

OPAL HEALTHCARE



henry&hymas

**CIVIL INTEGRATED WATER MANAGEMENT
PLAN
OPAL HEALTHCARE
ST IVES**

**For SSDA (\$4.55)
November 2025
Revision 01**

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1. INTRODUCTION

1.1 General

This Integrated Water Management Plan has been prepared by Henry and Hymas on behalf of OHCA Property Holdings Pty Ltd (the Applicant) and accompanies a Modification Application made under Section 4.55(2) of the *Environmental Planning & Assessment Act 1979* (EP&A Act). The application seeks approval for a range of modifications to the approved Residential Care Facility (RCF) at 285, 287, 287A, 289 Mona Vale Road and 1 Flinders Avenue, St Ives (the site).

A State Significant Development Application (SSD-48028209) was approved under delegation by the Independent Planning Commission (IPC) for redevelopment of the site including demolition, excavation and construction of a part three storey (plus basement) RCF comprising 145 beds, onsite kitchen and laundry facilities, onsite services including café, salon, gym, health consulting rooms, and basement car parking comprising 42 car parking spaces, 3 motorbike bays and a mini bus.

This Modification Application is submitted to the Department of Planning, Housing and Infrastructure (DPHI) for assessment and seeks approval for the following modifications:

- Inclusion of additional land at 293 and 295 Mona Vale Road;
- Reconfiguration of the site layout to accommodate the new northern wing and extension of the car park;
- Refinement of 'Home' planning and interior layouts;
- Enhancements to the landscape design, including additional tree planting and communal open spaces for residents at ground level; and
- Changes to the wording of conditions to facilitate the amended development.

For a more detailed description of the proposed changes, please refer to the Modification Report prepared by Colliers Urban Planning.



Figure 1.1 Locality Sketch

The following Engineering matters have been addressed in this report:

- Water Sensitive Urban Design (WSUD)
- Stormwater Detention
- Water Demand

The purpose of this report is to provide an overview of the various Engineering issues that relate to the site and how these issues have been addressed.

A full set of DA Drawings is provided in Appendix A of this report.

1.2 Engineering Objectives/ Principles

One of the Engineering objectives for the development is to provide a safe and efficient road and pedestrian footpath network for the residents and visitors to the development. In addition, driveway and footpath grades must comply with the relevant Australian standards and also be sympathetic to the needs of the users of the network.

The site has been designed such that the grades are sympathetic to the end users whilst giving consideration for earthworks quantities. This was done to assist in minimising construction costs, minimising the impact on local landfill resources whilst ensuring the site levels tie into existing levels at the site boundaries. As a result of the above, retaining walls will be required throughout the site (refer to engineering drawings in Appendix A). These walls have been designed taking into account both construction costs and with due consideration for the existing levels along the site boundaries.

The stormwater network must be designed to safely convey minor storm events via a pit and pipe stormwater system with provision for larger, more infrequent storm events overland via the road network. Another aspect of the stormwater system is to ensure that the design takes into account water sensitive urban design (WSUD) measures. The stormwater network has been designed in accordance with these principles.

1.3 Council Policies

The civil engineering component of the aforementioned project has been designed in accordance with the following council codes and policies:

- Ku-ring-Gai Council DCP Part 24 – Water Management
- Ku-ring-Gai Council DCP Part 21 – General Site Design
- KMC Draft Music Modelling Guidelines 2010

1.4 The Site & Its Context

The subject site has a total area of 1.2744. The existing levels generally fall from the North-West corner to the South-East corner near Flinders avenue. There is an existing ridge line running north-south which directs a small catchment to the western boundary (Mona Vale Rd) and the majority of the site towards the south East corner (Flinders Ave). Refer to the catchment plan C250 in Appendix A for more details.

Stormwater is to be managed via swales and a pit + pipe system, which directs flows to a rainwater tank, water quality chamber and on-site detention chamber. The stormwater system is proposed to discharge flows to an existing stormwater system within Mona Vale Rd (Eastern Catchment) or Flinders Avenue (South-East Catchment). Refer to drawings C101, C102 and C103 in Appendix A for more details.

Access to the site's porte cochere will be via a driveway located off Mona Vale Road. Similarly, access to the site's basement parking will be via a basement ramp located off Mona Vale Road. The grading of these driveways are compliant with AS2890.1 standards.

1.5 SEARS REQUIREMENTS

Refer to the following SEARs requirements and how each item has been addressed:

Provide an Integrated Water Management Plan for the development that:

- **is prepared in consultation with the local council and any other relevant drainage or water authority.**

Council has been consulted with regards to the drainage design. This consultation was in the form of email correspondence on the 17th of February 2023 and the 17th of September 2024. The key items discussed were basement drainage and rainwater tank sizing. Council's feedback has been incorporated into the current SSDA design.

- **Outlines the water-related servicing infrastructure required by the development (informed by the anticipated annual and ultimate increase in servicing demand) and evaluates opportunities to reduce water demand (such as recycled water provision).**

Refer to the engineering plan in Appendix A showing the required infrastructure to service the development. Refer to Section 4 of this report which addresses water demand.

- **Details the proposed drainage design for the site including any on-site treatment, reuse and detention facilities, water quality management measures, and the nominated discharge points.**

This information has been provided within the civil engineering DA drawings included within Appendix A. Two (2) OSD tanks have been provided. Water quality measures have been incorporated into the design in the form of pit baskets, rainwater tanks and Psorb stormfilter cartridges. The two stormwater discharge points are to the existing stormwater systems within Flinders Avenue and Mona Vale Road.

- **Demonstrates compliance with the local council or other drainage or water authority requirements and avoids adverse impacts on any downstream properties.**

Refer to Part 2 of this report, as well as the civil engineering drawings in Appendix A which demonstrate compliance with Council's stormwater controls. There are not expected to be any adverse impacts on downstream properties.

- **Where drainage infrastructure works are required that would be handed over to the local council, or other drainage or water authority, provide full hydraulic details and detailed plans and specification of proposed works that have been prepared in consultation with, and comply with the relevant standards, the local council or other drainage or water authority.**

Refer to the DRAINS model which has been included as part of the SSDA submission. Also included as part of the SSDA submission is the civil engineering plans (refer to Appendix A). These two documents demonstrate the necessary hydraulic and engineering information necessary to ensure that all relevant standards and local council requirements have been adhered to.

1.6 Response to Council Feedback - SSD-48028209

Council provided the following feedback in relation to the approved civil engineering SSDA design that was submitted to the Department of Planning:

A water balance model is required to evaluate the size of the rainwater tank to capture all roof runoffs. This should be accompanied by supporting hydraulic calculations.

No clarification has been provided as to the purpose of the proposed rainwater tank given that a retention component would also be required.

The basement pump out pit within the basement has not been shown. It would need to be designed to capture the driveway area and basement perimeter subsoil drainage. The pump out tank volume should be of a sufficient size to cope with a 100yr 2 hour storm. The rising main is required to be discharged to the OSD system.

Refer to the following responses to the above items, which have been incorporated into the current civil engineering SSDA design:

- Council's Water Balance Spreadsheet has been used in order to ascertain the required rainwater tank size to comply with Council's requirements. For rainwater tank 1, a total roof area of 1800m² is proposed, with an irrigation area of 1500m² (irrigation rate of 0.6kL/m²/yr). For rainwater tank 2, a total roof area of 1200m² is proposed, with an irrigation area of 720m² (irrigation rate of 0.6kL/m²/yr). This results in rainwater tank sizes of 31kL and 15kL respectively, in order to reduce runoff days by 50%, as per KMC requirements.
- A MUSIC model has been prepared in order to provide further details on the water balance for the site. The MUSIC model demonstrates that for rainwater tank 1 (31kL) with a 1800m² roof catchment area, a reuse rate of 71.04% is achieved. MUSIC demonstrates that a demand of 0.9ML/yr is expected based off the irrigation area, and 0.64ML/yr is able to be provided via rainwater tank 1. This means that 0.26ML/yr is provided via top up from the potable main supply, giving a total reuse of 71.14%. Similarly for rainwater tank 2 (15kL) with a 1200m² roof catchment area, a reuse rate of 82.49% is achieved. MUSIC demonstrates that a demand of 0.35ML/yr is expected based off the irrigation area, and 0.29ML/yr is able to be provided via rainwater tank 2.
- Council's request for the entire roof area to be directed to the rainwater has not been incorporated into the design. The subject site has many trees around the perimeter of the site (within the setback) which are proposed to be retained. In order to reduce the amount of impact on these trees, the services being reticulated through these areas is proposed to be reduced as much as possible. Having two stormwater lines (stormwater and rainwater) is not consistent with these principles. Therefore, it is proposed to reduce the roof area catchment to the rainwater tank to 1800m².
- No basement pump out pit is proposed with the new SSDA scheme, as gravity drainage can be provided.

2. STORMWATER MANAGEMENT

2.1 Introduction

2.1.1 Background

Stormwater controls will be implemented that ensure that the proposed development does not adversely impact on stormwater flows and water quality of the stormwater system downstream of the site.

The principles and operation of the proposed stormwater system for the development including water quality measures and the components of the internal drainage system are detailed on the Development Application Drawings included in Appendix A.

2.1.2 Key Issues

The key issues and the proposed mitigation measures to be implemented as part of the proposed development are:

- **Stormwater Quantity** - The increased impervious surfaces (such as roads, roofs, driveways, etc) associated with the development will result in an increase in peak stormwater flows from the site during storm events. On-site Stormwater Detention (OSD) will be proposed for the development to ensure that runoff from the development is appropriately managed in accordance with Council's requirements. The site stormwater system has been designed to safely convey the flows through the site and within the capacity of the downstream system. The design and operation of the proposed stormwater system is described in Section 2.2 below.
- **Water Quality** - Urban developments have the potential to increase gross pollutants, sediments, hydrocarbons and nutrient concentrations in stormwater runoff. To limit impact on the downstream water quality, water quality measures at source and end of line treatments will be provided. Section 2.3 further describes the specific implementation of these measures for the proposed development.

2.2 Stormwater Quantity

On Site Detention

As per Ku-Ring-Gai Council's DCP, on-site detention will be required to ensure post-developed flows are reduced to pre-developed flows in all storms up to the 100yr ARI event. Council's OSD spreadsheet has been used in order to appropriately size two (2) detention systems and orifices. The following parameters have been used:

- Catchment Name: Middle Harbour
- Catchment Discharge Rate = 0.0166litres/sec/m2
- Catchment Storage Rate = 0.0241m3/m2
- Total Site Area = 9324m2 + 3420m2 (2 On-site Detention Tanks)

Based on the OSD calculation sheet, a total on-site detention volume of 185m3 (135m3 + 50m3) is required for the development.

Refer to Appendix C for further details.

Capacity of Downstream Council Stormwater System – Flinders Ave

A DRAINS model has been developed in order to model the proposed stormwater system for the subject site. A total pre-developed flow rate of 456L/s has been estimated for the 1 in 100yr ARI storm event. An on-site detention system has been proposed to form part of the site stormwater design, to ensure that the post-developed flow rates are reduced to below pre-developed values. Refer to the table below which demonstrates the pre and post developed flow rates for the various storm events.

Storm ARI	Pre-Developed Flow Rates	Post-Developed Flow Rates
10yr ARI	267L/s	186L/s
20yr ARI	325L/s	290L/s
100yr ARI	456L/s	427L/s

Table 2.2a Pre and Post developed flows South East Catchment

Capacity of Downstream Stormwater System – Mona Vale Rd

A DRAINS model has been developed in order to model the proposed stormwater system for the subject site. A total pre-developed flow rate of 167L/s has been estimated for the 1 in 100yr ARI storm event. An on-site detention system has been proposed to form part of the site stormwater design, to ensure that the post-developed flow rates are reduced to below pre-developed values. Refer to the table below which demonstrates the pre and post developed flow rates for the various storm events.

Storm ARI	Pre-Developed Flow Rates	Post-Developed Flow Rates
10yr ARI	98L/s	53L/s
20yr ARI	119L/s	96L/s
100yr ARI	167L/s	156L/s

Table 2.2b Pre and Post developed flows West Catchment

As shown by the above tables, with the inclusion of on-site detention, post-developed flow rates are reduced to below pre-developed values. This ensures that there is no negative impact on the downstream capacity of Council's stormwater system.

2.3 Water Quality

Council's requirements also dictate that the stormwater be treated before discharging from the site. The requirements dictate that the post developed pollutants be reduced by the following factors when compared to the pre-developed pollutant generation:

- Total Nitrogen to be reduced by 45%
- Total Phosphorus to be reduced by 65%
- Total Suspended Solids to be reduced by 85%

A MUSIC model has been prepared in order to design the stormwater quality system. Stormwater from the site is proposed to be treated by a combination of 690mm Psorb stormfilter cartridges, 2 rainwater tanks and Oceanguard pit baskets. Refer to drawings 22K93_D4_C201, 22K93_D4_C202 and 22K93_D4_C250 for further details on the stormwater treatment system. The results from the MUSIC model has been summarised in the table below.

Pollutant	Pre-Developed Pollutant Loads (kg/yr)	Post Developed Pollutant Loads (kg/yr)	Target Reduction	Pollutant Reduction
Nitrogen	26.9	13.7	45%	48.9%
Phosphorus	2.74	0.851	65%	68.9%
Suspended Solids	1140	130	85%	88.5%

Table 2.3 Catchment 1 Pollutant Loads

The proposed development meets Ku-Ring-Gai Council's water quality requirements as shown by the table above, and figure 2.3 below.

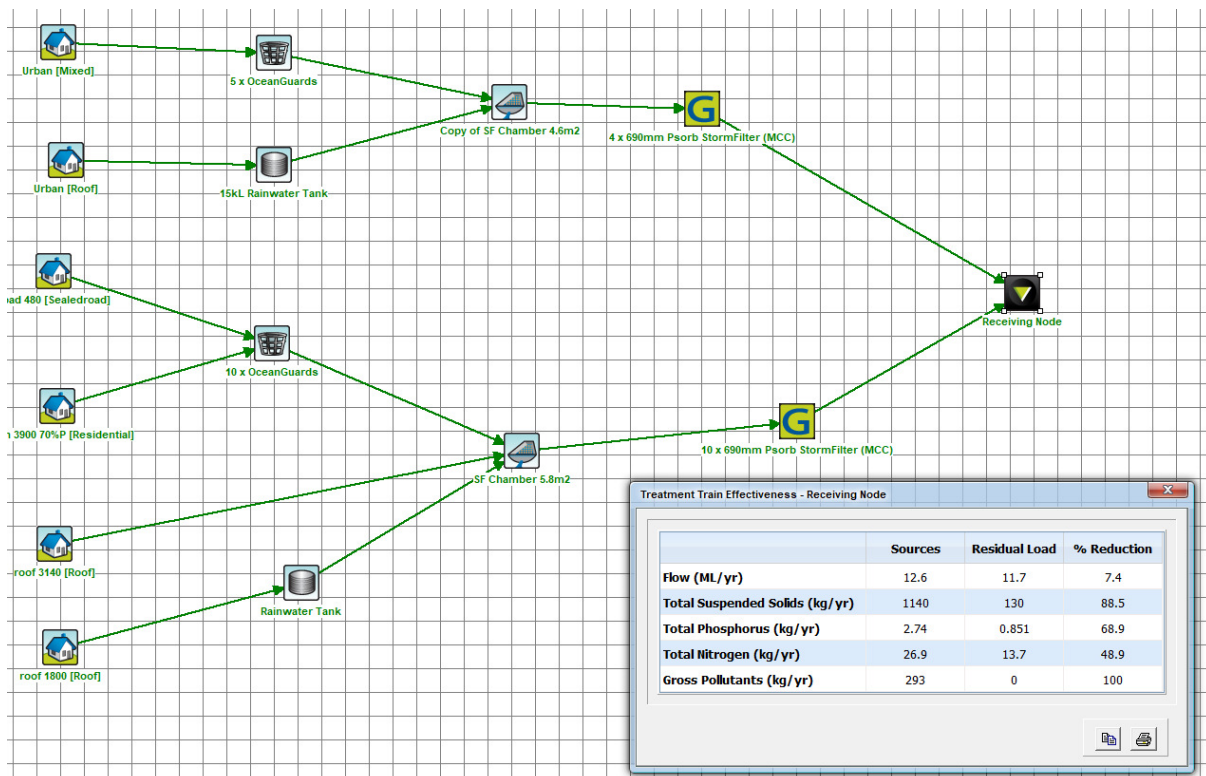


Figure 2.3 MUSIC modelling water quality screenshot

3. CONSULTATION WITH COUNCIL

Consultation with Ku-ring-gai Municipal Council has been undertaken via email correspondence on the 17th of February 2023 wherein the matters of on-site detention and basement drainage were being clarified. No meeting took place with Council's engineering department as it was not considered to be necessary.

An additional conference call with Council's engineers took place on the 17th of September 2024 to discuss the rainwater tank requirements and basement drainage requirements. Additionally there was a follow up email from Council's engineer. Council's feedback has been incorporated into the current SSDA design.

4. BASEMENT DRAINAGE

The proposed basement is at approx RL 157.90, which is well above the invert level of the downstream council stormwater pipe system in Flinders Avenue (IL 152.06). Therefore, the drainage in the basement is proposed to connect into the site stormwater system via gravity. No basement pump out pit is expected to be required for this site.

Ku-Ring-Gai Council's DCP Part 24C.3 dictates that basements are to be fully tanked unless it can be demonstrated that ongoing dewatering will be less than 3ML/year. The proposed design will comply with this policy.

5. WATER DEMAND AND REUSE

As per Ku-Ring-Gai Council's DCP Part 24C.4, for a type 6 development, a rainwater tank needs to be provided for the development. As per email correspondence with Council on the 17th of September 2024, a rainwater tank spreadsheet was provided by Vincent Ooi (senior development engineer) to size the rainwater tank appropriately. The following parameters were input into the spreadsheet:

- A total roof area of 4936m²
- An irrigation area of 1500m² (irrigation rate of 0.6kL/m²/yr.
- This results in 20kL of rainwater storage in order to reduce runoff days by 50%, as per KMC requirements.

Refer to Figure 5.0 below.

Project: St Ives 22K93									
BoM Station: Turrumurra [Kissing Point Rd] - Daily Rainfall (66158) 1990 - 2016									
Assumptions		Rainfall loss	1	mm	Water Usage - Landscape Watering				
* Wet day = greater than 0mm of daily rain		Roof area	4936	m2	Area to be watered		1500	m2	
* Total water usage is calculated in m3/day and subtracted on each day		Rainwater tank size	20	m3	Watering rate		0.6	m3/yr/m2 [a]	
* Target is 50% reduction in runoff days		%Full at start	0	%	Total water used		2,464	m3/day	
* Assume that if rainwater tank does not overflow on a wet day, this is no longer a 'runoff day'. OF = Overflow Day					Water Usage - Car Wash Bay				
* %Reduction in wet days = (wet days - OF days) / wet days		Total# days	9611	days	Number units		0		
		Total# wet days	3875	days	% of units using car wash		50	%	
		Total# OF days	1929	days	Average washes		4	washes/yr/unit	
		%reduction in wet days	50.2	%	Usage Rate		100	L/wash [b]	
References					Total water used		0,000	m3/day	
[a] Blacktown Council WSUD guidelines									
[b] AW / Sydney Water		%of time tank is empty	24	%					
[c] Melbourne Household Water Use calculator		%of time tank is full	20	%	Total Water usage		2,464	m3/day	

Figure 5.0 Council Rainwater Tank Sizing Spreadsheet

Alternative Rainwater Tank Design that has been adopted

- A MUSIC model has been prepared in order to provide further details on the water balance for the site. The MUSIC model demonstrates that with a 20kL tank and 4936m² roof area, a reuse rate of 71.04% is achieved. MUSIC demonstrates that a demand of 0.9ML/yr is expected based off the irrigation area, and 0.64ML/yr is able to be provided via the rainwater tank. This means that 0.26ML/yr is provided via top up from the potable main supply, giving a total reuse of 70.04%.
- Council's request for the entire roof area to be directed to the rainwater has not been incorporated into the design. The subject site has many trees around the perimeter of the site (within the setback) which are proposed to be retained. In order to reduce the amount of impact on these trees, the services being reticulated through these areas is proposed to be reduced as much as possible. Having two stormwater lines (stormwater and rainwater) is not consistent with these principles. Therefore, it is proposed to reduce the roof area catchment to the rainwater tank to 1800m². Refer to drawing C250 in Appendix A for details.
- MUSIC modelling has been undertaken to remodel the rainwater tank size with the new roof catchment area. With a rainwater tank size of 31kL, a reuse rate of 71.17% can be achieved. Therefore a rainwater tank size of 31kL, with a roof catchment area of 1800m² has been proposed, which will ensure an identical water balance result as per the 20kL/4936m² arrangement dictated by Council's spreadsheet.
- Additionally, a 15kL rainwater tank for the western catchment has been incorporated into the design. Sing Council's spreadsheet, this results in a reduction of wet days by 63.5%. Refer to Figure 5.1 below.

GV Project: St Ives 22K93									
BoM Station: Turrumurra [Kissing Point Rd] - Daily Rainfall (66158) 1990 - 2016									
Assumptions				Rainfall loss	1	mm	Water Usage - Landscape Watering		
* Wet day = greater than 0mm of daily rain				Roof area	1200	m ²	Area to be watered	720	m ²
* Total water usage is calculated in m3/day and subtracted on each day				Rainwater tank size	15	m ³	Watering rate	0.6	m ³ /yr/m ² [a]
* Target is 50% reduction in runoff days				%Full at start	0	%	Total water used	1.183	m ³ /day
* Assume that if rainwater tank does not overflow on a wet day, this is no longer a 'runoff day'. OF = Overflow Day									
* %Reduction in wet days = (wet days - OF days) / wet days				Total# days	9611	days	Water Usage - Car Wash Bay		
				Total# wet days	3875	days	Number units	0	
				Total# OF days	1414	days	% of units using car wash	50	%
				%reduction in wet days	63.5	%	Average washes	4	washes/yr/unit
References							Usage Rate	100	L/wash [b]
[a] Blacktown Council WSUD guidelines				%of time tank is empty	21	%	Total water used	0.000	m ³ /day
[b] AW / Sydney Water				%of time tank is full	15	%	Total Water usage		
[c] Melbourne Household Water Use calculator								1.183	m ³ /day

Figure 5.1 Council Rainwater Tank Sizing Spreadsheet

As per the above, the proposed water conservation strategy complies with the Ku-ring-gai Councils DCP.

6. CONCLUSION

The design provides a safe and efficient road and pedestrian footpath network for the proposed development which will be sympathetic to the needs of the users of the network. The road and footpath network will be integrated with appropriate traffic facilities to assist in controlling parking, traffic guidance and pedestrian safety.

