

## Appendix E: Engineering Letter and Drawing

The Manager  
JG Afrika  
Environmental Division  
PO Box 794  
HILTON  
3245

Ref No: UPM236/2.4  
21 October 2020

Attention: Mr John Richardson

### **ETHAM COLLEGE: INSTALLATION OF TEMPORARY CONSERVANCY TANK**

I refer to our recent discussions regarding the proposed sewer system and how the system will operate and maintained. This will form part of the Part 2 amendment process.

The temporary conservancy tank option will be utilised until the new outfall sewer and Hilton WWTW becomes operational – this is estimated by Umgeni Water to be December 2021. In the interim, it is proposed to accommodate the first intake into Etham College by linking the sewer system into a conservancy tank.

#### **Calcamite specifications and installation**

The Calcamite tank is a prefabricated tank with an inlet to receive the sewage and has two access lids used during maintenance and emptying of the tanks by a vacuum tanker.

Following excavation, a blinding layer of concrete is laid on the insitu material. A concrete slab is required where the base of the excavation is unstable, clayey or has a high watertable. In situations where ground water is a perennial problem, the Engineer may prescribe an under (concrete slab) drain of single size concrete stone to convey the water away from the area.

The subgrade and subbase must have sufficient bearing capacity to support the mass of the cast-in-situ concrete slab, full tanks and compacted backfill. Once the modular tank is in position on the cast-in-situ concrete slab, it is essential to hand stamp granular backfill material under and between the legs of the tank to a depth of at least 400mm above the cast-in-situ concrete slab. Thereafter the tank is filled with water to an approximate depth of 200mm and commence backfilling with selected granular material in 250mm layers compacted to 90% Mod AASHO. Refer to supplier installation guidelines and the attached design drawing with sections – UPM236-101.

#### **Volumes and Frequency of emptying**

The volume calculations are based on 150 learners and 30 staff, being 180 at a consumer/consumption rate of 30l/p/day. According to the SANS 10252 regulations the rate varies between 40-50l/p/day, which is considered to be conservative compared to the Redbook guideline of 20l/p/day. The 180 people @ 30l/p/day equates to a total of 5,400litres per day which requires a 9500litre Calcamite tank, which is almost two days storage. For safety measures, 2 x 9500litre tanks will be installed, phased based on volume requirements. The tanks will operate on two different float switches, 50% and 80% of capacity, respectively. Once these levels within the tank is reached, signals will be sent to the contracted service provider responsible for effluent removal using vacuum tankers. The conservancy tank will have to be emptied every 2<sup>nd</sup> day, although this could change depending on usage, but all controlled by the float switches and telemetry. There are three accredited companies operating in the Hilton/Howick area which can be used

for the above-mentioned activities, being On-Site Services, Midlands sewer and Royal Flush. All three companies are accredited service providers and will conclude an agreement with the Client to remove effluent to a local waste water treatment works for disposal.

### **Mitigation**

Although the 2 x 9500litre tanks have approximately 4 days storage capacity, it is suggested that as part of mitigation measures for an overflow, earth berms not exceeding 1m in height be constructed around the tanks. This berm will prevent overflows into the nearby wetland area, but the risk is low, as effluent levels will be controlled and managed by two float switches, linked to the service provider and the maintenance manager at the school.

### **Alternative option**


Due to the temporary nature of the conservancy tank, a reinforced concrete tank is not recommended. An alternative to the prefabricated Calcamite tank is a conventional tank built with M140 blocks plastered inside with a block and lintel roof covering. The Calcamite tank would be easy to empty and remove once the school is linked to the waterborne sewage system.

### **Phase 1**

Phase 1 of Etham College will be provided with a gravity waterborne sewage system linked to the Calcamite conservancy tank and converted to link into the Hilton WWTW by December 2021, after which the Calcamite tank will be removed and salvaged.

