

Before the Gisborne District Council

In the matter of the Resource Management Act 1991

And

In the matter of An application by NZHG Gisborne Limited to construct eight dwellings and create an eight-lot fee simple subdivision of the property at 99A Stanley Road, Gisborne and pursuant to Regulation 10 of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health

STATEMENT OF EVIDENCE OF JOHANNES PETRUS EHLERS FOR NZHG GISBORNE LIMITED

Dated 6 September 2024

INTRODUCTION

- 1 My name is Johannes Petrus Ehlers. I am a Director at Infir Limited, a civil engineering consultancy specialising in land development civil design & construction monitoring, and construction project management.

- 2 I am an International Professional Engineer/APEC Engineer and Chartered Professional Engineer specialising in civil engineering, an Engineering NZ Chartered Member and hold a Bachelors degree in Civil Engineering and an Honours degree in Construction Project Management from Pretoria University. I have been managing Infir for nine years and was with Napier City Council for the twenty years before that, where I was in charge of the infrastructure development team that included design of the Council's Parklands development and the Awatoto wastewater treatment plant.

CODE OF CONDUCT

- 3 I confirm that I have read and agree to comply with the 'Expert Witnesses Code of Conduct' contained in the Environment Court of New Zealand

Practice Note 2023. My evidence has been prepared in compliance with that Code in the same way as if I was giving evidence in the Environment Court. In particular, unless I state otherwise, this evidence is within my sphere of expertise, and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

PURPOSE AND SCOPE OF EVIDENCE

- 4 In my evidence I will:
 - 4.1 Provide an overview of the civil engineering works associated with the development;
 - 4.2 Respond to matters raised in the Section 42A Report; and
 - 4.3 Respond to matters raised by submitters.

TECHNICAL REPORT - SUMMARY OF CONCLUSIONS

5 The report “99A Stanley Road, Gisborne Servicing Report – J23231/6” dated 6 September 2024 is attached to my evidence. This report incorporates the applicant’s response to the Council’s request for further information in relation to stormwater into the servicing report provided at Appendix 4 of the application lodged with the Gisborne District Council.

6 That report details the proposed civil engineering works, assessment of effects and associated mitigation measures for the proposed residential subdivision at 99A Stanley Road, Gisborne as summarised below:

6.1 Bulk Earthworks

The site will be shaped to ensure that stormwater runoff is controlled by draining lots to the proposed private road and to Stanley Road along well-defined overland flow paths. The stormwater will pass through stormwater attenuation devices to control peak discharge rates, thereby avoiding adverse stormwater effects on adjoining lots.

Level changes at the property boundary will be less than 600mm along the site perimeter. Along the parts of the northern and southern boundaries where the level difference between the proposed development and neighbouring lots will exceed 300mm, it is proposed to install retaining walls. Where the level difference between the proposed development and neighbouring lots will be less than 300mm, the height difference can be accommodated by fence nibs. The changes to ground levels will not affect neighbouring properties because the existing property is fenced by a solid wall with no permeability. The concept earthworks design matches existing levels as much as practicable whilst ensuring a well-defined drainage pattern.

6.2 Stormwater

Stormwater drainage is to Stanley Road and the concept design limits stormwater runoff from the site to the pre-development levels during 1 in 5-year, 1 in 10-year and 1 in 100-year rain events. Rainwater tanks will be installed to attenuate runoff from all roof areas before being discharged to a permeable concrete accessway and parking area, which then discharges to Stanley Road via a new double kerb connection. The permeable concrete accessway and parking area is used to attenuate and dispose of runoff from contributing areas by storing water in open graded road pavement gravel layers, and soakage into the underlying soil.

The concept design ensures that the sum of the runoff rates from unattenuated areas, the discharge from the rainwater tanks, and the overflow from the permeable concrete storage-soakage system is no greater than for the pre-developed site during 1 in 5 year, 1 in 10-year and 1 in 100-year rain events.

6.3 Wastewater

It is proposed to install a DN150 gravity main discharging to the existing DN225 sewer main on Stanley Road. A new manhole will be required at the connection point. Individual DN100 connections will extend from each dwelling unit and connect to the common private wastewater pipeline within the accessway.

The calculated average daily dry weather flow (ADWF) for the development is 5,120L (0.06L/s), and the estimated peak wet weather flow (PWWF) is 20,480L (0.24L/s).

The wastewater system within the site will be designed and installed in compliance with the requirements of Building Code compliance document G13/AS3. This is the preferred industry standard.

6.4 Water Supply

It is proposed to extend a 50mm diameter connection (DN63 polyethylene) into the development from the existing DN150 cast iron water main in Stanley Road. A testable backflow prevention device and meter will be installed at the boundary of the development. Individual connections to the common private water supply pipeline will be provided to each lot. A meter manifold will be installed at each lot.

The calculated average daily consumption for the development is 0.098L/s.

The GDC network pressure is approximately 500-550kPa. This hydraulic assessment was done by using a conservative pressure of 450-500kPa to allow for future pressure reduction in the GDC network. The head loss in the DN63 PE rider main in the joint accessway from the council main to the furthest point of supply is 103 kPa, consisting of the head loss from the above ground reduced pressure zone backflow prevention unit, minor losses, and pipe friction losses. The pressure at the point of supply at ground level

will be 347kPa. In addition, four of the buildings are two storeys with bathrooms on the first floor, 2.75m above ground level. The height difference causes a further 27kPa pressure loss. The pressure at the first floor, excluding friction and minor losses in the building plumbing, will be 320kPa. This is sufficient to service the buildings.

Fire hydrants must be provided within 135m of fire risks, such that 12.5L/s is available within 135m run distance and 25L/s is available within 270m run distance from a maximum of two fire hydrants. The existing fire hydrants opposite 91 Stanley Road and 497 Childers Road satisfy these requirements.

RESPONSE TO MATTERS RAISED IN THE SECTION 42A REPORT

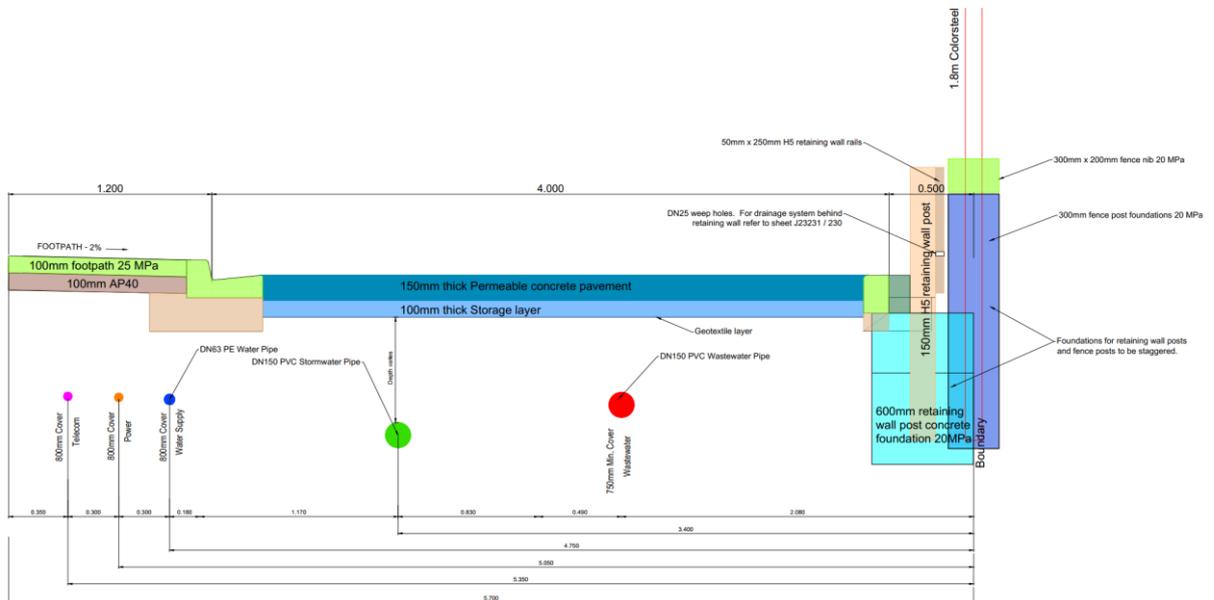
- 7 I have reviewed the Section 42A Report issued on 30 August 2024. Matters relating to civil engineering and three waters services are addressed primarily in paragraphs 166 and 190-199 of that report.
- 8 At paragraph 166 the reporting officer states that the applicant's proposal has been accepted to connect water, wastewater and stormwater services to Council's reticulated services, and that the geotechnical design has been accepted. The Traffic Engineer will respond to the comments regarding traffic impacts on adjacent properties and other road users.
- 9 I was responsible for design of the accessway on the property. The reporting officer comments at paragraphs 184 to 186 on minimum required widths and tracking curves.
- 10 Figure C2.10 in the Tairāwhiti Resource Management Plan sets rules for dimensions of multiple site accessways. For eight to ten dwellings, it prescribes a legal width of 6 metres and a minimum carriageway width of 5.5 metres. For five to seven dwellings, it prescribes a legal width of 5

metres and a minimum carriageway width of 4.0 metres.

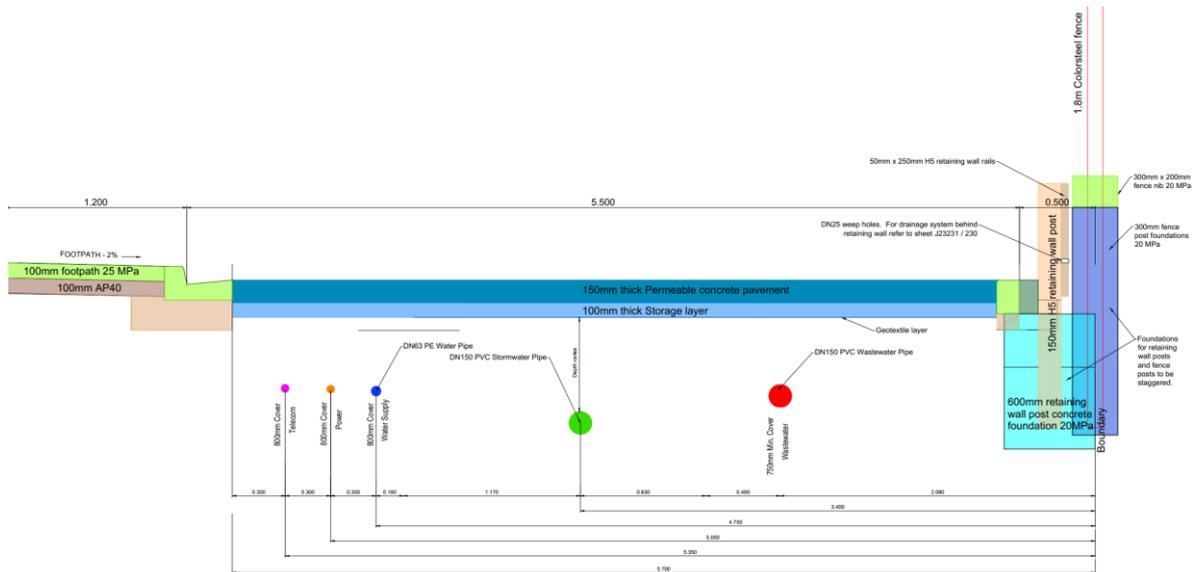
Dwellings to be Served	Legal Width (metres)	Minimum Carriageway Width (metres)
2 to 4	4	3
5 – 7	5	4
8: 10	6	5.5

Figure C2.10 – Rules for Dimensions of Multiple Site Accessways

- 11 Most of the proposed shared access will be used by seven dwellings (lots 2 to 8) and consist of a 4.0m wide vehicle carriageway, a 1.2m wide footpath and a 0.5m wide strip along the northern boundary for a retaining wall. A typical cross section is shown below.



- 12 The portion of the accessway used for access to the parking space for lot 1 will be used by eight dwellings. This portion of the accessway will consist of a 5.5m wide vehicle carriageway, a 1.2m wide footpath and a 0.5m wide strip along the northern boundary for a retaining wall. A typical cross section is shown below.



- 13 The portion of the accessway furthest from Stanley Road will be used for access to a total of two dwelling on lots 6 and 7. This portion of the accessway will consist of a 3.4m wide vehicle carriageway and a 1.2m wide footpath.
- 14 The proposal meets the minimum carriageway width requirements as described in Figure C-10 of the Tairāwhiti Resource Management Plan. A well-defined footpath will also be provided.
- 15 Vehicle tracking was assessed using Figure C2.14 of the Tairāwhiti Resource Management Plan. Figure C2.14 shows a 90th percentile motor car (1.88m wide and 4.77m long) with a minimum outside turning radius of 6.3m and minimum inside turning radius of 4.3m. It is not possible to achieve the recommended 600mm clearance and in some instances the clearances on the scheme plan are less than 100mm. With careful detailed design it will be possible to achieve 300mm clearances which is used in some jurisdictions. It is recommended that a consent condition be imposed to demonstrate that 300mm clearances can be achieved throughout, with some exceptions to 250mm, using the standard design vehicle.
- 16 Access to lot 8 is the most constrained and will require vehicles to drive to the end of the driveway, turn around at the hammerhead and drive back to the entrance of lot 8 and entering by turning left. Exiting lot 8 will be a standard reverse manoeuvre.

- 17 The officer's report mentions RainSmart tanks at paragraph 195. RainSmart tanks were proposed in an earlier iteration of the design but has now been replaced with permeable concrete because the elevation will be high enough to allow drainage. The permeable concrete solution relies on soakage, as did the RainSmart solution, and the proposal to conduct a confirmatory soakage test is supported because it will provide assurance that the system will operate as designed. I suggest that a confirmatory soakage test be carried out during construction when the excavation for the permeable concrete pavement has been completed, and before pavement layers are constructed. Infir has successfully followed this practice and adjusted the design to reflect the implications of the results of confirmatory tests during construction.
- 18 It is standard practice for councils to require construction review producer statements, known as PS4 statements. The practice is that the designer provides a PS1 design certificate with the design which details the Building Code clauses that apply to the application, how compliance is achieved and also the level of construction monitoring that is required. The building consent authorities review the applications and can require PS2 design review statements to be provided or can seek it themselves from suitably qualified people. PS4 statements are issued by the person who carried out construction monitoring. This is usually the same person who issued the PS1 statement. For this project I will prepare the PS1 statement and will require the provision of a PS3 construction statement as part of the records I would rely on to support my PS4 statement. I issue PS4 statements after completion of construction only when I am satisfied that the standard of construction meets the specifications. A requirement to provide a PS4 statement is supported.
- 19 The long-term efficacy of permeable pavement is addressed at paragraph 199. Permcon, a supplier of permeable concrete products, states in its documentation that a general maintenance regime of sweeping or surface washing will minimise the opportunity for the product to clog. In situations where this occurs an industrial vacuum can be used to clear the voids. A condition requiring proof of continued maintenance is sought. The

challenge is to devise a testing procedure that is simple to carry out but that clearly shows whether the system is operating satisfactorily. I suggest that the test consists of placing a 10-litre bucket on the pavement, on a soft rubber ring along the bucket's perimeter. The bottom of the bucket must be perforated so that water can leak through unobstructed. After the bucket has been placed on the soft rubber ring, 10 litres of water should be placed in it and the time measured for the water to infiltrate into the permeable concrete underneath the bucket. This is known as a drop test. For a standard 10-litre bucket with a diameter of 225mm the water should infiltrate the concrete within 30 minutes to demonstrate an infiltration rate of 500mm per hour. This infiltration rate is the same as the observed infiltration rate of the soil on the site. The design infiltration rate for the soakage system is 125mm per hour, which is one quarter of the observed infiltration rate. The test methodology would need to be documented because people are unlikely to remember how to do it.

RESPONSE TO MATTERS RAISED IN SUBMISSIONS

- 20 I have read the submissions received from neighbours in response to this application. With respect to design elements carried out by Infir, submitters have raised concerns about the access width.
- 21 The submission by Ron More discusses the driveway width and tapering. The carriageway width will be 5.5 m along the short section where eight dwellings will be serviced, reducing to 4.0 metres along the section that will service five dwellings, and finally reducing the 3.4 metres along the section that will service two dwellings. This is compliant with GDC's rules concerning dimensions of multiple site accessways.
- 22 Mr More suggests that the access 'for practical purposes' does not support use by more than one vehicle at a time. That is not correct. The seven metre length of the driveway at the Stanley Road entrance is 5.5m wide which is sufficient for one vehicle to enter while others exit.

CONCLUSIONS AND RECOMMENDATIONS

23 The proposed civil engineering works for this development have been carefully designed to ensure that:

23.1 The effects of the development on three waters infrastructure will be less than minor.

23.2 The development will not worsen flooding on other properties.

23.3 The access road into the development will operate to the requirements of figure C2.10 of the Tairāwhiti Resource Management Plan but with less than the recommended minimum clearance of 600mm. Reduced clearances will not impact on safety standards because vehicle speeds will be reduced.

I am confident that each of those outcomes will be achieved.



Johannes Petrus Ehlers

99A STANLEY ROAD, GISBORNE REPORT J23231/6

FOR RESOURCE CONSENT

Report prepared by Sarath Sasidharan

6 September 2024



REPORT	PREPARED BY	CHECKED BY
J23231/6 –6 September 2024	 Sarath Sasidharan	 Johan Ehlers

REPORT	DESCRIPTION
J23231/1 – 19 October 2023	Resource Consent Updates
J23231/2 - 8 November 2023	Resource Consent Updates
J23231/3 – 24 November 2023	Resource Consent Updates
J23231/4– 16 August 2024	Resource Consent Updates
J23231/5– 30 August 2024	Resource Consent Updates
J23231/6– 6 September 2024	Resource Consent Updates

Table of Contents

1	Brief.....	5
2	Background.....	5
3	Consent and Compliance requirements.....	6
3.1	Flood zones.....	6
3.2	Building consent.....	6
3.3	Service connections.....	6
3.4	Vehicle Crossing.....	6
3.5	Engineering approval.....	6
4	Earthworks.....	6
4.1	Proposal.....	6
4.2	Preparing the Site for Future Construction.....	6
4.2.1	Lot Development.....	7
4.2.2	General Matters.....	7
5	Site Services.....	8
5.1	Stormwater Drainage.....	8
5.1.1	HEC HMS Modelling Software.....	8
5.1.2	Rainfall Intensities.....	9
5.1.1	Predevelopment Discharge Rates.....	9
5.1.1	Post-Development Unattenuated Runoff Rates.....	10
5.1.2	Attenuation.....	10
	• Roof Attenuation:.....	10
	• Permeable concrete storage and soakage system.....	10
5.1.3	Stormwater treatment.....	11
6	Water Supply.....	12
6.1	Firefighting Requirements.....	13
7	Wastewater Disposal.....	14
8	Accessways.....	15
9	Landscaping.....	16
10	Power and telecommunication services.....	16
11	Appendices.....	17

Table of Tables

Table 1 – RCP8.5 Rainfall Intensities for 2081-2100 (mm/hr).....	9
Table 2 - Predevelopment discharge rates.....	9
Table 3 - Post-development Unattenuated Discharge rates.	10
Table 4 – Allowable discharge rates.....	10
Table 5: Post-development attenuated discharge from the site.	11
Table 6 – Head loss for water supply	13
Table 7 - Wastewater Discharge	14
Table 8 – Tairāwhiti Resource Management Plan Standard for multiple site access.	15

Table of Figures

Figure 1 - Rain on grid 2090 1% AEP	5
Figure 2 - Stormwater reticulation	8
Figure 3 - Water reticulation	12
Figure 4 - Wastewater reticulation.....	14

1 Brief

TW Property Group has engaged Infir Limited to prepare a servicing report for a proposed housing development at 99A Stanley Road, Gisborne. The development is proposed to take place on Lot 1 DP 5799. This report is to be used as part of a subdivision consent application for the development. Note that detailed design and specifications will be required for building consent.

2 Background

The existing site consists of one parcel (Lot 1 DP 5799), occupied by a house and an outbuilding. The site is 1,590m² in size.

Stormwater drainage is to Stanley Road, and wastewater drains to a DN225 sewer main at the front of the property. Potable water is available from a DN150 cast iron water main in the western berm of Stanley Road.

This site is not in a flood hazard overlay zone. The rain on grid model (2090 1% AEP) shows isolated ponding areas on the site and some ponding on Stanley Road's berms. The water level in the berm in Stanley Road at the proposed access point is at RL4.74 (NZVD2016), flowing to a ponding area south of Childers Road where the flood level is at RL4.60. This is considered to be the controlling water body in the area, setting a minimum floor level of RL5.10 to provide a 500mm freeboard. Building Code requirements, such as a minimum of 150mm clearance above surrounding sealed ground, may require floor levels to be higher.



Figure 1 - Rain on grid 2090 1% AEP

The Scheme Plan is **attached** in Appendix A.

Drawings are **attached** in Appendix B.

Stormwater calculations are **attached** in Appendix C.

A topographical survey plan is **attached** in Appendix D.

3 Consent and Compliance requirements

3.1 Flood zones

The site is not in a flood hazard overly area. However, the berm in Stanley Road is an overland flow path as shown on the 2090 1% AEP rain-on-grid map in Figure 1. The overland flow path drains to a ponding area south of Childers Road with a flood level of RL4.60. Post-development peak discharge rates should not exceed pre-development peak discharge rates.

3.2 Building consent

All work on the site will be privately owned. Engineering approval is therefore not required, but building consent will be required for all the works in the scope of this report that fall within the definition of building work, including stormwater, wastewater, water supply, structural, access, and servicing works.

3.3 Service connections

Service connection applications will be required for all services.

3.4 Vehicle Crossing

An application will be required to construct a vehicle crossing.

3.5 Engineering approval

Other than service laterals in the road reserve, no assets will vest in Council. It is therefore considered that engineering approval will not be required.

4 Earthworks

A topographical survey was carried out by Definition Surveying on 11 September 2023.

4.1 Proposal

Earthworks will be required to shape the site such that stormwater runoff is controlled by draining all lots to the access road, to provide well-defined overland flow paths, and to avoid adverse stormwater effects on adjoining lots.

4.2 Preparing the Site for Future Construction

The earthworks drawings show existing site levels, proposed finished levels, cut and fill depths, and net earthworks volumes.

In summary, earthworks will be required to ensure that:

- Stormwater flows are directed away from new buildings and ensure that minimum grades are achieved to prevent ponding over paved areas; and
- Overland flows from the new Lots are directed to the new access road and then to Stanley Road, and away from neighbouring private properties.

The extent of the earthworks is outlined in Appendix B, which shows drawings indicating the existing contours on the site, the proposed finished contours, and the proposed cut-and-fill areas on the site.

4.2.1 Lot Development

The net earthworks volume consists of 70 m³ fill and 280 m³ cut, measured solid in place.

Level changes at the property boundary will be less than 600mm along the site perimeter. Along the parts of the northern and southern boundaries where the level difference between the proposed development and neighbouring lots will exceed 300mm, it is proposed to install retaining walls. Where the level difference between the proposed development and neighbouring lots will be less than 300mm, the height difference can be accommodated by fence nibs. The changes to ground levels will not affect neighbouring properties because the existing property is fenced by a solid wall without any permeability.

4.2.2 General Matters

Following the demolition of the buildings, the duration of the earthworks is expected to be in the order of 2-3 weeks. Access to the site shall be provided off Stanley Road.

Hours of operation for all stages should be limited to comply with District Plan rules. All works should be required to comply with NZS6803: 1999 Acoustics – Construction Noise.

Erosion and sediment control will be undertaken following an approved Erosion and Sediment Control Plan to be developed specifically for the site. In summary, the Erosion and Sediment Control Plan will require that:

- A silt fence is installed and maintained for the duration of the earthworks around the perimeter of the site; and
- Stabilised entrances are provided and maintained for construction vehicles.

An Accidental Discovery Protocol should be adopted.

5 Site Services

The proposed design of a stormwater drainage system, potable and fire-fighting water supply system, wastewater system, and a typical road cross section for the development are detailed in the following sections.

5.1 Stormwater Drainage

The design ensures that the discharge for a 1 in 5-year, 1 in 10-year, and 1 in 100-year design event does not exceed their corresponding pre-development discharge rates. The discharge from the roof attenuation tanks of all lots will be released to permeable concrete pavement after attenuation. The permeable concrete pavement will have both storage and soakage capabilities for further attenuation along with attenuation of overland flows.

Construction of all stormwater works within the development site shall comply with document E1 / AS1 of the New Zealand Building Code.

The design methodology involves using the hydrologic modelling simulation using HEC HMS to calculate predevelopment and post-development discharge rates. This simulation was run for a 24-hour duration and considers a 1 in 5-year, 1 in 10-year and 1 in 100-year events.

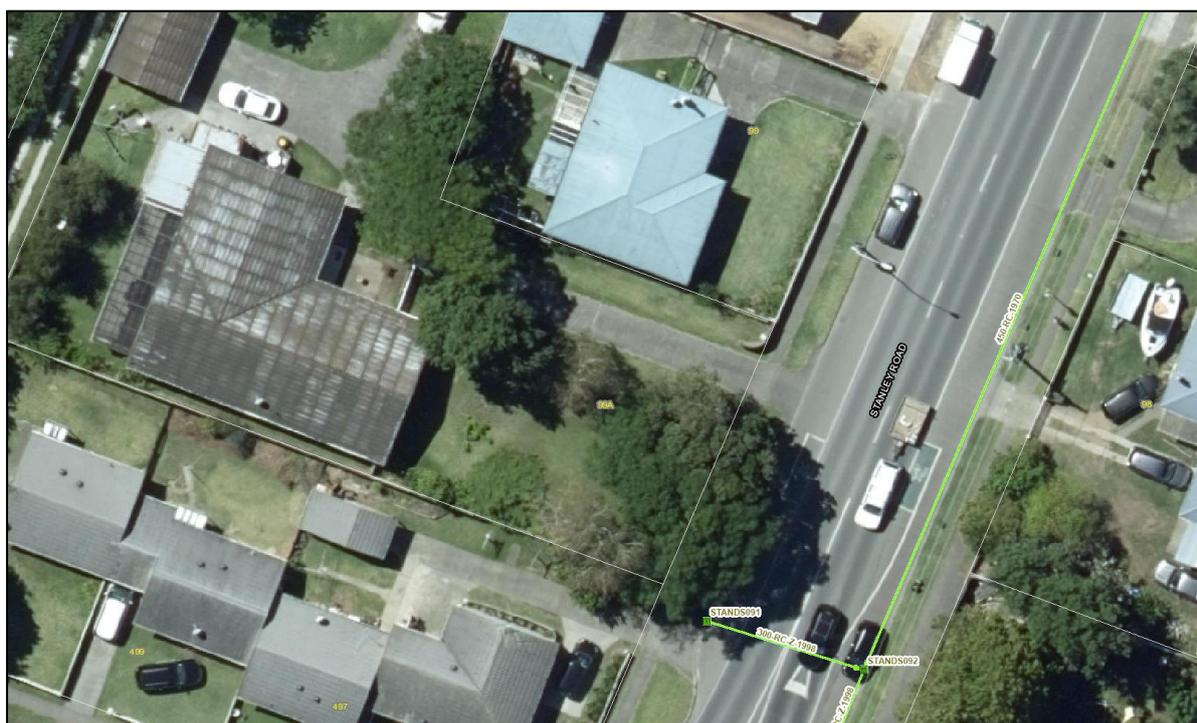


Figure 2 - Stormwater reticulation

5.1.1 HEC HMS Modelling Software

The pre-development and post-development catchment conditions are analysed using the US Army Corps of Engineers HEC-HMS 4.3 Hydrologic Modelling System, Refer to the following sections for design outputs.

The hydrologic model has been prepared based on the following assumptions:

1. NIWA Rainfall Intensity Data, HIRDS RCP 8.5 for the period 2081 – 2100, as shown in Table 1.

2. The hydrological analysis has assessed the peak discharge for design storms of 20%, 10%, and 1% AEP.
3. The temporal pattern for the 24-hour design storm has been created based on NIWA's HIRDS data.
4. The time of concentration for each lot has been established using the US Soil Conservation Service method.
5. Rainfall-runoff curve numbers are based on the US Army Corps of Engineers HEC-HMS hydrologic Modelling System, Technical Reference Manual.
6. Hydrologic Soil Group B has been used with a curve number of 98 for impermeable areas and 68 for permeable areas.
7. The terrain model of the site was derived from LIDAR data for predevelopment and Civil 3D design surface for post-development.

5.1.2 Rainfall Intensities

Rainfall intensities for the period 2081 to 2100 were obtained from NIWA's HIRDS V4 system with a RCP8.5 (Representative Concentration Pathway). The site location is Longitude: 178.0077 and Latitude: -38.6595. The 10% AEP and 1% AEP rainfall intensities are included in Table 1.

Table 1 – RCP8.5 Rainfall Intensities for 2081-2100 (mm/hr).

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h
2	0.5	54.6	38.6	31.8	23.1	16.7	9.45	6.38	4.13
5	0.2	77.1	54.2	44.5	32.1	23	12.9	8.68	5.58
10	0.1	95.3	66.7	54.7	39.3	28	15.7	10.5	6.69
20	0.05	115	80.4	65.7	47	33.4	18.6	12.3	7.85
30	0.033	128	89	72.7	51.9	36.8	20.4	13.5	8.57
40	0.025	137	95.3	77.8	55.4	39.2	21.7	14.4	9.1
50	0.02	145	101	82	58.4	41.2	22.8	15	9.51
60	0.017	151	105	85.4	60.7	42.8	23.7	15.6	9.87
80	0.013	162	112	91.1	64.7	45.5	25	16.5	10.4
100	0.01	170	117	95.5	67.7	47.6	26.2	17.2	10.9
250	0.004	206	141	115	80.9	56.6	30.9	20.2	12.7

5.1.1 Predevelopment Discharge Rates

A HEC HMS stormwater modelling is conducted to obtain the current discharge rates from the site. The discharge rates obtained are as follows:

Table 2 - Predevelopment discharge rates.

Description	20%AEP event	10%AEP event	1%AEP event
Pre-Development Discharge (L/s)	22.94	29.85	58.88
Site Area (m ²)	1590	1590	1590
Intensity, I _{20minute} (mm/hr)	77.1	95.3	170
Predevelopment Runoff Coefficient	0.67	0.71	0.78

5.1.1 Post-Development Unattenuated Runoff Rates

The post-development unattenuated runoff rates obtained through HEC HMS stormwater modelling are as follows.

Table 3 - Post-development Unattenuated Discharge rates.

Description	20%AEP event	10%AEP event	1%AEP event
Post-Development Runoff (L/s)	29.65	37.31	67.83
Site Area (m ²)	1590	1590	1590
Intensity, I _{20minute} (mm/hr)	77.1	95.3	170
Post-development Runoff Coefficient	0.87	0.89	0.90

Therefore, attenuation is required to limit the discharge from the site to the pre-development discharge rates. The allowable discharge rates are shown in Table 4 – Allowable discharge rates.

Table 4 – Allowable discharge rates.

Description	20%AEP event	10%AEP event	1%AEP event
Allowable discharge rates (L/s)	22.94	29.85	58.88

5.1.2 Attenuation

The proposed approach to stormwater attenuation includes a combination of above-ground roof attenuation tanks and a permeable concrete storage and soakage system.

- **Roof Attenuation:**

Roof runoff will be attenuated before it is discharged from individual lots. Lots 1 to 6 will each have 2m³ tanks, and Lots 7 & 8 will each have 3m³ tanks for attenuation storage. These tanks will release water at a total rate of 2.1 L/s for a 10% AEP event without overflowing. The tanks are sized to ensure that there will be no overflow during a 10% AEP event.

- **Permeable concrete storage and soakage system.**

The permeable concrete in the common accessway and parking area of Lots 2 and 3, covering a total area of 252m², serves as a soakage area for runoff attenuation. The storage layer beneath the permeable concrete surface will have a capacity of 6m³ and will act as attenuation storage. When combined, this system will help to reduce and manage the discharge from roof tanks and overland flows from sealed and permeable areas, allowing the water to be released at peak rates not exceeding predevelopment peak discharge rates.

Table 5: Post-development attenuated discharge from the site.

Description	20%AEP event (L/s)	10%AEP event (L/s)	1%AEP event (L/s)
Attenuated roof discharge Lot 1	0.14	0.16	2.14
Attenuated roof discharge Lot 2	0.14	0.16	2.14
Attenuated roof discharge Lot 3	0.14	0.16	2.09
Attenuated roof discharge Lot 4	0.14	0.16	2.09
Attenuated roof discharge Lot 5	0.14	0.16	2.09
Attenuated roof discharge Lot 6	0.14	0.16	2.09
Attenuated roof discharge Lot 7	0.48	0.57	4.89
Attenuated roof discharge Lot 8	0.48	0.57	4.97
JOAL discharge	10.74	15.89	36.38
Total Discharge	12.54	17.99	58.88
Post-development Attenuated Runoff Coefficient	0.37	0.43	0.78

A HEC HMS stormwater modelling for a 24-hour duration with a 1-minute time step employing the soakage is carried out, and the results are explained in Appendix C.

5.1.3 Stormwater treatment

All stormwater draining from the permeable concrete surface will pass through a Hynds First Defence High-Capacity Stormwater Treatment unit prior to being discharged from the site.

6 Water Supply

It is proposed to install a DN63 PE100 SDR17 PN10 water main in the carriageway and 550mm in front of the face of the northern kerb. DN20 connections will be provided to each lot. The DN63 main will be connected to the DN150 cast iron water main in Stanley Road. It is proposed to install an above ground testable backflow prevention device in the berm of Stanley Road.

Peak water demand will be 8,400 litres per day, based on 8 households, 3.2 people per household, and 330 litres peak demand per person per day.

The instantaneous peak flow rate, based on a peak factor of 10, will be 0.98L/s, which will generate a flow velocity of 0.5m/s in a 50mm internal diameter DN63 pipe.

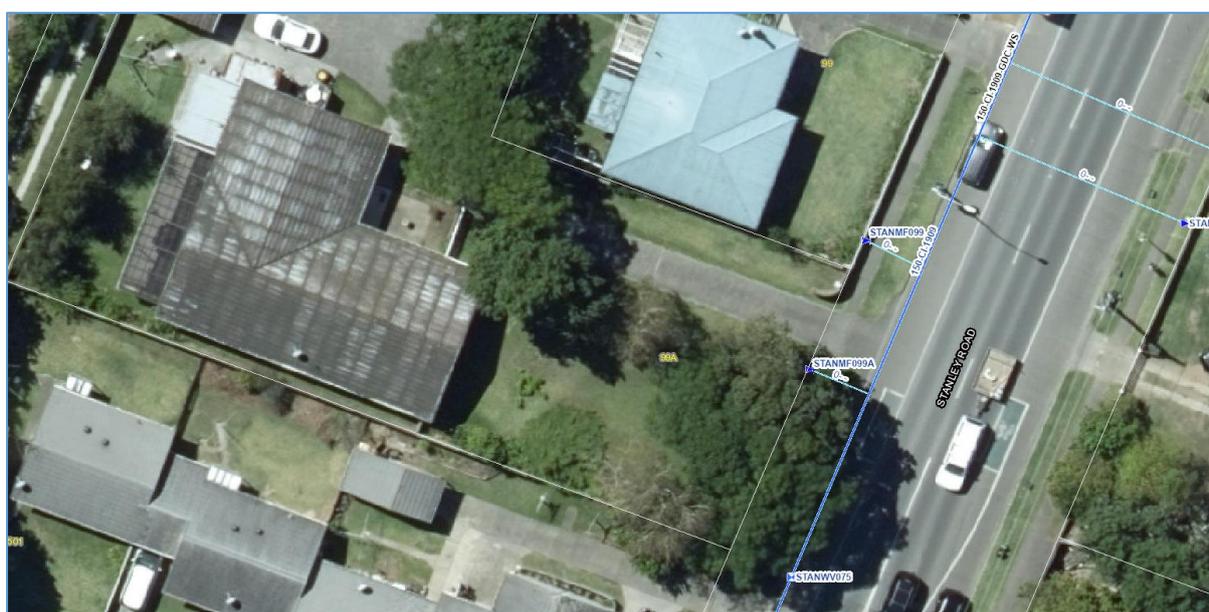


Figure 3 - Water reticulation

The GDC network pressure is approximately 500-550kPa. This hydraulic assessment was done by using a conservative pressure of 450-500kPa to allow for future pressure reduction in the GDC network.

The head loss in the DN63 PE rider main in the joint accessway from the council main to the furthest point of supply is 103 kPa, consisting of the head loss from the above ground reduced pressure zone backflow prevention unit, minor losses, and pipe friction losses. The pressure at the point of supply at ground level will be 347kPa.

In addition, four of the buildings are two storeys with bathrooms on the first floor, 2.75m above ground level. The height difference causes a further 27kPa pressure loss. The pressure at the first floor, excluding friction and minor losses in the building plumbing, will be 320kPa. This is sufficient to service the buildings.

Head loss is calculated as shown in Table 6.

Table 6 – Head loss for water supply

Head Losses		
By Darcy-Weisbach equation Friction loss, h_f	4.75	kPa
Minor Friction loss, 1 Nos Branch flow, flanged Tee	0.03	kPa
Minor Friction loss, 5 Nos regular flanged 90° Elbow	0.19	kPa
Minor Friction loss, 7 Nos Branch flow, threaded Tee	17.73	kPa
Head loss by Backflow prevention device	80.00	kPa
Total Head loss	102.69	kPa
Minimum Conservative pressure in GDC network	450.00	kPa
The minimum pressure available at each dwelling unit	347.31	kPa

Pipe friction losses were calculated using the Colebrook-White formula and a pipe roughness of 0.3mm.

6.1 Firefighting Requirements

The New Zealand Fire Fighting Code of Practice SNZ PAS 4509 sets out the requirements for firefighting purposes. Fire hydrants must be provided within 135m of fire risks, such that 12.5L/s is available within 135m run distance and 25L/s is available within 270m run distance from a maximum of two fire hydrants. The existing fire hydrants opposite 91 Stanley Road and 497 Childers Road satisfies these requirements.

7 Wastewater Disposal

It is proposed to install a DN150 gravity main discharging to the existing DN225 sewer main on Stanley Road. A new manhole will be required at the connection point. Services have been surveyed and it is possible to connect to the DN225 as shown on the drawings.

Building Code compliance document G13/AS3 requires a minimum gradient of 1.00% for DN150 mains which has been adopted for the design.

Design wastewater discharge, based on 8 household units, 3.2 persons per household, 200 litres per person per day average dry weather flow (ADWF), peak dry weather flow (PDWF) two times ADWF, and peak wet weather flow (PWWF) four times ADWF is as follows:

Table 7 - Wastewater Discharge

Conditions	Litres per day	L/s
ADWF	5,120	0.06
PDWF	12,800	0.15
PWWF	20,480	0.24

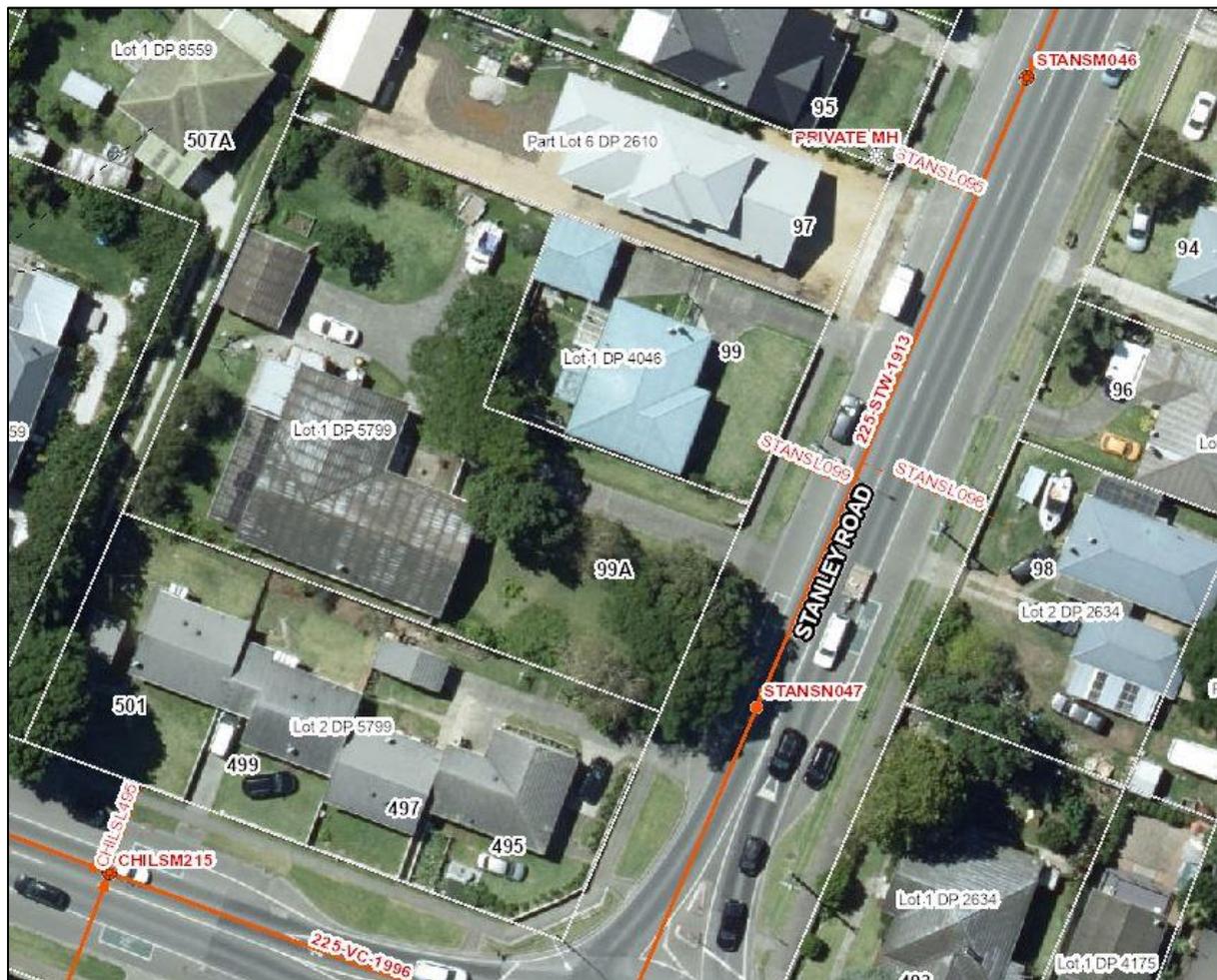


Figure 4 - Wastewater reticulation

8 Accessways

A new vehicle crossing will be constructed to provide common access for all eight Lots.

