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Proposed Subdivision & Medium Density Development 23A & 29 Robert Street, Tenambit Stormwater Report

Antkim Holdings

Revision: 1
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GCA Ref: 21374

Revision	Description	Author		Review		Approved	
1	Original Issue	T.S	01.11.21	S.H	17.01.22	S.H	17.01.22

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List of Acronyms

AEP	Annual Exceedance Probability	GCA	GCA Engineering Solutions
AHD	Australian Height Datum	MCC	Maitland City Council
ARR2019	Australian Rainfall and Runoff 2019	MLEP 2011	Maitland Local Environmental Plan 2011
EY	Exceedances per Year	MOES	Manual of Engineering Standards
FPA	Flood Planning Area	OSD	On-site Detention
FPL	Flood Planning Level	PSD	Permissible Site Discharge

1 Background

This report supports a Development Application to Maitland City Council (MCC) for a proposed subdivision and medium density development to be located at Lot 52 on DP 815073 and Lot 3 on DP 31696, known respectively as 23A and 29 Robert Street, Tenambit.

1.1 Site

The site comprises Lot 52 on DP 815073 and Lot 3 on DP 31696, with an area of 3239m². The site is zoned R1 (General Residential) in accordance with the Maitland Local Environmental Plan (MLEP) 2011 and is located wholly within the Maitland Local Government Area. The topography across the site is approximately 5%, and generally falls in a north-easterly direction toward Robert Street.

The stormwater drainage system is to be connected to the existing kerb invert located east of the site's access handle.

1.2 Proposed Development

The proposed development comprises 11 new dwellings and associated curtilage including car parking and landscaping within Lot 52 on DP815073 (23A Robert Street) corresponding with the R1 (General Residential) zoning of the site. Access to this proposed subdivision has been constructed through Lot 3 on DP 31696 (29 Robert Street), with a partial demolition of the existing dwelling proposed to accommodate the access handle.

2 On-Site Detention

2.1 Requirements

Following Clause 7.8.2 on Page 120 of MCC’s Manual of Engineering Standards (MOES), stormwater detention for residential development is required at the rate of $7\text{m}^3 / 1000\text{m}^2$ site area with a Permissible Site Discharge (PSD) of 15 L/s per 1000m^2 . This is in addition to any BASIX requirements.

In order to reduce the impact of on-site detention on the parking area, the detention volume for the roofs has been allocated to the proposed Rainwater tanks, required as part of the BASIX commitments for the development.

Additionally, following Clause 7.8.4 on Page 121 of MCC’s MOES, detention of impervious areas exceeding 50m^2 such as long driveways and large vehicle-turning areas, shall be provided at an equivalent rate of 1.8m^3 per 100m^2 with a PSD of 1.5l/s per 100m^2 .

2.2 Results

2.2.1 Rainwater Tank

BASIX tank volume per residential dwelling is 1.5m^3 .

Total tank volume per residential dwelling is 3m^3 .

Rainwater tank OSD volume for the roof area is provided in Table 2.1.

Table 2-1: Rainwater tank OSD volume for roof area.

Unit Number	Roof Area (m)	OSD Volume (m^3)	OSD Volume (% of tank vol)
1	139	0.97	32
2	140	0.98	33
3	109	0.76	25
4	94	0.66	22
5	93	0.65	22
6	93	0.65	22
7	94	0.66	22
8	109	0.76	25
9	94	0.66	22
10	93	0.65	22
11	94	0.66	22

Assuming a tank height of 2.14m, an orifice at the height of 1.07m (50% of the tank height).

Max Head = 1.07m.

Flow rate and the subsequent orifice size for each dwelling is provided in Table 2.2.

Table 2-2: Flow rate and orifice size.

Unit Number	Flow rate (m ³ /s)	Orifice size (mm)
1	0.0021	31
2	0.0021	31
3	0.0016	28
4	0.0014	26
5	0.0014	25
6	0.0014	25
7	0.0014	26
8	0.0016	28
9	0.0014	26
10	0.0014	25
11	0.0014	26

A 25mm orifice plate is the smallest size required by the system. A 25mm orifice plate is to be installed at the outlet of each rainwater tank (1.07m from the top of the tank).

2.2.2 Below-ground Detention Basin

Below ground OSD for the car park area = $820\text{m}^2 \times 1.8\text{m}^3 / 100\text{m}^2 = 14.8\text{m}^3$.

Total area (inc. car park and all roofs) = 1972m^2

The proposed below-ground detention basin was sized iteratively. The details are as follows:

Minimum volume = 14.8m^3 at RL 41.0

Max Head = $42.2 - 41 = 1.2\text{m}$

Flow Rate = $1972/1000 \times 15 \times 0.001 = 0.030\text{m}^3/\text{s}$

Orifice size = $(4 \times 0.030 / \pi \times 0.6 \times (19.6 \times 1.2)^{0.5})^{0.5} = 110\text{mm}$

A 110mm orifice plate is to be installed at the outlet pit to the detention basin.

Outlet: 110mm orifice plate IL 41.0

2.3 Conclusion

The stormwater design comprises a 14.8m^3 below-ground detention basin and 11 rainwater tanks with an individual capacity of 3m^3 that together, satisfy the minimum OSD volume for the proposed development.

A 25mm orifice plate is to be installed at the outlet of each rainwater tank (1.07m from the top of the tank). A 110mm orifice plate at IL 41.0 is to be installed at the outlet pit to the detention basin.

The proposed design satisfies the on-site detention requirements in accordance with MOES.

