PROPOSED DEVELOPMENT
No.60, 62 & 64 SHOWGROUND ROAD, GOSFORD
STORMWATER & WATER CYCLE MANAGEMENT REPORT

LEGEND

- DENOTES ON-SITE DETENTION TANK
- DENOTES ON-SITE RETENTION TANK
- DENOTES DWELLING FOOTPRINT
- SW — DENOTES 100mm DIA. STORMWATER/SURFACE WATER SYSTEM PIPE AT 1% MIN. GRADE U.N.O.
- RW — DENOTES 100mm DIA. FULLY SEALED RAINWATER SYSTEM PIPE U.N.O.
- 150 RW — DENOTES RAINWATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
- 150 SW — DENOTES STORMWATER/SURFACE WATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
- 65 W/RM — DENOTES RISING MAIN AND PIPE DIA. U.N.O.
- 100 SS — DENOTES SUBSOIL DRAINAGE LINE AND DIA. WRAPPED IN GEOFABRIC U.N.O.
- DP — DENOTES DOWNPIPE
- IO — DENOTES INSPECTION OPENING WITH SCREW DOWN LID AT FINISHED SURFACE LEVEL
- CO — DENOTES INSPECTION OPENING WITH SCREW DOWN LID AT FINISHED SURFACE LEVEL FOR SYSTEM FLUSHING PURPOSES
- STORMWATER PIT - SOLID COVER
- STORMWATER PIT - GRATED INLET
- DENOTES GRATED DRAIN
- DENOTES ABSORPTION TRENCH
- NON RETURN VALVE
- PUMP
- STOP VALVE (ISOLATION VALVE)
- 240v REQUIRED
- IL23.31 — DENOTES LEVEL OF INLET /OUTLET OF STORMWATER PIPE. NOTE: UNLESS NOTED OTHERWISE, THE BASE OF THE PIT IS THE SAME AS THE PIPE INLET/OUTLET.

DIAL BEFORE YOU DIG

DIAL BEFORE YOU DIG www.1100.com.au

IMPORTANT: THE CONTRACTOR IS TO MAINTAIN A CURRENT SET OF "DIAL BEFORE YOU DIG" DRAWINGS ON SITE AT ALL TIMES.

GENERAL NOTES

1. THESE PLANS SHALL BE READ IN CONJUNCTION WITH OTHER RELEVANT CONSULTANTS' PLANS, SPECIFICATIONS, CONDITIONS OF DEVELOPMENT CONSENT AND CONSTRUCTION CERTIFICATE REQUIREMENTS. WHERE DISCREPANCIES ARE FOUND ACOR CONSULTANTS (CC) MUST BE CONTACTED IMMEDIATELY FOR VERIFICATION
2. WHERE THESE PLANS ARE NOTED FOR DEVELOPMENT APPLICATION PURPOSES ONLY, THEY SHALL NOT BE USED FOR OBTAINING A CONSTRUCTION CERTIFICATE NOR USED FOR CONSTRUCTION PURPOSES
3. SUBSOIL DRAINAGE SHALL BE DESIGNED AND DETAILED BY THE STRUCTURAL ENGINEER. SUBSOIL DRAINAGE SHALL NOT BE CONNECTED INTO THE STORMWATER SYSTEM IDENTIFIED ON THESE PLANS UNLESS APPROVED BY ACOR CONSULTANTS (CC)

