53 Dwyer Road, Bringelly

Overland Flood Assessment

Revision 1
July 2018

Catchment Simulation Solutions

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1 INTRODUCTION

Sasanadhaja Buddhist Association Inc are planning to construct a new temple facility at the rear of an existing residential dwelling located at 53 Dwyer Road, Bringelly. The location of development site is shown in **Figure 1**, which is enclosed in **Appendix A**.

The proposed development will involve the construction of one main shrine building with one ancillary building for toiletry purposes and another building for kitchen purposes, an open courtyard, a large open carpark, relocation of septic tanks and demolition of four (4) existing sheds. Plans of the proposed development are included in **Appendix B**.

The development site is located within the Liverpool City Council Local Government Area. Council identified that the site is impacted by an overland flow path. Accordingly, any development across the site has the potential to alter the current distribution of overland flood water, which may adversely impact on neighbouring properties. As a result, Council requested that an overland flood study be prepared to support the development application for the proposed temple.

This report forms the overland flood study for the proposed development. The primary goals of the study were to:

- Develop a new flood model of the local catchment draining through the site using the TUFLOW software;
- Use the TUFLOW model to simulate the 100 year ARI flood for pre-development and post-development conditions;
- Prepare flood maps describing overland flood behaviour in the vicinity of the site for pre-development and post-development conditions;
- Prepare flood level difference mapping to quantify the nature and extent of any changes in flood level and extent associated with the proposed development; and,
- Identify any works that may be required to mitigate any adverse flood impacts.

The outcomes of the overland flow study are summarised in the following report.

2 PRE-DEVELOPMENT FLOOD ASSESSMENT

2.1 Description of the Site

The development site occupies a total area of 3.1 hectares and adjoins Dwyer Road at Bringelly (refer **Figure 1**). The site is currently occupied by one residential dwelling located on the eastern side of the site. Four sheds are also scattered across the eastern section of the site.

There are three (3) existing dams on the site:

- Dam 1: Located in the front yard immediately adjacent to Dwyer Road;
- Dam 2: A larger dam to the rear of the existing dwelling located roughly in the middle of the site; and,
- Dam 3: A small dam located at the very rear (western part) of the site.

Dam 1 is small and receives minor inflows from the front yard and a part of Dwyer Road. Dam 2 receives overland flows from the development site as well as two properties located to the north (49 and 51 Dwyer Road) via two different overland flow paths. Overflows from this dam discharge to the south and into 55 Dwyer Road. Dam 3 receives overland flows from a small portion of the development site and a small area at the rear of 51 Dwyer Road.

2.2 TUFLOW Modelling

2.2.1 Model Development

In order to understand the potential for the development to impact on existing/pre-development flood behaviour, it is first necessary to define flood behaviour for "pre-development" conditions. Pre-development flood behaviour across the site was established using a purpose-built direct rainfall TUFLOW model.

The TUFLOW model that was developed for the investigation incorporated the following features:

- Model Domain: the TUFLOW model domain/area extends across the full catchment draining through the development site. The model also extends downstream of the site to ensure any uncertainty in the downstream boundary condition does not impact on results in the vicinity of the site. The extent of the model is shown in **Figure 2**.
- Grid Size: a 1 metre grid size was used to represent the variation in terrain and hydrologic/hydraulic properties across the catchment.
- Elevations: elevations were assigned to each grid cell in the model based upon LiDAR information collected by NSW Land and Property Information in 2011.
- Rainfall Losses and Manning's "n" Roughness: Rainfall losses and Manning's "n" roughness coefficients were assigned based upon the land use polygons shown in **Figure 2**. The land uses were delineated by hand based upon recent aerial imagery. The rainfall losses and Manning's "n" values assigned to each land use are summarised in **Table 1**.

Table 1 Rainfall Loss and Manning's "n" Roughness Values

Material Description	Rainfall Losses		Manning's "n"
	Initial Loss (mm)	Continuing Loss (mm/hr)	
Short grass	10.0	2.5	0.035
Long grass	10.0	2.5	0.045
Water bodies	0.0	0.0	0.030
Trees	10.0	2.5	0.100
Concrete	1.0	0.0	0.015
Sealed road	1.0	0.0	0.018
Building	1.0	0.0	1.000

- Downstream Boundary: The downstream boundary conditions for the model was defined using a normal depth (i.e., Manning's) calculation. A variable bed slope of between 0.06 and 0.23 was assigned along the length of the boundary to inform the normal depth calculations. This slope information was extracted from the available LiDAR information.
- Rainfall: Design rainfall was extracted from 'Australian Rainfall & Runoff' (Engineers Australia, 1987) for the 1% AEP event for a range of difference durations. The design rainfall is summarised in **Table 2**. The design rainfall was extracted at the centroid of the catchment draining through the development site. ARR1987 rainfall was adopted in preference to ARR2016 rainfall as the ARR1987 rainfall was higher for all storm durations.

Table 2 1% AEP Design Rainfall Depths

Duration	Rainfall Depth (mm)
30 mins	49.3
1 hour	66.8
1.5 hour	78.5
2 hours	87.7
3 hours	102
6 hours	132

- Buildings: Buildings represent one of the most significant overland flow impediments. As shown in **Table 1**, this flow impediment was represented by applying a high Manning's "n" roughness value to all building footprints (n=1.00). However, a lower Manning's "n" value was adopted for shallow flow depths to reflect the rapid rainfall runoff from roof areas.
- Farm Dams: As discussed, the local catchment incorporates a number of farm dams. Although there is potential for each dam to capture and store runoff from the upstream catchment (thereby reducing downstream flows), it was assumed that each dam was

"full" prior to the commencement of rainfall to ensure a conservative estimate of overland flood behaviour was provided.

2.2.2 Results

The TUFLOW model was used to simulate a range of different durations for the 1% AEP storm, ranging from 30 minutes up to 6 hours. The results from the design flood simulations were reviewed to confirm the critical storm duration in the vicinity of the site. This analysis determined that the 1.5 hour storm was most commonly critical for the overland flow paths draining into the development site while the 2 hour storm was typically critical for the farm dams. Accordingly, both the 1.5 hour and 2 hour storm were run and the results from the individual storm durations were combined to form a final design flood envelope which formed the basis for the display of results.

Peak floodwater depths and water levels for pre-development conditions were extracted from the design flood envelop and are presented in **Figure 3**. It should be noted that only areas exposed to an inundation depth of greater than 0.1 metres is shown in **Figure 3** to distinguish between areas of negligible inundation and those areas subject to more significant overland flooding. It was noted that application of a depth filter did result in a significant number of "puddles". Therefore, an additional area threshold was applied to the raw TUFLOW results to remove isolated puddles less than 50 m^2 that did not form part of an obvious overland flow path.

Figure 3 shows that with the exception of the three farm dams, the majority of the development site is not predicted to be exposed to significant overland flow depths. However, there are two overland flow paths identified in **Figure 3**:

- The primary flow path which enters partway along the northern property boundary and drains in a south-westerly direction into Dam 2. Peak 1% AEP water depths along this flow path are predicted to reach just over 0.4 metres.
- A smaller, secondary path runs along a part section of the southern site boundary. Peak 1% AEP water depths along this flow path typically do not exceed 0.2 metres.

3 POST DEVELOPMENT FLOOD ASSESSMENT

3.1 Description of the Development

The proposed development will involve the construction of one main shrine building, ancillary buildings for toiletry and kitchen purposes, an open courtyard, a large open carpark, relocation of septic tanks and demolition of four existing sheds. Plans of the proposed development are provided in **Appendix B**.

3.2 TUFLOW Modelling

3.2.1 Model Modifications

As discussed, one of the key goals of the study was to quantify overland flood behaviour for "post-development" conditions and to quantify the potential impacts that the proposed development is predicted to have on existing overland flow behaviour. In this regard, the TUFLOW model that was used to define "pre-development" overland flood behaviour was updated to reflect the proposed development.

The following updates were completed to the TUFLOW model to reflect the proposed development:

- The proposed changes in ground surface elevations were included in the TUFLOW model as "z shapes" based upon the plans enclosed in **Appendix B**. The extent of terrain changes is shown in **Figure 4**. Post-development ground level contours are also provided on **Figure 5**.
- The four sheds that are located on the existing site were removed.
- The materials polygons were modified to reflect the reduced potential for rainfall infiltration and reduced roughness across the proposed development footprint. This typically involved increasing the extent of the buildings and impervious/concrete areas. The extent of the material changes is shown in **Figure 4**.
- The proposed stormwater management system was included in the model based upon the plans enclosed in **Appendix B**. This included new stormwater pits and pipes as well as modifications to Dam 2 to include an additional onsite detention volume (this included lowering the terrain as well as inclusion of a new basin wall). The location of the new stormwater pits and pipes as well as the extent of the elevation changes to represent the proposed detention area are shown in **Figure 4**. It was assumed that the onsite detention area was empty at the beginning of the simulation and that the outlet from the onsite detention included a floodgate to prevent water in Dam 2 from "backing up" into the detention area.

3.2.2 Results

The updated model was used to re-simulate the 1.5 and 2-hour 1% AEP storms for post-development conditions. Peak floodwater depths and water levels were extracted from the results of the design flood simulations and are presented in **Figure 5**. The same depth and

minimum area filter that was applied to the pre-development results was also applied to the post-development results.

Flood level difference mapping was also prepared to confirm the nature and extent of any changes in existing 1% AEP flood levels associated with the development. The flood level difference mapping was prepared by subtracting peak "post-development" flood levels from "pre-development" flood levels at each TUFLOW model grid cell. This creates a difference map showing the magnitude and location of changes in flood levels and extents associated with the proposed development. The flood level difference mapping is provided in **Figure 6**.

Figure 6 indicates that the proposed development is predicted to generate increases as well as decreases in existing flood levels across the development site. Water levels within Dam 2 are predicted to reduce by 0.05 metres as a result of the new detention area. Existing flood levels within the new detention areas are predicted to increase by 0.11 metres as a result of the new detention "wall". A very small increase in water level (0.02m) is also predicted along the swale that adjoins the southern site boundary. However, this is dissipated by the new stormwater system in this area. All flood level increases are fully contained to the development site.

Figure 6 also shows that the proposed development is not predicted to change existing flood levels upstream of the site. In addition, a small reduction in flood level (i.e., -0.02 metres) is anticipated downstream of the site as a result of the proposed detention system.

Accordingly, the results indicate that this development will not have any adverse flood impacts on the adjoining properties and will actually afford a small improvement to existing flood levels and extents downstream of the site.