Appropriate stormwater management practices will be implemented that minimise the impact of development on the existing stormwater system in terms of water quality whilst ensuring safe and efficient conveyance of runoff and the provision of adequate freeboard to habitable dwellings.

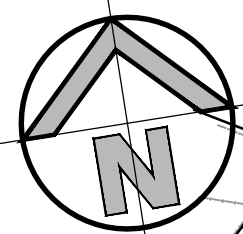
The design is in accordance with both Ku-Ring-Gai Council's requirements and best practice principles, hence it can be ensured that there will be minimal impact on the existing environment as a result of the proposed development.

It should be noted that the results shown in this report are limited to use for SSDA purposes only. During the detailed design stages, a further refinement of the modelling based on the detail design of the development will be necessary.

REFERENCES

- Landcom - "Soils and Construction Volume 1 – 4th Edition", March 2004
- Institution of Engineers, Australia - "Australian Rainfall and Runoff 3rd Edition", 1987
- Sixmaps, 2018 - <<https://maps.six.nsw.gov.au/>>
- Ku-ring-Gai Council DCP Part 24 – Water Management
- Ku-ring-Gai Council DCP Part 21 – General Site Design
- KMC Draft Music Modelling Guidelines 2010

APPENDIX A – DEVELOPMENT APPLICATION DRAWINGS



LEGEND

- EXISTING BOUNDARY
- PROPOSED JUNCTION PITS
- PROPOSED SURFACE INLET PITS
- PROPOSED PIT TAG
- LINE LETTER
- PIT NUMBER
- STORMWATER UPSTREAM INVERT RL
- STORMWATER PIPE DIAMETER & CLASS
- STORMWATER PIPE LENGTH
- STORMWATER PIPE GRADE
- STORMWATER DOWNSTREAM INVERT RL
- PROPOSED GRATED DRAIN
- PROPOSED STORMWATER PIPE
- EXISTING CONTOURS
- PROPOSED SPOT LEVEL
- EXISTING TELSTRA LINES
- EXISTING WATER LINE
- EXISTING ELECTRICAL MAINS LINE
- EXISTING GAS LINE
- EXISTING SEWER LINE
- EXISTING STORMWATER PITS
- PROPOSED FALL
- PROPOSED RETAINING WALL
- EXISTING RETAINING WALL
- STRUCTURAL ROOT ZONE (SRZ) OF EXISTING TREE
- TREE PROTECTION ZONE (TPZ)

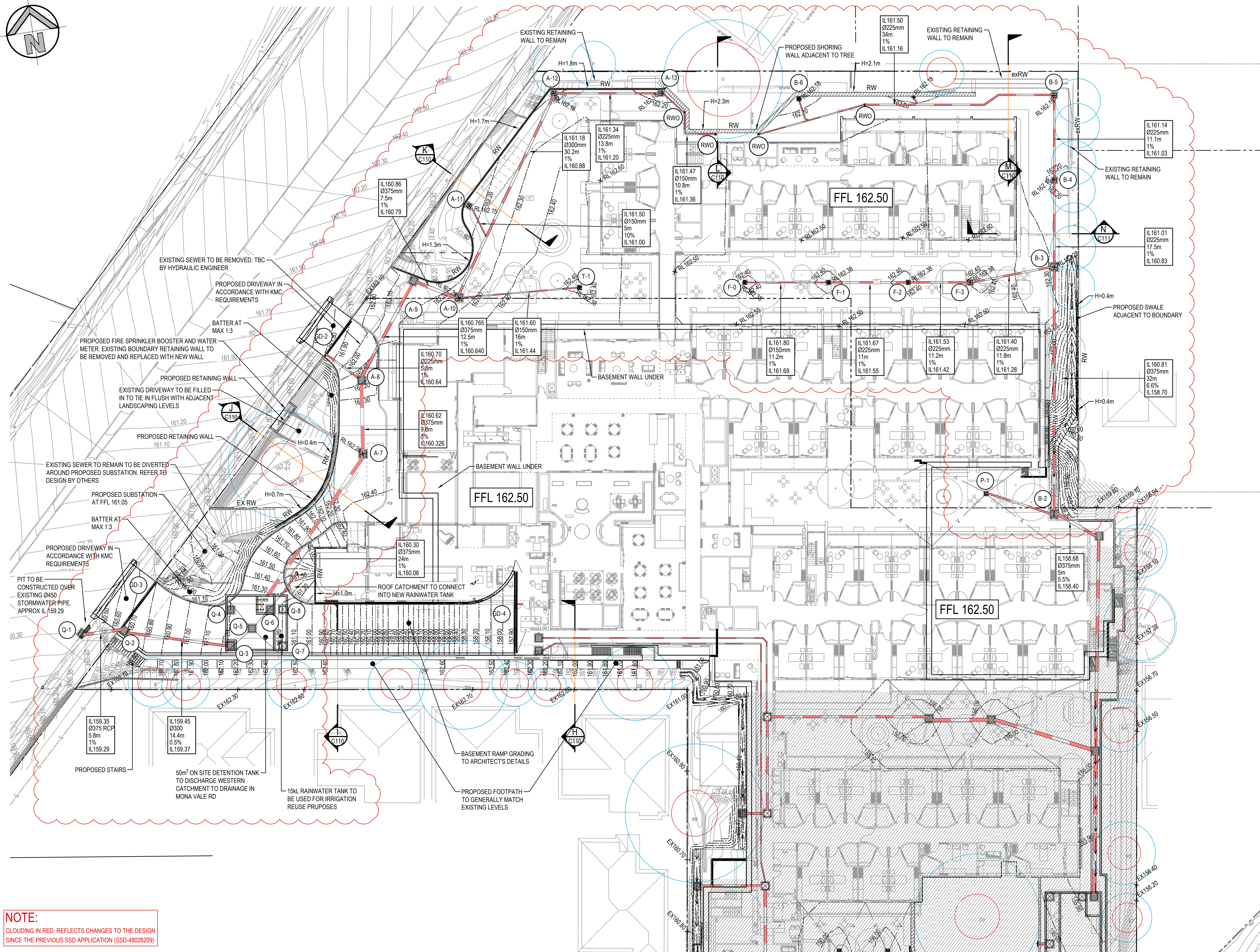
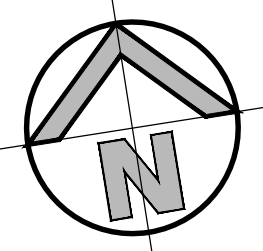
NOTE:
CLOUDING IN RED REFLECTS CHANGES TO THE DESIGN
SINCE THE PREVIOUS SSD APPLICATION (SSD-48028209)



DETAIL PLAN - LOWER GROUND
SCALE: 1:250

ISSUED FOR S4.55 APPROVAL

SURVEY INFORMATION SURVEYED BY: SDG DATUM: AHD ORIGIN OF LEVELS: SSM 85414 RL 163393										Client OPAL HEALTHCARE Architect GROUP GSA This drawing and design remains the property of Henry & Hymas and may not be copied in whole or in part without the prior written approval of Henry & Hymas.										Suite 2.01 828 Pacific Highway Gordon NSW 2072 Telephone +61 2 9417 8400 Facsimile +61 2 9417 8337 Email email@hcnconsult.com.au Web www.henryandhymas.com.au										 henry&hymas										Project PROPOSED HEALTHCARE DEVELOPMENT 285-289, 293-295 MONA VALE RD & 1 FLINDERS AVE, ST IVES, NSW Title DETAIL PLAN - LOWER GROUND SHEET 1 OF 3										Drawn A.Fernandes Checked N.Heazlewood Drawing number 22K93_D4_C101			Designed N.Heazlewood Approved A.Francis			Date SEP 2024 Scale @A1 1:250 Revision 01																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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LEGEND

EXISTING BOUNDARY

PROPOSED JUNCTION PITS

PROPOSED SURFACE INLET PITS

PROPOSED PIT TAG

STORMWATER UPSTREAM INVERT RL
STORMWATER PIPE DIAMETER & CLASS
STORMWATER PIPE LENGTH
STORMWATER PIPE GRADE
STORMWATER DOWNSTREAM INVERT RL

PROPOSED GRATED DRAIN

PROPOSED STORMWATER PIPE

EXISTING COURTS

PROPOSED SPOT LEVEL

EXISTING TELSTRA LINES

EXISTING WATER LINE

EXISTING ELECTRICAL MAINS LINE

EXISTING GAS LINE

EXISTING SEWER LINE

EXISTING STORMWATER PITS

PROPOSED FALL

PROPOSED RETAINING WALL

EXISTING RETAINING WALL

STRUCTURAL ROOT ZONE (SRZ)
OF EXISTING TREE

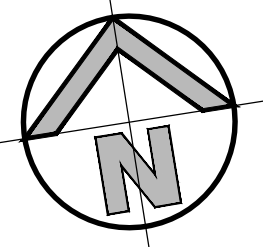
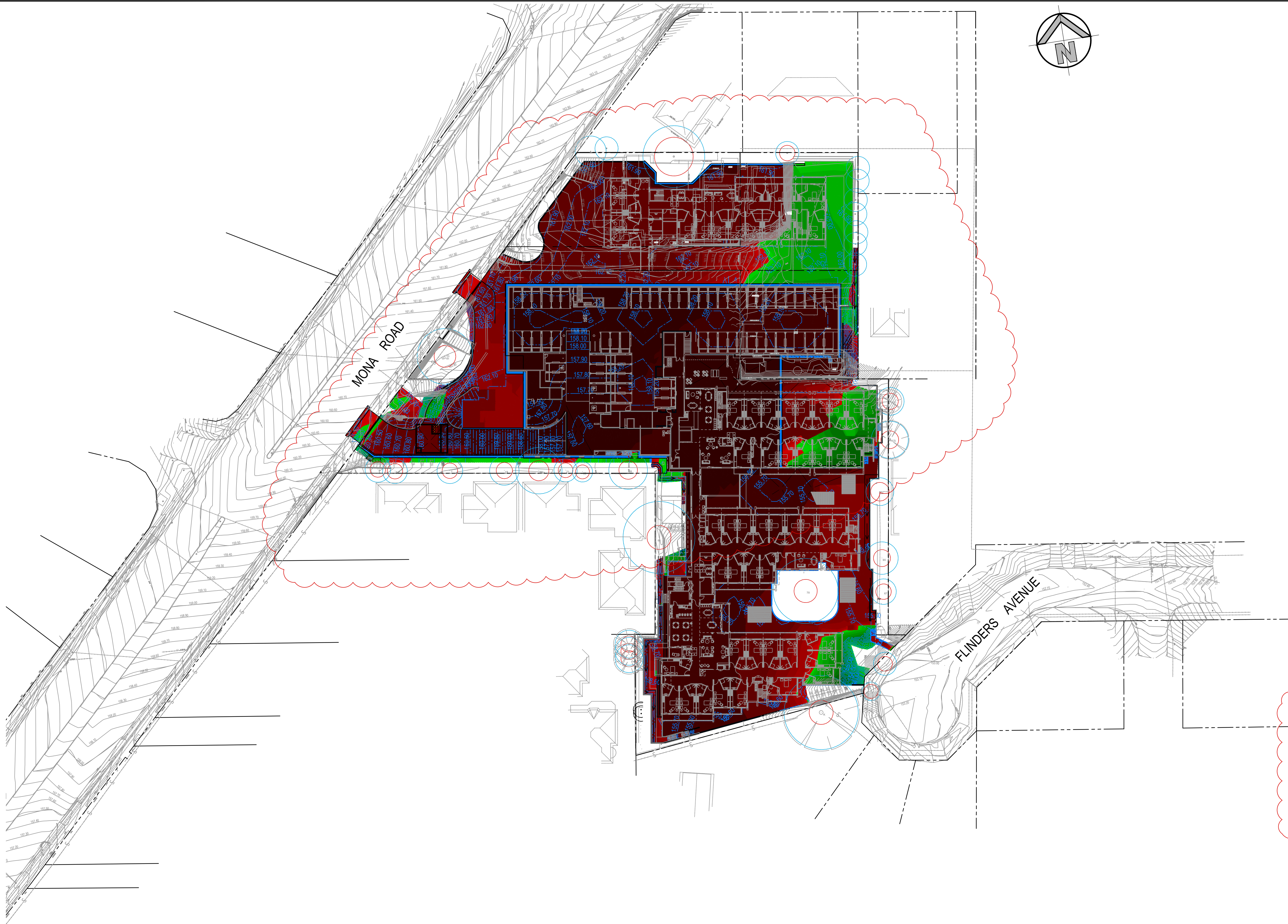
TREE PROTECTION ZONE (TPZ)

DETAIL PLAN - LEVEL 1

SCALE: 1:250

ISSUED FOR S4.55 APPROVAL

SURVEY INFORMATION SURVEYED BY: SDG DATUM: AHD ORIGIN OF LEVELS: SSM 85414 RL 163393																				Client OPAL HEALTHCARE Architect GROUP GSA This drawing and design remains the property of Henry & Hymas and may not be copied in whole or in part without the prior written approval of Henry & Hymas.										Suite 2.01 828 Pacific Highway Gordon NSW 2072  Gordon Shire Council Telephone +61 2 9417 8400 Facsimile +61 2 9417 8337 Email email@hhconsult.com.au Web www.henryandhymas.com.au										 henry&hymas										Project PROPOSED HEALTHCARE DEVELOPMENT 285-289, 293-295 MONA VALE RD & 1 FLINDERS AVE, ST IVES, NSW Title DETAIL PLAN - LEVEL 1 SHEET 3 OF 3										Drawn A.Fernandes Checked N.Heazlewood Drawing number 22K93_D4_C103										Designed N.Heazlewood Approved A.Francis Revision 01										Date SEP 2024 Scale @A1 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LEGEND

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	EXISTING CONTOURS
	CONTOURS BE

LEGEND

DEPTH OF CUT & FILL RANGE				COLOUR
LOWER VALUE		UPPER VALUE		
-8.00	to	-4.00	m	
-4.00	to	-2.00	m	
-2.00	to	-1.00	m	
-1.00	to	-0.80	m	
-0.80	to	-0.60	m	
-0.60	to	-0.40	m	
-0.40	to	-0.20	m	
-0.20	to	-0.10	m	
-0.10	to	-0.05	m	
-0.05	to	0.00	m	
0.00	to	0.05	m	
0.05	to	0.10	m	
0.10	to	0.20	m	
0.20	to	0.40	m	
0.40	to	0.60	m	
0.60	to	0.80	m	
0.80	to	1.00	m	
1.00	to	2.00	m	
2.00	to	4.00	m	
4.00	to	8.00	m	

BULK EARTHWORKS QUANTITIES

TOTAL AREA (11, 121m²)

CUT	25942	m³
FILL	468	m³
EXCESS OF CUT OVER FILL	25474	m³
EXCAVATION FOR RETAINING WALLS NOT INCLUDED IN CALCULATION		
EXCAVATION FOR SERVICE TRENCHES NOT INCLUDED IN CALCULATION		
VOLUME HAS BEEN CALCULATED AFTER STRIPPING THE SITE OF TOPSOIL - ASSUMED TOPSOIL DEPTH 300mm. STRIPPED MATERIAL NOT INCLUDED IN ABOVE QUANTITIES		
SETDOWN FOR EXTERNAL AREAS = 300mm		
SETDOWN FOR BUILDING SLAB = 250mm		

NOTE:

QUANTITIES ARE PRELIMINARY ONLY AND NOT TO BE USED FOR TENDERING PURPOSES.

NOTE:

CLOUDING IN RED REFLECTS CHANGES TO THE DESIGN SINCE THE PREVIOUS SSD APPLICATION (SSD-48028209)



SCALE 1:500

BULK EARTHWORKS CUT AND FILL PLAN

SCALE: 1:250

ISSUED FOR S4.55 APPROVAL

SURVEY INFORMATION

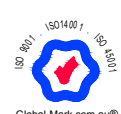
SURVEYED BY: SDG
DATUM: AHD
ORIGIN OF LEVELS:
SSM 85414
RL 163393

REVISION	AMENDMENT	DRAWN	DESIGNED	DATE	REVISION	AMENDMENT	DRAWN	DESIGNED	DATE
01	ISSUED FOR S4.55	DC	NH	14.11.2025					

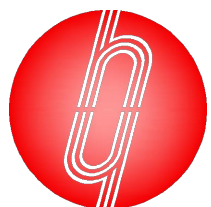
Client
OPAL HEALTHCARE
Architect
GROUP GSA

