

Civil Stormwater Report

German International School Sydney - New Science Centre and Reception

Prepared for German International School Sydney / 24 November 2021

211476

Contents

1.0	Introduction	3
1.1	The Site.....	3
1.2	Existing Stormwater	3
1.3	Existing Services	4
1.4	Geotechnical conditions.....	4
2.0	Proposed Development	4
3.0	General Design Principles	5
4.0	Stormwater Design.....	5
4.1	Stormwater Quantity	5
4.2	Stormwater Quality	5
4.2.1	MUSIC Modelling	6
4.2.2	Event Mean Concentration	6
4.2.3	MUSIC Model Treatment Train and Catchment Breakdown	6
4.2.4	Treatment Train Effectiveness	7
4.3	Erosion and Sediment Control	8
	Appendix A	9

1.0 Introduction

Taylor Thomson Whitting (TTW) has been appointed by German International School Sydney to complete the stormwater design concept and report for support the Development Application (DA) for the proposed New Science Centre and Reception.

1.1 The Site

The German International School Sydney (GISS) is located at 33 Myoora Road, Terrey Hills NSW 2084 and is within the Northern Beaches Council LGA. The site consists of several single and two-storey buildings, soft landscaping and hard paved areas including a bitumen carpark. It is located within Lot 1 of Deposited Plan 1145029.



Figure 1.1 Site location

1.2 Existing Stormwater

An existing in-ground stormwater system is conveying stormwater runoff within site which appears to be discharging at multiple connections to Council's existing in-ground stormwater system along Myoora Road.

An existing concrete open channel, which passes through the proposed location of the New Science Centre, conveys stormwater from the northwestern portion of the site prior to a discharge point at Myoora Road through a series of pipes and channels.

Limited information regarding the existing stormwater system are available to-date.

1.3 Existing Services

The site contains existing services including water, sewer, electricity, communications, gas and stormwater. Limited services search has been conducted within surveys to date.

Services may be required to be relocated and diverted around the site or removed as part of the works. It is possible that additional unknown services may be encountered during demolition or construction. It is recommended that services be physically located prior to design development to identify any clash points with proposed in-ground infrastructure.

1.4 Geotechnical conditions

At this stage no geotechnical investigations have been undertaken. It is recommended that sufficient geotechnical investigations are undertaken to determine the underlying ground conditions including any potential contamination of soil.

2.0 Proposed Development

The proposed development consists of a two-storey New Science Centre with landscaped areas, and extension of the existing Administration Building as Reception. The development will introduce additional impervious surfaces within the site. The proposed development area is approximately 650m². A plan view of the development is shown in Figure 2.1.



Figure 2.1 Proposed development plan

The proposed development will require diversion of an existing concrete channel which conveys stormwater from the northwestern portion of the site to Myoora Road through a series of pipes and channels.

The proposed diversion will be connected downstream of the Council's existing in-ground stormwater line along Myoora Road via proposed surface inlet pit. The proposed diversion network has been sized to cater for

all storm events up to and including the 100 year Annual Recurrence Interval (ARI) storm event with additional capacity. Further, the proposed downstream connection will alleviate the existing flooding/surcharge risk at the existing point of connection. A layout of the proposed stormwater diversion line is shown in **Drawing C10 of Appendix A**.

3.0 General Design Principles

The civil engineering components of the project are to be designed and constructed to comply with:

- The relevant current Australian Standards, Building Code of Australia and Design Codes
- The requirements of all relevant Statutory Authorities and Local Regulations including Tweed Shire Council requirements and any future consent conditions

A preliminary design concept has been prepared for costing purposes and is attached in **Appendix A**. This will be subject to change following further site investigations and design development.

4.0 Stormwater Design

4.1 Stormwater Quantity

Stormwater design within the site is required to comply with the Northern Beaches Council Water Management for Development Policy (Policy). The minor (piped) drainage system must provide for the 1 in 20 year Average Recurrence Interval (ARI) storm event and major (overland flow) drainage system shall provide for the 1 in 100 year ARI storm event.

The development is located within Region 2 for Central Catchments as defined in the Policy. Due to the proportion of impervious areas within the site for the existing and proposed scenarios, the Policy stipulates the requirement for provision of an on-site detention (OSD) tank.

The proposed OSD tank has been sized in accordance with the Policy per the table of values provided in the Simplified Method. Reference to the Policy has been in consideration of a total development area of approximately 650m² with 100% impervious area. The obtained detention requirements are summarised below:

- Minimum size of basin (SSR): 21.1m³
- Permitted site discharge (PSD) from basin: 20 L/s

The stormwater detention components of the design include the following:

Table 4.1 On-site detention (OSD) system summary

OSD system	Volume (m ³)	Peak flow discharge (L/s)
OSD tank	21	18
Discharge control pit	1.6	2
TOTAL	22.6	20

Refer to **Drawings C10 in Appendix A** for information on the OSD system.

4.2 Stormwater Quality

Stormwater quality treatment within the site is required to comply with the Northern Beaches Council Water Management for Development Policy. Water quality treatment devices must achieve the water quality targets as specified in Table 4.2. The treatment train is required to be modelled in the Model for Urban Stormwater

Improvement Conceptualisation (MUSIC) to ensure targets are met.

Table 4.2 Water Quality Targets

Pollutant	Minimum Reductions Required
Total Suspended Solids (TSS)	85%
Total Phosphorus (TP)	65%
Total Nitrogen (TN)	45%
Gross Pollutants (GP)	90%

4.2.1 MUSIC Modelling

The effectiveness of the combination of treatment train measures has been assessed using numerical modelling within MUSIC (Model for Urban Stormwater Improvement Conceptualisation version 6). The results of the modelling were compared against the Council’s pollutant reduction targets to determine the effectiveness of the proposed measures.

MUSIC simulates the performance of a group of stormwater management measures, configured in series or in parallel to form a “treatment train” against historic rainfall event data sets. It is the industry standard water quality modelling software developed by the MUSIC Development Team of the Cooperative Research Centre for Catchment Hydrology (CRCCH).

The MUSIC User Manual suggests that the time-step should not exceed the time of concentration of the smallest sub-catchment however due consideration must also be made regarding the shortest detention time of nodes within the treatment train.

4.2.2 Event Mean Concentration

MUSIC uses different event mean concentrations (EMC) to determine the pollutant loads generated by different land uses. The standard EMCs adopted within MUSIC were based on research undertaken by Duncan (1999) through the CRCCH and the results are reproduced in Australian Runoff Quality – A Guide to Water Sensitive Urban Design (ARQ). The EMC values used in the MUSIC models for this project were based on the Northern Beaches Council WSUD and MUSIC Modelling Guidelines utilising modified % impervious area, rainfall threshold, soil properties & pollutant concentrations. Table 4.3 below summarises the parameters used for the development site:

Table 4.3 EMC inputs for MUSIC

NODE TYPE		MEAN BASE FLOW CONCENTRATIONS Log ₁₀ (mg/L)			MEAN STORM FLOW CONCENTRATIONS Log ₁₀ (mg/L)		
		TSS	TP	TN	TSS	TP	TN
Roof	Mean	N/A	N/A	N/A	1.300	-0.89	0.30
	Std dev	N/A	N/A	N/A	0.32	0.25	0.19
Urban residential	Mean	1.200	-0.85	0.11	2.150	-0.60	0.30
	Std dev	0.17	0.19	0.12	0.32	0.25	0.19

4.2.3 MUSIC Model Treatment Train and Catchment Breakdown

Stormwater quality measures have been modelled using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC). The treatment train proposed for the site consists of Ocean Protect’s OceanGuards (or equivalent) for use in multiple grated surface inlet pits to target total gross pollutants leaving

site. Additional treatment is to be provided through the use of Rainwater tank capturing the roof of the New Science Centre for irrigation rainwater re-use, and Ocean Protect’s 310 PSorb StormFilter cartridges. Refer to Figure 4.1 and **Appendix A** for the location of these proposed quality control measures.

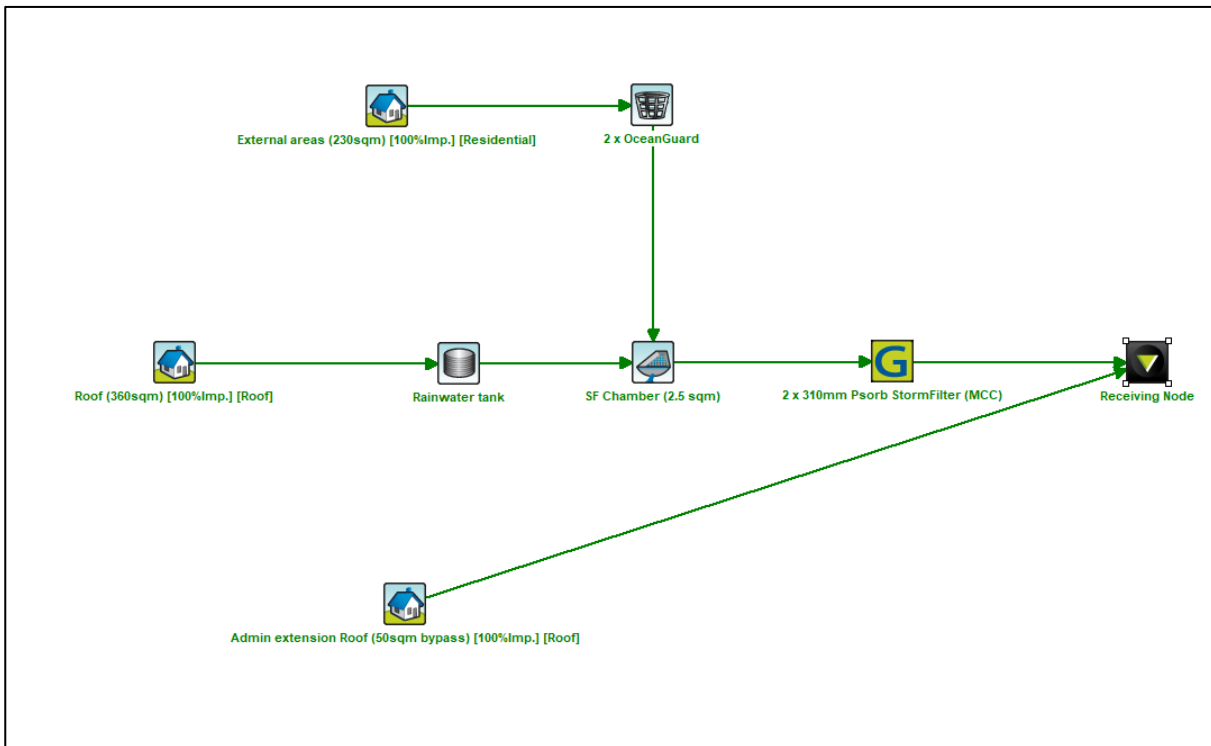


Figure 4.1 MUSIC Model layout

The water quality catchment breakdown is shown in Table 4.4.

Table 4.4 MUSIC Catchment breakdown

CATCHMENT	AREA (m ²)	% IMPERVIOUS	TREATMENT
Building 1 [Roof]	360	100	5kL RWT, SF Chamber, 2 x 310 PSORB Storm Filters
External areas [Paved]	230	100	Ocean Guard, SF Chamber, 2 x 310 PSORB Storm Filters
Admin Extension [Roof]	50	100	n/a

4.2.4 Treatment Train Effectiveness

The results of the MUSIC modelling are tabulated below:

Table 4.5 MUSIC modelling results

Pollutant	Minimum Reductions Required	Annual Residual Load (% Reduction)
-----------	-----------------------------	------------------------------------

Total Suspended Solids (TSS)	85%	87.5%
Total Phosphorus (TP)	65%	67.4%
Total Nitrogen (TN)	45%	47.9%
Gross Pollutants (GP)	90%	92.2%

4.3 Erosion and Sediment Control

During construction while the site is disturbed, erosion prevention and sediment control measures will be required. Erosion and sediment control measures will be required to comply with

- Northern Beaches Council Water Management for Development Policy
- Landcom's Managing Urban Stormwater: Soils and Construction

The silt fence will prevent silt and waste being washed onto the neighbouring site and streets. The silt fence can be integrated with safety fencing. A sedimentation trap will be installed in the low point of site excavation. A temporary construction entry will be created off the existing car park and entry into the proposed site. Pits will have silt protection installed to prevent silt entering the stormwater system during construction. Refer to drawings **C03 and C04 in Appendix A** for Sediment and Erosion Control Plan and Details.

Should further information be required, please contact the undersigned.

Prepared by
TTW (NSW) PTY LTD



DAVID TOLENTINO
Civil Engineer

Authorised By
TTW (NSW) PTY LTD



NEMESIO BIASON JR.
Associate Director

P:\2021\2114\211476\Reports\TTW\Civil\DA\Civil Stormwater Report_DA_211476 GISS.docx

Appendix A

Stormwater Concept Plan

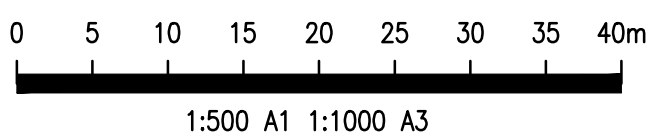
GERMAN INTERNATIONAL SCHOOL SYDNEY NEW SCIENCE CENTRE AND RECEPTION CIVIL WORKS



LOCALITY PLAN
SCALE 1:500

DRAWING SCHEDULE

DRAWING NUMBER	DRAWING NAME
C01	COVER SHEET, LOCALITY PLAN AND DRAWING SCHEDULE
C02	GENERAL NOTES AND LEGENDS
C03	OVERALL GENERAL ARRANGEMENT PLAN
C04	SEDIMENT AND EROSION CONTROL PLAN & DETAILS
C10	SITWORKS PLAN
C11	PAVEMENT PLAN
C12	SIGNAGE AND LINEMARKING PLAN
C13	TYPICAL SECTION
C15	LONGITUDINAL SECTION
C16	CROSS SECTIONS, SHEET 1
C16	CROSS SECTIONS, SHEET 2
C20	TYPICAL DETAILS, SHEET 1
C21	TYPICAL DETAILS, SHEET 2
C22	TYPICAL DETAILS, SHEET 3
C23	TYPICAL DETAILS, SHEET 4



FILENAME: Z:\p04\211476\p04\ C01.dwg - USER: imoo - Plot File Created: Nov 24, 2021 - 10:20am

A1 0 1 2 3 4 5 6 7 8 9 10

REV	DESCRIPTION	CHK	DR	DATE	REV	DESCRIPTION	CHK	DR	DATE
P1	ISSUE FOR DA			24.11.21					

ARCHITECT:
design architect knut menden
dipl. ing. bettina steffens
www.bettiundknut.com.au

ENGINEER:
TTW Structural
Civil
Traffic
Façade
612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

PROJECT:
GERMAN INTERNATIONAL SCHOOL
SYDNEY - NEW SCIENCE CENTRE AND
RECEPTION
33 MYOORA ROAD,
TERRY HILLS NSW 2084

DRAWING NAME:
COVER SHEET, LOCALITY PLAN AND
DRAWING SCHEDULE

SCALE : A1	DRAWN BY	AUTHORISED BY
1:500	LA	NB
PROJECT No	DRAWING No	REVISION
211476	C01	P1
Plot File Created: Nov 24, 2021 - 10:20am		

GENERAL NOTES

- Contractor must verify all dimensions and existing levels on site prior to commencement of works. Any discrepancies to be reported to the Engineer.
- Strip all topsoil from the construction area. All stripped topsoil shall be disposed of off-site unless directed otherwise.
- Make smooth connection with all existing works.
- Compact subgrade under buildings and pavements to minimum 98% standard maximum dry density in accordance with AS 1289 5.1.1. Compaction under buildings to extend 2m minimum beyond building footprint.
- All work on public property, property which is to become public property, or any work which is to come under the control of the Statutory Authority, the Contractor is to ensure that the drawings used for construction have been approved by all relevant authorities prior to commencement site.
- All work on public property, property which is to become public property, or any work which is to come under the control of the Statutory Authority is to be carried out in accordance with the requirements of the relevant Authority. The Contractor shall obtain these requirements from the Authority. Where the requirements of the Authority are different to the drawings and specifications, the requirements of the Authority shall be applicable.
- For all temporary batters refer to geotechnical recommendations.

REFERENCE DRAWINGS

These drawings have been based from, and to be read in conjunction with the following Consultants drawings. Any conflict to the drawings must be notified immediately to the Engineer.

Consultant	Dwg Title	Dwg No	Rev	Date
DESIGN ARCHITECT KNUT MENDEN	GROUND FLOOR SCIENCE CENTRE	10	03	25/06/21

BEE & LETHBRIDGE	PLAN	16961	03	18/08/21
------------------	------	-------	----	----------

SURVEY AND SERVICES INFORMATION SURVEY

Origin of levels : RL 161,495
 Datum of levels : AUSTRALIAN HEIGHT DATUM (AHD)
 Coordinate system : UTM/IGN
 Survey prepared by : BEE & LETHBRIDGE
 Setout Points : PM 9461

Taylor Thomson Whitting does not guarantee that the survey information shown on these drawings is accurate and will accept no liability for any inaccuracies in the survey information provided to us from any cause whatsoever.

UNDERGROUND SERVICES - WARNING

The locations of underground services shown on Taylor Thomson Whittings drawings have been plotted from diagrams provided by service authorities. This information has been prepared solely for the authorities own use and may not necessarily be updated or accurate. The position of services as recorded by the authority at the time of installation may not reflect changes in the physical environment subsequent to installation. Taylor Thomson Whitting does not guarantee that the services information shown on these drawings shows more than the presence or absence of services, and will accept no liability for inaccuracies in the services information shown from any cause whatsoever.

