



henry&hymas

12 April 2022

Hannas Property Group  
Suite 23.02 Governor Phillip Tower  
1 Farrer Place  
SYDNEY NSW 2000

Attention: Mr. Joe Quarello

Dear Joe,

**RE: INDUSTRIAL UNITS AND STORAGE FACILITY  
101-105 OLD PITTWATER ROAD, BROOKVALE  
CIVIL ENGINEERING SERVICES**

### **PROJECT OVERVIEW**

It is proposed to construct a multi-level storage facility at the above mentioned address. The existing site is approximately 4200m<sup>2</sup> and is a mixture of existing concrete hardstand and industrial style buildings and is located within the Northern Beaches Council local government area. The site area generally falls in an easterly direction and is set lower than Old Pittwater Road, which is the site's primary access point. Figure 1 shows the site location.

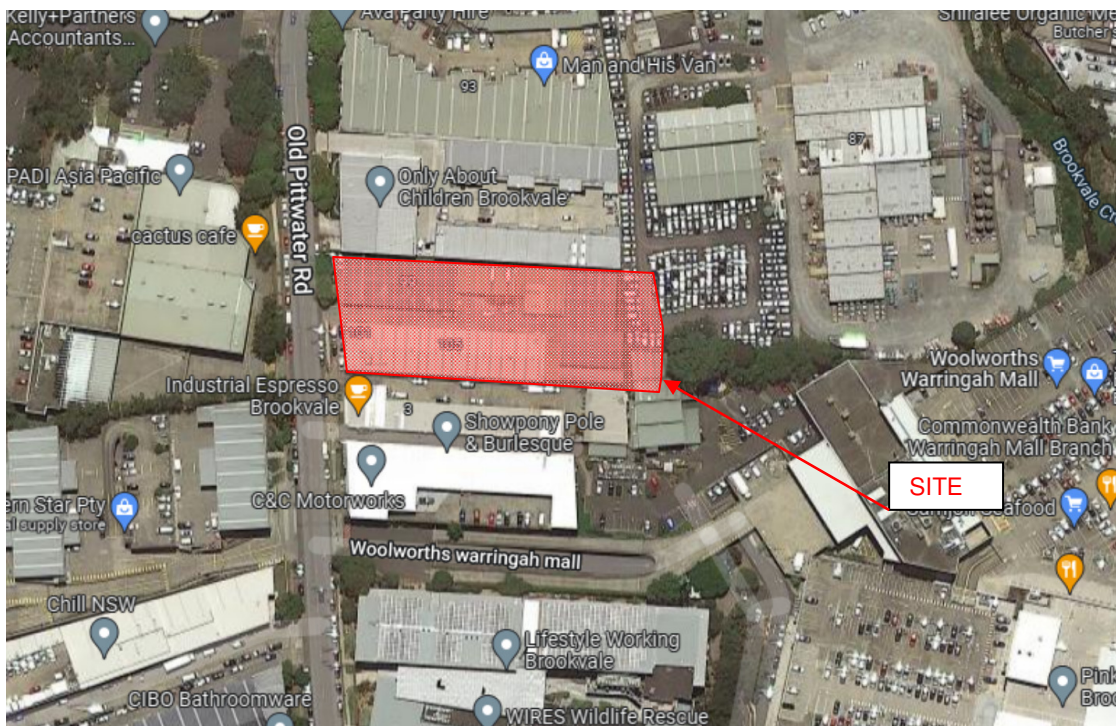


Figure 1: Location of site

## **SURROUNDING ROADS AND STORMWATER INFRASTRUCTURE**

As mentioned above, the site area generally falls in an easterly direction. Old Pittwater Road falls in a southerly direction. Due to the falls of the site, it is reasonable to conclude that it would form part of the greater catchment that drains to Brookvale Creek.

There is an existing Council drainage easement running along the eastern side of the site and existing inlet pits and a 750mm diameter stormwater line located along this easement. The legal point of connection for this site is to an existing pit in this easement and is shown on our detail plan drawing C102.

In a previous development application for the site directly to the north, Council required the upgrade of the pipework and pits within the stormwater easement which has been completed. The point of connection for this development at 101-105 Old Pittwater Road is into this easement line. The flows that will be discharged to this line are detailed in the stormwater strategy section of this report, however it should be noted that there will be no flows over and above what has been previously allowed for into the Council stormwater easement.