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henry&hymas

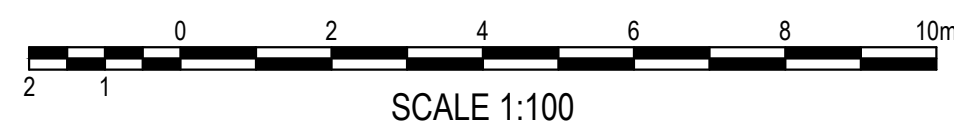
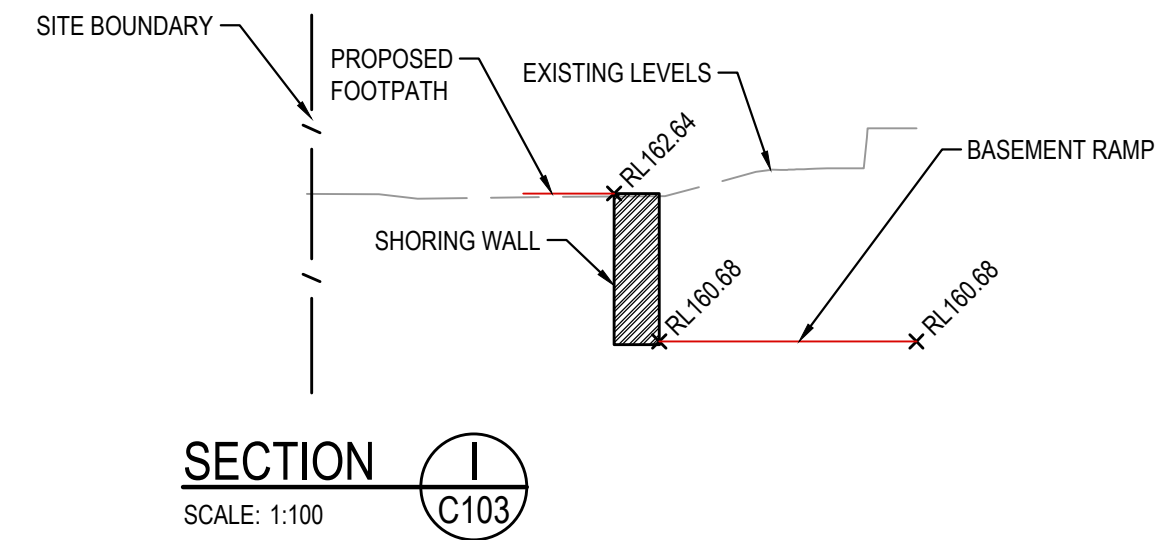
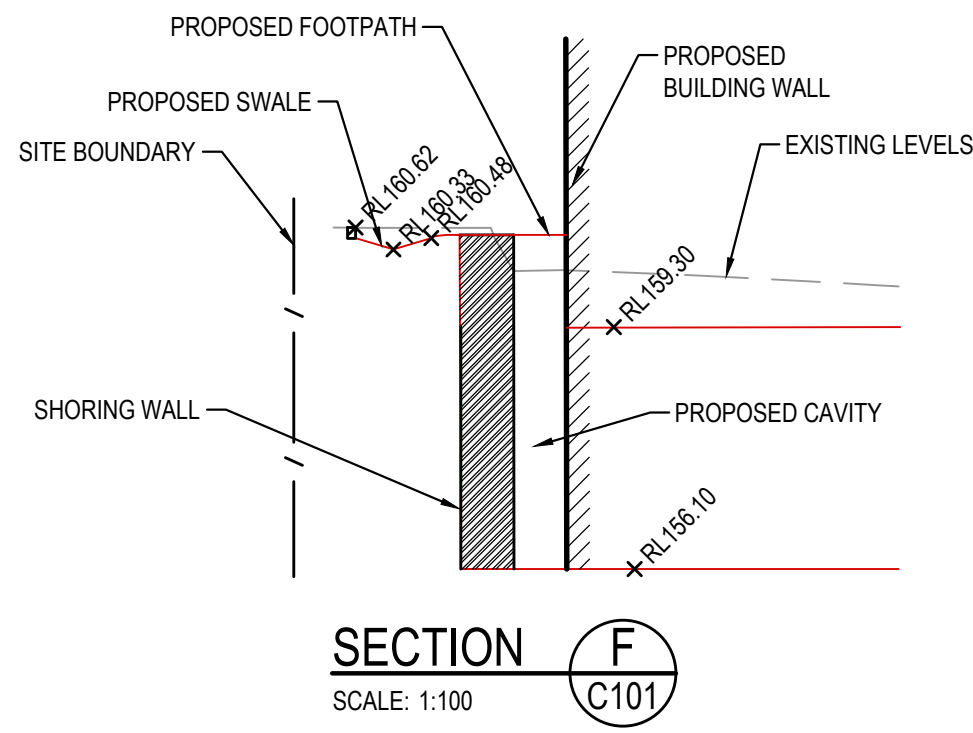
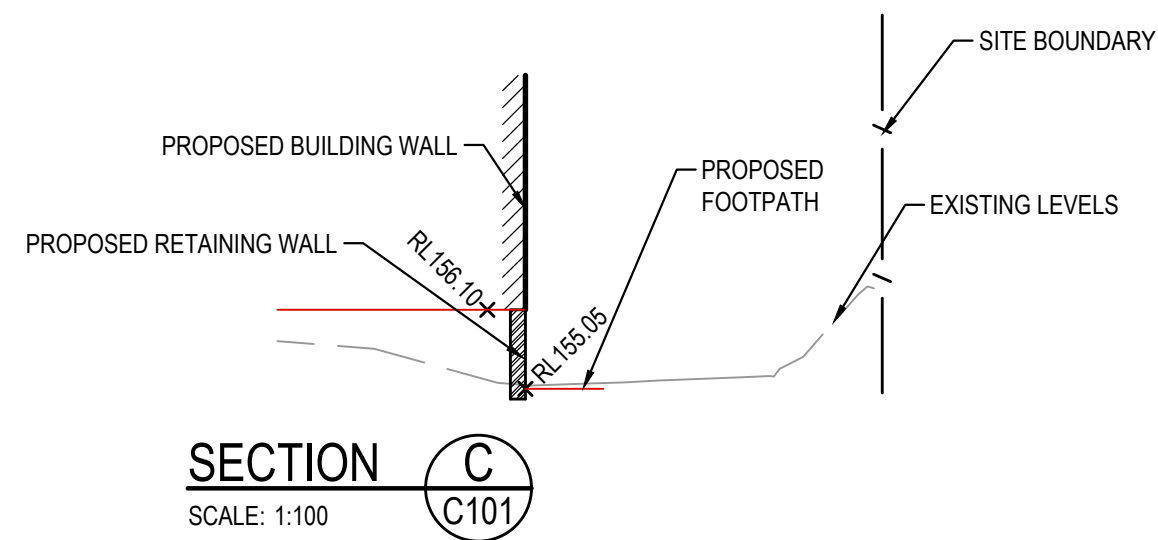
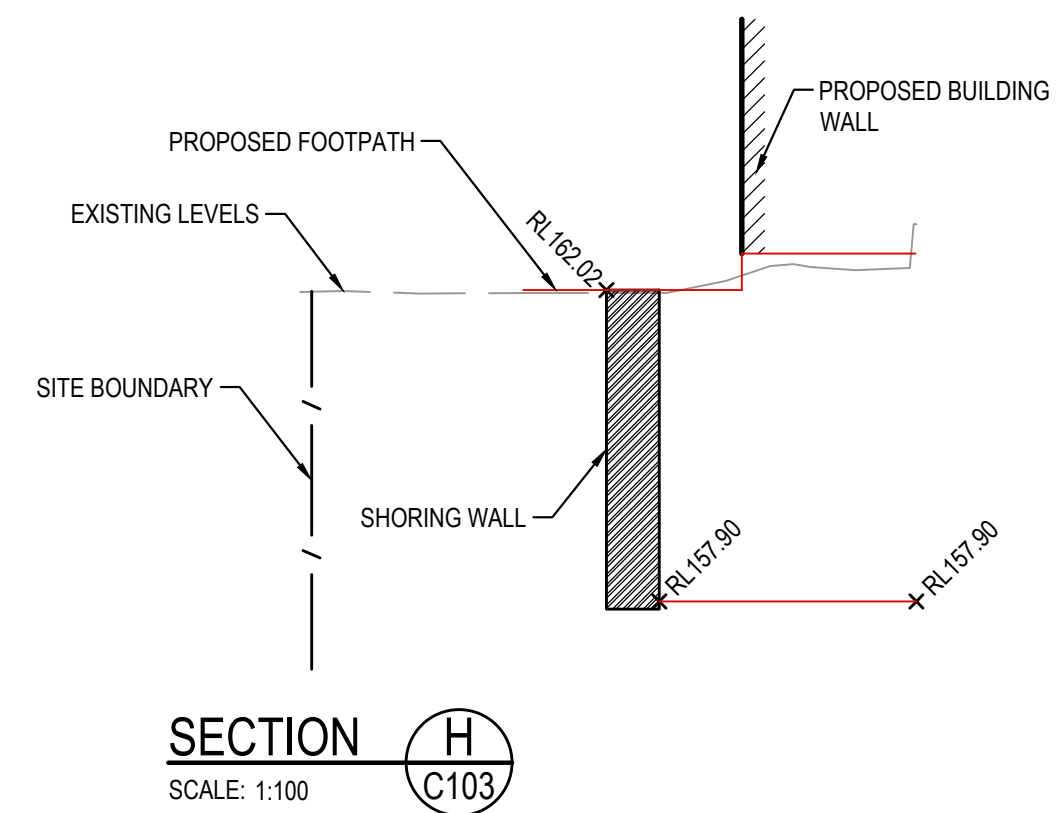
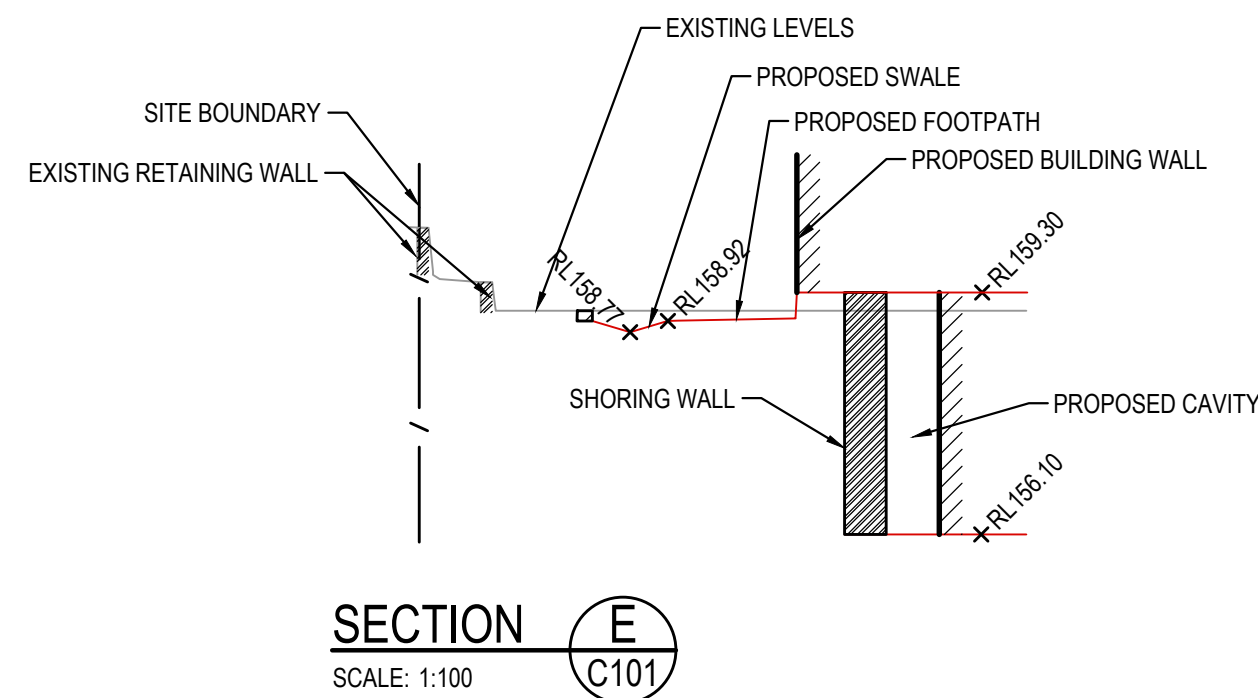
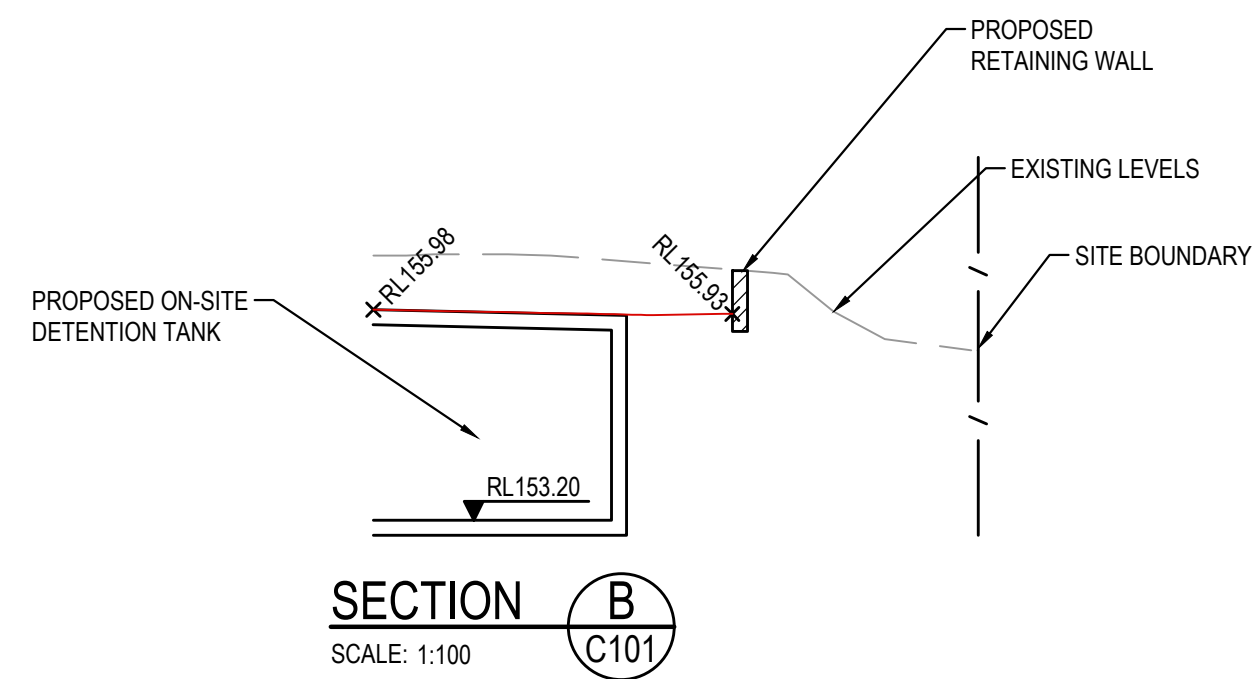
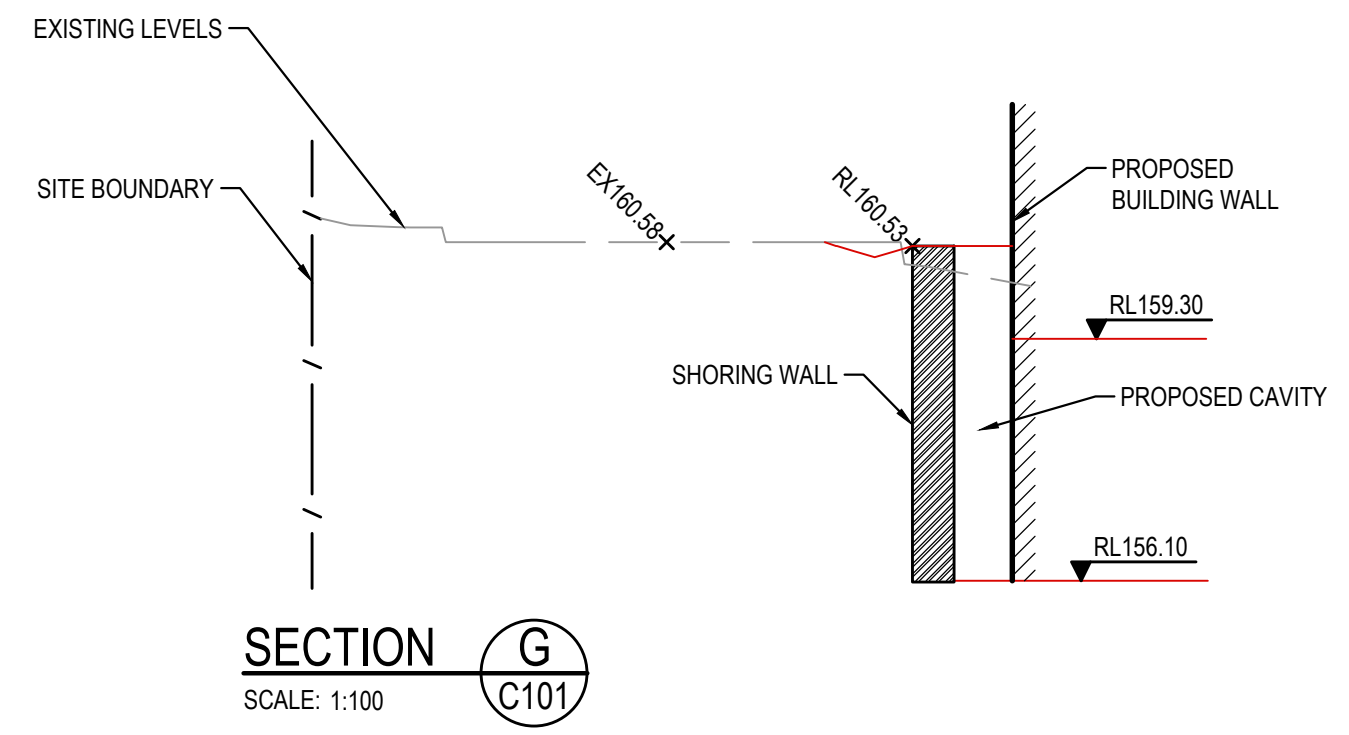
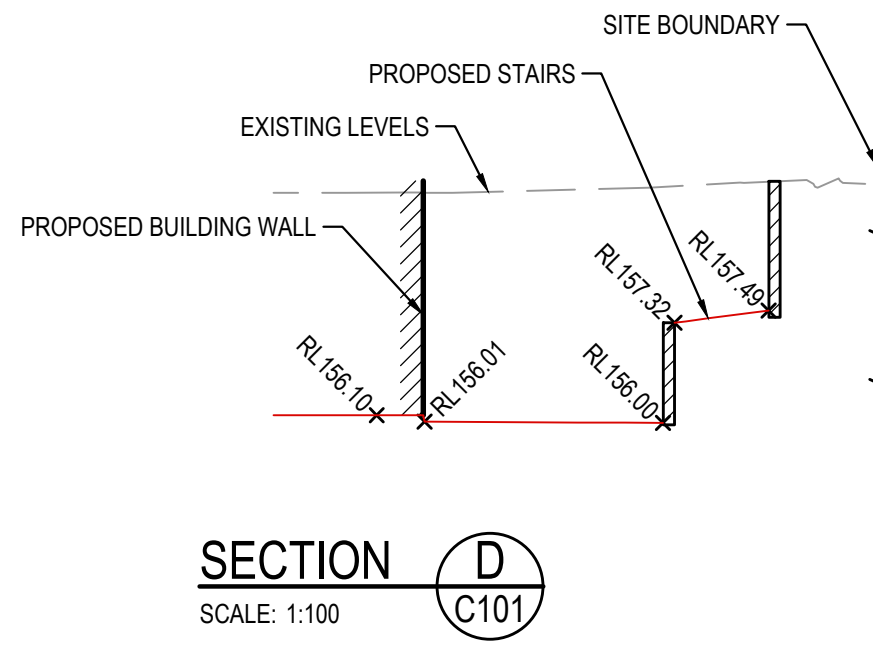
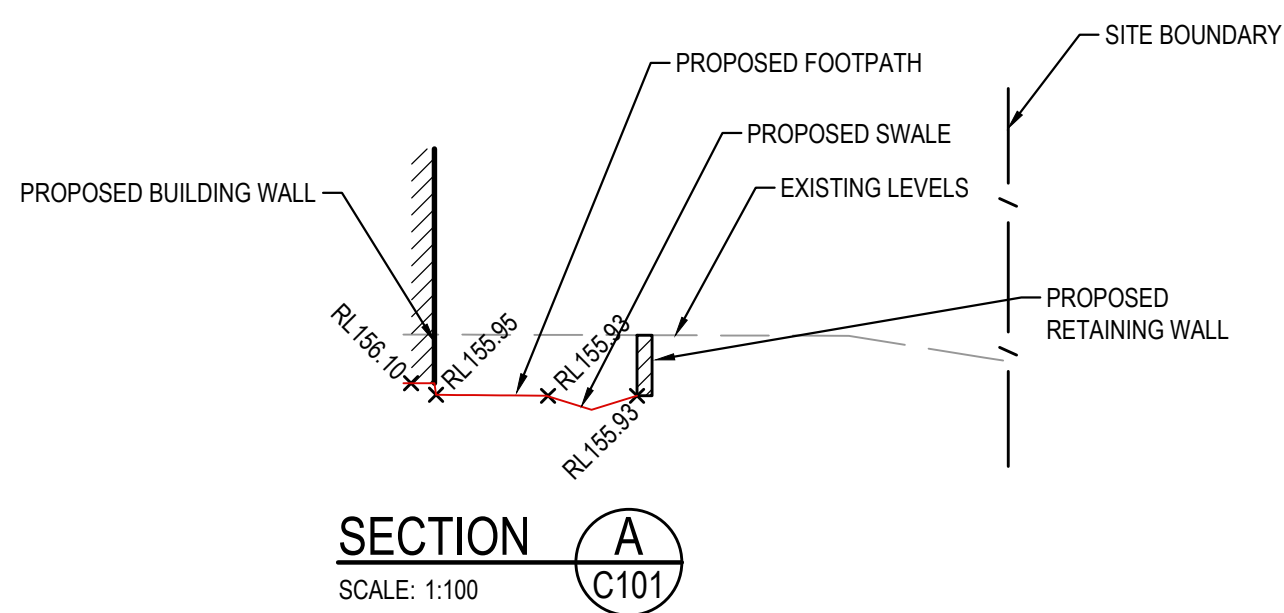
Project
PROPOSED HEALTHCARE DEVELOPMENT
285-289, 293-295 MONA VALE RD & 1 FLINDERS AVE, ST IVES, NSW

Title
BULK EARTHWORKS CUT AND FILL PLAN

Drawn
M.Pereira
Designed
N.Heazlewood
Checked
N.Heazlewood
Approved
A.Francis
Date
FEB 2024
Scale @A1
1:500