4 SUMMARY

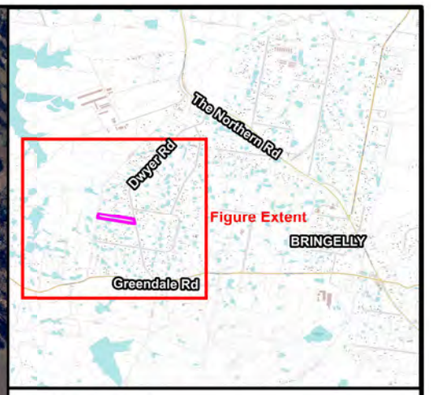
This report has summarised the outcomes of an overland flood study that was completed to quantify the potential impacts that a proposed development at 53 Dwyer Road, Bringelly may have on overland flood behaviour. The assessment was completed using a direct rainfall TUFLOW computer flood model that was developed specifically for this project.

The TUFLOW model was used to simulate the 1% AEP floods for "pre-development" as well as "post-development" conditions for a range of durations. The results of the flood simulations indicate that most of the site is not predicted to be exposed to a significant overland flow risk. Furthermore, the results of the TUFLOW model simulations confirm that the stormwater management system that is proposed as part of the development will ensure the proposed development will not adversely impact on existing flood behaviour (small reductions in existing flood levels are predicted downstream of the development site).

5 REFERENCES

- BMT WBM (2018). TUFLOW User Manual. Version 2018-03-AA-iDP_w64.
- Engineers Australia (1987). Australian Rainfall and Runoff - A Guide to Flood Estimation. Edited by D. Pilgrim.

APPENDIX A
FIGURES



LEGEND

Site Boundary

Notes:

N
W E
S

Scale 1:7,600 (at A3)

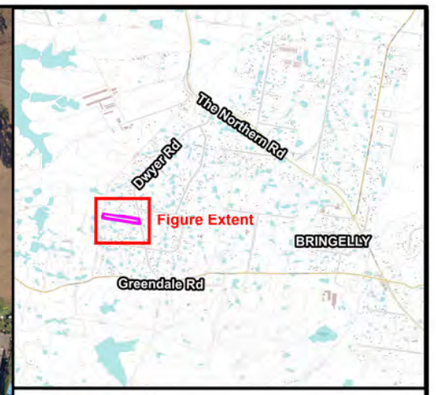
0 200 400

m

Figure 1: Location of the Development Site

Prepared By:
Catchment Simulation Solutions
Suite 10.01, 70 Phillip St
Sydney, NSW 2000

File Name: Location of the Development Site.wor



LEGEND

- Site Boundary
- TUFLOW Model Boundary and Extent of Applied Rainfall
- Downstream Outlet
- Gully Lines

Material Polygons (n = Manning's 'n' value)

- Short Grass (n = 0.035)
- Long Grass (n = 0.045)
- Water (n = 0.030)
- Trees (n = 0.100)
- Concrete (n = 0.015)
- Sealed Road (n = 0.018)
- Building (n = 1.000)

Notes:

N
W E
S

Scale 1:1,900 (at A3)

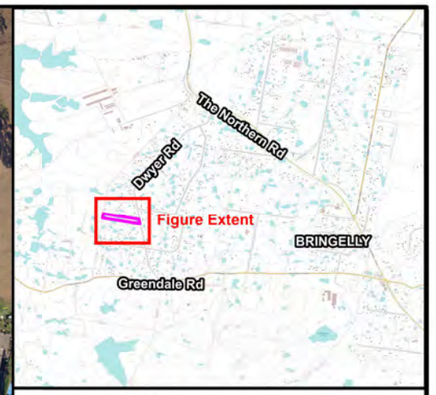
0 50 100

m

Figure 2: TUFLOW Model Layout for Existing Conditions

Prepared By:
Catchment Simulation Solutions
Suite 10.01, 70 Phillip St
Sydney, NSW 2000

File Name: TUFLOW Layout for Existing Conditions.wor



LEGEND

- Site Boundary
- 90.0 Water Level Contour (mAHD)
- 90.0 Ground Level Contour (mAHD)

Peak Water Depths (m)

- Less than 0.10
- 0.10 to 0.20
- 0.20 to 0.40
- 0.40 to 0.60
- Greater than 0.60

Notes:

Inundation depths below 0.10m are not shown in this figure.

N W E S

Scale 1:1,900 (at A3)

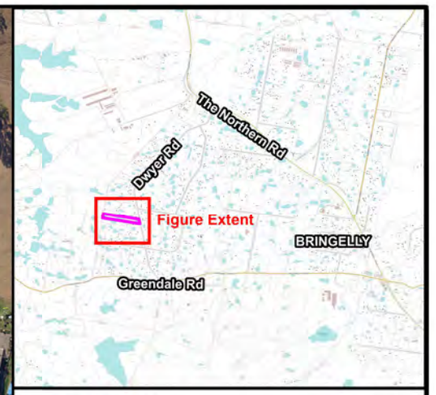
0 50 100 m

Figure 3: Peak 100-year ARI Floodwater Depths and Flood Levels for Existing Conditions

Prepared By:

Catchment Simulation Solutions
Suite 10.01, 70 Phillip St
Sydney, NSW 2000

File Name: Peak 100-year ARI Floodwater Depth and Levels for Existing Conditions.wor



LEGEND

- TUFLOW Model Boundary and Extent of Applied Rainfall
- Downstream Outlet
- Gully Lines
- Proposed OSD Basin Wall
- Extent of Terrain Changes
- Proposed Stormwater Pits and Pipes

Material Polygons (n = Manning's 'n' value)

- Short Grass (n = 0.035)
- Long Grass (n = 0.045)
- Water (n = 0.030)
- Trees (n = 0.100)
- Concrete (n = 0.015)
- Sealed Road (n = 0.018)
- Building (n = 1.000)

Notes:

N
W E
S

Scale 1:1,900 (at A3)

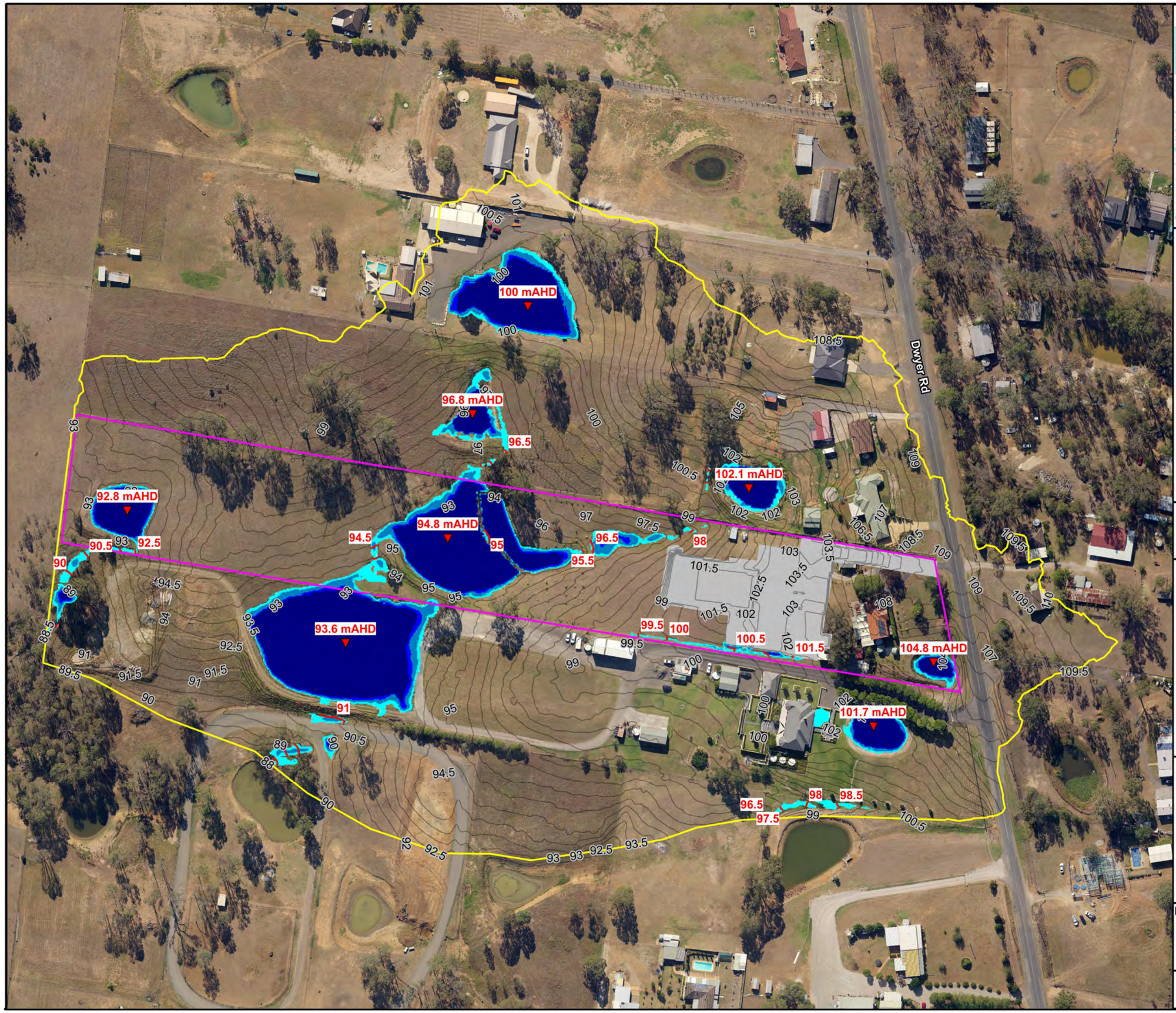
0 50 100

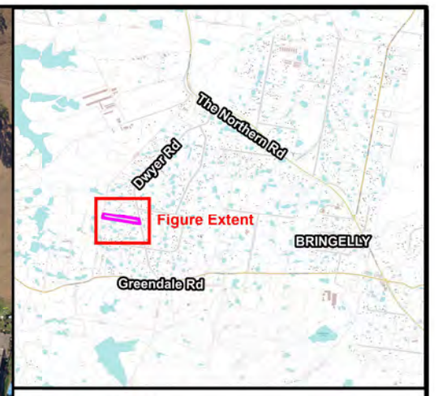
m

Figure 4: TUFLOW Model Layout for Post Development Conditions

Prepared By:
Catchment Simulation Solutions
Suite 10.01, 70 Phillip St
Sydney, NSW 2000

File Name: TUFLOW Layout for Post Development Conditions.wor





LEGEND

- Site Boundary
- Post Development Extent of Proposed Works
- 90.0 Water Level Contour (mAHD)
- 90.0 Ground Level Contour (mAHD)

Peak Water Depths (m)

- Less than 0.10
- 0.10 to 0.20
- 0.20 to 0.40
- 0.40 to 0.60
- Greater than 0.60

Notes:

Inundation depths below 0.10m are not shown in this figure.