Appendix A

Development Plans



PROPOSED SUBDIVISION & MEDIUM DENSITY DEVELOPMENT

23A & 29 ROBERT STREET

TENAMBIT

ANTKIM HOLDINGS

MAITLAND CITY COUNCIL

DRAWING SCHEDULE 21374C

DWG No.	SHEET TITLE	REV
C00	COVER SHEET	2
C01	CIVIL WORKS PLAN	2
C02	DETENTION TANK DETAILS	2
C03	POLLUTION CONTROL PIT DETAILS	2
C03	EROSION AND SEDIMENT CONTROL PLAN	2
C04	EROSION AND SEDIMENT CONTROL DETAILS	2
C06	RAINWATER TANK DETAILS	2






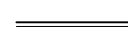
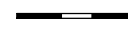
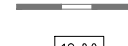




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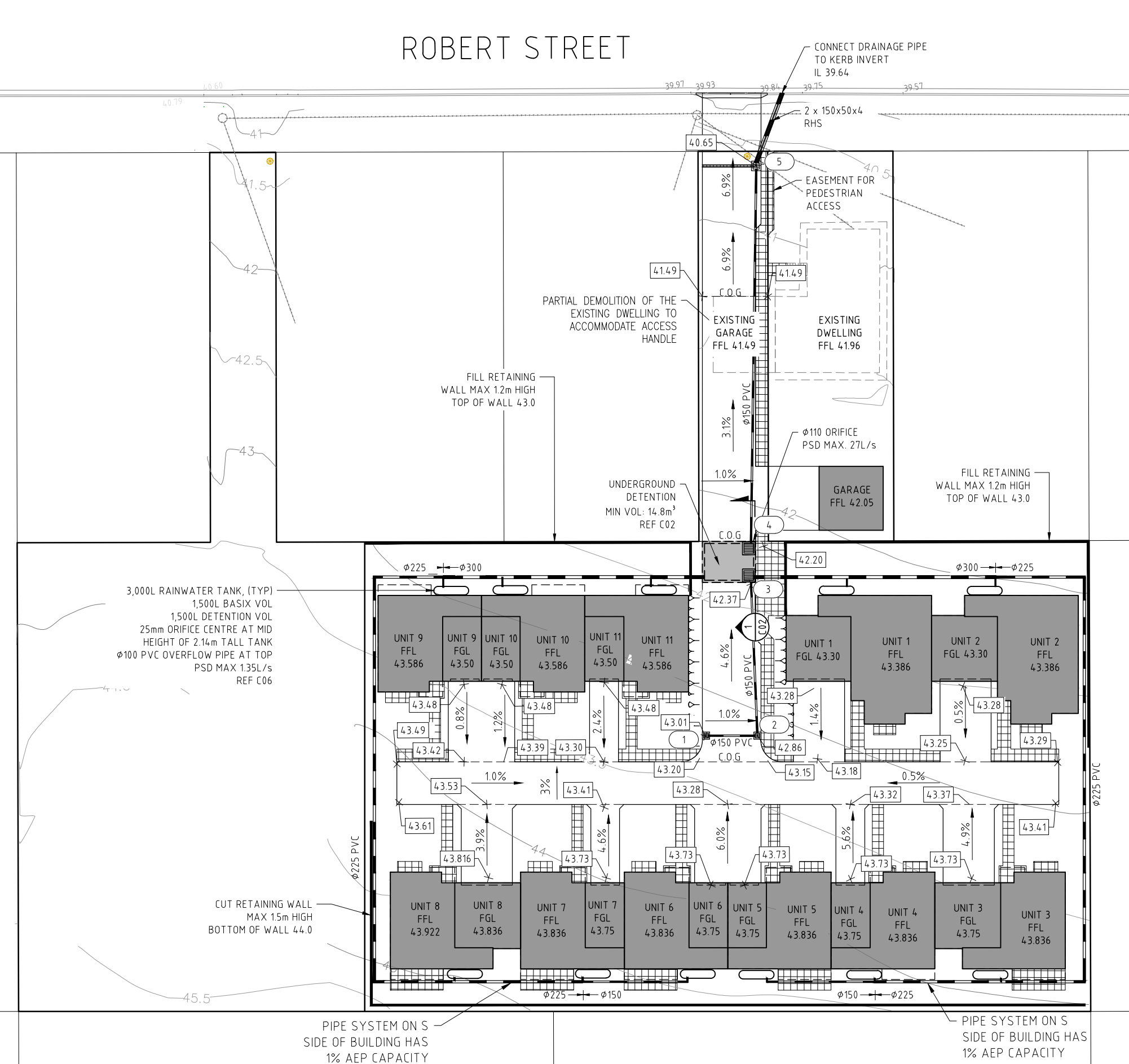
PRELIMINARY ISSUE
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ROBERT STREET

NOTE
 ALL EXISTING UNDERGROUND SERVICES MUST BE LOCATED AND EXPOSED PRIOR TO EARTHWORKS COMMENCING AND IT IS THE RESPONSIBILITY OF THOSE PERSONS USING THIS PLAN TO CONFIRM BOTH POSITION & LEVEL OF THESE UTILITIES IN CONJUNCTION WITH THE APPROPRIATE AUTHORITY.

LEGEND

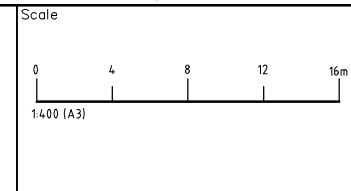
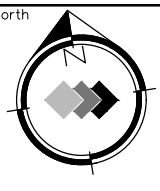
-  PROPOSED BUILDING
-  PROPOSED DETENTION BASIN
- FFL** FINISHED FLOOR LEVEL
- DP** DOWN PIPE
-  PIT NUMBER
-  KERB ONLY
-  PROPOSED PIPE
-  EXISTING PIPE
-  DESIGN FINISHED PAVEMENT LEVEL
-  PROPOSED PIT
-  EXISTING PIT
-  PAVEMENT SURFACE GRADE



Pit No.	DESCRIPTION	LEVEL	
		SURFACE	PIPE INVERT
1	450 x 450 PCP	43.01	42.56
2	450 x 450 PCP	42.86	42.41
3	ACCESS GRATE ON TANK	42.37	41.00
4	TANK 900 x 900 INLET GRATE	42.20	41.00
5	600 x 600 PCP	40.65	40.00

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Amendment	Description	Drawn	App'd	Date
2	ARCHITECTURAL REVISION	B.Y	S.H	19.01.22
1	ORIGINAL ISSUE	B.Y	S.H	17.01.22



