultation with the Building Officials Institute of 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 Review 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 a certificate of completion of building work are Schedule 6 of NZS 3910:2013 or Schedules E1/E2 of NZIA's SCC 2011²

PS4 Construction Review Intended for use by a suitably qualified independent 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 ACE New Zealand and Engineering New Zealand to interpret the Producer Statement.

Competence of Design Professional

This 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 as a Chartered Professional Engineer (CPEng).

Membership of a professional body, such as Engineering New Zealand (formerly IPENZ) provides additional assurance of the designer's standing within the profession. If the design firm is a member of ACE New Zealand, 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, ACE New Zealand 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 Engineers³). 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 statements 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 Building & Civil Engineering Construction
NZS 3910: 2013

² NZIA Standard Conditions of Contract SCC 2011

Guideline on the Briefing & Engagement for Consulting Engineering Services
(ACE New Zealand/Engineering New Zealand 2004)

⁴ PN Guidelines on Producer Statements

www.acenz.org.nz
www.engineeringnz.org



association of
consulting and
engineering

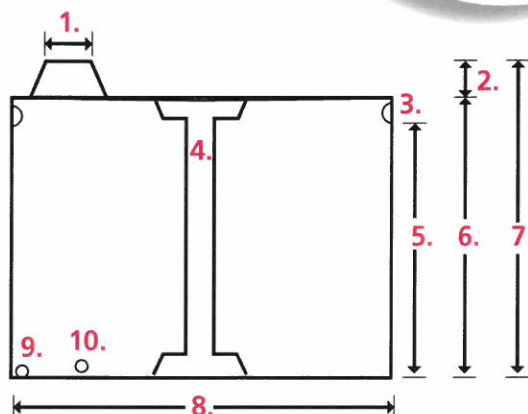
Suitable Applications For Duracrete Underground Water Tanks 25,000 Litre

Duracrete Underground Tanks are suitable for buried applications with 300mm maximum ground cover.

The roof is designed for light vehicle loading <2500kg.

***Please note the manhole riser and lid are not designed for vehicles. Manhole lids are manufactured to take a maximum loading of 500kg.**

- 9.760 Tonne Weight
- 65mm Wall Thickness
- 100mm Floor Thickness
- 80 MPA Concrete Strength
- Manhole lid maximum load capacity 500kg



Examples of completed installations



1. Hatch Opening	550mm
2. Permitted Ground Cover	300mm
3. Overflow/inlet, 4 positions	110mm
4. Support Column (Diameter)	150mm
5. Water Level Height	2.40m
6. Total Wall Height	2.635m
7. Overall Height	2.935m
8. Outside Diameter	3.73m
9. Drain	50mm
10. Outlet	40mm

**Light Vehicle Loading Roof Only
(<2500kg gross weight)**

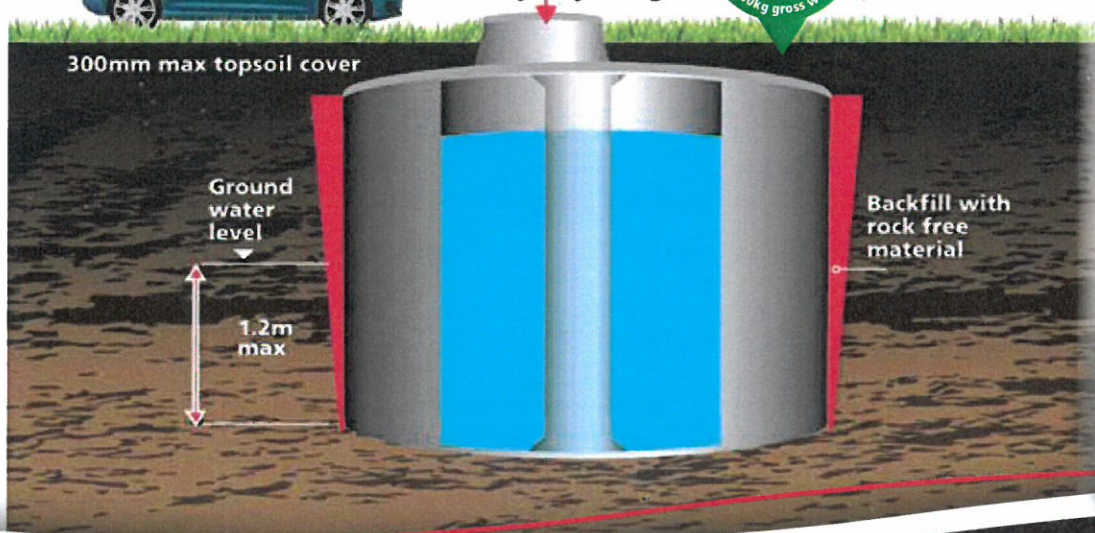
***Please note the manhole riser and lid are not designed for vehicles**



Manhole lid maximum load capacity 500kg



Weight of soil 1800 kg/m³



This drawing has been checked for compliance with the extent of our work described on the drawing. The accompanying Producer Statement Ref: 10382.

Signed: *Allyson* Date: 8/6/2023



Hawthorn Geddes
engineers & architects ltd

Tank Warranty
will be voided unless site preparation is carried out by a Duracrete approved earthworks contractor, in accordance with Duracrete's site preparation document. Please contact us and advise us of your proposed contractor.