The Contractor must confirm the exact location and extent of services prior to construction and notify any conflict with the drawings immediately to the Engineer/Superintendent.

The contractor is to get approval from the relevant state survey department, to remove/adjust any survey mark. This includes but is not limited to; State Survey Marks (SSM), Permanent Marks (PM), cadastral reference marks or any other survey mark which is to be removed or adjusted in any way.

Taylor Thomson Whitting plans do not indicate the presence of any survey mark. The contractor is to undertake their own search.

BOUNDARY AND EASEMENT NOTE

The property boundary and easement locations shown on Taylor Thomson Whitting drawing's have been based from information received from:

BEE & LETHBRIDGE DATED 25/06/21
SUIT 2, 14 STARKEY ST, FORESTVILLE NSW 2087
PH: 02 9451 6757

Taylor Thomson Whitting makes no guarantees that the boundary or easement information shown is correct. Taylor Thomson Whitting will accept no liabilities for boundary inaccuracies. The contractor/builder is advised to check/confirm all boundaries in relation to all proposed work prior to the commencement of construction. Boundary inaccuracies found are to be reported to the superintendent prior to construction starting.

SAFETY IN DESIGN

Contractor to refer to Appendix B of the Civil Specification for the Civil Risk and Solutions Register.

EXISTING SERVICES

Contractor to be aware existing services are located within the site. Location of all services to be verified by the Contractor prior to commencing works. Contractor to confirm with relevant authority regarding measures to be taken to ensure services are protected or procedures are in place to demolish and/or relocate.

EXISTING STRUCTURES

Contractor to be aware existing structures may exist within the site. To prevent damage to existing structure(s) and/or personnel, site works to be carried out as far as practicably possible from existing structure(s).

EXISTING TREES

Contractor to be aware existing trees exist within the site which need to be protected. To prevent damage to trees and/or personnel, site works to be carried out as far as practicably possible from existing trees. Advice needs to be sought from Arborist and/or Landscape Architect on measures required to protect trees.

GROUNDWATER

Contractor to be aware ground water levels are close to existing surface level. Temporary de-watering may be required during construction works.

EXCAVATIONS

Deep excavations due to stormwater drainage works is required. Contractor to ensure safe working procedures are in place for works. All excavations to be fenced off and batters adequately supported to approval of Geotechnical Engineer.

GROUND CONDITIONS

Contractor to be aware of the site geotechnical conditions, refer to geotechnical report by (insert report details) for details.

HAZARDOUS MATERIALS

Existing asbestos products & contaminated material may be present on site. Contractor to ensure all hazardous materials are identified prior to commencing works. Safe working practices as per relevant authority to be adopted and appropriate PPE to be used when handling all hazardous materials. Refer to geotechnical/environmental report by (insert report details) for details.

CONFINED SPACES

Contractor to be aware of potential hazards due to working in confined spaces such as stormwater pits, trenches and/or tanks. Contractor to provide safe working methods and use appropriate PPE when entering confined spaces.

MANUAL HANDLING

Contractor to be aware manual handling may be required during construction. Contractor to take appropriate measures to ensure manual handling procedures and assessments are in place prior to commencing works.

WATER POLLUTION

Contractor to ensure appropriate measures are taken to prevent pollutants from construction works contaminating the surrounding environment.

SITE ACCESSES/EGRESS

Contractor to be aware site works occur in close proximity to footpaths and roadways. Contractor to erect appropriate barriers and signage to protect site personnel and public.

VEHICLE MOVEMENT

Contractor to supply and comply with traffic management plan and provide adequate site traffic control including a certified traffic marshal to supervise vehicle movements where necessary.

SITWORKS NOTES

- All basecourse material to comply with RMS specification No 3051 and compacted to minimum 98% modified standard dry density in accordance with AS 1289 5.2.1.
- All trench backfill material shall be compacted to the same density as the adjacent material.
- All service trenches under vehicular pavements shall be backfilled with an approved select material and compacted to a minimum 98% standard maximum dry density in accordance with AS 1289 5.1.1.

STORMWATER DRAINAGE NOTES

- Stormwater Design Criteria :
 - (A) Average exceedance probability –
 - 1% AEP for roof drainage to first external pit
 - 5% AEP for paved and landscaped areas
 - (B) Rainfall intensities –
 - Time of concentration: 5 minutes
 - 1% AEP = 283 mm/hr
 - 5% AEP = 207 mm/hr
 - (C) Rainfall losses –
 - Impervious areas: IL = 1.5 mm , CL = 0 mm/hr
 - Pervious areas: IL = 41 mm , CL = 1.8 mm/hr
- Pipes 300 dia and larger to be reinforced concrete Class *2* approved spigot and socket with rubber ring joints U.N.O.
- Pipes up to 300 dia may be sewer grade uPVC with solvent welded joints, subject to approval by the engineer
- Equivalent strength VCP or FRP pipes may be used subject to approval.
- Precast pits may be used external to the building subject to approval by Engineer
- Enlargers, connections and junctions to be manufactured fittings where pipes are less than 300 dia.
- Where subsoil drains pass under floor slabs and vehicular pavements, unslotted uPVC sewer grade pipe is to be used.
- Grates and covers shall conform with AS 3996-2006, and AS 1428.1 for access requirements.
- Pipes are to be installed in accordance with AS 3725. All bedding to be type H2 U.N.O.
- Care is to be taken with invert levels of stormwater lines. Grades shown are not to be reduced without approval.
- All stormwater pipes to be 150 dia at 1.0% min fall U.N.O.
- Subsoil drains to be slotted flexible uPVC U.N.O.
- Adopt invert levels for pipe installation (grades shown are only nominal).

CONCRETE FINISHING NOTES

- All exposed concrete pavements are to be broomed finished.
- All edges of the concrete pavement including keyed and dowelled joints are to be finished with an edging tool.
- Concrete pavements with grades greater than 10 % shall be heavily broomed finished.
- Carborandum to be added to all stair treads and ramped crossings U.N.O.

CONCRETE NOTES

EXPOSURE CLASSIFICATION : External : B2

CONCRETE

Place concrete of the following characteristic compressive strength f_c as defined in AS 1379.

Location	AS 1379 f _c MPa at 28 days	Specified Slump	Nominal Agg. Size
Kerbs	S20	80	20
Retaining wall footing	S40	80	20

- Use Type 'GP' cement, unless otherwise specified.
- All concrete shall be subject to project assessment and testing to AS 1379.
- Consolidate by mechanical vibration. Cure all concrete surfaces as directed in the Specification.
- For all falls in slab, drip grooves, reglets, chamfers etc. refer to Architects drawings and specifications.
- Unless shown on the drawings, the location of all construction joints shall be submitted to Engineer for review.
- No holes or chases shall be made in the slab without the approval of the Engineer.
- Conduits and pipes are to be fixed to the underside of the top reinforcement layer.
- Slurry used to lubricate concrete pump lines is not to be used in any structural members.
- All slabs cast on ground require sand blinding with a Concrete Underlay.

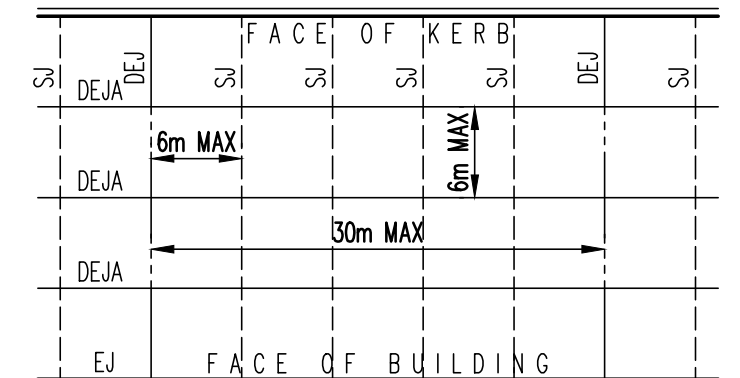
FORMWORK

The design, certification, construction and performance of the formwork, falsework and backpropping shall be the responsibility of the contractor. Proposed method of installation and removal of formwork is to be submitted to the superintendent for comment prior to work being carried out.

JOINTING NOTES

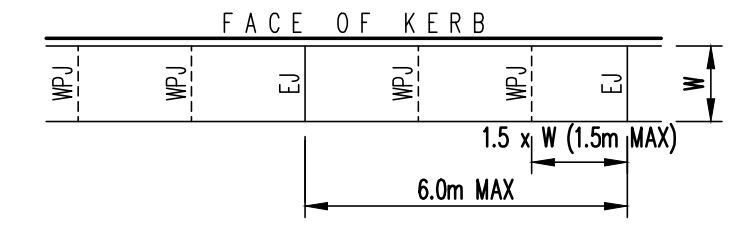
Vehicular Pavement Jointing

- All vehicular pavements to be jointed as shown on drawings.
- Keyed construction joints should generally be located at a maximum of 6m centres.
- Sawn joints should generally be located at a maximum of 6m centres or 1.5 x the spacing of keyed joints, where key joint spacing is less than 4m, with dowelled expansion joints at maximum of 30m centres.
- Provide 10mm wide full depth expansion joints between buildings and all concrete or unit pavers.
- The timing of the saw cut is to be confirmed by the contractor on site. Site conditions will determine how many hours after the concrete pour before the saw cuts are commenced. Refer to the specification for weather conditions and temperatures required. Vehicular pavement jointing as follows:



Pedestrian Footpath Jointing

- Expansion joints are to be located where possible at tangent points of curves and elsewhere at max 6.0m centres.
- Weakened plane joints are to be located at a max 1.5 x width of the pavement.
- Where possible joints should be located to match kerbing and/or adjacent pavement joints.
- All pedestrian footpath jointings as follows U.N.O.



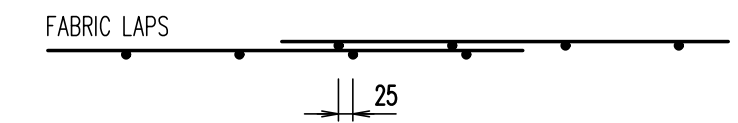
KERBING NOTES

Includes all kerbs, gutters, dish drains, crossings and edges.

- All kerbs, gutters, dish drains and crossings to be constructed on 75mm (MIN) granular basecourse compacted to minimum 98% modified maximum dry density in accordance with AS 1289 5.2.1.
- Expansion joints (EJ) to be formed from 10mm compressible cork filler board for the full depth of the section and cut to profile. Expansion joints to be located at drainage pits, on tangent points of curves and elsewhere at 12m centres except for integral kerbs where the expansion joints are to match the joint locations in slabs.
- Weakened plane joints to be min 3mm wide and located at 3m centres except for integral kerbs where weakened plane joints are to match the joint locations in slabs.
- Broomed finished to all ramped and vehicular crossings, all other kerbing or dish drains to be steel float finished.
- In the replacement of kerbs –
 - Existing road pavement is to be sawcut 900mm from lip of gutter.
 - Upon completion of new kerbs, new basecourse and surface is to be laid 900mm wide to match existing materials and thicknesses.
 - Existing allotment drainage pipes are to be built into the new kerb with a ø100mm hole. Existing kerbs are to be completely removed where new kerbs are shown.

REINFORCEMENT NOTES

- Fix reinforcement as shown on drawings. The type and grade is indicated by a symbol as shown below. On the drawings this is followed by a numeral which indicates the size in millimetres of the reinforcement.
 - N. Hot rolled ribbed bar grade D500N
 - R. Plain round bar grade R250N
 - SL. Square mesh grade 500L
 - RL. Rectangular mesh grade 500L
- Provide bar supports or spacers to give the following concrete cover to all reinforcement unless otherwise noted on drawings.
 - Footings – 50 top, 50 bottom, 50 sides.
 - Walls – 30 generally.
 - 30 when cast in forms but later exposed to weather or ground.
 - .. when cast directly in contact with ground.
- Cover to reinforcement ends to be 50mm U.N.O.
- Provide N12-450 support bars to top reinforcement as required, Lap 500 U.N.O.
- Maintain cover to all pipes, conduits, reglets, drip grooves etc.
- All cogs to be standard cogs unless noted otherwise.
- Fabric end and side laps are to be placed strictly in accordance with the manufacturers requirements to achieve a full tensile lap. Fabric shall be laid so that there is a maximum of 3 layers at any location.

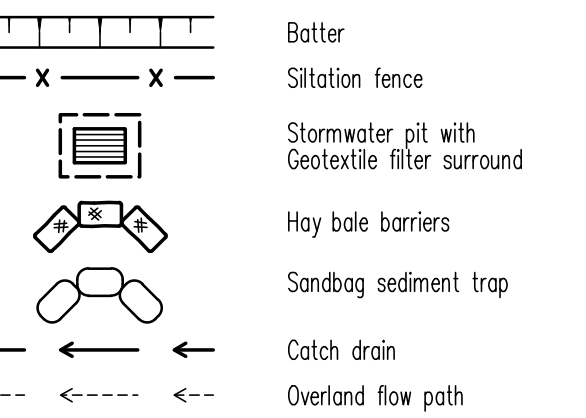


- Laps in reinforcement shall be made only where shown on the drawings unless otherwise approved. Lap lengths as per table below.

A1 0 1 2 3 4 5 6 7 8 9 10

ARCHITECT:			ENGINEER:			PROJECT:			DRAWING NAME:			SCALE : A1			DRAWN BY			AUTHORISED BY			
design architect knut menden			TTW Structural Civil Traffic Façade			GERMAN INTERNATIONAL SCHOOL SYDNEY - NEW SCIENCE CENTRE AND RECEPTION			GENERAL NOTES AND LEGENDS			N/A			LA			NB			
dipl. ing. bettina steffens			612 9439 7288 Level 6, 73 Miller Street, North Sydney, NSW 2060			33 MYOORA ROAD, TERRY HILLS NSW 2084						PROJECT No 211476			DRAWING No C02			REVISION P1			
www.bettiundknut.com.au												Plot File Created: Nov 24, 2021 - 10:39am									
PI ISSUE FOR DA		DT LA 24.11.21																			
REV	DESCRIPTION	CHK	DR	DATE	REV	DESCRIPTION	CHK	DR	DATE	REV	DESCRIPTION	CHK	DR	DATE	REV	DESCRIPTION	CHK	DR	DATE	REV	DESCRIPTION

EROSION AND SEDIMENT CONTROL LEGEND



EROSION AND SEDIMENT CONTROL NOTES

- All work shall be generally carried out in accordance with
 - Local authority requirements,
 - EPA - Pollution control manual for urban stormwater,
 - LANDCOM NSW - Managing Urban Stormwater: Soils and Construction ("Blue Book")
- Erosion and sediment control drawings and notes are provided for the whole of the works. Should the Contractor stage these works then the design may be required to be modified. Variation to these details may require approval by the relevant authorities. The erosion and sediment control plan shall be implemented and adapted to meet the varying situations as work on site progresses.
- Maintain all erosion and sediment control devices to the satisfaction of the superintendent and the local authority.
- When stormwater pits are constructed prevent site runoff entering the pits unless silt fences are erected around pits.
- Minimise the area of site being disturbed at any one time.
- Protect all stockpiles of materials from scour and erosion. Do not stockpile loose material in roadways, near drainage pits or in watercourses.
- All soil and water control measures are to be put back in place at the end of each working day, and modified to best suit site conditions.
- Control water from upstream of the site such that it does not enter the disturbed site.
- All construction vehicles shall enter and exit the site via the temporary construction entry/exit.
- All vehicles leaving the site shall be cleaned and inspected before leaving.
- Maintain all stormwater pipes and pits clear of debris and sediment. Inspect stormwater system and clean out after each storm event.
- Clean out all erosion and sediment control devices after each storm event.

Sequence Of Works

- Prior to commencement of excavation the following soil management devices must be installed.
 - Construct silt fences below the site and across all potential runoff sites.
 - Construct temporary construction entry/exit and divert runoff to suitable control systems.
 - Construct measures to divert upstream flows into existing stormwater system.
 - Construct sedimentation traps/basin including outlet control and overflow.
 - Construct turf lined swales.
 - Construct sandbag sediment traps upstream of existing pits.
 - Construct geotextile filter pit surround around all proposed pits as they are constructed.
- On completion of pavement provide sand bag kerb inlet sediment traps around pits.
- Provide and maintain a strip of turf on both sides of all roads after the construction of kerbs.