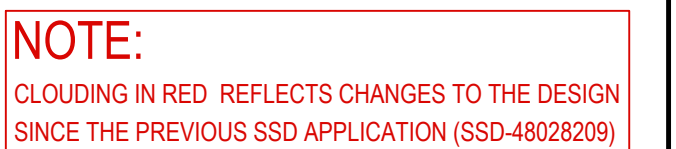
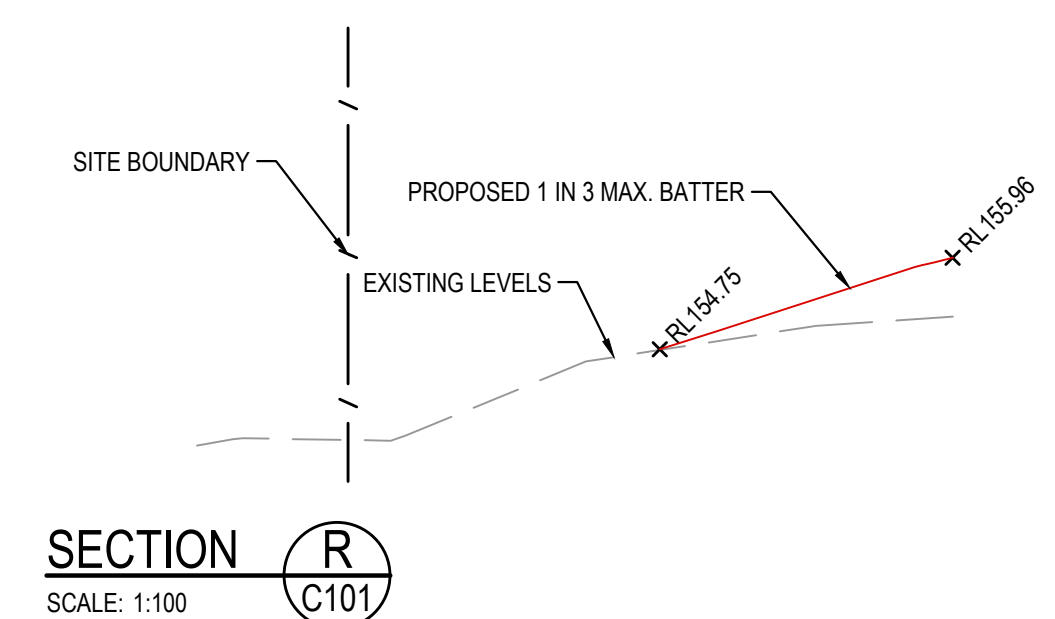
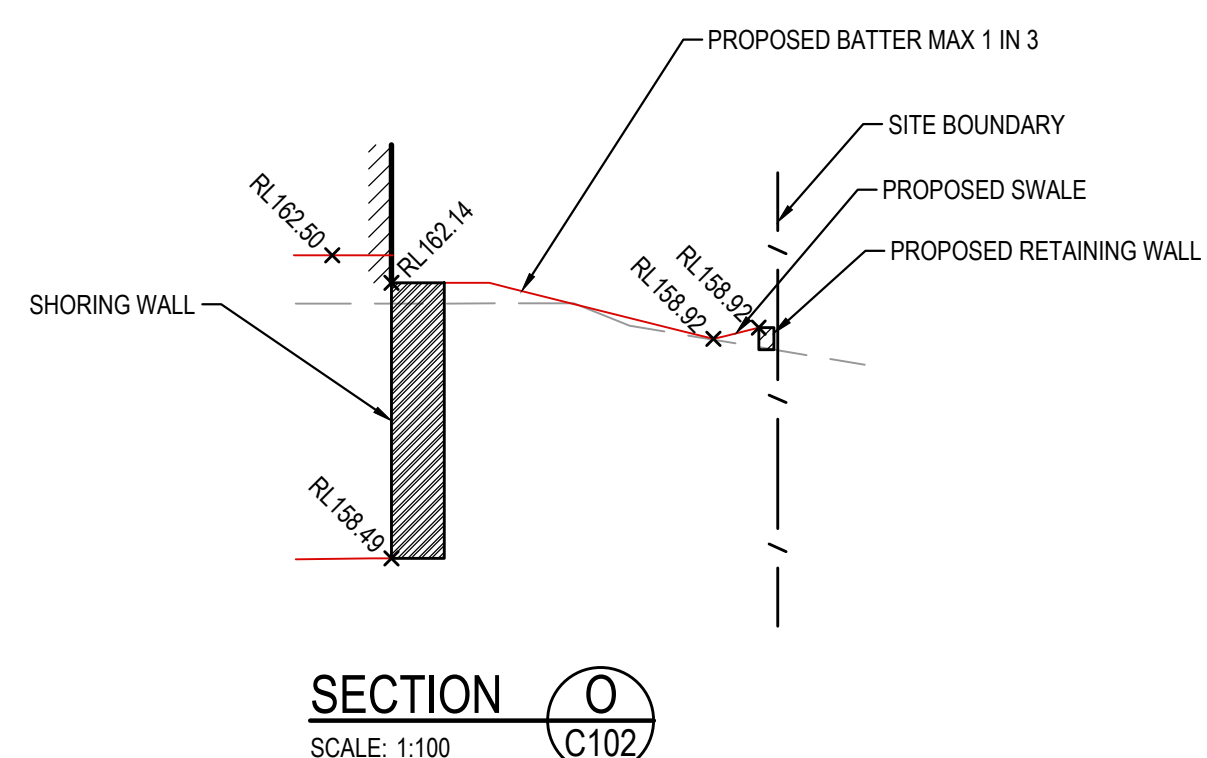
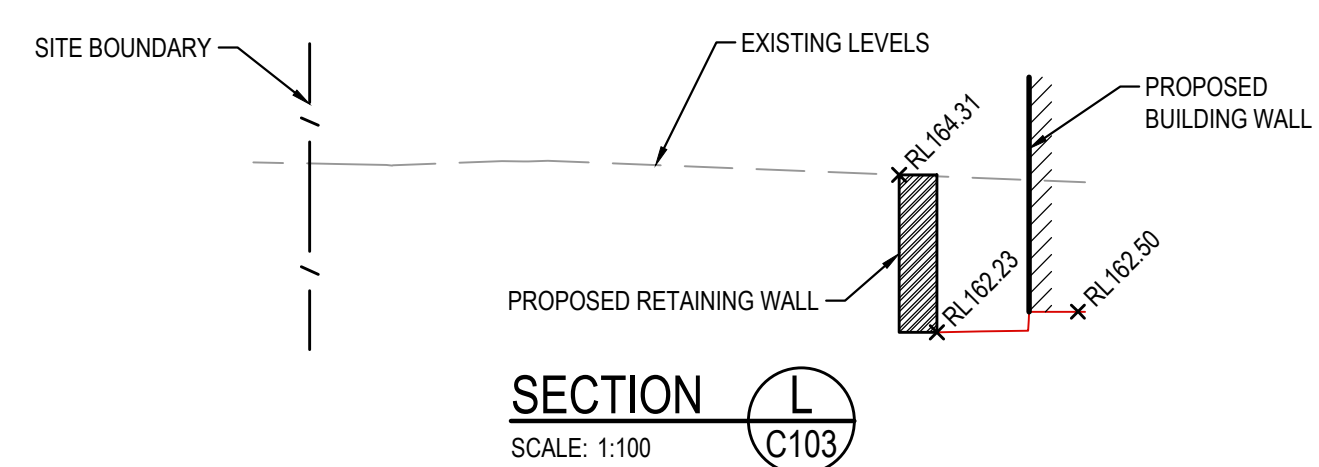
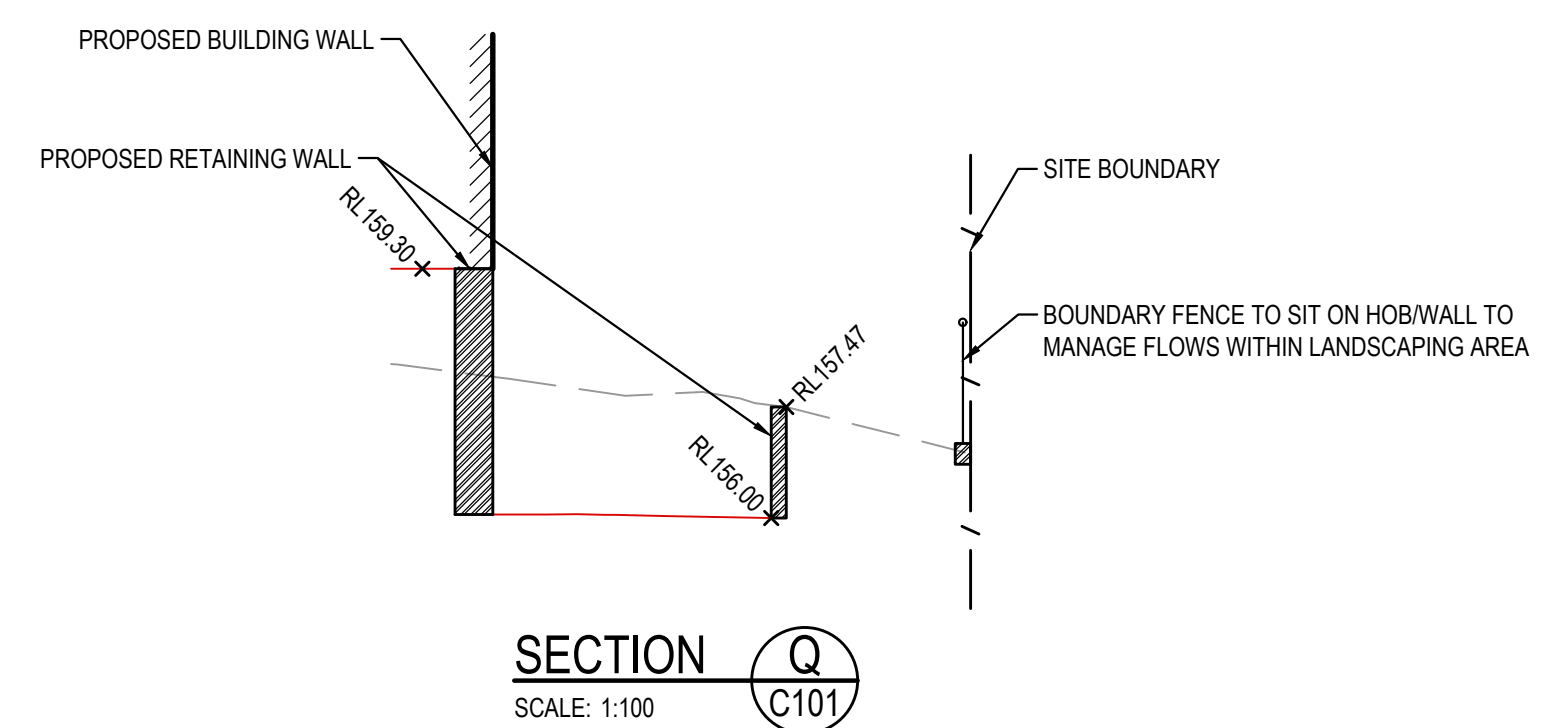
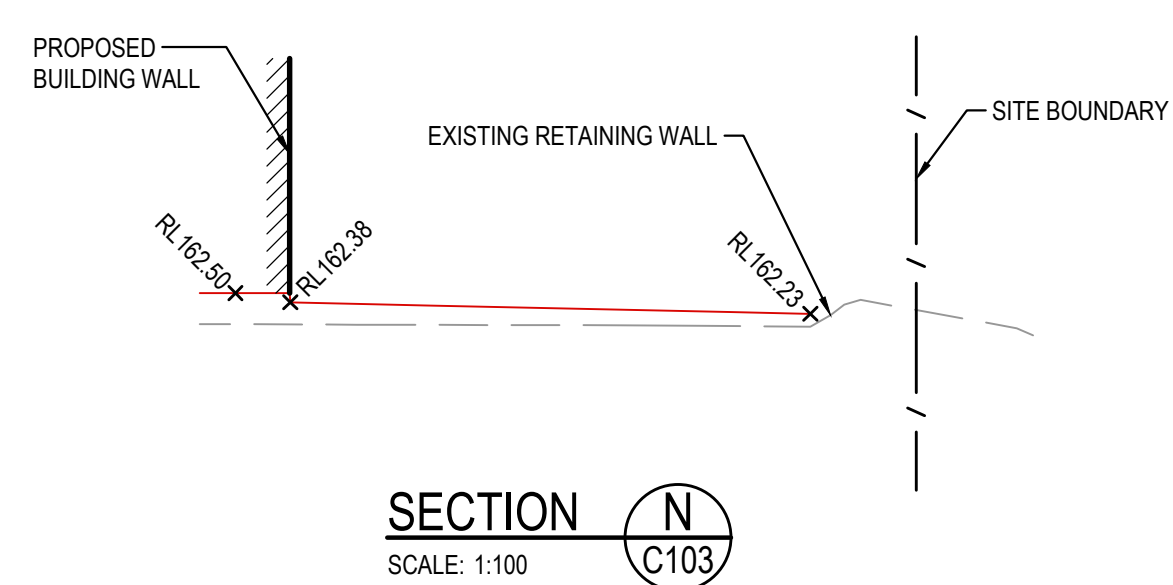
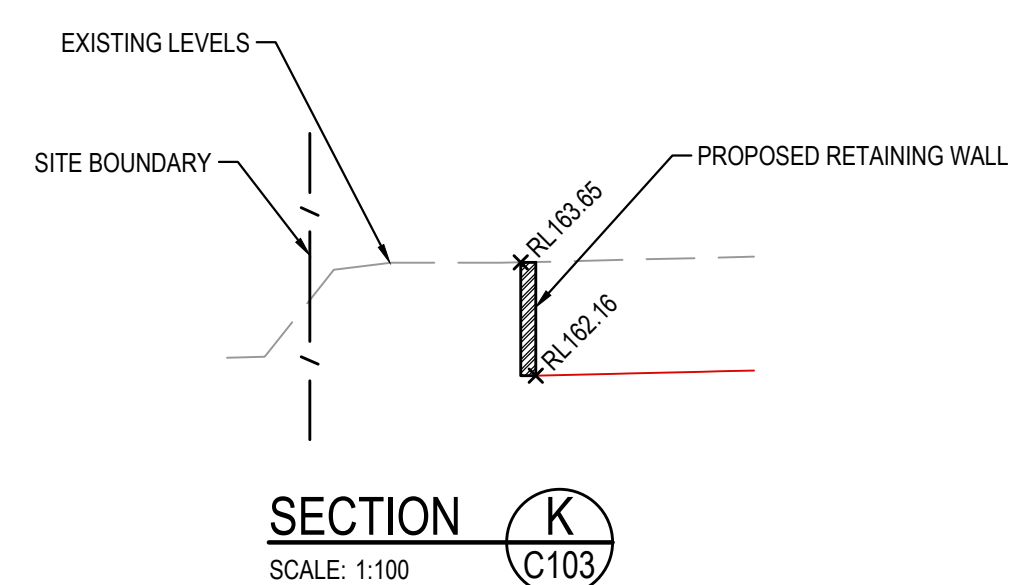
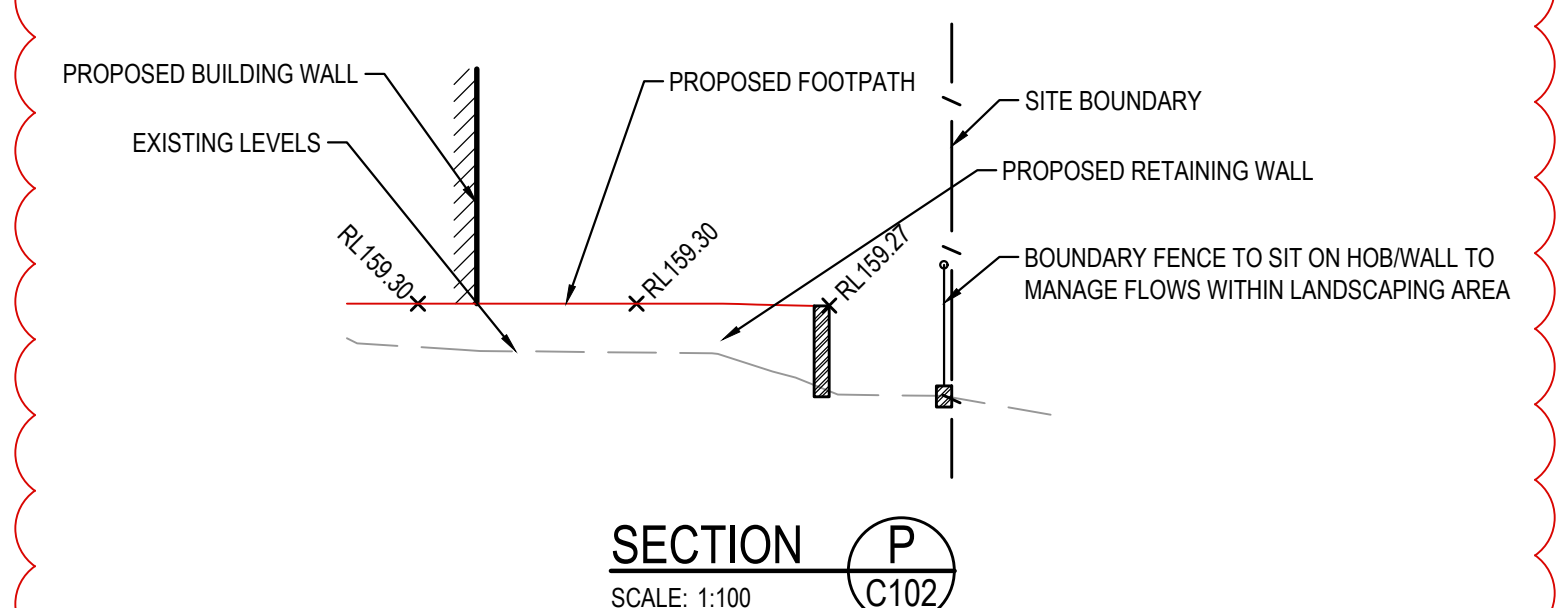
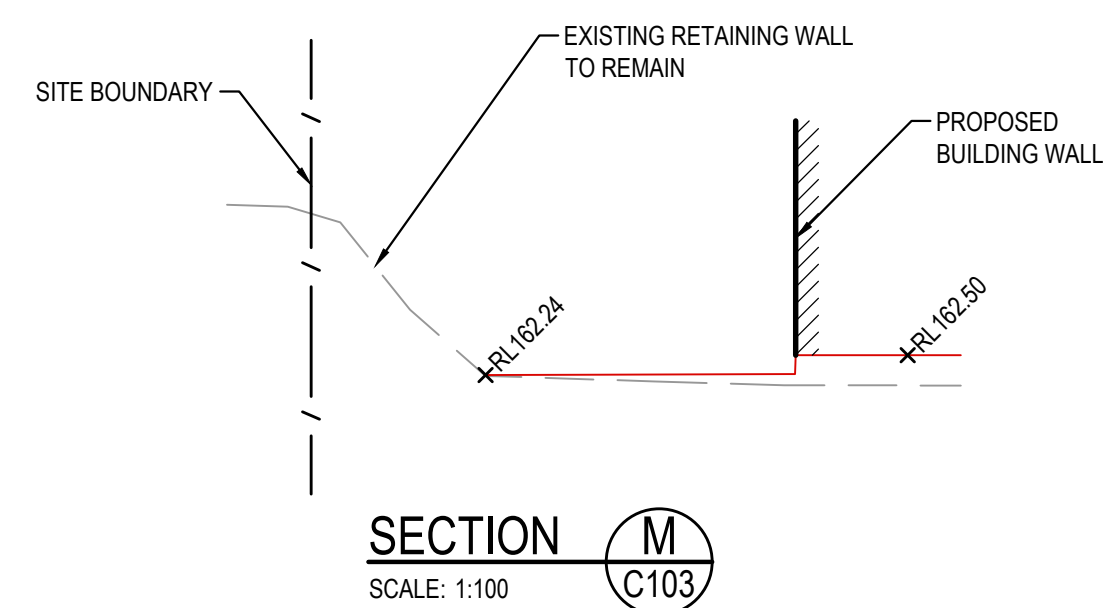
Drawing number
22K93_D4_BE01
Revision
01

DRAWING TO BE PRINTED IN COLOUR



ISSUED FOR S4.55 APPROVAL

SURVEY INFORMATION SURVEYED BY: SDG DATUM: AHD ORIGIN OF LEVELS: SSM 85414 RL 163393																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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ISSUED FOR \$4.55 APPROVAL

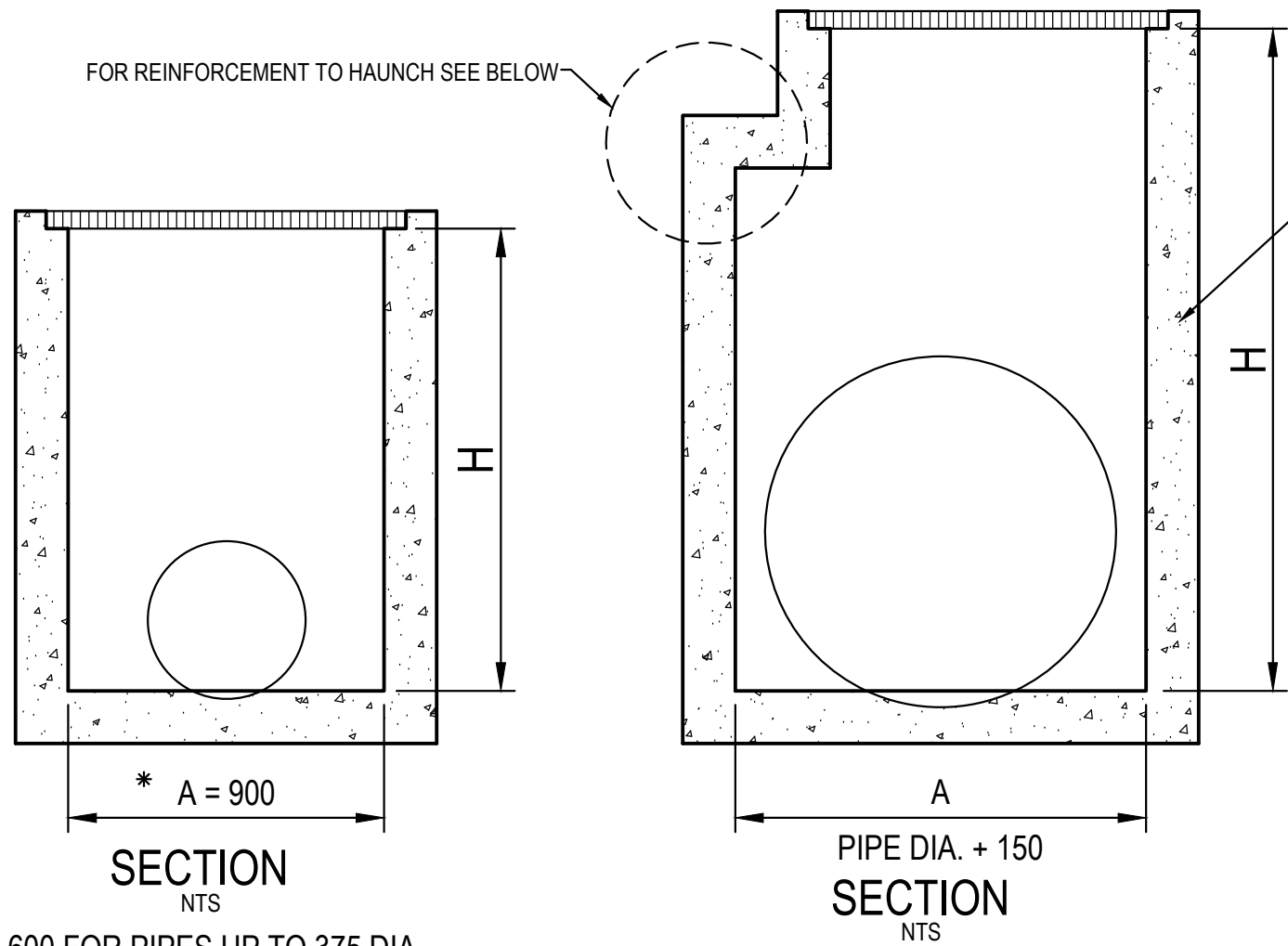
[illegible]

TYPICAL PIT CHAMBER SIZES

IT IS THE CONTRACTORS RESPONSIBILITY TO SELECT PIT CHAMBER SIZE WITH REGARDS TO PIPE SIZE, DEPTH TO INVERT AND SKEW ANGLE. REFER SKETCHES BELOW.

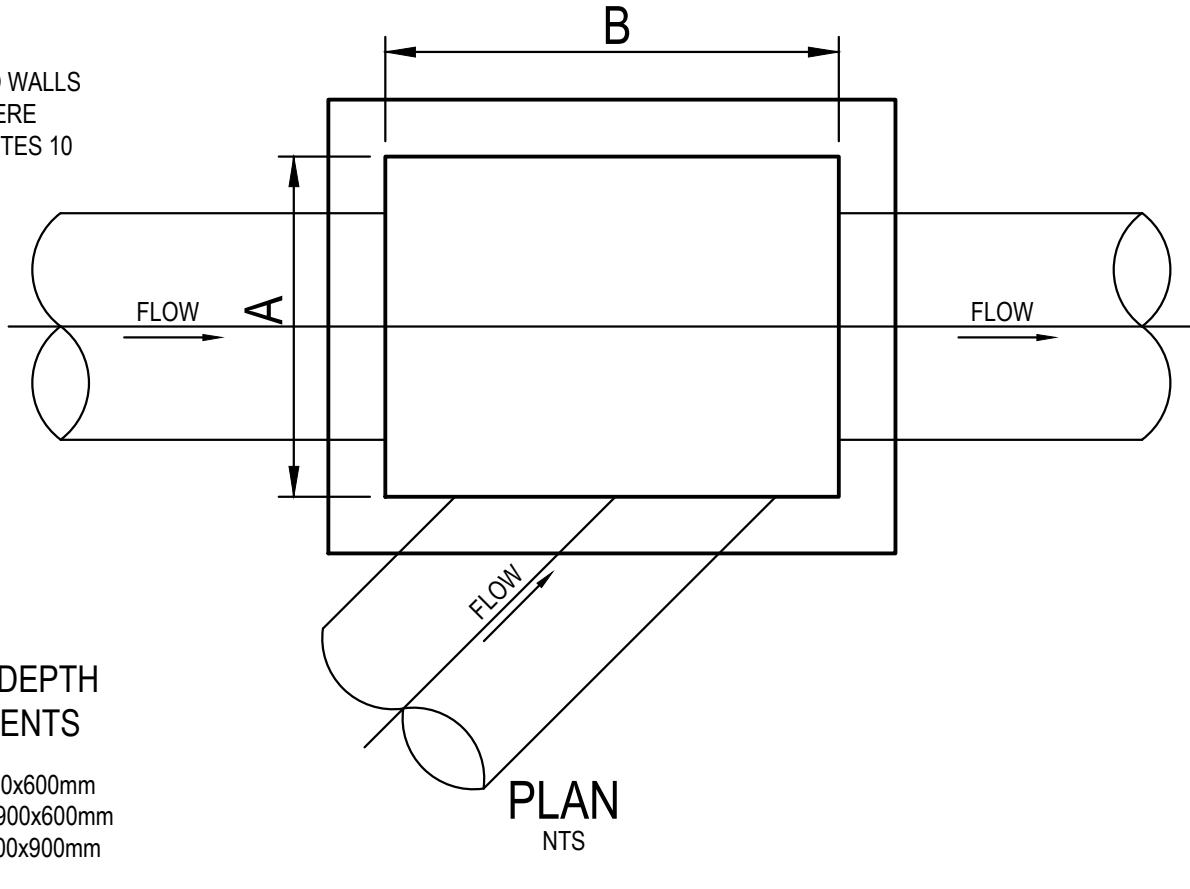
1. SELECT PIT CHAMBER USING THE STEPS BELOW:
2. SELECT PIT CHAMBER SIZE DEPENDING ON THE PIPE DIAMETERS.
3. CHECK PIT CHAMBER SIZE TO SATISFY DEPTH TO INVERT REQUIREMENTS.
4. CHECK PIT CHAMBER DIMENSIONS TO SATISFY THE SKEW ANGLE IN THE TABLE.