Section 2.1.7.118 of the Tairāwhiti Resource Management Plan (TRMP) sets the following standards for multiple site access:

Table 8 – Tairāwhiti Resource Management Plan Standard for multiple site access.

DWELLING SITES TO BE SERVICED	LEGAL WIDTH (m)	MINIMUM CARRIAGE-WAY WIDTH(m)
2 to 4	4	3
5 to 7	5	4
8 to 10	6	5.5

A 5.5m wide accessway and a 1.2m wide footpath is provided for eight Lots.

Most of the proposed shared access will be used by seven dwellings (lots 2 to 8) and consist of a 4.0m wide vehicle carriageway and a 1.2m wide footpath.

The portion of the accessway furthest from Stanley Road will be used for access to a total of two dwelling on lots 6 and 7. This portion of the accessway will consist of a 3.4m wide vehicle carriageway and a 1.2m wide footpath.

The proposal meets the minimum carriageway width requirements as described in Table 8. Typical accessway cross-sections are shown on the drawings.

Vehicle tracking was assessed using Figure C2.14 of the Tairāwhiti Resource Management Plan. Figure C2.14 shows a 90th percentile motor car (1.88m wide and 4.77m long) with a minimum outside turning radius of 6.3m and minimum inside turning radius of 4.3m. It is not possible to achieve the recommended 600mm clearance and in some instances the clearances on the scheme plan are less than 100mm. With careful detailed design it will be possible to achieve 300mm clearances which is used in some jurisdictions. It is recommended that a consent condition be imposed to demonstrate that 300mm clearances can be achieved throughout, with some exceptions to 250mm, using the standard design vehicle.

Access to lot 8 is the most constrained and will require vehicles to drive to the end of the driveway, turn around at the hammerhead and drive back to the entrance of lot 8 and entering by turning left. Exiting lot 8 will be a standard reverse manoeuvre.

Drainage will be by way of a 3% cross fall to the kerb and channel along the western edge of the proposed accessway and a longitudinal gradient towards Stanley Road.

9 Landscaping

Landscaping is shown on the architectural drawings.

10 Power and telecommunication services

Power and telecommunications will be installed as shown on the cross sections.

11 Appendices

Appendix A	Scheme Plan.....	18
Appendix B	Drawings.....	19
Appendix C	Stormwater Calculations	20
Appendix D	Topographic Survey	21
Appendix E	SW20 First Defence High-Capacity Brochure.....	22
Appendix F	Reduced Pressure Zone Device Brochure	23
Appendix G	Permeability test results	24

Appendix A Scheme Plan



Appendix B Drawings

TW PROPERTY GROUP



INFRASTRUCTURE SOLUTIONS
PROJECT MANAGEMENT
PO Box 7335, Taradale 4141
Phone : 06 650 5565 Email : admin@infir.nz

Residential Development 99A STANLEY ROAD Gisborne



SITE LOCATION PLAN
(NOT TO SCALE)

FOR RESOURCE CONSENT

GENERAL NOTES

1. All construction work outside the property boundary shall comply with the Gisborne Engineering Code of Practice (GECOP). Where conflict exists between the requirements set out in the specification and the GECOP, the Code shall take precedence.
2. All work inside the property boundary shall comply with the New Zealand Building Code, unless such works will be vested with council, in which case, GECOP takes precedence.
3. Horizontal datum: ESPG:2107 NZGD/Poverty Bay Circuit 2000
4. Vertical datum: ESPG:1169 New Zealand Vertical Datum 2016
5. Horizontal & Vertical Origin: SS 49 SO 8021 (B9P6)
6. Drawings are intended to be read in conjunction with any and all information provided by the Development Architect, in addition to information provided by the Landscape Architect if applicable.
7. All measurements to be confirmed on site.
8. Dimensions are in meters unless otherwise stated.
9. 3rd decimal place in setting-out and level data is for purpose of accuracy only, to avoid or highlight rounding errors, and does not represent construction tolerances.
10. All services are to be marked on site and located before construction.
11. All work on site is to be in accordance with the Contractor's Health and Safety Plan and the Health and Safety at Work Act 2015.
12. Connections to the Gisborne District Council water supply and wastewater and stormwater networks must only be undertaken by the Gisborne District Council.
13. Concrete grades: Slabs and other in-situ work 32MPa minimum except where otherwise noted.
14. Concrete work shall comply with NZS4210.
15. Trench details shall be in accordance with the GECOP for works outside property boundary.

EARTHWORKS

16. Any fill must be tested in accordance with NZS4402.
17. Subgrade testing is required to confirm pavement design before pavement construction.
18. During construction, stormwater runoff shall be controlled on site in accordance with an approved erosion and sediment control plan.

ROADWORKS

19. All road signs and markings shall comply with the Gisborne Engineering Code of Practice, and the New Zealand Transport Agency Manual of Traffic Signs and Markings (MOTSAM).
20. Should any conflicts arise between the GECOP and MOTSAM, the MOTSAM standard shall take precedence.
21. Final pavement design shall be subject to site testing.

STORMWATER

22. All stormwater works within the development site shall comply with document E1 / AS1 Surface Water of the New Zealand Building Code.
23. All stormwater works outside the property boundary shall comply with the Gisborne District Council Code of Practice. Where conflict exists between the requirements set out in the specification and the Code of Practice, the Code shall take precedence.
24. Concrete pipe shall comply with AS/NZS4058, minimum Class 2, unless noted otherwise.
25. PVC pipes shall comply with AS/NZS1254 of AS/NZS1260, minimum SN8, unless noted otherwise.
26. Downpipe location and sizing shall be provided by the architect.
27. Downpipe and level entry connections shall be provided as DN150 SN8 pipelines at not less than 1:200 grade or DN100 SN8 pipelines at not less than 1:120 grade.
28. Level entry thresholds shall be in accordance with E2/AS1 External Moisture of the New Zealand Building Code.
29. Manholes / inspection chambers within the development site shall generally be in accordance with Figure 11 and Figure 12 of Compliance Document E1/AS1 Surface Water of the New Zealand Building Code:
 - Minimum DN450 for pipelines 100mm diameter of less and depths less than 1.0m
 - Minimum DN600 for depths less than 1.0m
 - Minimum DN1050 for depths greater than 1.0m

WASTEWATER

31. All wastewater works outside the property boundary shall comply with the Gisborne District Council Code of Practice. Where conflict exists between the requirements set out in the specification and the Code of Practice, the Code shall take precedence.
32. All wastewater works within the development site shall comply with document G13 / AS2 of the New Zealand Building Code, unless such work is to be vested in Gisborne District Council as public infrastructure, whereby the council's code will take precedence.
33. The location of existing services shall be confirmed on site prior to construction.
34. PVC pipes shall comply with AS/NZS1254 of AS/NZS1260, minimum SN8.
35. PE pipelines (pressure systems only) shall be PE100 PN10 conforming to AS/NZS4130.

WATER RETICULATION

36. All water supply works within the property shall comply with NZ Building Code - Acceptable Solutions & Verifiable Methods (G12 / AS1).
37. All water supply works outside the property boundary shall comply with the Gisborne District Council Code of Practice. Where conflict exists between the requirements set out in the specification and the Code of Practice, the Code shall take precedence.
38. The location of existing services shall be confirmed on site prior to construction.
39. PVC pipes shall comply with AS/NZS1477, minimum pressure rating PN9.
40. PE pipelines shall be PE100 SDR17 Series 1, in accordance with AS/NZS4130.
41. Ductile iron flanges shall conform to AS/NZS4087 Figure B5.
42. The connection point to the Gisborne District Council network is shown indicative only and shall be confirmed prior to the commencement of works.

SERVICES

43. Where indicated on the plans, existing service locations have been determined from Before-U-Dig plans or Gisborne District Council GIS data and may not fully reflect the true location or extent of existing services.
44. Location and extent of all services shall be verified on site prior to commencing construction and installing new services.
45. Connection points to existing services are indicative only and shall be confirmed prior to the commencement of works.

FOR RESOURCE CONSENT

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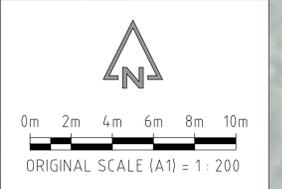
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DRAWING TITLE
**SCHEME PLAN
OVERALL SITE DEVELOPMENT PLAN**

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LEGEND

-  MINOR CONTOURS
-  MAJOR CONTOURS



0m 2m 4m 6m 8m 10m
 ORIGINAL SCALE (A1) = 1 : 200



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 EXISTING GROUND CONTOURS (EGL)

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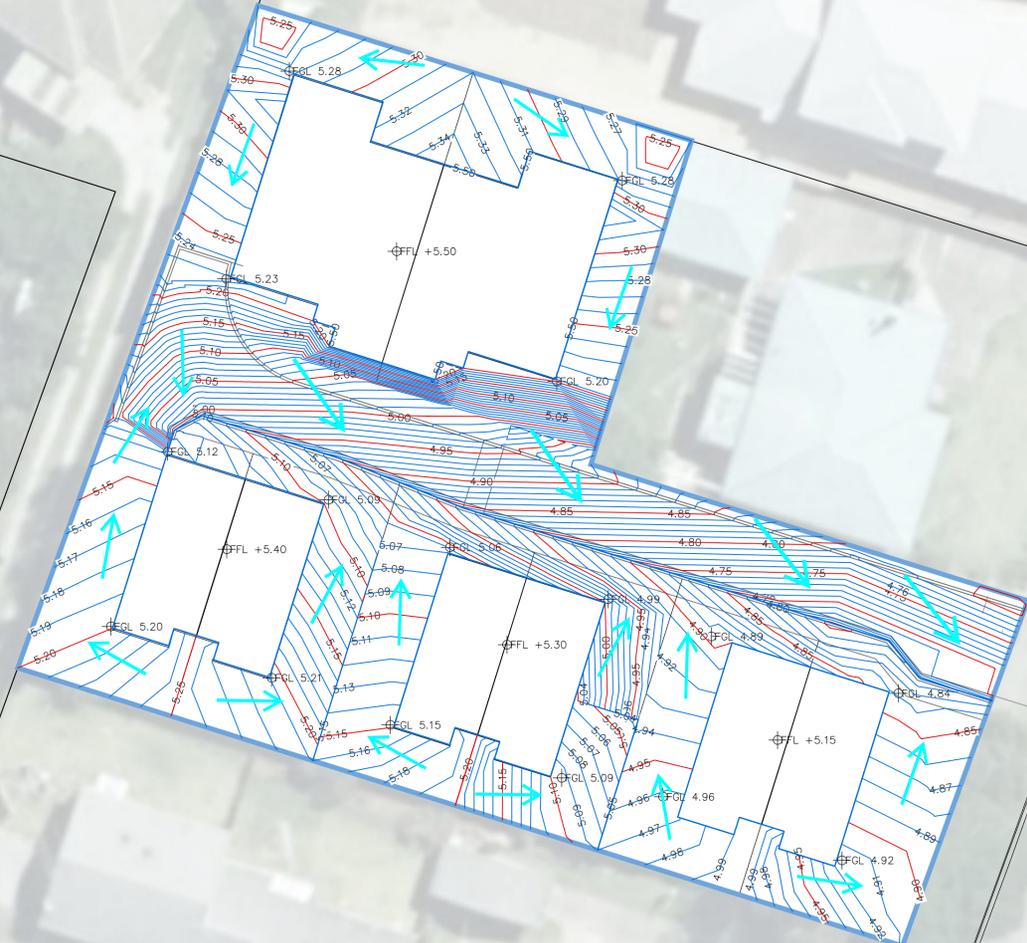


LEGEND

-  MINOR CONTOURS
-  MAJOR CONTOURS
-  OVERLAND FLOW PATHS



0m 2m 4m 6m 8m 10m
ORIGINAL SCALE (A1) = 1 : 200



STANLEY ROAD

CHILDERS ROAD

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99A STANLEY ROAD
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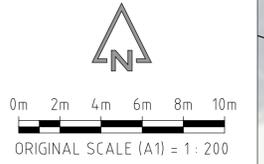
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Cut & Fill Details				
Band No.	From Depth (m)	To Depth (m)	Vol. (cu.m)	Colour
1	-0.68	-0.50	4	Red
2	-0.50	-0.30	54	Yellow
3	-0.30	0.00	222	Green
4	0.00	0.20	61	Blue
5	0.20	0.46	9	Purple
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TOTAL FILL =			70m ³	
NET =			210m ³ (CUT)	

NOTE:

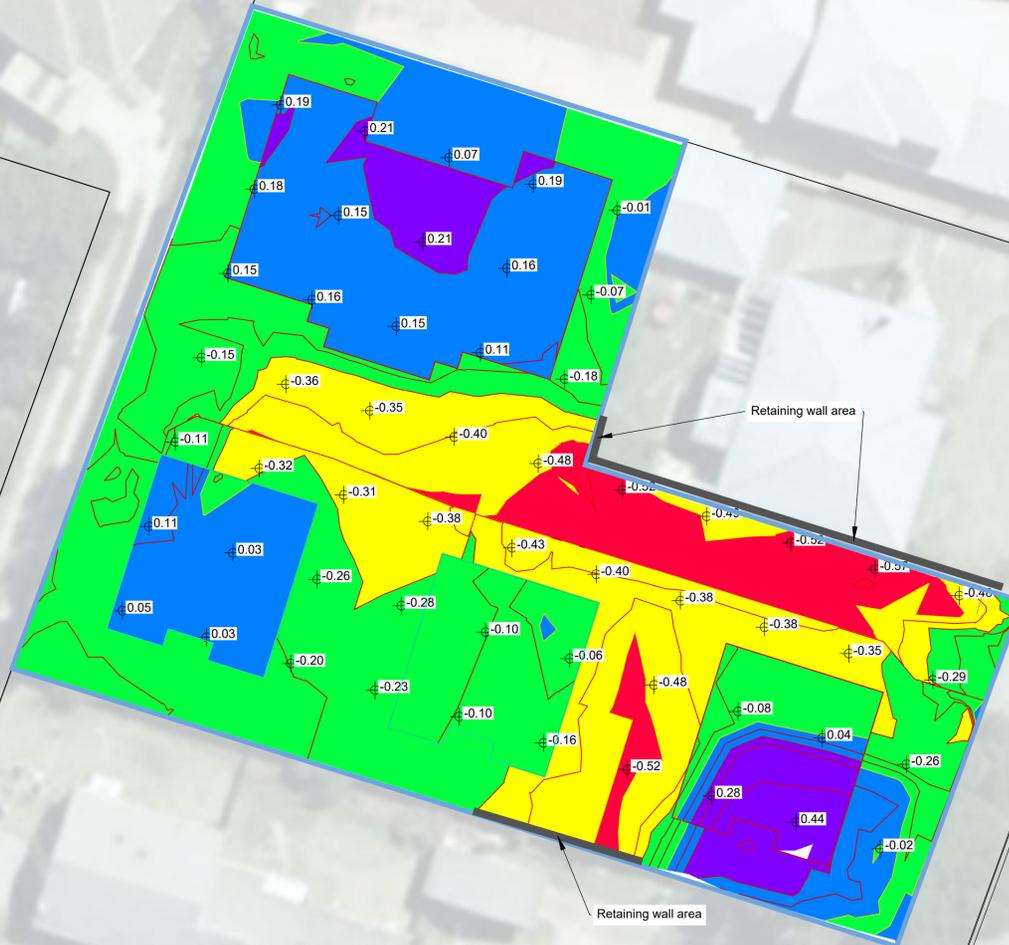
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- ALL VOLUMES ARE GROSS IN-SITU VALUES AND ARE NOT ADJUSTED FOR BULKING OR COMPACTION.
- ±9.99 DENOTES CUT / FILL DEPTH FROM EXISTING SURFACE TO FINISHED SURFACE GROUND LEVELS AND FLOOR LEVELS.



NOTE:

Retaining wall to be installed inside border along perimeter where cut levels exceed 300mm. (at locations shown)

Refer to detail on sheet J23231 / 210



CHILDERS ROAD

STANLEY ROAD

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2	UPDATED FOR RESOURCE CONSENT	SS	19-04-2024
1	UPDATED FOR RESOURCE CONSENT	KP	08-02-2024
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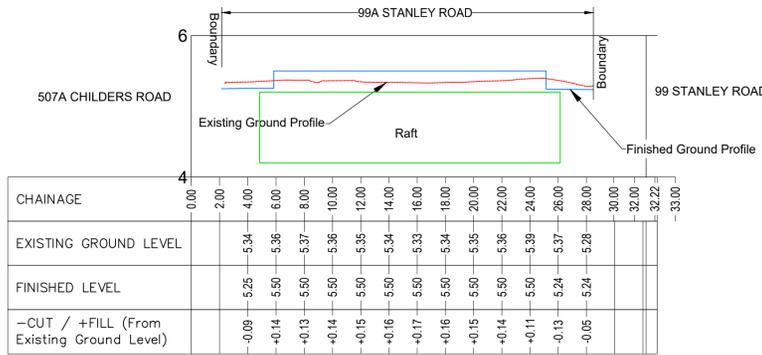
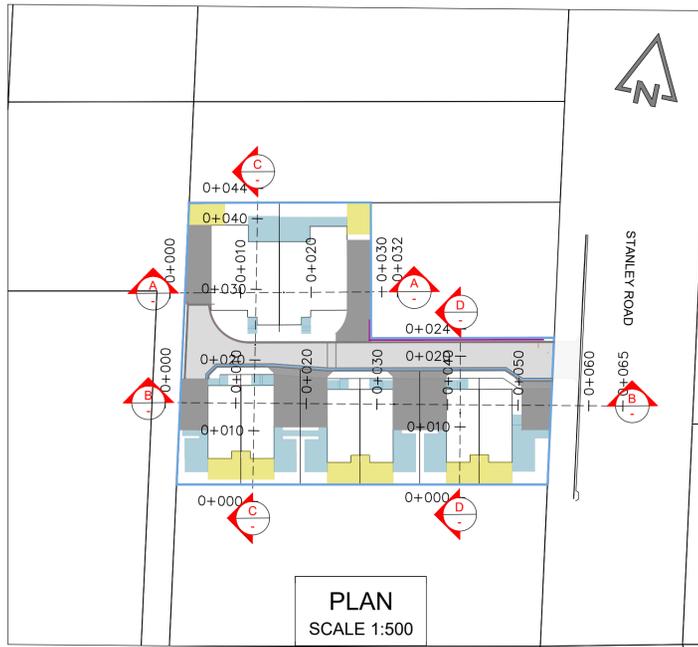
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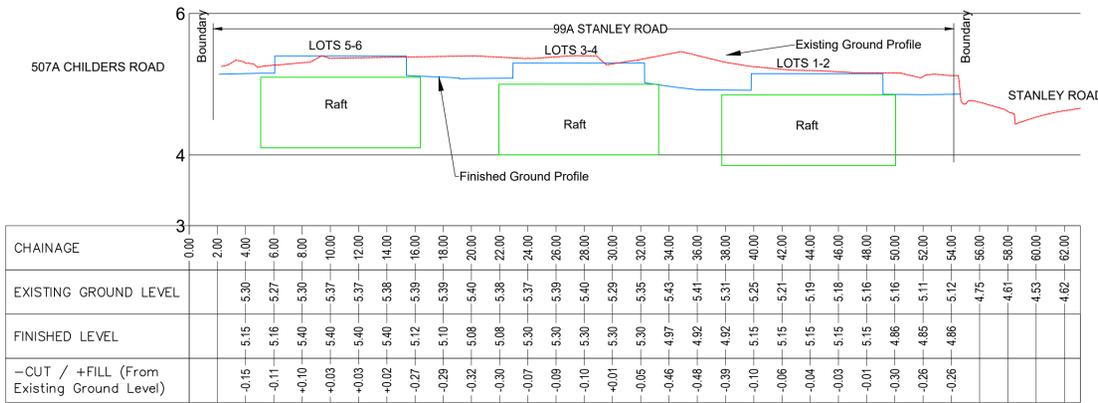
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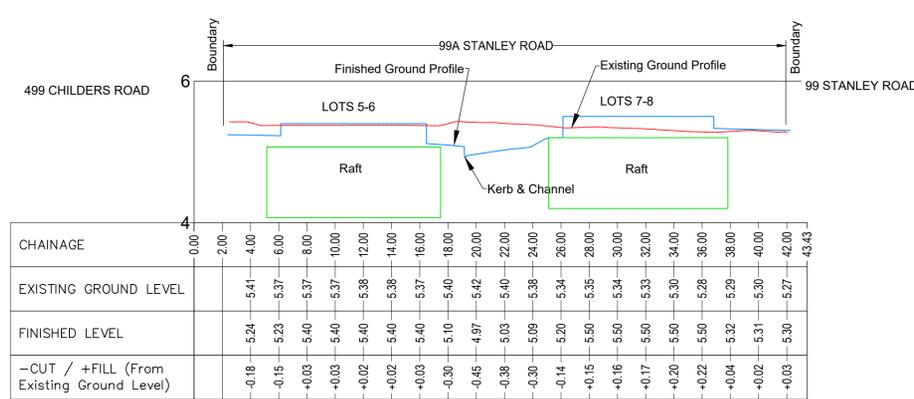




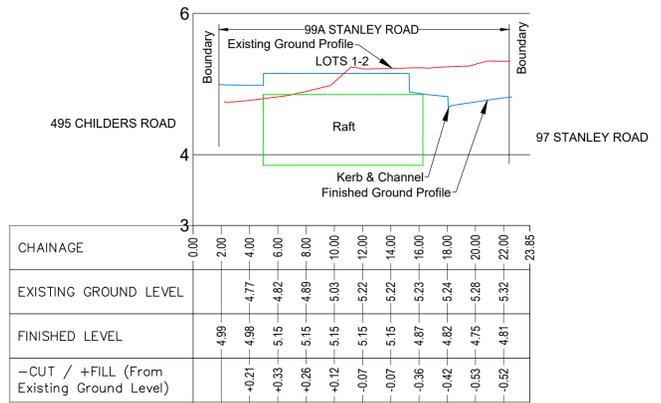
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LONGITUDINAL SECTION - D-D
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2	UPDATED FOR RESOURCE CONSENT	KP	08-02-2023
1	ADDED FOUNDATION RAFTS	KP	26-10-2023
0	ORIGINAL	KP	19-10-2023

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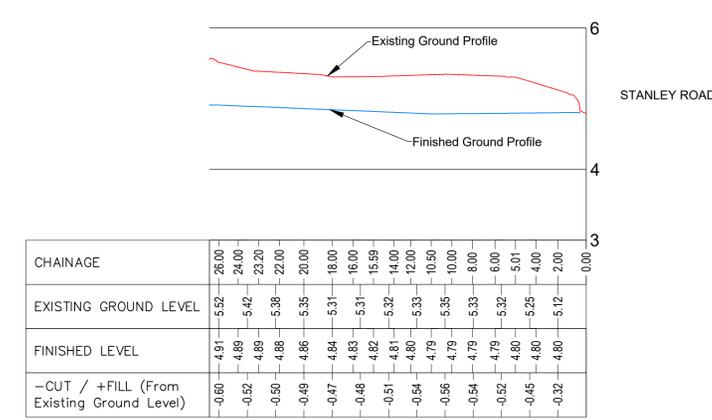
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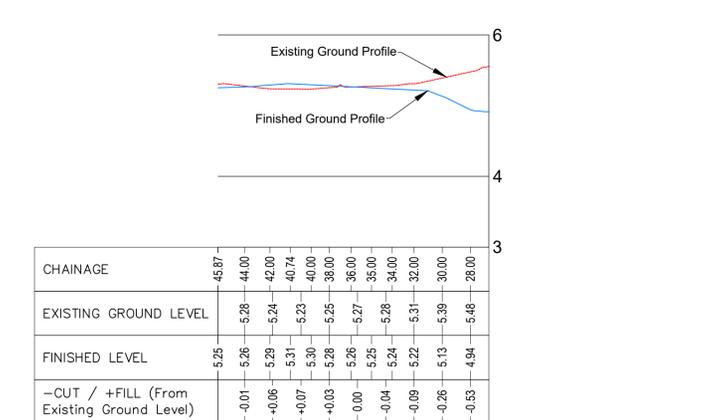
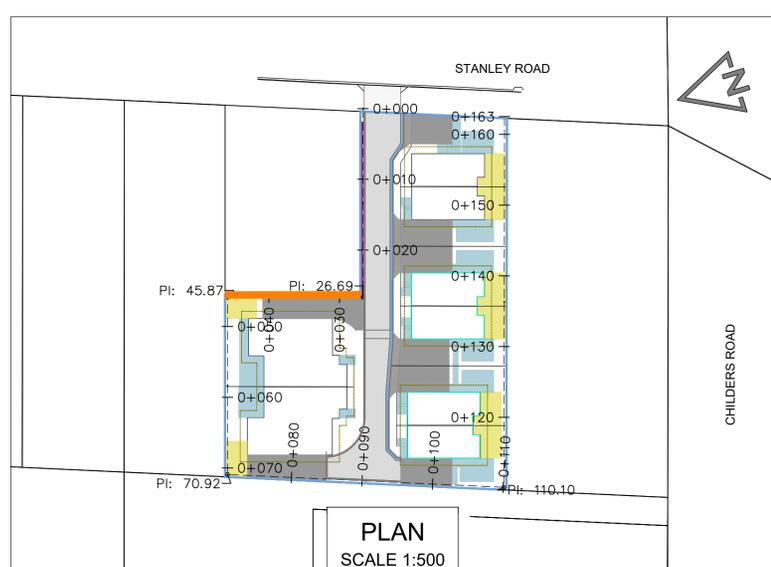
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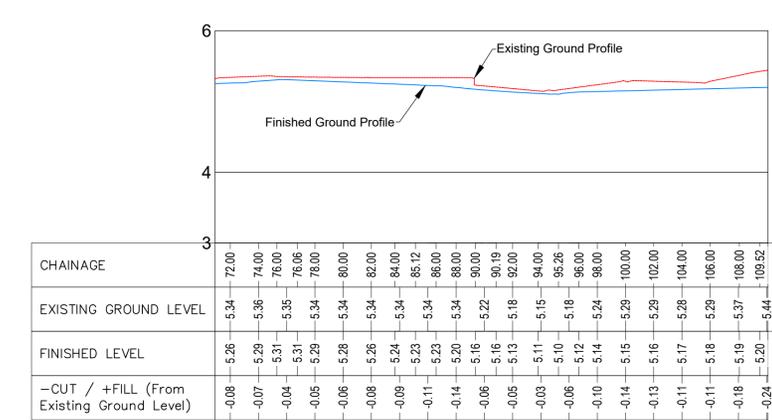




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LONGITUDINAL SECTION - Site Perimeter
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(SCALES: HOR 1:100 & VERT 1:20)



LONGITUDINAL SECTION - Site Perimeter
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(SCALES: HOR 1:100 & VERT 1:20)

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0	ISSUED FOR RESOURCE CONSENT	KP	19.04-2024

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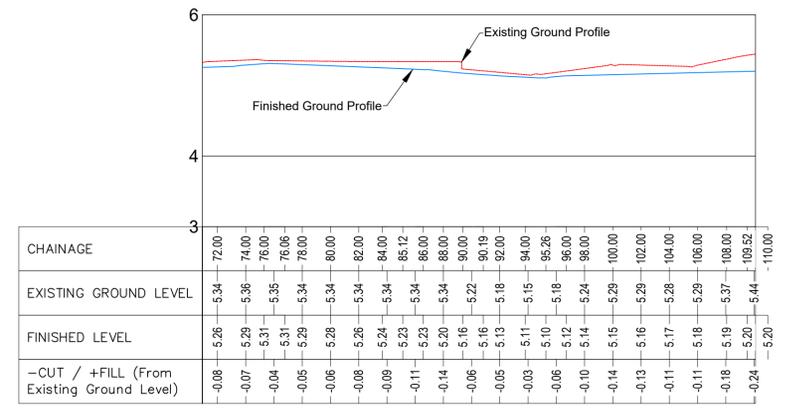
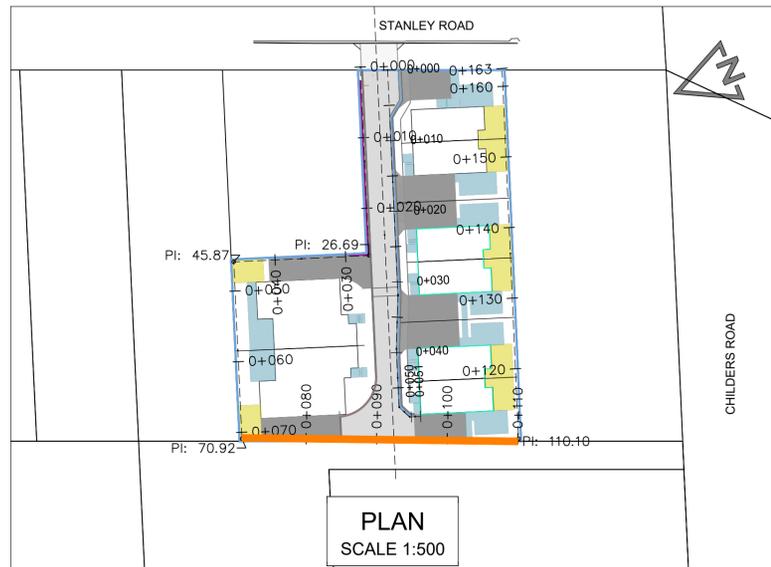
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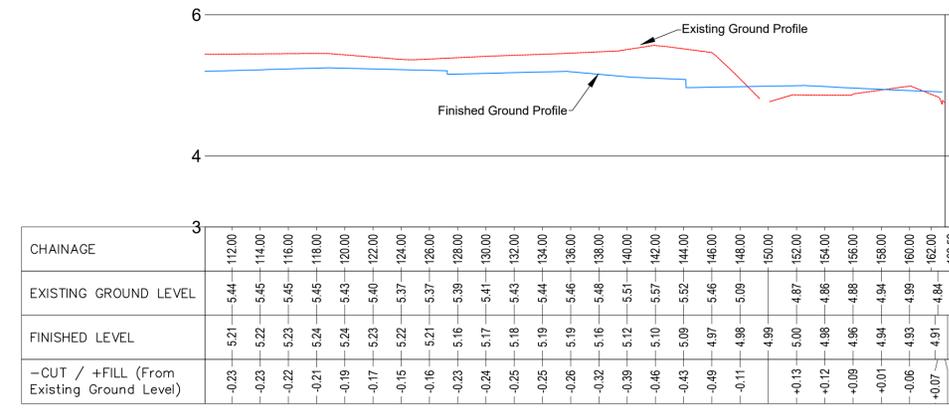
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LONGITUDINAL SECTION - Site Perimeter
STATIONS 110.10 - 163
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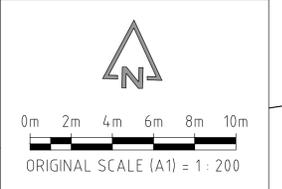
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LEGEND

SECURITY FENCE 

SILT FENCE 

STABILISED ENTRY 



STANLEY ROAD

FOR RESOURCE CONSENT

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**RESIDENTIAL DEVELOPMENT
99A STANLEY ROAD
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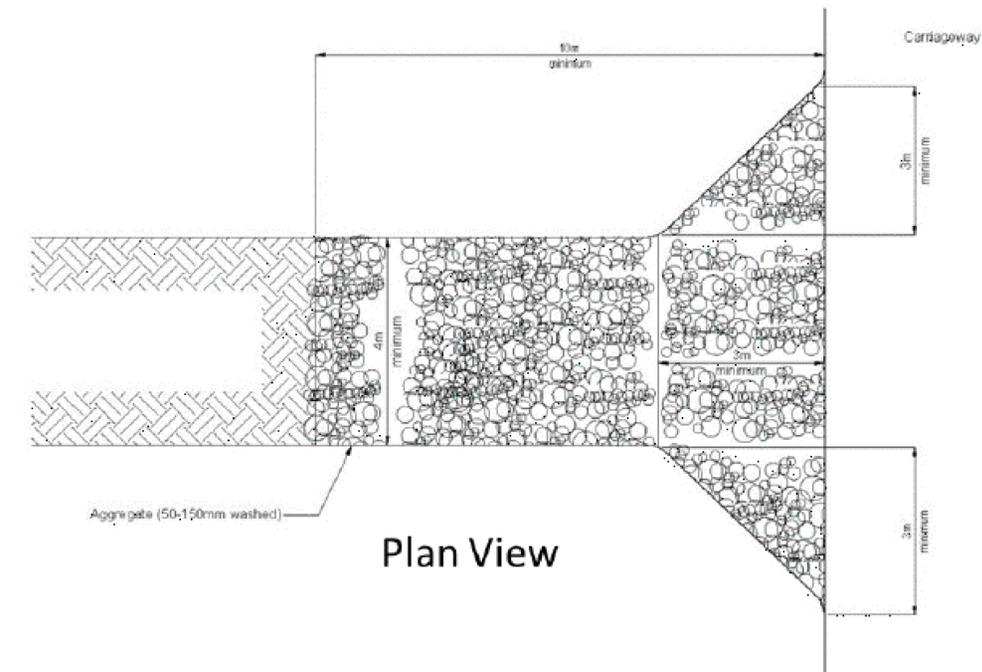
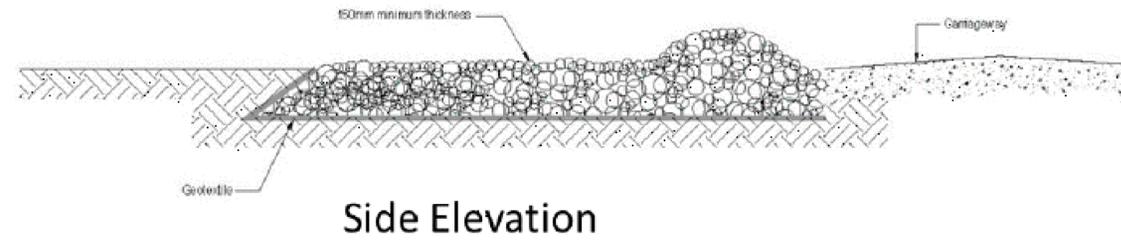
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EROSION & SEDIMENT CONTROL PLAN**

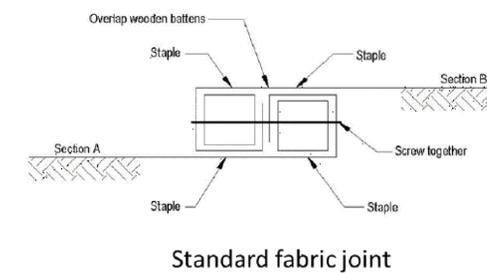
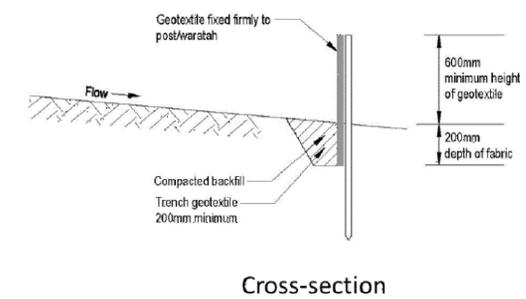
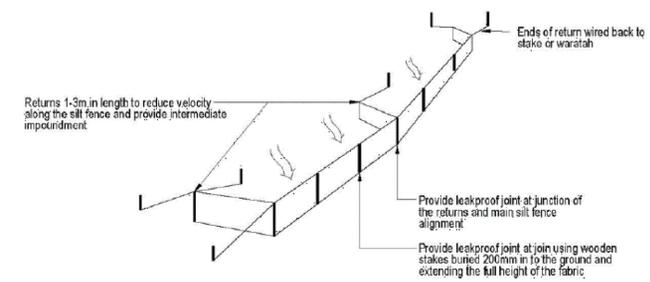
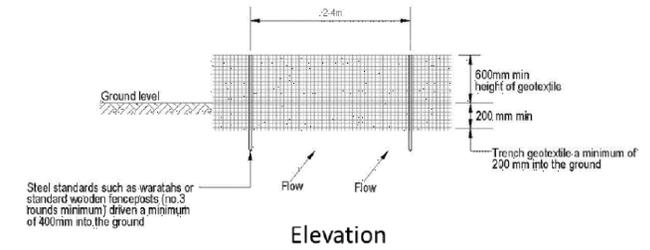
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Design parameter	Specification
Aggregate size	50 - 150 mm washed aggregate
Minimum thickness	150 mm
Minimum length	10 m
Minimum width	4 m



STABILIZED CONSTRUCTION ENTRANCE SCHEMATIC
From GD05 - Erosion & Sediment Control Guide - 06/2015



SILT FENCE SCHEMATIC
From GD05 - Erosion & Sediment Control Guide - 06/2015

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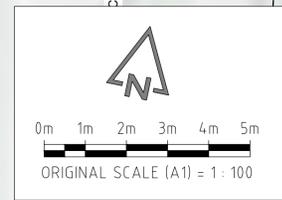
PROJECT: RESIDENTIAL DEVELOPMENT
99A STANLEY ROAD
GISBORNE

INFRASTRUCTURE SOLUTIONS || PROJECT MANAGEMENT
PO Box 7335, Taradale 4141
Phone : 06 650 5565 Email : admin@infir.nz

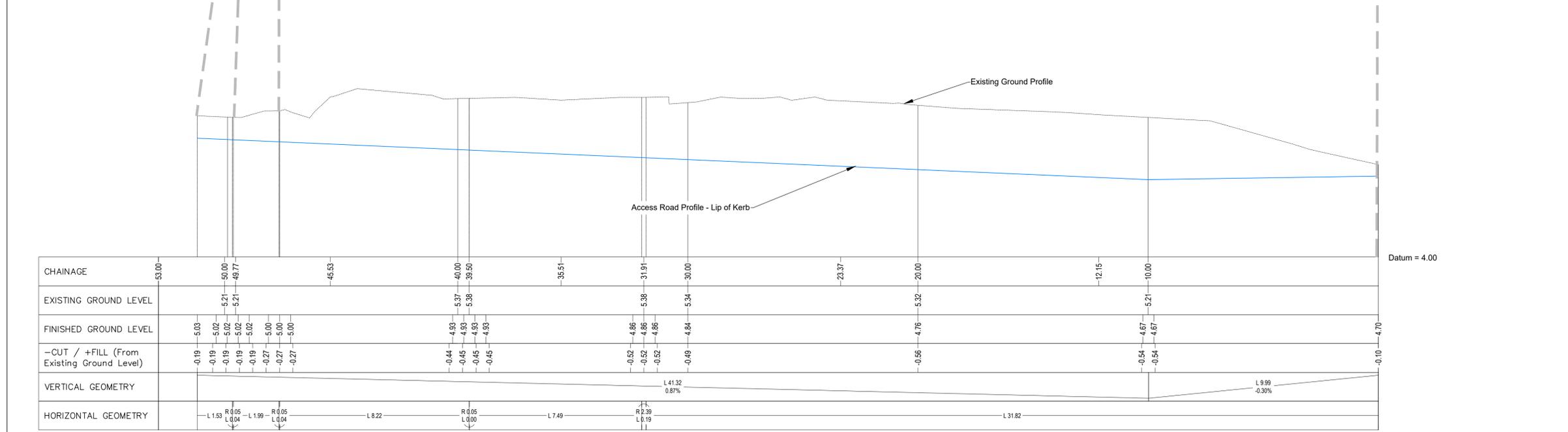
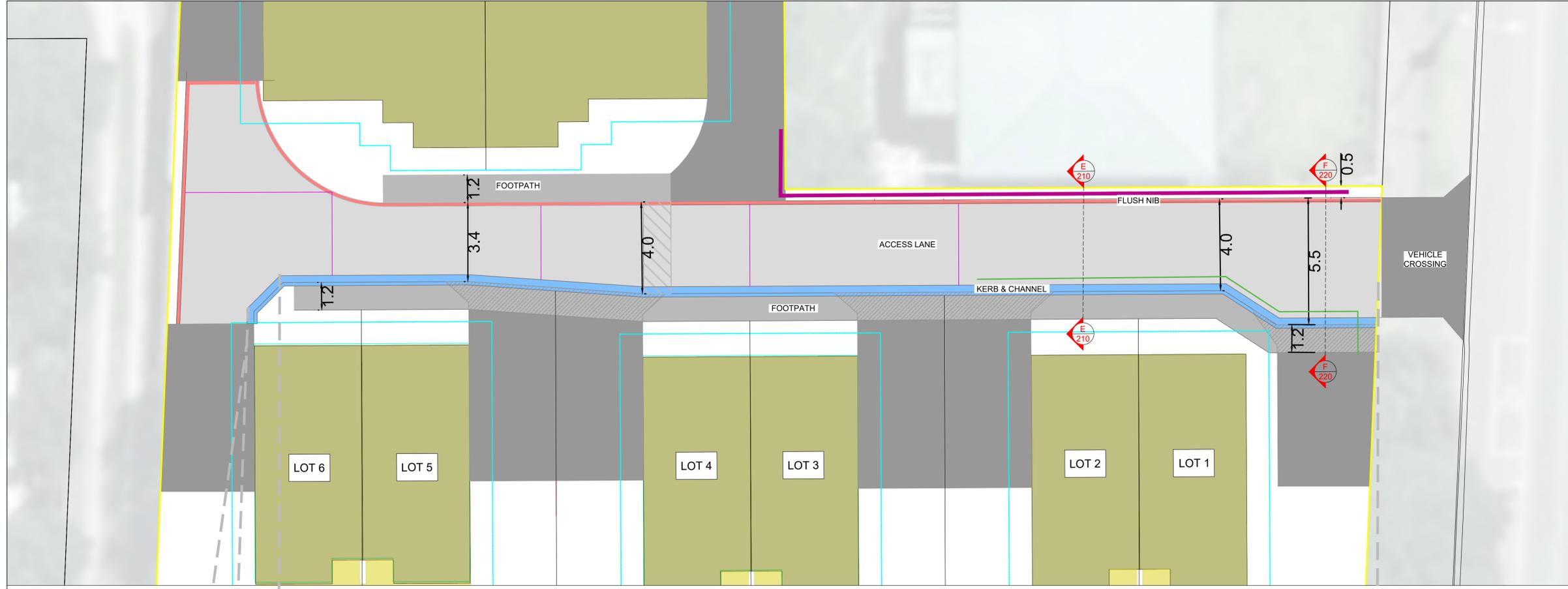
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EROSION & SEDIMENT CONTROL DETAIL