## **STORMWATER STRATEGY**

As discussed earlier, the site has an area of approximately 0.42 hectares and currently drains in an easterly direction and ultimately to Brookvale Creek. The Northern Beaches council policy for this site is that all post development flows up to and including the 1%AEP (100ARI) rainfall event must be controlled to a greenfield/state of nature condition.

Our stormwater strategy plans C101 to C103 show how the developed state stormwater will be conveyed through the site. The ground level and upper level 1 will drain in an easterly direction via a piped gravity system. The lower basement level will incorporate a pump out pit. The entire site catchment areas will be directed to a proposed On Site Detention (OSD) tank located below the ground level. In order to control the post development flows to the required rates, 140m<sup>3</sup> of storage will be required in the tank. A combined internal discharge arrangement of an orifice and high level overflow weir has been designed. Details of the tank, including assumed downstream tailwater levels are detailed on the drawing C201.

The connection point for the site is to the existing drainage easement at the east. The previous development directly to the north was required by Council to upgrade this stormwater line to accommodate a maximum of 310L/s. This flow was designed to be accommodated at the connection pit in the easement as shown on our C102 drawing. For reference, the previous engineering plans that were approved by Council for the northern development are included to this report as an attachment. It should be noted that the maximum discharge from the site is only 142L/s in the 100ARI, which is less than half of what was allowed for. This is due to the Northern Beaches Council post development controls that are being followed for this development.

Drawing C250 shows the break-up of the post development catchment areas. Since the level 1 area is what is exposed, it is only this floor and associated roof/mezzanine areas that have been used for the piped drainage assessment. Detailed design of the pump out pit and lower level drainage lines will be carried out at the CC stage.

The design of the OSD tank and level 1 piped system has been modelled using the DRAINS software. The DRAINS model prepared and submitted for the site stormwater system is;

- 21W12 – Drains[00] – rev1TD.drn

### DRAINS MODELLING DATA

For the above mentioned model, the DRAINS modelling software using the ARR 2016 procedures for rainfall and storm generation was used. The rainfall depths and temporal patterns are generated using the Bureau of Meteorology (BOM) and *ARR Data hub* websites respectively. These data files are provided as an attachment to this report.

The site location and co-ordinates used for the data generation is;

Site: Brookvale, NSW

Co-ordinates: Latitude: 33.7625(S)

Longitude: 151.2625(E)

Table 1 below shows how the proposed OSD tank is effective in controlling the post development flows to pre-development/existing rates for a range of storm events from the 50% AEP(2ARI) to the 1% AEP(100ARI).

Table 1 – Pre and Post development flows

ARI	Pre (L/s)	Post (L/s)
2	55	54
5	90	66
10	117	71
20	142	79
100	204	204

### WATER QUALITY STRATEGY

Council's water quality policy for this site is that it must be effective in reducing pollutant loads for the following;

Total Phosphorous – 65% reduction

Total Nitrogen – 45% reduction

Total Suspended Solids – 85% reduction

Gross Pollutants – 90% reduction

In order to achieve these targets, we have proposed a strategy that will pre-treat the stormwater runoff with 4 x OceanGuard pit baskets, followed by 4 x Psorb Stormfilter cartridges. These

devices will be located in the end of line On Site Detention (OSD) Tank. Refer to our plan C201 for the details of this tank and treatment and C251 for the water quality/MUSIC catchment plan and treatment results/reductions achieved.

MUSIC modelling was carried out to determine the treatment strategy. The model presented for review is;

- *101-105 Old Pittwater Road, Brookvale (rev1).SQZ*

## **FLOODING**

A flood information request was submitted with Northern Beaches Council for the development site at 101-105 Old Pittwater Road. On the 21<sup>st</sup> March 2021, we received the flood information certificate and advice from Council's Project Engineer, Ghazal Hosseini. The provided information showed that there is no Flood Planning Level (FPL) for the site, however there are 100ARI overland flows that currently impact the site. As can be seen on figure 2, the "purple" shaded areas are the 100ARI flow extents that enter the site. The existing site levels are lower than the Old Pittwater Road kerb. This means that when the flood levels overtop the kerb, they flow down and into the site as there is reverse cross fall from the kerb. The existing site levels and buildings/structures are such that these flows would be trapped and not be able to pass through and out of the eastern boundary of the site.