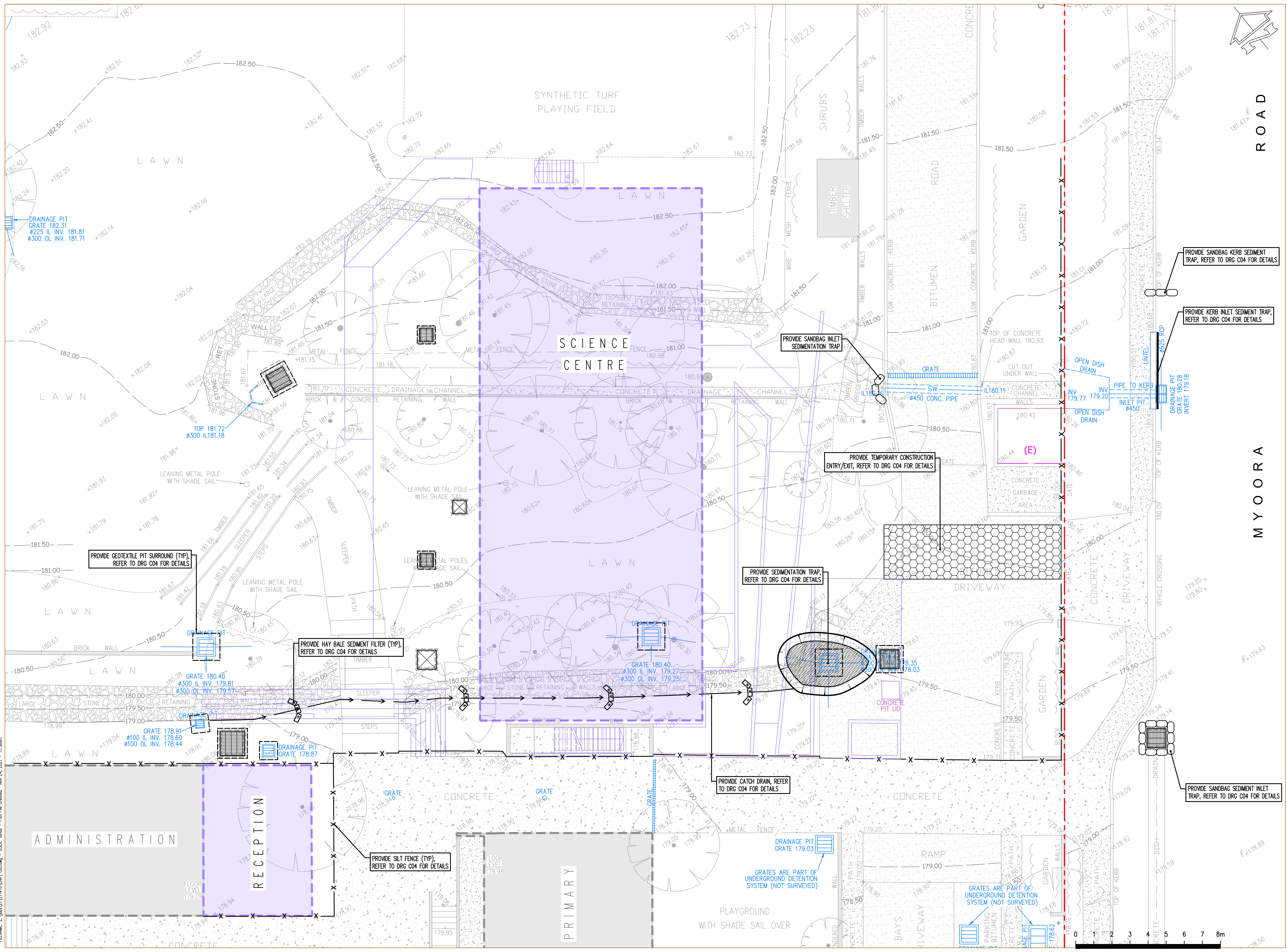
WATER QUALITY TESTING REQUIREMENTS

Prior to discharge of site stormwater, groundwater and seepage water into council's stormwater system, contractors must undertake water quality tests in conjunction with a suitably qualified environmental consultant outlining the following:

- Compliance with the criteria of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)
- If required subject to the environmental consultants advice, provide remedial measures to improve the quality of water that is to be discharged into Councils storm water drainage system. This should include comments from a suitably qualified environmental consultant confirming the suitability of these remedial measures to manage the water discharged from the site into Councils storm water drainage system. Outlining the proposed, ongoing monitoring, contingency plans and validation program that will be in place to continually monitor the quality of water discharged from this site. This should outline the frequency of water quality testing that will be undertaken by a suitably qualified environmental consultant.

EROSION AND SEDIMENT CONTROL PUMP OUT NOTES

Any accumulated water contaminated with sediment, from a sediment basin or excavation pit, is to be flocculated or filtered in order to lower the suspended solid load to less than 50mg per litre gypsum gas or other approved flocculant should be applied within 24 hours of the end of the storm event. The gypsum must be spread evenly over the entire water surface. Pumping is not to occur for at least 36 hours and preferably 48 hours after application. Clean water is to be discharged to the water table via a hole ball sediment filter in a way that does not pick up sediment that has dropped to the bottom. Note: gypsum is a hydrated form of calcium sulphate and is available at many swimming pool shops and hardware stores.



A1 0 1 2 3 4 5 6 7 8 9 10

1:100 A1 1:200 A3

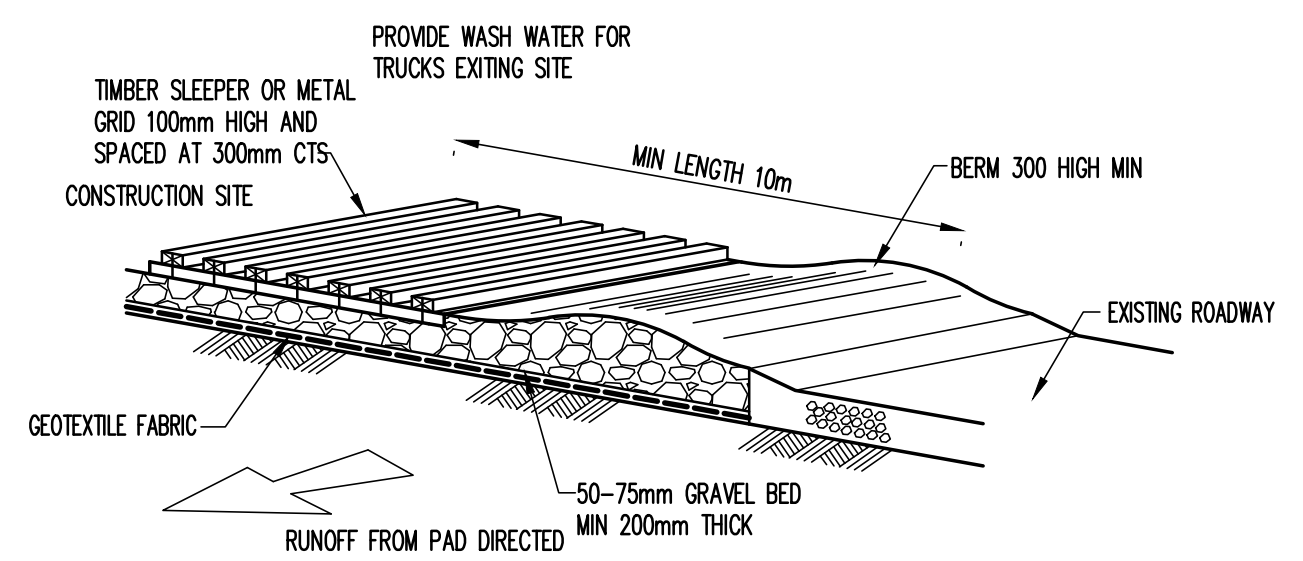
PI	ISSUE FOR DA	DT	LA	24.11.21	REV DESCRIPTION	CHK DR	DATE	REV DESCRIPTION	CHK DR	DATE

ARCHITECT:
design architect knut menden
dipl. ing. bettina steffens
www.bettundknut.com.au

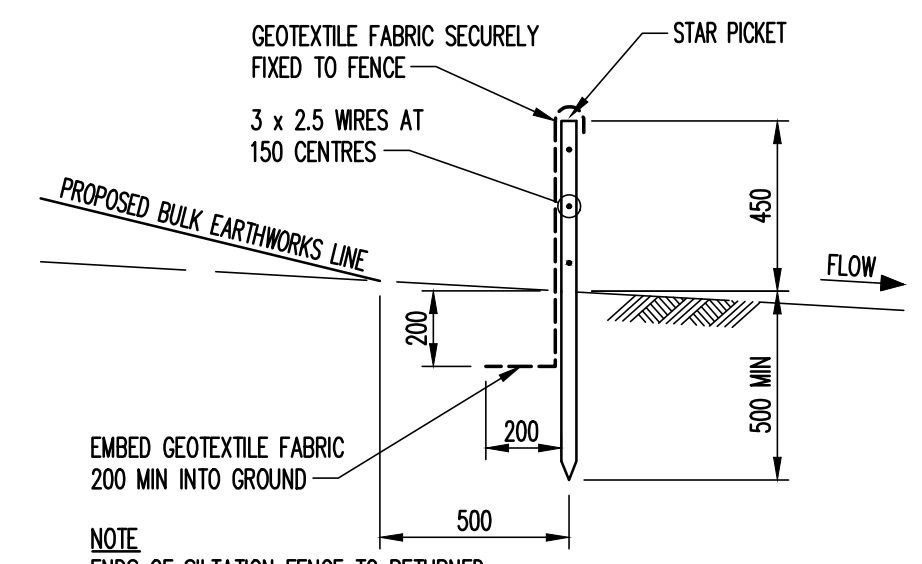
ENGINEER:
TTW Structural Civil Traffic Façade
612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

PROJECT:
GERMAN INTERNATIONAL SCHOOL SYDNEY - NEW SCIENCE CENTRE AND RECEPTION
33 MYOORA ROAD, TERRY HILLS NSW 2084

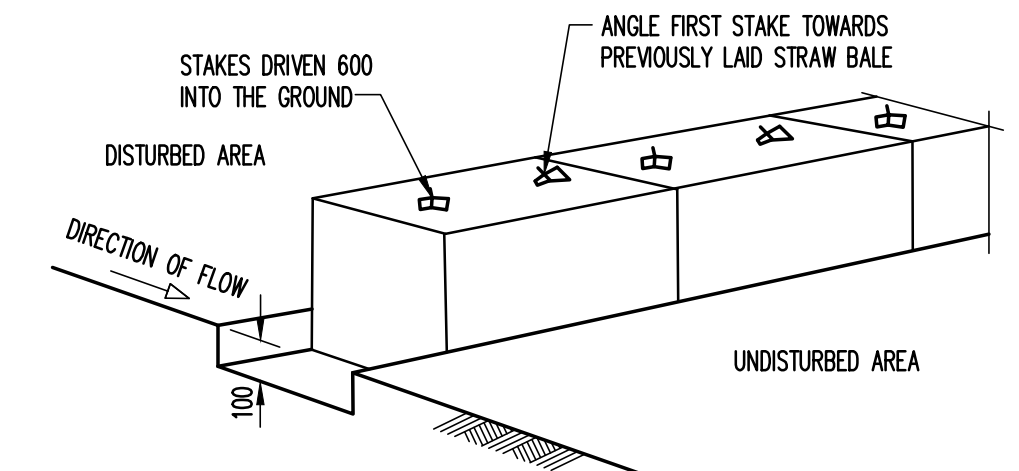
DRAWING NAME:
SEDIMENT AND EROSION CONTROL PLAN
SCALE: A1
DRAWN BY: LA
AUTHORISED BY: NB
PROJECT No: 211476
DRAWING No: C03
REVISION: P1
Plot File Created: Nov 24, 2021 - 11:36am



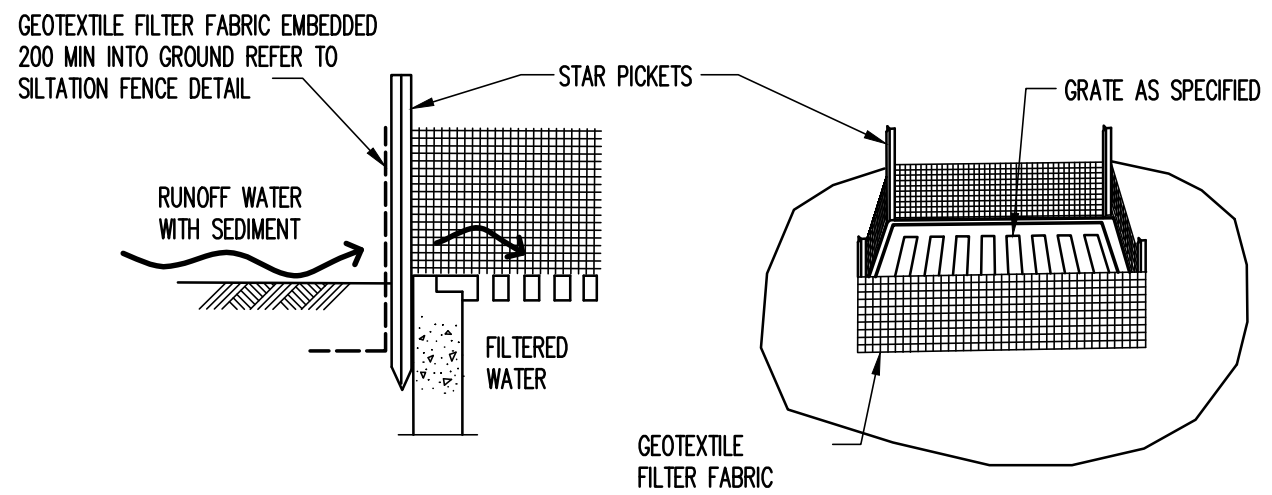
TEMPORARY CONSTRUCTION VEHICLE EXIT
NTS



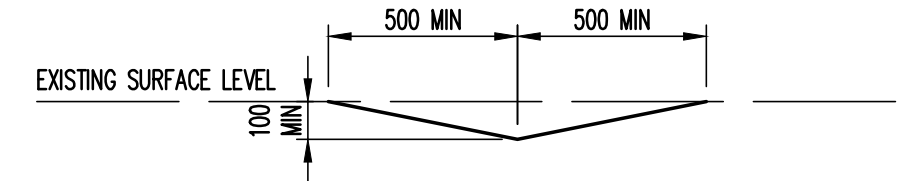
SILTATION FENCE DETAIL
SCALE 1: 20



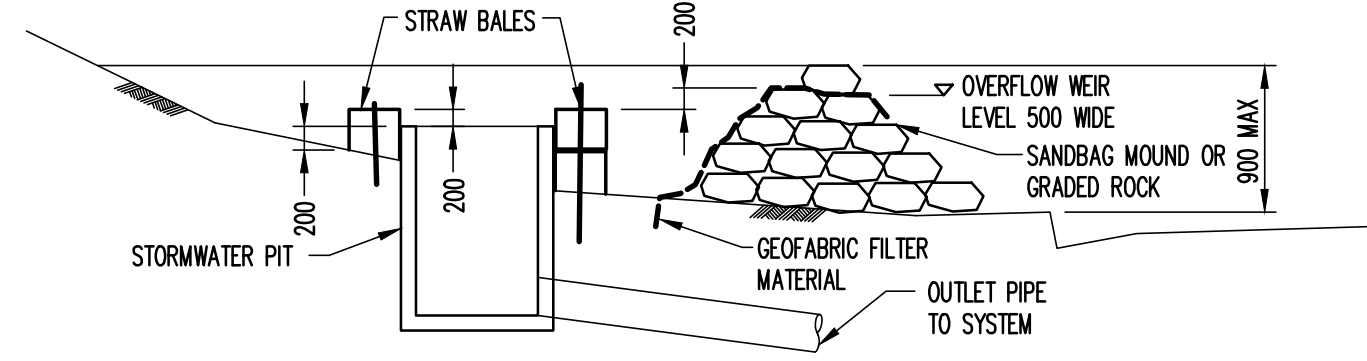
HAY BALE SEDIMENT FILTER
NTS
NOTE: STAKE TO BE EITHER TAR COATED STAR OR 50 x 50 HARDWOOD



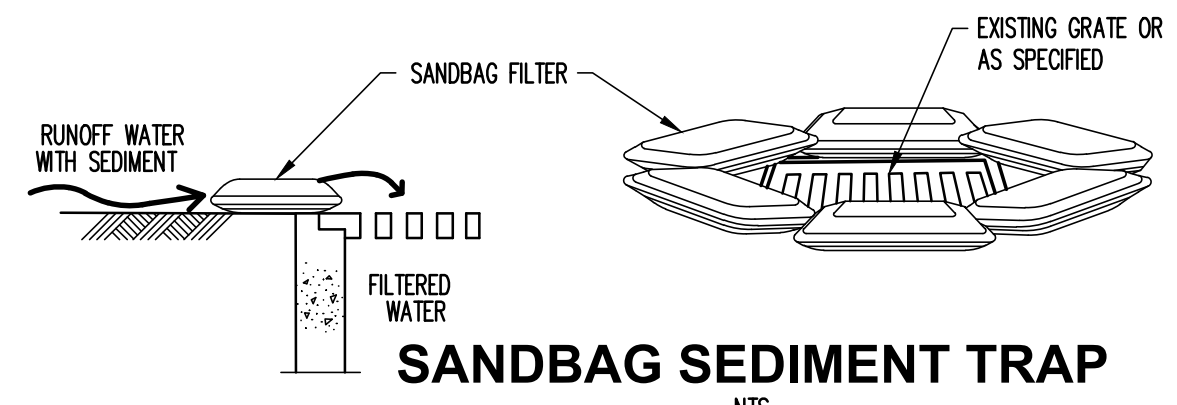
GEOTEXTILE FILTER PIT SURROUND
NTS



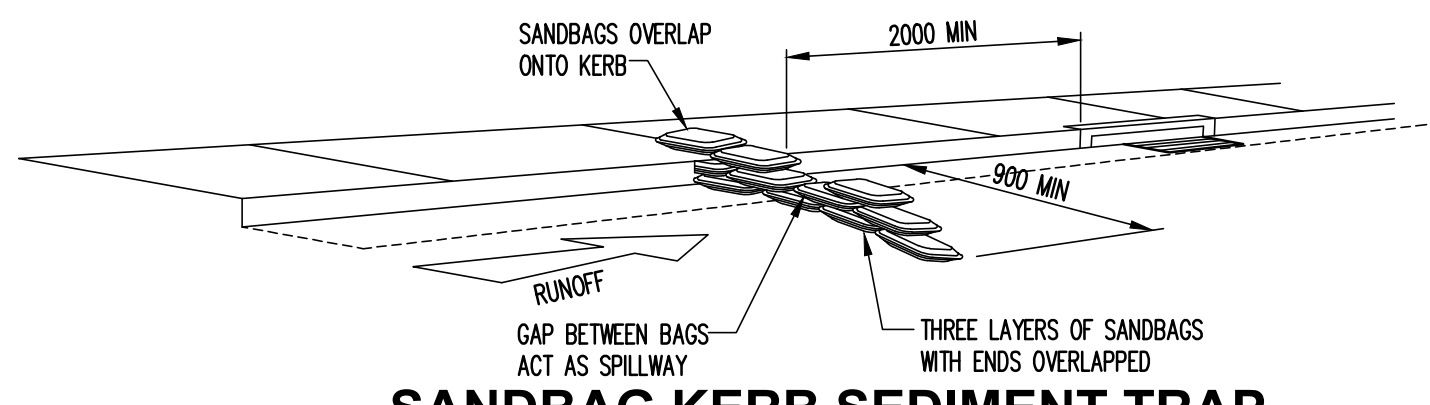
TYPICAL SECTION THROUGH CATCH DRAIN
SCALE 1: 20