FOR B = 600mm - MAX. SIDE ENTRY PIPE AT 45° SKEW = 225mm
FOR B = 900mm - MAX. SIDE ENTRY PIPE AT 45° SKEW = 375mm
FOR B = 1200mm - MAX. SIDE ENTRY PIPE AT 45° SKEW = 600mm
FOR B = 1500mm - MAX. SIDE ENTRY PIPE AT 45° SKEW = 825mm
FOR B = 1900mm - MAX. SIDE ENTRY PIPE AT 45° SKEW = 1050mm

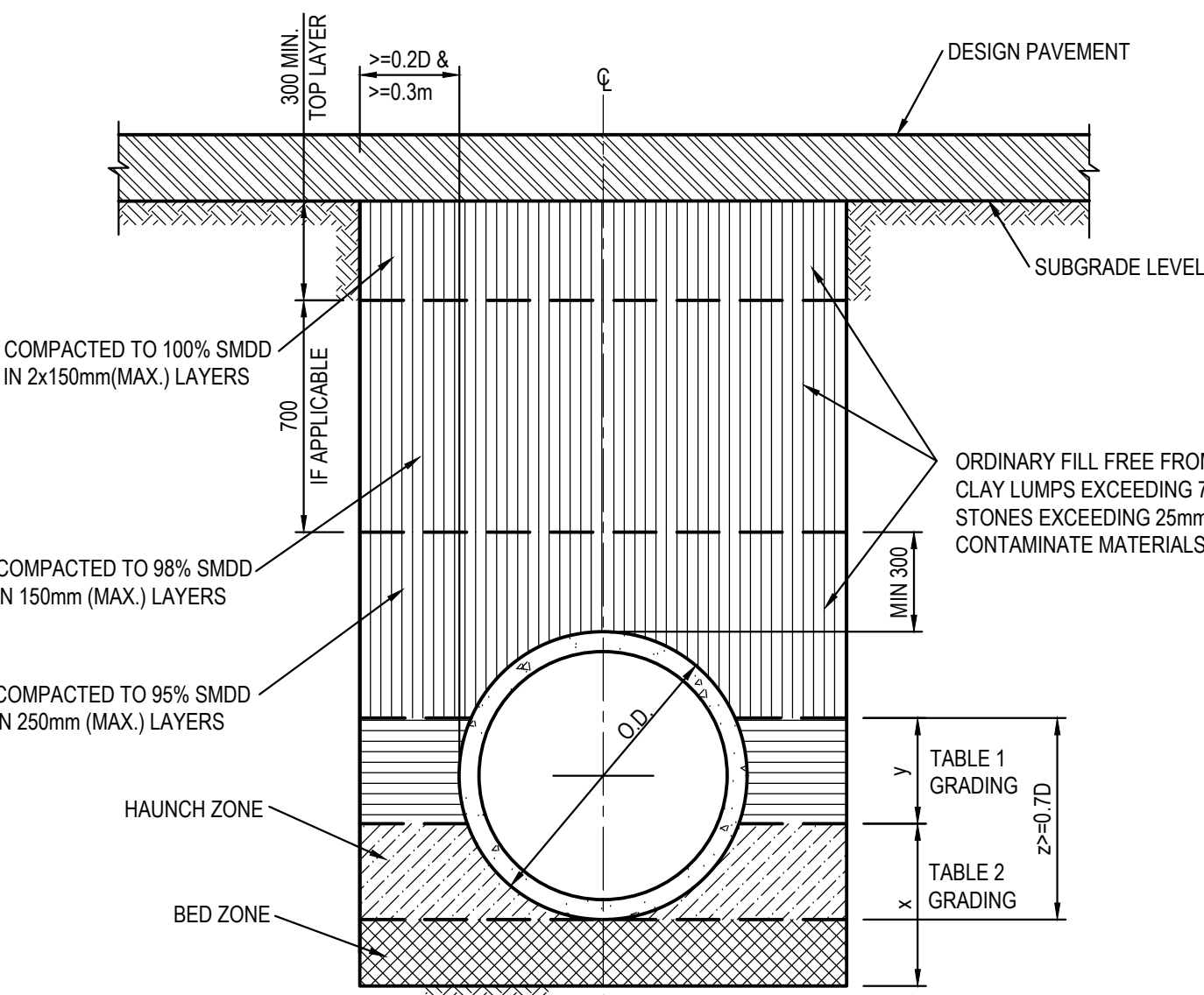


1. PIT CHAMBER DIMENSIONS FOR PIPES UP TO 600 DIA.

1. PIT CHAMBER FOR PIPES GREATER THAN 600 DIA.

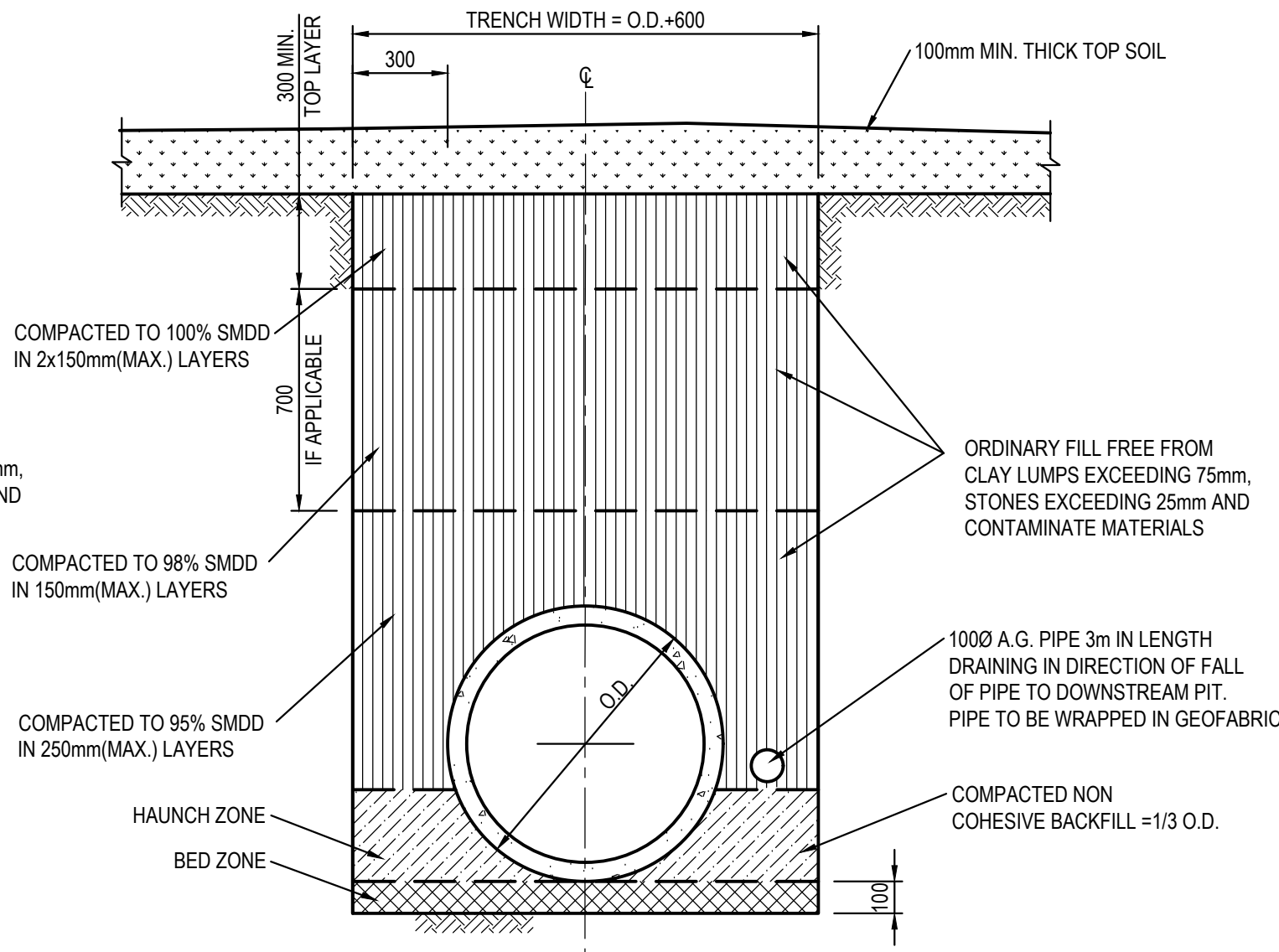


3. PIT CHAMBER FOR SIDE ENTRY ON SKEW



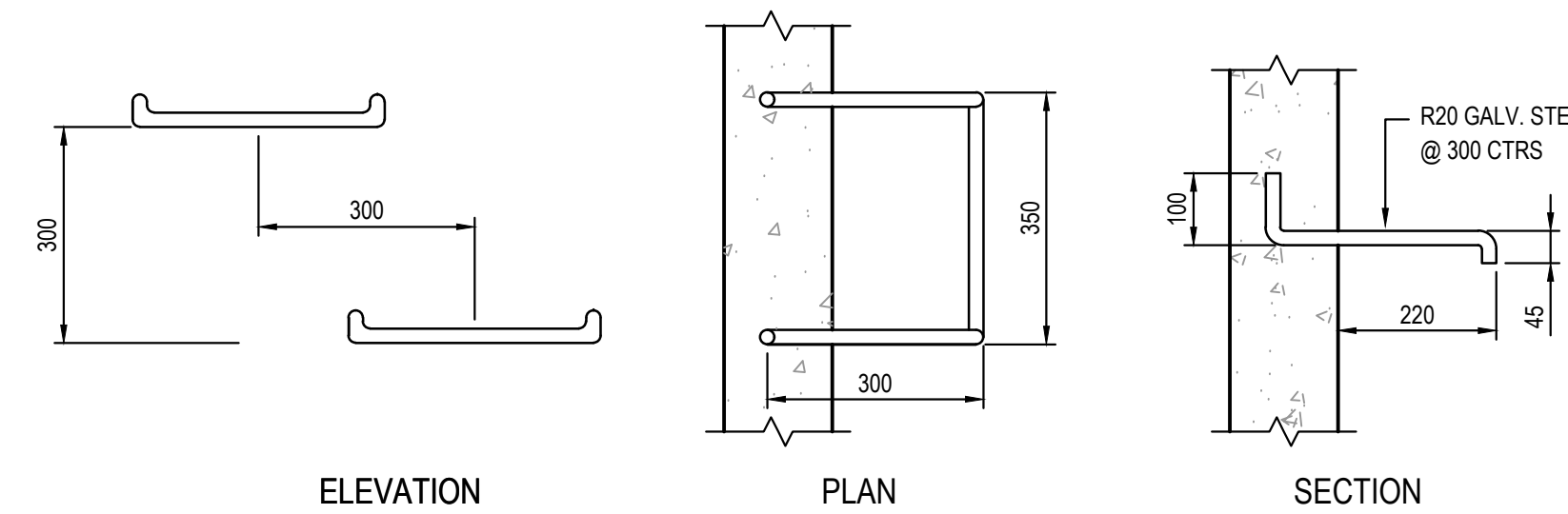
PIPE TRENCH INSTALLATION
BENEATH PAVEMENT

(HS SUPPORT TO BE USED UNDER ROADWAY)
SCALE 1:20



PIPE TRENCH INSTALLATION
IN LANDSCAPE AREAS

(H1 & H2 SUPPORT)
SCALE 1:20



TYPICAL STEP IRON DETAIL

SCALE 1:10

150 WALL - CORNER DETAIL

SCALE 1:20

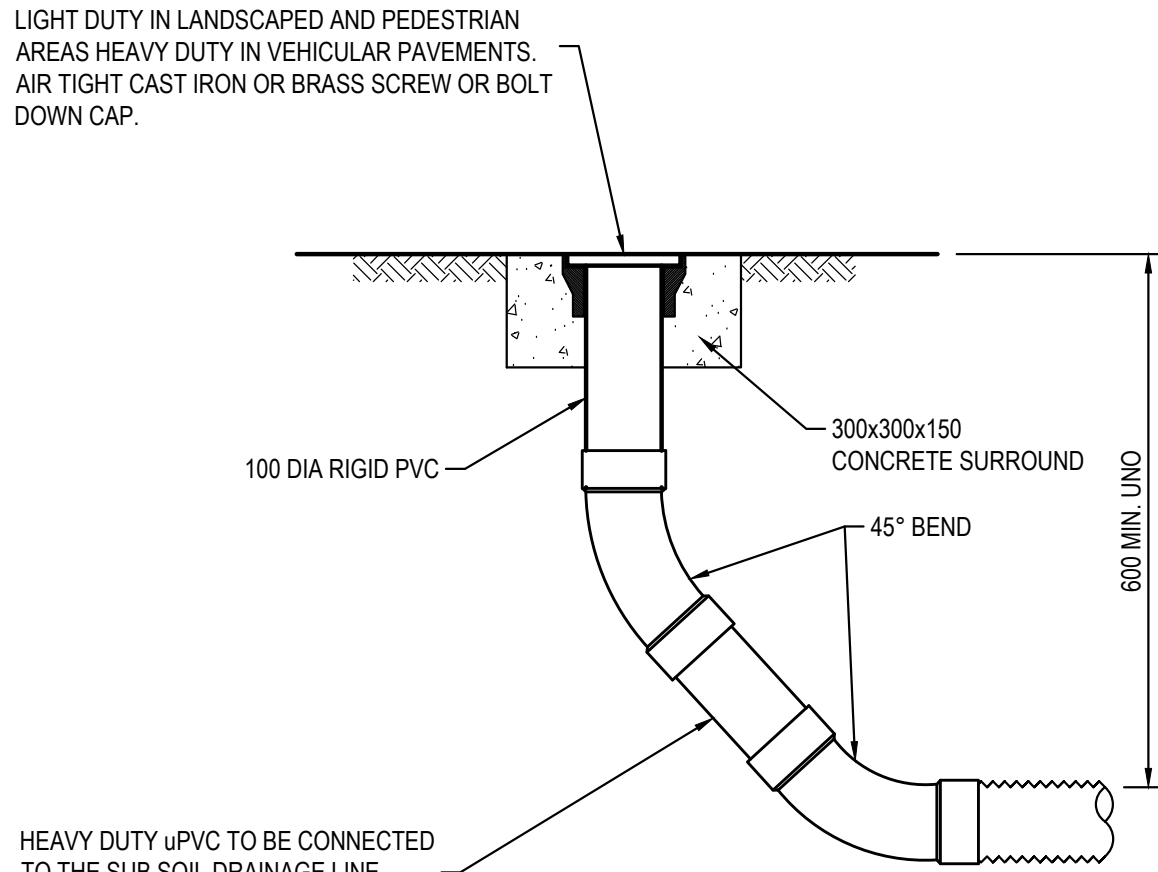
200 WALL - CORNER DETAIL

SCALE 1:20

PIT REINFORCEMENT
SHOWN DOTTED

HAUNCH DETAIL - TYPICAL

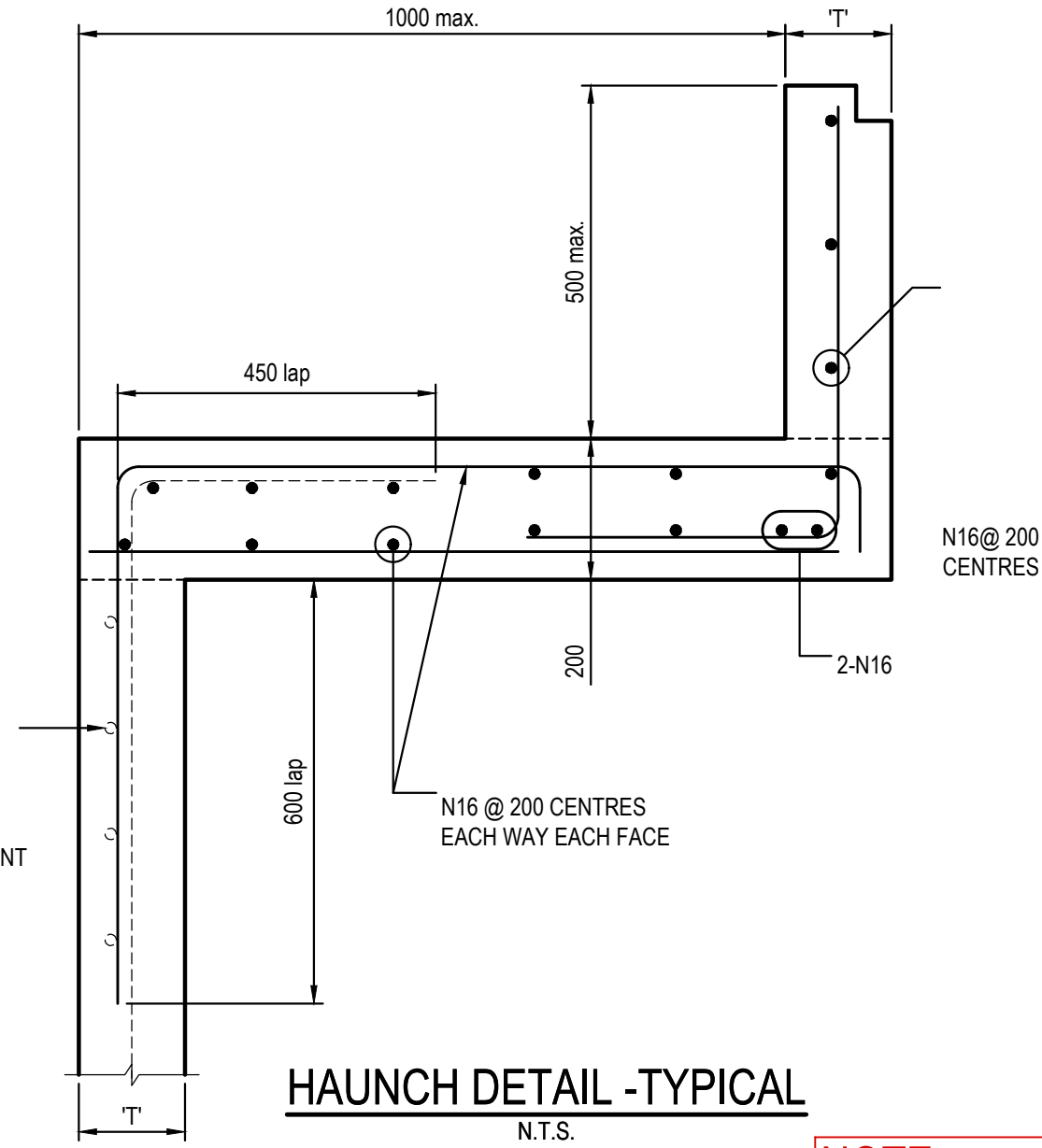
N.T.S.



FLUSHING POINT (FP)

SCALE 1:10

NOTE: SLOTTED RIGID PVC PIPE AND
FITTINGS MAY BE USED



NOTE:

CLOUDING IN RED REFLECTS CHANGES TO THE DESIGN
SINCE THE PREVIOUS SSD APPLICATION (SSD-48028209)

TABLE 1	
SIEVE SIZE (MM)	WEIGHT PASISNG (%)
75.0	100
9.5	100 TO 50
2.36	100 TO 30
0.60	50 TO 15
0.075	25 TO 0

TABLE 2	
SIEVE SIZE (MM)	WEIGHT PASISNG (%)
19.0	100
2.36	100 TO 50
0.60	90 TO 20
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

TABLE 3				
SUPPORT TYPE	BED ZONE X	HAUNCH ZONE Y	BED AND HAUNCH ZONES COMPACTION	MAX BEDDING FACTOR
HS1		0.1D	50	2.0
HS2	100 IF D<=1500, OR 150 IF D>=1500	0.3D	60	2.5
HS3		0.3D	70	4.0

NOTE:

1. ALL INLET PITS TO BE FITTED WITH OCEANGUARD PIT BASKET

PIT LID SCHEDULE

PIT/STRUCTURE NUMBER	DESCRIPTION
EX-1	EXISTING PIT TO REMAIN
L-1 D-1 D-2 D-3 D-4 D-7 A-1 A-3 E-2 A-2 B-1 B-2 A-9 A-10 B-4 B-3 F-3	PROPOSED INLET PIT WITH 900x900 HINGED MEDIUM DUTY GRATED LID INTEL PIT CLASS "B" IN ACCORDANCE WITH KU-RING-GAI COUNCIL'S REQUIREMENT.
D-5 D-6 J-1 J-2 P-1 A-11 A-12 A-13 F-0 F-1 F-2 B-5 B-6 T-1	PROPOSED INLET PIT WITH 600x600 HINGED MEDIUM DUTY GRATED LID INTEL PIT CLASS "B" IN ACCORDANCE WITH KU-RING-GAI COUNCIL'S REQUIREMENT.
C-1 C-2 C-3 E-1 A-4	PROPOSED JUNCTION PIT WITH 900x900 HEAVY DUTY JUNCTION PIT SEALED LID CLASS "D" IN ACCORDANCE WITH ACCORDANCE WITH KU-RING-GAI COUNCIL'S REQUIREMENT.
SD-5	PROPOSED 300mm WIDE GRATED DRAIN WITH HEELPROOF GRATE IN ACCORDANCE WITH KU-RING-GAI COUNCIL'S REQUIREMENT.
SD-2 SD-3 SD-4	PROPOSED 200mm WIDE HEAVY DUTY GRATED DRAIN IN ACCORDANCE WITH KU-RING-GAI COUNCIL'S REQUIREMENT.
C-4 H-1 A-7 A-5 H-0 Q-2 A-8	PROPOSED INLET PIT WITH 900x900 HINGED HEAVY DUTY GRATED LID INTEL PIT CLASS "D" IN ACCORDANCE WITH KU-RING-GAI COUNCIL'S REQUIREMENT.
H-2 I-1 M-1 H-3	PROPOSED INLET PIT WITH 600x600 HINGED HEAVY DUTY GRATED LID WITH HEELPROOF GRATE INLET PIT CLASS "D" IN ACCORDANCE WITH KU-RING-GAI COUNCIL'S REQUIREMENT.
G-1 G-6 G-7 Q-3 Q-4 Q-5 Q-6	PROPOSED OSD ACCESS LID WITH 900x900 HINGED HEAVY DUTY GRATED LID CLASS "C" IN ACCORDANCE WITH KU-RING-GAI COUNCIL'S REQUIREMENT.
G-2 G-3 G-4 G-5 Q-7 Q-8	PROPOSED OSD ACCESS LID WITH 900x900 HINGED HEAVY DUTY SEALED LID CLASS "C" IN ACCORDANCE WITH KU-RING-GAI COUNCIL'S REQUIREMENT.
RWO	PROPOSED 200x200 RAINWATER OUTLET
Q-1	PROPOSED 1.8m KERB INLET PIT IN ACCORDANCE WITH KU-RING-GAI COUNCIL'S REQUIREMENT.