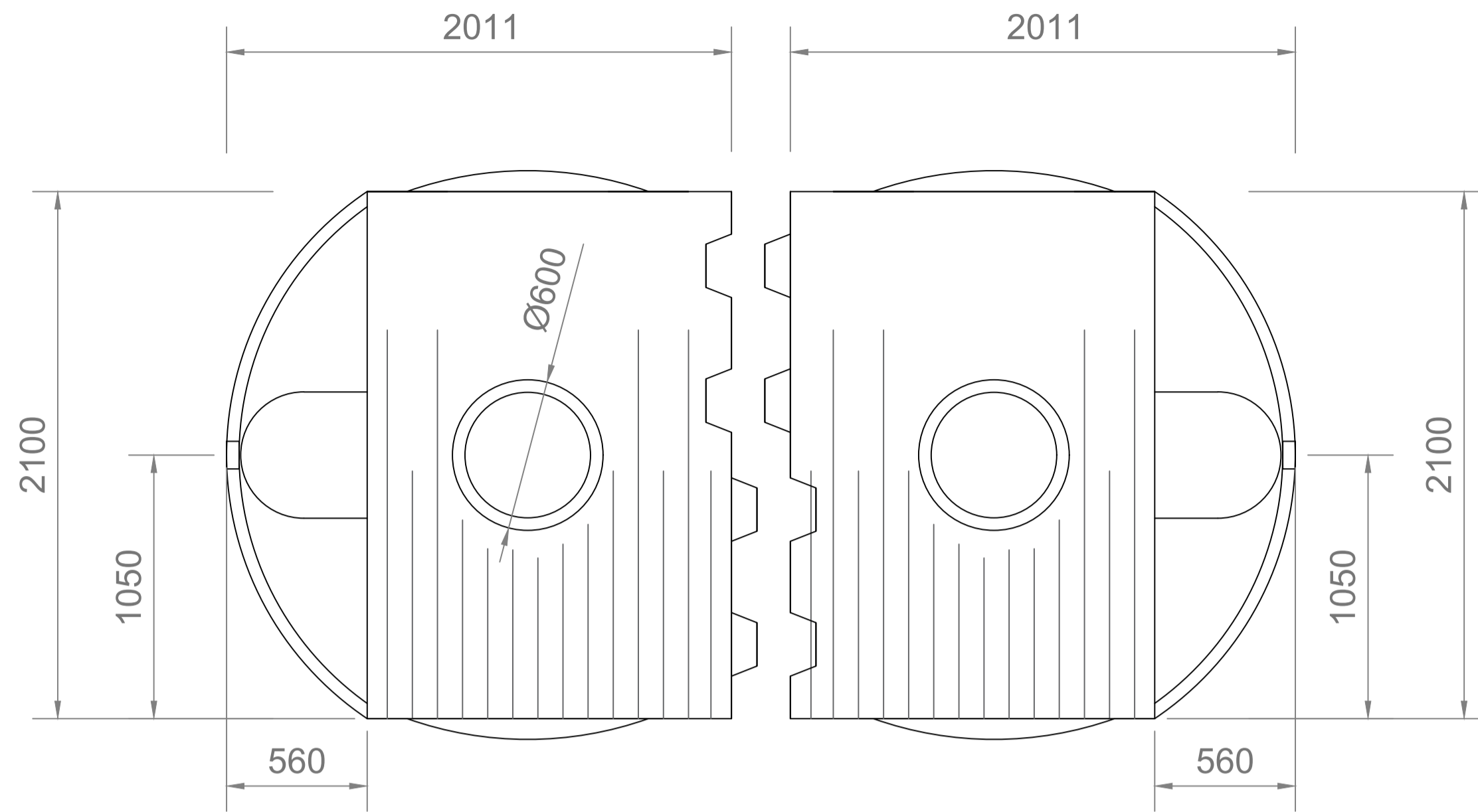
We trust the above provides sufficient details on the proposed temporary use of 2 x 9500litre Calcamite conservancy tanks until the Hilton WWTW becomes operational in December 2021. However, please do not hesitate to contact us should you require any additional information.