N W E S

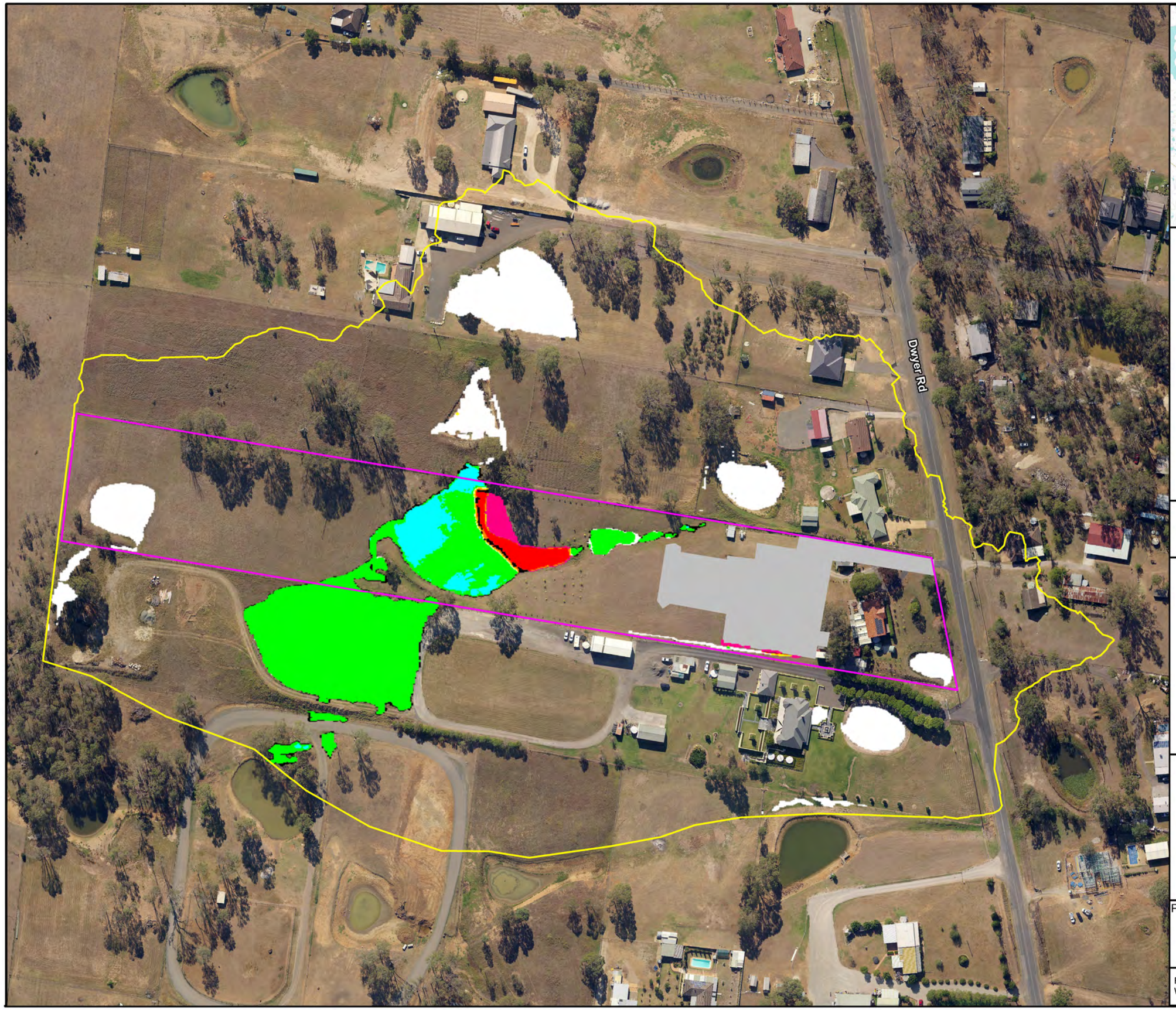
Scale 1:1,900 (at A3)

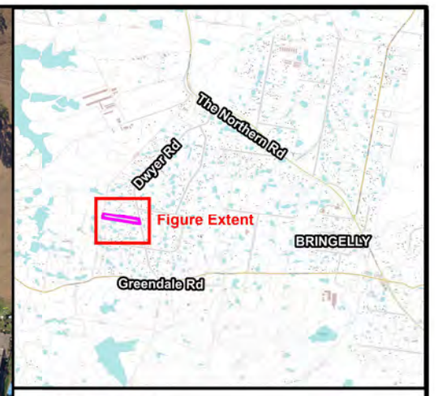
0 50 100 m

Figure 5: Peak 100-year ARI Floodwater Depths and Flood Levels for Post Development Conditions

Prepared By:
Catchment Simulation Solutions
Suite 10.01, 70 Phillip St
Sydney, NSW 2000

File Name: Peak 100-year ARI Floodwater Depth and Levels for PostDev Conditions.wor





LEGEND

- Site Boundary
- Post Development Extent of Proposed Works

Water Level Differences (m)

- Was Dry, Now Wet
- Greater Than 0.15
- 0.10 to 0.15
- 0.05 to 0.10
- 0.01 to 0.05
- -0.01 to 0.01
- -0.01 to -0.05
- -0.05 to -0.10
- -0.10 to -0.15
- Greater Than -0.15
- Was Wet, Now Dry

Notes:

Inundation depths below 0.10m are not shown in this figure.

N
W E
S

Scale 1:1,900 (at A3)

0 50 100

m

Figure 6: Predicted Change in Peak 100yr ARI Water Levels

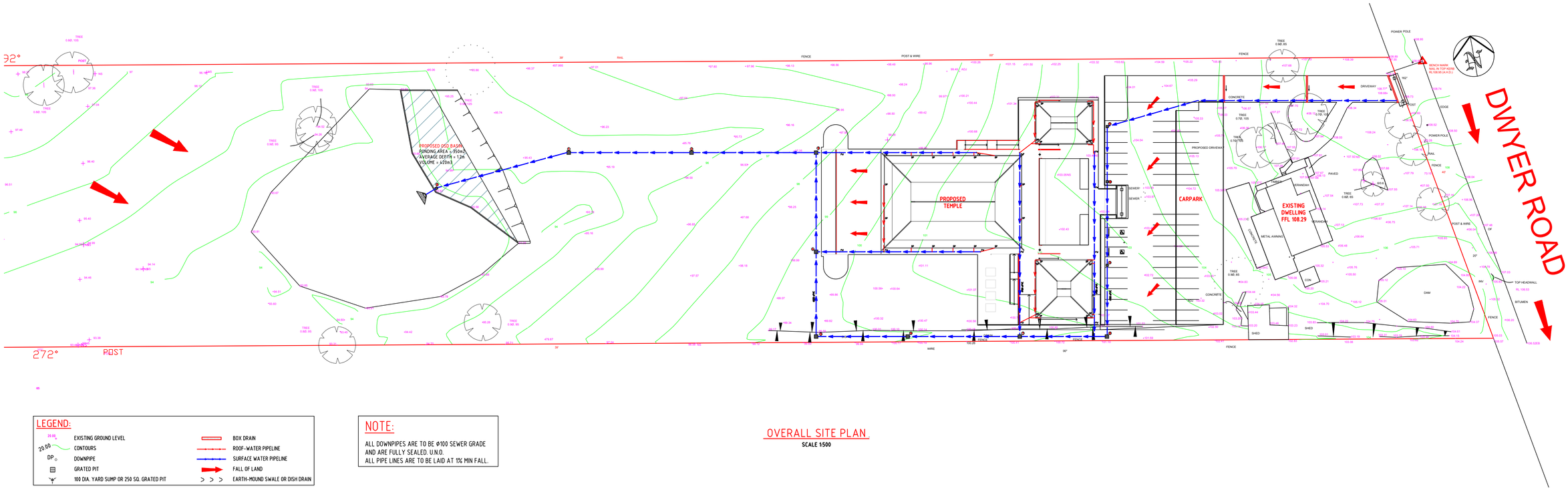
Prepared By:

Catchment Simulation Solutions
Suite 10.01, 70 Phillip St
Sydney, NSW 2000

File Name: Predicted Changed in Peak 100yr ARI Water Levels.wor

APPENDIX B
DEVELOPMENT PLANS

A1



LEGEND:

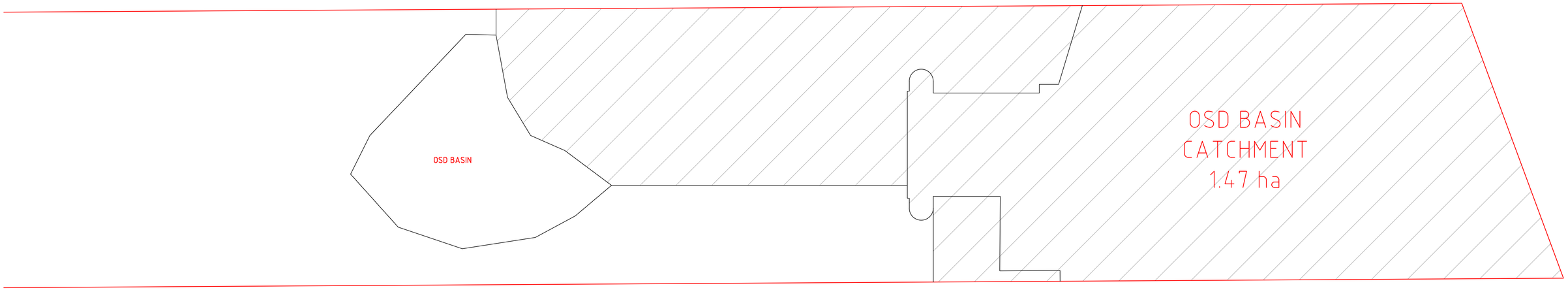
- EXISTING GROUND LEVEL
- CONTOURS
- DP — DOWNPIPE
- GRATED PIT
- 100 DIA. YARD SUMP OR 250 SQ. GRATED PIT
- BOX DRAIN
- ROOF-WATER PIPELINE
- SURFACE WATER PIPELINE
- FALL OF LAND
- EARTH-MOUND SWALE OR DISH DRAIN

NOTE:

ALL DOWNPIPES ARE TO BE ø100 SEWER GRADE AND ARE FULLY SEALED. U.N.O.
ALL PIPE LINES ARE TO BE LAID AT 1% MIN FALL.