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 Project Approval: IAN HILL (B.E)
 Consulting Civil Engineer

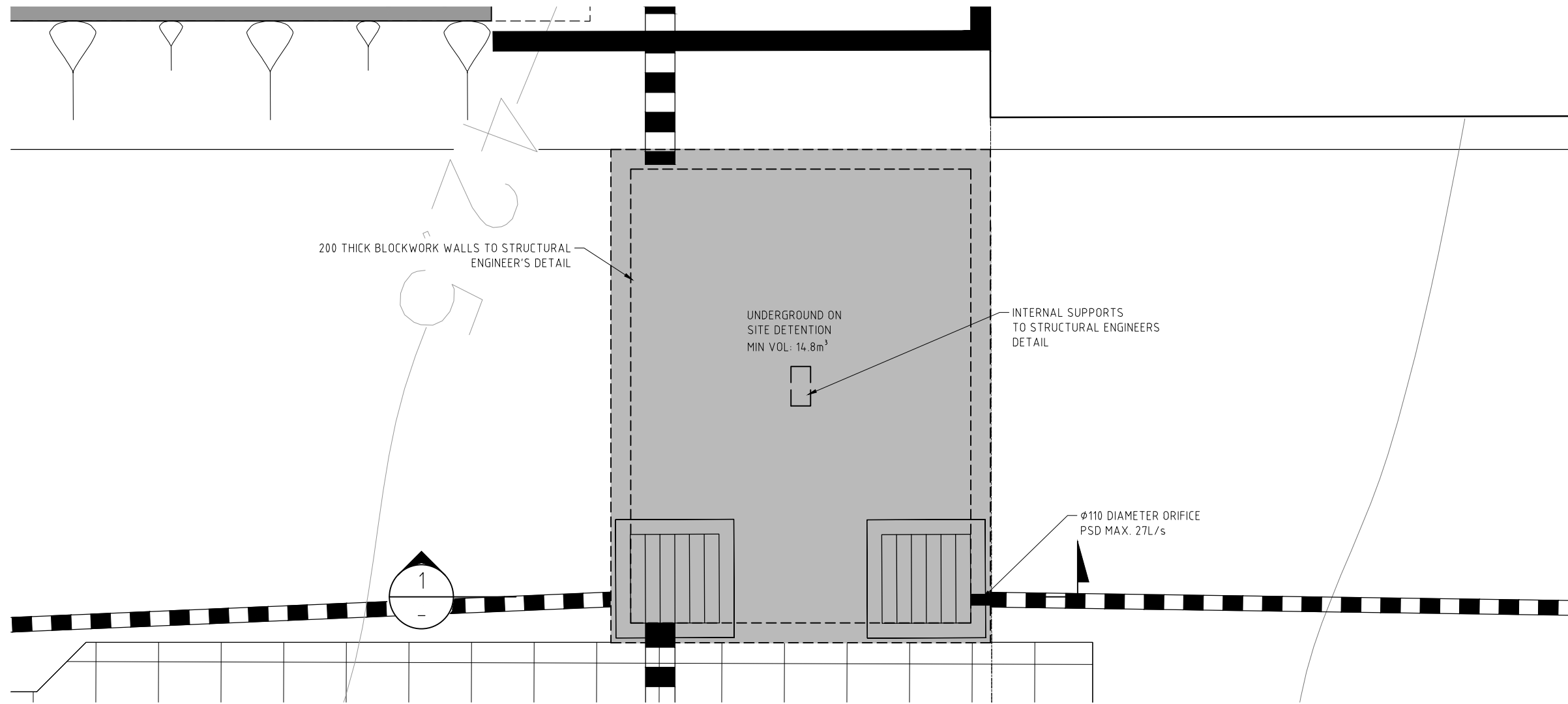
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A3 SHEET

Client:



ANTKIM HOLDINGS
 23A & 29 ROBERT STREET
 TENAMBIT
 CIVIL WORKS PLAN

Project No		21374C
Drawing No	Revision	
C01	2	



UNDERGROUND DETENTION TANK PLAN

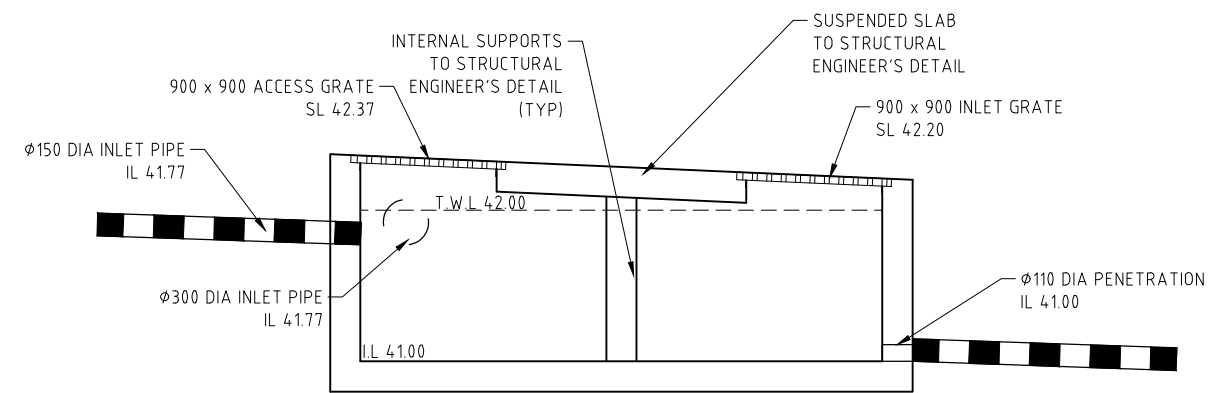
SCALE 1:50

200 THICK BLOCKWORK WALLS TO STRUCTURAL ENGINEER'S DETAIL

UNDERGROUND ON SITE DETENTION
MIN VOL: 14.8m³

INTERNAL SUPPORTS TO STRUCTURAL ENGINEERS DETAIL

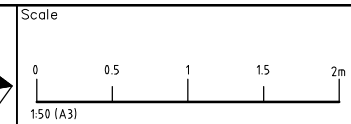
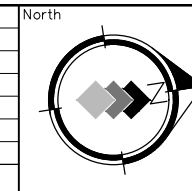
Ø110 DIAMETER ORIFICE
PSD MAX. 27L/s