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DRAWN BY: KP	A1 DWG SCALE: NA	PROJ / DWG / SHEET: J23231 / 141	REVISION: 0	





LEGEND	
	CARRIAGEWAY / ACCESS LANE
	FOOTPATH
	VEHICLE CROSSING
	RETAINING WALL
	FLUSH NIB
	STANDARD KERB & CHANNEL



CHAINAGE	50.00	50.00	49.77	45.53	40.00	39.50	35.51	31.91	30.00	23.37	20.00	12.15	10.00	4.70
EXISTING GROUND LEVEL		-5.21	-5.21		-5.37	-5.38		-5.38	-5.34		-5.32		-5.21	-4.70
FINISHED GROUND LEVEL	-5.03	-5.02	-5.02		-4.93	-4.93		-4.86	-4.84		-4.76		-4.67	-4.70
-CUT / +FILL (From Existing Ground Level)	-0.19	-0.19	-0.19		-0.44	-0.45		-0.52	-0.49		-0.56		-0.54	-0.10
VERTICAL GEOMETRY								L 41.32 0.87%					L 9.99 -0.30%	
HORIZONTAL GEOMETRY	L 1.53	R 0.05 L 0.04	L 1.99		L 8.22	R 0.05 L 0.00	L 7.49	R 2.39 L 0.19		L 31.82				

LONGITUDINAL SECTION - Accessway - Lip of Kerb
 SCALES: HOR 1:100 & VERT 1:20

FOR RESOURCE CONSENT

REV	DESCRIPTION TO REVISION	REV BY	DATE
3	UPDATED FOR RESOURCE CONSENT	SS	30-08-2024
2	UPDATED FOR RESOURCE CONSENT	SS	19-04-2024
1	UPDATED FOR RESOURCE CONSENT	KP	08-02-2024
0	ORIGINAL	KP	19-10-2023

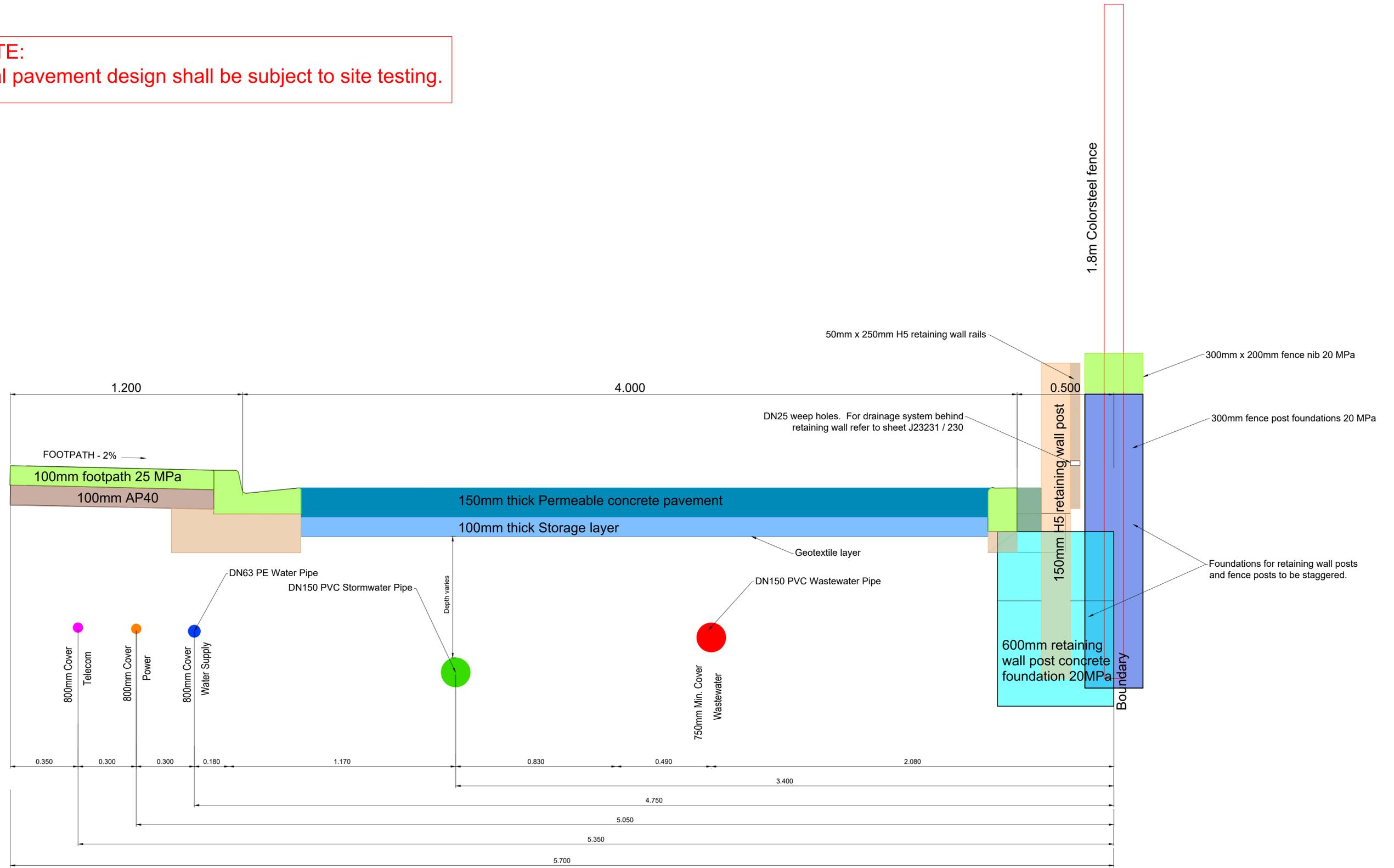
NOTES :

CLIENT	TW PROPERTY GROUP
PROJECT	RESIDENTIAL DEVELOPMENT 99A STANLEY ROAD GISBORNE

INFRASTRUCTURE SOLUTIONS PROJECT MANAGEMENT	
PO Box 7335, Taradale 4141	
Phone : 06 650 5565	Email : admin@infir.nz
DRAWING TITLE	
ROADING OVERALL PLAN & LONG SECTION	
PROPOSAL CHECKED:	CAD CHECKED:
PROPOSAL APPROVED:	CLIENT APPROVED:
ENGINEER APPROVED:	
DRAWN BY: KP	SCALE: 1:100
PROJ / DWG / SHEET: J23231 / 200	REVISION: 1



NOTE:
Final pavement design shall be subject to site testing.



TYPICAL CROSS-SECTION (E)

Scale 1:10

FOR RESOURCE CONSENT

REV	DESCRIPTION TO REVISION	REV BY	DATE
2	UPDATED FOR RESOURCE CONSENT	SS	30-08-2024
1	UPDATED FOR RESOURCE CONSENT	KP	08-02-2024
0	ORIGINAL	KP	19.10.2023

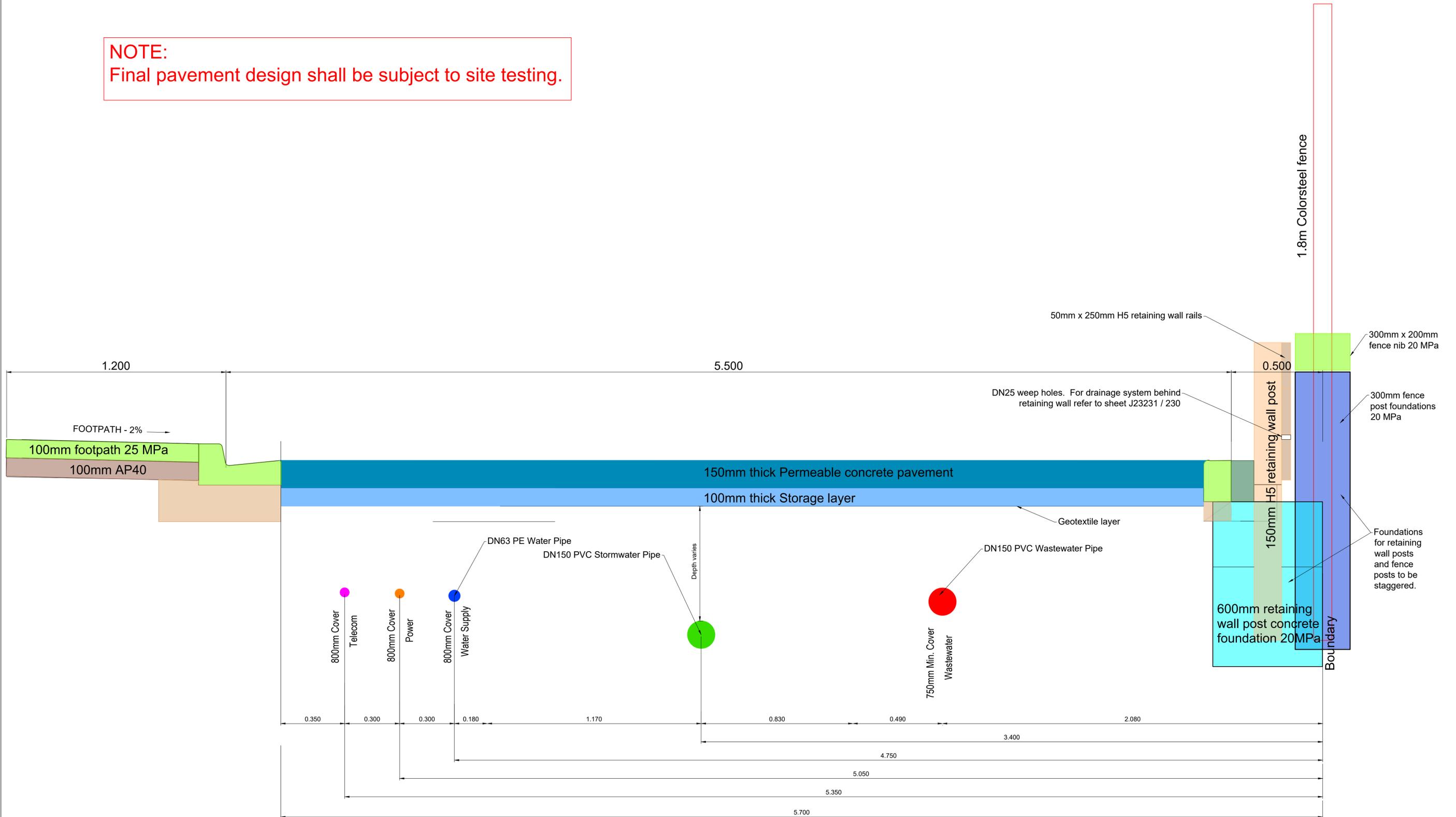
NOTES:

CLIENT	TW PROPERTY GROUP
PROJECT	RESIDENTIAL DEVELOPMENT 99A STANLEY ROAD NAPIER

INFRASTRUCTURE SOLUTIONS PROJECT MANAGEMENT	
PO Box 7335, Taradale 4141 Phone : 06 650 5565 Email : admin@infir.nz	
DRAWING TITLE ROADING CROSS-SECTION (1/2)	
PROPOSAL CHECKED: KP	CAD CHECKED: AS SHOWN
PROPOSAL APPROVED: J23231 / 210	CLIENT APPROVED: 1
ENGINEER APPROVED:	REVISION: 1



NOTE:
Final pavement design shall be subject to site testing.



TYPICAL CROSS-SECTION (F)
Scale 1:10

FOR RESOURCE CONSENT

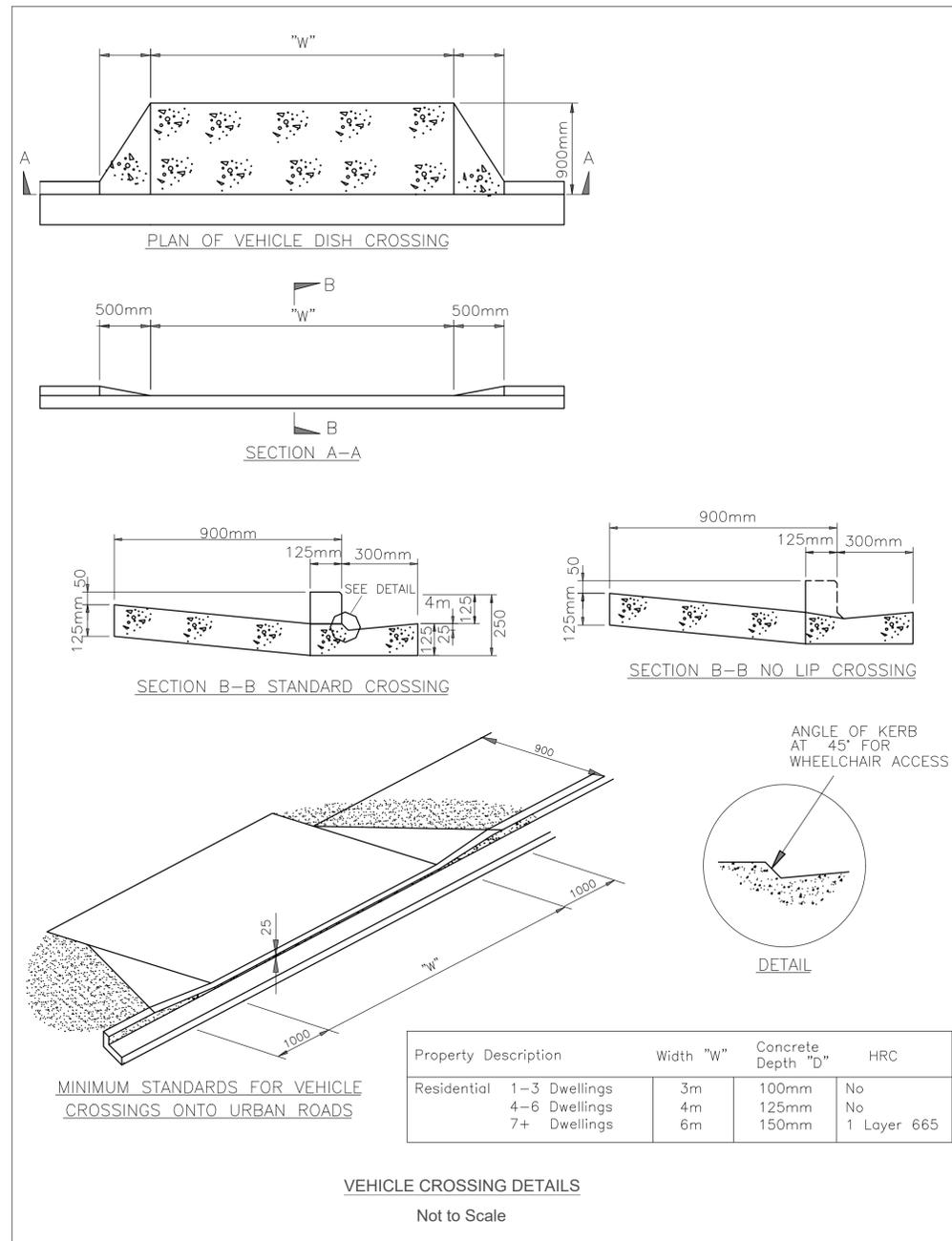
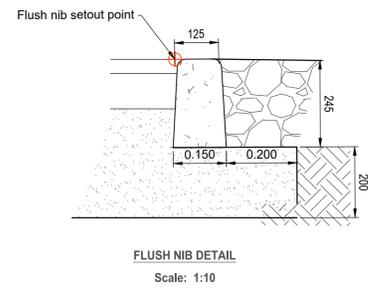
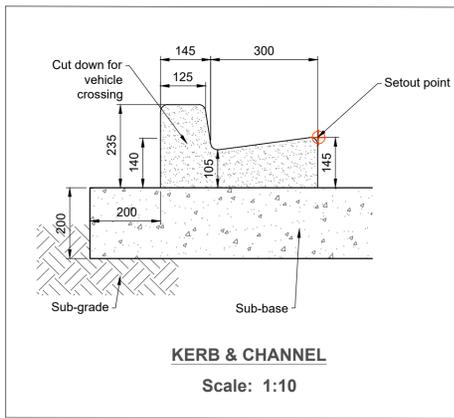
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2	UPDATED FOR RESOURCE CONSENT	SS	30-08-2024
1	UPDATED FOR RESOURCE CONSENT	KP	08-02-2024
0	ORIGINAL	KP	19.10.2023

NOTES:

CLIENT: TW PROPERTY GROUP
PROJECT: RESIDENTIAL DEVELOPMENT 99A STANLEY ROAD NAPIER

INFRASTRUCTURE SOLUTIONS || PROJECT MANAGEMENT
PO Box 7335, Taradale 4141
Phone: 06 650 5565 Email: admin@infir.nz
DRAWING TITLE: ROADING CROSS-SECTION (2/2)
PROPOSAL CHECKED: CAD CHECKED: PROPOSAL APPROVED: CLIENT APPROVED: ENGINEER APPROVED:
DRAWN BY: KP A1 DWG SCALE: AS SHOWN PROJ / DWG / SHEET: J23231 / 210 REVISION: 1





FOR BUILDING CONSENT

REV	DESCRIPTION TO REVISION	REV BY	DATE
0	ISSUED FOR BUILDING CONSENT	KP	99.99.9999

NOTES :

CLIENT: TW PROPERTY GROUP

PROJECT: RESIDENTIAL DEVELOPMENT
99A STANLEY ROAD
NAPIER

INFRASTRUCTURE SOLUTIONS || PROJECT MANAGEMENT
PO Box 7335, Taradale 4141
Phone : 06 650 5565 Email : admin@infir.nz

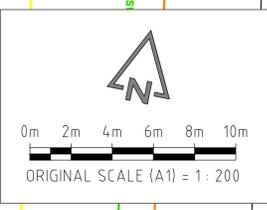
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TYPICAL DETAILS

PROPOSAL CHECKED:	CAD CHECKED:	PROPOSAL APPROVED:	CLIENT APPROVED:	ENGINEER APPROVED:
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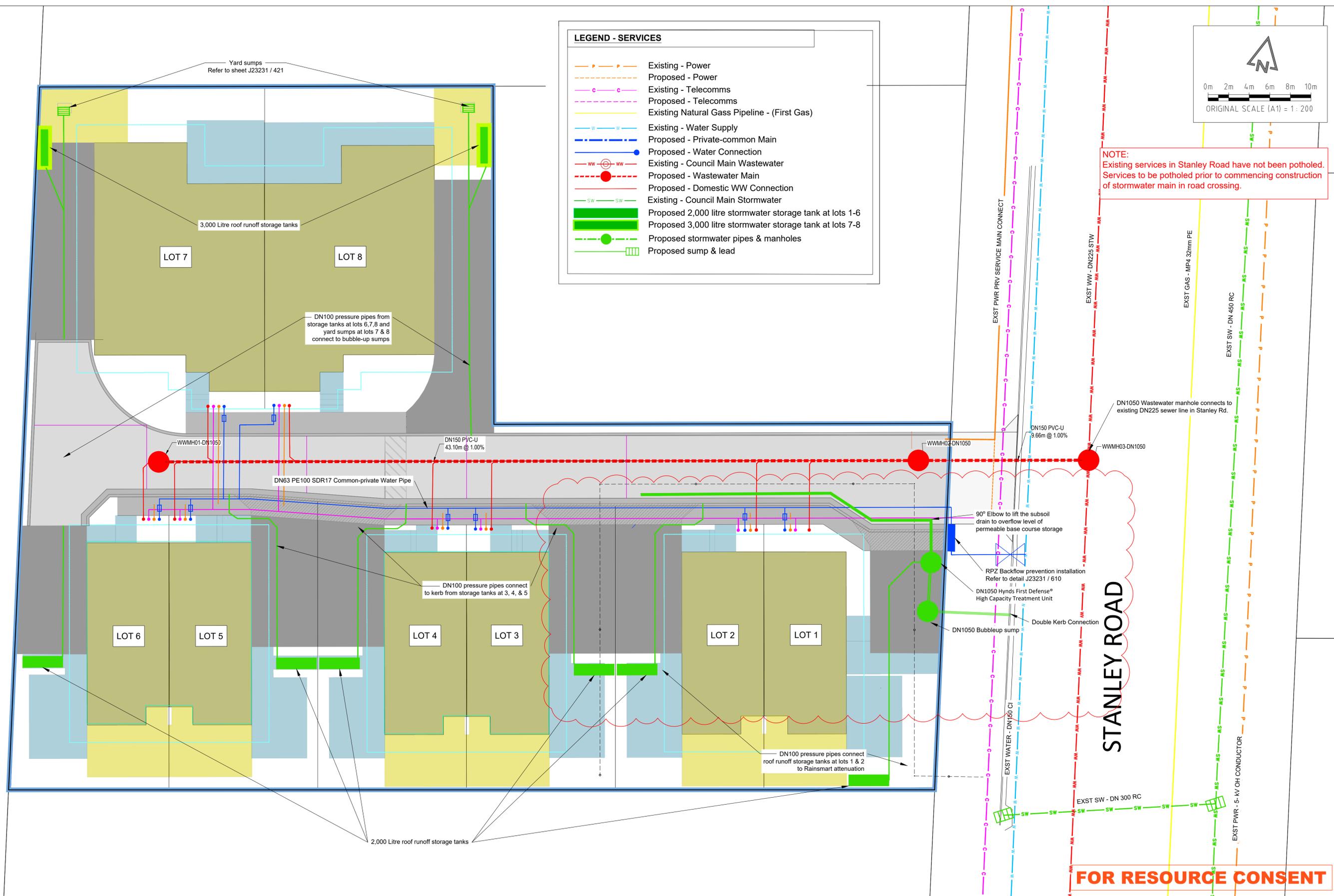


LEGEND - SERVICES

- P — P — Existing - Power
- - - P - - - Proposed - Power
- C — C — Existing - Telecomms
- - - C - - - Proposed - Telecomms
- G — G — Existing Natural Gas Pipeline - (First Gas)
- W — W — Existing - Water Supply
- - - W - - - Proposed - Private-common Main
- ● — ● — Proposed - Water Connection
- WW — WW — Existing - Council Main Wastewater
- - - WW - - - Proposed - Wastewater Main
- ● — ● — Proposed - Domestic WW Connection
- SW — SW — Existing - Council Main Stormwater
- ● — ● — Proposed 2,000 litre stormwater storage tank at lots 1-6
- ● — ● — Proposed 3,000 litre stormwater storage tank at lots 7-8
- ● — ● — Proposed stormwater pipes & manholes
- ● — ● — Proposed sump & lead



NOTE:
Existing services in Stanley Road have not been potholed. Services to be potholed prior to commencing construction of stormwater main in road crossing.



REV	DESCRIPTION TO REVISION	REV BY	DATE
4	UPDATED FOR RESOURCE CONSENT	SS	19-04-2024
3	UPDATED FOR RESOURCE CONSENT	KP	08-02-2024
2	WATER SUPPLY CONNECTION UPDATED	KP	23-11-2023
1	SILT PIT STORMWATER TREATMENT UPDATED	KP	08-11-2023
0	ORIGINAL	KP	19-10-2023

NOTES:

CLIENT
TW PROPERTY GROUP

PROJECT
**RESIDENTIAL DEVELOPMENT
99A STANLEY ROAD
GISBORNE**

INFRASTRUCTURE SOLUTIONS || PROJECT MANAGEMENT
PO Box 7335, Taradale 4141
Phone : 06 650 5565 Email : admin@infir.nz

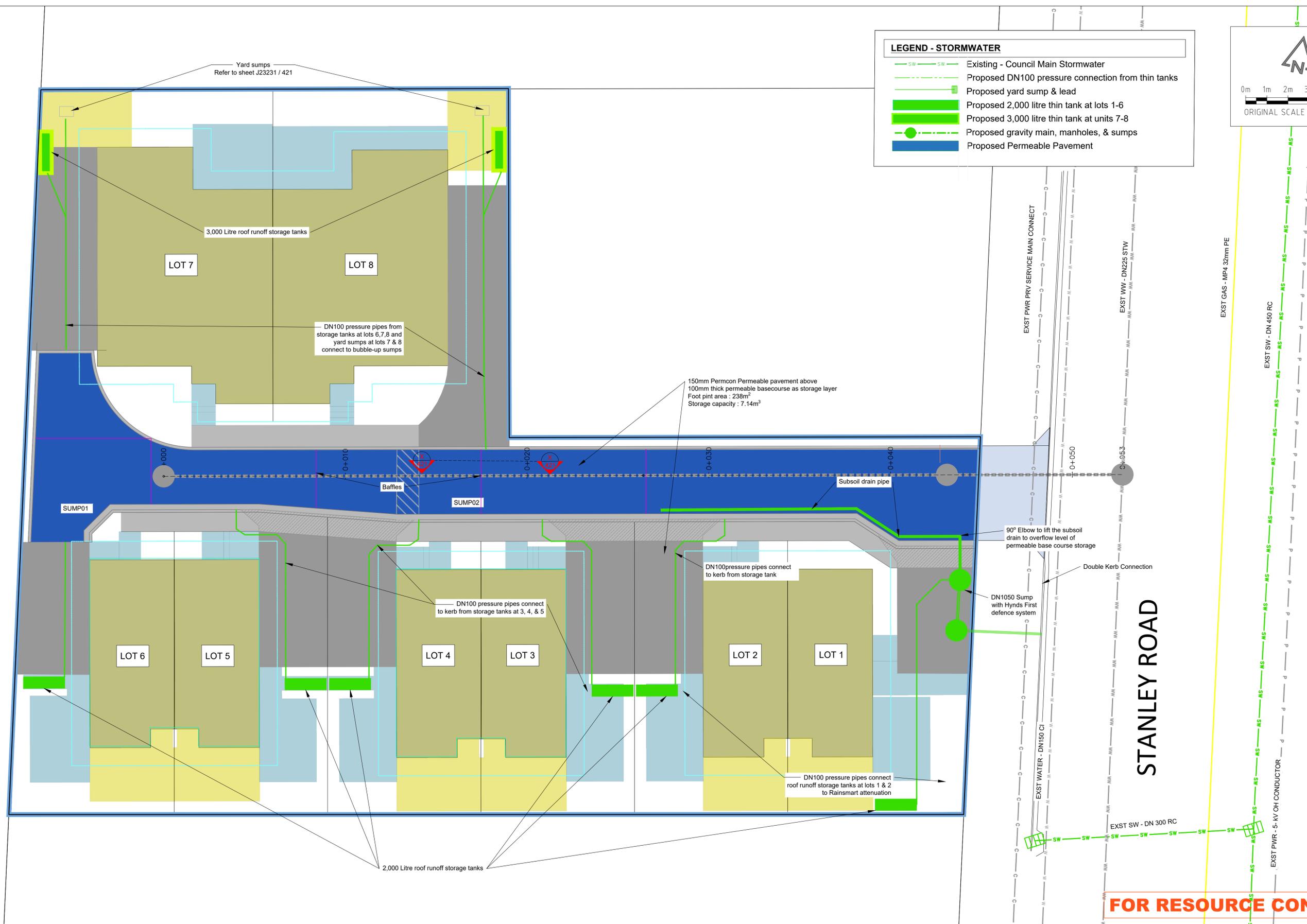
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**SERVICES
OVERALL SERVICES PLAN**

PROPOSAL CHECKED:	CAD CHECKED:	PROPOSAL APPROVED:	CLIENT APPROVED:	ENGINEER APPROVED:
DRAWN BY: KP	A1 DWG SCALE: 1:100	PRJ / DWG / SHEET: J23231 / 300	REVISION: 3	

LEGEND - STORMWATER

- SW — SW Existing - Council Main Stormwater
- Proposed DN100 pressure connection from thin tanks
- Proposed yard sump & lead
- Proposed 2,000 litre thin tank at lots 1-6
- Proposed 3,000 litre thin tank at units 7-8
- Proposed gravity main, manholes, & sumps
- Proposed Permeable Pavement

0m 1m 2m 3m 4m 5m
ORIGINAL SCALE (A1) = 1 : 100



REV	DESCRIPTION TO REVISION	REV BY	DATE
0	ISSUED FOR RESOURCE CONSENT	SS	19-04-2024

NOTES:

CLIENT
TW PROPERTY GROUP

PROJECT
**RESIDENTIAL DEVELOPMENT
99A STANLEY ROAD
GISBORNE**

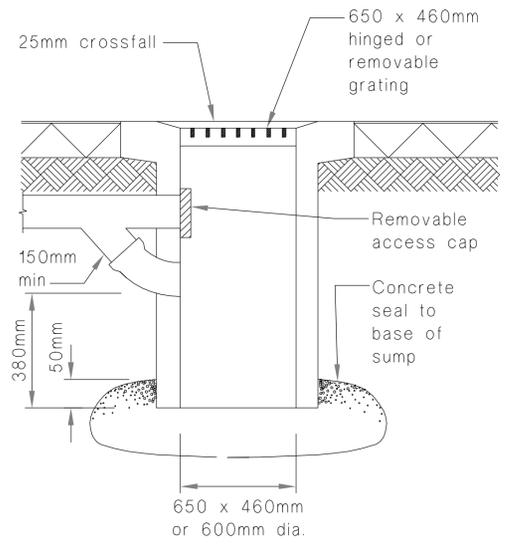
INFRASTRUCTURE SOLUTIONS || PROJECT MANAGEMENT
PO Box 7335, Taradale 4141
Phone : 06 650 5565 Email : admin@infir.nz

DRAWING TITLE
**STORMWATER
OVERALL PLAN**

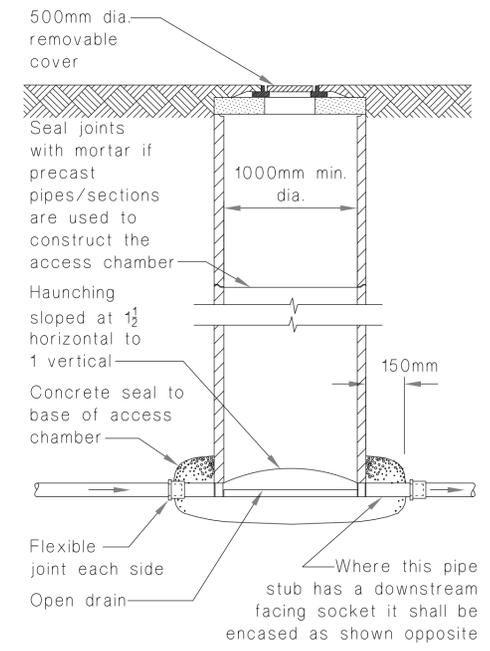
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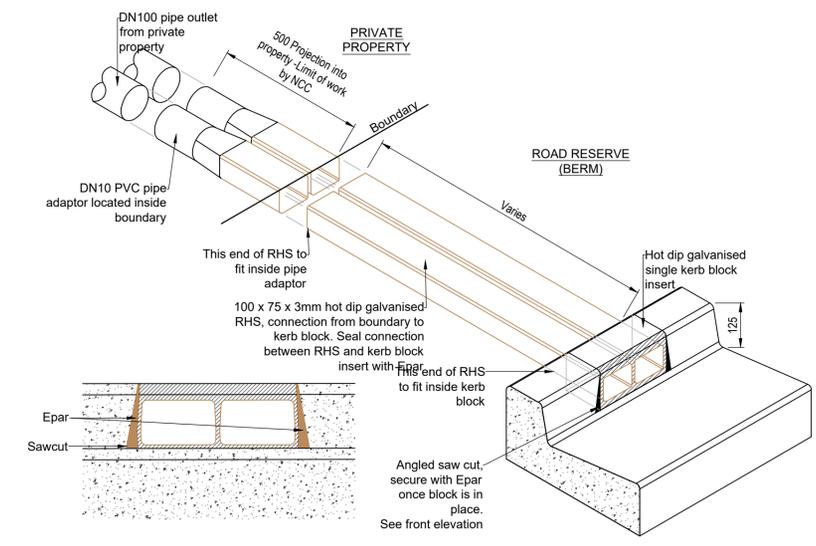
FOR RESOURCE CONSENT



TYPICAL SUMP WITHG BUBBLE-UP CHAMBER
(from New Zealand Building Code Clause E1 -Surface Water)
Not To Scale



TYPICAL STORMWATER MANHOLE / ACCESS CHAMBER
(from New Zealand Building Code Clause E1 -Surface Water)
Not To Scale

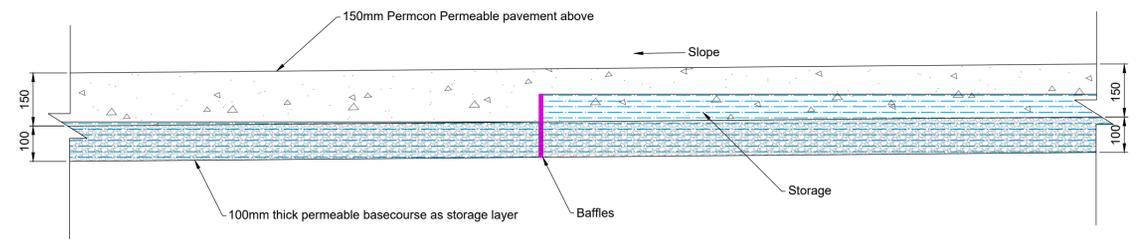


NOTES

- 1. Single kerb connection only to be used with approval of Service Engineer.

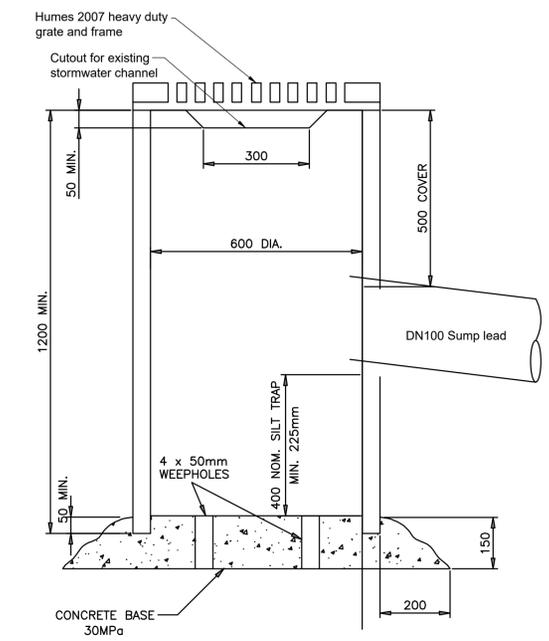
DOUBLE STORMWATER CONNECTION TO KERB AND CHANNEL

Scale: 1:10



PERMEABLE CONCRETE LONGITUDINAL CROSS SECTION X-X (J23231/400)

Scale: 1:10



YARD SUMP DETAIL

Scale: 1:10

FOR RESOURCE CONSENT

REV	DESCRIPTION TO REVISION	REV BY	DATE
0	ISSUED FOR RESOURCE CONSENT	KP	19-04-2024

NOTES:

CLIENT: TW PROPERTY GROUP

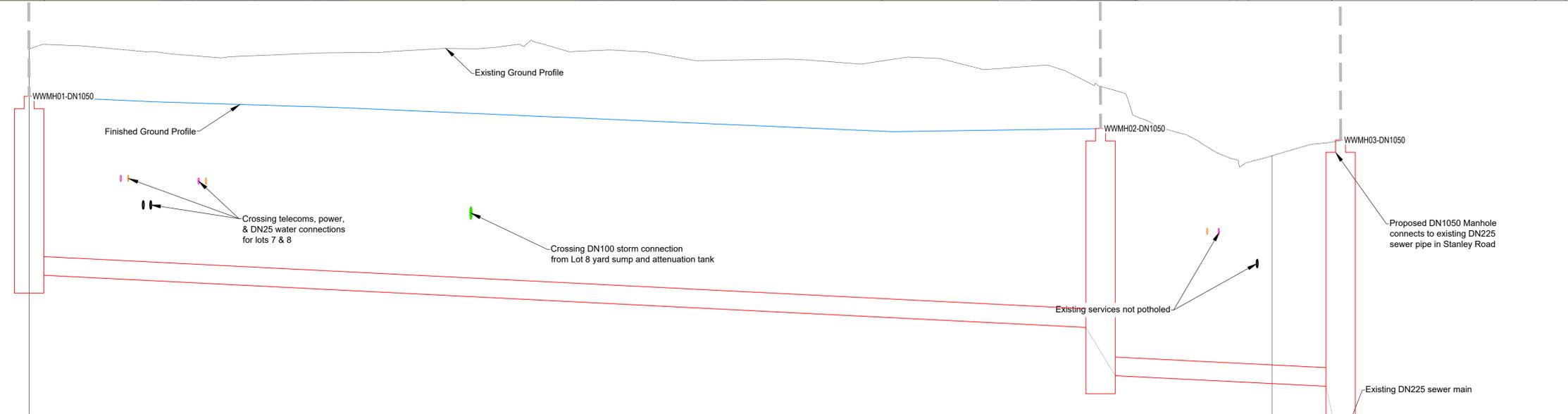
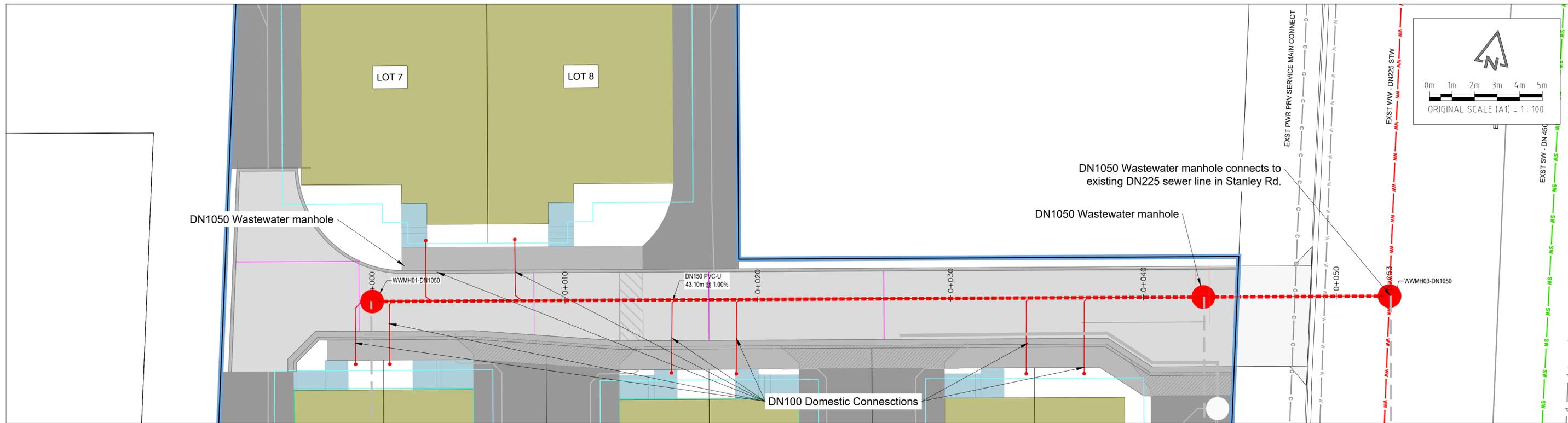
PROJECT: RESIDENTIAL DEVELOPMENT
99A STANLEY ROAD
GISBORNE

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PO Box 7335, Taradale 4141
Phone : 06 650 5565 Email : admin@infr.nz

DRAWING TITLE: STORMWATER TYPICAL DETAILS

PROPOSAL CHECKED: KP	CAD CHECKED: AS SHOWN	PROPOSAL APPROVED: PROJ / DWG / SHEET: J23231 / 421	CLIENT APPROVED: REVISION: 0	ENGINEER APPROVED:
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Datum = 2.00	
CHAINAGE	0.00 — 0.59 — 42.51 — 43.89 — 50.00 — 52.17 — 52.80 — 55.00
FINISHED GROUND LEVEL	5.02 — 5.01 — 4.76 — 4.76 — 2.710 — 2.688 — 2.120 — 2.12
INVERT LEVEL	3.581 — 3.162 — 2.773 — 2.710 — 2.688 — 2.120
DEPTH TO INVERT	1.43 — 1.85 — 1.99 — 1.99 — 2.710 — 2.688 — 2.120
PIPE LENGTH & GRADE (Length to MH centres)	43.10 @ 1.000% 9.66 @ 1.000%
PIPE DESCRIPTION	DN150 PVC-U DN150 PVC-U