OVERALL SITE PLAN

SCALE 1:500



CATCHMENT PLAN

SCALE 1:500

GENERAL NOTES

1. THE PLUMBER/ DRAINER SHALL INSPECT THE SITE AND CONFIRM THE EXISTING SITE STRUCTURES, SERVICES AND CONDITIONS PRIOR TO PROCEEDING. IF ANY DISCREPANCIES FOUND, CONTACT THE ENGINEER FOR DISCUSSION.

2. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS, BUILDING CODE OF AUSTRALIA AND LOCAL GOVERNMENT'S REQUIREMENTS. IT IS THE RESPONSIBILITY OF THE PLUMBER/ DRAINER TO OBTAIN ANY APPROVALS/ PERMITS/ LICENSES ISSUED BY THE AUTHORITIES PRIOR TO PROCEEDING WITH STORMWATER WORKS.

3. ALL MATERIALS USED IN THE WORK SHALL BE NEW AND CONFORM WITH RELEVANT AUSTRALIAN STANDARDS AND BEAR THE REQUIRED STANDARDS MARK.

4. LOCATION OF STORMWATER SYSTEMS, INCLUDING DOWNPIPES, PIPES, PITS AND RAINWATER TANK ARE INDICATIVE ONLY. EXACT LOCATION SHALL BE DETERMINED ON SITE TO SUIT SITE CONDITIONS.

5. SUB-SOIL DRAINS FOR RETAINING WALL SHALL BE INSTALLED BY THE BUILDER AND CONNECTED TO STORMWATER LINES. ALL AGG. LINES SHALL BE 100mm DIA., UNLESS NOTED OTHERWISE.

6. LEVELS ARE APPROXIMATE ONLY. THE PLUMBER/ DRAINER SHALL CONFIRM THE LEVELS PRIOR TO PROCEEDING. IF ANY DISCREPANCIES FOUND, CONTACT THE ENGINEER FOR DISCUSSION.

7. INSPECTION AND CERTIFICATION, IF REQUIRED, SHALL BE DONE PRIOR TO BACKFILLING. ALLOW 24 HOUR NOTICE FOR THE ENGINEER TO CARRY OUT INSPECTION.

8. ANY DAMAGE TO SERVICES DURING CONSTRUCTION SHALL BE REPAIRED IMMEDIATELY AT THE PLUMBER/ DRAINER'S OWN EXPENSE.

DISCHARGE SUMMARY

STORM EVENT	10 YEAR	20 YEAR	50 YEAR	100 YEAR
PRE	474 l/s	564 l/s	686 l/s	781 l/s
POST	131 l/s	137 l/s	145 l/s	152 l/s

Paper size: A1

All dimensions are in millimetres. Do not scale the drawing. Use written dimensions. Dimensions must be confirmed prior to commencement. Location of services are approximate only. Dial 1100 before any excavation or demolition.

Issue	Revisions
D	AMENDED TO COUNCIL COMMENTS

Author: HL
Approved:
Quoc Huy Nguyen
PhD (Eng), MIEAust, CPEng, NER

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W: nitma.com.au

PROJECT: PROPOSED TEMPLE
ADDRESS: 53 DWYER RD, BRINGELLY
LGA: LIVERPOOL CITY COUNCIL

OVERALL PLAN

Project No: 2706H Issue: D Date: 13.03.2019 Sheet No: 1 of 4

A1

DRAINAGE PLAN PART 1 OF 2

SCALE 1:200

LEGEND:

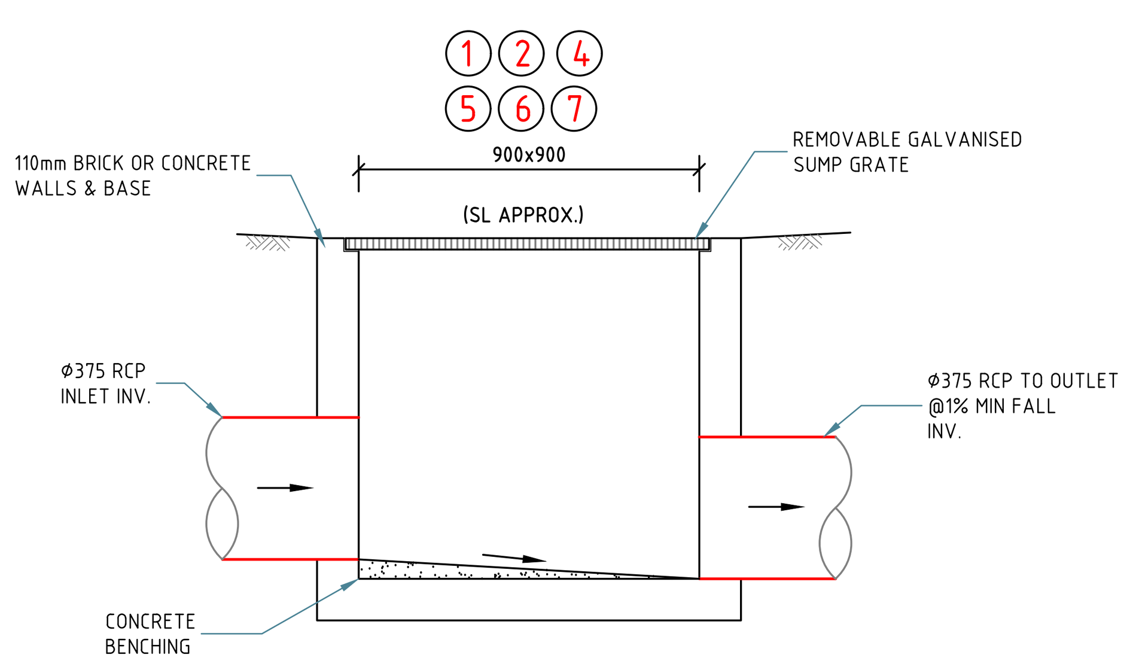
20.00 +	EXISTING GROUND LEVEL		BOX DRAIN
20.00	CONTOURS		ROOF-WATER PIPELINE
DP ○	DOWNPIPE		SURFACE WATER PIPELINE
	GRATED PIT		FALL OF LAND
	100 DIA. YARD SUMP OR 250 SQ. GRATED PIT	> > >	EARTH-MOUND SWALE OR DISH DRAIN

NOTE:

ALL DOWNPIPES ARE TO BE Ø100 SEWER GRADE AND ARE FULLY SEALED. U.N.O.
ALL PIPE LINES ARE TO BE LAID AT 1% MIN FALL.

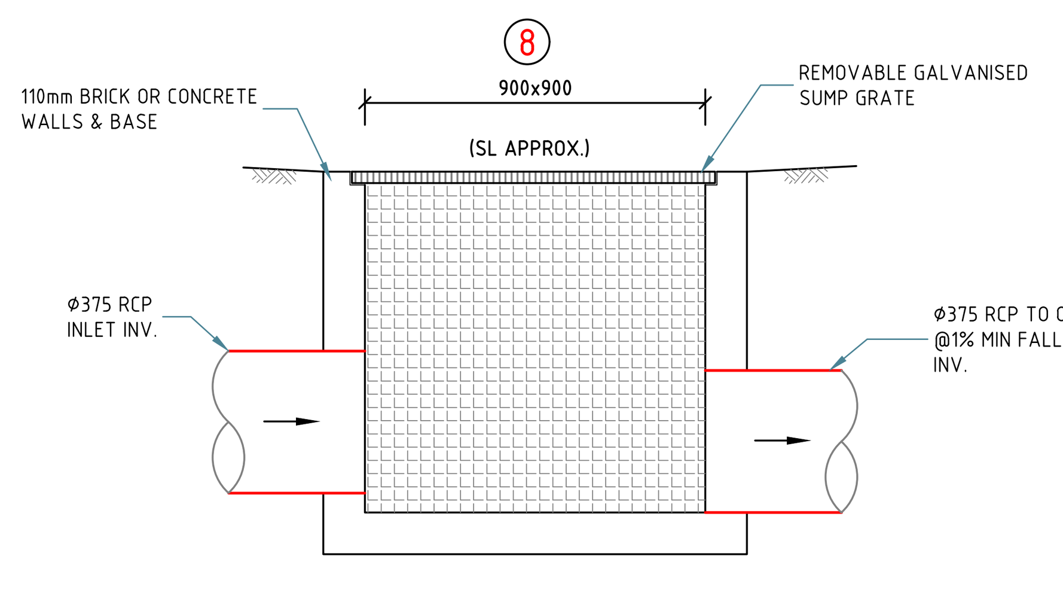
DISCHARGE SUMMARY

STORM EVENT	10 YEAR	20 YEAR	50 YEAR	100 YEAR
PRE	474 l/s	564 l/s	686 l/s	781 l/s
POST	131 l/s	137 l/s	145 l/s	152 l/s



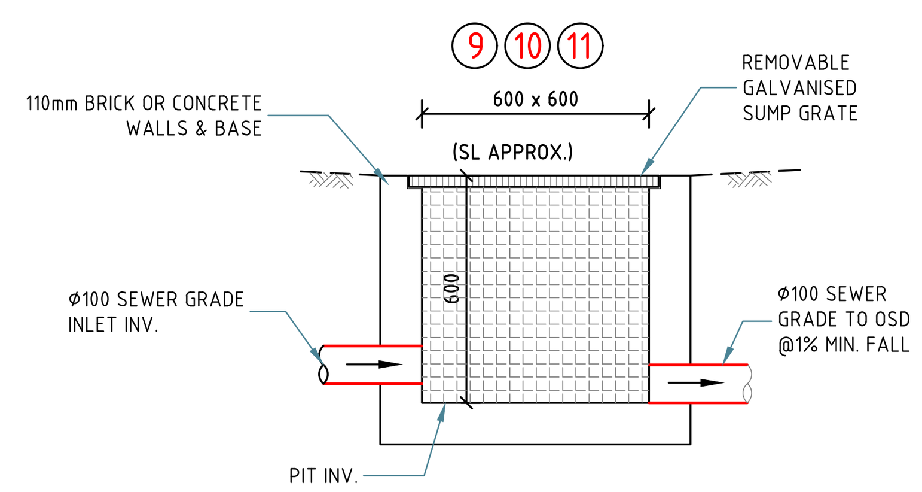
900 SQ. GRATED PIT DETAILS (TYP.)