The provided flood information shows points around the site with nominated PMF and 100ARI flood levels. It should be noted that the provided flood information did not include any flow values for any storm event. Refer to figure 3 for the flood information table. Points 1, 2 and 3 are of most relevance to the proposed development. Because the development incorporates both a ground floor and basement floor that are below street level, there will need to be protection of all driveway and pedestrian entrances that are below the 100ARI overland flow level. The proposed strategy is to install a combination of water proof concrete hobs and flood gate systems across the frontage of the site that is potentially impacted. We have used the 100ARI flood levels along the kerb to determine what height the protective hobs and flood gates should be set to. A 300mm freeboard has been applied to these levels. Refer to drawing C102 for the location of the proposed protective measures. It should be noted that the 300mm freeboard is only applied to the 100ARI levels and not to the PMF. We are only ensuring that the protection is at or above the PMF which is line with best practice for flood protection.

No floodgate system is proposed across the southern most driveway. This is because this driveways grades directly upwards from the boundary (RL15.73) to Level 1 (RL20.52). The driveway ramp itself will act as the barrier in this location.





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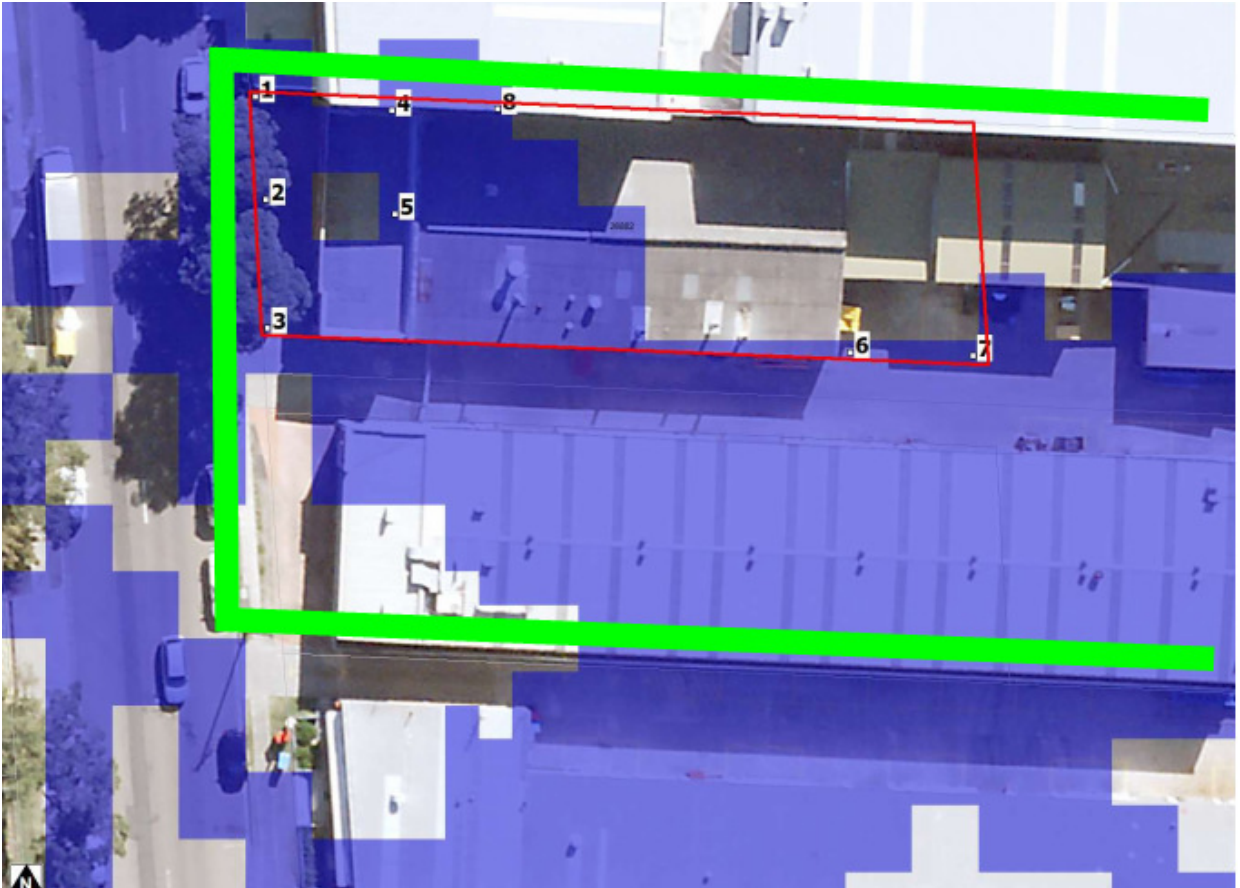


Figure 2: Overland flows impacting site area.