Yours faithfully

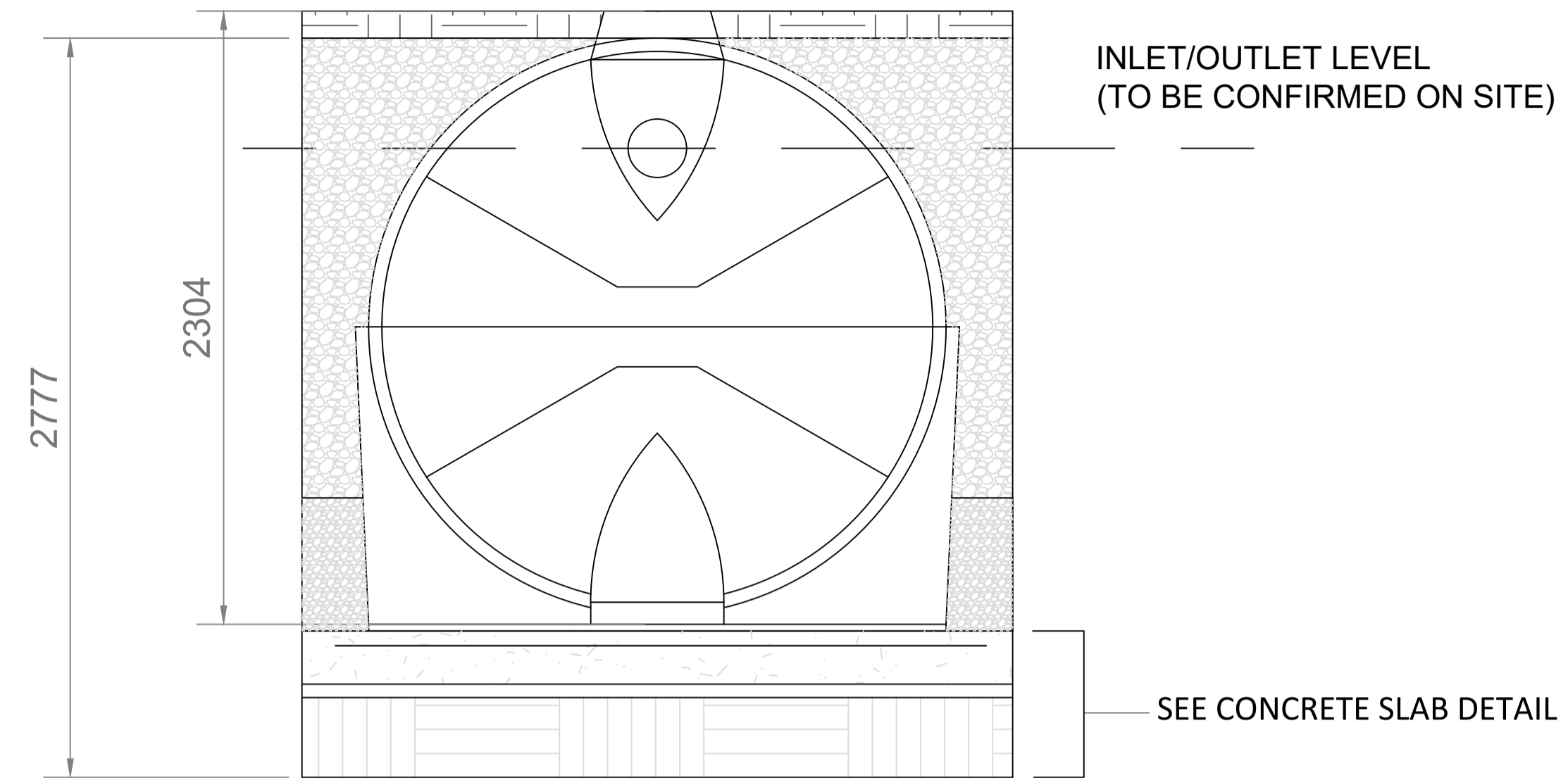


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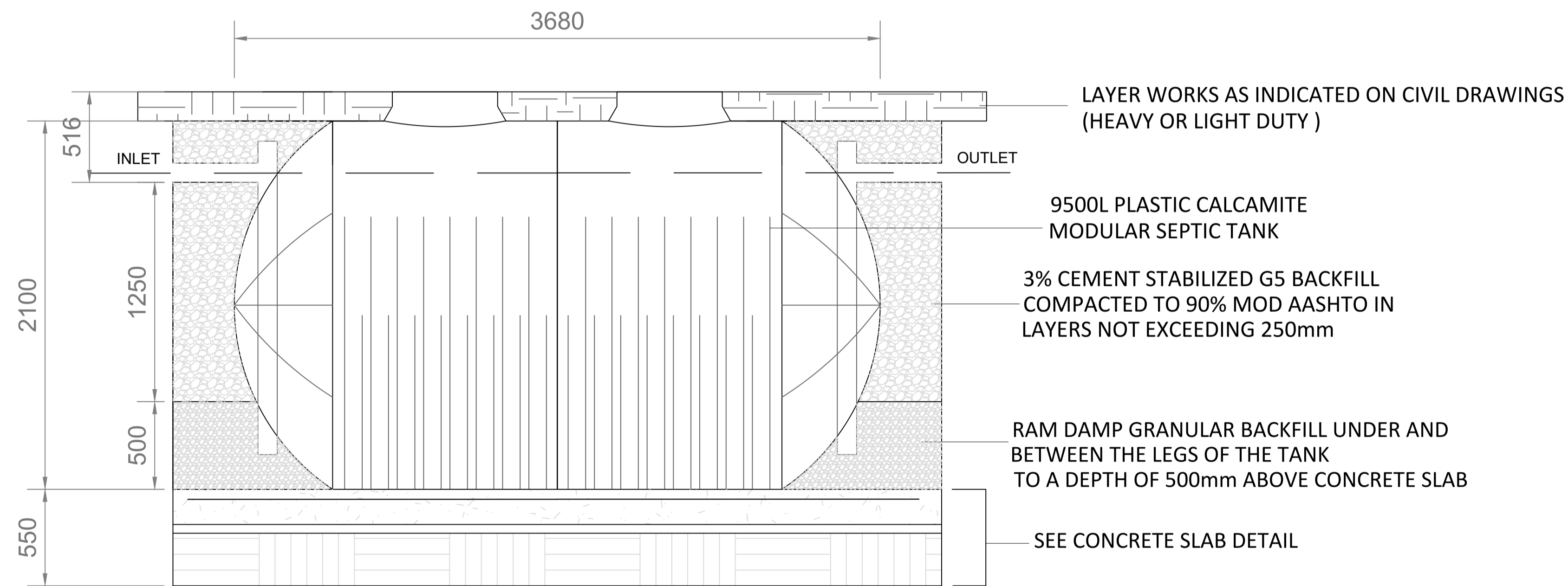
**JG CRONJE**  
PrTechn (Civil), PrCPM