LONGITUDINAL SECTION - Wastewater
 SCALES HORIZ 1:100 VERT 1:20

FOR RESOURCE CONSENT

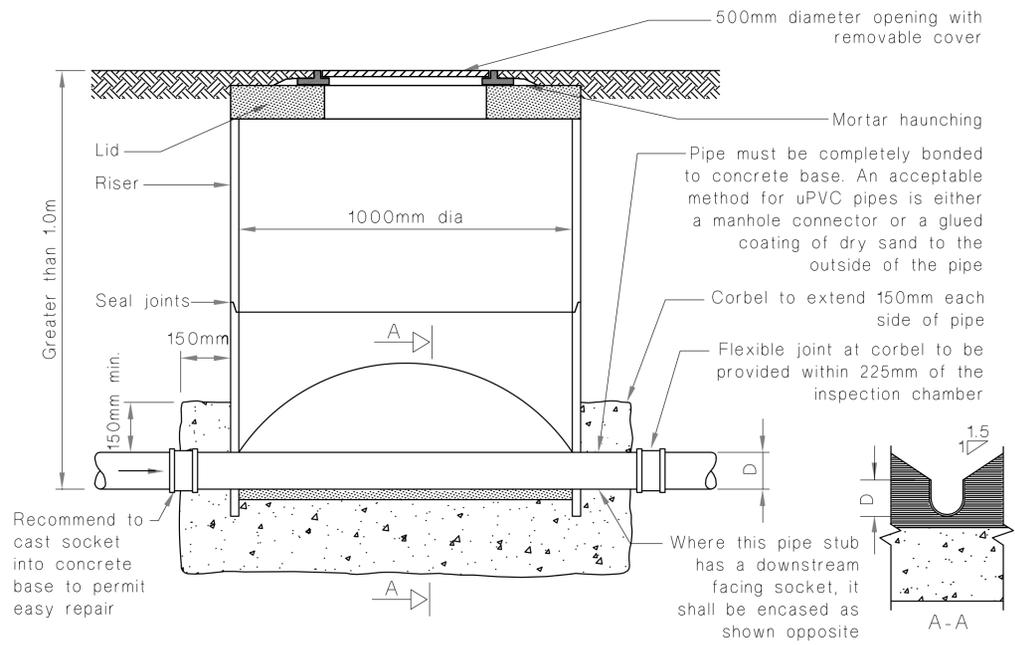
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2	UPDATED FOR RESOURCE CONSENT	SS	19-04-2024
1	UPDATED FOR RESOURCE CONSENT	KP	08-02-2024
0	ORIGINAL	KP	19-10-2023

NOTES:

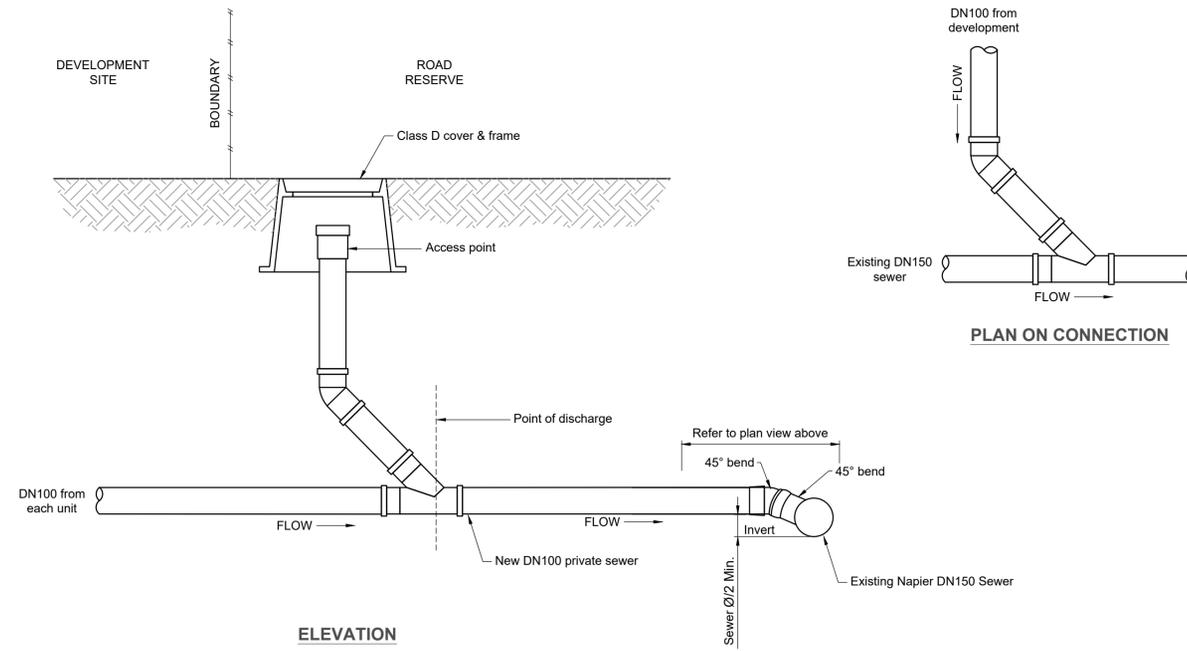
CLIENT: TW PROPERTY GROUP
 PROJECT: RESIDENTIAL DEVELOPMENT 99A STANLEY ROAD GIBBORNE

INFRASTRUCTURE SOLUTIONS || PROJECT MANAGEMENT
 PO Box 7335, Taradale 4141
 Phone : 06 650 5565 Email : admin@infir.nz
 DRAWING TITLE: WASTEWATER OVERALL PLAN & LONG SECTION
 PROPOSAL CHECKED: CAD CHECKED: PROPOSAL APPROVED: CLIENT APPROVED: ENGINEER APPROVED:
 DRAWN BY: KP A1 DWG SCALE: 1:100 PRJ / DWG / SHEET: J23231 / 510 REVISION: 1

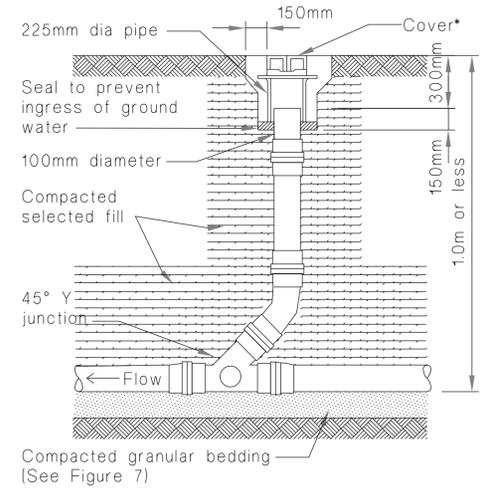




STANDARD CIRCULAR ACCESS CHAMBER WITH OPEN DRAIN
(from New Zealand Building Code Clause G13 - Foul Water)
Not To Scale



SEWER POINT OF DISCHARGE DETAIL
Not To Scale



SEWER POINT OF DISCHARGE DETAIL
(from New Zealand Building Code Clause G13 - Foul Water)
Not To Scale

FOR RESOURCE CONSENT

REV	DESCRIPTION TO REVISION	REV BY	DATE
0	ISSUED FOR RESOURCE CONSENT	KP	19-04-2024

NOTES:

CLIENT: TW PROPERTY GROUP

PROJECT: RESIDENTIAL DEVELOPMENT
99A STANLEY ROAD
GISBORNE

INFRASTRUCTURE SOLUTIONS || PROJECT MANAGEMENT
PO Box 7335, Taradale 4141
Phone : 06 650 5565 Email : admin@infir.nz

DRAWING TITLE: WASTEWATER TYPICAL DETAILS

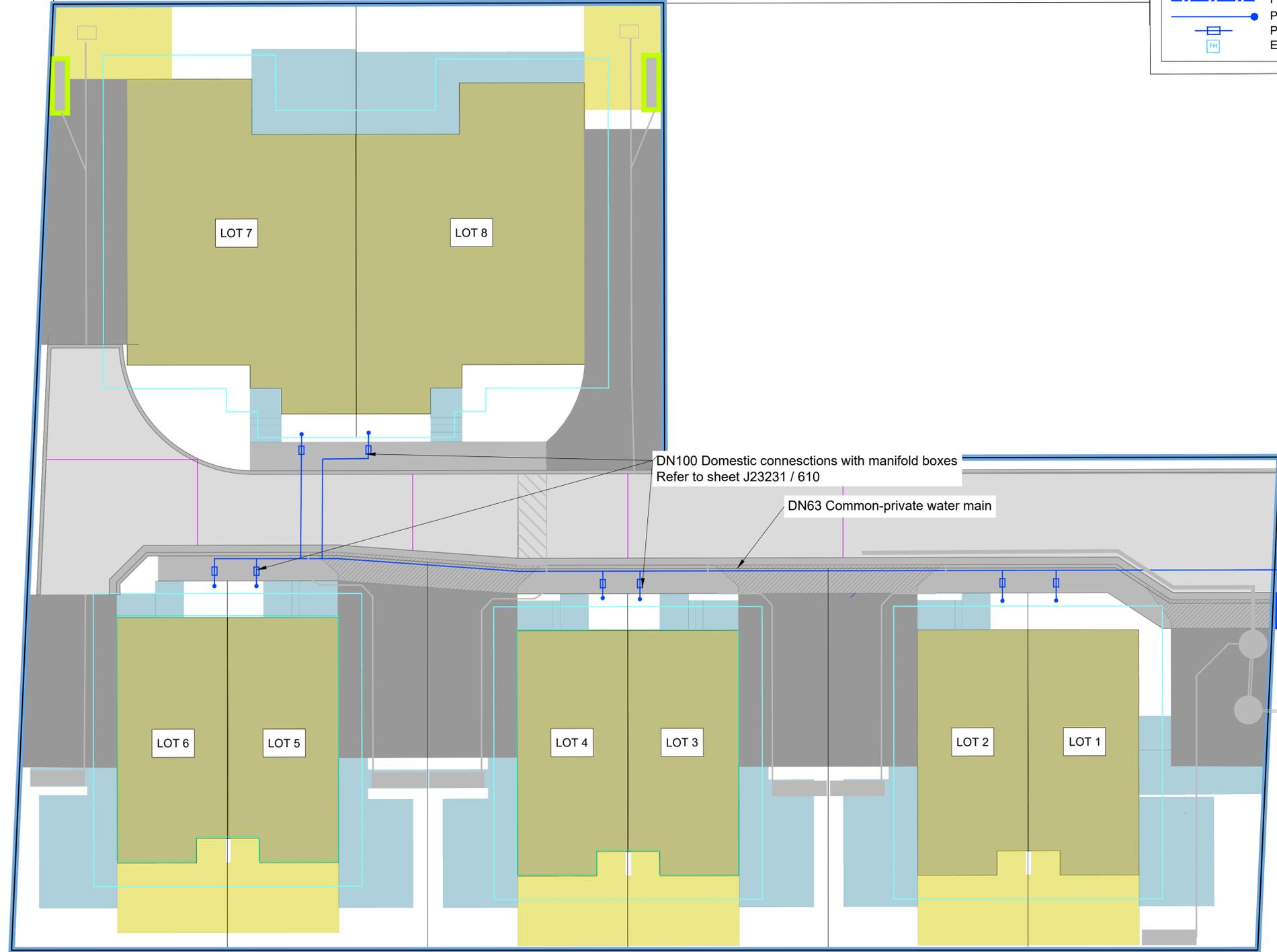
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DRAWN BY: KP	A1 DWG SCALE: AS SHOWN	PRJ / DWG / SHEET: J23231 / 520	REVISION: 0	



LEGEND - WATER SUPPLY

- Existing - Water Supply
- Proposed - DN63 Common-Private Water Main
- Proposed - DN20 Water Connection
- Proposed - Manifold Box - Domestic Connection
- Existing - Fire Hydrants

0m 2m 4m 6m 8m 10m
ORIGINAL SCALE (A1) = 1 : 200



DN100 Domestic connections with manifold boxes
Refer to sheet J23231 / 610

DN63 Common-private water main

RPZ Backflow prevention installation
Refer to sheet J23231 / 610

DN50 Valve

STANLEY ROAD

FOR RESOURCE CONSENT

REV	DESCRIPTION TO REVISION	REV BY	DATE
0	ISSUED FOR RESOURCE CONSENT	KP	19-04-2024

NOTES :

CLIENT TW PROPERTY GROUP

PROJECT RESIDENTIAL DEVELOPMENT
99A STANLEY ROAD
GISBORNE

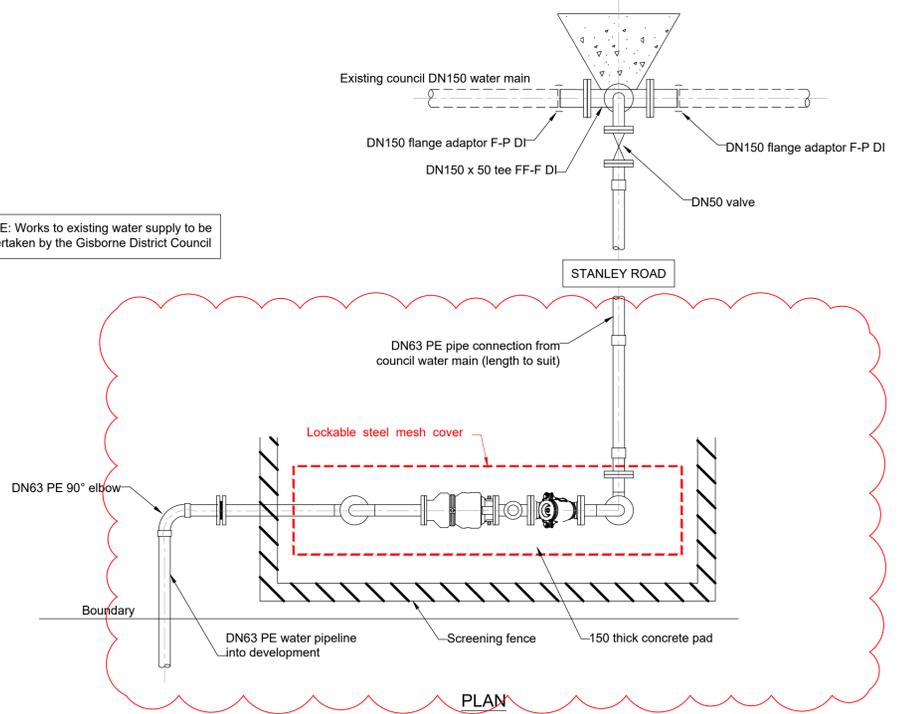
INFRASTRUCTURE SOLUTIONS || PROJECT MANAGEMENT
PO Box 7335, Taradale 4141
Phone : 06 650 5565 Email : admin@infir.nz

DRAWING TITLE WATER SUPPLY
OVERALL PLAN

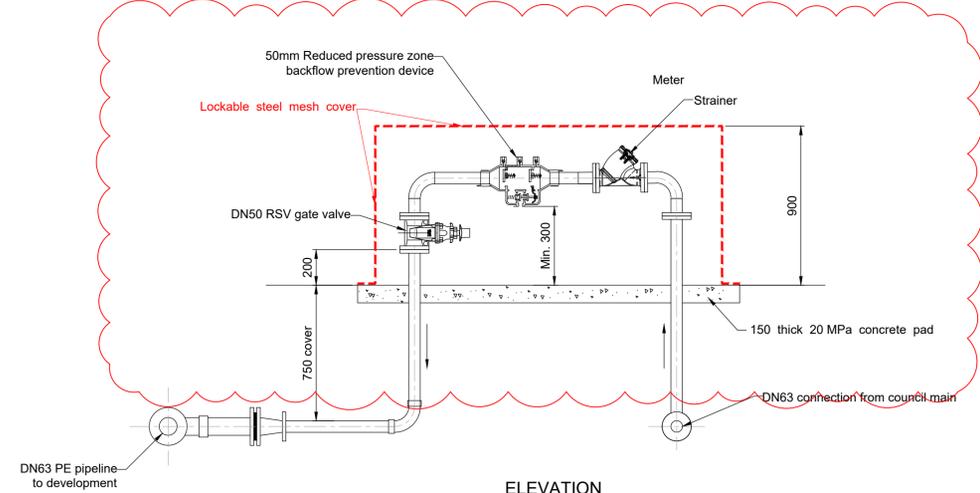
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NOTE: Works to existing water supply to be undertaken by the Gisborne District Council

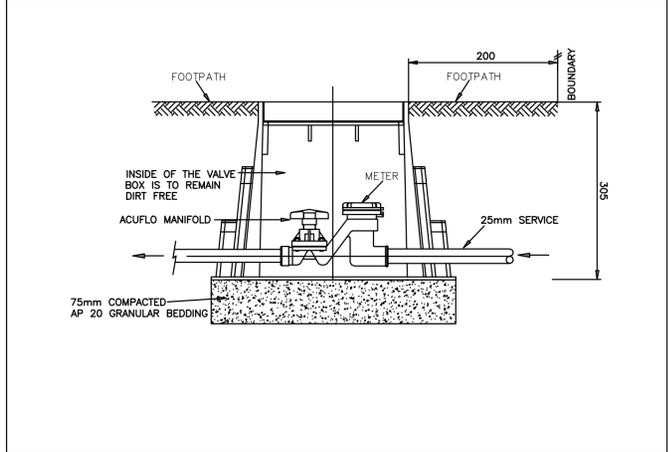


PLAN



ELEVATION

CONNECTION FROM COUNCIL MAIN TO BACKFLOW INSTALLATION
Scale 1:20



FOR RESOURCE CONSENT

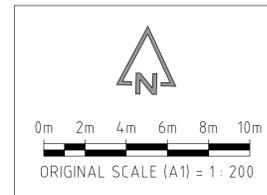
REV	DESCRIPTION TO REVISION	REV BY	DATE
1	UPDATED FOR RESOURCE CONSENT	KP	08-02-2024
0	ORIGINAL	KP	23-11-2023

NOTES:

CLIENT	TW PROPERTY GROUP
PROJECT	RESIDENTIAL DEVELOPMENT 99A STANLEY ROAD GISBORNE

INFRASTRUCTURE SOLUTIONS PROJECT MANAGEMENT			
PO Box 7335, Taradale 4141			
Phone : 06 650 5565 Email : admin@infir.nz			
DRAWING TITLE WATER SUPPLY TYPICAL DETAILS			
PROPOSAL CHECKED:	CAD CHECKED:	PROPOSAL APPROVED:	CLIENT APPROVED:
ENGINEER APPROVED:			
DRAWN BY: KP	A1 DWG SCALE: AS SHOWN	PRJ / DWG / SHEET: J23231 / 610	REVISION: 1





Existing Fire Hydrant #1
Distance = 128 Meters

Existing Fire Hydrant #2
Distance = 130 Meters

LEGEND

- FH Nearest Existing Fire Hydrants
- Path to Hydrant #1
- Path to Hydrant #2

FOR RESOURCE CONSENT

REV	DESCRIPTION TO REVISION	REV BY	DATE
1	UPDATED FOR RESOURCE CONSENT	SS	19-04-2024
0	ORIGINAL	KP	2023.10.06

NOTES :

CLIENT
TW PROPERTY GROUP

PROJECT
**RESIDENTIAL DEVELOPMENT
99A STANLEY ROAD
GISBORNE**

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PO Box 7335, Taradale 4141
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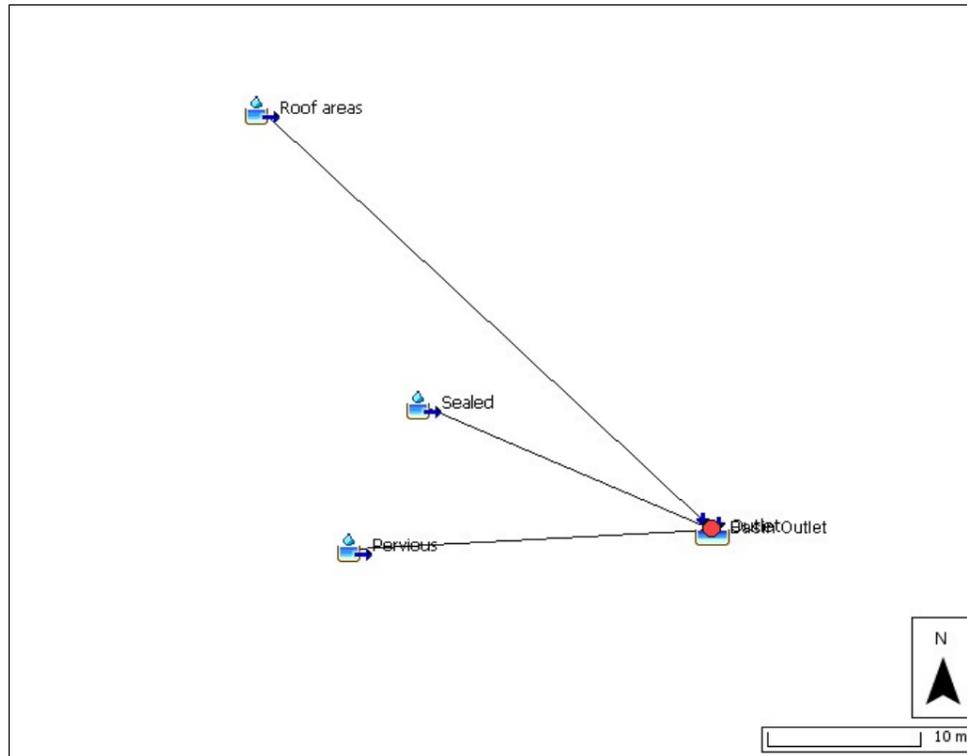
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**WATER SUPPLY
HYDRANT RANGE**

PROPOSAL CHECKED:	CAD CHECKED:	PROPOSAL APPROVED:	CLIENT APPROVED:	ENGINEER APPROVED:
DRAWN BY: KP	A1 DWG SCALE: 1:200	PRJ / DWG / SHEET: J23215 / 620	REVISION: 1	



Appendix C Stormwater Calculations

Pre development Schematic model and input Parameters



Pre Development model input Parameters

SCS Curve number and SCS unit hydrograph are the methods used for Subbasin Loss and Subbasin transform respectively

Area type	Area (m2)
Roof areas	367
Sealed Areas	270
Pervious areas	953
Total area	1590

Description	Paved Parking areas driveways, roofs etc	Curve Number CN	Product of CNxArea	Open space	Curve Number CN	Product of CNxArea	CN (Weighted)=	Total Area (m2)	Total Area (km2)	Ia: Initial abstraction (mm)	Channelisation factor, C	Catchment length, L (km)	Catchment slope, Sc (m/m)	Time of concentration, t _c (hrs)	Time of concentration, t _c (min)	SCS LAG For HEC-HMS, t _p (min)
Roof areas	367	98	35966				98	367	0.000367	0.00	0.6	0.045	0.009	0.046	7.000	4.67
Sealed Areas	270	98	26460				98	270	0.000270	0.00	0.6	0.048	0.009	0.048	7.000	4.67
Pervious areas				953	68	64804	68	953	0.000953	5.00	0.6	0.076	0.009	0.091	7.000	4.67
Total Area								1590								

Comparison Between Pre and Post development Discharge Rates

99A Stanley Road	Discharge from site			
	Description	1 in 5 year (L/s)	1 in 10 year (L/s)	1 in 100 year(L/s)
Pre Development	Total	22.94	29.85	58.88
	I _{10 minute} (mm/hr)	77.1	95.3	170
	Area (m ²)	1589	1590	1590
	Runoff Coefficient	0.67	0.71	0.78
Post Development unattenuated	Total	29.65	37.31	67.83
	I _{10 minute} (mm/hr)	77.1	95.3	170
	Area (m ²)	1590	1590	1590
	Runoff Coefficient	0.87	0.89	0.90
Post Development attenuated (Attenuation carried out using Roof attenuation tanks and soakage)	Total	12.54	17.99	58.88
	I _{10 minute} (mm/hr)	77.1	95.3	170
	Area (m ²)	1590	1590	1590
	Runoff Coefficient	0.37	0.43	0.78

Nested Storm Rainfall Depths

20% AEP

HIRDS rainfall depth for a 20% AEP magnitude event

Duration (minutes)	Depth (mm)
10	12.8
20	18.1
30	22.3
60	32.1
120	46
360	77.7
720	104
1440	134

10% AEP

HIRDS rainfall depth for a 10% AEP magnitude event

Duration (minutes)	Depth (mm)
10	15.9
20	22.2
30	27.3
60	39.3
120	56
360	94
720	125
1440	161

1% AEP

HIRDS rainfall depth for a 1% AEP magnitude event

Duration (minutes)	Depth (mm)
10	28.3
20	39.1
30	47.8
60	67.7
120	95.3
360	157
720	207
1440	261

Distribution of HIRDS rainfall depth data nested around a midpoint of 12 hours

Start Time	End Time	Rainfall Depth (mm)
0:00	0:10	0.42
0:10	0:20	0.42
0:20	0:30	0.42
0:30	0:40	0.42
0:40	0:50	0.42
0:50	1:00	0.42
1:00	1:10	0.42
1:10	1:20	0.42
1:20	1:30	0.42
1:30	1:40	0.42
1:40	1:50	0.42
1:50	2:00	0.42
2:00	2:10	0.42
2:10	2:20	0.42
2:20	2:30	0.42
2:30	2:40	0.42
2:40	2:50	0.42
2:50	3:00	0.42
3:00	3:10	0.42

Distribution of HIRDS rainfall depth data nested around a midpoint of 12 hours

Start Time	End Time	Rainfall Depth (mm)
0:00	0:10	0.50
0:10	0:20	0.50
0:20	0:30	0.50
0:30	0:40	0.50
0:40	0:50	0.50
0:50	1:00	0.50
1:00	1:10	0.50
1:10	1:20	0.50
1:20	1:30	0.50
1:30	1:40	0.50
1:40	1:50	0.50
1:50	2:00	0.50
2:00	2:10	0.50
2:10	2:20	0.50
2:20	2:30	0.50
2:30	2:40	0.50
2:40	2:50	0.50
2:50	3:00	0.50
3:00	3:10	0.50

Distribution of HIRDS rainfall depth data nested around a midpoint of 12 hours

Start Time	End Time	Rainfall Depth (mm)
0:00	0:10	0.75
0:10	0:20	0.75
0:20	0:30	0.75
0:30	0:40	0.75
0:40	0:50	0.75
0:50	1:00	0.75
1:00	1:10	0.75
1:10	1:20	0.75
1:20	1:30	0.75
1:30	1:40	0.75
1:40	1:50	0.75
1:50	2:00	0.75
2:00	2:10	0.75
2:10	2:20	0.75
2:20	2:30	0.75
2:30	2:40	0.75
2:40	2:50	0.75
2:50	3:00	0.75
3:00	3:10	0.75

3:10	3:20	0.42
3:20	3:30	0.42
3:30	3:40	0.42
3:40	3:50	0.42
3:50	4:00	0.42
4:00	4:10	0.42
4:10	4:20	0.42
4:20	4:30	0.42
4:30	4:40	0.42
4:40	4:50	0.42
4:50	5:00	0.42
5:00	5:10	0.42
5:10	5:20	0.42
5:20	5:30	0.42
5:30	5:40	0.42
5:40	5:50	0.42
5:50	6:00	0.42
6:00	6:10	0.42
6:10	6:20	0.73
6:20	6:30	0.73
6:30	6:40	0.73
6:40	6:50	0.73
6:50	7:00	0.73
7:00	7:10	0.73
7:10	7:20	0.73
7:20	7:30	0.73
7:30	7:40	0.73
7:40	7:50	0.73
7:50	8:00	0.73
8:00	8:10	0.73
8:10	8:20	0.73
8:20	8:30	0.73
8:30	8:40	0.73
8:40	8:50	0.73
8:50	9:00	0.73
9:00	9:10	0.73
9:10	9:20	1.32
9:20	9:30	1.32
9:30	9:40	1.32
9:40	9:50	1.32
9:50	10:00	1.32
10:00	10:10	1.32
10:10	10:20	1.32
10:20	10:30	1.32
10:30	10:40	1.32
10:40	10:50	1.32
10:50	11:00	1.32
11:00	11:10	1.32
11:10	11:20	2.32
11:20	11:30	2.32
11:30	11:40	2.32
11:40	11:50	3.27
11:50	12:00	12.80
12:00	12:10	5.30
12:10	12:20	4.20
12:20	12:30	3.27
12:30	12:40	3.27
12:40	12:50	2.32
12:50	13:00	2.32
13:00	13:10	2.32
13:10	13:20	1.32
13:20	13:30	1.32
13:30	13:40	1.32
13:40	13:50	1.32
13:50	14:00	1.32
14:00	14:10	1.32
14:10	14:20	1.32
14:20	14:30	1.32

3:10	3:20	0.50
3:20	3:30	0.50
3:30	3:40	0.50
3:40	3:50	0.50
3:50	4:00	0.50
4:00	4:10	0.50
4:10	4:20	0.50
4:20	4:30	0.50
4:30	4:40	0.50
4:40	4:50	0.50
4:50	5:00	0.50
5:00	5:10	0.50
5:10	5:20	0.50
5:20	5:30	0.50
5:30	5:40	0.50
5:40	5:50	0.50
5:50	6:00	0.50
6:00	6:10	0.50
6:10	6:20	0.86
6:20	6:30	0.86
6:30	6:40	0.86
6:40	6:50	0.86
6:50	7:00	0.86
7:00	7:10	0.86
7:10	7:20	0.86
7:20	7:30	0.86
7:30	7:40	0.86
7:40	7:50	0.86
7:50	8:00	0.86
8:00	8:10	0.86
8:10	8:20	0.86
8:20	8:30	0.86
8:30	8:40	0.86
8:40	8:50	0.86
8:50	9:00	0.86
9:00	9:10	0.86
9:10	9:20	1.58
9:20	9:30	1.58
9:30	9:40	1.58
9:40	9:50	1.58
9:50	10:00	1.58
10:00	10:10	1.58
10:10	10:20	1.58
10:20	10:30	1.58
10:30	10:40	1.58
10:40	10:50	1.58
10:50	11:00	1.58
11:00	11:10	1.58
11:10	11:20	2.78
11:20	11:30	2.78
11:30	11:40	2.78
11:40	11:50	4.00
11:50	12:00	15.90
12:00	12:10	6.30
12:10	12:20	5.10
12:20	12:30	4.00
12:30	12:40	4.00
12:40	12:50	2.78
12:50	13:00	2.78
13:00	13:10	2.78
13:10	13:20	1.58
13:20	13:30	1.58
13:30	13:40	1.58
13:40	13:50	1.58
13:50	14:00	1.58
14:00	14:10	1.58
14:10	14:20	1.58
14:20	14:30	1.58

3:10	3:20	0.75
3:20	3:30	0.75
3:30	3:40	0.75
3:40	3:50	0.75
3:50	4:00	0.75
4:00	4:10	0.75
4:10	4:20	0.75
4:20	4:30	0.75
4:30	4:40	0.75
4:40	4:50	0.75
4:50	5:00	0.75
5:00	5:10	0.75
5:10	5:20	0.75
5:20	5:30	0.75
5:30	5:40	0.75
5:40	5:50	0.75
5:50	6:00	0.75
6:00	6:10	0.75
6:10	6:20	1.39
6:20	6:30	1.39
6:30	6:40	1.39
6:40	6:50	1.39
6:50	7:00	1.39
7:00	7:10	1.39
7:10	7:20	1.39
7:20	7:30	1.39
7:30	7:40	1.39
7:40	7:50	1.39
7:50	8:00	1.39
8:00	8:10	1.39
8:10	8:20	1.39
8:20	8:30	1.39
8:30	8:40	1.39
8:40	8:50	1.39
8:50	9:00	1.39
9:00	9:10	1.39
9:10	9:20	2.57
9:20	9:30	2.57
9:30	9:40	2.57
9:40	9:50	2.57
9:50	10:00	2.57
10:00	10:10	2.57
10:10	10:20	2.57
10:20	10:30	2.57
10:30	10:40	2.57
10:40	10:50	2.57
10:50	11:00	2.57
11:00	11:10	2.57
11:10	11:20	4.60
11:20	11:30	4.60
11:30	11:40	4.60
11:40	11:50	6.63
11:50	12:00	28.30
12:00	12:10	10.80
12:10	12:20	8.70
12:20	12:30	6.63
12:30	12:40	6.63
12:40	12:50	4.60
12:50	13:00	4.60
13:00	13:10	4.60
13:10	13:20	2.57
13:20	13:30	2.57
13:30	13:40	2.57
13:40	13:50	2.57
13:50	14:00	2.57
14:00	14:10	2.57
14:10	14:20	2.57
14:20	14:30	2.57

14:30	14:40	1.32
14:40	14:50	1.32
14:50	15:00	1.32
15:00	15:10	1.32
15:10	15:20	0.73
15:20	15:30	0.73
15:30	15:40	0.73
15:40	15:50	0.73
15:50	16:00	0.73
16:00	16:10	0.73
16:10	16:20	0.73
16:20	16:30	0.73
16:30	16:40	0.73
16:40	16:50	0.73
16:50	17:00	0.73
17:00	17:10	0.73
17:10	17:20	0.73
17:20	17:30	0.73
17:30	17:40	0.73
17:40	17:50	0.73
17:50	18:00	0.73
18:00	18:10	0.73
18:10	18:20	0.42
18:20	18:30	0.42
18:30	18:40	0.42
18:40	18:50	0.42
18:50	19:00	0.42
19:00	19:10	0.42
19:10	19:20	0.42
19:20	19:30	0.42
19:30	19:40	0.42
19:40	19:50	0.42
19:50	20:00	0.42
20:00	20:10	0.42
20:10	20:20	0.42
20:20	20:30	0.42
20:30	20:40	0.42
20:40	20:50	0.42
20:50	21:00	0.42
21:00	21:10	0.42
21:10	21:20	0.42
21:20	21:30	0.42
21:30	21:40	0.42
21:40	21:50	0.42
21:50	22:00	0.42
22:00	22:10	0.42
22:10	22:20	0.42
22:20	22:30	0.42
22:30	22:40	0.42
22:40	22:50	0.42
22:50	23:00	0.42
23:00	23:10	0.42
23:10	23:20	0.42
23:20	23:30	0.42
23:30	23:40	0.42
23:40	23:50	0.42
23:50	0:00	0.42

134.00

14:30	14:40	1.58
14:40	14:50	1.58
14:50	15:00	1.58
15:00	15:10	1.58
15:10	15:20	0.86
15:20	15:30	0.86
15:30	15:40	0.86
15:40	15:50	0.86
15:50	16:00	0.86
16:00	16:10	0.86
16:10	16:20	0.86
16:20	16:30	0.86
16:30	16:40	0.86
16:40	16:50	0.86
16:50	17:00	0.86
17:00	17:10	0.86
17:10	17:20	0.86
17:20	17:30	0.86
17:30	17:40	0.86
17:40	17:50	0.86
17:50	18:00	0.86
18:00	18:10	0.86
18:10	18:20	0.50
18:20	18:30	0.50
18:30	18:40	0.50
18:40	18:50	0.50
18:50	19:00	0.50
19:00	19:10	0.50
19:10	19:20	0.50
19:20	19:30	0.50
19:30	19:40	0.50
19:40	19:50	0.50
19:50	20:00	0.50
20:00	20:10	0.50
20:10	20:20	0.50
20:20	20:30	0.50
20:30	20:40	0.50
20:40	20:50	0.50
20:50	21:00	0.50
21:00	21:10	0.50
21:10	21:20	0.50
21:20	21:30	0.50
21:30	21:40	0.50
21:40	21:50	0.50
21:50	22:00	0.50
22:00	22:10	0.50
22:10	22:20	0.50
22:20	22:30	0.50
22:30	22:40	0.50
22:40	22:50	0.50
22:50	23:00	0.50
23:00	23:10	0.50
23:10	23:20	0.50
23:20	23:30	0.50
23:30	23:40	0.50
23:40	23:50	0.50
23:50	0:00	0.50

161.00

14:30	14:40	2.57
14:40	14:50	2.57
14:50	15:00	2.57
15:00	15:10	2.57
15:10	15:20	1.39
15:20	15:30	1.39
15:30	15:40	1.39
15:40	15:50	1.39
15:50	16:00	1.39
16:00	16:10	1.39
16:10	16:20	1.39
16:20	16:30	1.39
16:30	16:40	1.39
16:40	16:50	1.39
16:50	17:00	1.39
17:00	17:10	1.39
17:10	17:20	1.39
17:20	17:30	1.39
17:30	17:40	1.39
17:40	17:50	1.39
17:50	18:00	1.39
18:00	18:10	1.39
18:10	18:20	0.75
18:20	18:30	0.75
18:30	18:40	0.75
18:40	18:50	0.75
18:50	19:00	0.75
19:00	19:10	0.75
19:10	19:20	0.75
19:20	19:30	0.75
19:30	19:40	0.75
19:40	19:50	0.75
19:50	20:00	0.75
20:00	20:10	0.75
20:10	20:20	0.75
20:20	20:30	0.75
20:30	20:40	0.75
20:40	20:50	0.75
20:50	21:00	0.75
21:00	21:10	0.75
21:10	21:20	0.75
21:20	21:30	0.75
21:30	21:40	0.75
21:40	21:50	0.75
21:50	22:00	0.75
22:00	22:10	0.75
22:10	22:20	0.75
22:20	22:30	0.75
22:30	22:40	0.75
22:40	22:50	0.75
22:50	23:00	0.75
23:00	23:10	0.75
23:10	23:20	0.75
23:20	23:30	0.75
23:30	23:40	0.75
23:40	23:50	0.75
23:50	0:00	0.75