STORMWATER CONSTRUCTION NOTES

1. ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH AS/NZS 3500 (CURRENT EDITION) AND THE REQUIREMENTS OF THE LOCAL COUNCIL'S POLICIES AND CODES
2. THE MINIMUM SIZES OF THE STORMWATER DRAINS SHALL NOT BE LESS THAN DN90 FOR CLASS 1 BUILDINGS AND DN100 FOR OTHER CLASSES OF BUILDING OR AS REQUIRED BY THE REGULATORY AUTHORITY
3. THE MINIMUM GRADIENT OF STORMWATER DRAINS SHALL BE 1%, UNLESS NOTED OTHERWISE
4. COUNCIL'S TREE PRESERVATION ORDER IS TO BE STRICTLY ADHERED TO. NO TREES SHALL BE REMOVED UNTIL PERMIT IS OBTAINED
5. PUBLIC UTILITY SERVICES ARE TO BE ADJUSTED AS NECESSARY AT THE CLIENT'S EXPENSE
6. ALL PITS TO BE BENCHED AND STREAMLINED. PROVIDE STEP IRONS FOR ALL PITS OVER 1.2m DEEP
7. MAKE SMOOTH JUNCTION WITH ALL EXISTING WORK
8. VEHICULAR ACCESS AND ALL SERVICES TO BE MAINTAINED AT ALL TIMES TO ADJOINING PROPERTIES AFFECTED BY CONSTRUCTION
9. SERVICES SHOWN ON THESE PLANS HAVE BEEN LOCATED FROM INFORMATION SUPPLIED BY THE RELEVANT AUTHORITIES AND FIELD INVESTIGATIONS AND ARE NOT GUARANTEED COMPLETE NOR CORRECT. IT IS THE CLIENT & CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL PRIOR TO CONSTRUCTION
10. ANY VARIATION TO THE WORKS AS SHOWN ON THE APPROVED DRAWINGS ARE TO BE CONFIRMED BY ACOR CONSULTANTS (CC) PRIOR TO THEIR COMMENCEMENT

RAINWATER RE-USE SYSTEM NOTES

1. RAINWATER SUPPLY PLUMBING TO BE CONNECTED TO OUTLETS WHERE REQUIRED BY BASIX CERTIFICATE (BY OTHERS)
2. TOWN WATER CONNECTION TO RAINWATER TANK TO BE TO THE SATISFACTION OF THE REGULATORY AUTHORITY. THIS MAY REQUIRE PROVISION OF:
   2.1. PERMANENT AIR GAP
   2.2. BACKFLOW PREVENTION DEVICE
3. NO DIRECT CONNECTION BETWEEN TOWN WATER SUPPLY AND THE RAIN WATER SUPPLY
4. AN APPROVED STOP VALVE AND/OR PRESSURE LIMITING VALVE AT THE RAINWATER TANK
5. PROVIDE AT LEAST ONE EXTERNAL HOSE COCK ON THE TOWN WATER SUPPLY FOR FIRE FIGHTING
6. PROVIDE APPROPRIATE FLOAT VALVES AND/OR SOLENOID VALVES TO CONTROL TOWN WATER SUPPLY INLET TO TANK IN ORDER TO ACHIEVE THE TOP-UP INDICATED ON THE TYPICAL DETAIL
7. ALL PLUMBING WORKS ARE TO BE CARRIED OUT BY LICENSED PLUMBERS IN ACCORDANCE WITH AS/NZS3500.1 NATIONAL PLUMBING AND DRAINAGE CODE
8. PRESSURE PUMP ELECTRICAL CONNECTION TO BE CARRIED OUT BY A LICENSED ELECTRICIAN
9. ONLY ROOF RUN-OFF IS TO BE DIRECTED TO THE RAINWATER TANK . SURFACE WATER INLETS ARE NOT TO BE CONNECTED
10. PIPE MATERIALS FOR RAINWATER SUPPLY PLUMBING ARE TO BE APPROVED MATERIALS TO AS/NZS3500 PART 1 SECTION 2 AND TO BE CLEARLY AND PERMANENTLY IDENTIFIED AS 'RAINWATER'. THIS MAY BE ACHIEVED FOR BELOW GROUND PIPES USING IDENTIFICATION TAPE (MADE IN ACCORDANCE WITH AS2648) OR FOR ABOVE GROUND PIPES BY USING ADHESIVE PIPE MARKERS (MADE IN ACCORDANCE WITH AS1345)
11. EVERY RAINWATER SUPPLY OUTLET POINT AND THE RAINWATER TANK ARE TO BE LABELED 'RAINWATER' ON A METALLIC SIGN IN ACCORDANCE WITH AS1319
12. ALL INLETS AND OUTLETS TO THE RAINWATER TANK ARE TO HAVE SUITABLE MEASURES PROVIDED TO PREVENT MOSQUITO AND VERMIN ENTRY

SHEET INDEX

CENTRAL COAST COUNCIL REQUIREMENTS

SITE AREA (m²)	2438
TOTAL PROPOSED IMPERVIOUS AREA (m²)	2370 (97%)
PROPOSED ROOF AREA (m²)	1380
PROPOSED DRIVEWAY	30
MISC. PAVING / COURTYARDS (m²)	960

PROPOSED COMMERCIAL MULTI UNIT COMPLEX IN ACCORDANCE WITH THE GOSFORD CITY COUNCIL DCP 2013 CLAUSE 6.7.6.1 THE FOLLOWING DEVELOPMENT TARGETS ARE REQUIRED.