SECTION 1
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Project Approval
IAN HILL (B.E)
Consulting Civil Engineer

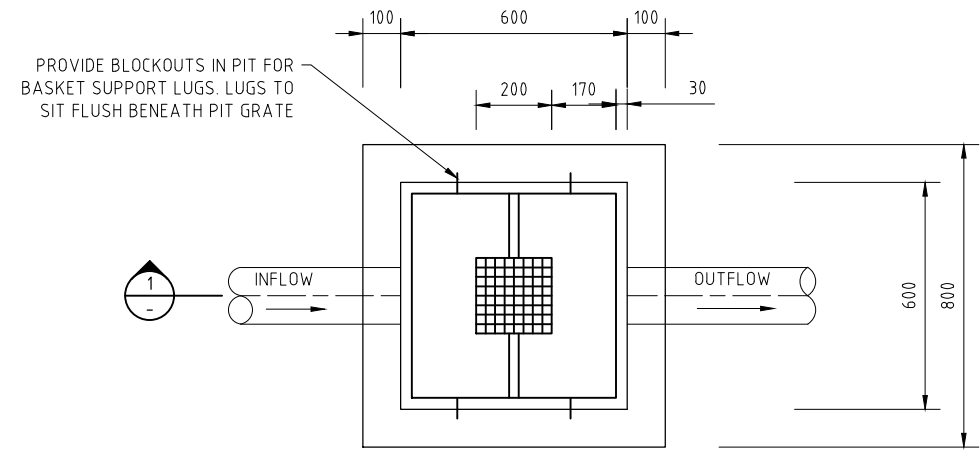
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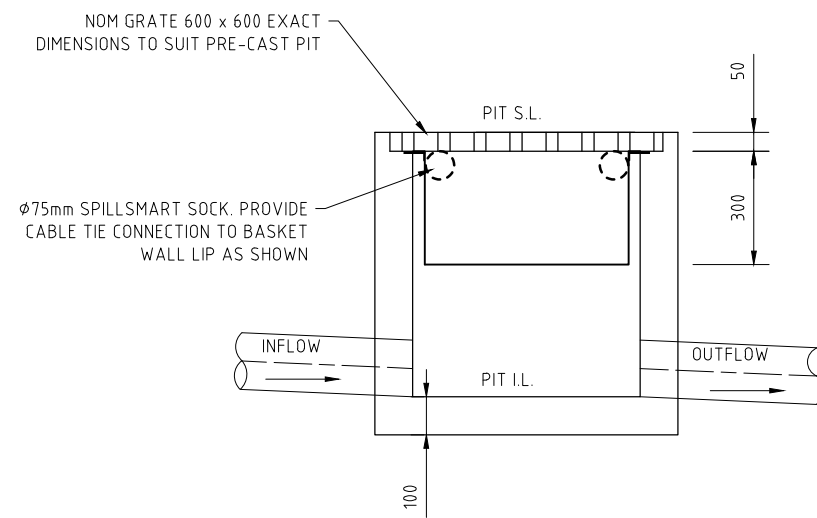


ANTKIM HOLDINGS
23A & 29 ROBERT STREET
TENAMBIT
DETENTION TANK DETAILS

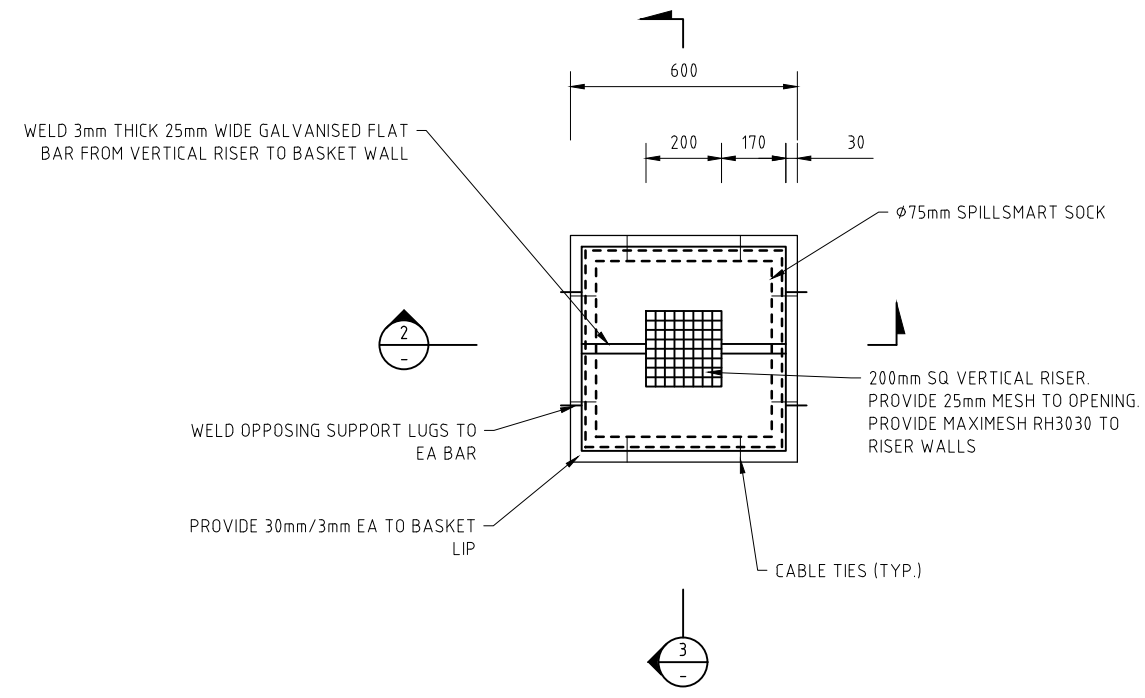
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Drawing No C02	Revision 2