261.00

a)1 in 5-year Soakage results

b)1 in 10-year Soakage results

Date	Time	Inflow from Overland flow (M3/S)	Inflow from Lot 7 Tank (M3/S)	Inflow from Lot 8 Tank (M3/S)	Inflow from Lot 1 Tank (M3/S)	Inflow from Lot 2 Tank (M3/S)	Inflow from Lot 3 Tank (M3/S)	Inflow from Lot 4 Tank (M3/S)	Inflow from Lot 5 Tank (M3/S)	Total Inflow (M3/S)	Total Inflow (M3)
8-Jan-24	11:16	0.00364	0.00029	0.00029	0.0001	0.0001	0.0001	0.0001	0.0001	0.00483	2.8980
8-Jan-24	11:17	0.00387	0.00029	0.00029	0.0001	0.0001	0.0001	0.0001	0.0001	0.00507	3.0420
8-Jan-24	11:18	0.00404	0.00029	0.00029	0.0001	0.0001	0.0001	0.0001	0.0001	0.00525	3.1500
8-Jan-24	11:19	0.00417	0.0003	0.00029	0.00011	0.00011	0.0001	0.0001	0.0001	0.00538	3.2280
8-Jan-24	11:20	0.00426	0.0003	0.0003	0.00011	0.00011	0.0001	0.0001	0.0001	0.00548	3.2880
8-Jan-24	11:21	0.00433	0.00031	0.0003	0.00011	0.00011	0.0001	0.0001	0.0001	0.00557	3.3420
8-Jan-24	11:22	0.00438	0.00031	0.00031	0.00011	0.00011	0.00011	0.00011	0.00011	0.00563	3.3780
8-Jan-24	11:23	0.00441	0.00031	0.00031	0.00011	0.00011	0.00011	0.00011	0.00011	0.00567	3.4020
8-Jan-24	11:24	0.00444	0.00031	0.00031	0.00011	0.00011	0.00011	0.00011	0.00011	0.00571	3.4260
8-Jan-24	11:25	0.00446	0.00032	0.00031	0.00011	0.00011	0.00011	0.00011	0.00011	0.00574	3.4440
8-Jan-24	11:26	0.00448	0.00032	0.00032	0.00011	0.00011	0.00011	0.00011	0.00011	0.00577	3.4620
8-Jan-24	11:27	0.00449	0.00032	0.00032	0.00011	0.00011	0.00011	0.00011	0.00011	0.00579	3.4740
8-Jan-24	11:28	0.0045	0.00033	0.00033	0.00011	0.00011	0.00011	0.00011	0.00011	0.00581	3.4860
8-Jan-24	11:29	0.00451	0.00033	0.00033	0.00011	0.00011	0.00011	0.00011	0.00011	0.00583	3.4980
8-Jan-24	11:30	0.00452	0.00033	0.00033	0.00011	0.00011	0.00011	0.00011	0.00011	0.00585	3.5100
8-Jan-24	11:31	0.00452	0.00033	0.00033	0.00011	0.00011	0.00011	0.00011	0.00011	0.00586	3.5160
8-Jan-24	11:32	0.00453	0.00034	0.00034	0.00011	0.00011	0.00011	0.00011	0.00011	0.00588	3.5280
8-Jan-24	11:33	0.00453	0.00034	0.00034	0.00011	0.00011	0.00011	0.00011	0.00011	0.00589	3.5340
8-Jan-24	11:34	0.00454	0.00034	0.00034	0.00012	0.00012	0.00011	0.00011	0.00011	0.0059	3.5400
8-Jan-24	11:35	0.00454	0.00035	0.00034	0.00012	0.00012	0.00011	0.00011	0.00011	0.00592	3.5520
8-Jan-24	11:36	0.00454	0.00035	0.00035	0.00012	0.00012	0.00011	0.00011	0.00011	0.00593	3.5580
8-Jan-24	11:37	0.00454	0.00035	0.00035	0.00012	0.00012	0.00012	0.00012	0.00012	0.00594	3.5640
8-Jan-24	11:38	0.00455	0.00035	0.00035	0.00012	0.00012	0.00012	0.00012	0.00012	0.00595	3.5700
8-Jan-24	11:39	0.00455	0.00036	0.00035	0.00012	0.00012	0.00012	0.00012	0.00012	0.00596	3.5760
8-Jan-24	11:40	0.00455	0.00036	0.00036	0.00012	0.00012	0.00012	0.00012	0.00012	0.00597	3.5820
8-Jan-24	11:41	0.00458	0.00036	0.00036	0.00012	0.00012	0.00012	0.00012	0.00012	0.00601	3.6060
8-Jan-24	11:42	0.00467	0.00036	0.00036	0.00012	0.00012	0.00012	0.00012	0.00012	0.00611	3.6660
8-Jan-24	11:43	0.00486	0.00037	0.00036	0.00012	0.00012	0.00012	0.00012	0.00012	0.0063	3.7800
8-Jan-24	11:44	0.00512	0.00037	0.00037	0.00012	0.00012	0.00012	0.00012	0.00012	0.00658	3.9480
8-Jan-24	11:45	0.00542	0.00037	0.00037	0.00012	0.00012	0.00012	0.00012	0.00012	0.00689	4.1340
8-Jan-24	11:46	0.0057	0.00037	0.00037	0.00012	0.00012	0.00012	0.00012	0.00012	0.00718	4.3080
8-Jan-24	11:47	0.00594	0.00038	0.00038	0.00012	0.00012	0.00012	0.00012	0.00012	0.00743	4.4580
8-Jan-24	11:48	0.00613	0.00038	0.00038	0.00012	0.00012	0.00012	0.00012	0.00012	0.00763	4.5780
8-Jan-24	11:49	0.00626	0.00039	0.00039	0.00013	0.00013	0.00012	0.00012	0.00012	0.00778	4.6680
8-Jan-24	11:50	0.00635	0.00039	0.00039	0.00013	0.00013	0.00012	0.00012	0.00012	0.00788	4.7280
8-Jan-24	11:51	0.0067	0.0004	0.00039	0.00013	0.00013	0.00013	0.00013	0.00013	0.00824	4.9440
8-Jan-24	11:52	0.00759	0.0004	0.0004	0.00013	0.00013	0.00013	0.00013	0.00013	0.00915	5.4900
8-Jan-24	11:53	0.00943	0.00041	0.00041	0.00013	0.00013	0.00013	0.00013	0.00013	0.01101	6.6060
8-Jan-24	11:54	0.01207	0.00042	0.00042	0.00013	0.00013	0.00013	0.00013	0.00013	0.01369	8.2140
8-Jan-24	11:55	0.01497	0.00043	0.00043	0.00013	0.00013	0.00013	0.00013	0.00013	0.01663	9.9780
8-Jan-24	11:56	0.01776	0.00045	0.00044	0.00014	0.00014	0.00014	0.00014	0.00014	0.01947	11.6820
8-Jan-24	11:57	0.02015	0.00046	0.00046	0.00014	0.00014	0.00014	0.00014	0.00014	0.02192	13.1520
8-Jan-24	11:58	0.02198	0.00049	0.00048	0.00015	0.00015	0.00014	0.00014	0.00014	0.02381	14.2860
8-Jan-24	11:59	0.02325	0.00051	0.0005	0.00015	0.00015	0.00015	0.00015	0.00015	0.02515	15.0900
8-Jan-24	12:00	0.02419	0.00053	0.00053	0.00015	0.00015	0.00015	0.00015	0.00015	0.02616	15.6960
8-Jan-24	12:01	0.02468	0.00055	0.00055	0.00016	0.00016	0.00016	0.00016	0.00016	0.02672	16.0320
8-Jan-24	12:02	0.02452	0.00057	0.00057	0.00016	0.00016	0.00016	0.00016	0.00016	0.02662	15.9720
8-Jan-24	12:03	0.02344	0.00059	0.00058	0.00017	0.00017	0.00016	0.00016	0.00016	0.0256	15.3600
8-Jan-24	12:04	0.02159	0.0006	0.0006	0.00017	0.00017	0.00017	0.00017	0.00017	0.02381	14.2860
8-Jan-24	12:05	0.01945	0.00062	0.00062	0.00017	0.00017	0.00017	0.00017	0.00017	0.02172	13.0320
8-Jan-24	12:06	0.01736	0.00063	0.00063	0.00018	0.00018	0.00017	0.00017	0.00017	0.01966	11.7960
8-Jan-24	12:07	0.01555	0.00064	0.00064	0.00018	0.00018	0.00018	0.00018	0.00018	0.01789	10.7340
8-Jan-24	12:08	0.01418	0.00065	0.00065	0.00018	0.00018	0.00018	0.00018	0.00018	0.01655	9.9300
8-Jan-24	12:09	0.01324	0.00066	0.00065	0.00018	0.00018	0.00018	0.00018	0.00018	0.01563	9.3780
8-Jan-24	12:10	0.01256	0.00066	0.00066	0.00018	0.00018	0.00018	0.00018	0.00018	0.01497	8.9820
8-Jan-24	12:11	0.01203	0.00067	0.00066	0.00019	0.00019	0.00018	0.00018	0.00018	0.01447	8.6820
8-Jan-24	12:12	0.01158	0.00067	0.00067	0.00019	0.00019	0.00018	0.00018	0.00018	0.01403	8.4180
8-Jan-24	12:13	0.01114	0.00068	0.00067	0.00019	0.00019	0.00019	0.00019	0.00019	0.0136	8.1600
8-Jan-24	12:14	0.01067	0.00068	0.00068	0.00019	0.00019	0.00019	0.00019	0.00019	0.01315	7.8900
8-Jan-24	12:15	0.01024	0.00068	0.00068	0.00019	0.00019	0.00019	0.00019	0.00019	0.01273	7.6380
8-Jan-24	12:16	0.00985	0.00069	0.00068	0.00019	0.00019	0.00019	0.00019	0.00019	0.01235	7.4100
8-Jan-24	12:17	0.00953	0.00069	0.00069	0.00019	0.00019	0.00019	0.00019	0.00019	0.01205	7.2300
8-Jan-24	12:18	0.00929	0.00069	0.00069	0.00019	0.00019	0.00019	0.00019	0.00019	0.01182	7.0920
8-Jan-24	12:19	0.00913	0.00069	0.00069	0.00019	0.00019	0.00019	0.00019	0.00019	0.01166	6.9960
8-Jan-24	12:20	0.00901	0.0007	0.00069	0.00019	0.00019	0.00019	0.00019	0.00019	0.01155	6.9300
8-Jan-24	12:21	0.00889	0.0007	0.00069	0.0002	0.0002	0.00019	0.00019	0.00019	0.01145	6.8700
8-Jan-24	12:22	0.00875	0.0007	0.0007	0.0002	0.0002	0.00019	0.00019	0.00019	0.01161	6.9660
8-Jan-24	12:23	0.00853	0.00092	0.00113	0.0002	0.0002	0.00019	0.00019	0.00019	0.01176	7.0560
8-Jan-24	12:24	0.00826	0.00094	0.00078	0.0002	0.0002	0.00019	0.00019	0.00019	0.01115	6.6900
8-Jan-24	12:25	0.00796	0.00086	0.00097	0.0002	0.0002	0.0002	0.0002	0.0002	0.01097	6.5820
8-Jan-24	12:26	0.00769	0.00088	0.00077	0.0002	0.0002	0.0002	0.0002	0.0002	0.01052	6.3120
8-Jan-24	12:27	0.00746	0.0008	0.00088	0.0002	0.0002	0.0002	0.0002	0.0002	0.01033	6.1980
8-Jan-24	12:28	0.00729	0.00083	0.00075	0.0002	0.0002	0.0002	0.0002	0.0002	0.01005	6.0300
8-Jan-24	12:29	0.00717	0.00077	0.00083	0.0002	0.0002	0.0002	0.0002	0.0002	0.00996	5.9760
8-Jan-24	12:30	0.00708	0.00081	0.00073	0.0002	0.0002	0.0002	0.0002	0.0002	0.00981	5.8860
8-Jan-24	12:31	0.00702	0.00075	0.00081	0.0002	0.0002	0.0002	0.0002	0.0002	0.00977	5.8620
8-Jan-24	12:32	0.00697	0.00079	0.00073	0.0004	0.0002	0.0002	0.0002	0.0002	0.00989	5.9340
8-Jan-24	12:33	0.00694	0.00074	0.00079	0.00031	0.0002	0.0002	0.0002	0.0002	0.00978	5.8680
8-Jan-24	12:34	0.00691	0.00079	0.00073	0.00034	0.0002	0.0002	0.0002	0.0002	0.00977	5.8620
8-Jan-24	12:35	0.0069	0.00074	0.00078	0.00033	0.0002	0.0002	0.0002	0.0002	0.00974	5.8440
8-Jan-24	12:36	0.00689	0.00078	0.00073	0.00033	0.0002	0.0002	0.0002	0.0002	0.00986	5.9160
8-Jan-24	12:37	0.00688	0.00073	0.00077	0.00033	0.0002	0.0002	0.0002	0.0002	0.00985	5.9100
8-Jan-24	12:38	0.00687	0.00078	0.00073	0.00033	0.0002	0.0002	0.0002	0.0002	0.00985	5.9100
8-Jan-24	12:39	0.00687	0.00073	0.00077	0.00033	0.0002	0.0002	0.0002	0.0002	0.00984	5.9040
8-Jan-24	12:40	0.00687	0.00078	0.00073	0.00033	0.0002	0.0002	0.0002	0.0002	0.00985	5.9100
8-Jan-24	12:41	0.00684	0.00073</								

c)1 in 100-year Soakage results

99A Stanley Road
HEC HMS Soakage simulation 1 in 100 year event

Soakage rate mm/hr 500
Design soakage rate mm/hr 125
Soak pit footprint m2 251.4
Time step minutes 10
Soakage per time step m3/time step 5.238
Discharge through one single & one double kerb connection m3/time step 11.268

Permeable concrete
Permeability 0.3
Volume permeable 20.0 Thickness 0.079547
Pre-development discharge from site 58.88 L/s

Summary : 1% AEP Event	
Storage required	6.00 m ³
Peak discharge from kerb connections	18.78 L/s
Peak overflow from soakage system	40.10 L/s
Peak Discharge from site	58.88 L/s
Provided storage	6.00 m ³

Date	Time	Inflow from Overland flow (M3/S)	Inflow from Lot 7 Tank (M3/S)	Inflow from Lot 8 Tank (M3/S)	Inflow from Lot 2 Tank (M3/S)	Inflow from Lot 1 Tank (M3/S)	Inflow from Lot 4 Tank (M3/S)	Inflow from Lot 3 Tank (M3/S)	Inflow from Lot 6 Tank (M3/S)	Inflow from Lot 5 Tank (M3/S)	Total Inflow (M3/S)	Total Inflow (M3)
8-Jan-24	0:00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8-Jan-24	0:01	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8-Jan-24	0:02	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8-Jan-24	0:03	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8-Jan-24	0:04	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8-Jan-24	0:05	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0060
8-Jan-24	0:06	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0060
8-Jan-24	0:07	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0120
8-Jan-24	0:08	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0180
8-Jan-24	0:09	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0180
8-Jan-24	0:10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0240
8-Jan-24	0:11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0300
8-Jan-24	0:12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0300
8-Jan-24	0:13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0360
8-Jan-24	0:14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0420
8-Jan-24	0:15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0480
8-Jan-24	0:16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0480
8-Jan-24	0:17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0540
8-Jan-24	0:18	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0600
8-Jan-24	0:19	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0660
8-Jan-24	0:20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0660
8-Jan-24	0:21	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0720
8-Jan-24	0:22	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0780
8-Jan-24	0:23	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0780
8-Jan-24	0:24	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0840
8-Jan-24	0:25	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002	0.0900
8-Jan-24	0:26	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002	0.0960
8-Jan-24	0:27	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002	0.1020
8-Jan-24	0:28	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002	0.1080
8-Jan-24	0:29	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002	0.1140
8-Jan-24	0:30	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002	0.1260
8-Jan-24	0:31	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002	0.1320
8-Jan-24	0:32	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002	0.1380
8-Jan-24	0:33	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0003	0.1500
8-Jan-24	0:34	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0003	0.1560
8-Jan-24	0:35	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0003	0.1680
8-Jan-24	0:36	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0003	0.1740
8-Jan-24	0:37	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0003	0.1860
8-Jan-24	0:38	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0003	0.1980
8-Jan-24	0:39	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0003	0.2040
8-Jan-24	0:40	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0004	0.2160
8-Jan-24	0:41	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0004	0.2220
8-Jan-24	0:42	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0004	0.2340
8-Jan-24	0:43	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0004	0.2400
8-Jan-24	0:44	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0004	0.2460
8-Jan-24	0:45	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0004	0.2580
8-Jan-24	0:46	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0004	0.2640
8-Jan-24	0:47	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0005	0.2700
8-Jan-24	0:48	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0005	0.2820
8-Jan-24	0:49	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0005	0.2880
8-Jan-24	0:50	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0005	0.2940
8-Jan-24	0:51	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0005	0.3000
8-Jan-24	0:52	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0005	0.3060
8-Jan-24	0:53	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0005	0.3120
8-Jan-24	0:54	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0005	0.3180
8-Jan-24	0:55	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0005	0.3240
8-Jan-24	0:56	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0006	0.3300
8-Jan-24	0:57	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0006	0.3360
8-Jan-24	0:58	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0006	0.3420
8-Jan-24	0:59	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0006	0.3480
8-Jan-24	1:00	0.0003	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0006	0.3540
8-Jan-24	1:01	0.0003	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0006	0.3600
8-Jan-24	1:02	0.0003	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0006	0.3660
8-Jan-24	1:03	0.0003	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0006	0.3720
8-Jan-24	1:04	0.0003	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0006	0.3780
8-Jan-24	1:05	0.0003	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0006	0.3840
8-Jan-24	1:06	0.0003	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0007	0.3900
8-Jan-24	1:07	0.0003	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0007	0.3960
8-Jan-24	1:08	0.0003	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0007	0.3960
8-Jan-24	1:09	0.0003	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0007	0.4020
8-Jan-24	1:10	0.0003	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0007	0.4080
8-Jan-24	1:11	0.0003	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0007	0.4140
8-Jan-24	1:12	0.0003	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0007	0.4200
8-Jan-24	1:13	0.0003	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0007	0.4200

Soakage simulation

Start storage (m3)	Inflow (m3)	End storage without soakage (m3)	Soakage (m3)	Kerb discharge (m3)	End storage after soakage and kerb discharge (m3)	Excess of storage (m3)	Discharge through kerb connection (L/s)	Direct Overflow from soakage storage (L/s)	Total discharge from site (L/s)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.01								

Date	Time	Inflow from Overland flow (M3/S)	Inflow from Lot 7 Tank (M3/S)	Inflow from Lot 8 Tank (M3/S)	Inflow from Lot 1 Tank (M3/S)	Inflow from Lot 2 Tank (M3/S)	Inflow from Lot 3 Tank (M3/S)	Inflow from Lot 4 Tank (M3/S)	Inflow from Lot 5 Tank (M3/S)	Total Inflow (M3/S)	Total Inflow (M3)
8-Jan-24	11:16	0.0063	0.00044	0.00044	0.00015	0.00015	0.00015	0.00015	0.00015	0.00088	4.8480
8-Jan-24	11:17	0.00671	0.00045	0.00044	0.00015	0.00015	0.00015	0.00015	0.00015	0.00085	5.1000
8-Jan-24	11:18	0.00702	0.00045	0.00045	0.00015	0.00015	0.00015	0.00015	0.00015	0.00882	5.2920
8-Jan-24	11:19	0.00724	0.00046	0.00045	0.00015	0.00015	0.00015	0.00015	0.00015	0.00906	5.4360
8-Jan-24	11:20	0.0074	0.00046	0.00046	0.00015	0.00015	0.00015	0.00015	0.00015	0.00923	5.5380
8-Jan-24	11:21	0.00751	0.00046	0.00046	0.00016	0.00016	0.00015	0.00015	0.00015	0.00936	5.6160
8-Jan-24	11:22	0.0076	0.00047	0.00046	0.00016	0.00016	0.00015	0.00015	0.00015	0.00946	5.6760
8-Jan-24	11:23	0.00767	0.00047	0.00047	0.00016	0.00016	0.00015	0.00015	0.00015	0.00954	5.7240
8-Jan-24	11:24	0.00771	0.00048	0.00047	0.00016	0.00016	0.00016	0.00016	0.00016	0.0096	5.7600
8-Jan-24	11:25	0.00775	0.00048	0.00048	0.00016	0.00016	0.00016	0.00016	0.00016	0.00964	5.7840
8-Jan-24	11:26	0.00777	0.00048	0.00048	0.00016	0.00016	0.00016	0.00016	0.00016	0.00968	5.8080
8-Jan-24	11:27	0.00779	0.00049	0.00048	0.00016	0.00016	0.00016	0.00016	0.00016	0.00972	5.8320
8-Jan-24	11:28	0.00781	0.00049	0.00049	0.00016	0.00016	0.00016	0.00016	0.00016	0.00975	5.8500
8-Jan-24	11:29	0.00782	0.00049	0.00049	0.00016	0.00016	0.00016	0.00016	0.00016	0.00977	5.8620
8-Jan-24	11:30	0.00783	0.0005	0.00049	0.00016	0.00016	0.00016	0.00016	0.00016	0.00979	5.8740
8-Jan-24	11:31	0.00784	0.0005	0.0005	0.00016	0.00016	0.00016	0.00016	0.00016	0.00981	5.8860
8-Jan-24	11:32	0.00785	0.00051	0.0005	0.00016	0.00016	0.00016	0.00016	0.00016	0.00983	5.8980
8-Jan-24	11:33	0.00785	0.00051	0.00051	0.00017	0.00017	0.00016	0.00016	0.00016	0.00985	5.9100
8-Jan-24	11:34	0.00786	0.00051	0.00051	0.00017	0.00017	0.00016	0.00016	0.00016	0.00987	5.9220
8-Jan-24	11:35	0.00786	0.00052	0.00051	0.00017	0.00017	0.00016	0.00016	0.00016	0.00988	5.9280
8-Jan-24	11:36	0.00786	0.00052	0.00052	0.00017	0.00017	0.00017	0.00017	0.00017	0.0099	5.9400
8-Jan-24	11:37	0.00786	0.00053	0.00052	0.00017	0.00017	0.00017	0.00017	0.00017	0.00991	5.9460
8-Jan-24	11:38	0.00787	0.00053	0.00053	0.00017	0.00017	0.00017	0.00017	0.00017	0.00993	5.9580
8-Jan-24	11:39	0.00787	0.00053	0.00053	0.00017	0.00017	0.00017	0.00017	0.00017	0.00994	5.9640
8-Jan-24	11:40	0.00787	0.00053	0.00053	0.00017	0.00017	0.00017	0.00017	0.00017	0.00995	5.9700
8-Jan-24	11:41	0.00792	0.00054	0.00053	0.00017	0.00017	0.00017	0.00017	0.00017	0.01002	6.0120
8-Jan-24	11:42	0.00807	0.00054	0.00054	0.00017	0.00017	0.00017	0.00017	0.00017	0.01018	6.1080
8-Jan-24	11:43	0.00839	0.00054	0.00054	0.00017	0.00017	0.00017	0.00017	0.00017	0.01051	6.3060
8-Jan-24	11:44	0.00885	0.00055	0.00054	0.00017	0.00017	0.00017	0.00017	0.00017	0.01098	6.5880
8-Jan-24	11:45	0.00936	0.00055	0.00055	0.00018	0.00018	0.00017	0.00017	0.00017	0.01151	6.9060
8-Jan-24	11:46	0.00985	0.00056	0.00055	0.00018	0.00018	0.00017	0.00017	0.00017	0.01201	7.2060
8-Jan-24	11:47	0.01027	0.00056	0.00056	0.00018	0.00018	0.00017	0.00017	0.00017	0.01244	7.4640
8-Jan-24	11:48	0.01058	0.00057	0.00056	0.00018	0.00018	0.00018	0.00018	0.00018	0.01278	7.6680
8-Jan-24	11:49	0.0108	0.00057	0.00057	0.00018	0.00018	0.00018	0.00018	0.00018	0.01301	7.8060
8-Jan-24	11:50	0.01096	0.00058	0.00057	0.00018	0.00018	0.00018	0.00018	0.00018	0.01319	7.9140
8-Jan-24	11:51	0.0116	0.00058	0.00058	0.00018	0.00018	0.00018	0.00018	0.00018	0.01385	8.3100
8-Jan-24	11:52	0.01328	0.00059	0.00059	0.00018	0.00018	0.00018	0.00018	0.00018	0.01555	9.3300
8-Jan-24	11:53	0.01674	0.0006	0.00059	0.00019	0.00019	0.00018	0.00018	0.00018	0.01904	11.4240
8-Jan-24	11:54	0.02172	0.00061	0.00061	0.00019	0.00019	0.00019	0.00019	0.00019	0.02406	14.4360
8-Jan-24	11:55	0.02719	0.00063	0.00063	0.00019	0.00019	0.00019	0.00019	0.00019	0.02959	17.7540
8-Jan-24	11:56	0.03243	0.00065	0.00065	0.0002	0.0002	0.00019	0.00019	0.00019	0.03489	20.9340
8-Jan-24	11:57	0.03692	0.00067	0.00067	0.0002	0.0002	0.0002	0.0002	0.0002	0.03945	23.6700
8-Jan-24	11:58	0.04034	0.00076	0.0007	0.00106	0.00108	0.0002	0.0002	0.0002	0.04474	26.8440
8-Jan-24	11:59	0.04271	0.00453	0.00456	0.00197	0.00197	0.0018	0.0018	0.0018	0.06295	37.7700
8-Jan-24	12:00	0.04444	0.00494	0.00484	0.00209	0.0021	0.00208	0.00208	0.00208	0.06673	40.0380
8-Jan-24	12:01	0.04532	0.00486	0.00487	0.00213	0.00213	0.00207	0.00207	0.00207	0.06761	40.5660
8-Jan-24	12:02	0.04498	0.00497	0.00489	0.00214	0.00214	0.00209	0.00209	0.00209	0.06747	40.4820
8-Jan-24	12:03	0.04292	0.00464	0.00465	0.00206	0.00205	0.00201	0.00201	0.00201	0.06437	38.6220
8-Jan-24	12:04	0.03943	0.00436	0.0043	0.00191	0.0019	0.00186	0.00186	0.00186	0.05934	35.6040
8-Jan-24	12:05	0.03538	0.00384	0.00384	0.00172	0.0017	0.00167	0.00167	0.00167	0.05318	31.9080
8-Jan-24	12:06	0.03143	0.00346	0.00342	0.00152	0.00151	0.00148	0.00148	0.00148	0.04728	28.3680
8-Jan-24	12:07	0.02802	0.00303	0.00303	0.00135	0.00134	0.00132	0.00132	0.00132	0.04204	25.2240
8-Jan-24	12:08	0.02543	0.00279	0.00276	0.00122	0.00121	0.00119	0.00119	0.00119	0.03816	22.8960
8-Jan-24	12:09	0.02366	0.00256	0.00255	0.00116	0.00112	0.0011	0.0011	0.0011	0.03544	21.2640
8-Jan-24	12:10	0.02237	0.00245	0.00242	0.00114	0.00109	0.00104	0.00104	0.00104	0.03361	20.1660
8-Jan-24	12:11	0.02137	0.00231	0.0023	0.00111	0.00107	0.00099	0.00099	0.00099	0.03209	19.2540
8-Jan-24	12:12	0.02052	0.00224	0.00221	0.00106	0.00103	0.00095	0.00095	0.00095	0.03085	18.5100
8-Jan-24	12:13	0.01969	0.00212	0.00212	0.001	0.00099	0.00094	0.00094	0.00094	0.02967	17.8020
8-Jan-24	12:14	0.01884	0.00206	0.00203	0.00094	0.00094	0.00092	0.00092	0.00092	0.02848	17.0880
8-Jan-24	12:15	0.01803	0.00194	0.00198	0.0009	0.00088	0.00089	0.00089	0.00089	0.02731	16.3860
8-Jan-24	12:16	0.01732	0.00189	0.0019	0.00087	0.00084	0.00086	0.00086	0.00086	0.02626	15.7560
8-Jan-24	12:17	0.01674	0.0018	0.00183	0.00085	0.00081	0.00082	0.00082	0.00082	0.02531	15.1860
8-Jan-24	12:18	0.0163	0.00178	0.00177	0.00082	0.00078	0.00078	0.00078	0.00078	0.02456	14.7360
8-Jan-24	12:19	0.016	0.00172	0.00173	0.00079	0.00076	0.00075	0.00075	0.00075	0.02401	14.4060
8-Jan-24	12:20	0.01578	0.00172	0.0017	0.00077	0.00075	0.00073	0.00073	0.00073	0.02365	14.1900
8-Jan-24	12:21	0.01556	0.00168	0.00168	0.00076	0.00074	0.00072	0.00072	0.00072	0.0233	13.9800
8-Jan-24	12:22	0.01529	0.00166	0.00165	0.00074	0.00072	0.00071	0.00071	0.00071	0.02291	13.7460
8-Jan-24	12:23	0.01488	0.0016	0.00161	0.00073	0.00071	0.00069	0.00069	0.00069	0.02231	13.3860
8-Jan-24	12:24	0.01434	0.00156	0.00156	0.00071	0.00069	0.00067	0.00067	0.00067	0.02155	12.9300
8-Jan-24	12:25	0.01377	0.00148	0.0015	0.00068	0.00066	0.00065	0.00065	0.00065	0.02069	12.4140
8-Jan-24	12:26	0.01325	0.00144	0.00144	0.00066	0.00063	0.00062	0.00062	0.00062	0.01991	11.9460
8-Jan-24	12:27	0.0128	0.00138	0.00139	0.00063	0.00061	0.0006	0.0006	0.0006	0.01921	11.5260
8-Jan-24	12:28	0.01247	0.00135	0.00135	0.00061	0.00059	0.00058	0.00058	0.00058	0.01869	11.2140
8-Jan-24	12:29	0.01223	0.00132	0.00132	0.00059	0.00057	0.00057	0.00057	0.00057	0.01831	10.9860
8-Jan-24	12:30	0.01206	0.00131	0.0013	0.00058	0.00057	0.00056	0.00056	0.00056	0.01805	10.8300
8-Jan-24	12:31	0.01194	0.00129	0.00128	0.00057	0.00056	0.00055	0.00055	0.00055	0.01784	10.7040
8-Jan-24	12:32	0.01185	0.00129	0.00127	0.00056	0.00056	0.00054	0.00054	0.00054	0.01771	10.6260
8-Jan-24	12:33	0.01178	0.00127	0.00126	0.00056	0.00055	0.00054	0.00054	0.00054	0.01759	10.5540
8-Jan-24	12:34	0.01174	0.00127	0.00126	0.00055	0.00055	0.00054	0.00054	0.00054	0.01753	10.5180
8-Jan-24	12:35	0.0117	0.00126	0.00126	0.00055	0.00055	0.00054	0.00054	0.00054	0.01746	10.4760
8-Jan-24	12:36	0.01168	0.00127	0.00125	0.00055	0.00055	0.00053	0.00053	0.00053	0.01743	10.4580
8-Jan-24	12:37	0.01166	0.00126	0.00125	0.00055	0.00055	0.00053	0.00053	0.00053	0.0174	10.4400
8-Jan-24	12:38	0.01165	0.00126	0.00125	0.00055	0.00055	0.00053	0.00053	0.00053	0.01739	10.4340
8-Jan-24	12:39	0.01164	0.00125	0.00125	0.00055	0.00055	0.00053	0.00053	0.00053	0.01737	10.4220
8-Jan-24	12:40	0.01164	0.00126	0.00125	0.00055	0.00055					

Appendix D Topographic Survey

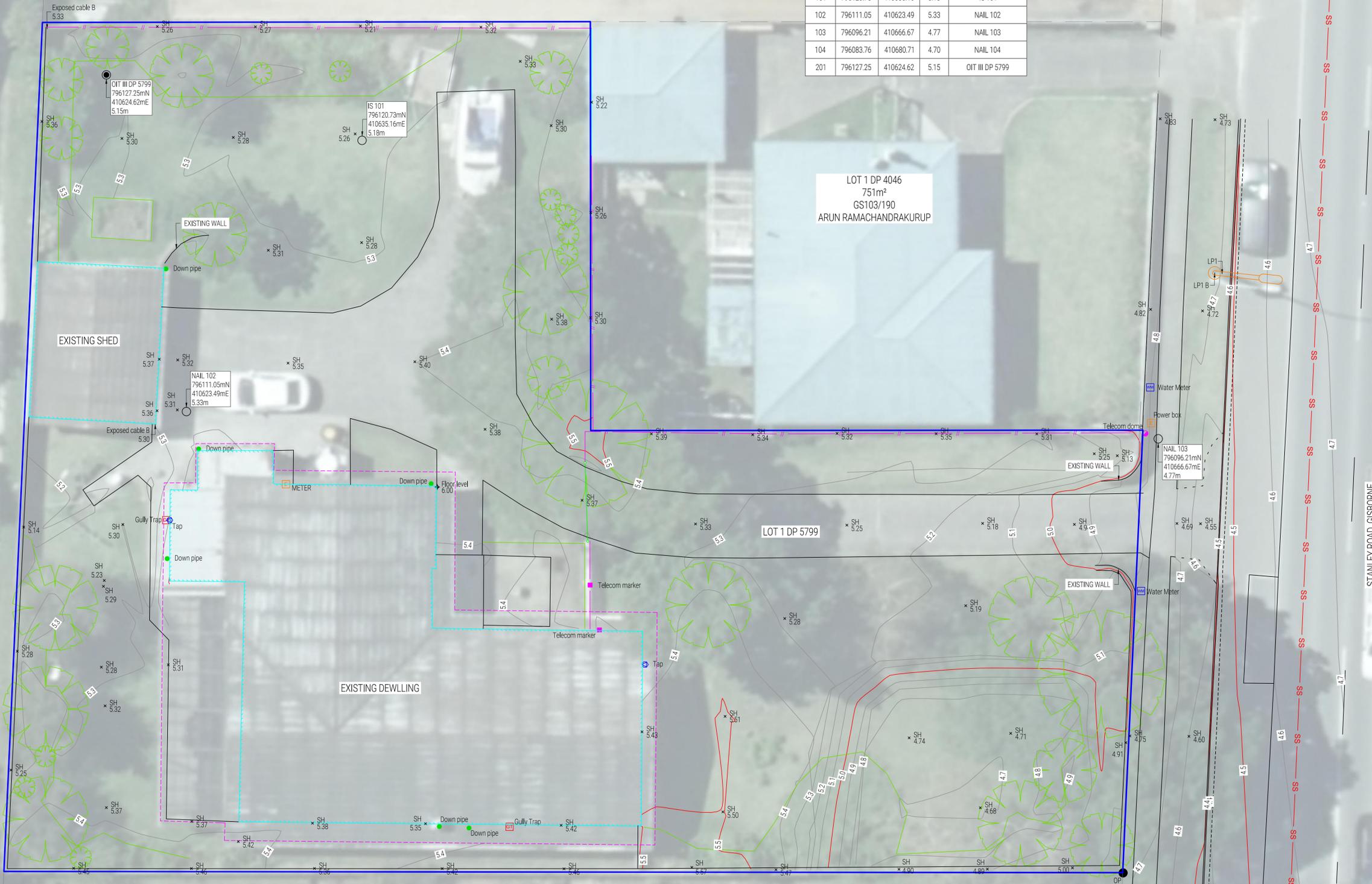


Lot 1 DP 8559
902m²
GS5D/852
CHRISTOPHER RONALD MORE,
RONALD MORE

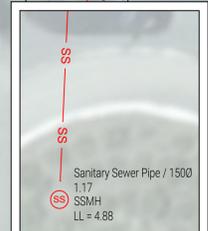
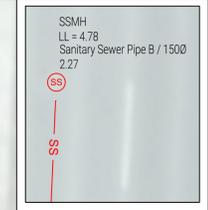
PART LOT 6 DP 2610
751m²
GS1D/693
ARUN RAMACHANDRAKURUP

SCHEDULE OF COORDINATES				
PT ID#	NORTHING	EASTING	LEVEL	DESCRIPTION
1	796306.75	410761.67	5.13	SS 49 SO 8021 (B9P6)
2	795760.30	410545.54	3.72	SS 160 SO 8030 (B9PK)
3	796268.02	410495.57	5.41	SS 49 SO 8021 (B9N2)
101	796120.73	410635.16	5.18	IS 101
102	796111.05	410623.49	5.33	NAIL 102
103	796096.21	410666.67	4.77	NAIL 103
104	796083.76	410680.71	4.70	NAIL 104
201	796127.25	410624.62	5.15	OIT III DP 5799

LOT 1 DP 4046
751m²
GS103/190
ARUN RAMACHANDRAKURUP



LOT 2 DP 5799
1201m²
GS3D/819
HOUSING NEW ZEALAND LIMITED



NOTES:

- THE PURPOSE OF THIS SCHEME PLAN IS TO SUPPORT A RESOURCE CONSENT APPLICATION ONLY. IF APPLICABLE THIS PLAN SHOULD BE READ IN CONJUNCTION WITH SUPPORTING ARCHITECTURAL AND ENGINEERING PLANS/INFORMATION.
- PROPOSED BOUNDARIES, DIMENSIONS AND AREAS ARE SUBJECT TO LAND TRANSFER SURVEY.
- FOR EXISTING BUILDINGS - EXTERIOR FACE OF CLADDING/WEATHERPROOFING HAS BEEN SURVEYED.
- SERVICES, UTILITIES, AND DRAINAGE SHOWN ON THIS PLAN ARE LIMITED TO WHAT WAS 'VISIBLE' AND 'ACCESSIBLE' ON THE DAY OF SURVEY.
- UNDERLYING BOUNDARIES ON THIS PLAN HAVE BEEN ADOPTED FROM THE MOST RELEVANT UNDERLYING PLANS.
- NOT ALL LEGAL INSTRUMENTS, DRAINAGE, OR OTHER INTERESTS PERTAINING TO THIS SITE ARE NECESSARILY SHOWN ON THIS PLAN.
- AERIAL IMAGERY (YEAR) HAS BEEN SOURCED FROM THE LINZ DATA SERVICE.
- THE COPYRIGHT AND INTELLECTUAL PROPERTY RIGHTS FOR THE INFORMATION SHOWN ON THIS PLAN REMAIN THE PROPERTY OF DEFINITION SURVEYING LTD.
- FOR PROPOSED DEVELOPMENTS, WHERE HEIGHT IN RELATION TO BOUNDARY BECOMES CRITICAL, ADDITIONAL GROUND LEVELS MAY BE REQUIRED ADJACENT TO THE CRITICAL POSITION LEVELS SHOWN ON THIS PLAN SHOULD BE CROSS-CHECKED AGAINST COUNCILS DEFINITIONS' BEFORE BEING USED FOR DESIGN PURPOSES.
- SOME DRAINAGE FEATURES INCLUDE PUMPS AND ASSOCIATED PIPES. PLEASE REFER TO SITE PHOTOS FOR DETAILS.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, SERVICE ENGINEER'S DRAWINGS AND SPECIFICATIONS.

SURVEY DETAILS

SURVEYOR	A. TUKAKI
VERIFIED BY	A. TUKAKI
SURVEY DATE	11/09/2023
VERIFIED DATE	14/09/2023
HORIZONTAL DATUM	EPSG:2107: NZGD2000 / Poverty Bay 2000
SCALE FACTOR	1.000000
HORIZONTAL ORIGIN	SS 49 SO 8021 (B9P6)
VERTICAL DATUM	EPSG:1169 / New Zealand Vertical Datum 2016
VERTICAL ORIGIN	SS 49 SO 8021 (B9P6)
EQUIPMENT USED	TRIMBLE R121 BASE AND ROVER
	TRIMBLE S7 ROBOTIC TOTAL STATION
BOUNDARY ACCURACY	SUBJECT TO CADASTRAL SURVEY

COMMENTS:

THIS WORK INCLUDES DATA WHICH IS LICENSED BY LAND INFORMATION NEW ZEALAND (LINZ) FOR REUSE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.

LEGEND

MAJOR CONTOUR	—
MINOR CONTOUR	—
PROPERTY BOUNDARY	—
ABUTTING BOUNDARIES	—
BUILDING	—
CENTRELINE	—
EAVE	—
EDGE OF CONCRETE	—
EX FENCE	—
EDGE OF SEAL	—
FOOTPATH	—
GATE	—
KERB	—
EX HEDGE	—
SANITARY SEWER PIPE	—
POWER UTILITIES	—
SANITARY SEWER UTILITIES	—
SIGN	—
STORMWATER UTILITIES	—
TELECOM UTILITIES	—
WATER UTILITIES	—
WALL	—

A	ISSUED FOR INFORMATION	DM	14/09/2023
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REV.	DESCRIPTION	BY:	DATE:
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STATUS: STATUS

DEFINITION SURVEYING LTD.
BAY OF PLENTY | HAWKES BAY | CANTERBURY
WWW.DEFINITION.NZ

CLIENT: GROUP OF COMPANIES

SURVEYOR:
DEFINITION SURVEYING LTD
BAY OF PLENTY
SITE:
LOT 1 DP 5799
99A STANLEY ROAD, TE HAPARA, GISBORNE

TITLE:
TOPOGRAPHICAL PLAN

SCALE AT:	DATE:	DRAWN:	CHECKED:
1:100	14/09/2023	KN	DM
PROJECT NO:	DRAWING NO:	REVISION:	
N230007.14	V100	A	

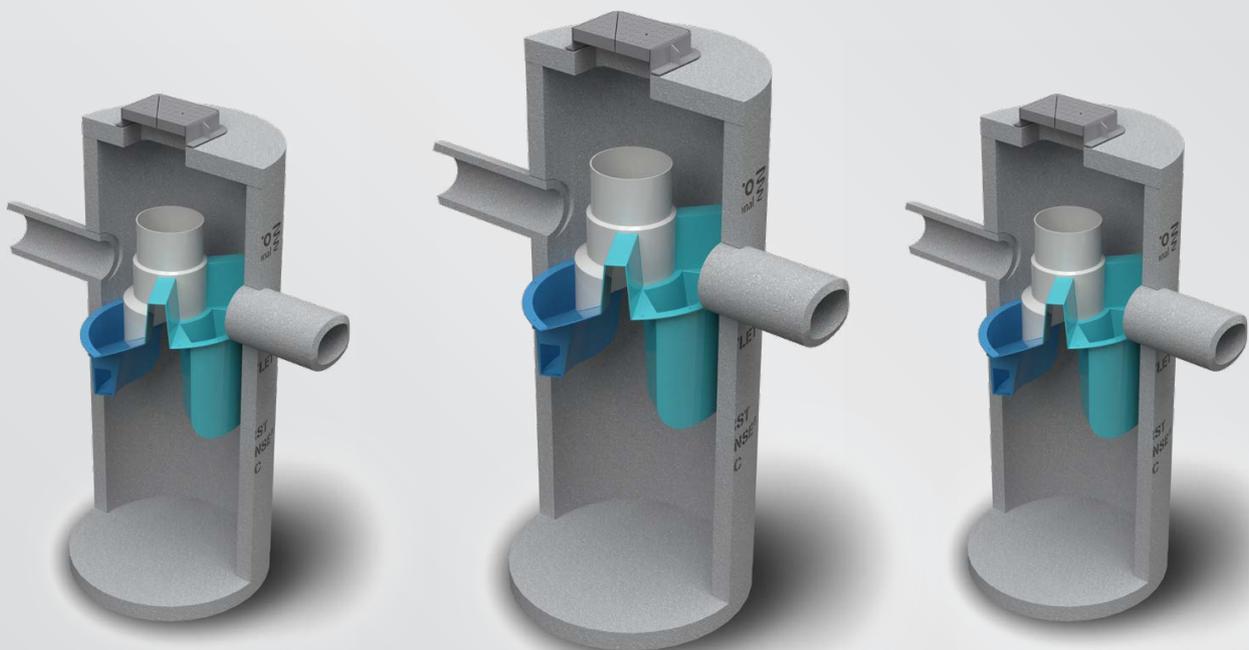
Appendix E SW20 First Defence High-Capacity Brochure

First Defense[®] High Capacity

(Stormwater Treatment)

Technical Guide SW 20

A simple solution for your trickiest sites



07.20 | STORMWATER | SW20 FIRST DEFENSE HIGH CAPACITY

Applications

Roads, carparks, commercial properties
Ports, airports, construction sites
Industrial and commercial facilities
Offline and online treatment of existing
stormwater reticulation

Product Attributes

Removal efficiencies exceeding 80%
on particulate contaminants down to
75 micron
Low head requirements at treatment
flow rate
Easy to maintain

Approvals/Standards

NJCAT
NZS3109, Concrete Construction

Quality

ISO 9001:2008 Quality
Management Standard

*We are the supply partner of choice for New Zealand's
stormwater management and treatment solutions.*

HYNDS
STORMWATER

The First Defense® High Capacity is an enhanced vortex separator that combines an effective stormwater treatment chamber with an integral peak flow bypass. It efficiently removes sediment, total suspended solids (TSS), trash and hydrocarbons from stormwater runoff without washing out previously captured pollutants.

The First Defense® High Capacity is available in several model configurations to accommodate a wide range of pipe sizes, peak flows and depth constraints.

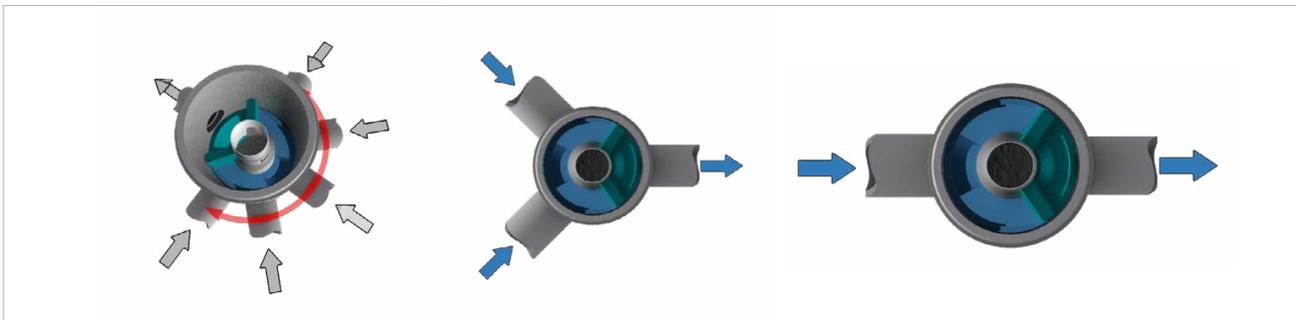


FIG. 1 The First Defense® High Capacity can have one or many inlets

Design and Sizing

This adaptable online treatment system works easily with large pipes, multiple inlet pipes, inlet grates and now, contains a high capacity bypass for the conveyance of large peak flows. Designed with site flexibility in mind, the First Defense® High Capacity allows engineers to maximize available site space without compromising treatment level.