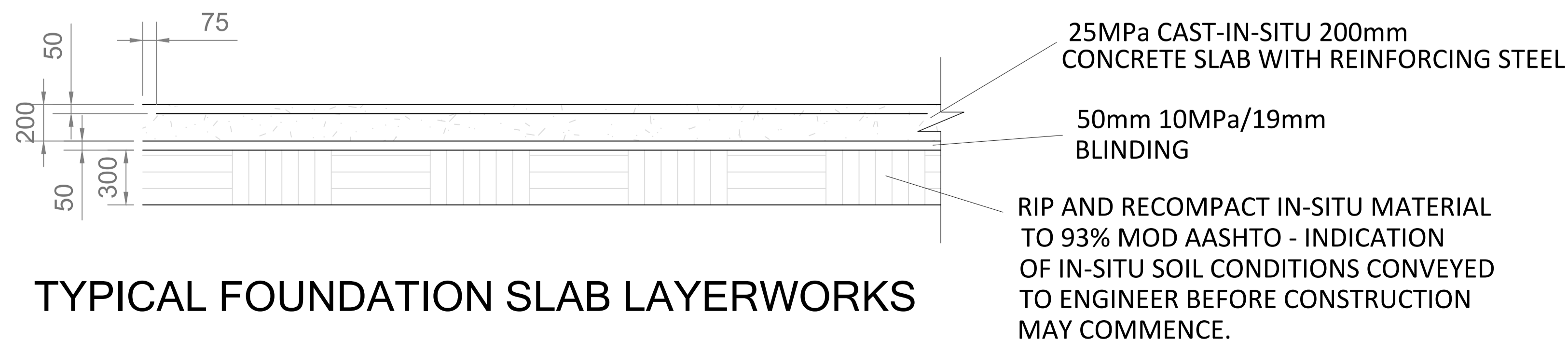
PLAN VIEW OF 9500L SEPTIC TANK



TYPICAL DOMED END VIEW



CROSS SECTION OF 9500L SEPTIC TANK



TYPICAL FOUNDATION SLAB LAYERWORKS

- NOTES
1. ONCE MODULAR TANK IS IN POSITION ON THE CAST-IN-SITU CONCRETE SLAB, IT IS ESSENTIAL TO RAM DAMP GRANULAR BACKFILL MATERIAL UNDER AND BETWEEN THE LEGS OF THE TANK TO A DEPTH OF AT LEAST 400mm ABOVE THE CAST-IN-SITU CONCRETE SLAB.
  2. THERE AFTER FILL THE TANK WITH WATER TO AN APPROXIMATE DEPTH OF 200mm AND COMMENCE BACK FILLING WITH SELECTED GRANULAR MATERIAL IN 250mm LAYERS COMPACTED TO 90% Mod AASHO.
  3. IT IS VERY IMPORTANT THAT THE LEVEL OF BACKFILLING THEREAFTER MUST NEVER EXCEED THE RISING LEVEL OF WATER WITHIN THE TANK UNTIL THE WATER OVERFLOWS THROUGH THE OUTLET PIPE THUS INDICATING THE TANK IS FULL.
  4. WHERE UNSTABLE SOIL, CLAY AND/ OR HIGH WATER TABLE IS A PRESENT, A CEMENT STABILIZED BACKFILL MIX OF 5% CEMENT AND 95% INERT GRANULAR MATERIAL MUST BE COMPACTED IN 250mm LAYERS COMPACTED TO 90% Mod AASHO.
  5. THE TWO TANKS SHALL BE INSTALLED IN SERIE WITH THE SECOND TANK TO BE INSTALLED WHEN DEMAND REQUIRES IT.
  6. EFFLUENT SHALL BE REMOVED BY A LIENCED SERVICE PROVIDER, WHO SHALL ALSO BE CONNECTED TO THE TELEMETRY AND FLOATSWITCHES IN THE TANKS TO ALERT WHEN RISING EFFLUENT LEVELS OCCUR.
  7. THE INVERT LEVEL SHALL BE CONFIRMED BY THE ENGINEER PRIOR TO INSTALLATION, DEPENDING ON THE INTERNAL SEWER GRADIENTS.
  8. AN ACCESS MANHOLE SHALL BE CONSTRUCTED ON EACH OPENING TO 150mm ABOVE NGL TO GAIN ACCESS AND INSTALL FLOAT SWITCHES

STAMPED BY PLANS APPROVAL COMMITTEE

REV	DATE	DESCRIPTION

CHECKED BY CONSULTANT  
SIGN:

CHECKED BY PROJECT LEADER  
SIGN:



UMSUNGULI PROJECT MANAGEMENT.

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MERRIVALE FAX : 086-667 9713  
KZN  
3291

PROJECT  
ETHAM COLLEGE

DRAWING  
SEPTIC TANK AND SOAKAWAY DETAILS

DRAWN BY T COXON	DESIGN BY B DU PLESSIS	CHECKED J CRONJE
SCALE: 1:20	PROJECT TYPE CIVIL	DATE: 20/10/2020

DRAWING No:  
UPM236-101

REVISION  
A

CLIENT DRAWING NUMBER

The Developer  
Monzali Property Management Company (Pty) Ltd  
PO Box 456  
HILTON  
3245

Ref No: UPM164/2.4  
30 September 2020