SCALE 1:20



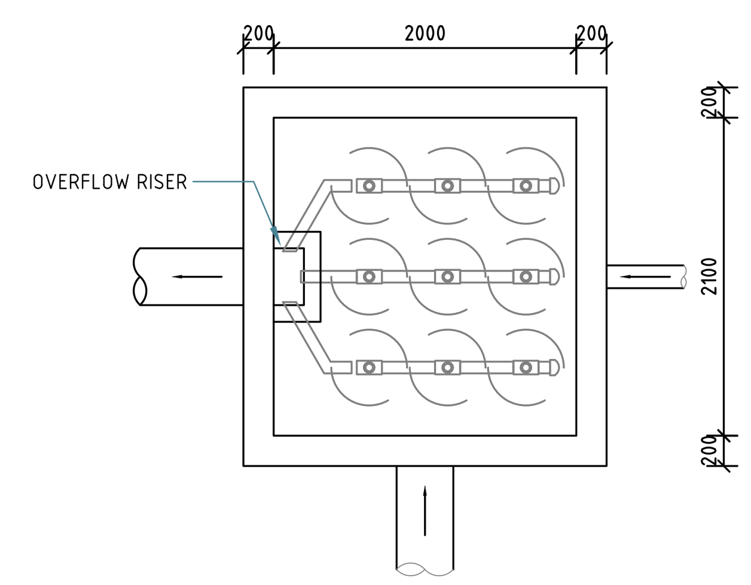
900 SQ. PIT WITH ENVIRO POD DETAILS

SCALE 1:20



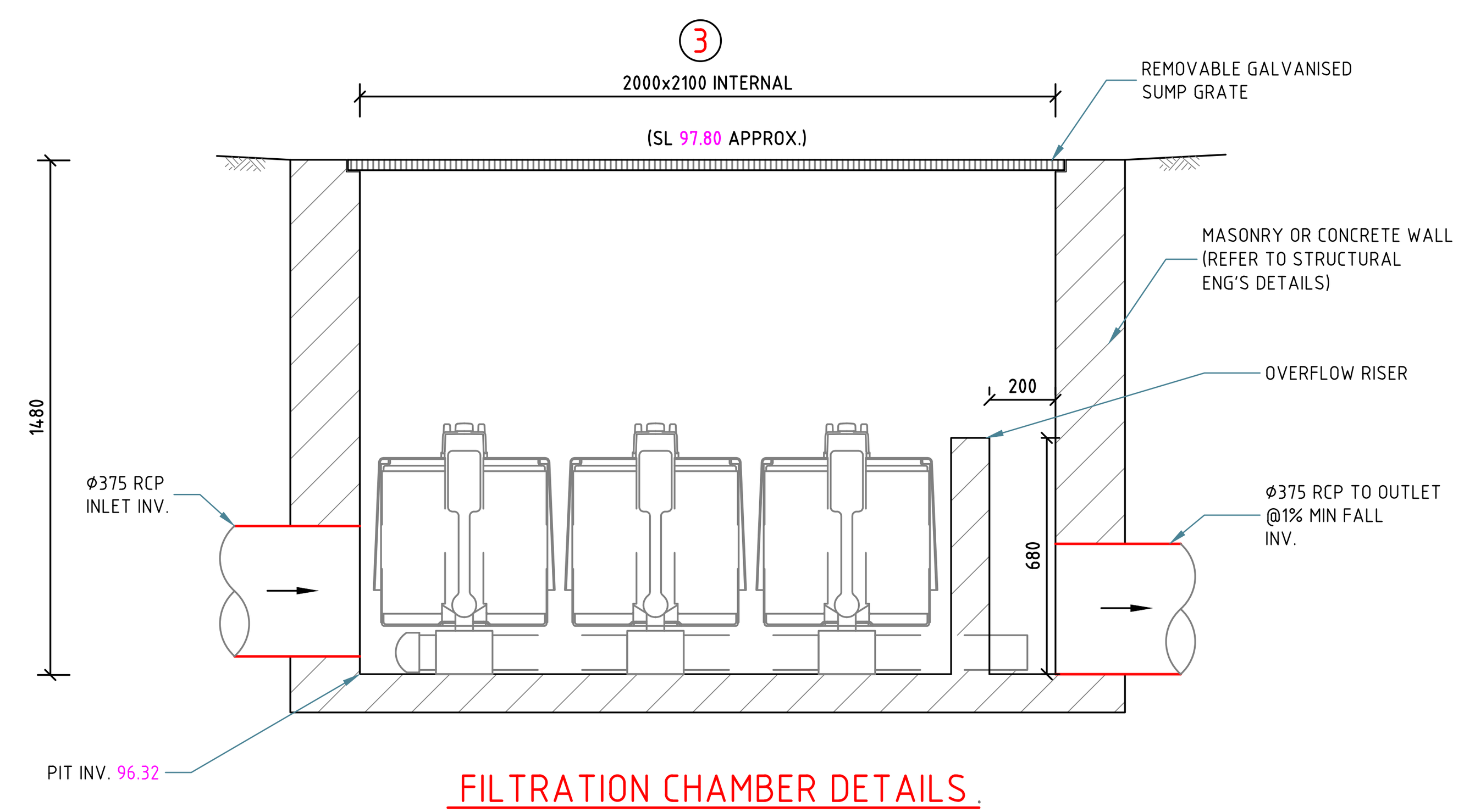
600 SQ. PIT WITH ENVIRO POD DETAILS

SCALE 1:20



FILTRATION CHAMBER

SCALE 1:50

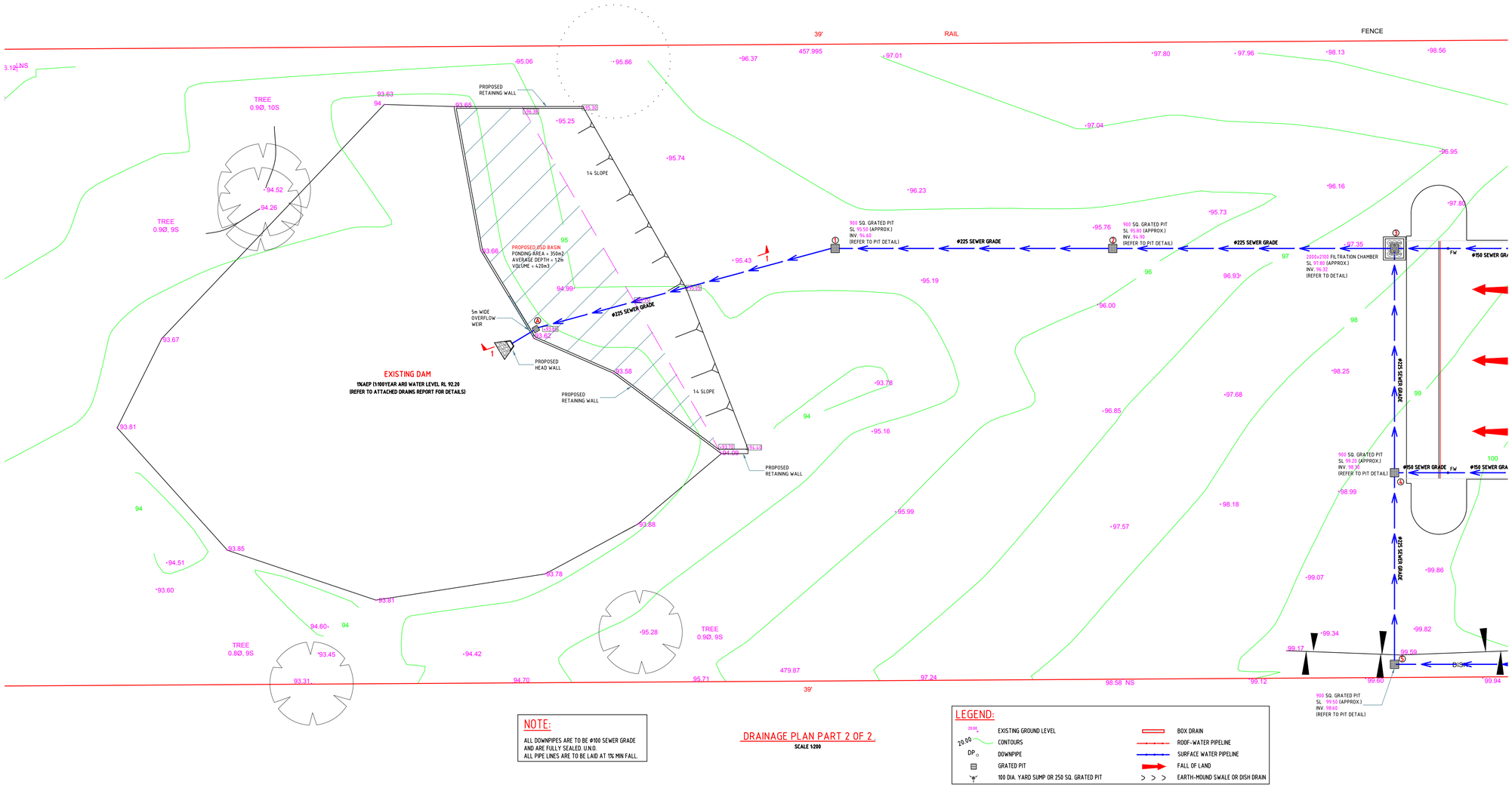


FILTRATION CHAMBER DETAILS

SCALE 1:20

Paper size: A1	All dimensions are in millimetres. Do not scale the drawing. Use written dimensions. Dimensions must be confirmed prior to commencement. Location of services are approximate only. Dial 1100 before any excavation or demolition.	Issue: D	Revisions: AMENDED TO COUNCIL COMMENTS	Author: HL Approved: Quoc Huy Nguyen PhD (Eng), MIEAust, CPEng, NER	NITMA CONSULTING PTY LTD PO Box 43, West Ryde NSW 1685 M: 0434 284 585 E: admin@nitma.com.au W: nitma.com.au © Copyright. All rights reserved.	PROJECT: PROPOSED TEMPLE ADDRESS: 53 DWYER RD, BRINGELLY LGA: LIVERPOOL CITY COUNCIL DRAINAGE PLAN PART 1 OF 2 Project No: 2706H Issue: D Date: 13.03.2019 Sheet No: 2 of 4

A1



NOTE:

ALL DOWNPIPES ARE TO BE Φ100 SEWER GRADE AND ARE FULLY SEALED. U.N.O.
ALL PIPE LINES ARE TO BE LAID AT 1% MIN FALL.