TABLE 1 Design & sizing

Model Diameter (m)	Typical Treatment Flow Rate (L/s)	Maximum online Flow Rate (L/s)	Emergency Spill Containment (L)	Sediment Storage (m3)
0.9	23.7	424	473	0.3
1.2	42.4	510	723	0.5
1.8	95.7	906	1878	1.2
2.5	169.9	1415	4239	2.1

Please note that FDHC0900 is only available in South Island

How it works

The First Defense® High Capacity has internal components designed to remove and retain gross debris, total suspended solids (TSS) and hydrocarbons. Contaminated stormwater runoff enters the inlet chute from a surface grate and/or inlet pipe. The inlet chute introduces flow into the chamber

tangentially to create a low energy vortex flow regime that directs sediment into the sump while oils, floating trash and debris rise to the surface.

Treated stormwater exits through a submerged outlet chute located opposite to the direction of the rotating flow. Enhanced vortex separation is provided by forcing the rotating flow within the vessel to follow the longest path possible rather than directly from inlet to outlet.

Higher flows bypass the treatment chamber to prevent turbulence and washout of captured pollutants. An internal bypass conveys infrequent peak flows directly to the outlet eliminating the need for, and expense of, external bypass control structures. A floatables draw off slot functions to convey floatables into the treatment chamber prior to bypass.

Applications

- Stormwater treatment at the point of entry into the drainage line.
- Sites constrained by space, topography or drainage profiles with limited slope and depth of cover.
- Retrofit installations where stormwater treatment is placed on or tied into an existing storm drain line.
- Pretreatment for filters, infiltration and storage.

TABLE 2 First Defense® High Capacity dimensions

Product	Chamber size (mm)	Lid Openings	Lid Thickness (mm)	Dimension (mm)					Mass Total (T)	Shipped from
				A	B	C	D	E		
First Defense High Capacity 900	900	1	200	1329	1199	933	1199	933	2.2	Chch
First Defense High Capacity 1200	1200	1	200	1647	1701	1049	1701	1049	4.3	Auck / Chch
First Defense High Capacity 1800	1800	1	200	2307	2004	1346	2004	1346	9.0	Auck / Chch
First Defense High Capacity 2550	2550	1	225	3150	2569	1686	2569	1686	24.0	Auck / Chch

Please note that FDHC0900 is only available in South Island

Advantages

- Inlet options include surface grate or multiple inlet pipes.
- Integral high capacity bypass conveys large peak flows without the need for “offline” arrangements using separate junction manholes.
- Proven to prevent pollutant washout at up to 450% of its treatment flow.
- Long flow path through the device ensures a long residence time within the treatment chamber, enhancing pollutant settling.
- Delivered to site pre-assembled and ready for installation.

Operation

The First Defense® operates on simple fluid hydraulics. It is selfactivating, has no moving parts, no external power requirement and the internals are fabricated with durable non-corrosive components. No manual procedures are required to operate the unit and maintenance is limited to monitoring accumulations of stored pollutants and periodic clean-outs. The First Defense® has been designed to allow for easy and safe access for inspection, monitoring and clean-out procedures. Neither entry into the unit nor removal of the internal components is necessary for maintenance, thus safety concerns related to confined-space entry are avoided.

Pollutant Capture and Retention

The internal components of the First Defense® High Capacity have been designed to optimize pollutant capture. Sediment is captured and retained in the base of the unit, while oil and floatables are stored on the water surface in the inner volume. The pollutant storage volumes are isolated from the built-in bypass chamber to prevent washout during high-flow storm events. The sump of the First Defense® High Capacity retains a standing water level between storm events. This ensures a quiescent flow regime at the onset of a storm, preventing resuspension and washout of pollutants captured during previous events. Accessories such as oil absorbent pads are available for enhanced oil removal and storage. Due to the separation of the oil and floatable

storage volume from the outlet, the potential for washout of stored pollutants between clean-outs is minimized.

Maintenance

Maintenance of the First Defense® High Capacity is simple, safe and cost-effective. Maintenance is carried out from the surface using a standard vacuum tanker and personnel are not required to enter the device.



FIG. 2 The First Defense® High Capacity internals

TABLE 3 MAINTENANCE / SERVICING

The Frequency of clean out is determined in the field after installation. During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation. A simple probe such as a Sludge-Judge can be used to determine the level of accumulated solids stored in the sump.

Activity	Indicative frequency for mid level catchment area
Inspection	Regularly during the first year of installation. Every 6 months after the first year of installation
Oil and Floatables Removal	Once per year, with sediment removal Following a spill in the drainage area
Sediment Removal	Once per year or as needed Following a spill in the drainage area

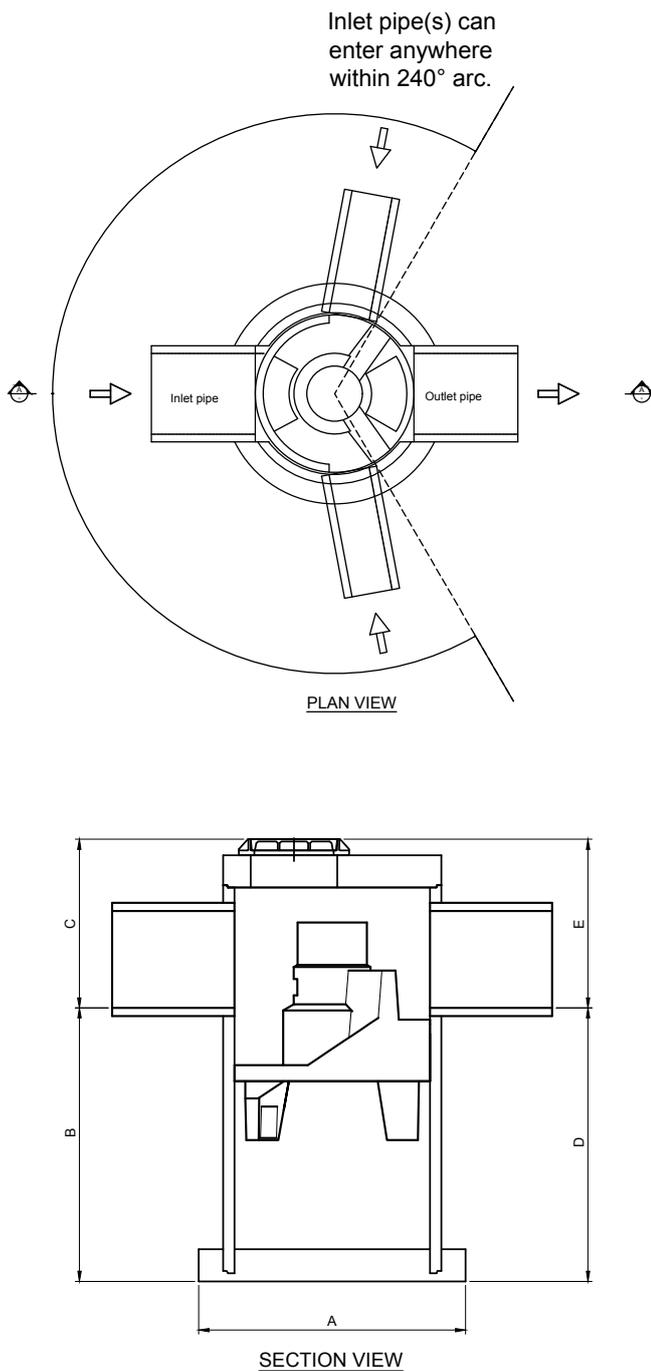


FIG. 3 General arrangement drawing

Lifting and Handling

All First Defense® High Capacity incorporate Swiftlift lifting anchors for safe lifting and must be used with the correct lifting clutch.

Hynds Pipe Systems has designed and manufactured First Defense® High Capacity with a minimum dynamic factor of 1.2. This dynamic factor requires that all the following conditions are observed when lifting, moving or placing the units:

1. Lifting with mobile plant (*such as an excavator or similar*) where equipment is specifically exempt from the requirements of the PECPR Regulations 1999, subject to the conditions outlined in the New Zealand Gazette, No. 104, September 2015 and
2. Lifting, travelling and placing over rough or uneven ground where anchor failure is not anticipated to cause harm or injury, by adopting procedures such as:
 - a. Transporting the element as close as practical to ground level (300mm recommended)
 - b. Establishing and maintaining exclusion zones
 - c. Transporting only precast concrete elements that are unlikely to topple if they were to hit the ground
 - d. Inspecting lifting anchors both after transportation and before final lifting into place

Refer to "Safe work with precast concrete - Handling, transportation and erection of precast concrete elements" published by Worksafe New Zealand (October 2018)

Shock loads resulting from travelling with suspended First Defense® High Capacity over rough terrain and uneven ground may exceed design, dynamic and safety factors of the lifting systems. It is essential that care is taken during lifting and transporting as additional stresses could result in anchor failure.

Branches Nationwide Support Office & Technical Services 09 274 0316

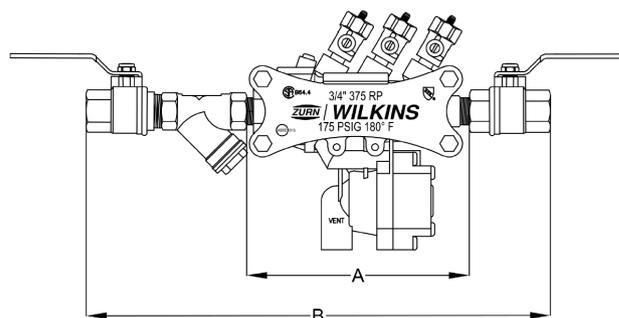
Disclaimer: While every effort has been made to ensure that the information in this document is correct and accurate, users of Hynds product or information within this document must make their own assessment of suitability for their particular application. Product dimensions are nominal only, and should be verified if critical to a particular installation. No warranty is either expressed, implied, or statutory made by Hynds unless expressly stated in any sale and purchase agreement entered into between Hynds and the user.

Appendix F Reduced Pressure Zone Device Brochure

375 (SMALL)

REDUCED PRESSURE PRINCIPAL ASSEMBLY 20MM - 50MM

WILKINS



ENGINEERING SPECIFICATION

- Designed for installation on potable water lines.
- Protects against both backsiphonage and backpressure of contaminated water into the water supply.
- Assembly provides protection where a potential health hazard exists (High Hazard).
- The Reduced Pressure Principle Backflow Preventer is Australian Watermark Approved (AZ/NZS 2845.1).
- The Reduced Pressure Principle Assembly is rated to 82°C.
- The Reduced Pressure Principle Assembly is supplied with male pipe thread tailpieces.
- The main body is Nylon and the seat disc elastomers are silicone.
- Unless otherwise specified, the assembly should be mounted at a minimum of 300mm and maximum of 762mm above adequate drains with sufficient side clearance for testing and maintenance.

PRODUCT INFORMATION

MODEL 375 FEATURES

Max. Working Water Pressure	1600kPa
Max. Working Temperature	82°C
Hydrostatic Test Pressure	2400kPa
End Connections	Threaded

MODEL 375 MATERIALS

Main Valve Body	Reinforced Nylon (FDA approved)
Housing	Brass (DZR)
Fastener	Stainless Steel 300 Series
Elastomers	Silicone & Buna Nitrile (FDA approved)
Internals	Delrin & Nylon (NSF listed)
Springs	Stainless Steel 300 Series
Tailpiece	Cast Bronze ASTM B 584
Struts	Forged Brass ASTM B 124

CODE	VALVE SIZE mm	A mm	B mm
W19375L	19	168	330
W25375L	25	178	375
W32375L	32	367	610
W40375L	40	367	635
W50375L	50	367	700

STANDARDS COMPLIANCE

- Australian Watermark (AS/NZS 2845.1) Approved Lic. 1379
- Type Tested AS/NZS 4020 Lic. 20111

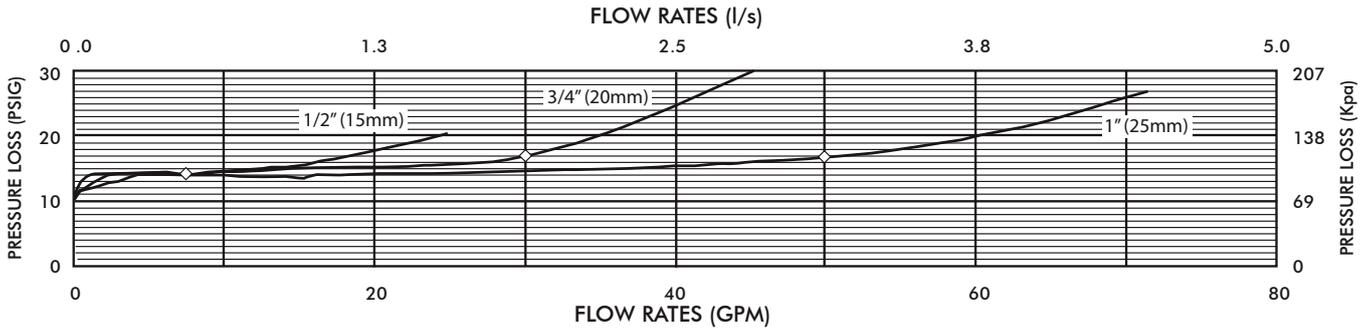
MODELS

RPZ COMES WITH 2 X BALL VALVES Y-STRAINER

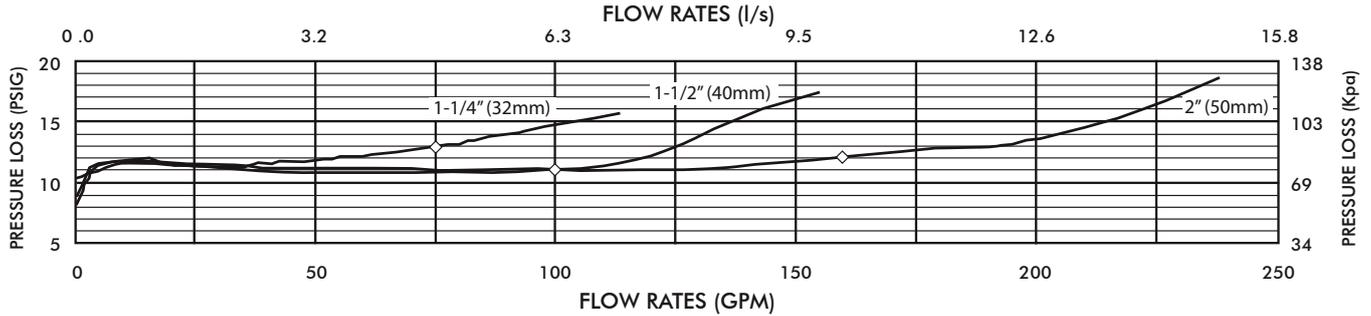
- W19375S** - 19mm Reduced Pressure Zone Device
- W25375S** - 25mm Reduced Pressure Zone Device
- W32375S** - 32mm Reduced Pressure Zone Device
- W40375S** - 40mm Reduced Pressure Zone Device
- W50375S** - 50mm Reduced Pressure Zone Device

FLOW CHARACTERISTICS

MODEL 375, 375XL 1/2", 3/4" & 1" (STANDARD & METRIC)



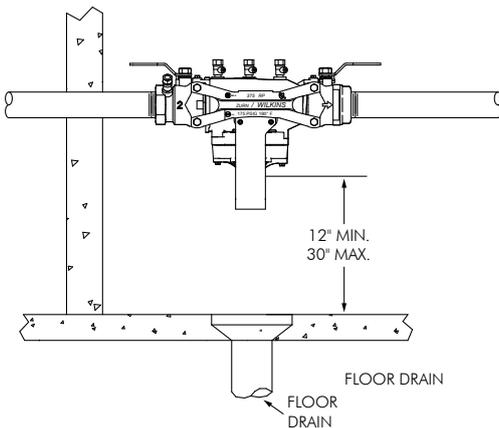
MODEL 375, 375XL 1-1/4"-2" (STANDARD & METRIC)



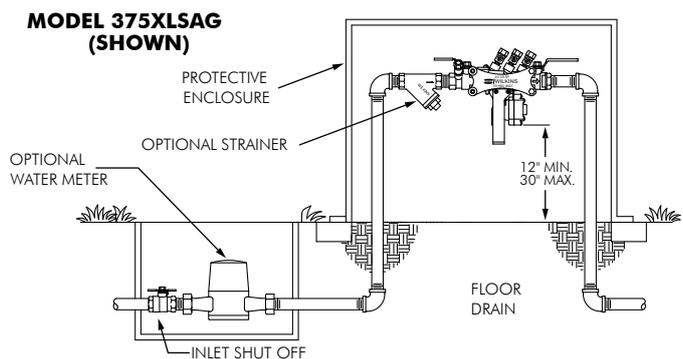
◇ Rated flow (Established by approval agencies)

TYPICAL INSTALLATION

Local codes shall govern installation requirements. To be installed in accordance with the manufacturers instructions and the latest edition of the Uniform Plumbing Code. Unless otherwise specified, the assembly shall be mounted at a minimum of 12" (305mm) and a maximum of 30" (762mm) above adequate drains with sufficient side clearance for testing and maintenance. The installation shall be made so that no part of the unit can be submerged.



DIRECTION OF FLOW →
INDOOR INSTALLATION



DIRECTION OF FLOW →
OUTDOOR INSTALLATION



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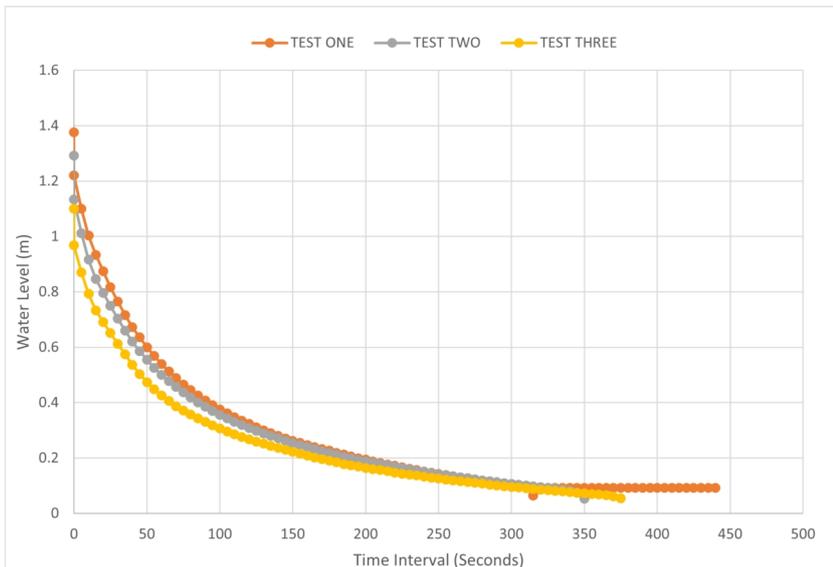
Appendix G Permeability test results

Client: NZHG
Project: Geotechnical Investigation for Proposed Subdivision
Location: 99A Stanley Road, Gisborne
Test Site: Refer to investigation plan

Coordinates: 5709109mN, 2035820mE
System: NZTM
Elevation: 5.3m (NZVD16)
Located By: Site plan/map

Test Date: 26/01/2024
Logged By: HAP
Checked By: AA
Vane ID:

Depth (m)	Graphic Log	Material Description	Geology	In-situ Testing				Test Values peak / remoulded (sensitivity)	RL (m)
				Dynamic Cone Penetrometer (blows / 50mm)					
				Shear Vane, Su (kPa)					
				2	4	6	8		
				50	100	150	200		
0.0 - 0.3		Organic sandy SILT, with trace gravel; dark brownish black; dry to moist; non-plastic; sand, fine to medium; gravel, fine, subangular; some rootlets. 0.3m: With some pumiceous sand; coarse; trace rootlets.	Topsoil						5.0
0.3 - 1.4		SAND; brown; moist; sand, fine to medium.	Holocene Shoreline Deposits						
1.4 - 1.8		Shelly SAND; light brown; moist; sand, fine to coarse; shells retrieved ass coarse sand size fragments.							4.0
				Groundwater Not Encountered					



Hole Depth: 1.80m
Termination: Target depth
Remarks:

See appended spreadsheet for soakage data / rates.



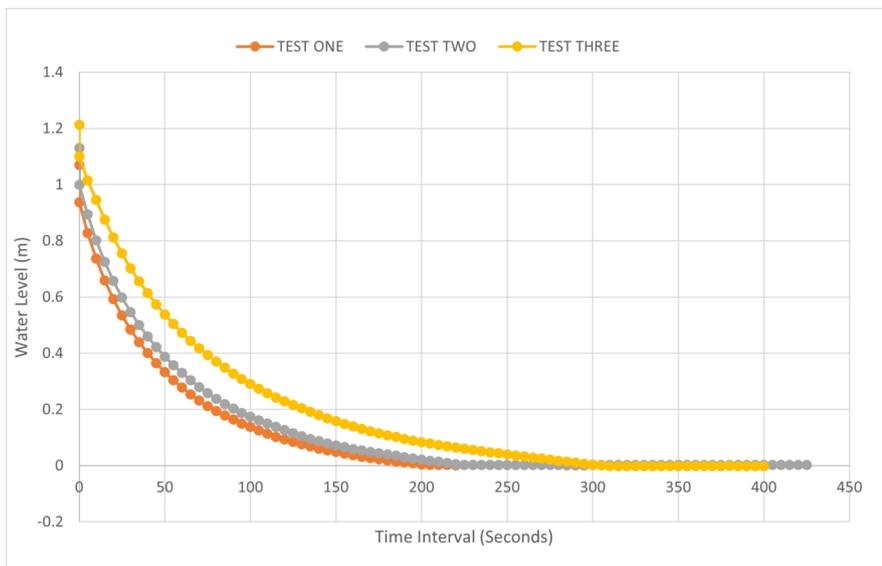
Materials described in general accordance with NZGS Field Description of Soil and Rock (2005). No correlation is implied between shear vane and DCP values.

Client: NZHG
Project: Geotechnical Investigation for Proposed Subdivision
Location: 99A Stanley Road, Gisborne
Test Site: Refer to investigation plan

Coordinates: 5709092mN, 2035804mE
System: NZTM
Elevation: 5.3m (NZVD16)
Located By: Site plan/map

Test Date: 26/01/2024
Logged By: HAP
Checked By: AA
Vane ID:

Depth (m)	Graphic Log	Material Description	Geology	Water	In-situ Testing				Test Values peak / remoulded (sensitivity)	RL (m)
					Dynamic Cone Penetrometer (blows / 50mm)					
					2	4	6	8		
					Shear Vane, Su (kPa)					
					50	100	150	200		
0.0 - 0.4		Sandy SILT; dark brownish black; dry to moist; non-plastic; sand, fine to medium; minor rootlets. 0.4m: With some pumiceous sand; coarse.	Topsoil	Groundwater Not Encountered						5.0
0.4 - 1.3		SAND; brown; moist; sand, fine to medium.	Holocene Shoreline Deposits							
1.3 - 1.7		Shelly SAND; light greyish brown; moist; sand, fine to coarse; shells retrieved as coarse sand size fragments. 1.3m: Shells retrieved as coarse sand to fine gravel size fragments. 1.5m: Shells retrieved as coarse sand to medium gravel size fragments. 1.7m: Moist to wet.								4.0



Hole Depth: 1.65m
Termination: Target depth

Remarks:
 See appended spreadsheet for soakage data/rates.



Materials described in general accordance with NZGS Field Description of Soil and Rock (2005). No correlation is implied between shear vane and DCP values.

Hand Auger Borehole Log

Test ID: **PT-03**

Project ID: 24729

Sheet: 1 of 1

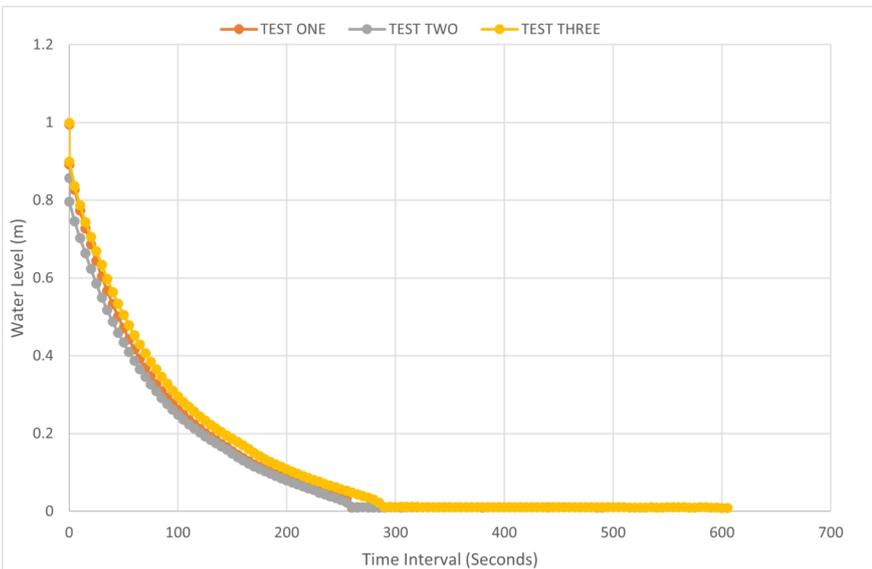
Method: 100mm Hand Auger | Falling Head Permiability Testing

Client: NZHG
Project: Geotechnical Investigation for Proposed Subdivision
Location: 99A Stanley Road, Gisborne
Test Site: Refer to investigation plan

Coordinates: 5709077mN, 2035839mE
System: NZTM
Elevation: 4.7m (NZVD16)
Located By: Site plan/map

Test Date: 26/01/2024
Logged By: BC
Checked By: AA
Vane ID:

Depth (m)	Graphic Log	Material Description	Geology	Water	In-situ Testing				Test Values peak / remoulded (sensitivity)	RL (m)
					Dynamic Cone Penetrometer (blows / 50mm)					
					Shear Vane, Su (kPa)					
					2	4	6	8		
					50	100	150	200		
0.0 - 0.5		Sandy SILT, with some rootlets; brownish black; dry; sand, fine.	Topsoil	Groundwater Not Encountered						
0.5 - 1.5		SAND; brown; dry to moist; sand, fine. 1.4m: Moist to wet.	Holocene Shoreline Deposits							
1.5 - 4.0										



Hole Depth: 1.50m
Termination: Target depth

Remarks:
 See appended spreadsheet for soakage data/rates.



Materials described in general accordance with NZGS Field Description of Soil and Rock (2005). No correlation is implied between shear vane and DCP values.

Test Name:	PT-01	Test hole Diameter:	0.1	Base Area (B):	0.008
Test Date:	26/01/2024	Test hole Depth:	1.7	Circumference (C):	0.314
Level Logger #:	2128031	Level Logger Depth:	1.5	T1:	10:39:50
				T2:	10:47:45
				T3:	10:58:05

Level	Time	time steps		Depth Steps		Volume Soaked	Soakage Surface Area	Soakage Rate	
		t0	t1	h0	h1	$V=(h0-h1)*B$	$A=(C*(h0+h1)/2)+B$	$SR=V/A/(t1-t0)$	$SR*60*60*$ 1000
m	hh:mm:ss	s		m		m ³	m ²	m ³ m ⁻² s ⁻¹	Lm ⁻² h ⁻¹

TEST ONE

1.3756371	10:39:50 am	0							
1.220897	10:39:55 am	0	5	1.376	1.221	1.22E-03	0.416	5.85E-04	2105
1.1003058	10:40:00 am	5	10	1.221	1.100	9.47E-04	0.372	5.09E-04	1831
1.0030581	10:40:05 am	10	15	1.100	1.003	7.64E-04	0.338	4.52E-04	1626
0.9326198	10:40:10 am	15	20	1.003	0.933	5.53E-04	0.312	3.55E-04	1277
0.8739042	10:40:15 am	20	25	0.933	0.874	4.61E-04	0.292	3.16E-04	1139
0.8173293	10:40:20 am	25	30	0.874	0.817	4.44E-04	0.274	3.25E-04	1170
0.7654434	10:40:25 am	30	35	0.817	0.765	4.08E-04	0.256	3.18E-04	1144
0.7164118	10:40:30 am	35	40	0.765	0.716	3.85E-04	0.241	3.20E-04	1152
0.6721713	10:40:35 am	40	45	0.716	0.672	3.47E-04	0.226	3.08E-04	1107
0.6352701	10:40:40 am	45	50	0.672	0.635	2.90E-04	0.213	2.72E-04	979
0.5996942	10:40:45 am	50	55	0.635	0.600	2.79E-04	0.202	2.77E-04	997
0.5683996	10:40:50 am	55	60	0.600	0.568	2.46E-04	0.191	2.57E-04	925
0.5393476	10:40:55 am	60	65	0.568	0.539	2.28E-04	0.182	2.51E-04	903
0.5131498	10:41:00 am	65	70	0.539	0.513	2.06E-04	0.173	2.38E-04	855
0.4883792	10:41:05 am	70	75	0.513	0.488	1.95E-04	0.165	2.36E-04	848
0.4646279	10:41:10 am	75	80	0.488	0.465	1.87E-04	0.158	2.37E-04	852
0.445158	10:41:15 am	80	85	0.465	0.445	1.53E-04	0.151	2.03E-04	730
0.4251784	10:41:20 am	85	90	0.445	0.425	1.57E-04	0.145	2.17E-04	782
0.4074414	10:41:25 am	90	95	0.425	0.407	1.39E-04	0.139	2.01E-04	723
0.3909276	10:41:30 am	95	100	0.407	0.391	1.30E-04	0.133	1.95E-04	701
0.3754332	10:41:35 am	100	105	0.391	0.375	1.22E-04	0.128	1.90E-04	683
0.3608563	10:41:40 am	105	110	0.375	0.361	1.14E-04	0.124	1.85E-04	667
0.3474006	10:41:45 am	110	115	0.361	0.347	1.06E-04	0.119	1.77E-04	639
0.3347604	10:41:50 am	115	120	0.347	0.335	9.93E-05	0.115	1.73E-04	622
0.3228338	10:41:55 am	120	125	0.335	0.323	9.37E-05	0.111	1.69E-04	607
0.3107034	10:42:00 am	125	130	0.323	0.311	9.53E-05	0.107	1.77E-04	639
0.3	10:42:05 am	130	135	0.311	0.300	8.41E-05	0.104	1.62E-04	583
0.2898063	10:42:10 am	135	140	0.300	0.290	8.01E-05	0.101	1.59E-04	574
0.2794088	10:42:15 am	140	145	0.290	0.279	8.17E-05	0.097	1.68E-04	604
0.2707441	10:42:20 am	145	150	0.279	0.271	6.81E-05	0.094	1.44E-04	520
0.2621814	10:42:25 am	150	155	0.271	0.262	6.73E-05	0.092	1.47E-04	529
0.2542304	10:42:30 am	155	160	0.262	0.254	6.24E-05	0.089	1.40E-04	505
0.246789	10:42:35 am	160	165	0.254	0.247	5.84E-05	0.087	1.35E-04	486
0.2395515	10:42:40 am	165	170	0.247	0.240	5.68E-05	0.084	1.35E-04	486
0.2326198	10:42:45 am	170	175	0.240	0.233	5.44E-05	0.082	1.33E-04	478
0.2259939	10:42:50 am	175	180	0.233	0.226	5.20E-05	0.080	1.30E-04	469
0.2187564	10:42:55 am	180	185	0.226	0.219	5.68E-05	0.078	1.46E-04	527
0.2120285	10:43:00 am	185	190	0.219	0.212	5.28E-05	0.076	1.40E-04	504
0.2053007	10:43:05 am	190	195	0.212	0.205	5.28E-05	0.073	1.44E-04	518
0.1991845	10:43:10 am	195	200	0.205	0.199	4.80E-05	0.071	1.35E-04	484
0.1939857	10:43:15 am	200	205	0.199	0.194	4.08E-05	0.070	1.17E-04	422
0.1879715	10:43:20 am	205	210	0.194	0.188	4.72E-05	0.068	1.39E-04	501
0.182263	10:43:25 am	210	215	0.188	0.182	4.48E-05	0.066	1.36E-04	489
0.1768603	10:43:30 am	215	220	0.182	0.177	4.24E-05	0.064	1.32E-04	475
0.1717635	10:43:35 am	220	225	0.177	0.172	4.00E-05	0.063	1.28E-04	460
0.1663609	10:43:40 am	225	230	0.172	0.166	4.24E-05	0.061	1.39E-04	501
0.1611621	10:43:45 am	230	235	0.166	0.161	4.08E-05	0.059	1.38E-04	496
0.1568807	10:43:50 am	235	240	0.161	0.157	3.36E-05	0.058	1.16E-04	419
0.15158	10:43:55 am	240	245	0.157	0.152	4.16E-05	0.056	1.48E-04	532
0.1470948	10:44:00 am	245	250	0.152	0.147	3.52E-05	0.055	1.29E-04	463
0.1429154	10:44:05 am	250	255	0.147	0.143	3.28E-05	0.053	1.23E-04	443
0.1381244	10:44:10 am	255	260	0.143	0.138	3.76E-05	0.052	1.45E-04	521
0.133945	10:44:15 am	260	265	0.138	0.134	3.28E-05	0.051	1.30E-04	467
0.1303772	10:44:20 am	265	270	0.134	0.130	2.80E-05	0.049	1.14E-04	409
0.1265036	10:44:25 am	270	275	0.130	0.127	3.04E-05	0.048	1.26E-04	454
0.12263	10:44:30 am	275	280	0.127	0.123	3.04E-05	0.047	1.29E-04	466
0.1191641	10:44:35 am	280	285	0.123	0.119	2.72E-05	0.046	1.19E-04	428
0.1154944	10:44:40 am	285	290	0.119	0.115	2.88E-05	0.045	1.29E-04	464
0.1121305	10:44:45 am	290	295	0.115	0.112	2.64E-05	0.044	1.21E-04	436
0.1088685	10:44:50 am	295	300	0.112	0.109	2.56E-05	0.043	1.20E-04	433
0.1055046	10:44:55 am	300	305	0.109	0.106	2.64E-05	0.042	1.27E-04	458
0.1009174	10:45:00 am	305	310	0.106	0.101	3.60E-05	0.040	1.79E-04	644
0.0966361	10:45:05 am	310	315	0.101	0.097	3.36E-05	0.039	1.73E-04	623
0.0647299	10:45:10 am	315	320	0.097	0.065	2.51E-04	0.033	1.51E-03	5434
0.091947	10:45:15 am	320	325	0.065	0.092	-2.14E-04	0.032	-1.32E-03	-4741
0.0920489	10:45:20 am	325	330	0.092	0.092	-8.01E-07	0.037	-4.36E-06	-16
0.091947	10:45:25 am	330	335	0.092	0.092	8.01E-07	0.037	4.36E-06	16
0.0921509	10:45:30 am	335	340	0.092	0.092	-1.60E-06	0.037	-8.71E-06	-31

0.0920489	10:45:35 am	340	345	0.092	0.092	8.01E-07	0.037	4.35E-06	16
0.0921509	10:45:40 am	345	350	0.092	0.092	-8.01E-07	0.037	-4.35E-06	-16
0.0921509	10:45:45 am	350	355	0.092	0.092	0.00E+00	0.037	0.00E+00	0
0.0923547	10:45:50 am	355	360	0.092	0.092	-1.60E-06	0.037	-8.69E-06	-31
0.0921509	10:45:55 am	360	365	0.092	0.092	1.60E-06	0.037	8.69E-06	31
0.0923547	10:46:00 am	365	370	0.092	0.092	-1.60E-06	0.037	-8.69E-06	-31
0.0923547	10:46:05 am	370	375	0.092	0.092	0.00E+00	0.037	0.00E+00	0
0.0923547	10:46:10 am	375	380	0.092	0.092	0.00E+00	0.037	0.00E+00	0
0.0920489	10:46:15 am	380	385	0.092	0.092	2.40E-06	0.037	1.30E-05	47
0.091947	10:46:20 am	385	390	0.092	0.092	8.01E-07	0.037	4.36E-06	16
0.091947	10:46:25 am	390	395	0.092	0.092	0.00E+00	0.037	0.00E+00	0
0.091947	10:46:30 am	395	400	0.092	0.092	0.00E+00	0.037	0.00E+00	0
0.091947	10:46:35 am	400	405	0.092	0.092	0.00E+00	0.037	0.00E+00	0
0.0922528	10:46:40 am	405	410	0.092	0.092	-2.40E-06	0.037	-1.31E-05	-47
0.0918451	10:46:45 am	410	415	0.092	0.092	3.20E-06	0.037	1.74E-05	63
0.091947	10:46:50 am	415	420	0.092	0.092	-8.01E-07	0.037	-4.36E-06	-16
0.0917431	10:46:55 am	420	425	0.092	0.092	1.60E-06	0.037	8.72E-06	31
0.0921509	10:47:00 am	425	430	0.092	0.092	-3.20E-06	0.037	-1.74E-05	-63
0.0922528	10:47:05 am	430	435	0.092	0.092	-8.01E-07	0.037	-4.35E-06	-16
0.0920489	10:47:10 am	435	440	0.092	0.092	1.60E-06	0.037	8.70E-06	31
0.0918451	10:47:15 am	440	445	0.092	0.092	1.60E-06	0.037	8.72E-06	31

TEST TWO

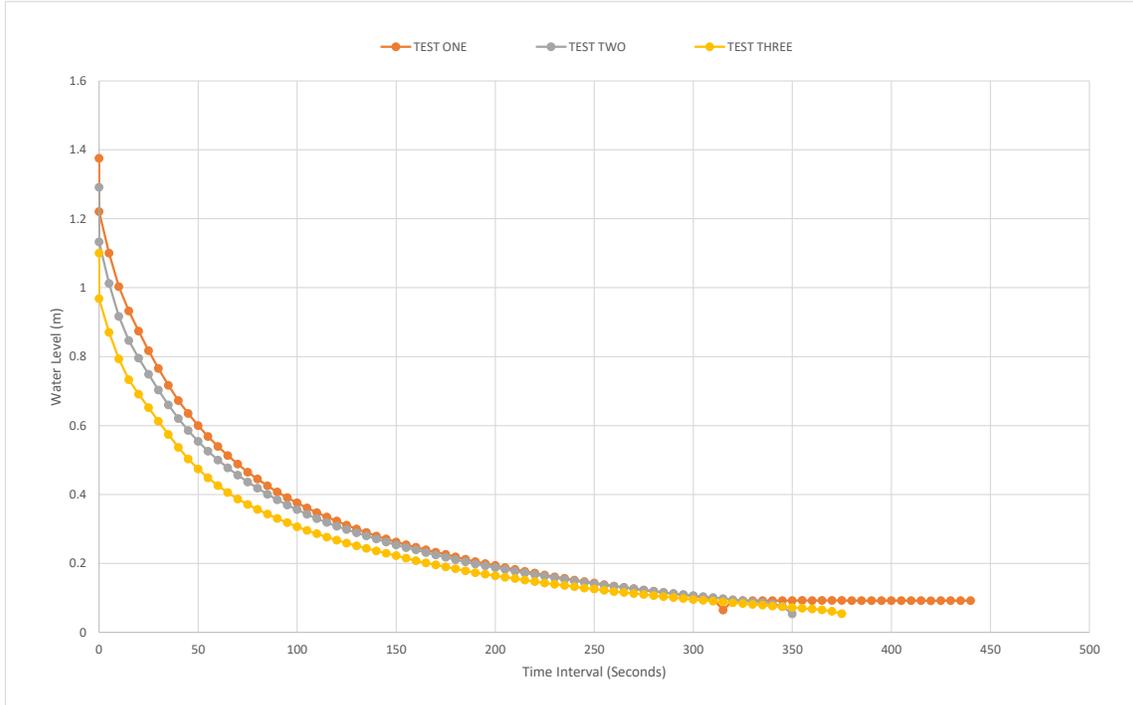
1.2912334	10:47:45 am	0							
1.1330275	10:47:50 am	0	5	1.291	1.133	1.24E-03	0.389	6.39E-04	2302
1.0122324	10:47:55 am	5	10	1.133	1.012	9.49E-04	0.345	5.50E-04	1981
0.9164118	10:48:00 am	10	15	1.012	0.916	7.53E-04	0.311	4.84E-04	1743
0.8466871	10:48:05 am	15	20	0.916	0.847	5.48E-04	0.285	3.85E-04	1384
0.7956167	10:48:10 am	20	25	0.847	0.796	4.01E-04	0.266	3.02E-04	1086
0.7489297	10:48:15 am	25	30	0.796	0.749	3.67E-04	0.250	2.93E-04	1054
0.7027523	10:48:20 am	30	35	0.749	0.703	3.63E-04	0.236	3.08E-04	1107
0.659633	10:48:25 am	35	40	0.703	0.660	3.39E-04	0.222	3.05E-04	1099
0.6200815	10:48:30 am	40	45	0.660	0.620	3.11E-04	0.209	2.97E-04	1071
0.5856269	10:48:35 am	45	50	0.620	0.586	2.71E-04	0.197	2.74E-04	988
0.5540265	10:48:40 am	50	55	0.586	0.554	2.48E-04	0.187	2.66E-04	956
0.52579	10:48:45 am	55	60	0.554	0.526	2.22E-04	0.177	2.50E-04	900
0.5	10:48:50 am	60	65	0.526	0.500	2.03E-04	0.169	2.40E-04	863
0.4771662	10:48:55 am	65	70	0.500	0.477	1.79E-04	0.161	2.22E-04	800
0.456371	10:49:00 am	70	75	0.477	0.456	1.63E-04	0.154	2.11E-04	761
0.4362895	10:49:05 am	75	80	0.456	0.436	1.58E-04	0.148	2.13E-04	767
0.4180428	10:49:10 am	80	85	0.436	0.418	1.43E-04	0.142	2.02E-04	726
0.4003058	10:49:15 am	85	90	0.418	0.400	1.39E-04	0.136	2.04E-04	735
0.3845056	10:49:20 am	90	95	0.400	0.385	1.24E-04	0.131	1.89E-04	681
0.3695209	10:49:25 am	95	100	0.385	0.370	1.18E-04	0.126	1.86E-04	671
0.3561672	10:49:30 am	100	105	0.370	0.356	1.05E-04	0.122	1.72E-04	620
0.3423038	10:49:35 am	105	110	0.356	0.342	1.09E-04	0.118	1.85E-04	667
0.3299694	10:49:40 am	110	115	0.342	0.330	9.69E-05	0.113	1.71E-04	615
0.3187564	10:49:45 am	115	120	0.330	0.319	8.81E-05	0.110	1.60E-04	578
0.3077472	10:49:50 am	120	125	0.319	0.308	8.65E-05	0.106	1.63E-04	586
0.2980632	10:49:55 am	125	130	0.308	0.298	7.61E-05	0.103	1.48E-04	532
0.2885831	10:50:00 am	130	135	0.298	0.289	7.45E-05	0.100	1.49E-04	536
0.2796126	10:50:05 am	135	140	0.289	0.280	7.05E-05	0.097	1.45E-04	522
0.2710499	10:50:10 am	140	145	0.280	0.271	6.73E-05	0.094	1.43E-04	513
0.2619776	10:50:15 am	145	150	0.271	0.262	7.13E-05	0.092	1.56E-04	560
0.2536188	10:50:20 am	150	155	0.262	0.254	6.56E-05	0.089	1.48E-04	532
0.2457696	10:50:25 am	155	160	0.254	0.246	6.16E-05	0.086	1.43E-04	514
0.2393476	10:50:30 am	160	165	0.246	0.239	5.04E-05	0.084	1.20E-04	432
0.2317023	10:50:35 am	165	170	0.239	0.232	6.00E-05	0.082	1.47E-04	528
0.2244648	10:50:40 am	170	175	0.232	0.224	5.68E-05	0.080	1.43E-04	515
0.2175331	10:50:45 am	175	180	0.224	0.218	5.44E-05	0.077	1.41E-04	507
0.2107034	10:50:50 am	180	185	0.218	0.211	5.36E-05	0.075	1.43E-04	514
0.204791	10:50:55 am	185	190	0.211	0.205	4.64E-05	0.073	1.27E-04	457
0.1984709	10:51:00 am	190	195	0.205	0.198	4.96E-05	0.071	1.39E-04	502
0.1931702	10:51:05 am	195	200	0.198	0.193	4.16E-05	0.069	1.20E-04	432
0.1875637	10:51:10 am	200	205	0.193	0.188	4.40E-05	0.068	1.30E-04	469
0.1826707	10:51:15 am	205	210	0.188	0.183	3.84E-05	0.066	1.16E-04	419
0.177472	10:51:20 am	210	215	0.183	0.177	4.08E-05	0.064	1.27E-04	456
0.1726809	10:51:25 am	215	220	0.177	0.173	3.76E-05	0.063	1.20E-04	431
0.1673802	10:51:30 am	220	225	0.173	0.167	4.16E-05	0.061	1.36E-04	489
0.1630989	10:51:35 am	225	230	0.167	0.163	3.36E-05	0.060	1.13E-04	405
0.158104	10:51:40 am	230	235	0.163	0.158	3.92E-05	0.058	1.35E-04	484
0.1537207	10:51:45 am	235	240	0.158	0.154	3.44E-05	0.057	1.21E-04	436
0.1494393	10:51:50 am	240	245	0.154	0.149	3.36E-05	0.055	1.21E-04	436
0.145158	10:51:55 am	245	250	0.149	0.145	3.36E-05	0.054	1.24E-04	447
0.1410805	10:52:00 am	250	255	0.145	0.141	3.20E-05	0.053	1.21E-04	437
0.1367992	10:52:05 am	255	260	0.141	0.137	3.36E-05	0.052	1.31E-04	470
0.1335372	10:52:10 am	260	265	0.137	0.134	2.56E-05	0.050	1.02E-04	367
0.1296636	10:52:15 am	265	270	0.134	0.130	3.04E-05	0.049	1.24E-04	445
0.1260958	10:52:20 am	270	275	0.130	0.126	2.80E-05	0.048	1.17E-04	420
0.1223242	10:52:25 am	275	280	0.126	0.122	2.96E-05	0.047	1.26E-04	455
0.1190622	10:52:30 am	280	285	0.122	0.119	2.56E-05	0.046	1.12E-04	403