DRAINAGE NOTES:

1. ALL STORMWATER WORK TO COMPLY WITH AS 3500 PART 3.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE MINIMUM COVER OF 600mm ON ALL PIPES.
3. PROTECTION OF PIPES DUE TO LOADS EXCEEDING W7 WHEEL LOAD SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
4. BEDDING TYPE SHALL BE TYPE H2 FOR RCP. WHERE NECESSARY THE OVERLAY ZONE SHALL BE REDUCED TO ACCOMMODATE PAVEMENT REQUIREMENTS. REFER TO THIS DRAWING FOR DETAILS.
5. MINIMUM COVER OVER EXISTING PIPES FOR PROTECTION DURING CONSTRUCTION SHALL BE 800mm.
6. NO CONSTRUCTION LOADS SHALL BE APPLIED TO PLASTIC PIPES.
7. FINISHED SURFACE LEVELS SHOWN ON LAYOUT PLAN DRGS TAKE PRECEDENCE OVER DESIGN DRAINAGE SURFACE LEVELS.
8. ALL PIPES UP TO AND INCLUDING 300 DIA. SHALL BE SOLVENT OR RUBBER RING JOINTED PVC CLASS SH PIPE TO AS1260. ALL OTHER PIPES TO BE RCP USING CLASS 2 RUBBER RING JOINTED PIPE. HARDIES FRG PIPE MAY BE USED IN LIEU OF RCP IF DESIRED IN GROUND. ALL AERIAL PIPES TO BE PVC CLASS SH.
9. ALL PITS IN NON TRAFFICABLE AREAS TO BE PREFABRICATED POLYESTER CONCRETE "POLYCRETE" WITH "LIGHT DUTY" CLASS B GALV. MILD STEEL GRATING AND FRAME. ALL PITS IN TRAFFICABLE AREAS (CLASS "D" LOADING MAX) TO HAVE 150mm THICK CONCRETE WALLS AND BASE CAST IN-SITU f_o=32 MPa, REINFORCED WITH N12-200 BOTH LOADING WAYS CENTRALLY PLACE U.N.O. ON SEPARATE DESIGN DRAWINGS IN THIS SET. GALV.MILD STEEL GRATING AND FRAME TO SUIT DESIGN LOADING. PRECAST PITS, RECTANGULAR OR CIRCULAR IN SHAPE, MAY BE USED IN LIEU AND SHALL COMPLY WITH RELEVANT AUSTRALIAN STANDARDS.
10. ALL PITS, GRATINGS AND FRAMES SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATION AND TO BE IN ACCORDANCE WITH AS3500.3 AND AS3996.
11. PIT CHAMBER DIMENSIONS ARE TO BE SELECTED TO SATISFY THE FOLLOWING:
 - PIPE SIZE
 - DEPTH TO INVERT
 - SKEW ANGLEREFER TYPICAL PIT CHAMBER DETAILS BELOW
IF PIT LID SIZE IS SMALLER THAN THE PIT CHAMBER SIZE THEN THE PIT LID IS TO BE CONSTRUCTED ON THE CORNER OF THE PIT CHAMBER WITH THE STEP IRONS DIRECTLY BELOW. ALTERNATIVELY THE PIT LID TO BE USED, IS TO BE THE SAME SIZE AS THE PIT CHAMBER.
12. FOR PIPE SIZES GREATER THAN Ø300mm, PIT FLOOR IS TO BE BENCH TO FACILITATE FLOW.
13. GALVANISED STEP IRONS SHALL BE PROVIDED AT 300 CTS FOR PITS HAVING A DEPTH EXCEEDING 1200mm. SUBSOIL DRAINAGE PIPE SHALL BE PROVIDED IN PIPE TRENCHES ADJACENT TO INLET PIPES. (MINIMUM LENGTH 3m).
14. ALL SUBSOIL PIPES SHALL BE 100mm SLOTTED PVC IN A FILTER SOCK, UNO, WITH 3m INSTALLED UPSTREAM OF ALL PITS.
15. ALL PIPEWORK SHALL HAVE MINIMUM DIAMETER 100.
16. MINIMUM GRADE FOR ROOFWATER DRAINAGE LINES SHALL BE 1%.
17. ALL PIPE JUNCTIONS AND TAPER UP TO AND INCLUDING 300 DIA. SHALL BE VIA PURPOSE MADE FITTINGS.
18. ALL ROOF DRAINAGE TO BE INSTALLED IN ACCORDANCE WITH AS3500, PART 3. TESTING TO BE UNDERTAKEN AND REPORTS PROVIDED TO THE SUPERINTENDENT.
19. LOCATION OF THE DIRECT DOWN PIPE CONNECTIONS MAY VARY ON SITE TO SUIT SITE CONDITIONS, WHERE CONNECTION SHOWN ON LONG SECTIONS CHAINAGES ARE INDICATIVE ONLY.
20. PITS IN EXCESS OF 1.5 m DEEP TO HAVE WALL AND FLOOR THICKNESS INCREASED TO 200mm. REINFORCED WITH N12@200 CTS CENTRALLY PLACED BOTH WAYS THROUGHOUT U.N.O.ON SEPARATE DESIGN DRAWINGS IN THIS SET. IF DEPTH EXCEEDS 5m CONTACT ENGINEER.
21. SUBSOIL DRAINAGE LINES FOR LANDSCAPE AREA NOT SHOWN ON THESE DRAWINGS. REFER TO LANDSCAPING PLANS FOR DETAILS.
22. ALL STORMWATER PITS TO HAVE Ø100 uPVC SLOTTED SUBSOIL PIPES CONNECTED TO THEM. THESE SUBSOILS TO EXTEND 3m UPSTREAM OF THE PIT AT A MINIMUM GRADE.

ISSUED FOR S4.55 APPROVAL

SURVEY
INFORMATION
SURVEYED BY: SDG

DATUM: AHD
ORIGIN OF LEVELS:
SSM 85414
RL 163593

REVISION	AMENDMENT	DRAWN	DESIGNED	DATE	REVISION	AMENDMENT	DRAWN	DESIGNED	DATE
01	ISSUED FOR S4.55	DC	NH	17.11.2025					

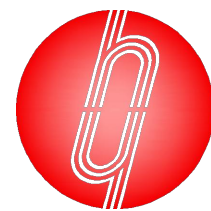
Client
OPAL HEALTHCARE

Architect
GROUP GSA

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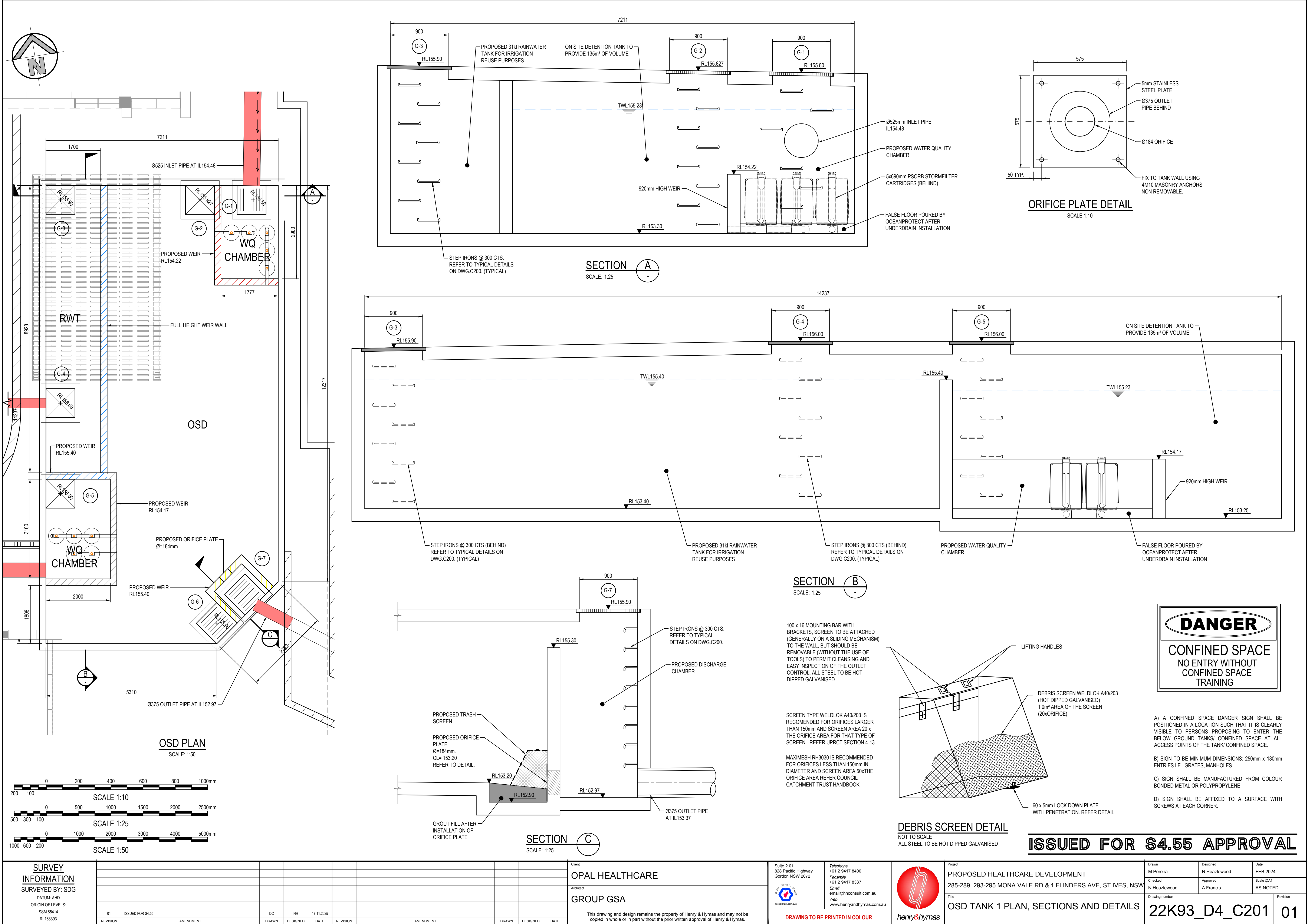


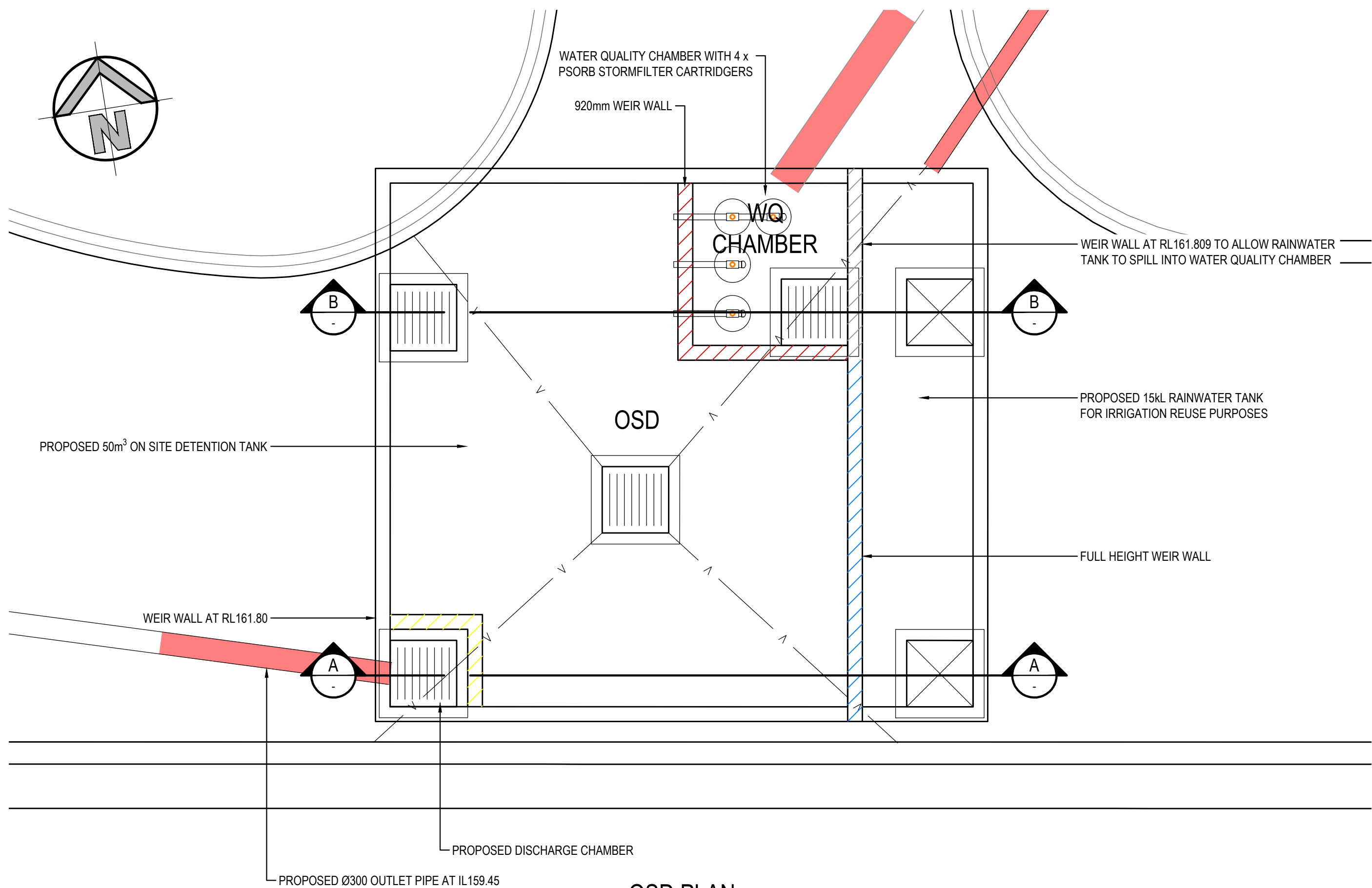
Project
PROPOSED HEALTHCARE DEVELOPMENT
285-289, 293-295 MONA VALE RD & 1 FLINDERS AVE, ST IVES, NSW

Title
STORMWATER MISCELLANEOUS DETAILS
AND PIT LID SCHEDULE

Drawn
M.Pereira
Designed
N.Heazlewood
Approved
A.Francis
Scale @A1
1:100

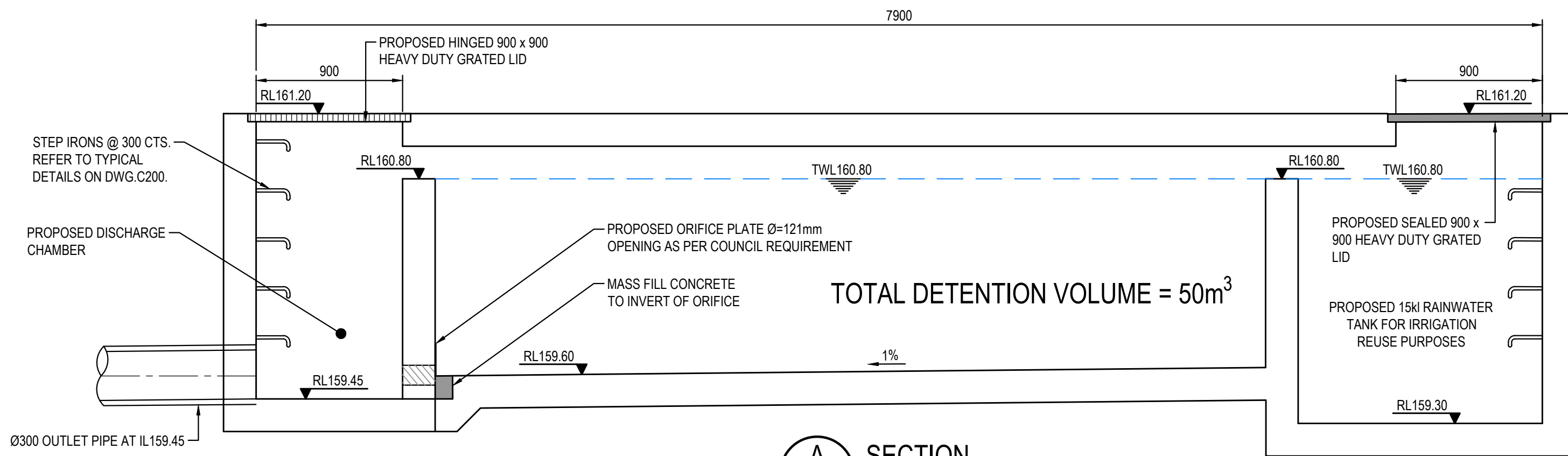
Drawing number
22K93_D4_C200
Revision
01





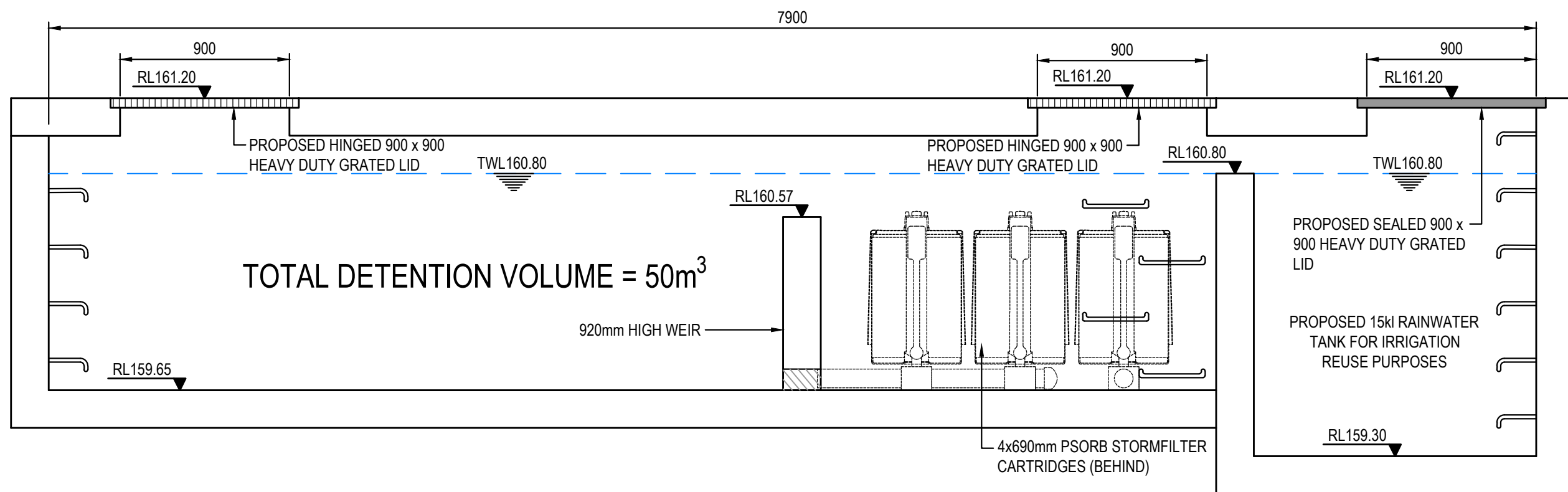
OSD PLAN

SCALE: 1:50



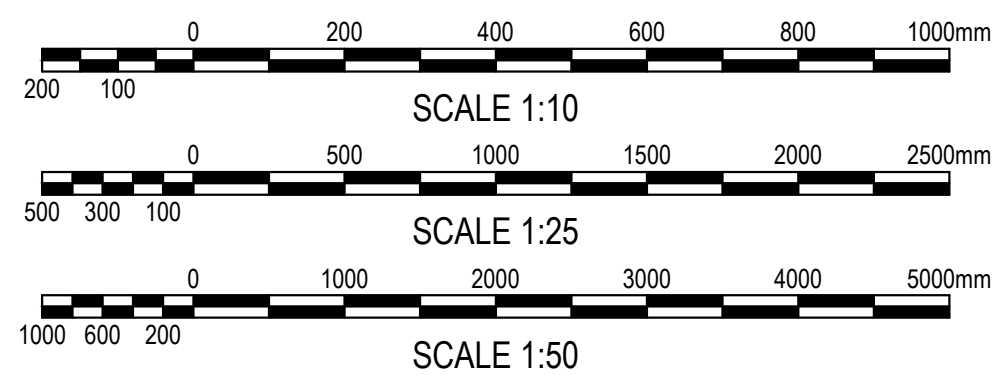
A SECTION

SCALE 1:25



B SECTION

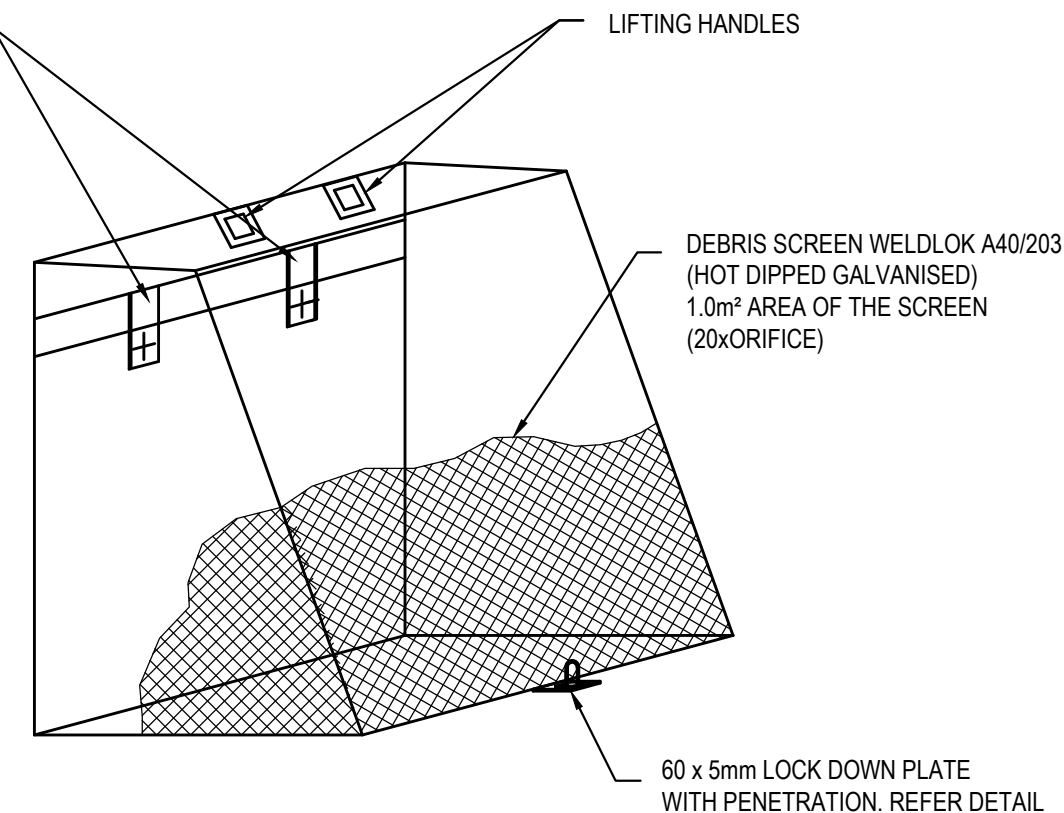
SCALE 1:25



100 x 16 MOUNTING BAR WITH BRACKETS, SCREEN TO BE ATTACHED (GENERALLY ON A SLIDING MECHANISM) TO THE WALL, BUT SHOULD BE REMOVABLE (WITHOUT THE USE OF TOOLS) TO PERMIT CLEANSING AND EASY INSPECTION OF THE OUTLET CONTROL. ALL STEEL TO BE HOT DIPPED GALVANISED.