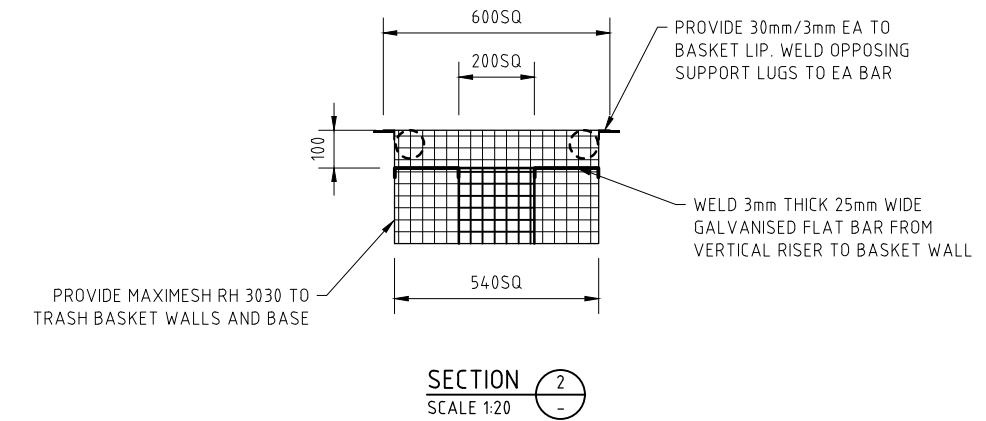
POLLUTION PIT TYPICAL DETAIL (PCP)
SCALE 1:20



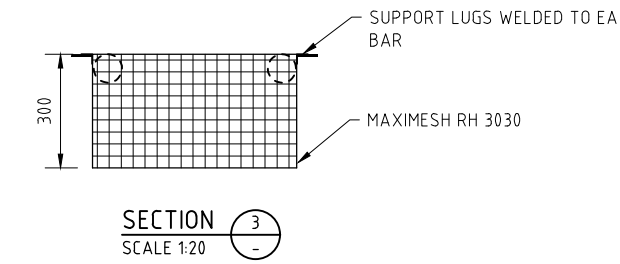
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SCALE 1:20



PCP TRASH BASKET TYPICAL DETAIL
SCALE 1:20



SECTION 2
SCALE 1:20

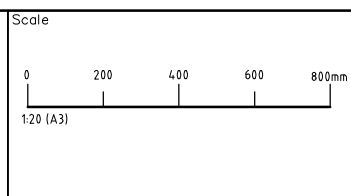


SECTION 3
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2	ARCHITECTURAL REVISION	B.Y	S.H	19.01.22
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North
Scale



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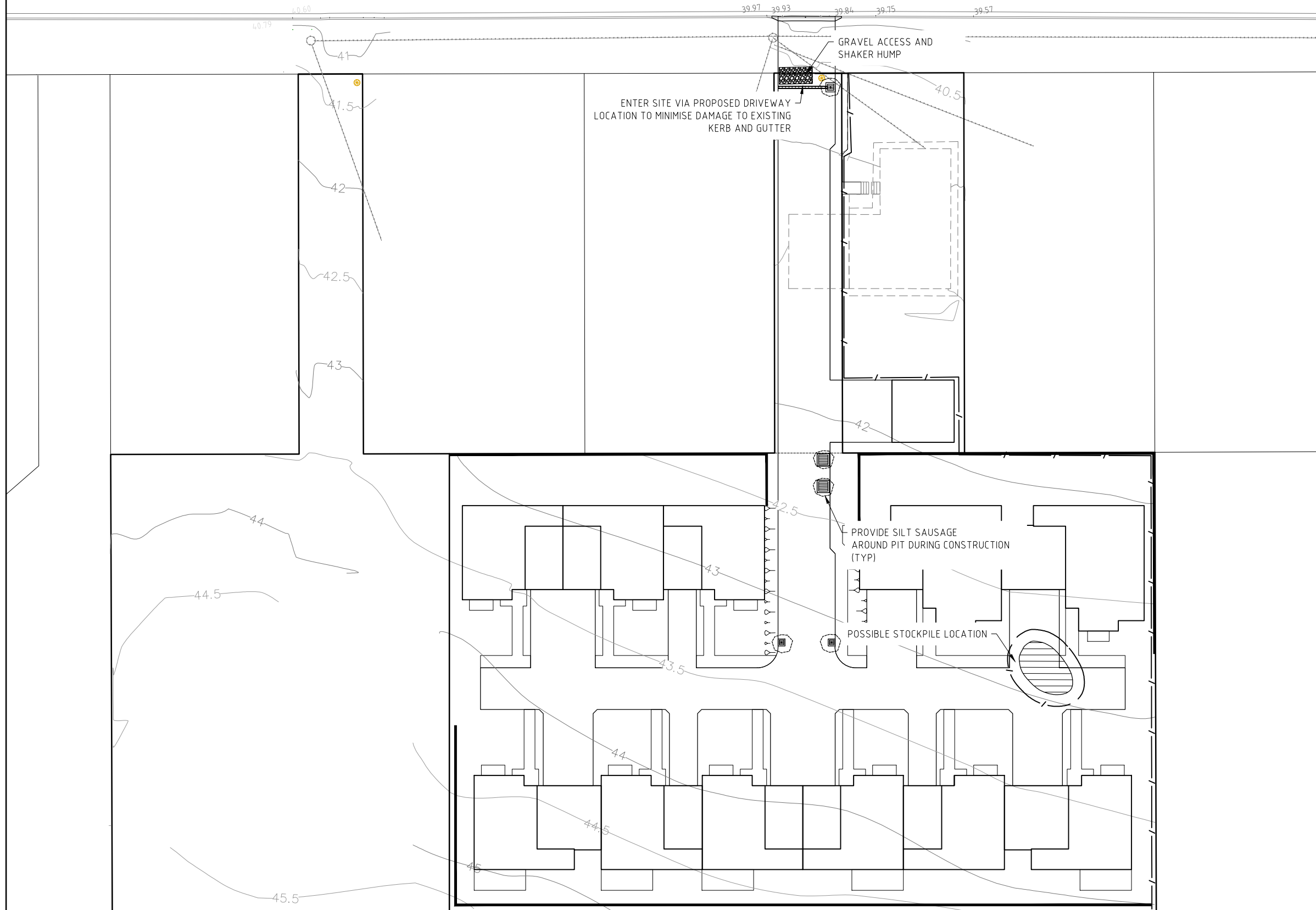
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Project Approval IAN HILL (B.E) Consulting Civil Engineer	