#### Flood Levels

ID	5% AEP Max WL (m AHD)	5% AEP Max Depth (m)	1% AEP Max WL (m AHD)	1% AEP Max Depth (m)	1% AEP Max Velocity (m/s)	Flood Planning Level (m)	PMF Max WL (m AHD)	PMF Max Depth (m)	PMF Max Velocity (m/s)
1	N/A	N/A	16.10	0.07	0.95	N/A	16.20	0.16	1.76
2	15.95	0.03	15.97	0.05	0.67	N/A	16.13	0.21	1.49
3	15.85	0.06	15.87	0.08	0.03	N/A	15.99	0.20	1.68
4	15.43	0.24	15.49	0.31	0.33	N/A	15.77	0.59	0.42
5	15.20	0.18	15.27	0.25	0.25	N/A	15.66	0.64	0.50
6	14.62	0.08	14.64	0.11	1.13	N/A	14.82	0.29	1.26
7	14.51	0.09	14.53	0.10	1.02	N/A	14.81	0.38	1.18
8	15.20	0.31	15.33	0.45	0.35	N/A	15.72	0.83	0.17

Figure 3: Flood levels from Flood information request.

### Floodgate System

The proposed flood gate system is a self-closing *HyfloSCFB* flood barrier. The gate is activated when an adjacent sump is filled with flood waters. When not in operation, the flood gate is concealed below the slab level within a cast-in slab sleeve. Refer to figure 4 that shows an example of the SCFB system during an activated scenario



Figure 4: Example of proposed automated flood gate system.

We believe that given the nature of the current flooding across the site, the proposed flood gate and concrete hob/barrier is an appropriate form of mitigation that adequately protects the development floor levels.

### **EROSION AND SEDIMENT CONTROL**

During construction, appropriate sediment and erosion control measures need to be implemented to ensure that downstream receiving water are not adversely impacted. Our drawings SE01 and SE02 have detailed the required measures. These have been designed in accordance with the requirements of the *Landcom – Managing Urban Stormwater - Soils and Construction, Volume 1, 4th Edition March 2004*.

### **RAMP GRADES AND OVERFLOW GRADING**

All internal ramp grades have been carried out by the Traffic Engineer. Please refer to CBRK plans for this detail. In terms of the hardstand/slab level grading, our detail plans C101-C103 show that the overflow routes for stormwater in an emergency blockage to the system is to the east and to



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the drainage easement for the ground floor and to Old Pittwater Road (via the access ramp) for the upper level 1 area.

### **DRAWING LIST**

The Civil DA drawings provided for submission and to be read in conjunction with this report are;

DRAWING SCHEDULE	
21W12_DA_C000	COVER SHEET, DRAWING SCHEDULE, NOTES AND LOCALITY SKETCH
21W12_DA_C101	BASEMENT DETAIL PLAN
21W12_DA_C102	GROUND FLOOR DETAIL PLAN
21W12_DA_C103	LEVEL 1 DETAIL PLAN
21W12_DA_C200	STORMWATER MISCELLANEOUS DETAILS AND PIT LID SCHEDULE
21W12_DA_C201	OSD PLAN, SECTIONS AND DETAILS
21W12_DA_C250	DRAINS CATCHMENT PLAN
21W12_DA_C251	MUSIC CATCHMENT PLAN
21W12_DA_SE01	SEDIMENT AND EROSION CONTROL PLAN
21W12_DA_SE02	SEDIMENT AND EROSION CONTROL TYPICAL SECTIONS & DETAILS

We trust this serves as an adequate summary and explanation for the nature of the storm water and grading issues related to this site.