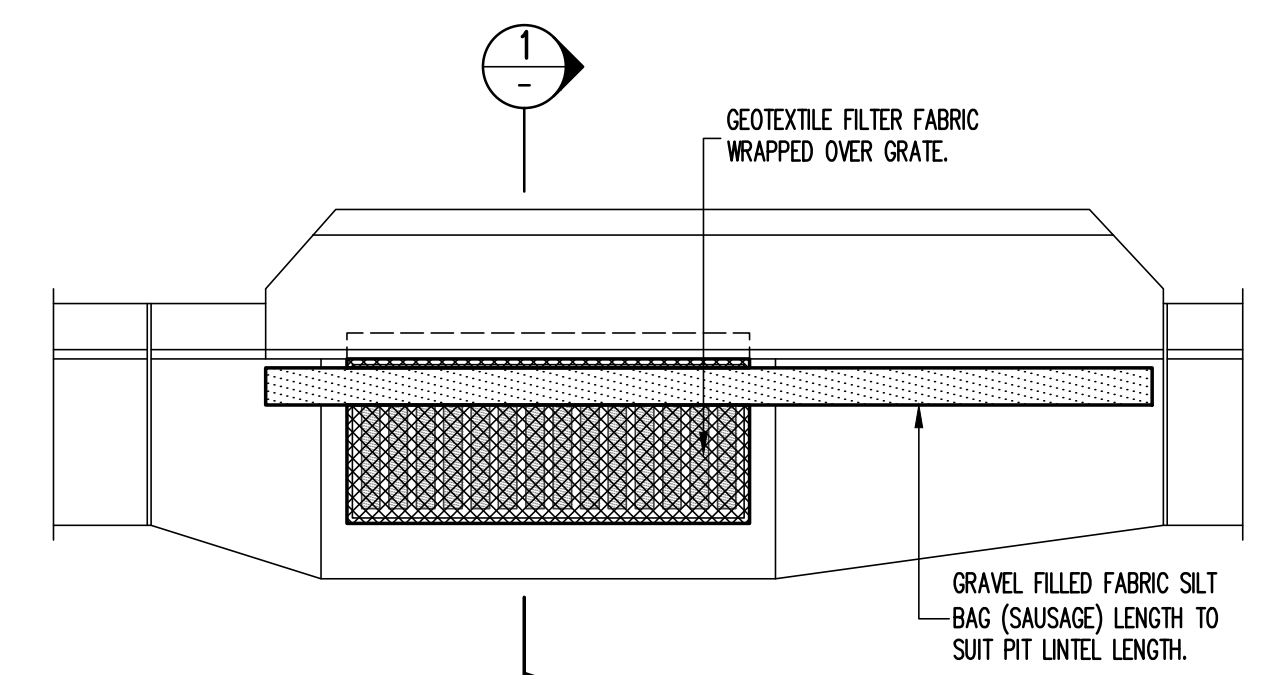
SEDIMENTATION TRAP
NTS



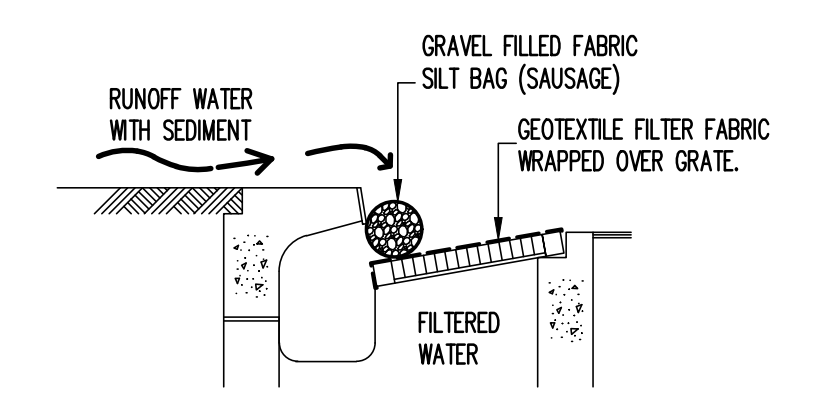
SANDBAG SEDIMENT TRAP
NTS



SANDBAG KERB SEDIMENT TRAP
NTS

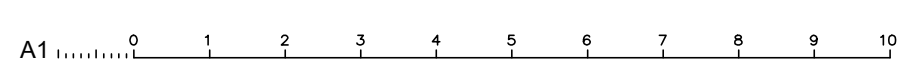


KERB INLET SEDIMENT TRAP
SCALE 1: 20



SECTION 1
SCALE 1: 20

FILENAME: Z:\pba\211476\pba\ C04.dwg - USER: jason - Plot File Created: Nov 24, 2021 - 11:37am



REV	DESCRIPTION	CHK	DR	DATE	REV	DESCRIPTION	CHK	DR	DATE
PI	ISSUE FOR DA			DT LA 24.11.21					

ARCHITECT:
design architect knut menden
dipl. ing. bettina steffens

www.bettindknut.com.au

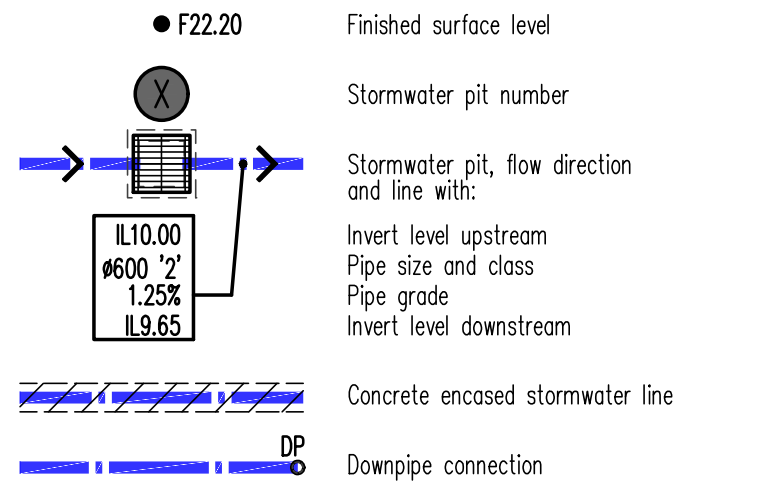
ENGINEER:
TTW Structural
Civil
Traffic
Façade
612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

PROJECT:
GERMAN INTERNATIONAL SCHOOL
SYDNEY - NEW SCIENCE CENTRE AND
RECEPTION
33 MYOORA ROAD,
TERRY HILLS NSW 2084

DRAWING NAME:
SEDIMENT AND EROSION CONTROL
DETAILS

SCALE : A1	DRAWN BY	AUTHORISED BY
N/A	LA	NB
PROJECT No	DRAWING No	REVISION
211476	C04	P1
Plot File Created: Nov 24, 2021 - 11:37am		

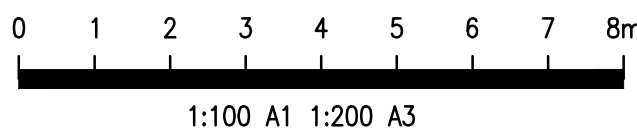
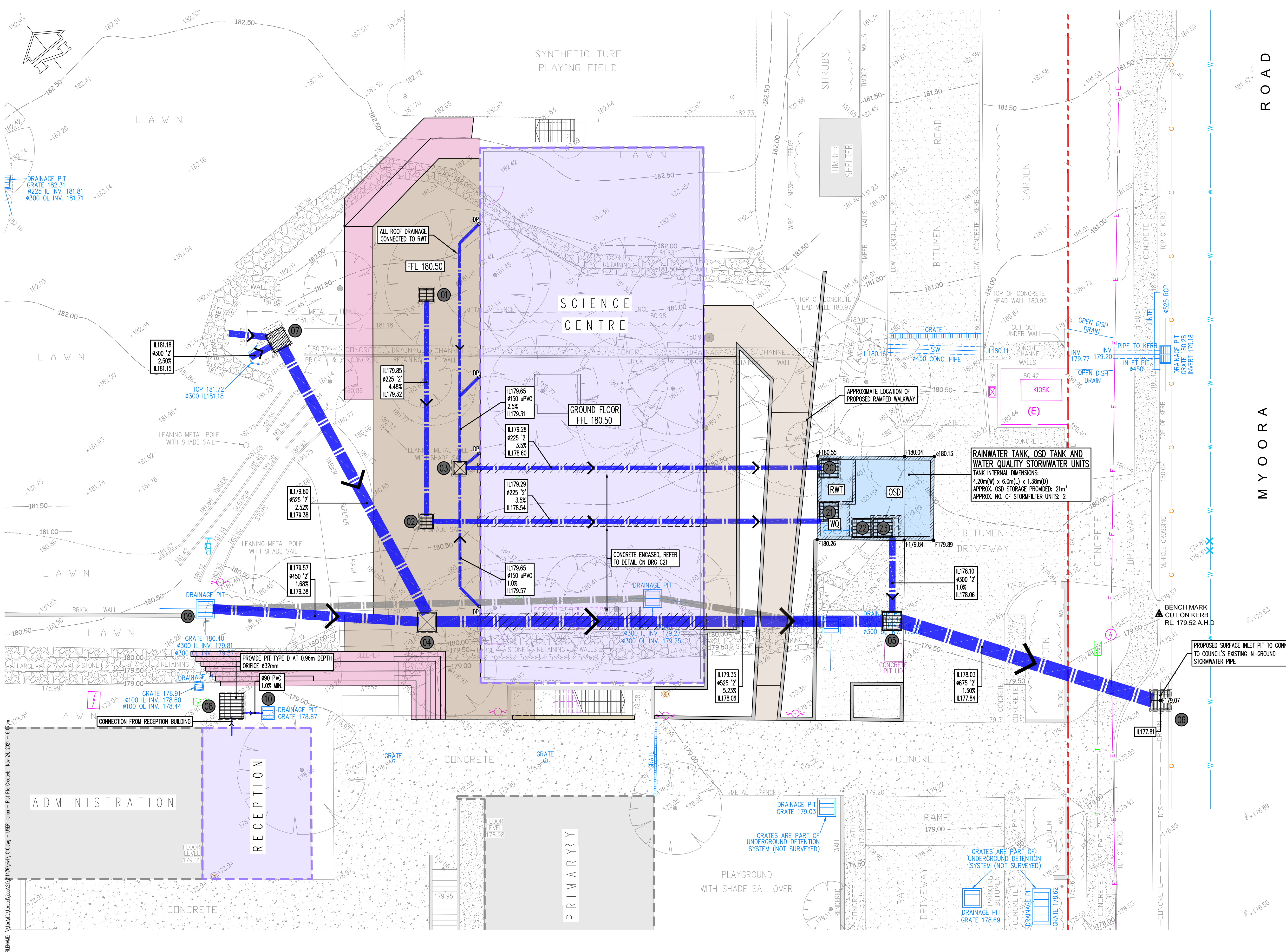
SITWORKS LEGEND



PIT SCHEDULE

Note: Grate size does not necessarily reflect pit size, refer pit type details, shown on detail sheets - C20
Final internal pit dimensions are to comply with AS3500

Type	Description	Cover (Clear Opening)	Number
A	Surface inlet pit	600 x 600 Class B galvanised mild steel grate hinged to frame with Ocean Guard pit insert	01, 02
	Junction pit	600 x 600 Class B cast iron cover with concrete infill with Ocean Guard pit insert	03
B	Junction pit	900 x 900 Class B cast iron cover with concrete infill	04
	Surface inlet pit	900 x 900 Class D galvanised mild steel grate hinged to frame	05, 07
C	Surface inlet pit	900 x 900 Class D "V" shape galvanised mild steel grate hinged to frame	06
D	Discharge control pit	1200 x 1200 Class C galvanised mild steel grate hinged to frame	08
E	Tank Access Lid	900 x 900 Class C galvanised mild steel grate hinged to frame	20 to 23
F	Existing pit	Existing pit to remain	09, 10



REV	DESCRIPTION	CHK	DR	DATE
P2	ISSUE FOR DA	DT	LA	24.11.21
P1	PRELIMINARY	DT	LA	04.11.21

REV	DESCRIPTION	CHK	DR	DATE

ARCHITECT:
design architect knut menden
dipl. ing. bettina steffens
www.bettiundknut.com.au