Client

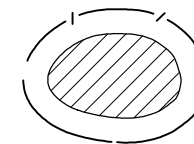
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23A & 29 ROBERT STREET
TENAMBIT
POLLUTION CONTROL PIT DETAILS

Project No	21374C
Drawing No	C03
Revision	2

ROBERT STREET



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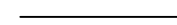
STOCKPILE. REFER SD4-1



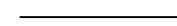
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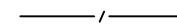
STABILISED SITE ACCESS. REFER SD6-14



LIP DRAIN. REFER DETAIL ON DWG C--



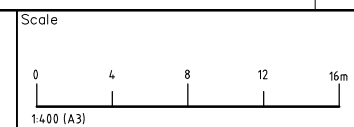
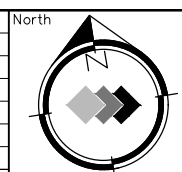
EARTH BANK. REFER SD5-5



SEDIMENT FENCE. REFER SD6-8

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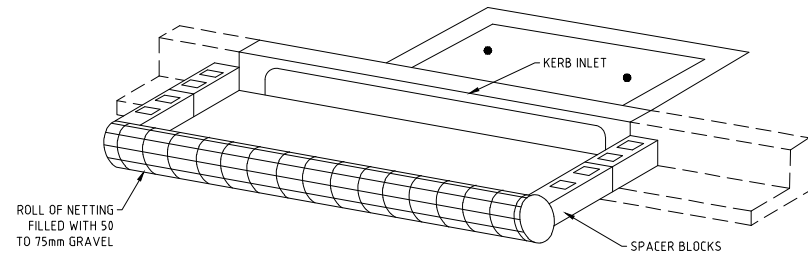
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Project Approval IAN HILL (B.E) Consulting Civil Engineer	

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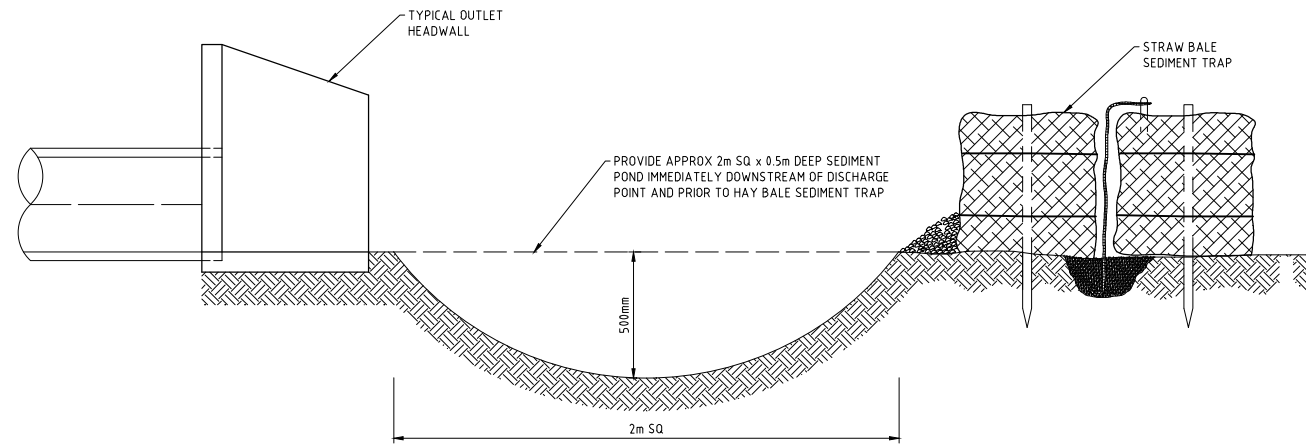
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23A & 29 ROBERT STREET
TENAMBIT
EROSION AND SEDIMENT CONTROL PLAN

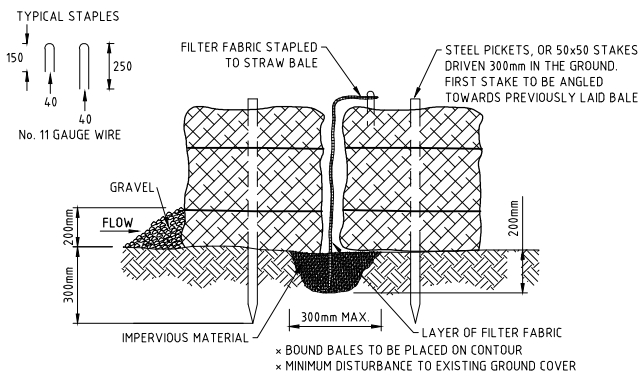
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Revision 2



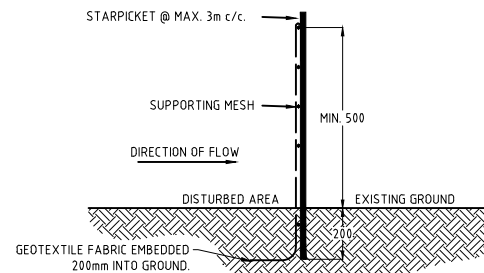
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N.T.S



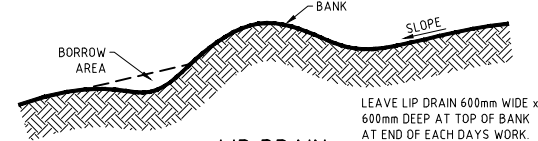
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N.T.S



STRAW BALE DETAIL
N.T.S



SEDIMENT FENCE.