DRAINAGE PLAN PART 2 OF 2

SCALE 1:200

LEGEND:

- EXISTING GROUND LEVEL
- CONTOURS
- DP DOWNPIPE
- GRATED PIT
- 100 DIA. YARD SUMP OR 250 SQ. GRATED PIT
- BOX DRAIN
- ROOF-WATER PIPELINE
- SURFACE WATER PIPELINE
- FALL OF LAND
- EARTH-MOUND SWALE OR DISH DRAIN

Paper size: A1	All dimensions are in millimetres. Do not scale the drawing. Use written dimensions. Dimensions must be confirmed prior to commencement. Location of services are approximate only. Dial 1100 before any excavation or demolition.	Issue	Revisions
		D	AMENDED TO COUNCIL COMMENTS

Author: HL
Approved:
Quoc Huy Nguyen
PhD (Eng), MIEAust, CPEng, NER

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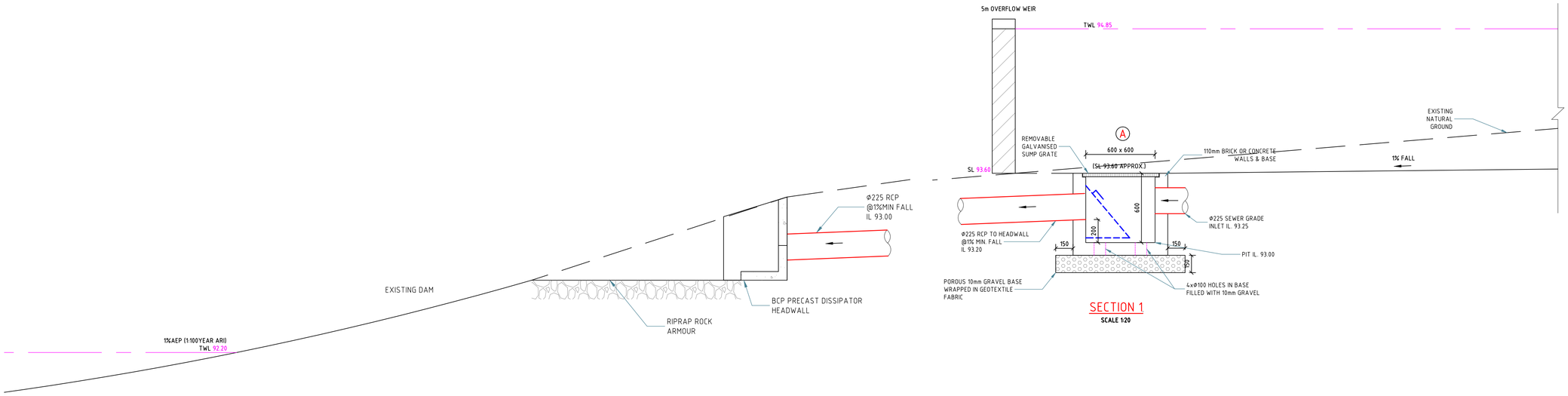
PROJECT: PROPOSED TEMPLE
ADDRESS: 53 DWYER RD, BRINGELLY
LGA: LIVERPOOL CITY COUNCIL

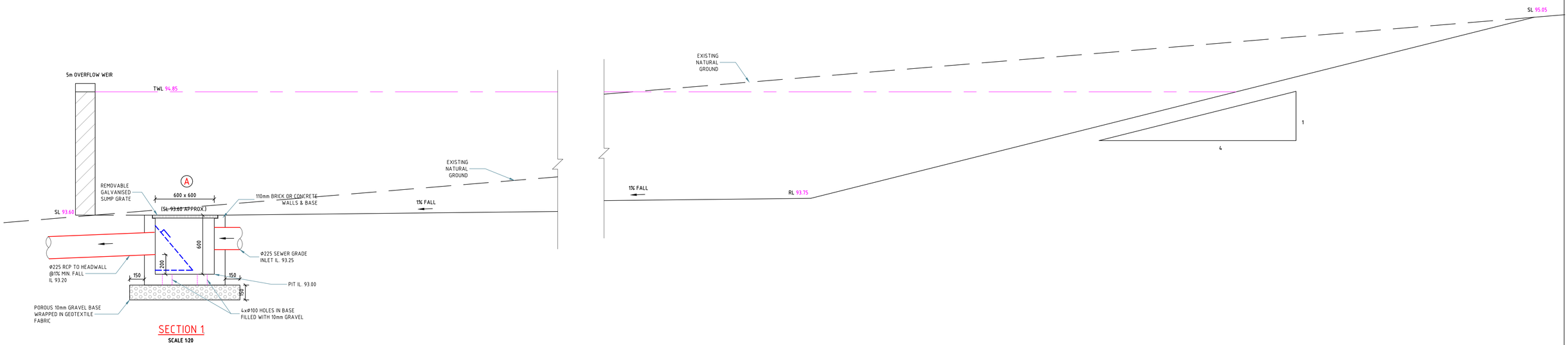
DRAINAGE PLAN PART 2 OF 2

Project No: 2706H Issue: D Date: 13.03.2019 Sheet No: 3 of 4

A1



SECTION 1
SCALE 1:20



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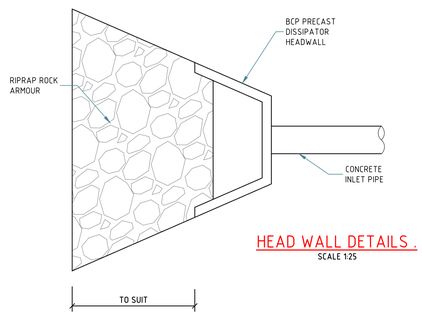

HEAD WALL DETAILS .
SCALE 1:25

Paper size: A1	All dimensions are in millimetres. Do not scale the drawing. Use written dimensions. Dimensions must be confirmed prior to commencement. Location of services are approximate only. Dial 1100 before any excavation or demolition.	Issue	Revisions	Author: HL Approved:	NITMA CONSULTING PTY LTD PO Box 43, West Ryde NSW 1685 M: 0434 284 585 E: admin@nitma.com.au W: nitma.com.au
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PROJECT: PROPOSED TEMPLE
ADDRESS: 53 DWYER RD, BRINGELLY
LGA: LIVERPOOL CITY COUNCIL

BASIN AND HEAD WALL DETAILS

Project No: 2706H Issue: D Date: 13.03.2019 Sheet No: 4 of 4

01 - LOCATION PLAN
N.T.S.

FLOOR SPACE RATIO (FSR) CALCULATION - :	
ZONING	R5 Large Lot Residential
USE	Place of Public Worship
SITE AREA	32,323.84 sqm
FLOOR SPACE RATIO (FSR)	0.02:1

WORSHIP AREA CALCULATION - :	
LOCATION	PROPOSED WORSHIP AREA
Main Shrine	178.88 sqm
Kitchen	N/A
WC Block	N/A
TOTAL WORSHIP AREA	178.88 sqm

GROSS FLOOR AREA (GFA) CALCULATION - :	
LOCATION	PROPOSED GROSS FLOOR AREA
Main Shrine	440.50 sqm
Kitchen	136.30 sqm
WC Block	91.03 sqm
TOTAL GROSS FLOOR AREA	667.83 sqm

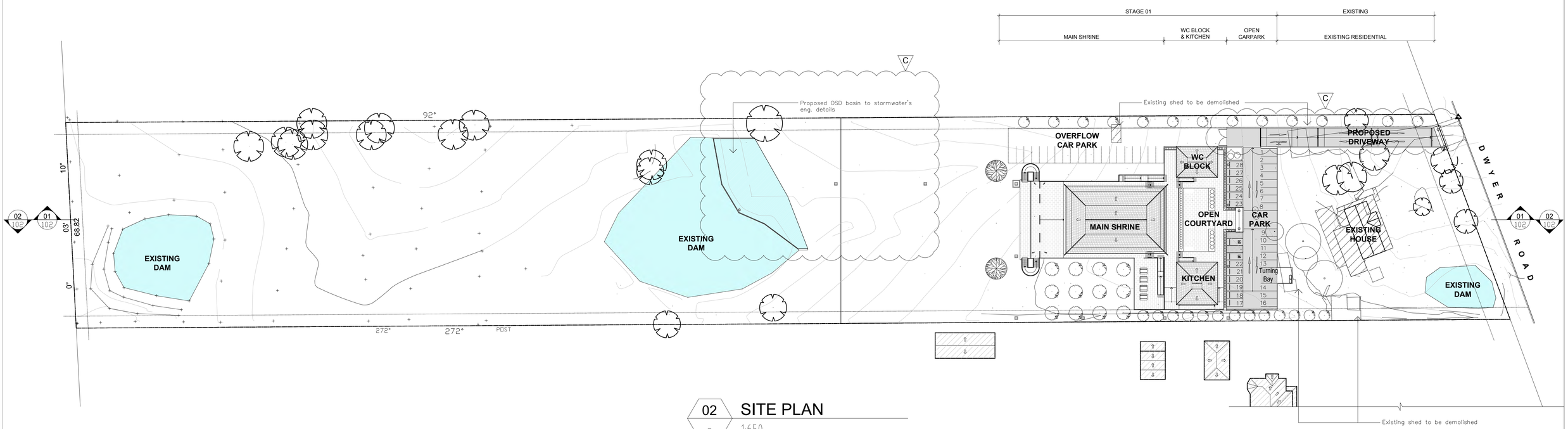
Legend

General

- New reinforced concrete structure
- New masonry brick wall
- New acoustic insulated stud wall
- New thermal insulated stud wall
- New concrete block wall
- RL — Proposed reduce level (AHD)
- RL — Existing reduced level (AHD)
- FD — Floor drain
- FW — Floor waste
- O/F — Overflow
- RWDP — Rainwater downpipe
- RWO — Rainwater outlet

Landscape

- Existing trees
- New trees
- Bodhi tree
- Remove trees



02 - SITE PLAN
1:650

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Date	Amendment	Rev.
01.03.18	Issue for DA Submission	A
15.11.18	Issue for Revision as clouded	B
19.03.19	Issue for Revision as clouded	C

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PROPOSED PLACE OF WORSHIP WITH ASSOCIATED CAR PARKING AND DEMOLITION OF EXISTING SHEDS
53 Dwyer Road
Bringelly,NSW 2556