WHANGAREI | WELLSFORD

Phone: 0800 387 227

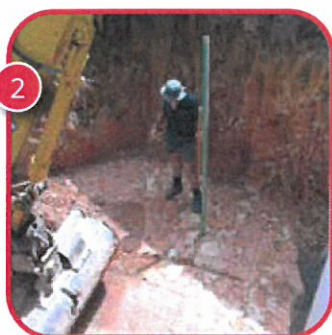
Email: info@duracrete.co.nz

www.duracrete.co.nz

SITE PREPARATION STEPS



1 Level the ground which will form the base for the tank. Excavate the virgin solid ground. Do not use excavated material to achieve a level platform. The tolerance allowed is 40mm.



2 The base should be a 4 meters x 4 meters square hole x 3.121m depth for 3.7m Ø tanks.



3 Add hard fill and compact with a compactor. Compact to a depth of 100mm thick. The tolerance to be within 15mm.



4 Add 7mm GAP Granular Fines as bedding material - this should be 75mm thick. Do not compact, this should be screeded to within 5mm tolerance over the entire base.

SITE PREPARATION IMPORTANCE & REQUIRED MATERIALS

The site loading of a full 25,000 litre water tank is approximately 33 tonnes. This extreme loading requires particular care to distribute the load evenly across the site. Foundations must be 'good ground' in accordance with NZS 3604.

The site for your tank must be free of all solid objects (rocks, tree stumps, roots, etc) and be flat, level and consistent across the tank base to allow the tank to sit evenly. A tolerance of 15mm is permitted over the entire site. This can be achieved by using a level and straight edge, laser level or similar method.

Correct site preparation is critical in order to transfer the total combined weight of the tank and water of approx 33 tonne to the prepared foundation.

Uneven weight transfer will result in failure of the tank base and therefore will not be covered by warranty.

75mm layer of 7mm granular fines "PAP 7", Scoria Fines or similar is suitable.



100mm layer of hard fill - compacted "Blue Brown 40" or similar is suitable.

4m square base, levelled in all directions "Good Ground" in accordance with NZS 3604.

Aggregates are sold at Western Hills Quarry, Whangarei and other quarries throughout NZ

WARRANTY TERMS & CONDITIONS:

All Duracrete Products are warranted to be free of defects caused by poor workmanship or non-compliance with industry standards.

CONDITIONS OF WARRANTY:

- Tank warranty will be voided unless site preparation is carried out by a Duracrete approved earthworks contractor, in accordance with Duracrete's site preparation document. Please contact us and advise us of your proposed contractor.
- Duracrete Products accepts no liability for damage caused due to improper site preparation and incorrect site situations that are outside our requirements and recommendations. (refer to site preparations points 1-4)
- Liability of Duracrete Products is limited to the repair, or if necessary, replacement of the concrete tank concerned. The decision to repair or replace the tank lies exclusively with Duracrete Products.

THIS WARRANTY DOES NOT COVER:

- Damage caused after delivery resulting from poor, inadequate or incorrect site Preparations in accordance with our PS1 document
- Tanks that are not placed directly on to a prepared tank site at the time of delivery.
- Damage caused during transportation or installation
- Moving the tank from its original location
- Undermining of the ground supporting the tank in any way
- Filling of the tank with water past the overflow point before the overflow pipe is fitted
- Blocked or incorrectly installed overflow pipe. This includes backlog of groundwater from full soakage pits and the overflow pipe not being installed to drain away from the tank base.
- Installation of the partially buried tanks exceeding the maximum ground level as per our specifications
- Exceeding of the load capacity on the manhole lid
- Hydraulic Uplift (Floatation)
- Normal wear and tear. Aging.
- Negligent or accidental damage that occurs after delivery
- Failure resulting from natural causes (earthquakes, flooding, ground settlement/subsidence and temperature differential)
- Tanks that are unequally buried that have a greater differential of more than 1m from highest to lowest point
- Tanks that are painted a dark colour that attracts heat, causing the temperature differential between the inside and outside of the tank to increase
- Damaged caused to the roof of the tank due to the exceeding of the load limitations (refer to PS1 document)
- Failure of any plumbing or drainage connections installed by others after delivery



PURCHASER RESPONSIBILITIES:

- It is the purchasers responsibility to ensure access is clear and site preparations are complete and to the required standard when the tanks arrive. This will avoid any delays and extra time on site and potential cost overruns. Duracrete and your chosen Transport Contractor takes no responsibility for site readiness or unforeseen delays on site
- Site suitable access is the responsibility of the purchaser. Check that there are no overhead power lines, tree branches, buildings, gate posts or other obstacles blocking access to the loaded delivery truck
- Duracrete and your chosen Transport contractors that are used to deliver the tanks are not responsible or liable for the site preparation standards
- On the day of installation, it is essential to install and pipe the overflow away from the tank base to prevent undermining of the site
- On the day of installation of fully or partially buried tanks (up to 2.1ml, it is critical that the tanks are filled completely with water not exceeding the overflow point to prevent floatation from occurring. The tanks should remain full until connected to the water catchment
- When purchasing multiple tanks, ensure that there is an accessible isolation valve between the tanks in order to be able to isolate one tank from the other for future maintenance purposes
- For buried applications, tanks buried 800mm or more into the ground may require a specific design to avoid hydraulic uplift occurring. Please refer to an engineer to decide if your tank requires this. Duracrete is not responsible for determining if your tank requires this
- It is the purchaser's responsibility to ensure that the path required from the road to the tank site does not have drains, septic tanks or irrigation lines that the truck could either fall into or damage
- It is the purchasers responsibility to ensure that their site access and tanks sites are ready to take delivery on the agreed date with our Production/Dispatch Manager. If there is a delay, you may move to the back of the que depending on product and transport contractor availability. Product may then need to be allocated to the next customer who is ready to take delivery as we can not store tanks due to storage space limitations
- It is the purchasers responsibility to pass these specifications, warranty terms and conditions and customer responsibilities document on to any relevant contractors or end users.