Yours faithfully,

TOM DEMPSEY (Senior Civil Engineer)

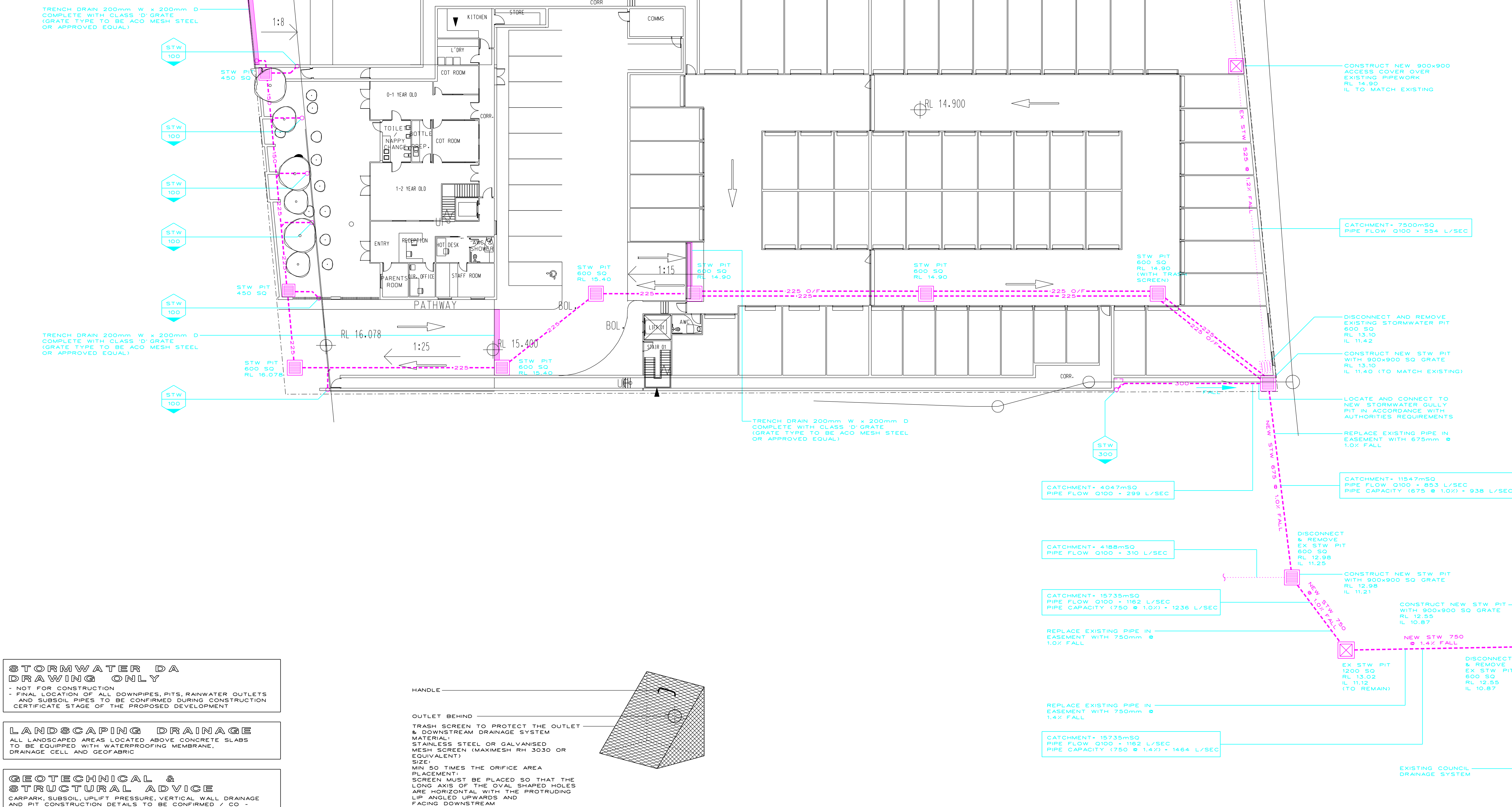
For, and on behalf of,  
H & H Consulting Engineers Pty Ltd



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## **ATTACHMENT A – PREVIOUS STORMWATER DESIGN FOR NORTHERN PROPERTY**





**STORMWATER DA  
DRAWING ONLY**

- NOT FOR CONSTRUCTION
- FINAL LOCATION OF ALL DOWNPIPES, PITS, RAINWATER OUTLETS AND SUBSOIL PIPES TO BE CONFIRMED DURING CONSTRUCTION CERTIFICATE STAGE OF THE PROPOSED DEVELOPMENT