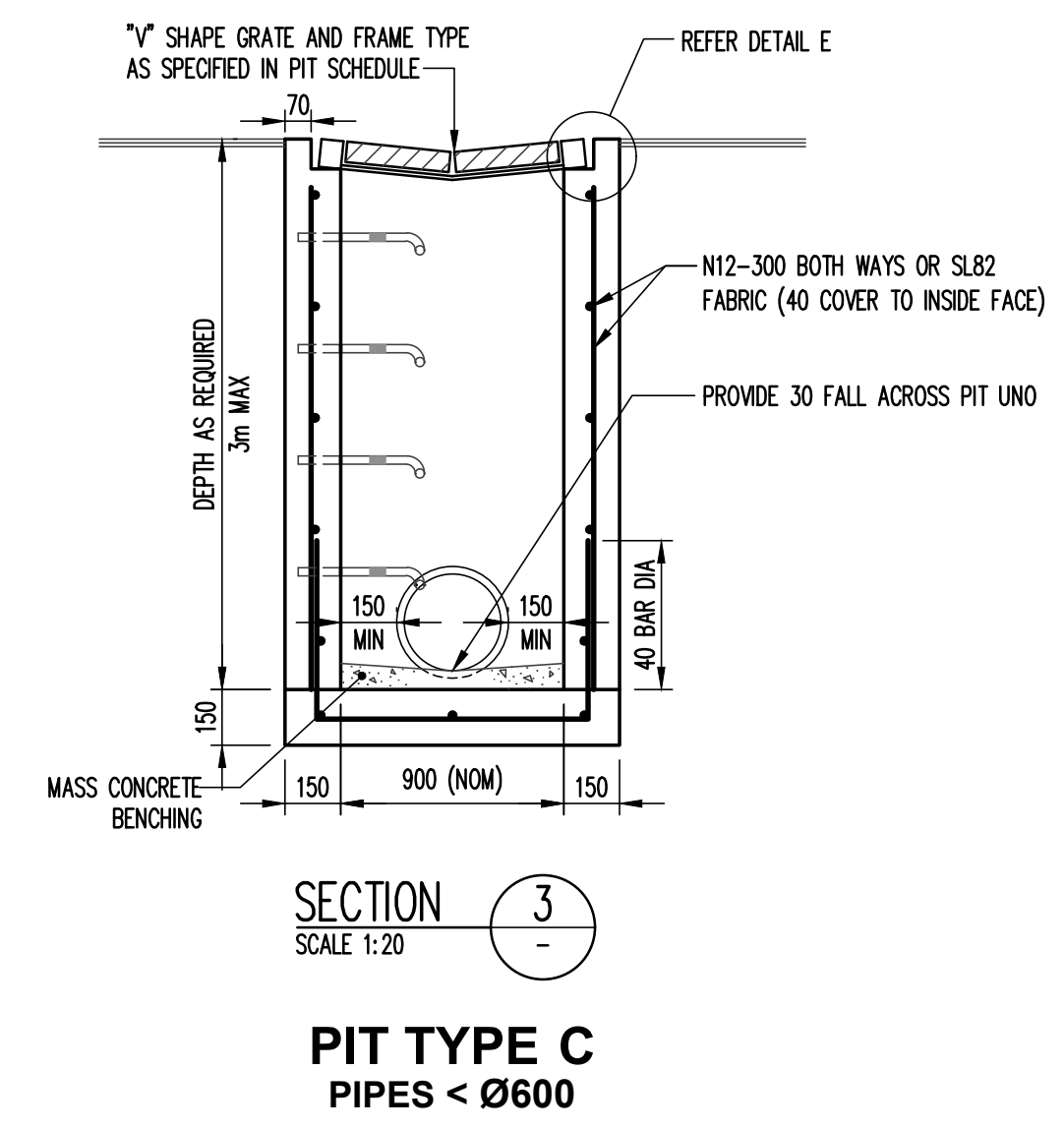
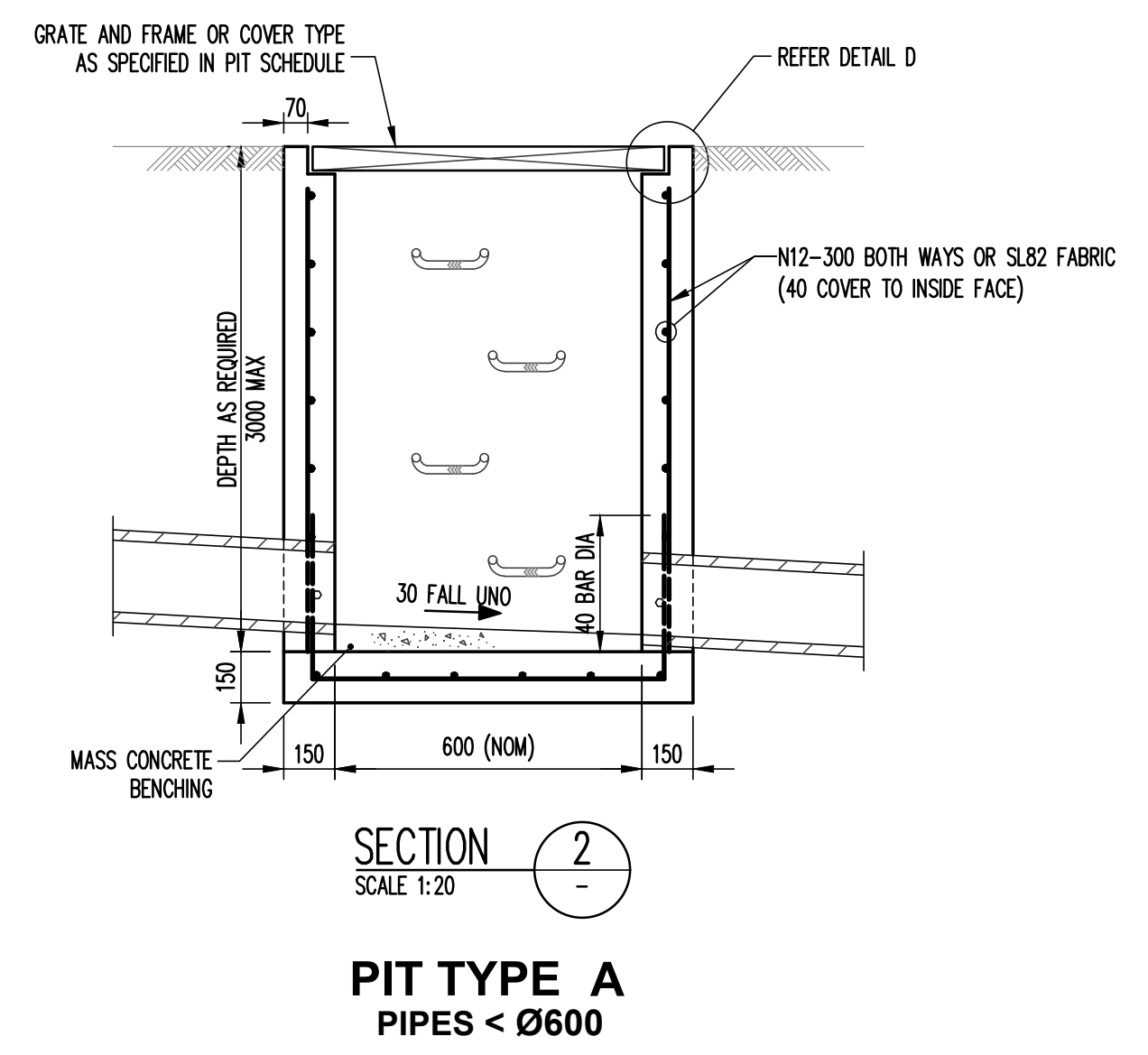
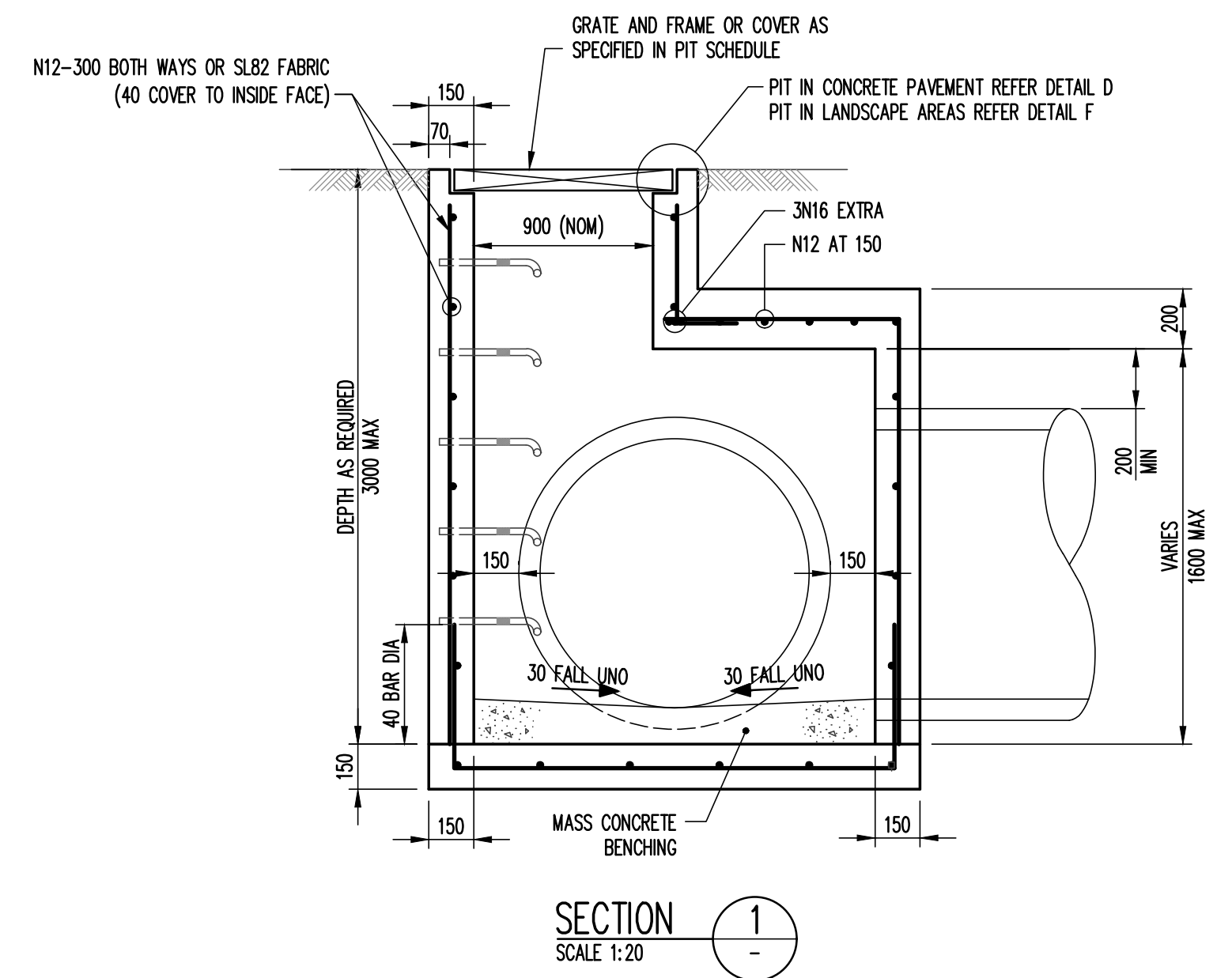
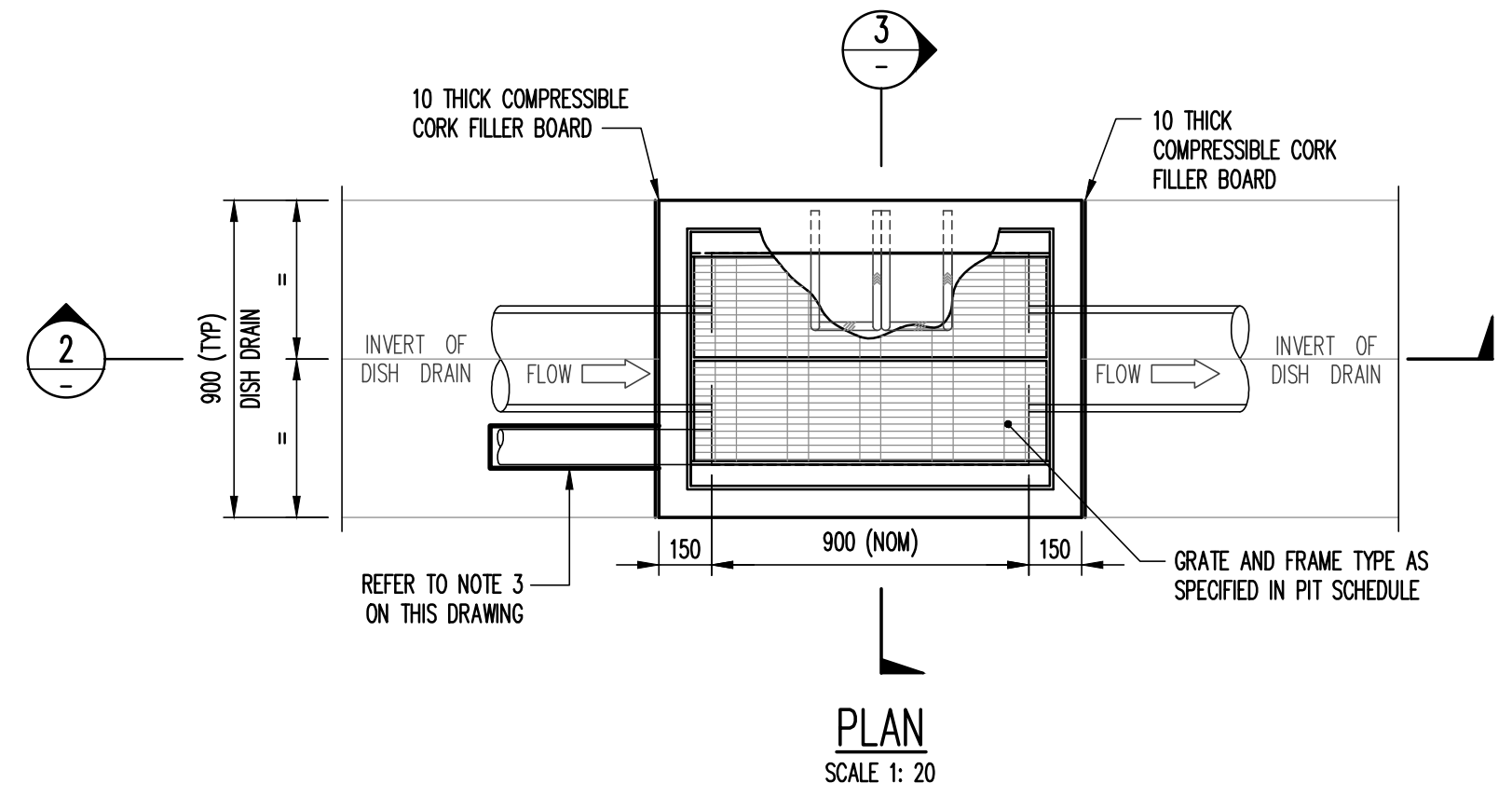
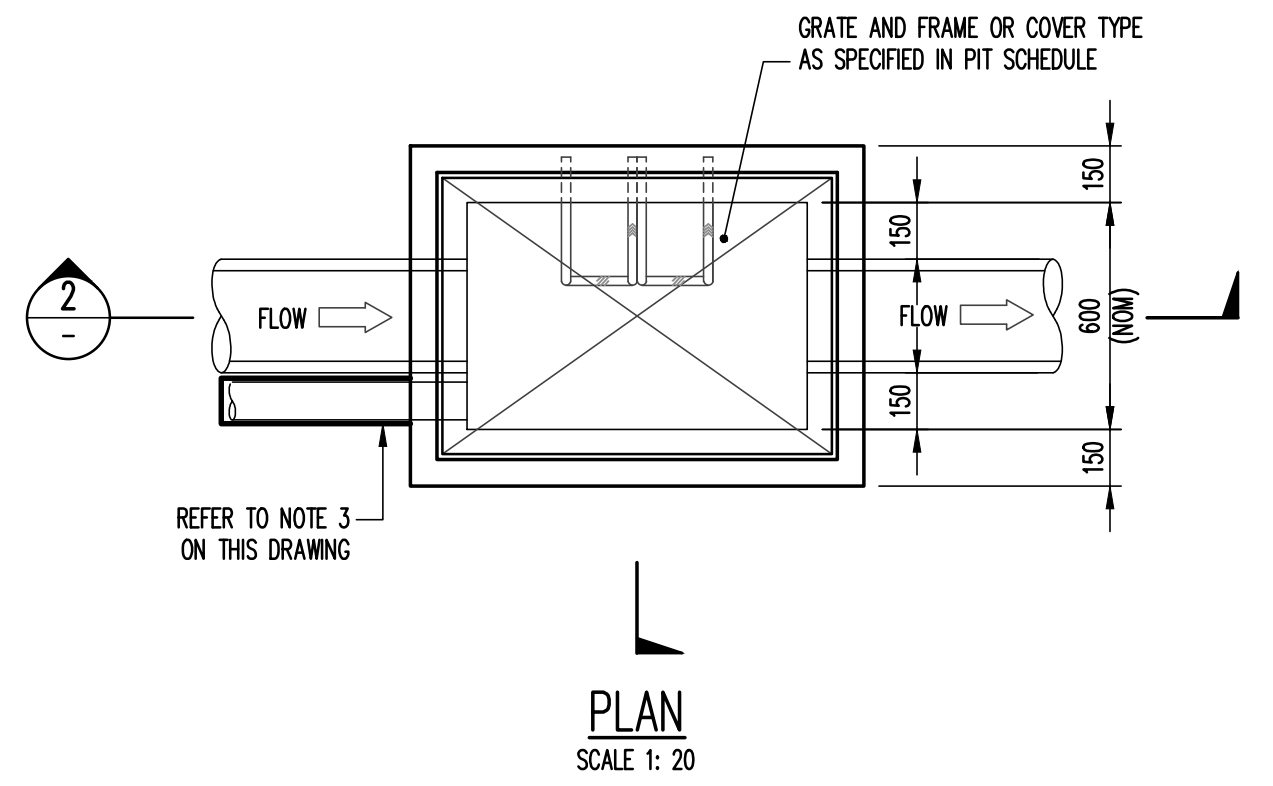
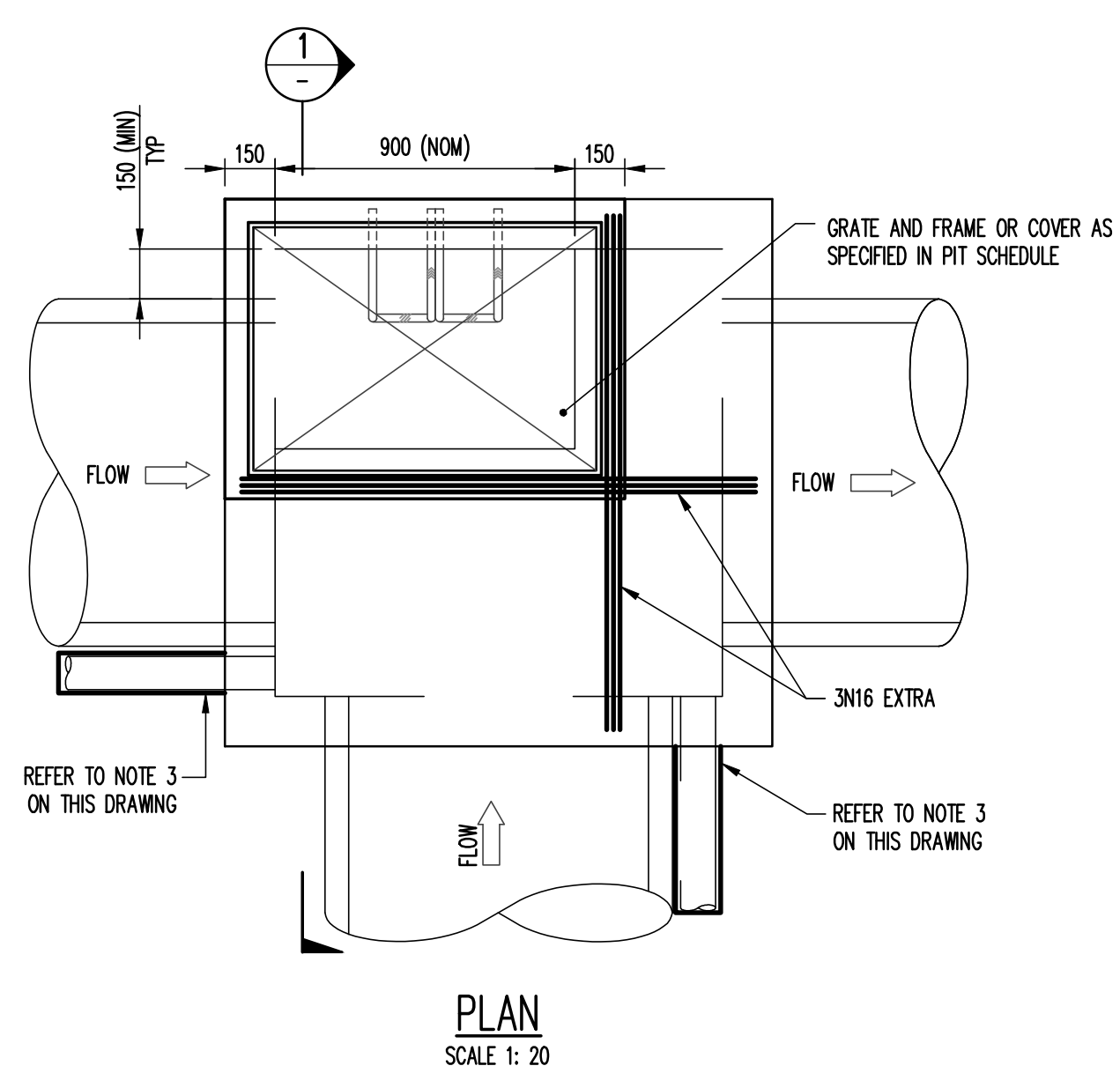
ENGINEER:
TTW Structural Civil Traffic Façade
612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