Drawing Title:
FLOOR PLANS
- LOCATION & SITE

Date:	Drawn by:	Scale:
19.03.19	CY	1:650@A1

Drawing No.: 857/ DA/ 001 Rev. C

01 ROOF PLAN

1:250

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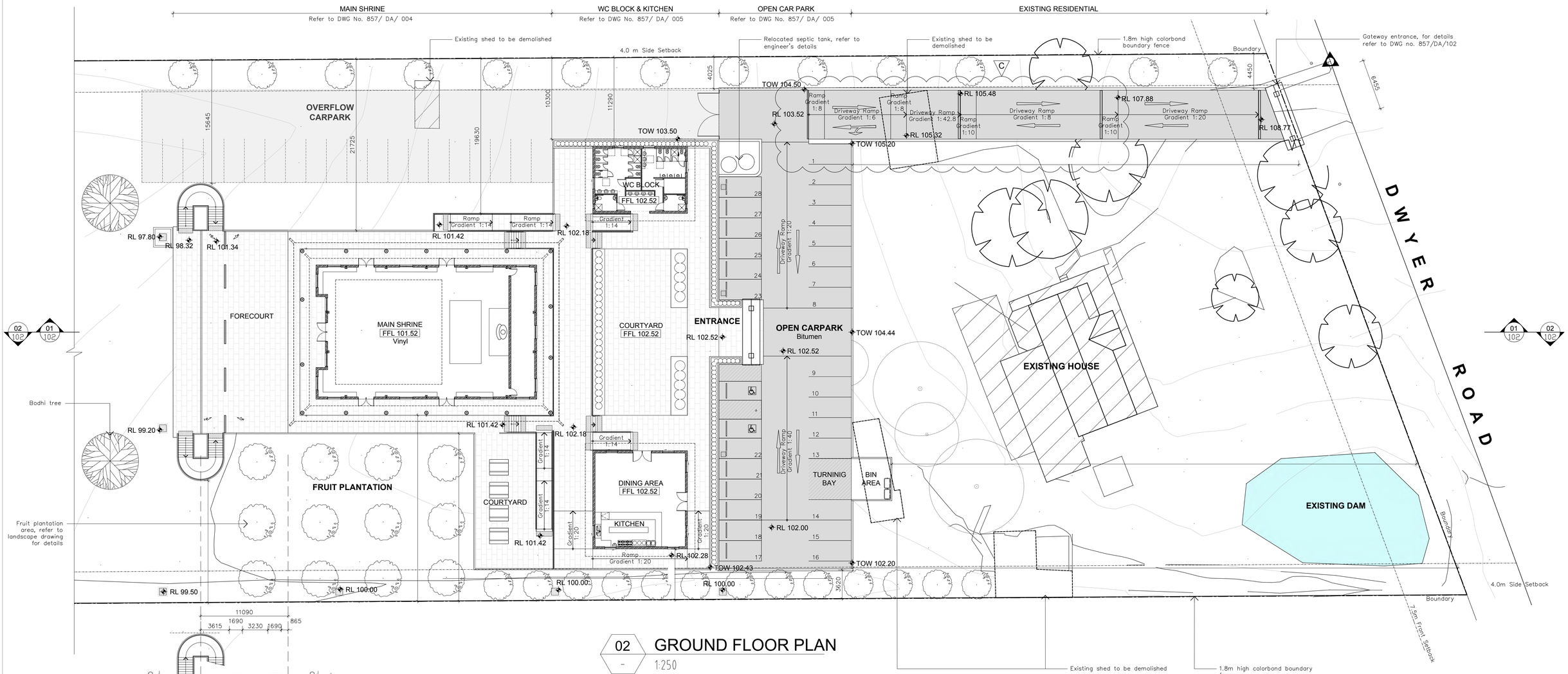
PROPOSED PLACE OF WORSHIP WITH ASSOCIATED CAR PARKING AND DEMOLITION OF EXISTING SHEDS
53 Dwyer Road
Bringelly,NSW 2556

Drawing Title:
FLOOR PLAN
- ROOF

Date:	Drawn by:	Scale:
19.03.19	CY	1:250

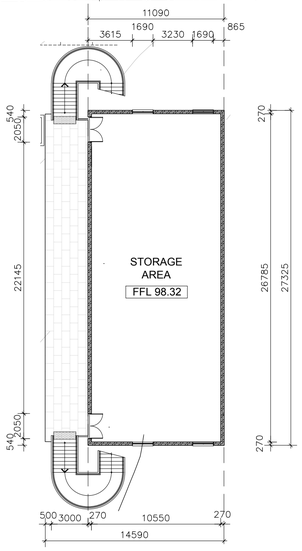
Drawing No.: 857/ DA/ 002

Rev. C



02 / 102 — 01 / 102

02 GROUND FLOOR PLAN
1:250



01 LOWER GROUND FLOOR PLAN
1:250

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53 Dwyer Road
Bringelly,NSW 2556

Drawing Title:
FLOOR PLANS
- LOWER & GROUND

Date: 19.03.19 | Drawn by: CY | Scale: 1:250

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PROPOSED PLACE OF WORSHIP WITH ASSOCIATED CAR PARKING AND DEMOLITION OF EXISTING SHEDS
53 Dwyer Road
Bringelly,NSW 2556

Drawing Title:
FLOOR PLAN
- MAIN SHRINE

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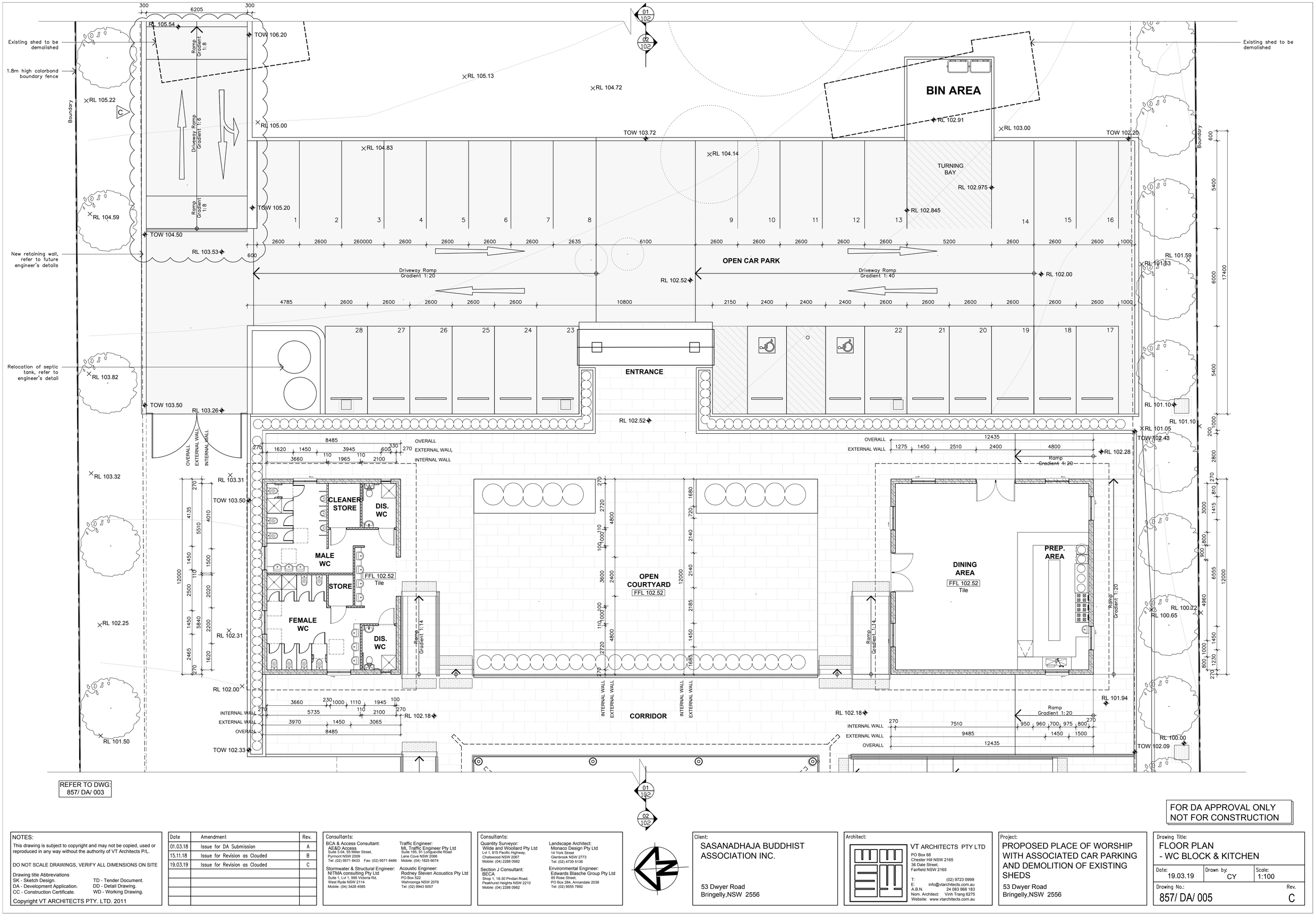
19.03.19	CY	1:100

Drawing No.: 857/ DA/ 004
Rev. C



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857/ DA/ 003

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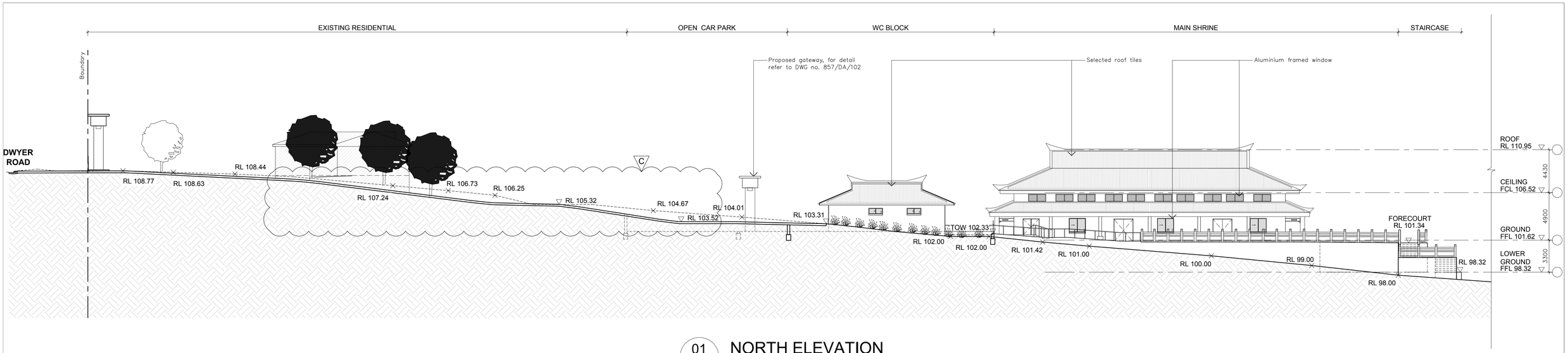
PROPOSED PLACE OF WORSHIP WITH ASSOCIATED CAR PARKING AND DEMOLITION OF EXISTING SHEDS
53 Dwyer Road
Bringelly,NSW 2556