0.1155963	10:52:35 am	285	290	0.119	0.116	2.72E-05	0.045	1.22E-04	438
0.1124363	10:52:40 am	290	295	0.116	0.112	2.48E-05	0.044	1.14E-04	409
0.1091743	10:52:45 am	295	300	0.112	0.109	2.56E-05	0.043	1.20E-04	432
0.106422	10:52:50 am	300	305	0.109	0.106	2.16E-05	0.042	1.04E-04	373
0.1033639	10:52:55 am	305	310	0.106	0.103	2.40E-05	0.041	1.18E-04	424
0.1007136	10:53:00 am	310	315	0.103	0.101	2.08E-05	0.040	1.04E-04	376
0.0976555	10:53:05 am	315	320	0.101	0.098	2.40E-05	0.039	1.23E-04	443
0.0945973	10:53:10 am	320	325	0.098	0.095	2.40E-05	0.038	1.26E-04	454
0.0917431	10:53:15 am	325	330	0.095	0.092	2.24E-05	0.037	1.21E-04	435
0.0889908	10:53:20 am	330	335	0.092	0.089	2.16E-05	0.036	1.19E-04	429
0.0861366	10:53:25 am	335	340	0.089	0.086	2.24E-05	0.035	1.27E-04	456
0.0824669	10:53:30 am	340	345	0.086	0.082	2.88E-05	0.034	1.68E-04	604
0.0754332	10:53:35 am	345	350	0.082	0.075	5.52E-05	0.033	3.38E-04	1218
0.0535168	10:53:40 am	350	355	0.075	0.054	1.72E-04	0.028	1.22E-03	4409

TEST THREE

1.1003058	10:58:05 am	0							
0.9681957	10:58:10 am	0	5	1.100	0.968	1.04E-03	0.333	6.24E-04	2245
0.8701325	10:58:15 am	5	10	0.968	0.870	7.70E-04	0.297	5.19E-04	1870
0.7933741	10:58:20 am	10	15	0.870	0.793	6.03E-04	0.269	4.48E-04	1613
0.7329256	10:58:25 am	15	20	0.793	0.733	4.75E-04	0.248	3.83E-04	1381
0.6908257	10:58:30 am	20	25	0.733	0.691	3.31E-04	0.231	2.86E-04	1028
0.6518858	10:58:35 am	25	30	0.691	0.652	3.06E-04	0.219	2.80E-04	1007
0.6125382	10:58:40 am	30	35	0.652	0.613	3.09E-04	0.206	2.99E-04	1078
0.5738022	10:58:45 am	35	40	0.613	0.574	3.04E-04	0.194	3.13E-04	1128
0.5364934	10:58:50 am	40	45	0.574	0.536	2.93E-04	0.182	3.22E-04	1158
0.5028542	10:58:55 am	45	50	0.536	0.503	2.64E-04	0.171	3.09E-04	1112
0.4740061	10:59:00 am	50	55	0.503	0.474	2.27E-04	0.161	2.81E-04	1011
0.4480122	10:59:05 am	55	60	0.474	0.448	2.04E-04	0.153	2.67E-04	963
0.4253823	10:59:10 am	60	65	0.448	0.425	1.78E-04	0.145	2.45E-04	882
0.4057085	10:59:15 am	65	70	0.425	0.406	1.55E-04	0.138	2.23E-04	804
0.3868502	10:59:20 am	70	75	0.406	0.387	1.48E-04	0.132	2.24E-04	806
0.370948	10:59:25 am	75	80	0.387	0.371	1.25E-04	0.127	1.97E-04	709
0.3567788	10:59:30 am	80	85	0.371	0.357	1.11E-04	0.122	1.82E-04	656
0.3429154	10:59:35 am	85	90	0.357	0.343	1.09E-04	0.118	1.85E-04	666
0.3302752	10:59:40 am	90	95	0.343	0.330	9.93E-05	0.114	1.75E-04	629
0.3180428	10:59:45 am	95	100	0.330	0.318	9.61E-05	0.110	1.75E-04	631
0.306422	10:59:50 am	100	105	0.318	0.306	9.13E-05	0.106	1.72E-04	620
0.2955148	10:59:55 am	105	110	0.306	0.296	8.57E-05	0.102	1.67E-04	602
0.2859327	11:00:00 am	110	115	0.296	0.286	7.53E-05	0.099	1.52E-04	546
0.2763507	11:00:05 am	115	120	0.286	0.276	7.53E-05	0.096	1.56E-04	563
0.2672783	11:00:10 am	120	125	0.276	0.267	7.13E-05	0.093	1.53E-04	550
0.2588175	11:00:15 am	125	130	0.267	0.259	6.65E-05	0.090	1.47E-04	529
0.2511723	11:00:20 am	130	135	0.259	0.251	6.00E-05	0.088	1.37E-04	491
0.243527	11:00:25 am	135	140	0.251	0.244	6.00E-05	0.086	1.40E-04	505
0.2361876	11:00:30 am	140	145	0.244	0.236	5.76E-05	0.083	1.39E-04	499
0.2294597	11:00:35 am	145	150	0.236	0.229	5.28E-05	0.081	1.30E-04	470
0.2224261	11:00:40 am	150	155	0.229	0.222	5.52E-05	0.079	1.40E-04	505
0.2150866	11:00:45 am	155	160	0.222	0.215	5.76E-05	0.077	1.51E-04	542
0.2079511	11:00:50 am	160	165	0.215	0.208	5.60E-05	0.074	1.51E-04	543
0.2015291	11:00:55 am	165	170	0.208	0.202	5.04E-05	0.072	1.40E-04	503
0.1954128	11:01:00 am	170	175	0.202	0.195	4.80E-05	0.070	1.37E-04	493
0.1899083	11:01:05 am	175	180	0.195	0.190	4.32E-05	0.068	1.26E-04	455
0.1844037	11:01:10 am	180	185	0.190	0.184	4.32E-05	0.067	1.30E-04	467
0.1781855	11:01:15 am	185	190	0.184	0.178	4.88E-05	0.065	1.51E-04	543
0.1732926	11:01:20 am	190	195	0.178	0.173	3.84E-05	0.063	1.22E-04	439
0.1688073	11:01:25 am	195	200	0.173	0.169	3.52E-05	0.062	1.14E-04	412
0.1639144	11:01:30 am	200	205	0.169	0.164	3.84E-05	0.060	1.28E-04	460
0.159735	11:01:35 am	205	210	0.164	0.160	3.28E-05	0.059	1.12E-04	403
0.1560652	11:01:40 am	210	215	0.160	0.156	2.88E-05	0.057	1.00E-04	361
0.151682	11:01:45 am	215	220	0.156	0.152	3.44E-05	0.056	1.23E-04	441
0.1474006	11:01:50 am	220	225	0.152	0.147	3.36E-05	0.055	1.23E-04	442
0.1431193	11:01:55 am	225	230	0.147	0.143	3.36E-05	0.053	1.26E-04	453
0.1394495	11:02:00 am	230	235	0.143	0.139	2.88E-05	0.052	1.10E-04	397
0.1363914	11:02:05 am	235	240	0.139	0.136	2.40E-05	0.051	9.39E-05	338
0.1324159	11:02:10 am	240	245	0.136	0.132	3.12E-05	0.050	1.25E-04	449
0.1285423	11:02:15 am	245	250	0.132	0.129	3.04E-05	0.049	1.25E-04	448
0.1254842	11:02:20 am	250	255	0.129	0.125	2.40E-05	0.048	1.01E-04	362
0.1219164	11:02:25 am	255	260	0.125	0.122	2.80E-05	0.047	1.20E-04	432
0.1182467	11:02:30 am	260	265	0.122	0.118	2.88E-05	0.046	1.26E-04	455
0.1156983	11:02:35 am	265	270	0.118	0.116	2.00E-05	0.045	8.98E-05	323
0.1126402	11:02:40 am	270	275	0.116	0.113	2.40E-05	0.044	1.10E-04	396
0.1097859	11:02:45 am	275	280	0.113	0.110	2.24E-05	0.043	1.05E-04	377
0.1068298	11:02:50 am	280	285	0.110	0.107	2.32E-05	0.042	1.11E-04	399
0.1037717	11:02:55 am	285	290	0.107	0.104	2.40E-05	0.041	1.17E-04	422
0.1007136	11:03:00 am	290	295	0.104	0.101	2.40E-05	0.040	1.20E-04	433
0.0981651	11:03:05 am	295	300	0.101	0.098	2.00E-05	0.039	1.02E-04	369
0.0953109	11:03:10 am	300	305	0.098	0.095	2.24E-05	0.038	1.17E-04	422
0.0931702	11:03:15 am	305	310	0.095	0.093	1.68E-05	0.037	8.98E-05	323
0.090316	11:03:20 am	310	315	0.093	0.090	2.24E-05	0.037	1.22E-04	440
0.0880734	11:03:25 am	315	320	0.090	0.088	1.76E-05	0.036	9.82E-05	353

0.085525	11:03:30 am	320	325	0.088	0.086	2.00E-05	0.035	1.14E-04	410
0.0833843	11:03:35 am	325	330	0.086	0.083	1.68E-05	0.034	9.78E-05	352
0.0809378	11:03:40 am	330	335	0.083	0.081	1.92E-05	0.034	1.14E-04	411
0.0787971	11:03:45 am	335	340	0.081	0.079	1.68E-05	0.033	1.02E-04	367
0.0760449	11:03:50 am	340	345	0.079	0.076	2.16E-05	0.032	1.34E-04	484
0.0740061	11:03:55 am	345	350	0.076	0.074	1.60E-05	0.031	1.02E-04	367
0.0719674	11:04:00 am	350	355	0.074	0.072	1.60E-05	0.031	1.04E-04	375
0.0701325	11:04:05 am	355	360	0.072	0.070	1.44E-05	0.030	9.55E-05	344
0.0675841	11:04:10 am	360	365	0.070	0.068	2.00E-05	0.029	1.36E-04	489
0.0650357	11:04:15 am	365	370	0.068	0.065	2.00E-05	0.029	1.40E-04	502
0.0608563	11:04:20 am	370	375	0.065	0.061	3.28E-05	0.028	2.38E-04	855
0.0543323	11:04:25 am	375	380	0.061	0.054	5.12E-05	0.026	3.95E-04	1422



Test one average soakage rate from 0-315seconds
 698 $\text{Lm}^{-2}\text{h}^{-1}$

Test two average soakage rate from 0-350seconds
 661 $\text{Lm}^{-2}\text{h}^{-1}$

Test three average soakage rate from 0-375seconds
 617 $\text{Lm}^{-2}\text{h}^{-1}$

Test Name:	PT-02	Test hole Diameter:	0.1	Base Area (B):	0.008
Test Date:	26/01/2024	Test hole Depth:	1.7	Circumference (C):	0.314
Level Logger #:	2128031	Level Logger Depth:	1.35	T1:	11:21:35
				T2:	11:27:55
				T3:	11:39:10

Level	Time	time steps		Depth Steps		Volume Soaked	Soakage Surface Area	Soakage Rate	
		t0	t1	h0	h1	$V=(h0-h1)*B$	$A=(C*(h0+h1)/2)+B$	$SR=V/A/(t1-t0)$	$SR*60*60*$ 1000
m	hh:mm:ss	s		m		m ³	m ²	m ³ m ⁻² s ⁻¹	Lm ⁻² h ⁻¹

TEST ONE

1.069419	11:21:35 am	0							
0.9373089	11:21:40 am	0	5	1.069	0.937	1.04E-03	0.323	6.42E-04	2312
0.8275229	11:21:45 am	5	10	0.937	0.828	8.62E-04	0.285	6.05E-04	2178
0.7362895	11:21:50 am	10	15	0.828	0.736	7.17E-04	0.253	5.65E-04	2035
0.6586137	11:21:55 am	15	20	0.736	0.659	6.10E-04	0.227	5.38E-04	1935
0.5923547	11:22:00 am	20	25	0.659	0.592	5.20E-04	0.204	5.09E-04	1833
0.5348624	11:22:05 am	25	30	0.592	0.535	4.52E-04	0.185	4.88E-04	1758
0.4841998	11:22:10 am	30	35	0.535	0.484	3.98E-04	0.168	4.74E-04	1706
0.4396534	11:22:15 am	35	40	0.484	0.440	3.50E-04	0.153	4.57E-04	1647
0.4	11:22:20 am	40	45	0.440	0.400	3.11E-04	0.140	4.46E-04	1605
0.3648318	11:22:25 am	45	50	0.400	0.365	2.76E-04	0.128	4.32E-04	1554
0.3330275	11:22:30 am	50	55	0.365	0.333	2.50E-04	0.117	4.25E-04	1531
0.3044852	11:22:35 am	55	60	0.333	0.304	2.24E-04	0.108	4.15E-04	1495
0.2776758	11:22:40 am	60	65	0.304	0.278	2.11E-04	0.099	4.24E-04	1527
0.2536188	11:22:45 am	65	70	0.278	0.254	1.89E-04	0.091	4.14E-04	1490
0.2313965	11:22:50 am	70	75	0.254	0.231	1.75E-04	0.084	4.15E-04	1495
0.2121305	11:22:55 am	75	80	0.231	0.212	1.51E-04	0.078	3.90E-04	1405
0.1946993	11:23:00 am	80	85	0.212	0.195	1.37E-04	0.072	3.82E-04	1374
0.179001	11:23:05 am	85	90	0.195	0.179	1.23E-04	0.067	3.71E-04	1334
0.1642202	11:23:10 am	90	95	0.179	0.164	1.16E-04	0.062	3.76E-04	1353
0.1502548	11:23:15 am	95	100	0.164	0.150	1.10E-04	0.057	3.83E-04	1379
0.1378186	11:23:20 am	100	105	0.150	0.138	9.77E-05	0.053	3.68E-04	1324
0.1253823	11:23:25 am	105	110	0.138	0.125	9.77E-05	0.049	3.97E-04	1429
0.1133537	11:23:30 am	110	115	0.125	0.113	9.45E-05	0.045	4.17E-04	1500
0.1024465	11:23:35 am	115	120	0.113	0.102	8.57E-05	0.042	4.10E-04	1477
0.0928644	11:23:40 am	120	125	0.102	0.093	7.53E-05	0.039	3.91E-04	1406
0.0841998	11:23:45 am	125	130	0.093	0.084	6.81E-05	0.036	3.82E-04	1374
0.075739	11:23:50 am	130	135	0.084	0.076	6.65E-05	0.033	4.03E-04	1451
0.0682977	11:23:55 am	135	140	0.076	0.068	5.84E-05	0.030	3.84E-04	1381
0.0609582	11:24:00 am	140	145	0.068	0.061	5.76E-05	0.028	4.09E-04	1474
0.0546381	11:24:05 am	145	150	0.061	0.055	4.96E-05	0.026	3.82E-04	1374
0.0487258	11:24:10 am	150	155	0.055	0.049	4.64E-05	0.024	3.86E-04	1388
0.0426096	11:24:15 am	155	160	0.049	0.043	4.80E-05	0.022	4.33E-04	1558
0.0373089	11:24:20 am	160	165	0.043	0.037	4.16E-05	0.020	4.08E-04	1469
0.0319062	11:24:25 am	165	170	0.037	0.032	4.24E-05	0.019	4.53E-04	1631
0.0272171	11:24:30 am	170	175	0.032	0.027	3.68E-05	0.017	4.30E-04	1547
0.0227319	11:24:35 am	175	180	0.027	0.023	3.52E-05	0.016	4.49E-04	1616
0.0185525	11:24:40 am	180	185	0.023	0.019	3.28E-05	0.014	4.58E-04	1648
0.014475	11:24:45 am	185	190	0.019	0.014	3.20E-05	0.013	4.91E-04	1768
0.0109072	11:24:50 am	190	195	0.014	0.011	2.80E-05	0.012	4.73E-04	1704
0.0077472	11:24:55 am	195	200	0.011	0.008	2.48E-05	0.011	4.60E-04	1657
0.0043833	11:25:00 am	200	205	0.008	0.004	2.64E-05	0.010	5.41E-04	1949
0.0027523	11:25:05 am	205	210	0.004	0.003	1.28E-05	0.009	2.85E-04	1028
0.0023445	11:25:10 am	210	215	0.003	0.002	3.20E-06	0.009	7.40E-05	266
0.0019368	11:25:15 am	215	220	0.002	0.002	3.20E-06	0.009	7.51E-05	270
0.0018349	11:25:20 am	220	225	0.002	0.002	8.01E-07	0.008	1.90E-05	68
0.0019368	11:25:25 am	225	230	0.002	0.002	-8.01E-07	0.008	-1.90E-05	-68
0.0022426	11:25:30 am	230	235	0.002	0.002	-2.40E-06	0.009	-5.64E-05	-203
0.0022426	11:25:35 am	235	240	0.002	0.002	0.00E+00	0.009	0.00E+00	0
0.0022426	11:25:40 am	240	245	0.002	0.002	0.00E+00	0.009	0.00E+00	0
0.0019368	11:25:45 am	245	250	0.002	0.002	2.40E-06	0.009	5.64E-05	203
0.0022426	11:25:50 am	250	255	0.002	0.002	-2.40E-06	0.009	-5.64E-05	-203
0.0022426	11:25:55 am	255	260	0.002	0.002	0.00E+00	0.009	0.00E+00	0
0.0022426	11:26:00 am	260	265	0.002	0.002	0.00E+00	0.009	0.00E+00	0
0.0019368	11:26:05 am	265	270	0.002	0.002	2.40E-06	0.009	5.64E-05	203
0.0027523	11:26:10 am	270	275	0.002	0.003	-6.40E-06	0.009	-1.49E-04	-537
0.0019368	11:26:15 am	275	280	0.003	0.002	6.40E-06	0.009	1.49E-04	537
0.0020387	11:26:20 am	280	285	0.002	0.002	-8.01E-07	0.008	-1.89E-05	-68
0.0017329	11:26:25 am	285	290	0.002	0.002	2.40E-06	0.008	5.69E-05	205
0.0018349	11:26:30 am	290	295	0.002	0.002	-8.01E-07	0.008	-1.90E-05	-69
0.001631	11:26:35 am	295	300	0.002	0.002	1.60E-06	0.008	3.81E-05	137
0.0021407	11:26:40 am	300	305	0.002	0.002	-4.00E-06	0.008	-9.48E-05	-341
0.0019368	11:26:45 am	305	310	0.002	0.002	1.60E-06	0.008	3.77E-05	136
0.0017329	11:26:50 am	310	315	0.002	0.002	1.60E-06	0.008	3.80E-05	137
0.0017329	11:26:55 am	315	320	0.002	0.002	0.00E+00	0.008	0.00E+00	0
0.0015291	11:27:00 am	320	325	0.002	0.002	1.60E-06	0.008	3.83E-05	138
0.0018349	11:27:05 am	325	330	0.002	0.002	-2.40E-06	0.008	-5.73E-05	-206
0.0017329	11:27:10 am	330	335	0.002	0.002	8.01E-07	0.008	1.90E-05	69
0.0013252	11:27:15 am	335	340	0.002	0.001	3.20E-06	0.008	7.68E-05	277

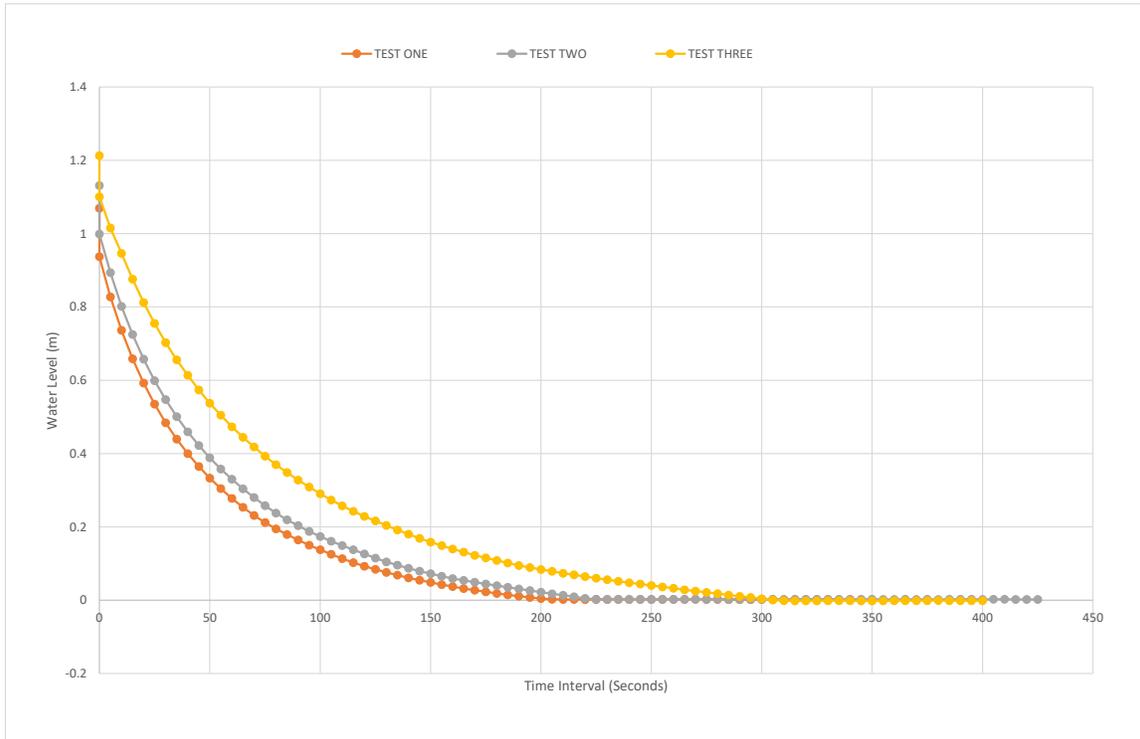
0.0019368	11:27:20 am	340	345	0.001	0.002	-4.80E-06	0.008	-1.15E-04	-413
TEST TWO									
1.1311927	11:27:55 am	0							
0.9992864	11:28:00 am	0	5	1.131	0.999	1.04E-03	0.343	6.05E-04	2178
0.8937819	11:28:05 am	5	10	0.999	0.894	8.29E-04	0.305	5.43E-04	1955
0.801631	11:28:10 am	10	15	0.894	0.802	7.24E-04	0.274	5.28E-04	1901
0.7248726	11:28:15 am	15	20	0.802	0.725	6.03E-04	0.248	4.87E-04	1753
0.6577982	11:28:20 am	20	25	0.725	0.658	5.27E-04	0.225	4.68E-04	1685
0.5986748	11:28:25 am	25	30	0.658	0.599	4.64E-04	0.205	4.53E-04	1629
0.5470948	11:28:30 am	30	35	0.599	0.547	4.05E-04	0.188	4.31E-04	1553
0.5006116	11:28:35 am	35	40	0.547	0.501	3.65E-04	0.172	4.23E-04	1524
0.4591233	11:28:40 am	40	45	0.501	0.459	3.26E-04	0.159	4.11E-04	1479
0.4220183	11:28:45 am	45	50	0.459	0.422	2.91E-04	0.146	3.98E-04	1435
0.3882773	11:28:50 am	50	55	0.422	0.388	2.65E-04	0.135	3.92E-04	1412
0.3577982	11:28:55 am	55	60	0.388	0.358	2.39E-04	0.125	3.83E-04	1378
0.3301733	11:29:00 am	60	65	0.358	0.330	2.17E-04	0.116	3.74E-04	1348
0.3039755	11:29:05 am	65	70	0.330	0.304	2.06E-04	0.107	3.83E-04	1379
0.2801223	11:29:10 am	70	75	0.304	0.280	1.87E-04	0.100	3.76E-04	1354
0.258002	11:29:15 am	75	80	0.280	0.258	1.74E-04	0.092	3.76E-04	1354
0.2378186	11:29:20 am	80	85	0.258	0.238	1.59E-04	0.086	3.70E-04	1331
0.219368	11:29:25 am	85	90	0.238	0.219	1.45E-04	0.080	3.64E-04	1310
0.203262	11:29:30 am	90	95	0.219	0.203	1.26E-04	0.074	3.41E-04	1227
0.1878695	11:29:35 am	95	100	0.203	0.188	1.21E-04	0.069	3.49E-04	1256
0.1740061	11:29:40 am	100	105	0.188	0.174	1.09E-04	0.065	3.37E-04	1212
0.1610601	11:29:45 am	105	110	0.174	0.161	1.02E-04	0.060	3.36E-04	1210
0.1491335	11:29:50 am	110	115	0.161	0.149	9.37E-05	0.057	3.31E-04	1192
0.1377166	11:29:55 am	115	120	0.149	0.138	8.97E-05	0.053	3.39E-04	1220
0.1261978	11:30:00 am	120	125	0.138	0.126	9.05E-05	0.049	3.67E-04	1321
0.1147808	11:30:05 am	125	130	0.126	0.115	8.97E-05	0.046	3.92E-04	1413
0.1044852	11:30:10 am	130	135	0.115	0.104	8.09E-05	0.042	3.82E-04	1376
0.0955148	11:30:15 am	135	140	0.104	0.096	7.05E-05	0.039	3.59E-04	1292
0.0874618	11:30:20 am	140	145	0.096	0.087	6.32E-05	0.037	3.46E-04	1244
0.0795107	11:30:25 am	145	150	0.087	0.080	6.24E-05	0.034	3.66E-04	1319
0.0722732	11:30:30 am	150	155	0.080	0.072	5.68E-05	0.032	3.59E-04	1291
0.0655454	11:30:35 am	155	160	0.072	0.066	5.28E-05	0.030	3.58E-04	1290
0.0591233	11:30:40 am	160	165	0.066	0.059	5.04E-05	0.027	3.68E-04	1324
0.0541284	11:30:45 am	165	170	0.059	0.054	3.92E-05	0.026	3.06E-04	1101
0.0490316	11:30:50 am	170	175	0.054	0.049	4.00E-05	0.024	3.33E-04	1198
0.0442406	11:30:55 am	175	180	0.049	0.044	3.76E-05	0.023	3.34E-04	1204
0.0399592	11:31:00 am	180	185	0.044	0.040	3.36E-05	0.021	3.19E-04	1148
0.0352701	11:31:05 am	185	190	0.040	0.035	3.68E-05	0.020	3.74E-04	1348
0.030683	11:31:10 am	190	195	0.035	0.031	3.60E-05	0.018	3.96E-04	1424
0.0264016	11:31:15 am	195	200	0.031	0.026	3.36E-05	0.017	4.00E-04	1439
0.0218145	11:31:20 am	200	205	0.026	0.022	3.60E-05	0.015	4.67E-04	1681
0.0176351	11:31:25 am	205	210	0.022	0.018	3.28E-05	0.014	4.67E-04	1682
0.0136595	11:31:30 am	210	215	0.018	0.014	3.12E-05	0.013	4.89E-04	1761
0.0093782	11:31:35 am	215	220	0.014	0.009	3.36E-05	0.011	5.86E-04	2110
0.0051988	11:31:40 am	220	225	0.009	0.005	3.28E-05	0.010	6.47E-04	2330
0.0024465	11:31:45 am	225	230	0.005	0.002	2.16E-05	0.009	4.77E-04	1719
0.0022426	11:31:50 am	230	235	0.002	0.002	1.60E-06	0.009	3.73E-05	134
0.0024465	11:31:55 am	235	240	0.002	0.002	-1.60E-06	0.009	-3.73E-05	-134
0.0023445	11:32:00 am	240	245	0.002	0.002	8.01E-07	0.009	1.86E-05	67
0.0025484	11:32:05 am	245	250	0.002	0.003	-1.60E-06	0.009	-3.71E-05	-134
0.0021407	11:32:10 am	250	255	0.003	0.002	3.20E-06	0.009	7.46E-05	268
0.0026504	11:32:15 am	255	260	0.002	0.003	-4.00E-06	0.009	-9.30E-05	-335
0.0028542	11:32:20 am	260	265	0.003	0.003	-1.60E-06	0.009	-3.67E-05	-132
0.0026504	11:32:25 am	265	270	0.003	0.003	1.60E-06	0.009	3.67E-05	132
0.0025484	11:32:30 am	270	275	0.003	0.003	8.01E-07	0.009	1.85E-05	66
0.0027523	11:32:35 am	275	280	0.003	0.003	-1.60E-06	0.009	-3.69E-05	-133
0.00316	11:32:40 am	280	285	0.003	0.003	-3.20E-06	0.009	-7.29E-05	-263
0.0023445	11:32:45 am	285	290	0.003	0.002	6.40E-06	0.009	1.47E-04	529
0.0029562	11:32:50 am	290	295	0.002	0.003	-4.80E-06	0.009	-1.11E-04	-398
0.0028542	11:32:55 am	295	300	0.003	0.003	8.01E-07	0.009	1.83E-05	66
0.0027523	11:33:00 am	300	305	0.003	0.003	8.01E-07	0.009	1.83E-05	66
0.0027523	11:33:05 am	305	310	0.003	0.003	0.00E+00	0.009	0.00E+00	0
0.0021407	11:33:10 am	310	315	0.003	0.002	4.80E-06	0.009	1.11E-04	401
0.0026504	11:33:15 am	315	320	0.002	0.003	-4.00E-06	0.009	-9.30E-05	-335
0.0028542	11:33:20 am	320	325	0.003	0.003	-1.60E-06	0.009	-3.67E-05	-132
0.0028542	11:33:25 am	325	330	0.003	0.003	0.00E+00	0.009	0.00E+00	0
0.0024465	11:33:30 am	330	335	0.003	0.002	3.20E-06	0.009	7.37E-05	265
0.0026504	11:33:35 am	335	340	0.002	0.003	-1.60E-06	0.009	-3.70E-05	-133
0.0022426	11:33:40 am	340	345	0.003	0.002	3.20E-06	0.009	7.43E-05	267
0.0025484	11:33:45 am	345	350	0.002	0.003	-2.40E-06	0.009	-5.58E-05	-201
0.0024465	11:33:50 am	350	355	0.003	0.002	8.01E-07	0.009	1.85E-05	67
0.0023445	11:33:55 am	355	360	0.002	0.002	8.01E-07	0.009	1.86E-05	67
0.0022426	11:34:00 am	360	365	0.002	0.002	8.01E-07	0.009	1.87E-05	67
0.0027523	11:34:05 am	365	370	0.002	0.003	-4.00E-06	0.009	-9.27E-05	-334
0.0022426	11:34:10 am	370	375	0.003	0.002	4.00E-06	0.009	9.27E-05	334
0.0025484	11:34:15 am	375	380	0.002	0.003	-2.40E-06	0.009	-5.58E-05	-201
0.0022426	11:34:20 am	380	385	0.003	0.002	2.40E-06	0.009	5.58E-05	201

0.0026504	11:34:25 am	385	390	0.002	0.003	-3.20E-06	0.009	-7.43E-05	-267
0.0027523	11:34:30 am	390	395	0.003	0.003	-8.01E-07	0.009	-1.84E-05	-66
0.0024465	11:34:35 am	395	400	0.003	0.002	2.40E-06	0.009	5.54E-05	199
0.0023445	11:34:40 am	400	405	0.002	0.002	8.01E-07	0.009	1.86E-05	67
0.0024465	11:34:45 am	405	410	0.002	0.002	-8.01E-07	0.009	-1.86E-05	-67
0.0025484	11:34:50 am	410	415	0.002	0.003	-8.01E-07	0.009	-1.85E-05	-67
0.0020387	11:34:55 am	415	420	0.003	0.002	4.00E-06	0.009	9.34E-05	336
0.0022426	11:35:00 am	420	425	0.002	0.002	-1.60E-06	0.009	-3.76E-05	-135
0.0019368	11:35:05 am	425	430	0.002	0.002	2.40E-06	0.009	5.64E-05	203

TEST THREE

1.212946	11:39:10 am	0							
1.1005097	11:39:15 am	0	5	1.213	1.101	8.83E-04	0.371	4.76E-04	1713
1.0154944	11:39:20 am	5	10	1.101	1.015	6.68E-04	0.340	3.92E-04	1413
0.9462793	11:39:25 am	10	15	1.015	0.946	5.44E-04	0.316	3.44E-04	1239
0.875739	11:39:30 am	15	20	0.946	0.876	5.54E-04	0.294	3.77E-04	1357
0.8118247	11:39:35 am	20	25	0.876	0.812	5.02E-04	0.273	3.68E-04	1324
0.7552497	11:39:40 am	25	30	0.812	0.755	4.44E-04	0.254	3.50E-04	1259
0.7025484	11:39:45 am	30	35	0.755	0.703	4.14E-04	0.237	3.50E-04	1258
0.6555556	11:39:50 am	35	40	0.703	0.656	3.69E-04	0.221	3.34E-04	1201
0.6137615	11:39:55 am	40	45	0.656	0.614	3.28E-04	0.207	3.17E-04	1140
0.5738022	11:40:00 am	45	50	0.614	0.574	3.14E-04	0.194	3.23E-04	1162
0.5376147	11:40:05 am	50	55	0.574	0.538	2.84E-04	0.182	3.12E-04	1122
0.5045872	11:40:10 am	55	60	0.538	0.505	2.59E-04	0.172	3.02E-04	1089
0.4731906	11:40:15 am	60	65	0.505	0.473	2.47E-04	0.161	3.05E-04	1100
0.4446483	11:40:20 am	65	70	0.473	0.445	2.24E-04	0.152	2.95E-04	1062
0.4183486	11:40:25 am	70	75	0.445	0.418	2.07E-04	0.143	2.88E-04	1037
0.3929664	11:40:30 am	75	80	0.418	0.393	1.99E-04	0.135	2.95E-04	1061
0.3699286	11:40:35 am	80	85	0.393	0.370	1.81E-04	0.128	2.83E-04	1020
0.34842	11:40:40 am	85	90	0.370	0.348	1.69E-04	0.121	2.80E-04	1008
0.3277268	11:40:45 am	90	95	0.348	0.328	1.63E-04	0.114	2.85E-04	1026
0.3089704	11:40:50 am	95	100	0.328	0.309	1.47E-04	0.108	2.73E-04	983
0.2906218	11:40:55 am	100	105	0.309	0.291	1.44E-04	0.102	2.82E-04	1017
0.2732926	11:41:00 am	105	110	0.291	0.273	1.36E-04	0.096	2.82E-04	1016
0.2573904	11:41:05 am	110	115	0.273	0.257	1.25E-04	0.091	2.74E-04	986
0.2425076	11:41:10 am	115	120	0.257	0.243	1.17E-04	0.086	2.71E-04	974
0.2286442	11:41:15 am	120	125	0.243	0.229	1.09E-04	0.082	2.66E-04	958
0.2164118	11:41:20 am	125	130	0.229	0.216	9.61E-05	0.078	2.47E-04	890
0.2041794	11:41:25 am	130	135	0.216	0.204	9.61E-05	0.074	2.60E-04	936
0.1917431	11:41:30 am	135	140	0.204	0.192	9.77E-05	0.070	2.79E-04	1004
0.1800204	11:41:35 am	140	145	0.192	0.180	9.21E-05	0.066	2.78E-04	1001
0.1688073	11:41:40 am	145	150	0.180	0.169	8.81E-05	0.063	2.81E-04	1012
0.1584098	11:41:45 am	150	155	0.169	0.158	8.17E-05	0.059	2.76E-04	992
0.1488277	11:41:50 am	155	160	0.158	0.149	7.53E-05	0.056	2.68E-04	966
0.1397554	11:41:55 am	160	165	0.149	0.140	7.13E-05	0.053	2.68E-04	965
0.1310907	11:42:00 am	165	170	0.140	0.131	6.81E-05	0.050	2.70E-04	972
0.122528	11:42:05 am	170	175	0.131	0.123	6.73E-05	0.048	2.82E-04	1015
0.1151886	11:42:10 am	175	180	0.123	0.115	5.76E-05	0.045	2.55E-04	918
0.1082569	11:42:15 am	180	185	0.115	0.108	5.44E-05	0.043	2.53E-04	913
0.1014271	11:42:20 am	185	190	0.108	0.101	5.36E-05	0.041	2.63E-04	947
0.0948012	11:42:25 am	190	195	0.101	0.095	5.20E-05	0.039	2.69E-04	969
0.0889908	11:42:30 am	195	200	0.095	0.089	4.56E-05	0.037	2.49E-04	895
0.0835882	11:42:35 am	200	205	0.089	0.084	4.24E-05	0.035	2.43E-04	874
0.0786952	11:42:40 am	205	210	0.084	0.079	3.84E-05	0.033	2.30E-04	830
0.0733945	11:42:45 am	210	215	0.079	0.073	4.16E-05	0.032	2.62E-04	944
0.069317	11:42:50 am	215	220	0.073	0.069	3.20E-05	0.030	2.12E-04	762
0.0643221	11:42:55 am	220	225	0.069	0.064	3.92E-05	0.029	2.72E-04	979
0.0601427	11:43:00 am	225	230	0.064	0.060	3.28E-05	0.027	2.40E-04	862
0.0558614	11:43:05 am	230	235	0.060	0.056	3.36E-05	0.026	2.58E-04	928
0.051682	11:43:10 am	235	240	0.056	0.052	3.28E-05	0.025	2.65E-04	955
0.0478084	11:43:15 am	240	245	0.052	0.048	3.04E-05	0.023	2.59E-04	933
0.0440367	11:43:20 am	245	250	0.048	0.044	2.96E-05	0.022	2.66E-04	957
0.0400612	11:43:25 am	250	255	0.044	0.040	3.12E-05	0.021	2.96E-04	1067
0.0360856	11:43:30 am	255	260	0.040	0.036	3.12E-05	0.020	3.15E-04	1135
0.0327217	11:43:35 am	260	265	0.036	0.033	2.64E-05	0.019	2.83E-04	1019
0.0283384	11:43:40 am	265	270	0.033	0.028	3.44E-05	0.017	3.95E-04	1421
0.0250765	11:43:45 am	270	275	0.028	0.025	2.56E-05	0.016	3.15E-04	1136
0.0213048	11:43:50 am	275	280	0.025	0.021	2.96E-05	0.015	3.91E-04	1409
0.017737	11:43:55 am	280	285	0.021	0.018	2.80E-05	0.014	4.01E-04	1442
0.0137615	11:44:00 am	285	290	0.018	0.014	3.12E-05	0.013	4.88E-04	1756
0.0107034	11:44:05 am	290	295	0.014	0.011	2.40E-05	0.012	4.11E-04	1478
0.0074414	11:44:10 am	295	300	0.011	0.007	2.56E-05	0.011	4.79E-04	1723
0.0040775	11:44:15 am	300	305	0.007	0.004	2.64E-05	0.010	5.47E-04	1969
0.0006116	11:44:20 am	305	310	0.004	0.001	2.72E-05	0.009	6.34E-04	2281
-0.001427	11:44:25 am	310	315	0.001	-0.001	1.60E-05	0.008	4.15E-04	1492
-0.001835	11:44:30 am	315	320	-0.001	-0.002	3.20E-06	0.007	8.72E-05	314
-0.001835	11:44:35 am	320	325	-0.002	-0.002	0.00E+00	0.007	0.00E+00	0
-0.001631	11:44:40 am	325	330	-0.002	-0.002	-1.60E-06	0.007	-4.38E-05	-158
-0.001325	11:44:45 am	330	335	-0.002	-0.001	-2.40E-06	0.007	-6.50E-05	-234
-0.001427	11:44:50 am	335	340	-0.001	-0.001	8.01E-07	0.007	2.16E-05	78
-0.001427	11:44:55 am	340	345	-0.001	-0.001	0.00E+00	0.007	0.00E+00	0