PROJECT:
GERMAN INTERNATIONAL SCHOOL SYDNEY - NEW SCIENCE CENTRE AND RECEPTION
33 MYOORA ROAD, TERRY HILLS NSW 2084

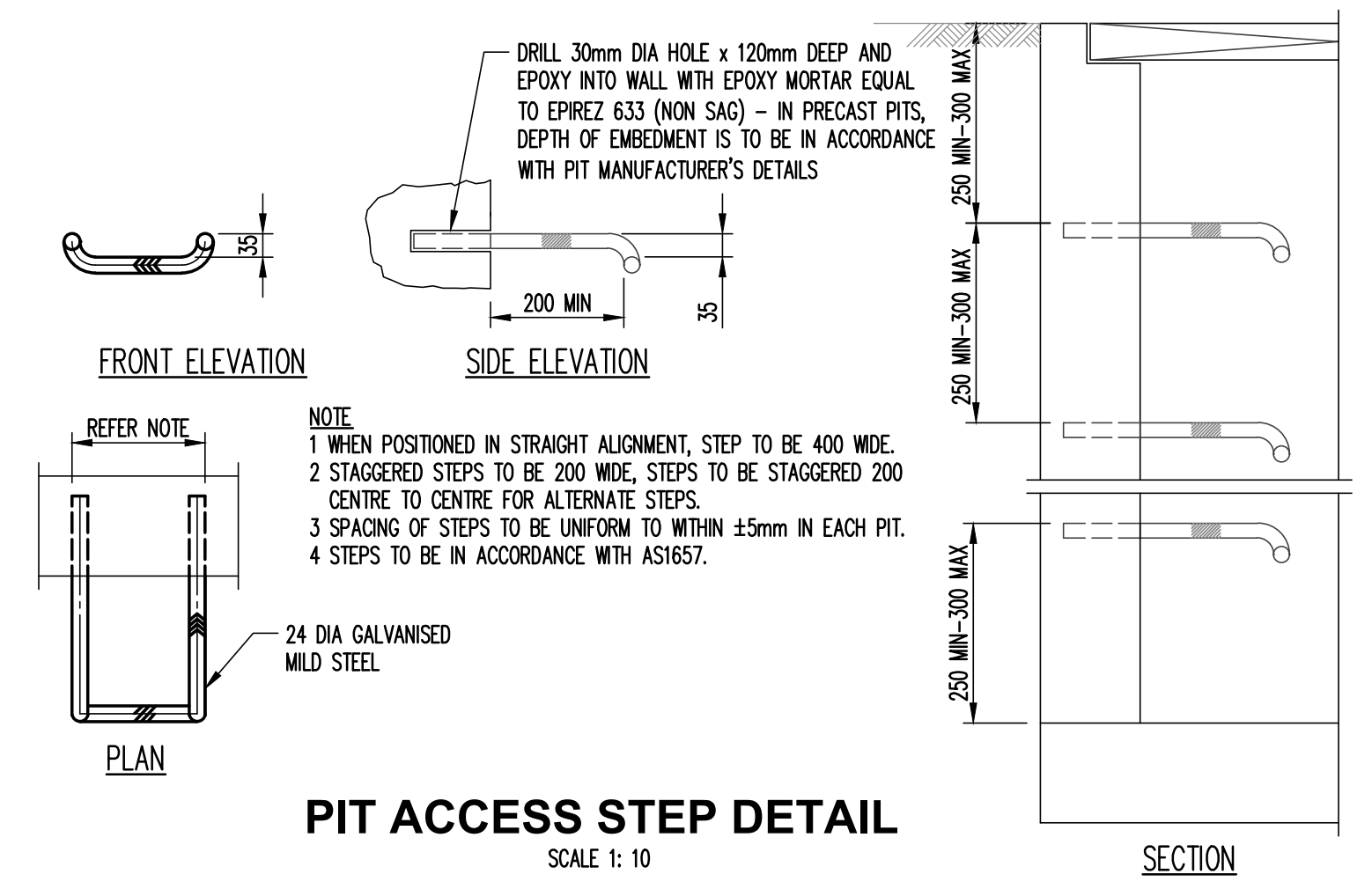
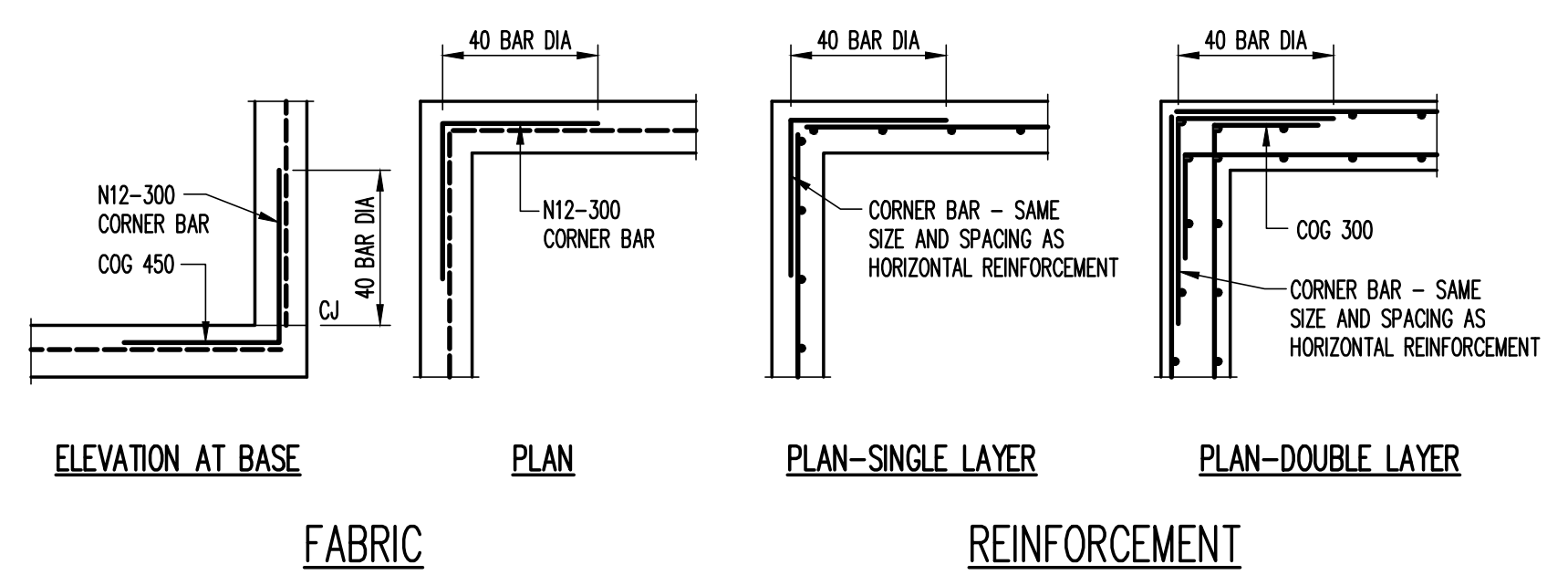
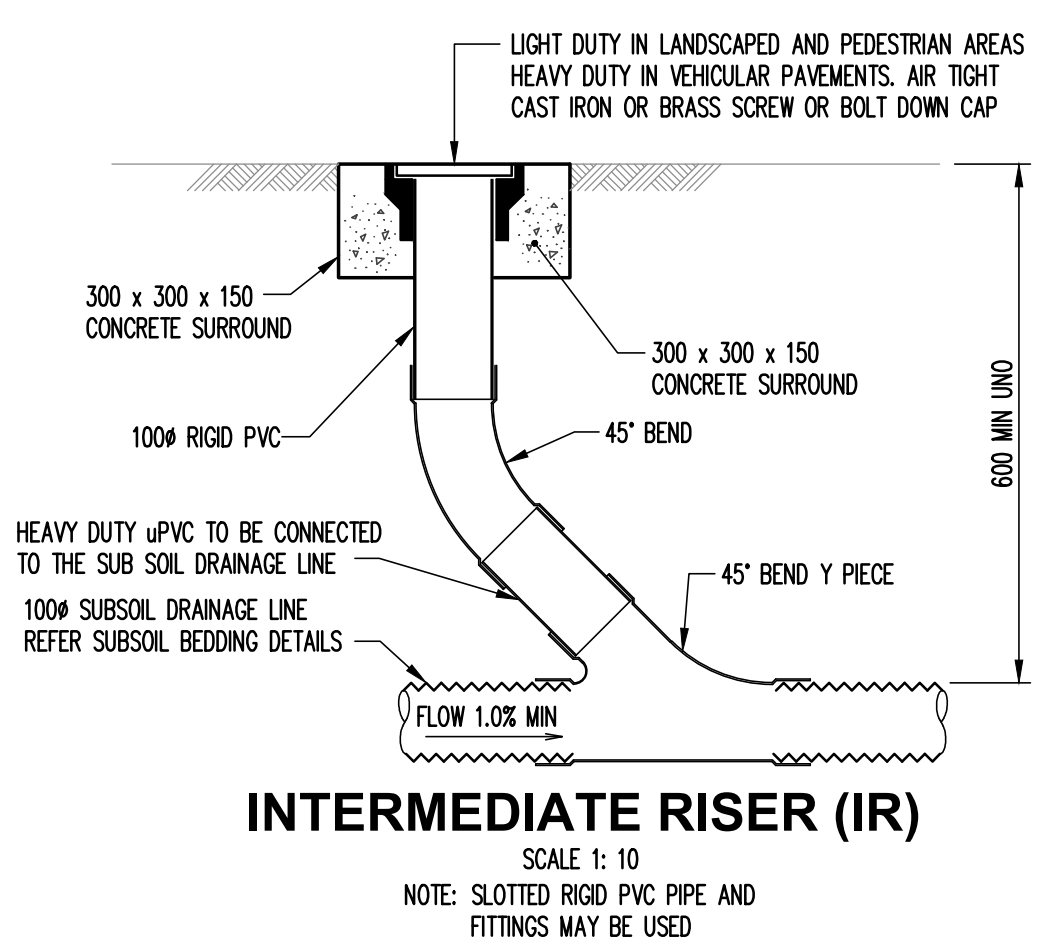
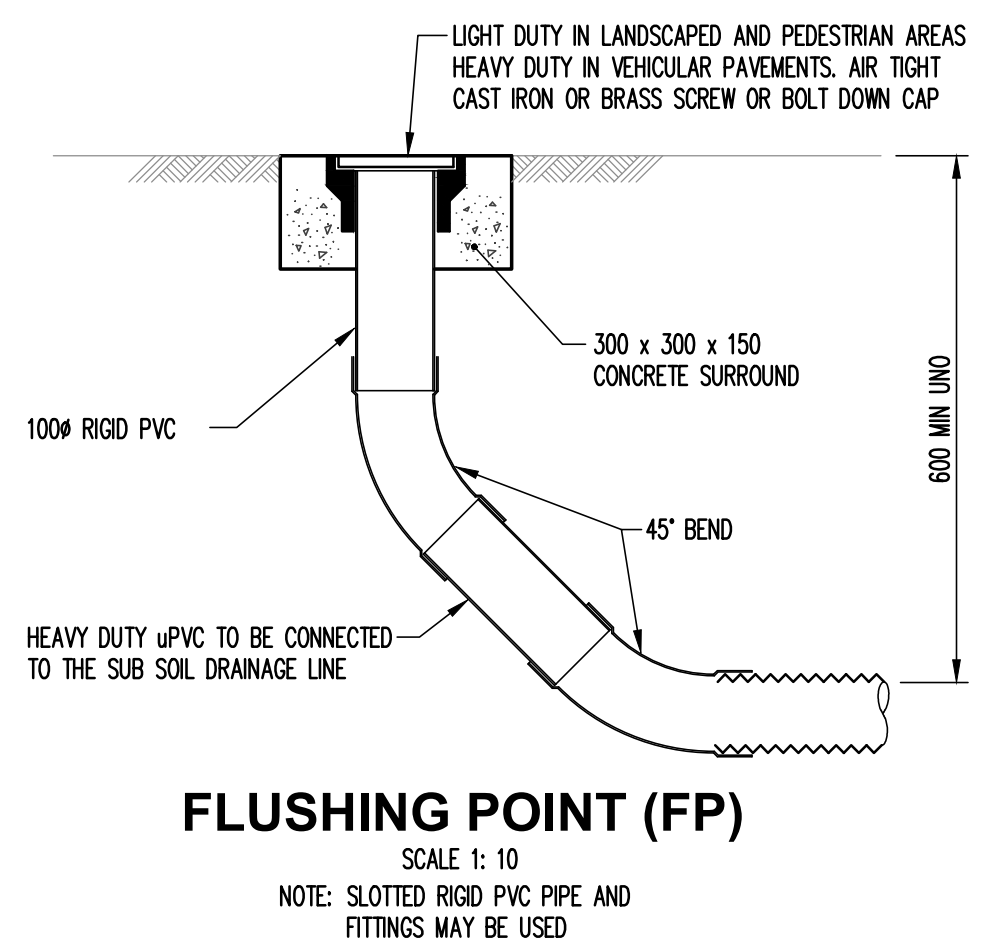
DRAWING NAME:
SITWORKS PLAN

SCALE: A1 1:100
DRAWN BY LA
AUTHORISED BY NB
PROJECT No 211476
DRAWING No C10
REVISION P2
Plot File Created: Nov 24, 2021 - 6:07pm

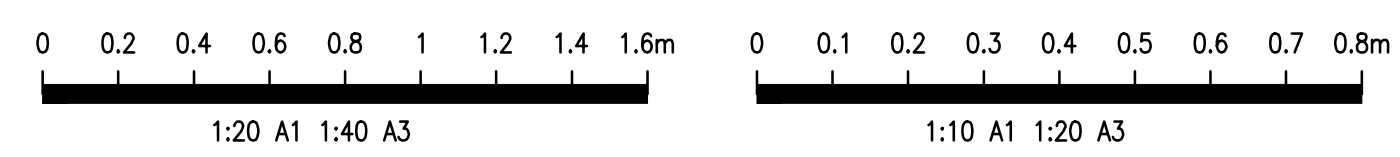
STORMWATER NOTES:
 1. IF REINFORCING FABRIC IS TO BE USED, REFER TO WALL AND CORNER DETAILS ON THIS DRAWING;
 2. PROVIDE PIT ACCESS STEPS IF PIT DEEPER THAN 900, REFER TO DETAIL ON THIS DRAWING;
 3. PROVIDE #100 x 3m LONG SUBSOIL DRAINAGE STUB SURROUNDED WITH 100mm OF 20mm (NOM) COARSE FILTER MATERIAL WRAPPED IN GEOTEXTILE FILTER FABRIC (BIDM A24 OR SIMILAR) TO EACH INLET PIPE;
 4. FOR ALL NOMINATED STORMWATER PIT GRATE AND FRAME OR COVER TYPES REFER TO PIT SCHEDULE ON DRG C10.