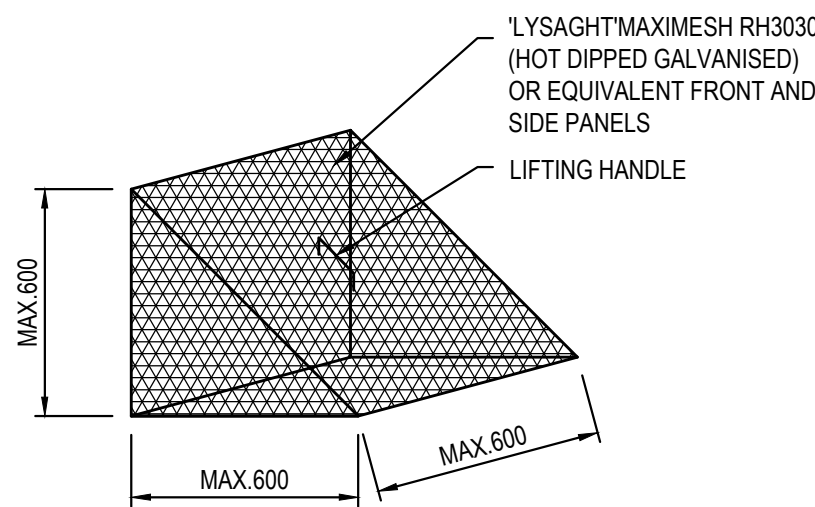
SCREEN TYPE WELDLOK A40/203 IS RECOMMENDED FOR ORIFICES LARGER THAN 150mm AND SCREEN AREA 20 x THE ORIFICE AREA FOR THAT TYPE OF SCREEN - REFER UPRCT SECTION 4-13

MAXIMESH RH3030 IS RECOMMENDED FOR ORIFICES LESS THAN 150mm IN DIAMETER AND SCREEN AREA 50x THE ORIFICE AREA REFER COUNCIL CATCHMENT TRUST HANDBOOK.



DEBRIS SCREEN DETAIL

NOT TO SCALE
ALL STEEL TO BE HOT DIPPED GALVANISED

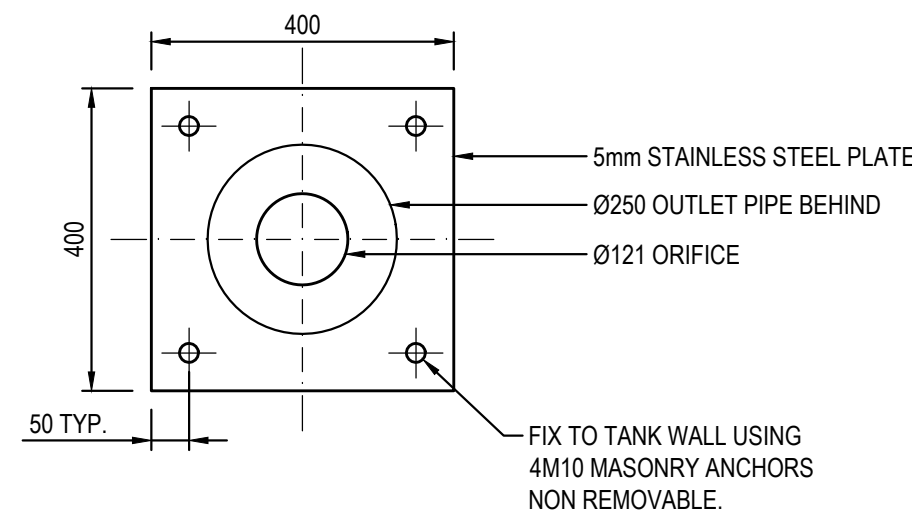


TRASH SCREEN DETAIL

N.T.S

TRASH SCREEN NOTES

1. MAXIMESH SCREENS MUST BE PLACED SUCH THAT THE LONG AXIS OF THE OVAL SHAPED HOLES ARE ORIENTATED HORIZONTALLY WITH THE PORTRUDING LIP ANGLED UPWARDS AND FACING TOWARDS THE OUTLET.
2. THE SCREEN IS TO BE FORMED BY WELDING TWO TRIANGULAR MAXIMESH (OR EQUIVALENT) PANELS TO A RECTANGULAR FRONT MAXIMESH PANEL (OR EQUIVALENT)



ORIFICE PLATE DETAIL

SCALE 1:10



A) A CONFINED SPACE DANGER SIGN SHALL BE POSITIONED IN A LOCATION SUCH THAT IT IS CLEARLY VISIBLE TO PERSONS PROPOSING TO ENTER THE BELOW GROUND TANKS/ CONFINED SPACE AT ALL ACCESS POINTS OF THE TANK/ CONFINED SPACE.

B) SIGN TO BE MINIMUM DIMENSIONS: 250mm x 180mm ENTRIES I.E., GRATES, MANHOLES

C) SIGN SHALL BE MANUFACTURED FROM COLOUR BONDED METAL OR POLYPROPYLENE

D) SIGN SHALL BE AFFIXED TO A SURFACE WITH SCREWS AT EACH CORNER.

ISSUED FOR S4.55 APPROVAL

SURVEY INFORMATION

SURVEYED BY: SDG

DATUM: AHD

ORIGIN OF LEVELS:

SSM 85414

RL 163393

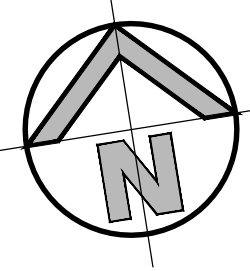
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01	ISSUED FOR S4.55	DC	NH	17.11.2025					

Client	OPAL HEALTHCARE
Architect	GROUP GSA
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DRAWING TO BE PRINTED IN COLOUR	



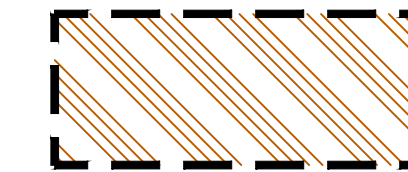
Project	PROPOSED HEALTHCARE DEVELOPMENT 285-289, 293-295 MONA VALE RD & 1 FLINDERS AVE, ST IVES, NSW
Drawn	M.Pereira
Designed	N.Heazlewood
Checked	N.Heazlewood
Approved	A.Francis
Drawing number	22K93_D4_C202
Revision	01



TOTAL SITE AREA: 12,744m²



WESTERN CATCHMENT
AREA: 3420m²



SOUTH-EAST CATCHMENT
AREA: 9324m²

MONA VALE ROAD

FLINDERS AVENUE



SCALE 1:500

POST-DEVELOPED STORMWATER CATCHMENT PLAN

SCALE: 1:500

NOTE:

CLOUDING IN RED. REFLECTS CHANGES TO THE DESIGN
SINCE THE PREVIOUS SSD APPLICATION (SSD-48028209)

ISSUED FOR S4.55 APPROVAL

SURVEY
INFORMATION

SURVEYED BY: SDG

DATUM: AHD
ORIGIN OF LEVELS:
SSM 85414
RL 163393

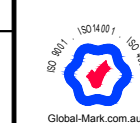
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01	ISSUED FOR S4.55	DC	NH	17.11.2023					

Client
OPAL HEALTHCARE

Architect
GROUP GSA

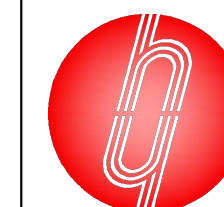
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DRAWING TO BE PRINTED IN COLOUR



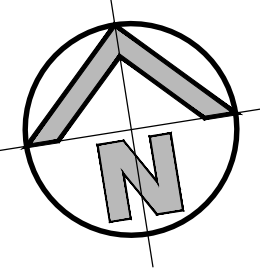
henry&hymas

Project
PROPOSED HEALTHCARE DEVELOPMENT
285-289, 293-295 MONA VALE RD & 1 FLINDERS AVE, ST IVES, NSW

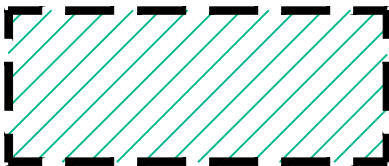
Title
POST-DEV STORMWATER CATCHMENT PLAN

Drawn M.Pereira	Designed N.Heazlewood	Date FEB 2024
Checked N.Heazlewood	Approved A.Francis	Scale @A1 1:250

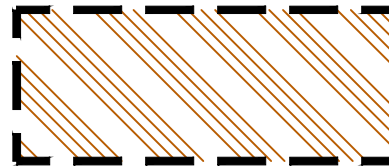
Drawing number 22K93_D4_C250	Revision 01
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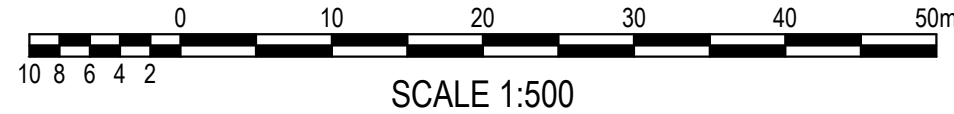
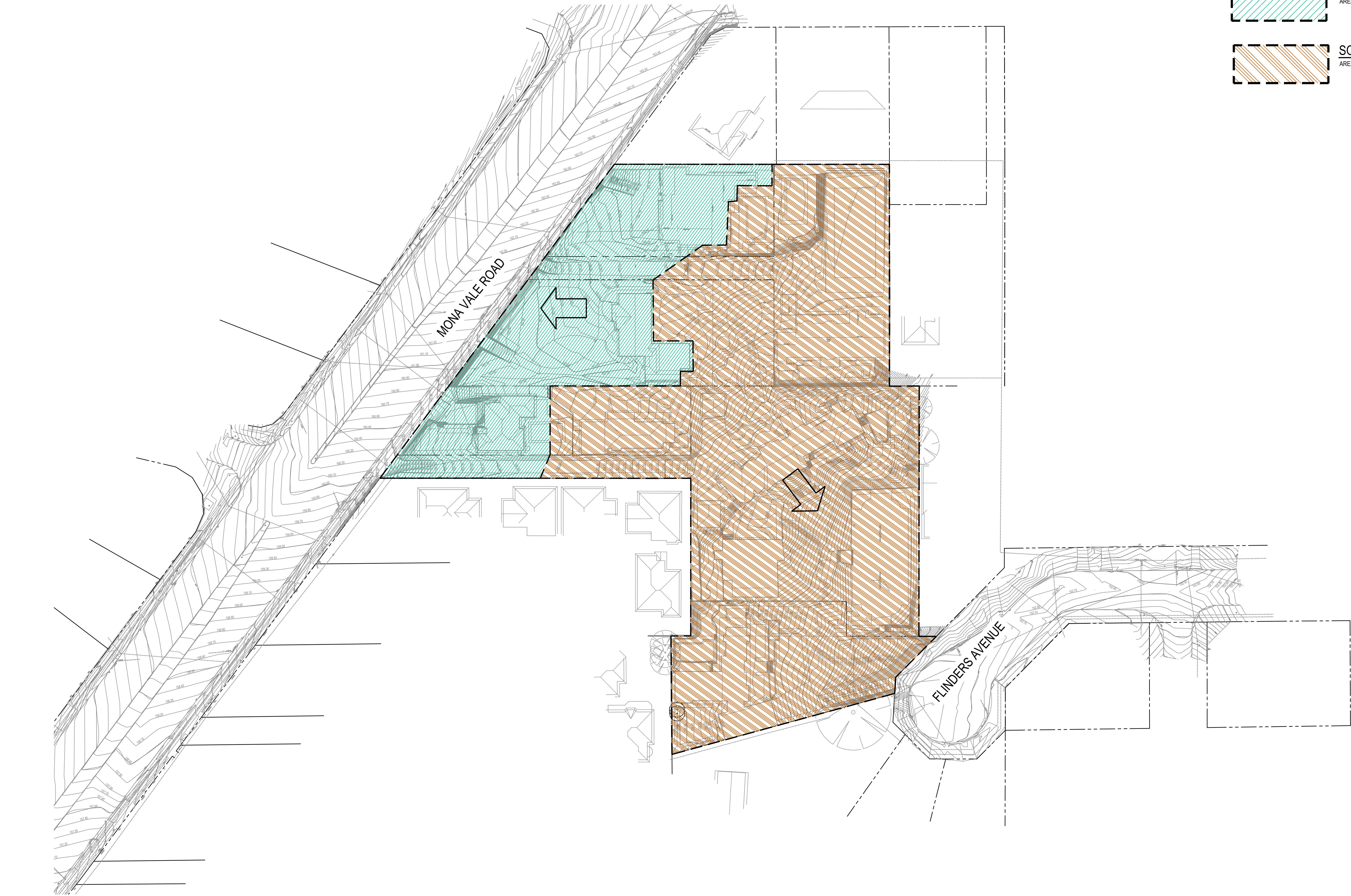
TOTAL SITE AREA: 12,744m²



WESTERN CATCHMENT
AREA: 3420m²



SOUTH-EAST CATCHMENT
AREA: 9324m²



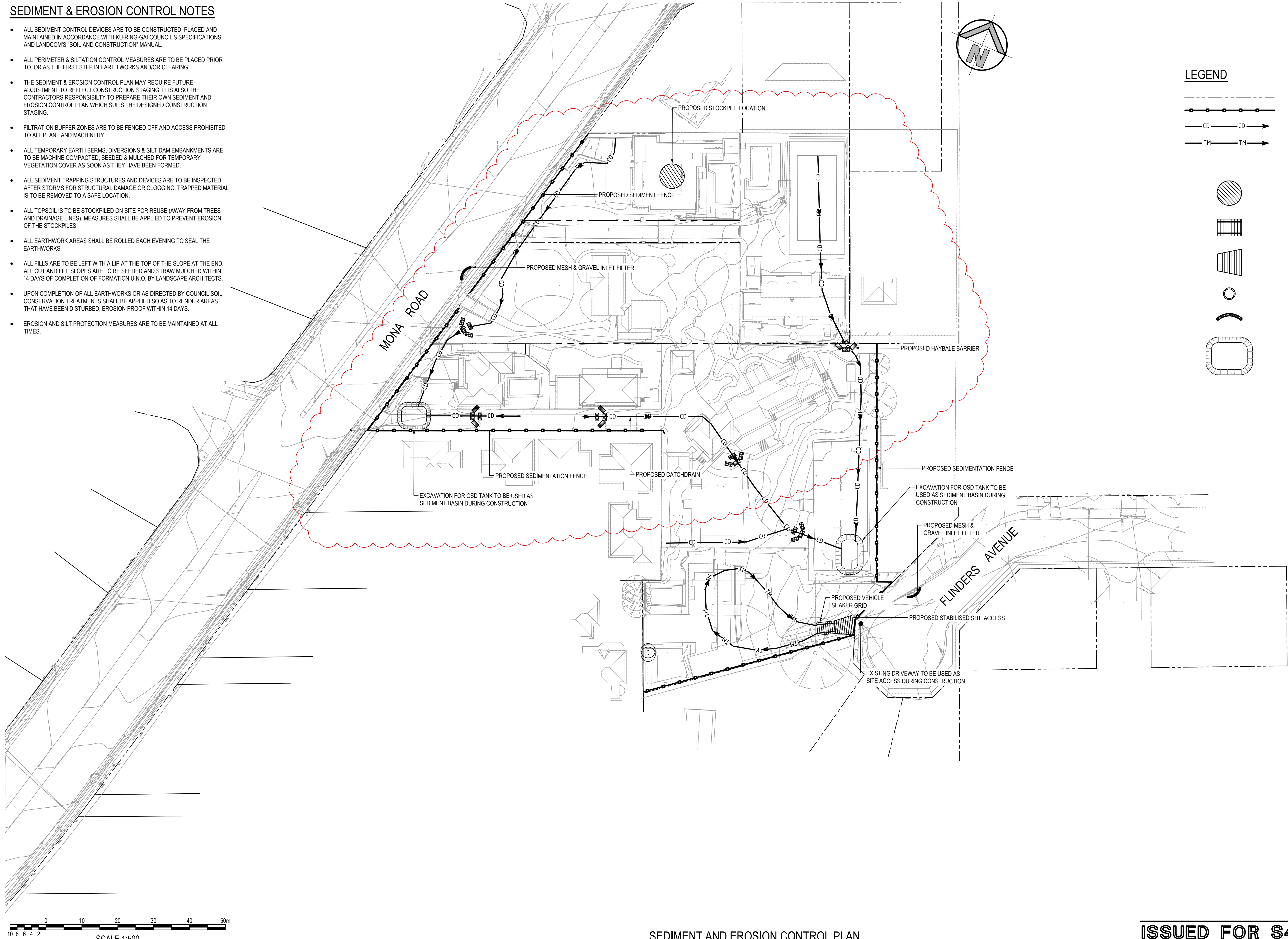
PRE-DEVELOPED STORMWATER CATCHMENT PLAN
SCALE: 1:500

ISSUED FOR S4.55 APPROVAL

SURVEY INFORMATION SURVEYED BY: SDG DATUM: AHD ORIGIN OF LEVELS: SSM 85414 RL 163393											Client OPAL HEALTHCARE Architect GROUP GSA This drawing and design remains the property of Henry & Hymas and may not be copied in whole or in part without the prior written approval of Henry & Hymas.	Suite 2.01 828 Pacific Highway Gordon NSW 2072  Telephone +61 2 9417 8400 Facsimile +61 2 9417 8337 Email email@hhconsult.com.au Web www.henryandhymas.com.au	 henry&hymas	Project PROPOSED HEALTHCARE DEVELOPMENT 285-289, 293-295 MONA VALE RD & 1 FLINDERS AVE, ST IVES, NSW Title PRE-DEV STORMWATER CATCHMENT PLAN	Drawn M.Pereira	Designed N.Heazlewood	Date FEB 2024																					
														Checked N.Heazlewood	Approved A.Francis	Scale @A1 1:250																						
														Drawing number 22K93_D4_C251		Revision 01																						
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01	ISSUED FOR \$4.55			DC	NH	17.11.2025																																
REVISION		AMENDMENT	DRAWN	DESIGNED	DATE	REVISION		AMENDMENT	DRAWN	DESIGNED	DATE																											

SEDIMENT & EROSION CONTROL NOTES

- ALL SEDIMENT CONTROL DEVICES ARE TO BE CONSTRUCTED, PLACED AND MAINTAINED IN ACCORDANCE WITH KU-RING-GAI COUNCIL'S SPECIFICATIONS AND LANDCOM'S "SOIL AND CONSTRUCTION" MANUAL.
- ALL PERIMETER & SILTATION CONTROL MEASURES ARE TO BE PLACED PRIOR TO, OR AS THE FIRST STEP IN EARTH WORKS AND/OR CLEARING.
- THE SEDIMENT & EROSION CONTROL PLAN MAY REQUIRE FUTURE ADJUSTMENT TO REFLECT CONSTRUCTION STAGING. IT IS ALSO THE CONTRACTORS RESPONSIBILITY TO PREPARE THEIR OWN SEDIMENT AND EROSION CONTROL PLAN WHICH SUITS THE DESIGNED CONSTRUCTION STAGING.
- FILTRATION BUFFER ZONES ARE TO BE FENCED OFF AND ACCESS PROHIBITED TO ALL PLANT AND MACHINERY.
- ALL TEMPORARY EARTH BERMS, DIVERSIONS & SILT DAM EMBANKMENTS ARE TO BE MACHINE COMPACTED, SEEDED & MULCHED FOR TEMPORARY VEGETATION COVER AS SOON AS THEY HAVE BEEN FORMED.
- ALL SEDIMENT TRAPPING STRUCTURES AND DEVICES ARE TO BE INSPECTED AFTER STORMS FOR STRUCTURAL DAMAGE OR CLOGGING. TRAPPED MATERIAL IS TO BE REMOVED TO A SAFE LOCATION.
- ALL TOPSOIL IS TO BE STOCKPILED ON SITE FOR REUSE (AWAY FROM TREES AND DRAINAGE LINES). MEASURES SHALL BE APPLIED TO PREVENT EROSION OF THE STOCKPILES.
- ALL EARTHWORK AREAS SHALL BE ROLLED EACH EVENING TO SEAL THE EARTHWORKS.
- ALL FILLS ARE TO BE LEFT WITH A LIP AT THE TOP OF THE SLOPE AT THE END. ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND STRAW MULCHED WITHIN 14 DAYS OF COMPLETION OF FORMATION U.N.O. BY LANDSCAPE ARCHITECTS.
- UPON COMPLETION OF ALL EARTHWORKS OR AS DIRECTED BY COUNCIL SOIL CONSERVATION TREATMENTS SHALL BE APPLIED SO AS TO RENDER AREAS THAT HAVE BEEN DISTURBED, EROSION PROOF WITHIN 14 DAYS.
- EROSION AND SILT PROTECTION MEASURES ARE TO BE MAINTAINED AT ALL TIMES.