LIP DRAIN
N.T.S

TYPICAL CONSTRUCTION SCHEDULE

	WEEK							
	1	2	3	4	5	6	7	8
CONSTRUCT ALL TEMPORARY SEDIMENT BASINS	█							
PLACE SILT FENCE ALONG ROAD BOUNDARIES AS SHOWN	█							
PLACE SILT FENCE BELOW AREAS TO BE REGRADED	█							
CONSTRUCT ALL DIVERSION BANKS CATCHING CLEAN WATER	█							
ROAD CONSTRUCTION AND REGRADED		█	█	█	█	█	█	█
PLACE SILT FENCE AROUND TOPSOIL STOCKPILES		█	█	█	█	█	█	█
PLACE SEDIMENT BARRIERS AROUND STORMWATER PITS AT COMPLETION OF DRAINAGE			█	█	█	█	█	█
PLACE STRIP TURF PARALLEL TO DESIGN CONTOURS ALONG ROAD AS SHOWN								█

EROSION CONTROL

- EROSION CONTROL DEVICES AND SILTATION TRAPS TO BE INSTALLED BEFORE SITE IS DISTURBED IN ACCORDANCE WITH N.S.W. DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT GUIDELINES AND APPROVED BY COUNCIL INSPECTOR.
- ALL PERIMETER AND CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN EARTHWORKS AND/OR CLEARING.
- SILT TO BE REMOVED FROM TEMPORARY SEDIMENT CONTROL BASINS AS DIRECTED BY COUNCIL INSPECTOR OR DEPARTMENT OF LAND AND WATER CONSERVATION REPRESENTATIVE TO MAINTAIN SILTATION STORAGE CAPACITY IN TEMPORARY BASINS.
- FILTRATION BUFFER ZONES ARE TO BE FENCED OFF AND ACCESS PROHIBITED TO ALL PLANT AND MACHINERY.
- HAY BALE BARRIERS AND GEOTEXTILE FENCES ARE TO BE CONSTRUCTED TO TOE OF BATTER PRIOR TO COMMENCEMENT OF EARTHWORKS IMMEDIATELY AFTER CLEARING OF VEGETATION BEFORE REMOVAL OF TOPSOIL.
- SANDBAGS TO BE USED DURING ROAD CONSTRUCTION TO DIVERT STORMWATER INTO PITS WHEN SUBGRADE IS UP TO KERB LEVEL.
- ALL TEMPORARY EARTH BERMS, DIVERSION AND SILT DAM EMBANKMENTS ARE TO BE MACHINE COMPACTED, SEEDED & MULCHED FOR TEMPORARY VEGETATION COVER AS SOON AS THEY HAVE BEEN FORMED.
- CLEAN WATER IS TO BE DIVERTED AWAY FROM DISTURBED GROUND AND INTO DRAINAGE SYSTEM.
- 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 APPROVED LOCATION.
- ALL TOPSOIL IS TO BE STOCKPILED ON SITE FOR RE-USE (AWAY FROM TREES AND DRAINAGE LINES). MEASURES SHALL BE APPLIED TO PREVENT EROSION OF THE STOCKPILES.
- ALL FILLS ARE TO BE LEFT WITH A LIP AT THE TOP OF THE SLOPE AT THE END OF EACH DAY'S EARTHWORKS. THE HEIGHT OF THE LIP SHALL BE A MINIMUM OF 200mm.
- ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND MULCHED WITHIN 10 DAYS OF COMPLETION OF FORMATION.
- UNDERSCRUBBING OF VEGETATION TO BE RESTRICTED TO SLASHING TO MINIMISE SOIL DISTURBANCE.
- UPON COMPLETION OF ALL EARTHWORKS OR AS DIRECTED BY COUNCIL, SOIL CONSERVATION TREATMENTS SHALL BE APPLIED TO RENDER AREAS THAT HAVE BEEN DISTURBED. EROSION PROOF WITHIN 14 DAYS.
- DENUDED AREAS TO BE STRIP TURF OR HYDROMULCH SEEDED WITH THE SEED MIX BELOW OR APPROVED BY DEPARTMENT OF LAND AND WATER CONSERVATION REPRESENTATIVE. WITHIN 14 DAYS OF PRACTICAL COMPLETION OF EARTHWORKS. STRIPS ARE TO BE PLACED ACROSS THE CONTOUR AT RIGHT ANGLES TO THE DIRECTION OF SLOPE.

HYDROMULCH SEED MIXES

SUMMER MIX		AUTUMN MIX	
MATERIAL	APPLICATION RATE	MATERIAL	APPLICATION RATE
JAPANESE MILLET	30 Kg/Ha	OATS	20 Kg/Ha
COUCH	10 Kg/Ha	RYE GRASS	10 Kg/Ha
CARPET GRASS	10 Kg/Ha	RED CLOVER	5 Kg/Ha
HAIFA WHITE CLOVER	5 Kg/Ha	WHITE CLOVER	5 Kg/Ha
BINDER	200 l/Ha	COUCH	10 Kg/Ha
PULP	1000 Kg/Ha	FERTILISER ENRICHER	300 Kg/Ha
FERTILISER	300 Kg/Ha	OR	
		DYNAMIC LIFTER	1000Kg/Ha

- THE AREA OVER ALL STORMWATER AND SEWER LINES NOT WITHIN ROAD RESERVES IS TO BE MULCHED AND SEEDED WITHIN 14 DAYS AFTER BACKFILL.
- NO MORE THAN 150m OF TRENCH IS TO BE OPEN AT ANY ONE TIME.
- AREAS OVER ELECTRICITY, TELEPHONE AND GAS SUPPLY TRENCHES ARE TO BE SEEDED AND MULCHED BY THE RELEVANT AUTHORITY WITHIN 14 DAYS AFTER BACKFILL.
- ALL FOOTPATHS, BERMS AND BATTERS AND SITE REGRADED AREAS ARE TO BE TOPSOILED WITH MINIMUM 75mm OF SELECTED SITE TOPSOIL AND GRASSED.
- STRIPS OF TURF ARE TO BE PLACED IMMEDIATELY BEHIND THE KERB AND GUTTER ON ALL NEW ROADS AND AT LOCATIONS AS DETERMINED BY COUNCIL'S SUPERVISING OFFICER.
- ALL FINAL EROSION PREVENTION MEASURES INCLUDING THE ESTABLISHMENT OF GRASSING ARE TO BE COMPLETED PRIOR TO THE SUBDIVISION FINAL INSPECTION. ALL EROSION DEVICES ARE TO BE MAINTAINED UNTIL THE END OF THE MAINTENANCE PERIOD.