PIT TYPE B
PIPES ≥ Ø600



FILENAME: Z:\p04\211476\p04\ C02.dwg - USER: imoo - Plot File Created: Nov 24, 2021 - 11:39am



PI	ISSUE FOR DA	DT	LA	24.11.21
REV	DESCRIPTION	CHK	DR	DATE

ARCHITECT:
 design architect knut menden
 dipl. ing. bettina steffens
 www.bettundknut.com.au

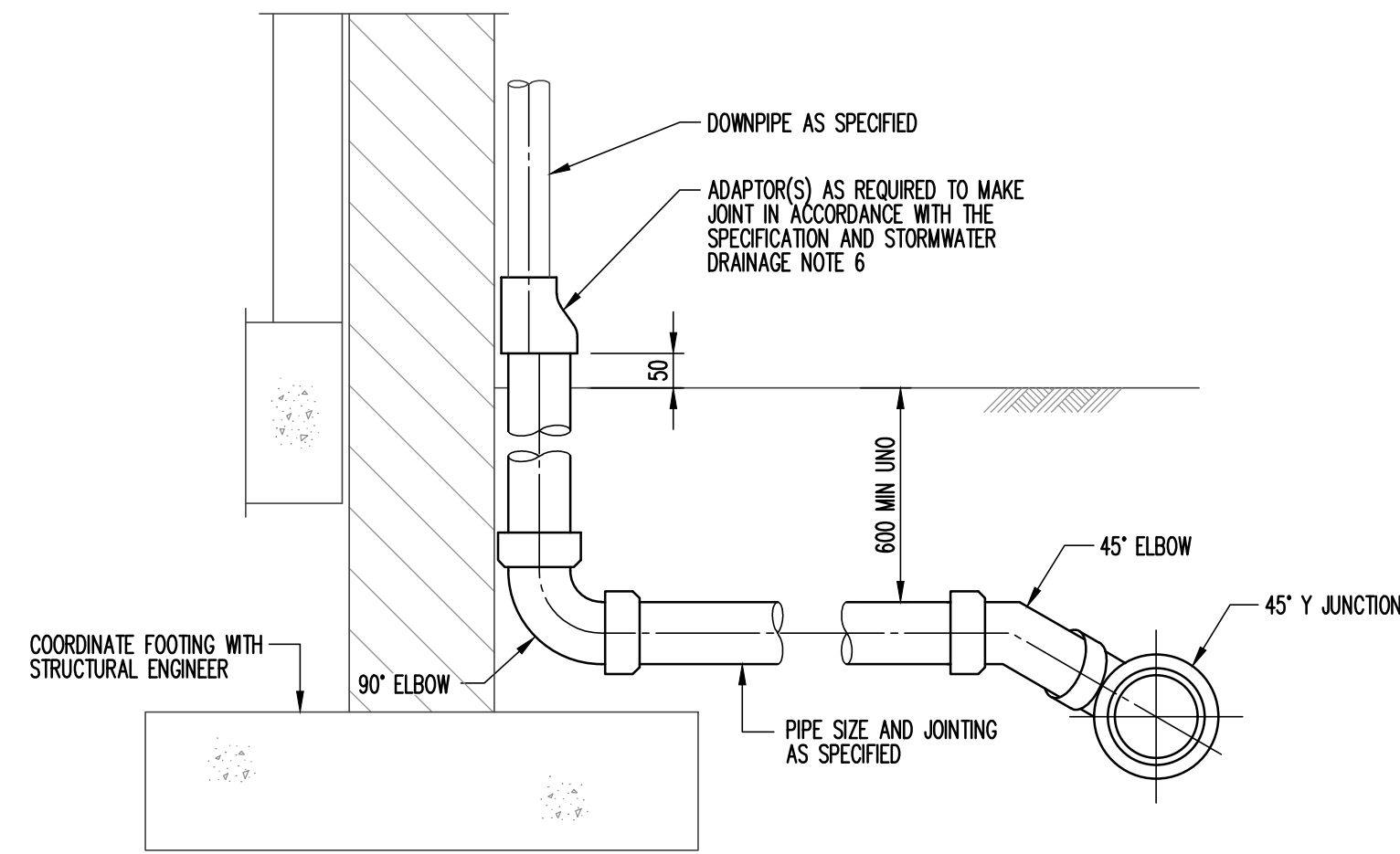
ENGINEER:

 612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

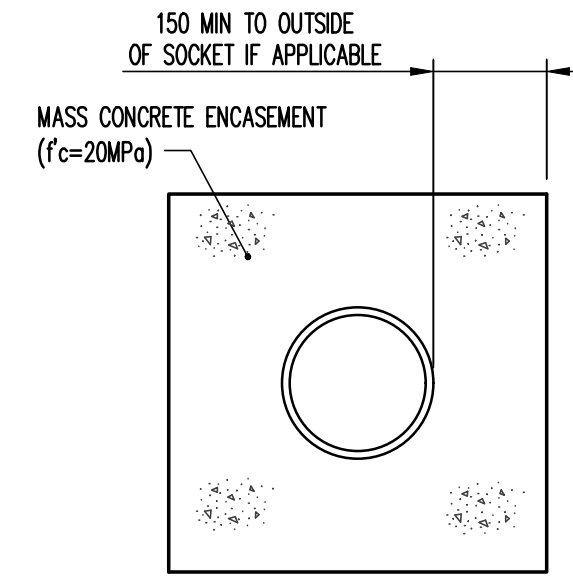
PROJECT:
 GERMAN INTERNATIONAL SCHOOL
 SYDNEY - NEW SCIENCE CENTRE AND
 RECEPTION
 33 MYOORA ROAD,
 TERRY HILLS NSW 2084

DRAWING NAME:
 TYPICAL DETAILS, SHEET 1
 SCALE: A1
AS NOTED
 PROJECT No
 211476
 DRAWING No
 C20
 REVISION
 P1
 Plot File Created: Nov 24, 2021 - 11:39am

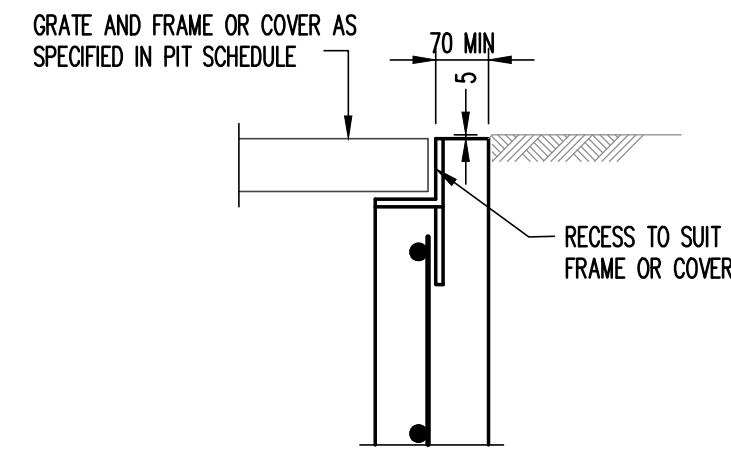
DRAWN BY
LA
 AUTHORISED BY
NB
 REVISION
 P1



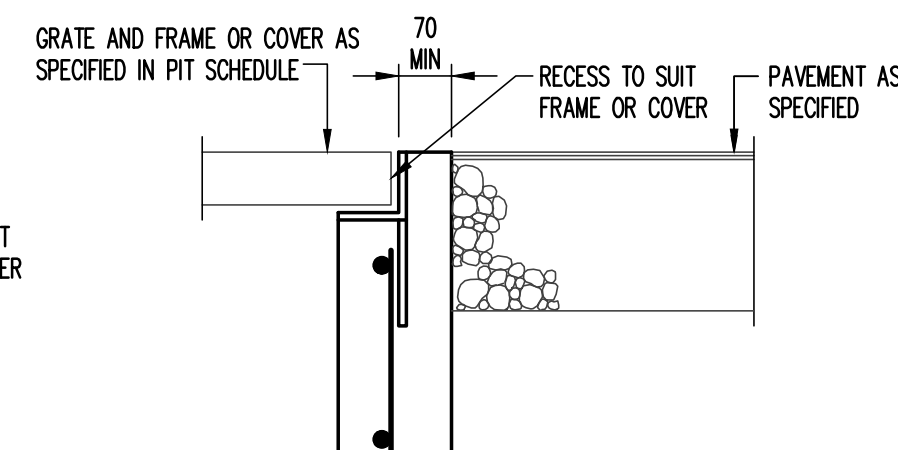
DOWNPIPE CONNECTION TO uPVC STORMWATER
SCALE 1: 10



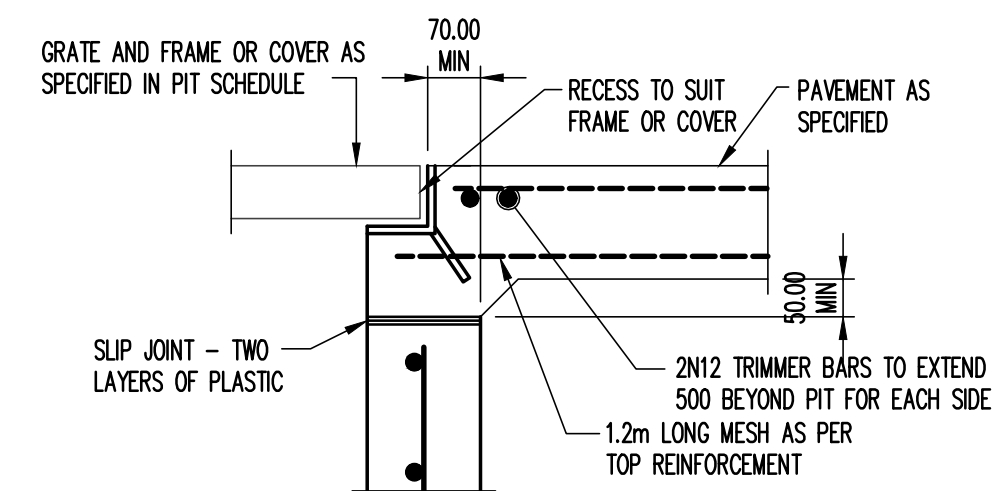
CONCRETE ENCASEMENT DETAIL
SCALE 1: 10



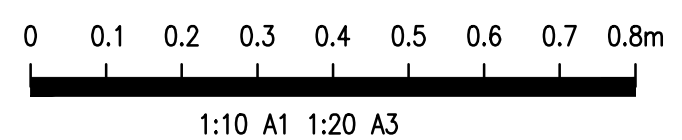
DETAIL F
SCALE 1: 10



DETAIL E
SCALE 1: 10



DETAIL D
SCALE 1: 10



FILENAME: Z:\pda\211476\pda\ C21.dwg - USER: imoo - Plot File Created: Nov 24, 2021 - 11:40am

A1 0 1 2 3 4 5 6 7 8 9 10

REV	DESCRIPTION	CHK	DR	DATE	REV	DESCRIPTION	CHK	DR	DATE
PI	ISSUE FOR DA	DT	LA	24.11.21					

ARCHITECT:
design architect knut menden
dipl. ing. bettina steffens

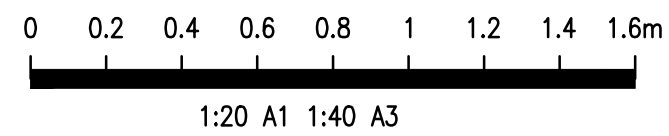
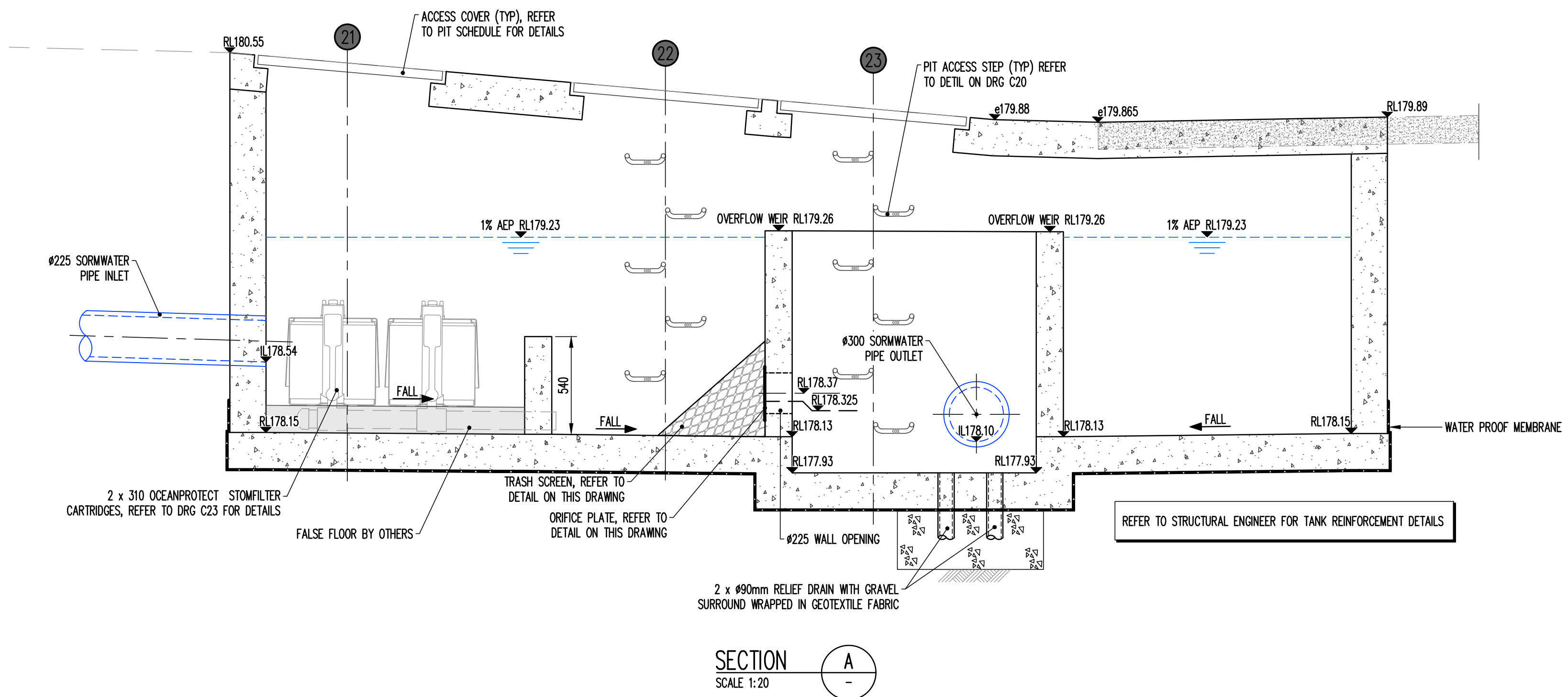
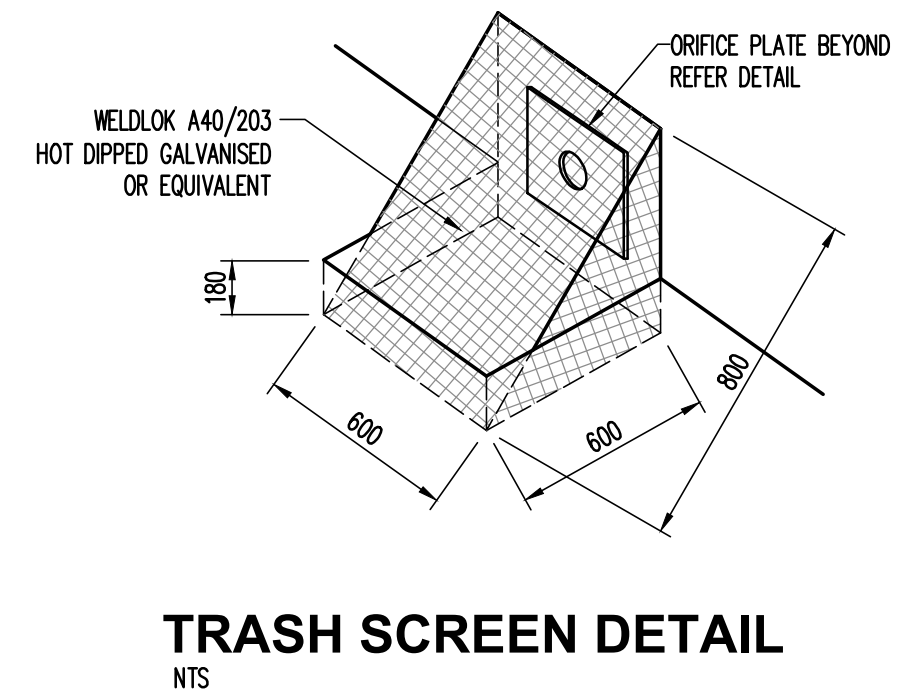
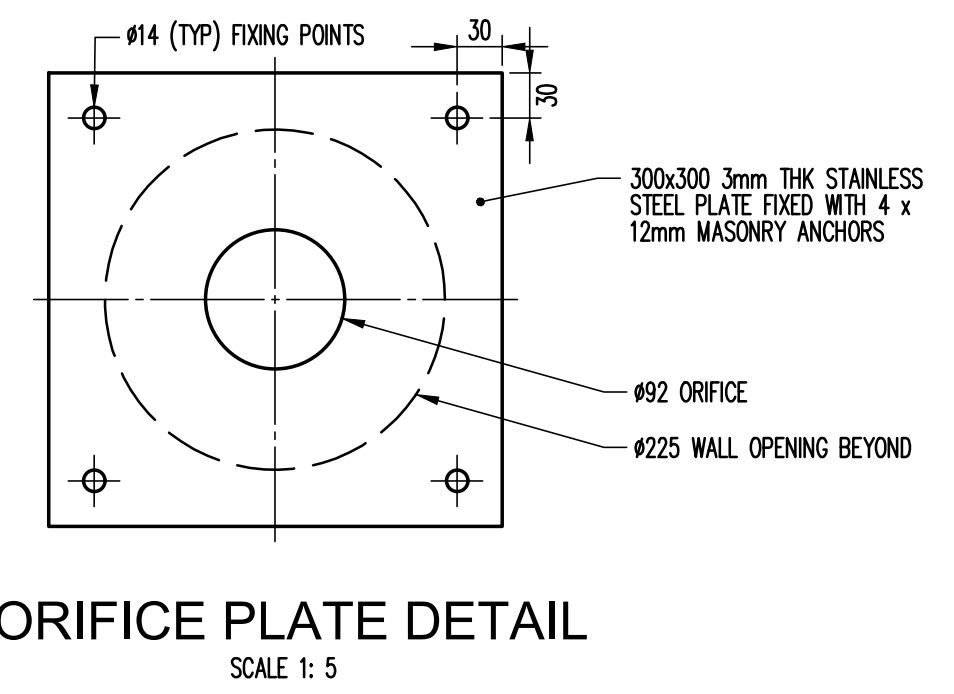
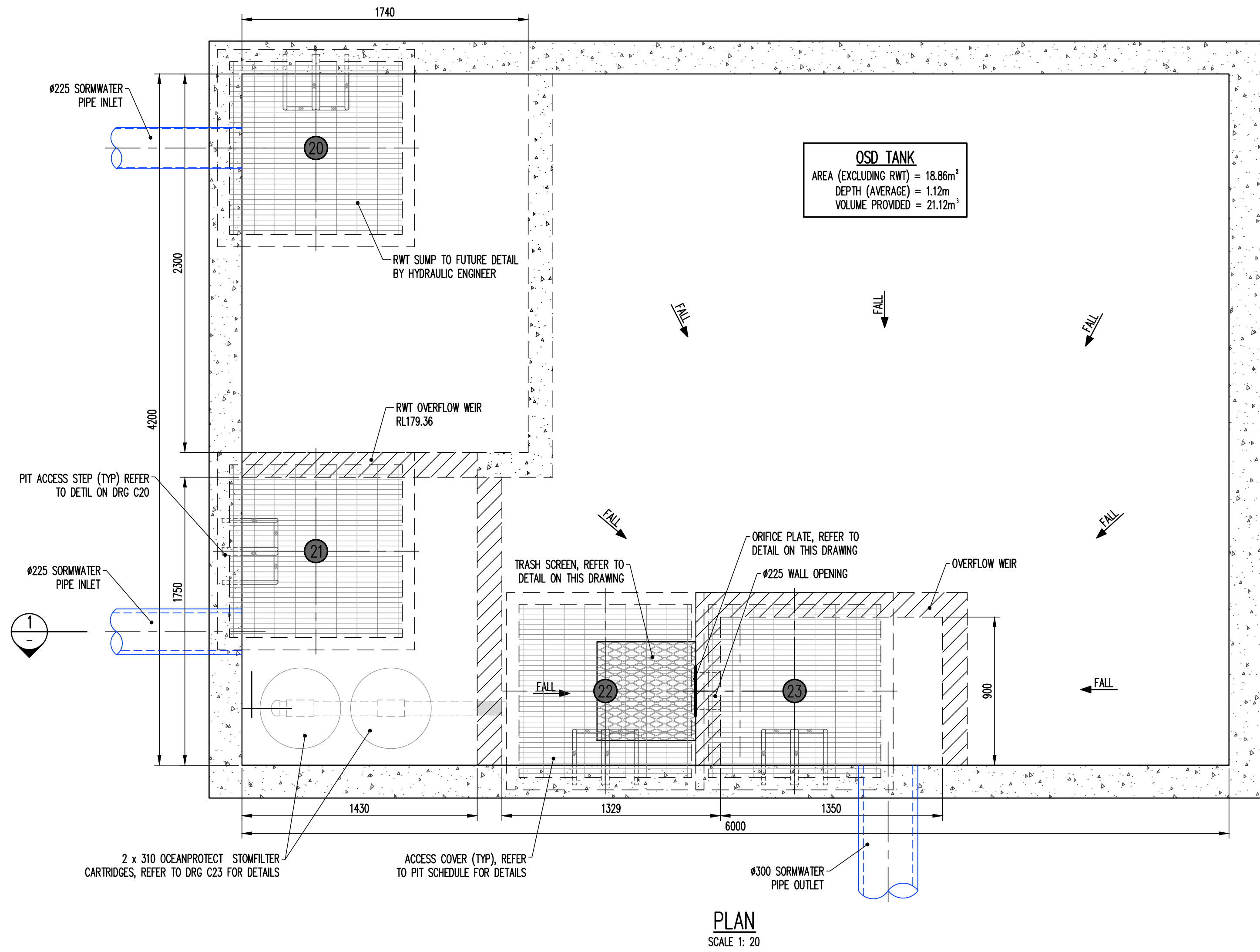
www.bettindknut.com.au