Attention: Mr Andre Voigts

### **AREA B: STORMWATER MANAGEMENT**

The above land parcel forms part of the Hilton/Mondi N3 Corridor Development that was approved in January 2014 and received their Environmental Authorisation in September 2011. The development was approved on the basis of a Stormwater Management Plan provided by Aurecon, dated January 2011 wherein the principles of stormwater management is explained.

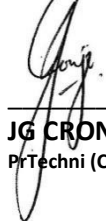
As part of the part 2 amendment application process associated with Area B specifically, we hereby confirm that the same stormwater management principles shall be implemented, as given in the guidelines from Aurecon. Since the development approval has been obtained, bulk earthworks have been completed on the site and a level platform with a 1% crossfall has been constructed and all earth embankments have been vegetated to the acceptance of the ECO who monitored this process during construction.

However, as the intended use of the site will now be implemented for education in the construction of a new school, the following stormwater management principles will be implemented during the detail design and construction processes, monitored by the ECO, namely:

- The increase in surface run-off due to the transformation of land to hardened surfaces, shall be managed on the site through the attenuation of the increase between pre and post development run-off.
- Stormwater harvesting is encouraged for the re-use on the site.
- All exposed embankments should be vegetated as soon as possible and where steep embankments are formed, it should be covered with 100mm topsoil and Soilsaver to prevent scouring.
- The recommendations of the EMPr shall be implemented during the construction process under the guidance of the ECO.

I trust the above is sufficient to support the Part 2 application process and detail designs of this proposed stormwater management systems shall be done once the final SDP is available from the architect and shall be submitted with the building plans to the uMngeni Municipality for building plan approval.

Yours faithfully



**JG CRONJE**  
PrTechni (Civil), PrCPM