-0.001733	11:45:00 am	345	350	-0.001	-0.002	2.40E-06	0.007	6.53E-05	235
-0.001733	11:45:05 am	350	355	-0.002	-0.002	0.00E+00	0.007	0.00E+00	0
-0.001631	11:45:10 am	355	360	-0.002	-0.002	-8.01E-07	0.007	-2.19E-05	-79
-0.001529	11:45:15 am	360	365	-0.002	-0.002	-8.01E-07	0.007	-2.18E-05	-78
-0.001529	11:45:20 am	365	370	-0.002	-0.002	0.00E+00	0.007	0.00E+00	0
-0.001121	11:45:25 am	370	375	-0.002	-0.001	-3.20E-06	0.007	-8.61E-05	-310
-0.001427	11:45:30 am	375	380	-0.001	-0.001	2.40E-06	0.007	6.44E-05	232
-0.000714	11:45:35 am	380	385	-0.001	-0.001	-5.60E-06	0.008	-1.49E-04	-537
-0.001223	11:45:40 am	385	390	-0.001	-0.001	4.00E-06	0.008	1.06E-04	382
-0.001529	11:45:45 am	390	395	-0.001	-0.002	2.40E-06	0.007	6.47E-05	233
-0.001529	11:45:50 am	395	400	-0.002	-0.002	0.00E+00	0.007	0.00E+00	0
-0.001325	11:45:55 am	400	405	-0.002	-0.001	-1.60E-06	0.007	-4.32E-05	-156



Test one average soakage rate from 0-225seconds
 1482 Lm⁻²h⁻¹

Test two average soakage rate from 0-235seconds
 1435 Lm⁻²h⁻¹

Test three average soakage rate from 0-320seconds
 1119 Lm⁻²h⁻¹

Test Name:	PT-03	Test hole Diameter:	0.1	Base Area (B):	0.008
Test Date:	26/01/2024	Test hole Depth:	1.5	Circumference (C):	0.314
Level Logger #:	2128031	Level Logger Depth:	1.1	T1:	09:50:45
				T2:	09:59:40
				T3:	10:05:50

Level	Time	time steps		Depth Steps		Volume Soaked	Soakage Surface Area	Soakage Rate	
		t0	t1	h0	h1	$V=(h_0-h_1)*B$	$A=(C*(h_0+h_1)/2)+B$	$SR=V/A/(t_1-t_0)$	SR^{60*60^*}
m	hh:mm:ss	s		m		m ³	m ²	m ³ m ⁻² s ⁻¹	Lm ² h ⁻¹

TEST ONE

0.9944954	9:50:45 am	0							
0.8918451	9:50:50 am	0	5	0.99449541	0.89184506	8.06E-04	0.304	5.30E-04	1908
0.8272171	9:50:55 am	5	10	0.89184506	0.82721713	5.08E-04	0.278	3.65E-04	1315
0.7738022	9:51:00 am	10	15	0.82721713	0.77380224	4.20E-04	0.259	3.24E-04	1165
0.7278287	9:51:05 am	15	20	0.77380224	0.72782875	3.61E-04	0.244	2.96E-04	1067
0.6857288	9:51:10 am	20	25	0.72782875	0.68572885	3.31E-04	0.230	2.88E-04	1036
0.6443425	9:51:15 am	25	30	0.68572885	0.64434251	3.25E-04	0.217	3.00E-04	1080
0.6035678	9:51:20 am	30	35	0.64434251	0.60356779	3.20E-04	0.204	3.14E-04	1131
0.5667686	9:51:25 am	35	40	0.60356779	0.5667686	2.89E-04	0.192	3.02E-04	1086
0.5325178	9:51:30 am	40	45	0.5667686	0.53251784	2.69E-04	0.181	2.98E-04	1073
0.5010194	9:51:35 am	45	50	0.53251784	0.50101937	2.47E-04	0.170	2.91E-04	1047
0.4713558	9:51:40 am	50	55	0.50101937	0.47135576	2.33E-04	0.161	2.90E-04	1045
0.4427115	9:51:45 am	55	60	0.47135576	0.44271152	2.25E-04	0.151	2.97E-04	1070
0.4169215	9:51:50 am	60	65	0.44271152	0.41692151	2.03E-04	0.143	2.84E-04	1021
0.3923547	9:51:55 am	65	70	0.41692151	0.39235474	1.93E-04	0.135	2.86E-04	1029
0.3697248	9:52:00 am	70	75	0.39235474	0.36972477	1.78E-04	0.128	2.79E-04	1003
0.3480122	9:52:05 am	75	80	0.36972477	0.34801223	1.71E-04	0.121	2.83E-04	1018
0.3273191	9:52:10 am	80	85	0.34801223	0.32731906	1.63E-04	0.114	2.85E-04	1027
0.3088685	9:52:15 am	85	90	0.32731906	0.3088685	1.45E-04	0.108	2.69E-04	968
0.2922528	9:52:20 am	90	95	0.3088685	0.2922528	1.30E-04	0.102	2.55E-04	919
0.2765545	9:52:25 am	95	100	0.2922528	0.27655454	1.23E-04	0.097	2.54E-04	913
0.2615698	9:52:30 am	100	105	0.27655454	0.26156983	1.18E-04	0.092	2.55E-04	917
0.248318	9:52:35 am	105	110	0.26156983	0.24831804	1.04E-04	0.088	2.37E-04	852
0.2347604	9:52:40 am	110	115	0.24831804	0.23476045	1.06E-04	0.084	2.54E-04	916
0.2230377	9:52:45 am	115	120	0.23476045	0.22303772	9.21E-05	0.080	2.31E-04	831
0.2117227	9:52:50 am	120	125	0.22303772	0.21172273	8.89E-05	0.076	2.33E-04	840
0.2010194	9:52:55 am	125	130	0.21172273	0.20101937	8.41E-05	0.073	2.31E-04	833
0.1913354	9:53:00 am	130	135	0.20101937	0.19133537	7.61E-05	0.069	2.19E-04	788
0.1821611	9:53:05 am	135	140	0.19133537	0.18216106	7.21E-05	0.067	2.17E-04	780
0.1732926	9:53:10 am	140	145	0.18216106	0.17329256	6.97E-05	0.064	2.19E-04	787
0.1646279	9:53:15 am	145	150	0.17329256	0.16462793	6.81E-05	0.061	2.23E-04	804
0.1549439	9:53:20 am	150	155	0.16462793	0.15494393	7.61E-05	0.058	2.62E-04	943
0.1455657	9:53:25 am	155	160	0.15494393	0.14556575	7.37E-05	0.055	2.68E-04	963
0.1370031	9:53:30 am	160	165	0.14556575	0.13700306	6.73E-05	0.052	2.57E-04	927
0.1288481	9:53:35 am	165	170	0.13700306	0.12884811	6.40E-05	0.050	2.58E-04	929
0.120999	9:53:40 am	170	175	0.12884811	0.12099898	6.16E-05	0.047	2.62E-04	942
0.1139653	9:53:45 am	175	180	0.12099898	0.11396534	5.52E-05	0.045	2.47E-04	889
0.1073394	9:53:50 am	180	185	0.11396534	0.10733945	5.20E-05	0.043	2.44E-04	879
0.1011213	9:53:55 am	185	190	0.10733945	0.10112123	4.88E-05	0.041	2.41E-04	866
0.0950051	9:54:00 am	190	195	0.10112123	0.0950051	4.80E-05	0.039	2.48E-04	895
0.0892966	9:54:05 am	195	200	0.0950051	0.08929664	4.48E-05	0.037	2.44E-04	877
0.0830785	9:54:10 am	200	205	0.08929664	0.08307849	4.88E-05	0.035	2.80E-04	1007
0.0779817	9:54:15 am	205	210	0.08307849	0.07798165	4.00E-05	0.033	2.41E-04	869
0.0726809	9:54:20 am	210	215	0.07798165	0.07268094	4.16E-05	0.032	2.64E-04	951
0.0681957	9:54:25 am	215	220	0.07268094	0.06819572	3.52E-05	0.030	2.35E-04	846
0.0625892	9:54:30 am	220	225	0.06819572	0.06258919	4.40E-05	0.028	3.10E-04	1116
0.058104	9:54:35 am	225	230	0.06258919	0.05810398	3.52E-05	0.027	2.63E-04	946
0.0534149	9:54:40 am	230	235	0.05810398	0.05341488	3.68E-05	0.025	2.90E-04	1045
0.0493374	9:54:45 am	235	240	0.05341488	0.04933741	3.20E-05	0.024	2.67E-04	961
0.0450561	9:54:50 am	240	245	0.04933741	0.04505607	3.36E-05	0.023	2.97E-04	1067
0.0408767	9:54:55 am	245	250	0.04505607	0.04087666	3.28E-05	0.021	3.07E-04	1107
0.0361876	9:55:00 am	250	255	0.04087666	0.03618756	3.68E-05	0.020	3.69E-04	1329
0.0309888	9:55:05 am	255	260	0.03618756	0.03098879	4.08E-05	0.018	4.44E-04	1597
0.0092762	9:55:10 am	260	265	0.03098879	0.00927625	1.71E-04	0.014	2.41E-03	8660
0.0107034	9:55:15 am	265	270	0.00927625	0.01070336	-1.12E-05	0.011	-2.04E-04	-734
0.0106014	9:55:20 am	270	275	0.01070336	0.01060143	8.01E-07	0.011	1.43E-05	51
0.0101937	9:55:25 am	275	280	0.01060143	0.01019368	3.20E-06	0.011	5.76E-05	207
0.0100917	9:55:30 am	280	285	0.01019368	0.01009174	8.01E-07	0.011	1.45E-05	52
0.0101937	9:55:35 am	285	290	0.01009174	0.01019368	-8.01E-07	0.011	-1.45E-05	-52
0.0098879	9:55:40 am	290	295	0.01019368	0.00988787	2.40E-06	0.011	4.36E-05	157
0.0103976	9:55:45 am	295	300	0.00988787	0.01039755	-4.00E-06	0.011	-7.25E-05	-261
0.0102956	9:55:50 am	300	305	0.01039755	0.01029562	8.01E-07	0.011	1.44E-05	52
0.0104995	9:55:55 am	305	310	0.01029562	0.01049949	-1.60E-06	0.011	-2.88E-05	-104

0.0102956	9:56:00 am	310	315	0.01049949	0.01029562	1.60E-06	0.011	2.88E-05	104
0.0103976	9:56:05 am	315	320	0.01029562	0.01039755	-8.01E-07	0.011	-1.44E-05	-52
0.0101937	9:56:10 am	320	325	0.01039755	0.01019368	1.60E-06	0.011	2.89E-05	104
0.0104995	9:56:15 am	325	330	0.01019368	0.01049949	-2.40E-06	0.011	-4.33E-05	-156
0.0104995	9:56:20 am	330	335	0.01049949	0.01049949	0.00E+00	0.011	0.00E+00	0
0.0103976	9:56:25 am	335	340	0.01049949	0.01039755	8.01E-07	0.011	1.44E-05	52
0.0101937	9:56:30 am	340	345	0.01039755	0.01019368	1.60E-06	0.011	2.89E-05	104
0.0101937	9:56:35 am	345	350	0.01019368	0.01019368	0.00E+00	0.011	0.00E+00	0
0.0103976	9:56:40 am	350	355	0.01019368	0.01039755	-1.60E-06	0.011	-2.89E-05	-104
0.0101937	9:56:45 am	355	360	0.01039755	0.01019368	1.60E-06	0.011	2.89E-05	104
0.0100917	9:56:50 am	360	365	0.01019368	0.01009174	8.01E-07	0.011	1.45E-05	52
0.0102956	9:56:55 am	365	370	0.01009174	0.01029562	-1.60E-06	0.011	-2.90E-05	-104
0.0101937	9:57:00 am	370	375	0.01029562	0.01019368	8.01E-07	0.011	1.45E-05	52
0.0100917	9:57:05 am	375	380	0.01019368	0.01009174	8.01E-07	0.011	1.45E-05	52
0.0098879	9:57:10 am	380	385	0.01009174	0.00988787	1.60E-06	0.011	2.91E-05	105
0.0098879	9:57:15 am	385	390	0.00988787	0.00988787	-8.01E-07	0.011	-1.46E-05	-53
0.0101937	9:57:20 am	390	395	0.00988787	0.01019368	-1.60E-06	0.011	-2.90E-05	-105
0.0100917	9:57:25 am	395	400	0.01019368	0.01009174	8.01E-07	0.011	1.45E-05	52
0.0102956	9:57:30 am	400	405	0.01009174	0.01029562	-1.60E-06	0.011	-2.90E-05	-104
0.0103976	9:57:35 am	405	410	0.01029562	0.01039755	-8.01E-07	0.011	-1.44E-05	-52
0.0100917	9:57:40 am	410	415	0.01039755	0.01009174	2.40E-06	0.011	4.34E-05	156
0.0102956	9:57:45 am	415	420	0.01009174	0.01029562	-1.60E-06	0.011	-2.90E-05	-104
0.0103976	9:57:50 am	420	425	0.01029562	0.01039755	-8.01E-07	0.011	-1.44E-05	-52
0.0100917	9:57:55 am	425	430	0.01039755	0.01009174	2.40E-06	0.011	4.34E-05	156
0.0101937	9:58:00 am	430	435	0.01009174	0.01019368	-8.01E-07	0.011	-1.45E-05	-52
0.0101937	9:58:05 am	435	440	0.01019368	0.01019368	0.00E+00	0.011	0.00E+00	0
0.0098879	9:58:10 am	440	445	0.01019368	0.00988787	1.60E-06	0.011	2.90E-05	105
0.0102956	9:58:15 am	445	450	0.00988787	0.01029562	-2.40E-06	0.011	-4.35E-05	-157
0.0098879	9:58:20 am	450	455	0.01029562	0.00988787	2.40E-06	0.011	4.35E-05	157
0.0102956	9:58:25 am	455	460	0.00988787	0.01029562	-2.40E-06	0.011	-4.35E-05	-157
0.0102956	9:58:30 am	460	465	0.01029562	0.01029562	0.00E+00	0.011	0.00E+00	0
0.0103976	9:58:35 am	465	470	0.01029562	0.01039755	-8.01E-07	0.011	-1.44E-05	-52
0.0102956	9:58:40 am	470	475	0.01039755	0.01029562	8.01E-07	0.011	1.44E-05	52
0.0100917	9:58:45 am	475	480	0.01029562	0.01009174	1.60E-06	0.011	2.90E-05	104
0.0101937	9:58:50 am	480	485	0.01009174	0.01019368	-8.01E-07	0.011	-1.45E-05	-52
0.0098879	9:58:55 am	485	490	0.01019368	0.00988787	2.40E-06	0.011	4.36E-05	157
0.0098879	9:59:00 am	490	495	0.00988787	0.00988787	0.00E+00	0.011	0.00E+00	0

TEST TWO

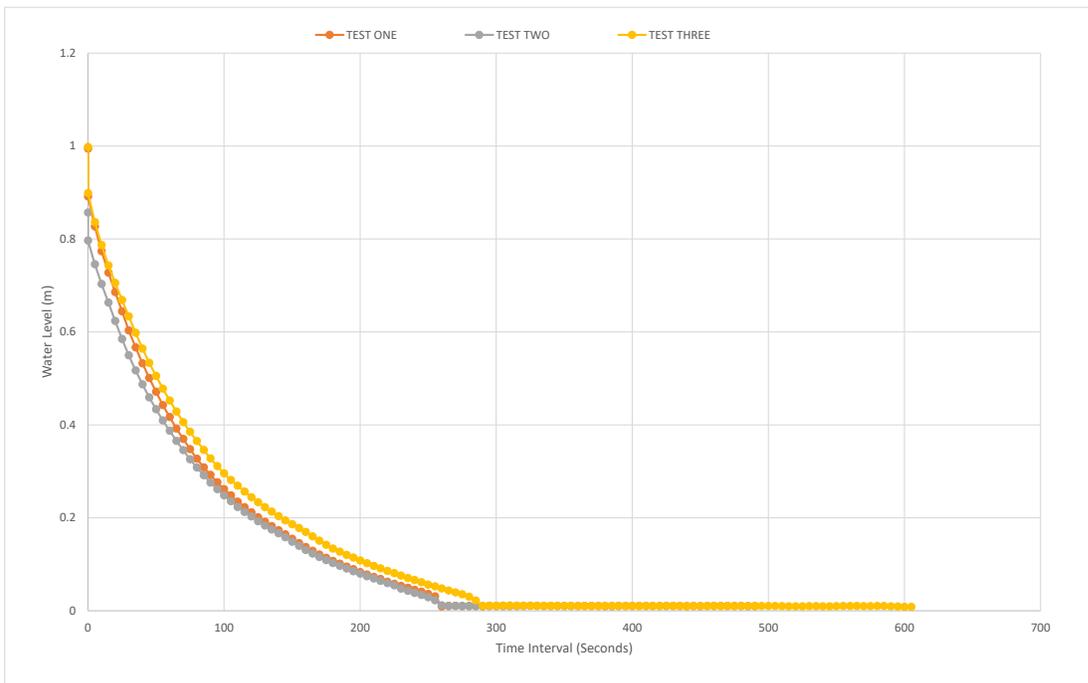
0.8570846	9:59:40 am	0							
0.7966361	9:59:45 am	0	5	0.85708461	0.79663609	4.75E-04	0.268	3.55E-04	1277
0.7457696	9:59:50 am	5	10	0.79663609	0.74576962	4.00E-04	0.250	3.19E-04	1150
0.7030581	9:59:55 am	10	15	0.74576962	0.7030581	3.35E-04	0.235	2.85E-04	1026
0.6633028	10:00:00 am	15	20	0.7030581	0.66330275	3.12E-04	0.222	2.81E-04	1010
0.6237513	10:00:05 am	20	25	0.66330275	0.62375127	3.11E-04	0.210	2.96E-04	1065
0.5849134	10:00:10 am	25	30	0.62375127	0.58491335	3.05E-04	0.198	3.09E-04	1111
0.5498471	10:00:15 am	30	35	0.58491335	0.54984709	2.75E-04	0.186	2.96E-04	1066
0.5172273	10:00:20 am	35	40	0.54984709	0.51722732	2.56E-04	0.175	2.92E-04	1051
0.4873598	10:00:25 am	40	45	0.51722732	0.48735984	2.35E-04	0.166	2.83E-04	1020
0.4592253	10:00:30 am	45	50	0.48735984	0.45922528	2.21E-04	0.157	2.82E-04	1016
0.433843	10:00:35 am	50	55	0.45922528	0.43384302	1.99E-04	0.148	2.69E-04	969
0.4097859	10:00:40 am	55	60	0.43384302	0.40978593	1.89E-04	0.140	2.69E-04	969
0.3873598	10:00:45 am	60	65	0.40978593	0.38735984	1.76E-04	0.133	2.65E-04	953
0.3656473	10:00:50 am	65	70	0.38735984	0.3656473	1.71E-04	0.126	2.70E-04	973
0.3455657	10:00:55 am	70	75	0.3656473	0.34556575	1.58E-04	0.120	2.64E-04	950
0.3261978	10:01:00 am	75	80	0.34556575	0.32619776	1.52E-04	0.113	2.68E-04	966
0.3083588	10:01:05 am	80	85	0.32619776	0.30835882	1.40E-04	0.108	2.61E-04	938
0.2915392	10:01:10 am	85	90	0.30835882	0.29153925	1.32E-04	0.102	2.59E-04	932
0.275841	10:01:15 am	90	95	0.29153925	0.27584098	1.23E-04	0.097	2.54E-04	915
0.2617737	10:01:20 am	95	100	0.27584098	0.2617737	1.10E-04	0.092	2.39E-04	862
0.248318	10:01:25 am	100	105	0.2617737	0.24831804	1.06E-04	0.088	2.40E-04	865
0.2356779	10:01:30 am	105	110	0.24831804	0.23567788	9.93E-05	0.084	2.37E-04	852
0.2234455	10:01:35 am	110	115	0.23567788	0.22344546	9.61E-05	0.080	2.40E-04	865
0.2126402	10:01:40 am	115	120	0.22344546	0.21264016	8.49E-05	0.076	2.22E-04	800
0.2028542	10:01:45 am	120	125	0.21264016	0.20285423	7.69E-05	0.073	2.10E-04	757
0.1926606	10:01:50 am	125	130	0.20285423	0.19266055	8.01E-05	0.070	2.29E-04	824
0.1833843	10:01:55 am	130	135	0.19266055	0.1833843	7.29E-05	0.067	2.18E-04	784
0.1748216	10:02:00 am	135	140	0.1833843	0.17482161	6.73E-05	0.064	2.10E-04	755
0.1665647	10:02:05 am	140	145	0.17482161	0.16656473	6.48E-05	0.061	2.11E-04	759
0.1583078	10:02:10 am	145	150	0.16656473	0.15830785	6.48E-05	0.059	2.20E-04	793
0.1487258	10:02:15 am	150	155	0.15830785	0.14872579	7.53E-05	0.056	2.68E-04	966
0.1395515	10:02:20 am	155	160	0.14872579	0.13955148	7.21E-05	0.053	2.71E-04	976
0.1309888	10:02:25 am	160	165	0.13955148	0.13098879	6.73E-05	0.050	2.67E-04	962
0.1229358	10:02:30 am	165	170	0.13098879	0.12293578	6.32E-05	0.048	2.65E-04	954
0.1155963	10:02:35 am	170	175	0.12293578	0.11559633	5.76E-05	0.045	2.54E-04	916
0.1091743	10:02:40 am	175	180	0.11559633	0.10917431	5.04E-05	0.043	2.34E-04	841
0.1028542	10:02:45 am	180	185	0.10917431	0.10285423	4.96E-05	0.041	2.41E-04	868
0.096738	10:02:50 am	185	190	0.10285423	0.09673802	4.80E-05	0.039	2.45E-04	882
0.0908257	10:02:55 am	190	195	0.09673802	0.09082569	4.64E-05	0.037	2.49E-04	896
0.0850153	10:03:00 am	195	200	0.09082569	0.08501529	4.56E-05	0.035	2.57E-04	926
0.0796126	10:03:05 am	200	205	0.08501529	0.07961264	4.24E-05	0.034	2.52E-04	906
0.07421	10:03:10 am	205	210	0.07961264	0.07420999	4.24E-05	0.032	2.65E-04	954
0.0695209	10:03:15 am	210	215	0.07420999	0.0695209	3.68E-05	0.030	2.42E-04	871
0.0644241	10:03:20 am	215	220	0.0695209	0.06442406	4.00E-05	0.029	2.77E-04	998
0.0593272	10:03:25 am	220	225	0.06442406	0.05932722	4.00E-05	0.027	2.93E-04	1056
0.0545362	10:03:30 am	225	230	0.05932722	0.05453619	3.76E-05	0.026	2.92E-04	1053

0.0477064	10:03:35 am	230	235	0.05453619	0.04770642	5.36E-05	0.024	4.49E-04	1615
0.0429154	10:03:40 am	235	240	0.04770642	0.04291539	3.76E-05	0.022	3.41E-04	1227
0.0384302	10:03:45 am	240	245	0.04291539	0.03843017	3.52E-05	0.021	3.41E-04	1229
0.033843	10:03:50 am	245	250	0.03843017	0.03384302	3.60E-05	0.019	3.75E-04	1351
0.0292559	10:03:55 am	250	255	0.03384302	0.02925586	3.60E-05	0.018	4.06E-04	1460
0.0225228	10:04:00 am	255	260	0.02925586	0.02252283	5.28E-05	0.016	6.61E-04	2380
0.0118247	10:04:05 am	260	265	0.02252283	0.01182467	8.41E-05	0.013	1.27E-03	4568
0.0097859	10:04:10 am	265	270	0.01182467	0.00978593	1.60E-05	0.011	2.85E-04	1025
0.0101937	10:04:15 am	270	275	0.00978593	0.01019368	-3.20E-06	0.011	-5.83E-05	-210
0.0098879	10:04:20 am	275	280	0.01019368	0.00988787	2.40E-06	0.011	4.36E-05	157
0.0098879	10:04:25 am	280	285	0.00988787	0.00988787	0.00E+00	0.011	0.00E+00	0
0.0098879	10:04:30 am	285	290	0.00988787	0.00988787	0.00E+00	0.011	0.00E+00	0
0.0099898	10:04:35 am	290	295	0.00988787	0.00998981	-8.01E-07	0.011	-1.46E-05	-53
0.0102956	10:04:40 am	295	300	0.00998981	0.01029562	-2.40E-06	0.011	-4.35E-05	-157
0.0102956	10:04:45 am	300	305	0.01029562	0.01029562	0.00E+00	0.011	0.00E+00	0
0.0097859	10:04:50 am	305	310	0.01029562	0.00978593	4.00E-06	0.011	7.27E-05	262
0.0101937	10:04:55 am	310	315	0.00978593	0.01019368	-3.20E-06	0.011	-5.83E-05	-210
0.0100917	10:05:00 am	315	320	0.01019368	0.01009174	8.01E-07	0.011	1.45E-05	52

TEST THREE

0.9984709	10:05:50 am	0							
0.8989806	10:05:55 am	0	5	0.99847095	0.89898063	7.81E-04	0.306	5.11E-04	1839
0.8361876	10:06:00 am	5	10	0.89898063	0.83618756	4.93E-04	0.280	3.52E-04	1266
0.7872579	10:06:05 am	10	15	0.83618756	0.7872579	3.84E-04	0.263	2.92E-04	1053
0.7433231	10:06:10 am	15	20	0.7872579	0.74332314	3.45E-04	0.248	2.78E-04	1001
0.7055046	10:06:15 am	20	25	0.74332314	0.70550459	2.97E-04	0.235	2.52E-04	908
0.6690112	10:06:20 am	25	30	0.70550459	0.66901121	2.87E-04	0.224	2.56E-04	922
0.6336391	10:06:25 am	30	35	0.66901121	0.63363914	2.78E-04	0.212	2.62E-04	941
0.5980632	10:06:30 am	35	40	0.63363914	0.5980632	2.79E-04	0.201	2.78E-04	999
0.5642202	10:06:35 am	40	45	0.5980632	0.56422018	2.66E-04	0.190	2.79E-04	1005
0.5336391	10:06:40 am	45	50	0.56422018	0.53363914	2.40E-04	0.180	2.66E-04	959
0.5053007	10:06:45 am	50	55	0.53363914	0.50530071	2.23E-04	0.171	2.60E-04	937
0.4781855	10:06:50 am	55	60	0.50530071	0.47818552	2.13E-04	0.162	2.62E-04	945
0.4524975	10:06:55 am	60	65	0.47818552	0.45249745	2.02E-04	0.154	2.62E-04	943
0.4287462	10:07:00 am	65	70	0.45249745	0.42874618	1.87E-04	0.146	2.55E-04	918
0.4061162	10:07:05 am	70	75	0.42874618	0.40611621	1.78E-04	0.139	2.56E-04	921
0.3851172	10:07:10 am	75	80	0.40611621	0.38511723	1.65E-04	0.132	2.50E-04	899
0.3654434	10:07:15 am	80	85	0.38511723	0.36544343	1.55E-04	0.126	2.46E-04	885
0.3461774	10:07:20 am	85	90	0.36544343	0.34617737	1.51E-04	0.120	2.53E-04	911
0.3278287	10:07:25 am	90	95	0.34617737	0.32782875	1.44E-04	0.114	2.53E-04	912
0.311213	10:07:30 am	95	100	0.32782875	0.31121305	1.30E-04	0.108	2.41E-04	868
0.2958206	10:07:35 am	100	105	0.31121305	0.29582059	1.21E-04	0.103	2.34E-04	843
0.2811417	10:07:40 am	105	110	0.29582059	0.28114169	1.15E-04	0.098	2.34E-04	843
0.2690112	10:07:45 am	110	115	0.28114169	0.26901121	9.53E-05	0.094	2.02E-04	728
0.256473	10:07:50 am	115	120	0.26901121	0.25647299	9.85E-05	0.090	2.18E-04	784
0.2444444	10:07:55 am	120	125	0.25647299	0.24444444	9.45E-05	0.087	2.18E-04	786
0.2335372	10:08:00 am	125	130	0.24444444	0.23353721	8.57E-05	0.083	2.07E-04	744
0.2227319	10:08:05 am	130	135	0.23353721	0.22273191	8.49E-05	0.080	2.13E-04	768
0.2131498	10:08:10 am	135	140	0.22273191	0.21314985	7.53E-05	0.076	1.97E-04	710
0.2036697	10:08:15 am	140	145	0.21314985	0.20366972	7.45E-05	0.073	2.03E-04	731
0.1944954	10:08:20 am	145	150	0.20366972	0.19449541	7.21E-05	0.070	2.05E-04	737
0.1863405	10:08:25 am	150	155	0.19449541	0.18634047	6.40E-05	0.068	1.89E-04	681
0.1782875	10:08:30 am	155	160	0.18634047	0.17828746	6.32E-05	0.065	1.94E-04	699
0.1695209	10:08:35 am	160	165	0.17828746	0.1695209	6.89E-05	0.062	2.20E-04	793
0.1601427	10:08:40 am	165	170	0.1695209	0.16014271	7.37E-05	0.060	2.47E-04	889
0.1506626	10:08:45 am	170	175	0.16014271	0.15066259	7.45E-05	0.057	2.63E-04	946
0.1417941	10:08:50 am	175	180	0.15066259	0.14179409	6.97E-05	0.054	2.59E-04	932
0.1337411	10:08:55 am	180	185	0.14179409	0.13374108	6.32E-05	0.051	2.47E-04	891
0.1270133	10:09:00 am	185	190	0.13374108	0.12701325	5.28E-05	0.049	2.16E-04	779
0.1201835	10:09:05 am	190	195	0.12701325	0.12018349	5.36E-05	0.047	2.30E-04	827
0.1143731	10:09:10 am	195	200	0.12018349	0.11437309	4.56E-05	0.045	2.04E-04	735
0.1081549	10:09:15 am	200	205	0.11437309	0.10815494	4.88E-05	0.043	2.28E-04	821
0.1023445	10:09:20 am	205	210	0.10815494	0.10234455	4.56E-05	0.041	2.23E-04	803
0.0964322	10:09:25 am	210	215	0.10234455	0.09643221	4.64E-05	0.039	2.38E-04	856
0.0911315	10:09:30 am	215	220	0.09643221	0.0911315	4.16E-05	0.037	2.23E-04	803
0.0858308	10:09:35 am	220	225	0.0911315	0.08583078	4.16E-05	0.036	2.34E-04	841
0.0807339	10:09:40 am	225	230	0.08583078	0.08073394	4.00E-05	0.034	2.35E-04	847
0.075841	10:09:45 am	230	235	0.08073394	0.07584098	3.84E-05	0.032	2.37E-04	853
0.0706422	10:09:50 am	235	240	0.07584098	0.0706422	4.08E-05	0.031	2.65E-04	953
0.0662589	10:09:55 am	240	245	0.0706422	0.06625892	3.44E-05	0.029	2.35E-04	844
0.0614679	10:10:00 am	245	250	0.06625892	0.06146789	3.76E-05	0.028	2.70E-04	970
0.0562691	10:10:05 am	250	255	0.06146789	0.05626911	4.08E-05	0.026	3.10E-04	1116
0.0523955	10:10:10 am	255	260	0.05626911	0.05239551	3.04E-05	0.025	2.44E-04	879
0.0481142	10:10:15 am	260	265	0.05239551	0.04811417	3.36E-05	0.024	2.84E-04	1024
0.0434251	10:10:20 am	265	270	0.04811417	0.04342508	3.68E-05	0.022	3.31E-04	1193
0.0393476	10:10:25 am	270	275	0.04342508	0.0393476	3.20E-05	0.021	3.07E-04	1106
0.0355759	10:10:30 am	275	280	0.0393476	0.03557594	2.96E-05	0.020	3.02E-04	1087
0.0303772	10:10:35 am	280	285	0.03557594	0.03037717	4.08E-05	0.018	4.48E-04	1614
0.0222222	10:10:40 am	285	290	0.03037717	0.02222222	6.40E-05	0.016	7.95E-04	2861
0.0103976	10:10:45 am	290	295	0.02222222	0.01039755	9.29E-05	0.013	1.43E-03	5152
0.0111111	10:10:50 am	295	300	0.01039755	0.01111111	-5.60E-06	0.011	-9.98E-05	-359
0.0107034	10:10:55 am	300	305	0.01111111	0.01070336	3.20E-06	0.011	5.68E-05	204
0.0110092	10:11:00 am	305	310	0.01070336	0.01100917	-2.40E-06	0.011	-4.26E-05	-154
0.011213	10:11:05 am	310	315	0.01100917	0.01121305	-1.60E-06	0.011	-2.82E-05	-102
0.0110092	10:11:10 am	315	320	0.01121305	0.01100917	1.60E-06	0.011	2.82E-05	102
0.0110092	10:11:15 am	320	325	0.01100917	0.01100917	0.00E+00	0.011	0.00E+00	0

0.0109072	10:11:20 am	325	330	0.01100917	0.01090724	8.01E-07	0.011	1.42E-05	51
0.0107034	10:11:25 am	330	335	0.01090724	0.01070336	1.60E-06	0.011	2.85E-05	102
0.0108053	10:11:30 am	335	340	0.01070336	0.0108053	-8.01E-07	0.011	-1.43E-05	-51
0.0104995	10:11:35 am	340	345	0.0108053	0.01049949	2.40E-06	0.011	4.29E-05	154
0.0107034	10:11:40 am	345	350	0.01049949	0.01070336	-1.60E-06	0.011	-2.86E-05	-103
0.0108053	10:11:45 am	350	355	0.01070336	0.0108053	-8.01E-07	0.011	-1.43E-05	-51
0.0106014	10:11:50 am	355	360	0.0108053	0.01060143	1.60E-06	0.011	2.86E-05	103
0.0102956	10:11:55 am	360	365	0.01060143	0.01029562	2.40E-06	0.011	4.31E-05	155
0.0103976	10:12:00 am	365	370	0.01029562	0.01039755	-8.01E-07	0.011	-1.44E-05	-52
0.0102956	10:12:05 am	370	375	0.01039755	0.01029562	8.01E-07	0.011	1.44E-05	52
0.0102956	10:12:10 am	375	380	0.01029562	0.01029562	0.00E+00	0.011	0.00E+00	0
0.0104995	10:12:15 am	380	385	0.01029562	0.01049949	-1.60E-06	0.011	-2.88E-05	-104
0.0107034	10:12:20 am	385	390	0.01049949	0.01070336	-1.60E-06	0.011	-2.86E-05	-103
0.0104995	10:12:25 am	390	395	0.01070336	0.01049949	1.60E-06	0.011	2.86E-05	103
0.0103976	10:12:30 am	395	400	0.01049949	0.01039755	8.01E-07	0.011	1.44E-05	52
0.0101937	10:12:35 am	400	405	0.01039755	0.01019368	1.60E-06	0.011	2.89E-05	104
0.0102956	10:12:40 am	405	410	0.01019368	0.01029562	-8.01E-07	0.011	-1.45E-05	-52
0.0103976	10:12:45 am	410	415	0.01029562	0.01039755	-8.01E-07	0.011	-1.44E-05	-52
0.0101937	10:12:50 am	415	420	0.01039755	0.01019368	1.60E-06	0.011	2.89E-05	104
0.0103976	10:12:55 am	420	425	0.01019368	0.01039755	-1.60E-06	0.011	-2.89E-05	-104
0.0104995	10:13:00 am	425	430	0.01039755	0.01049949	-8.01E-07	0.011	-1.44E-05	-52
0.0104995	10:13:05 am	430	435	0.01049949	0.01049949	0.00E+00	0.011	0.00E+00	0
0.0100917	10:13:10 am	435	440	0.01049949	0.01009174	3.20E-06	0.011	5.78E-05	208
0.0098879	10:13:15 am	440	445	0.01009174	0.00988787	1.60E-06	0.011	2.91E-05	105
0.0100917	10:13:20 am	445	450	0.00988787	0.01009174	-1.60E-06	0.011	-2.91E-05	-105
0.0100917	10:13:25 am	450	455	0.01009174	0.01009174	0.00E+00	0.011	0.00E+00	0
0.0102956	10:13:30 am	455	460	0.01009174	0.01029562	-1.60E-06	0.011	-2.90E-05	-104
0.0102956	10:13:35 am	460	465	0.01029562	0.01029562	0.00E+00	0.011	0.00E+00	0
0.0099898	10:13:40 am	465	470	0.01029562	0.00998981	2.40E-06	0.011	4.35E-05	157
0.0100917	10:13:45 am	470	475	0.00998981	0.01009174	-8.01E-07	0.011	-1.45E-05	-52
0.0099898	10:13:50 am	475	480	0.01009174	0.00998981	8.01E-07	0.011	1.45E-05	52
0.0100917	10:13:55 am	480	485	0.00998981	0.01009174	-8.01E-07	0.011	-1.45E-05	-52
0.0100917	10:14:00 am	485	490	0.01009174	0.01009174	0.00E+00	0.011	0.00E+00	0
0.0100917	10:14:05 am	490	495	0.01009174	0.01009174	0.00E+00	0.011	0.00E+00	0
0.0103976	10:14:10 am	495	500	0.01009174	0.01039755	-2.40E-06	0.011	-4.34E-05	-156
0.0102956	10:14:15 am	500	505	0.01039755	0.01029562	8.01E-07	0.011	1.44E-05	52
0.0100917	10:14:20 am	505	510	0.01029562	0.01009174	1.60E-06	0.011	2.90E-05	104
0.0099898	10:14:25 am	510	515	0.01009174	0.00998981	8.01E-07	0.011	1.45E-05	52
0.0095821	10:14:30 am	515	520	0.00998981	0.00958206	3.20E-06	0.011	5.86E-05	211
0.009684	10:14:35 am	520	525	0.00958206	0.009684	-8.01E-07	0.011	-1.47E-05	-53
0.0094801	10:14:40 am	525	530	0.009684	0.00948012	1.60E-06	0.011	2.95E-05	106
0.0097859	10:14:45 am	530	535	0.00948012	0.00978593	-2.40E-06	0.011	-4.42E-05	-159
0.0099898	10:14:50 am	535	540	0.00978593	0.00998981	-1.60E-06	0.011	-2.92E-05	-105
0.0093782	10:14:55 am	540	545	0.00998981	0.00937819	4.80E-06	0.011	8.82E-05	317
0.009684	10:15:00 am	545	550	0.00937819	0.009684	-2.40E-06	0.011	-4.43E-05	-159
0.0099898	10:15:05 am	550	555	0.009684	0.00998981	-2.40E-06	0.011	-4.39E-05	-158
0.0100917	10:15:10 am	555	560	0.00998981	0.01009174	-8.01E-07	0.011	-1.45E-05	-52
0.0101937	10:15:15 am	560	565	0.01009174	0.01019368	-8.01E-07	0.011	-1.45E-05	-52
0.0102956	10:15:20 am	565	570	0.01019368	0.01029562	-8.01E-07	0.011	-1.45E-05	-52
0.0098879	10:15:25 am	570	575	0.01029562	0.00988787	3.20E-06	0.011	5.81E-05	209
0.0097859	10:15:30 am	575	580	0.00988787	0.00978593	8.01E-07	0.011	1.46E-05	53
0.0100917	10:15:35 am	580	585	0.00978593	0.01009174	-2.40E-06	0.011	-4.38E-05	-158
0.0102956	10:15:40 am	585	590	0.01009174	0.01029562	-1.60E-06	0.011	-2.90E-05	-104
0.009684	10:15:45 am	590	595	0.01029562	0.009684	4.80E-06	0.011	8.74E-05	315
0.0090724	10:15:50 am	595	600	0.009684	0.00907238	4.80E-06	0.011	8.90E-05	320
0.0085627	10:15:55 am	600	605	0.00907238	0.00856269	4.00E-06	0.011	7.54E-05	271
0.0083588	10:16:00 am	605	610	0.00856269	0.00835882	1.60E-06	0.011	3.05E-05	110



Test one average soakage rate from 0-260seconds
1004 $\text{Lm}^{-2}\text{h}^{-1}$

Test three average soak rate 0-290seconds
954 $\text{Lm}^{-2}\text{h}^{-1}$

Test two average soakage rate from 0-270seconds
1077 $\text{Lm}^{-2}\text{h}^{-1}$