**LANDSCAPING DRAINAGE**

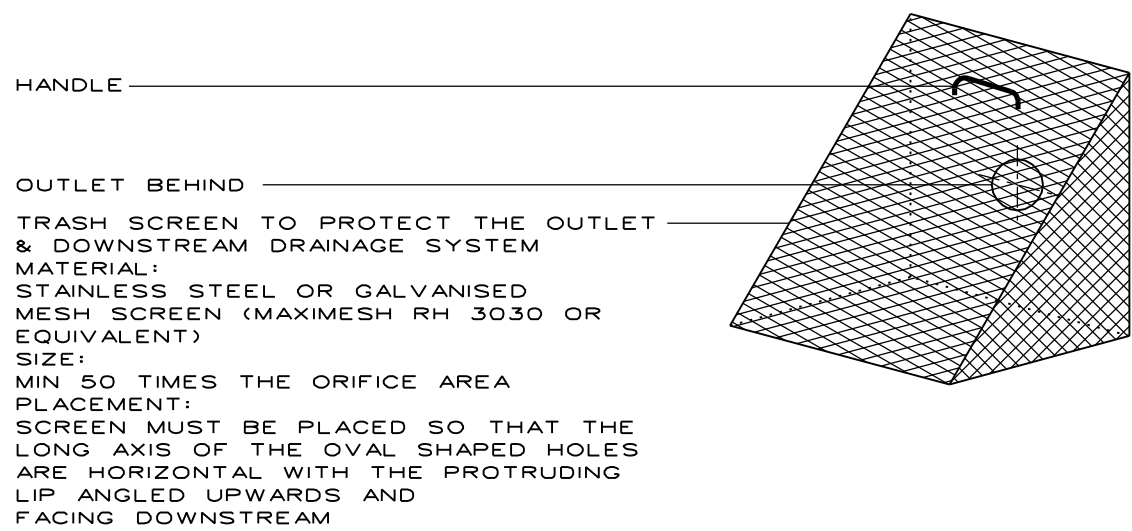
- ALL LANDSCAPED AREAS LOCATED ABOVE CONCRETE SLABS TO BE EQUIPPED WITH WATERPROOFING MEMBRANE, DRAINAGE CELL AND GEOFABRIC

**GEOTECHNICAL &  
STRUCTURAL ADVICE**

- CARPARK, SUBSOIL, UPLIFT PRESSURE, VERTICAL WALL DRAINAGE AND PIT CONSTRUCTION DETAILS TO BE CONFIRMED / CO - ORDINATED WITH STRUCTURAL AND GEOTECHNICAL ENGINEERS DURING CONSTRUCTION CERTIFICATE STAGE OF THE PROPOSED DEVELOPMENT

**CATCHMENT AREAS**

- ALL CATCHMENT AREAS NOMINATED ON PLAN ARE APPROXIMATE ONLY AND BASE ON INFORMATION AVAILABLE AT TIME OF PRINTING.



DETAIL 1:  
TRASH SCREEN  
NTS

		LIST OF REFERENCE DRAWINGS USED		DRAWING REVISION		CLIENT BRICKTOP TRUMEN	ARCHITECT ROTHE LOWMAN ARCHITECTS  itmdesign consulting hydraulic engineers unit 6 / 3 apollo st, warriewood nsw 2102 po box 1438 mono vale nsw 1660 tel:(02) 9997 1566 fax (02) 9997 3266 email: markus@itmdesign.com.au	PROJECT 97-99 OLD PITTWATER ROAD  BROOKVALE NSW 2100	DRAWING TITLE GROUND FLOOR STORMWATER DRAINAGE	
		DISCIPLINE	COMPANY	DRAWING No	A				SCALE 1:200 at A1	JOB No 14/139
		ARCH	R . L	TP1.01	3				DISCIPLINE HYD	DRAWING No H-DA-01
		ARCH	R . L						REVISION C	
C	RE-ISSUED FOR DA	08.04.15	STRUCT							
B	RE-ISSUED FOR DA	09.03.15	MECH							
A	ISSUED FOR DA	15.12.14	ELEC							
REV	DESCRIPTION	DATE	FIRE							