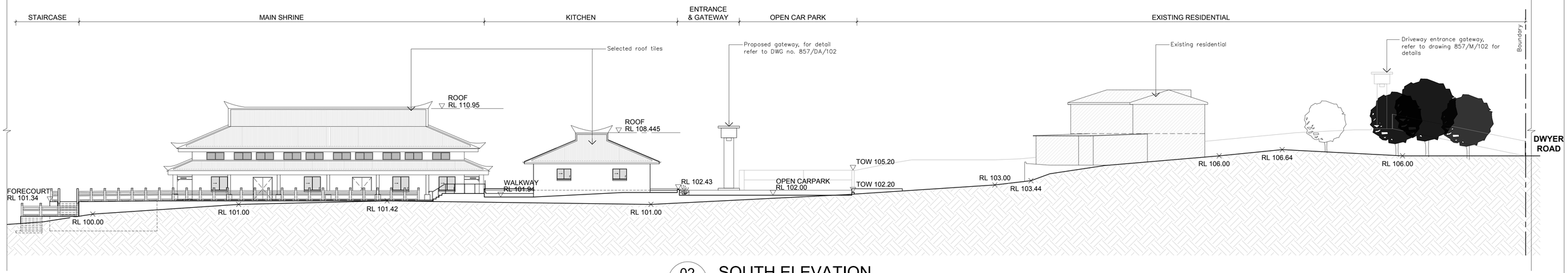
Drawing Title:
FLOOR PLAN
- WC BLOCK & KITCHEN

Date:	Drawn by:	Scale:
19.03.19	CY	1:100

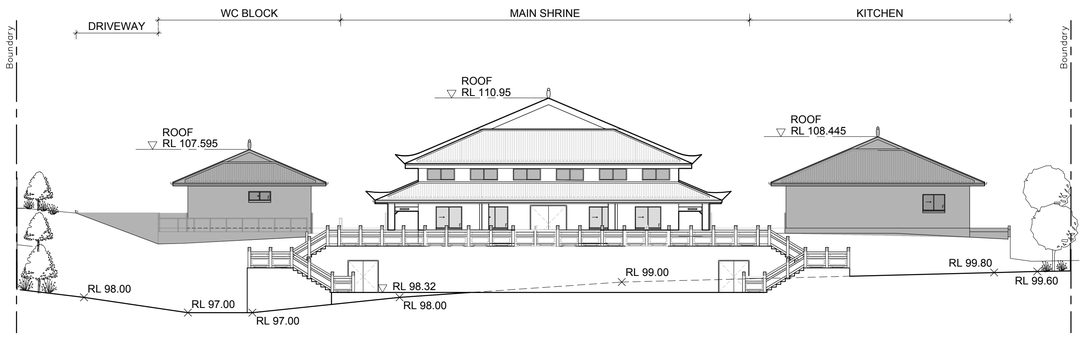
Drawing No.: 857/ DA/ 005
Rev. C



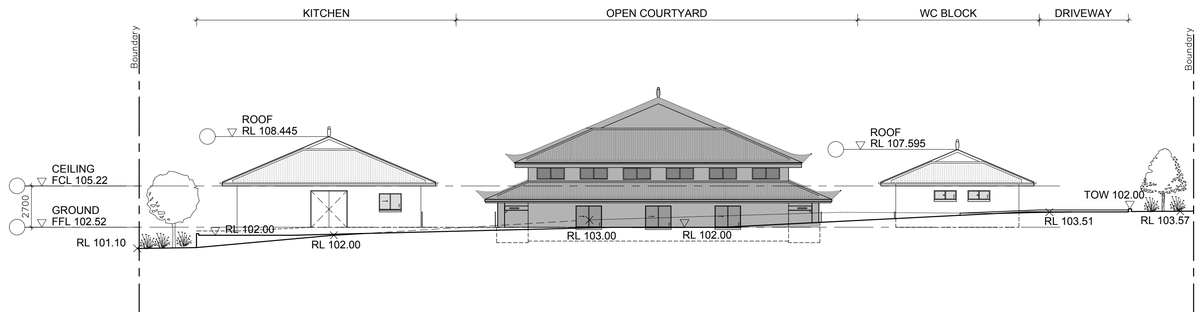
01 NORTH ELEVATION
1:200



02 SOUTH ELEVATION
1:500



03 WEST ELEVATION
1:200



04 EAST ELEVATION
1:200

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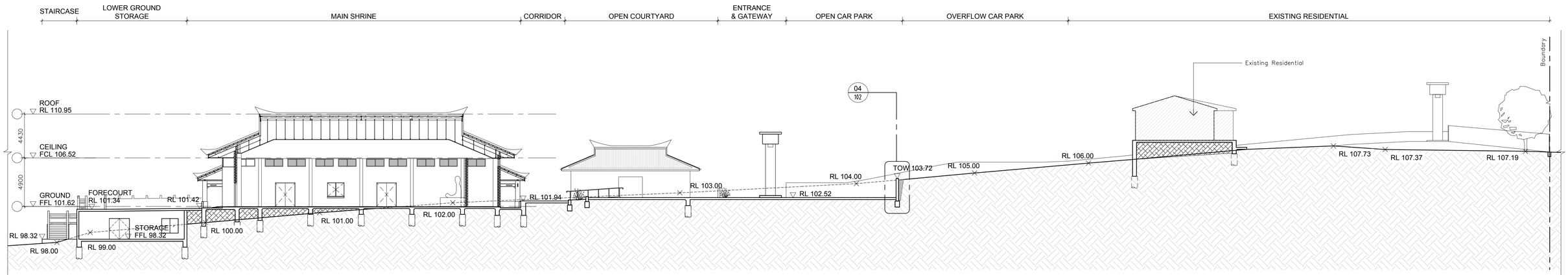
Project:
PROPOSED PLACE OF WORSHIP WITH ASSOCIATED CAR PARKING AND DEMOLITION OF EXISTING SHEDS
53 Dwyer Road
Bringelly,NSW 2556

Drawing Title:
ELEVATIONS
- NORTH SOUTH WEST EAST

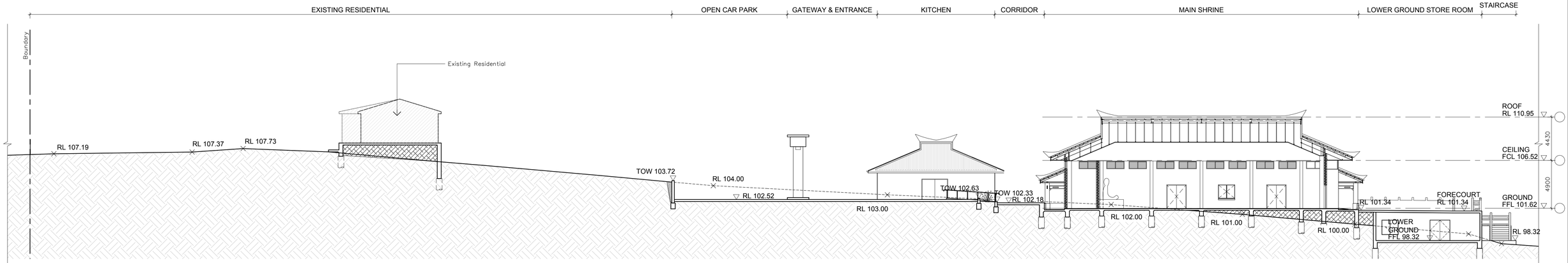
Date:	Drawn by:	Scale:
19.03.19	CY	1:200

Drawing No.: 857/ DA/ 101
Rev.: C



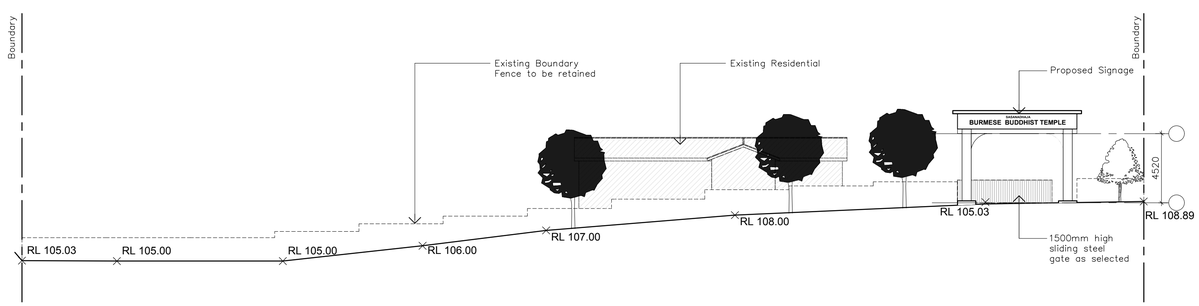
01 SITE SECTION 01

1:200



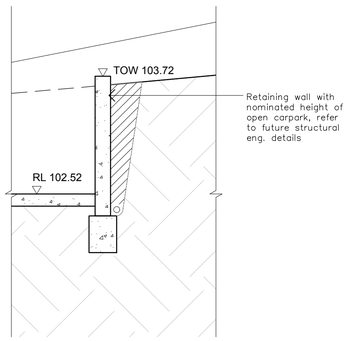
02 SITE SECTION 02

1:200



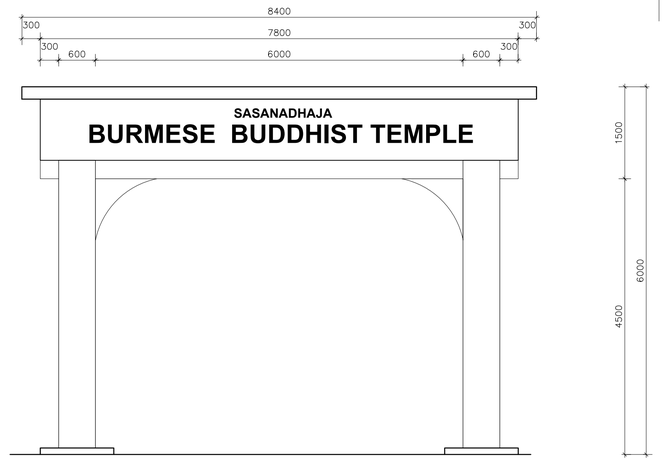
03 ELEVATION - FRONT ENTRANCE

1:200



04 SECTION DETAIL - RETAINING WALL

1:50



05 SIGNAGE

1:50

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Project:
PROPOSED PLACE OF WORSHIP WITH ASSOCIATED CAR PARKING AND DEMOLITION OF EXISTING SHEDS
53 Dwyer Road
Bringelly,NSW 2556

Drawing Title:
SITE SECTION & FRONT ENTRANCE ELEVATION

Date:	Drawn by:	Scale:
01.03.18	CY	1:200 & 1:50

Drawing No.: 857/ DA/ 102
Rev. A