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

Amendment	Description	Drawn	App'd	Date
2	ARCHITECTURAL REVISION	B.Y	S.H	19.01.22
1	ORIGINAL ISSUE	B.Y	S.H	27.10.92

PLOT DATE: 19/01/2022 2:18:11 PM CAD FILE: Q:\21\21374 29A Robert St, Tanambit\02_CAD\AutoCAD\Civil\21374C dC05 r2.dwg

North
Scale

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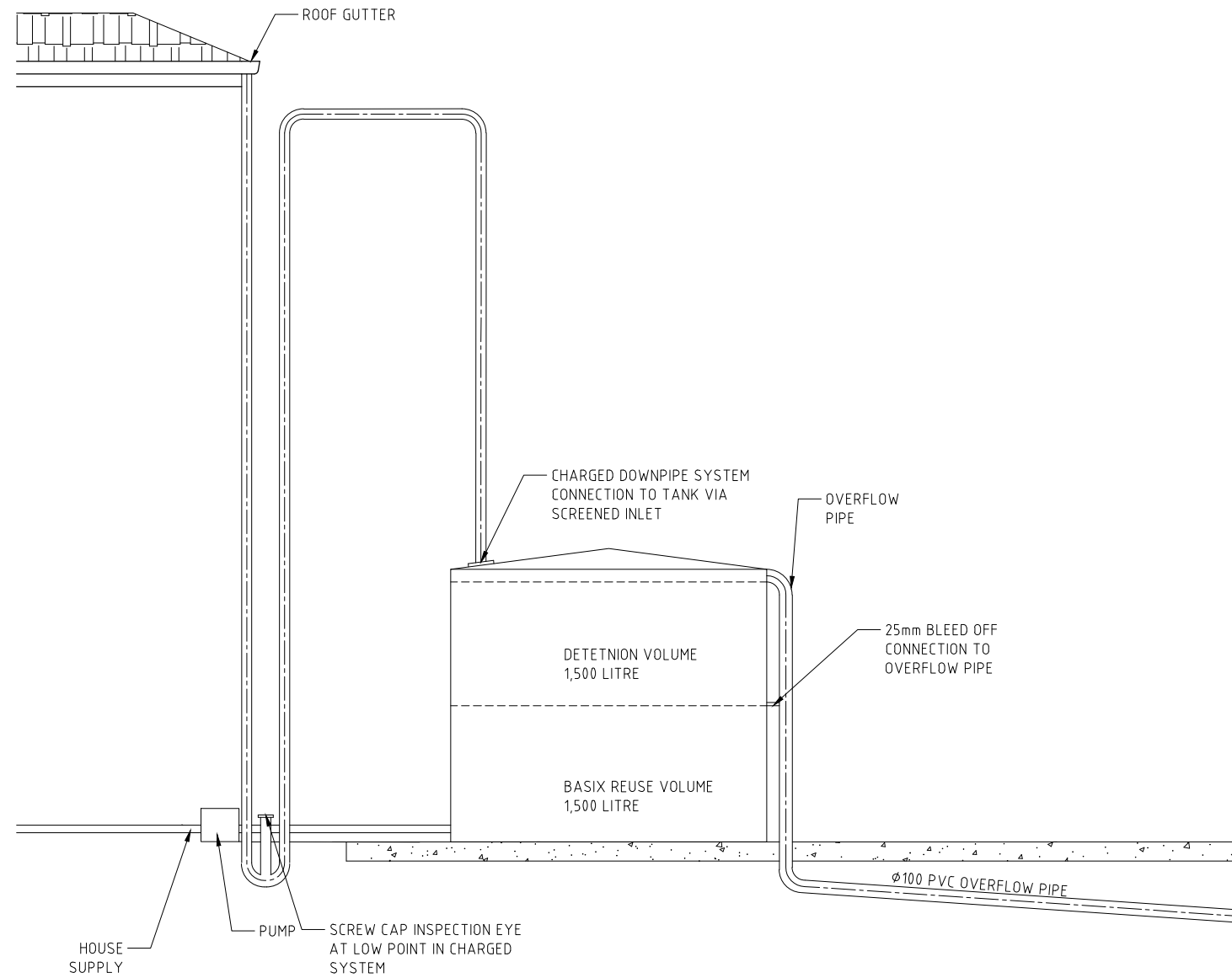
Designed
S.H
Scale
A3 SHEET
Project Approval
IAN HILL (B.E)
Consulting Civil Engineer

Cad Reference
21374C dC05 r2
Client

GCA
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ANTKIM HOLDINGS
23A & 29 ROBERT STREET
TENAMBIT
EROSION AND SEDIMENT CONTROL DETAILS

Project No	21374C
Drawing No	C05
Revision	2

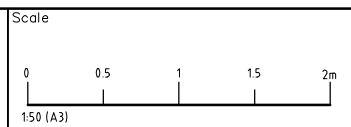


RAINWATER TANK DETAILS (SCHEMATIC)
SCALE 1:50

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

Amendment	Description	Drawn	App'd	Date
2	ARCHITECTURAL REVISION	B.Y	S.H	19.01.22
1	ORIGINAL ISSUE	B.Y	S.H	27.10.21

North



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Designed B.Y	Cad Reference 21374C dC06 r2
Scale 1:50	A3 SHEET
Project Approval IAN HILL (B.E) Consulting Civil Engineer	

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RAINWATER TANK DETAILS

Project No 21374C
Drawing No C06
Revision 2