LEGEND

SITE BOUNDARY

PROPOSED SEDIMENTATION FENCE

PROPOSED CATCH DIVERSION DRAIN

PROPOSED TRAFFIC MANOEUVRING

PROPOSED STOCKPILE LOCATION

PROPOSED VEHICLE SHAKER GRID

PROPOSED STABILISED SITE ACCESS

PROPOSED GEO-TEXTILE INLET FILTER

PROPOSED MESH AND GRAVEL INLET FILTER

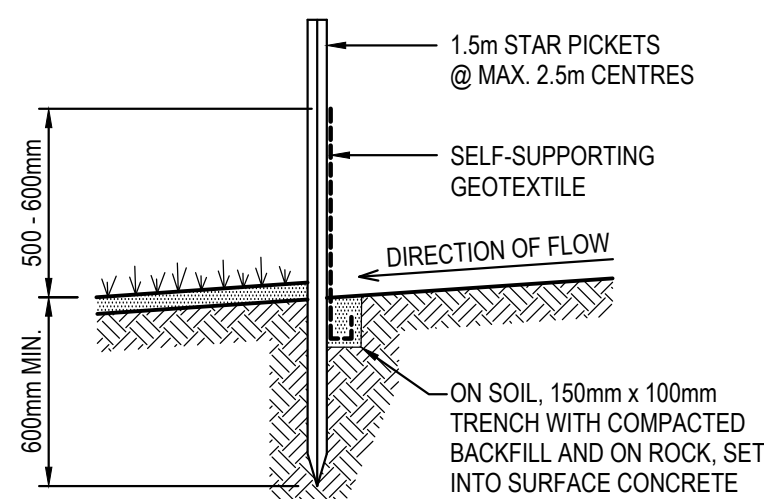
PROPOSED TEMPORARY SEDIMENT BASIN

NOTE:
CLOUDING IN RED REFLECTS CHANGES TO THE DESIGN
SINCE THE PREVIOUS SSD APPLICATION (SSD-48028209)

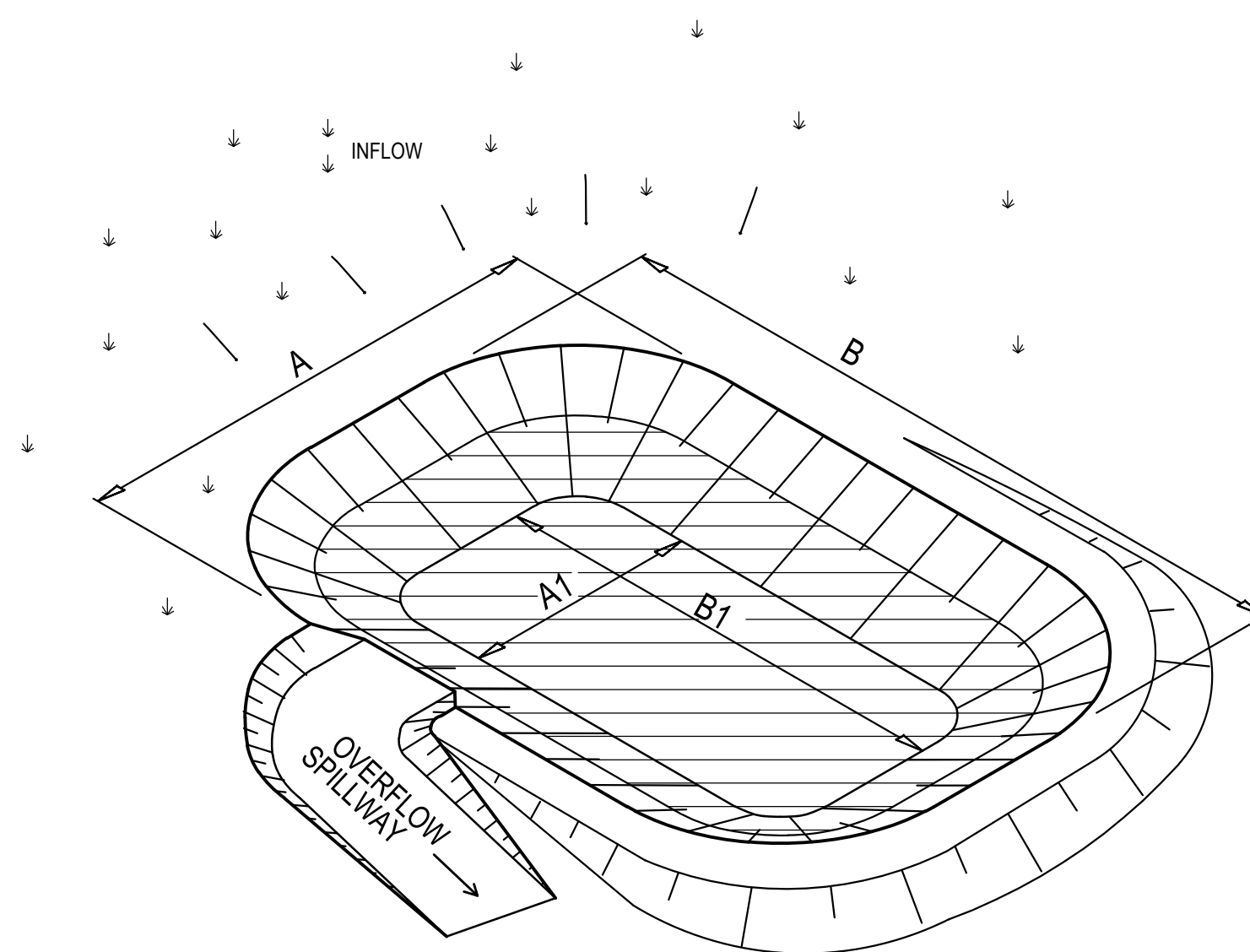
SEDIMENT AND EROSION CONTROL PLAN
SCALE: 1:500

ISSUED FOR S4.55 APPROVAL

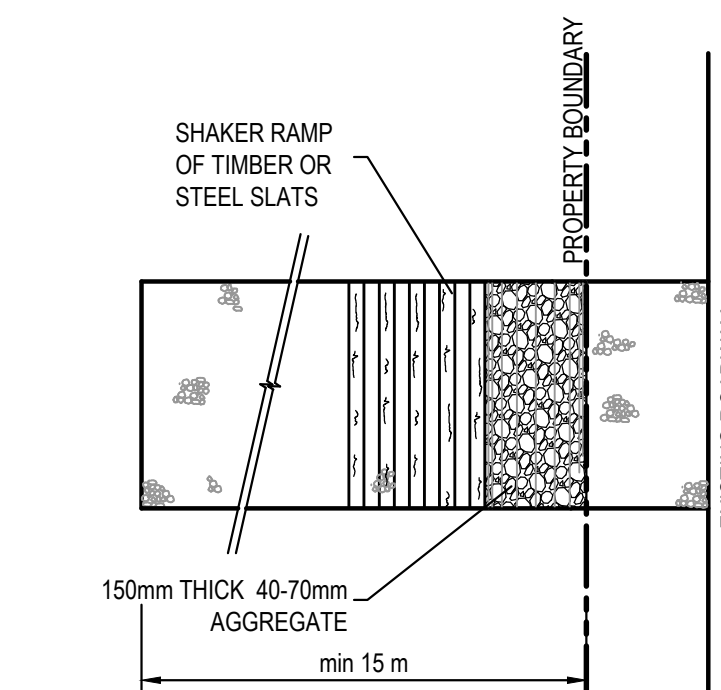
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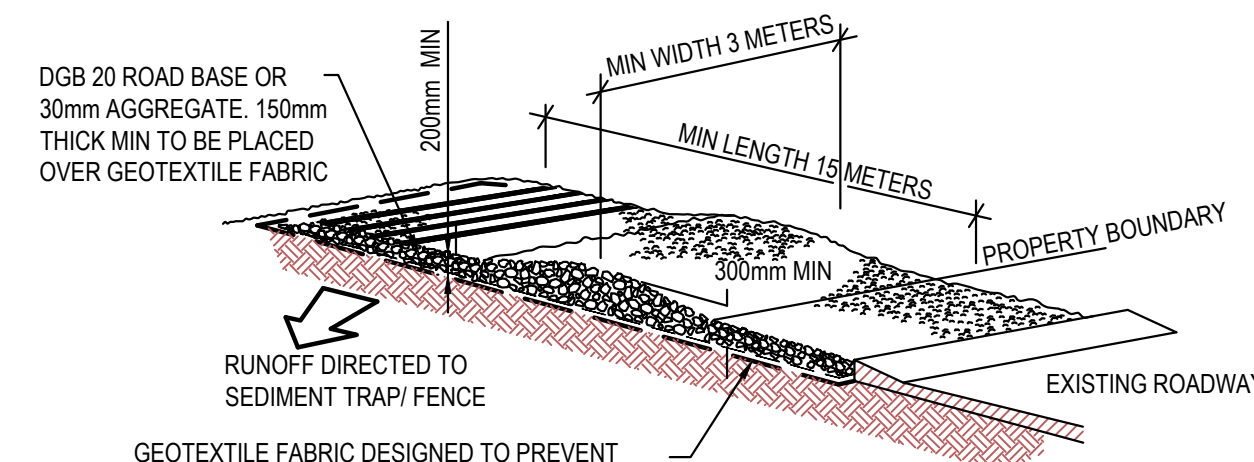
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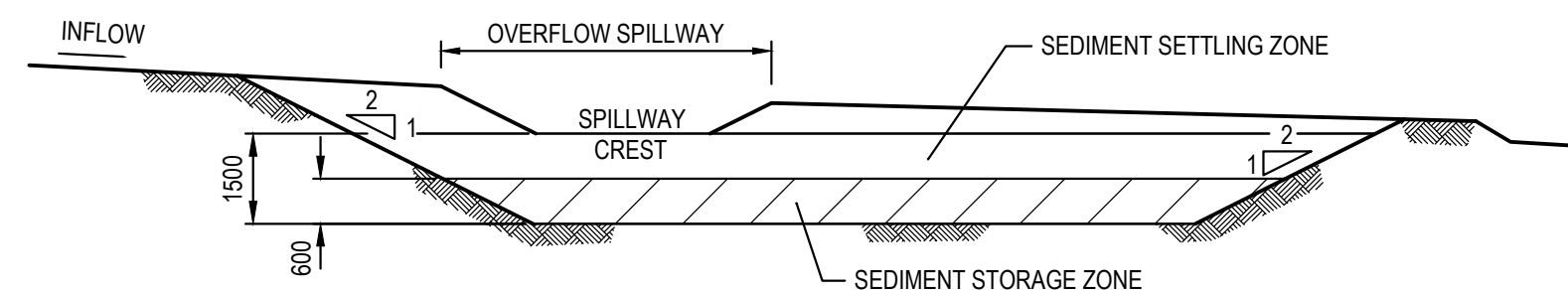
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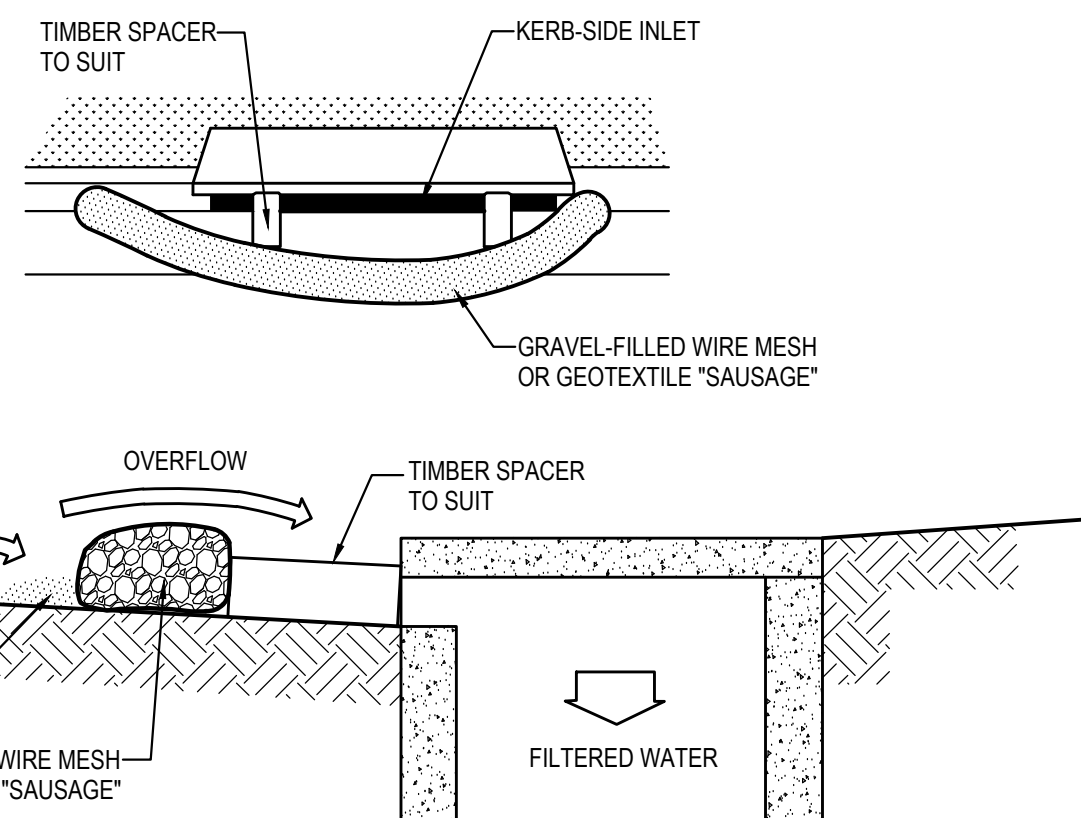
- ## SEDIMENT FENCE CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5m LONG STAR PICKETS INTO GROUND @ 2.5m INTERVALS (MAX.) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.



TYPICAL SECTION

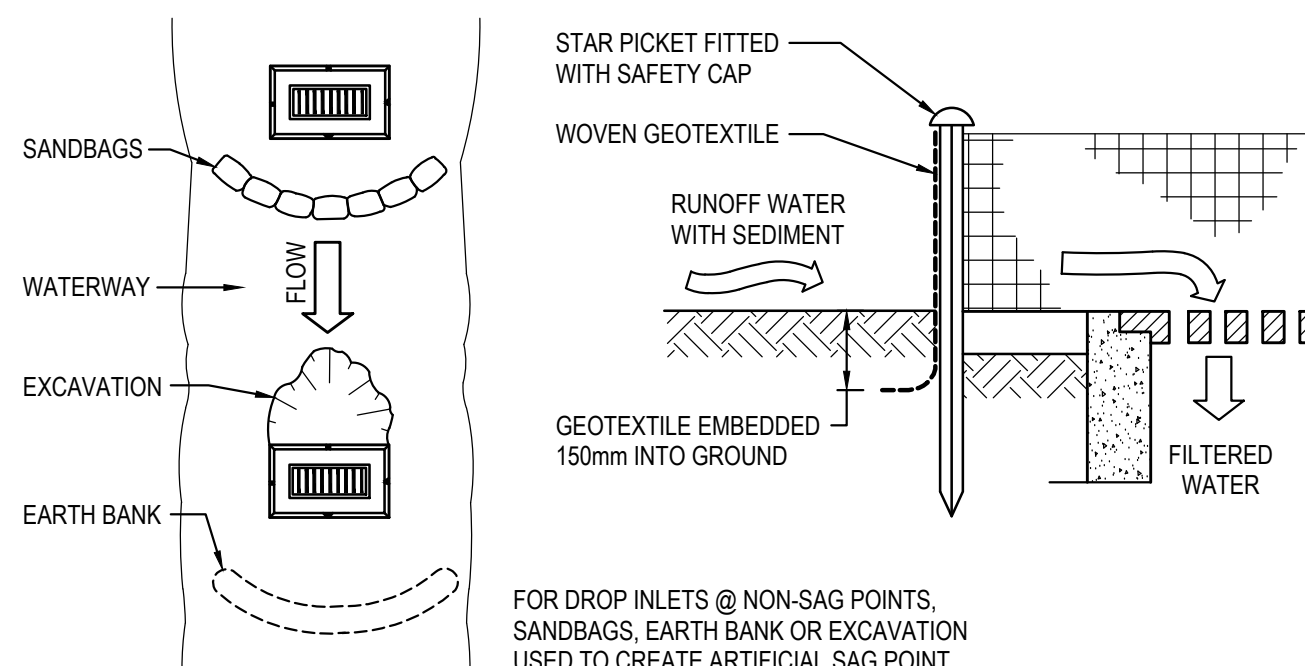
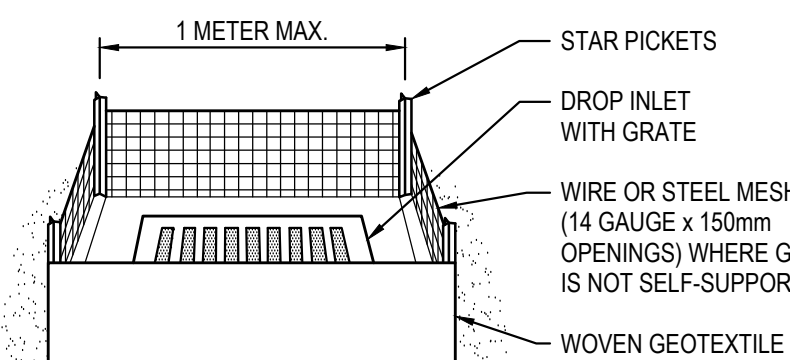
N.T.S.



MESH & GRAVEL INLET FILTER CONSTRUCTION NOTES:

1. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
2. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
3. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
4. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
5. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SUCH THAT THEY CAN FRMELY ABUT EACH OTHER AND SEDIMENT / LADEN WATERS CANNOT PASS BETWEEN.

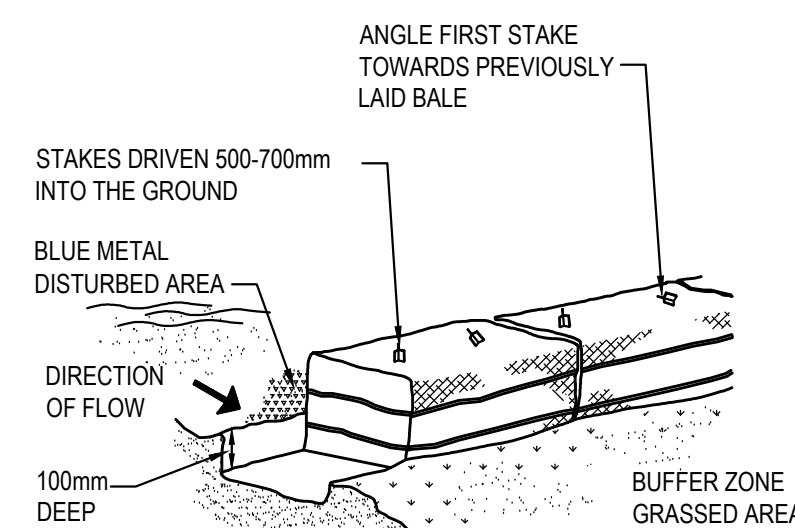
SCALE N.T.S.



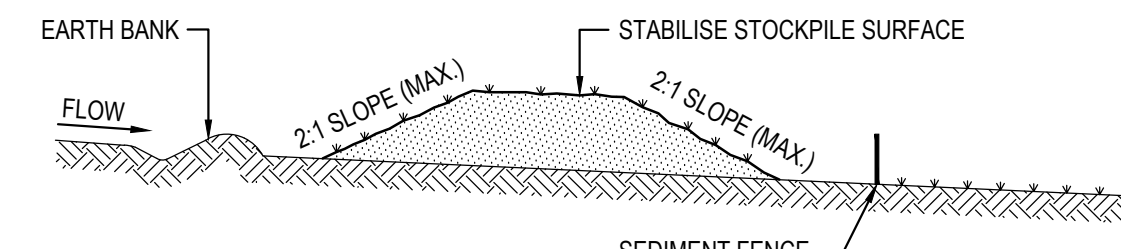
GEOTEXTILE INLET FILTER CONSTRUCTION NOTES

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE.
2. PICKET SPACING TO BE MAXIMUM 1.0m.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILES UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

SCALE N.T.S.



N.T.S



STOCKPILE CONSTRUCTION NOTES:

1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT THE CONTOUR AS LOW, FLAT, UNLOCATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
4. WHERE THEY ARE TO BE PLACED FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED E.S.C.P. OR S.W.M.P. TO REDUCE THE C-FACTOR TO LESS THAN 10.
5. CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES DOWNSLOPE.

SCALE N.T.S.

ISSUED FOR S4.55 APPROVAL

[illegible]

APPENDIX B – OSD CALCULATION SPREADSHEETS

24R.4 ON-SITE DETENTION CALCULATION SHEET

Address

Catchment Detail

1.	Catchment Name	middle harbour		
2.	Catchment Discharge Rate	0.0166	l/sec/m ²	A
3.	Catchment Storage Rate	0.0241	m ³ /m ²	B

Site Details

4.	Site Area	9324	m ²	^	60% of site area	5594	m ²	C
5.	Area(s) not draining to the detention system	0	m ²					
6.	Total impervious area (roofs, driveways, paving, etc.)	6000	m ²					D
7.	Impervious area bypassing detention system	0	m ²					E

Permitted Site Discharge

8.	C	[5594 m ²]	x	A	[0.0166 l/sec/m ²]	=	93	l/sec	Flow 1
9.	Adjustment for any uncontrolled impervious flow	E / D	=	0	(<0.25)				F
10.	Flow 1	[..... l/sec]	x	F	[.....]	=	0	l/sec	Flow 2
11.	Flow 1	[.....]	-	Flow 2	[.....]	=	93	l/sec	PSD

Site Storage Requirement

12.	C	[5594 m ²]	x	B	[0.0241 m ³ /m ²]	=	135	m ³	SSR1
13.	If the storage is in a landscaped basin, SSR1 x 1.2	=	n/a	m ³					SSR2

Outlet Control

14.	Height difference between top water surface level and the centre of the orifice	1.7	m					G
15.	Orifice Diameter	$21.8 \times \sqrt{\frac{PSD}{G}}$	184	mm				OD

PSD = Permitted Site Discharge

SSR1 = Site Storage Requirement (except for landscaped basins)

SSR2 = Site Storage Requirement (landscaped basins) (Note: Use only SSR1 or SSR2)

OD = Orifice Diameter

Signature  Name Nick Heazlewood

Qualifications B.E Civil Date 25.03.2024

24R.4 ON-SITE DETENTION CALCULATION SHEET

Address

Catchment Detail

1.	Catchment Name	middle harbour		
2.	Catchment Discharge Rate	0.0166	l/sec/m ²	A
3.	Catchment Storage Rate	0.0241	m ³ /m ²	B

Site Details

4.	Site Area	3420	m ²	60% of site area	2052	m ²	C
5.	Area(s) not draining to the detention system	0	m ²				
6.	Total impervious area (roofs, driveways, paving, etc.)	2736	m ²				D
7.	Impervious area bypassing detention system	0	m ²				E

Permitted Site Discharge

8.	C	[.2052.....m ²] x A	[.0.0166..... l/sec/m ²]	=	.34	l/sec	Flow 1
9.	Adjustment for any uncontrolled impervious flow	E / D	=	0	(<0.25)		F
10.	Flow 1	[..... l/sec] x F	[.....]	=	0	l/sec	Flow 2
11.	Flow 1	[.....] – Flow 2	[.....]	=	34	l/sec	PSD

Site Storage Requirement

12.	C	[.2052.....m ²] x B	[.0.0241.....m ³ /m ²]	=	.50	m ³	SSR1
13.	If the storage is in a landscaped basin, SSR1 x 1.2	=	n/a	m ³			SSR2

Outlet Control

14.	Height difference between top water surface level and the centre of the orifice	1.2	m		G
15.	Orifice Diameter	21.8 x $\sqrt{\frac{\text{PSD}}{\sqrt{G}}}$	121	mm	OD

PSD = Permitted Site Discharge

SSR1 = Site Storage Requirement (except for landscaped basins)

SSR2 = Site Storage Requirement (landscaped basins) (Note: Use only SSR1 or SSR2)

OD = Orifice Diameter

Signature.....  Name..... Nick Heazlewood

Qualifications..... B.E Civil, NER Date..... 17.11.2025

REFERENCES