ENGINEER:
TTW Structural Civil Traffic Façade
612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

PROJECT:
GERMAN INTERNATIONAL SCHOOL SYDNEY - NEW SCIENCE CENTRE AND RECEPTION
33 MYOORA ROAD, TERRY HILLS NSW 2084

DRAWING NAME:
TYPICAL DETAILS, SHEET 2

SCALE : A1	DRAWN BY	AUTHORISED BY
1:10	LA	NB
PROJECT No	DRAWING No	REVISION
211476	C21	P1
Plot File Created: Nov 24, 2021 - 11:40am		



FILENAME: \\na\pds\work\pds\211476\c22.dwg - USER: jano - Plot File Created: Nov 24, 2021 - 5:52pm

REV	DESCRIPTION	CHK	DR	DATE	REV	DESCRIPTION	CHK	DR	DATE
PI	ISSUE FOR DA			DT LA 24.11.21					

ARCHITECT:
 design architect knut menden
 dipl. ing. bettina steffens
 www.bettindknut.com.au

ENGINEER:

 612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

PROJECT:
 GERMAN INTERNATIONAL SCHOOL
 SYDNEY - NEW SCIENCE CENTRE AND
 RECEPTION
 33 MYOORA ROAD,
 TERRY HILLS NSW 2084

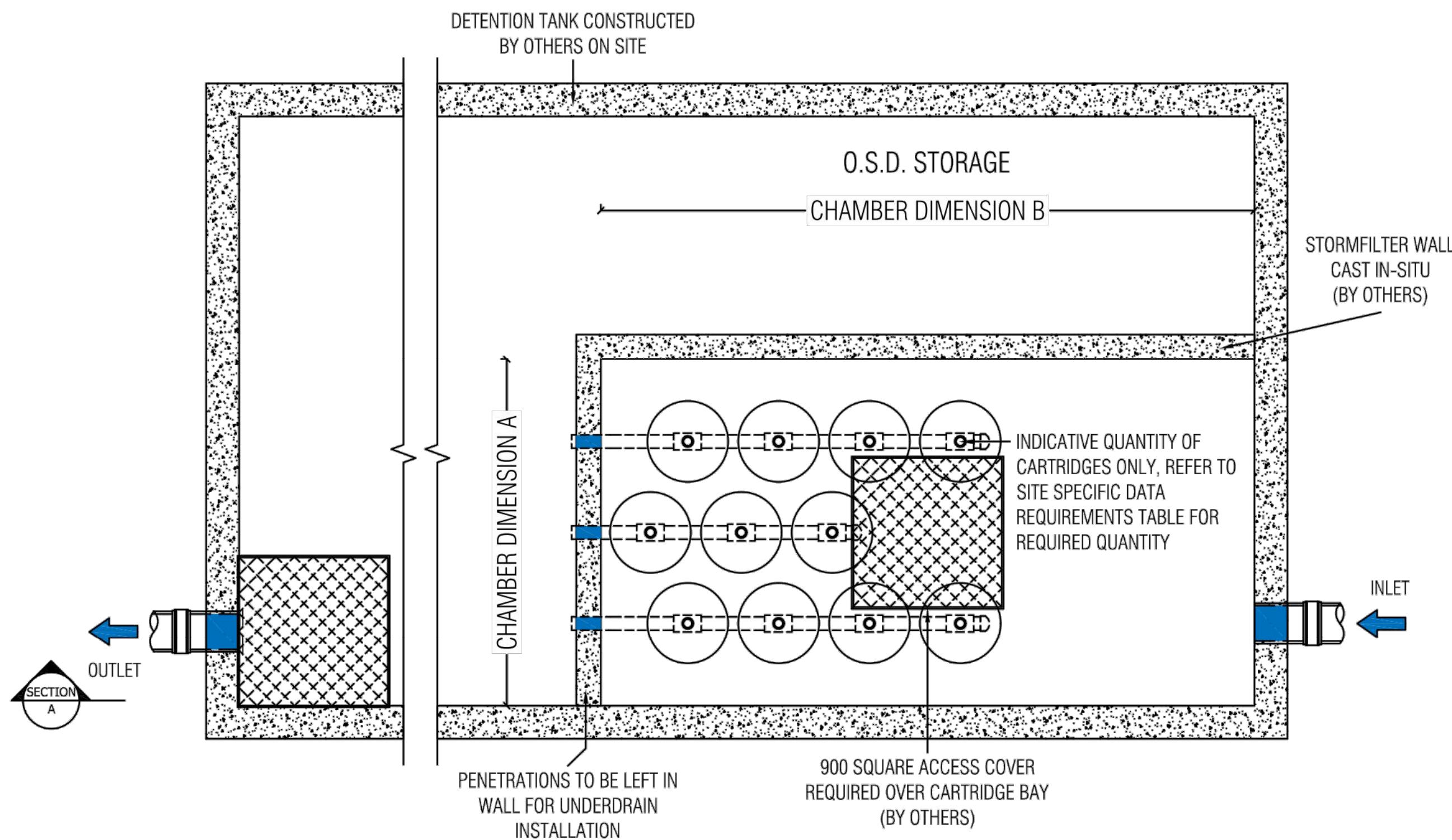
DRAWING NAME:
 TYPICAL DETAILS, SHEET 3

SCALE: A1
1:20
 PROJECT No
 211476
 Plot File Created: Nov 24, 2021 - 5:52pm

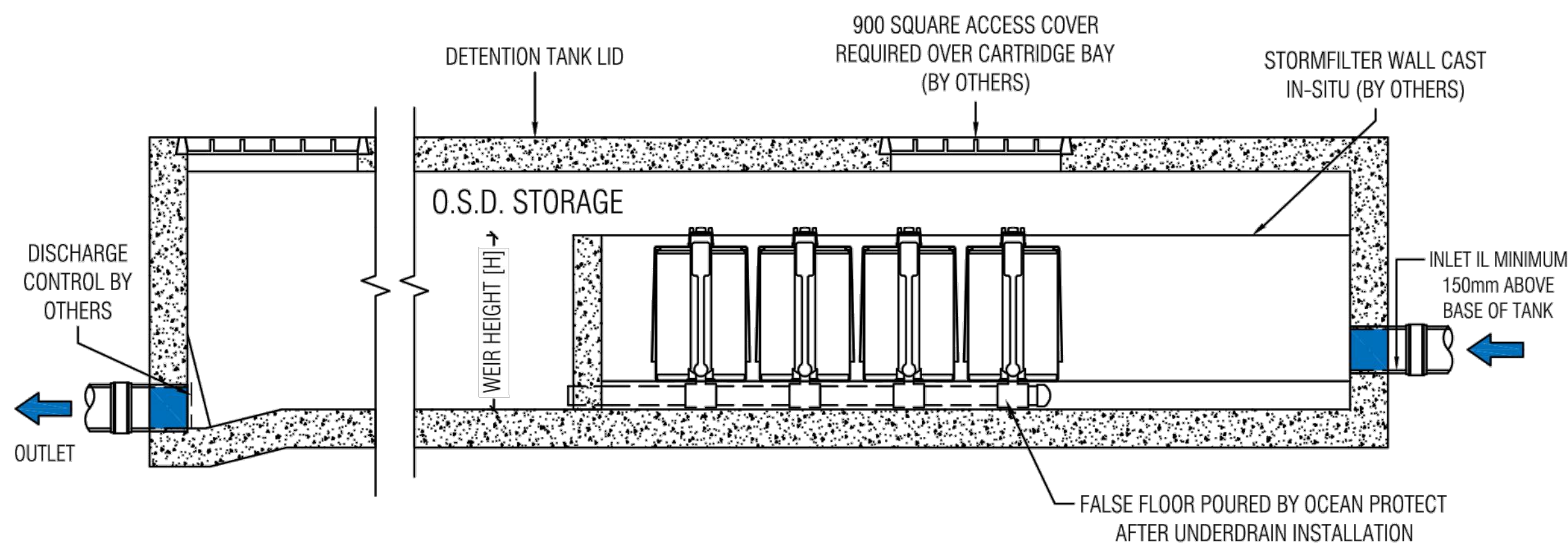
DRAWN BY
LA
 DRAWING No
 C22

AUTHORISED BY
NB
 REVISION
 P1

NOT FOR CONSTRUCTION



PLAN LAYOUT



SECTION A

LAST MODIFIED: 07-03-19

STORMFILTER DESIGN TABLE

- STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED.
- THE STANDARD CONFIGURATION IS SHOWN. ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CERTIFYING ENGINEER WILL BE SHOWN ON SUBMITTAL DRAWING(S).
- FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF-CLEANING. RADIAL MEDIA DEPTH SHALL BE 178mm.

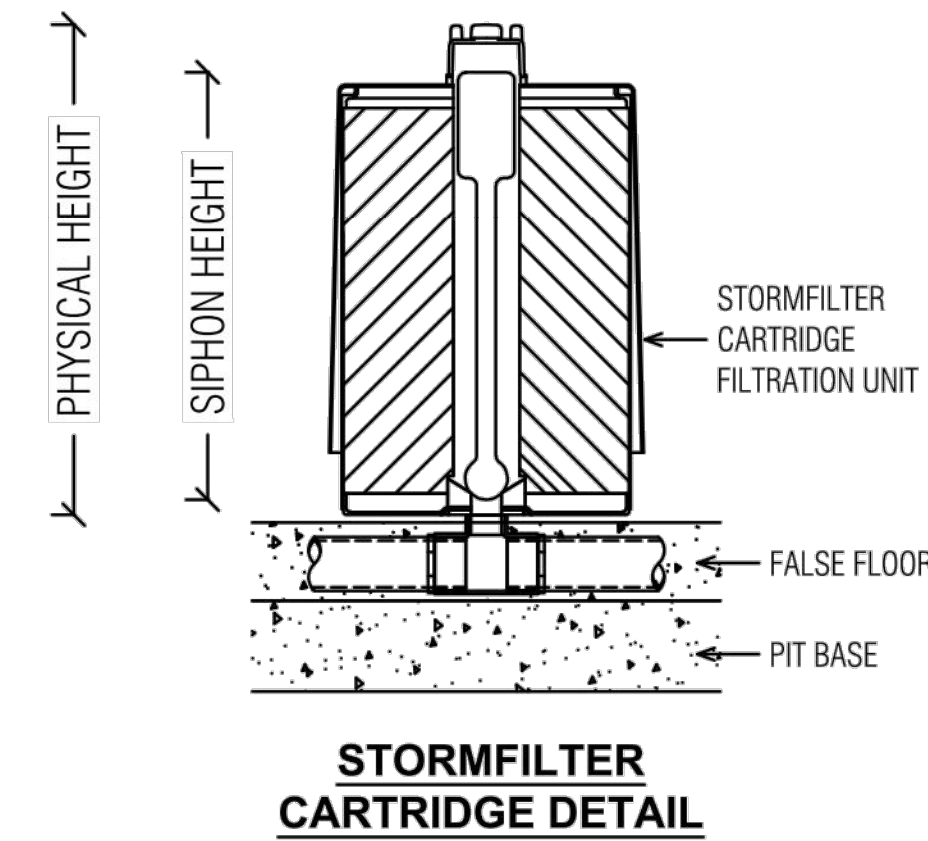
CARTRIDGE NAME / SIPHON HEIGHT (mm)	690	460	310
CARTRIDGE PHYSICAL HEIGHT (mm)	840	600	600
TYPICAL WEIR HEIGHT [H] (mm)	920	690	540
CARTRIDGE FLOW RATE FOR ZPG MEDIA (L/s)	1.6	1.1	0.7
CARTRIDGE FLOW RATE FOR PSORB MEDIA (L/s)	0.9	0.46	0.39

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	[]
NUMBER OF CARTRIDGES REQ'D	[]
SIPHON HEIGHT (310 / 460 / 690)	[]
MEDIA TYPE (ZPG / PSORB)	[]
WATER QUALITY FLOW RATE (L/S)	[]

DIMENSION A	[]
DIMENSION B	[]

TOTAL CARTRIDGE BAY AREA (A x B) TO MATCH AREA REQUIRED BY MUSIC MODELLING OR COUNCIL SPECIFIC REQUIREMENTS



GENERAL NOTES

1. INLET AND OUTLET PIPES TO BE IN ACCORDANCE WITH APPROVED PLANS.
2. A HIGH FLOW BYPASS ARRANGEMENT OR DISSIPATION STRUCTURE MAY BE REQUIRED TO MINIMISE RE-SUSPENSION OF SOLIDS OR ANY SIGNIFICANT INERTIAL FORCES ON THE CARTRIDGES.
3. ALL WATER QUALITY TREATMENT DEVICES REQUIRE PERIODIC MAINTENANCE. REFER TO OPERATION AND MAINTENANCE MANUAL FOR GUIDELINES AND ACCESS REQUIREMENTS.
4. SITE SPECIFIC PRODUCTION DRAWING WILL BE PROVIDED ON PLACEMENT OF ORDER.
5. THE INVERT LEVEL OF THE INLET PIPE MUST BE GREATER THAN THE RL OF THE FALSE FLOOR WITHIN THE CARTRIDGE CHAMBER.
6. CONCRETE STRUCTURE AND ACCESS COVERS DESIGNED AND PROVIDED BY OTHERS. ACCESS COVERS TO BE A MINIMUM 900 X 900 ABOVE CARTRIDGES. OH&S REGARDING ACCESS COVERS AND TANK ACCESS TO BE ASSESSED BY OTHERS ON SITE.
7. THE STRUCTURE THICKNESSES SHOWN ARE FOR REPRESENTATIONAL PURPOSES.
8. DRAWINGS NOT TO SCALE.

INSTALLATION NOTES

1. UNDERDRAIN AND FALSE FLOOR INSTALLED BY OCEAN PROTECT.



PHONE: 1300 354 722 www.oceanprotect.com.au

OCEAN PROTECT
STORMFILTER SYSTEM
DETENTION TANK ARRANGEMENT
SPECIFICATION DRAWING

A1 0 1 2 3 4 5 6 7 8 9 10

PI	ISSUE FOR DA	DT	LA	24.11.21	
REV DESCRIPTION	CHK DR	DATE	REV DESCRIPTION	CHK DR	DATE

ARCHITECT:
design architect knut menden
dipl. ing. bettina steffens

www.bettundknut.com.au

ENGINEER:
TTW Structural
Civil
Façade
612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

PROJECT:
GERMAN INTERNATIONAL SCHOOL
SYDNEY - NEW SCIENCE CENTRE AND
RECEPTION
33 MYOORA ROAD,
TERRY HILLS NSW 2084

DRAWING NAME:
TYPICAL DETAILS, SHEET 4

SCALE : A1
NTS
DRAWN BY
LA
AUTHORISED BY
NB
PROJECT No
211476
DRAWING No
C23
REVISION
P1
Plot File Created: Nov 24, 2021 - 11:41am