6.7.6.1 Intent
All developments that require consent will be required to demonstrate compliance with the targets in Table 1.

Table 1 Development Control Targets Matrix

Development Control Targets	Development Types						
	Pools & Spas	Alterations & Additions in excess of 50m²	Single Dwellings & Dual Occupancy	Medium and High Density Residential Development	Group homes, seniors housing, emergency facilities	Commercial, Industrial	Subdivisions (Urban & Rural)
Water Conservation	Covered by BASIX					✓	x
Retention	✓	✓	✓	✓	✓	✓	✓
Stormwater Quality	x	x	✓	✓	✓	✓	✓
Onsite Detention	x	x	x	✓	✓	✓	✓
Local Overland Drainage	✓	✓	✓	✓	✓	✓	✓
Flooding	✓	✓	✓	✓	✓	✓	✓

(i) WATER CONSERVATION

82,000 LITRE RAINWATER RE-USE TANK PROVIDED FOR LANDSCAPE IRRIGATION

(ii) STORMWATER RETENTION

STORMWATER RETENTION HAS BEEN PROVIDED IN ACCORDANCE WITH THE REQUIREMENTS OF GOSFORD DEVELOPMENT CONTROL PLAN 2013 PART 6.7.7.2..4 DEEMED TO COMPLY.

THE FOLLOWING MINIMUM RETENTION STORAGE IS TO BE PROVIDED TO SATISFY THIS REQUIREMENT:-

TOTAL RETENTION VOLUME REQUIRED = 82,000 LITRES
- RAINWATER TANK/S = 82,000 LITRES
- REFER WATER QUALITY REPORT SHEET C11

WE NOTE THIS MEETS THE MINIMUM DEEMED TO COMPLY WATER RETENTION TARGET.

(ii) ON SITE DETENTION

REFER TO SHEET C10 'ON SITE DETENTION REPORT'

(iii) STORMWATER QUALITY CONTROL

REFER TO WATER QUALITY REPORT SHEETS C11 TO C13

(iv) FLOOD PLANNING LEVEL FPL

REFER TO FLOOD SUMMARY ON SHEET C14

DESIGN PREPARED IN ACCORDANCE WITH GOSFORD CITY COUNCIL'S DCP 2013 PART 6.7, GOSFORD CITY COUNCIL WATER CYCLE MANAGEMENT GUIDELINES, AR&R AND AS/NZS 3500.

© COPYRIGHT of this design and plan is the property of ACOR Consultants (CC) Pty Ltd, ACN 127 012 104 ATF The ACOR (CC) Unit Trust ABN 81 392 991 647, all rights reserved. It must not be used, modified, reproduced or copied wholly or in part without written permission from ACOR Consultants (CC) Pty Ltd. ACOR Consultants is a trademark licensed to ACOR Consultants (CC) Pty Ltd by ACOR Consultants Pty Ltd.

Issue	Description	Date	Drawn	Approved
B	ISSUED FOR DEVELOPMENT APPLICATION	06.07.22	SJ	BK
A	ISSUED FOR CLIENT REVIEW	05.07.22	SJ	BK

1 0 1cm at full size 10cm

North

Client: CHP

Architect: ELEVATION ARCHITECTURE

ACOR CONSULTANTS
ACOR Consultants (CC) Pty Ltd
Platinum Building, Suite 2.01, 4 Ilya Avenue
ERINA NSW 2250, Australia
T +61 2 4324 3499
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project: PROPOSED COMMERCIAL DEVELOPMENT
No.60, 62 & 64
SHOWGROUND ROAD
GOSFORD

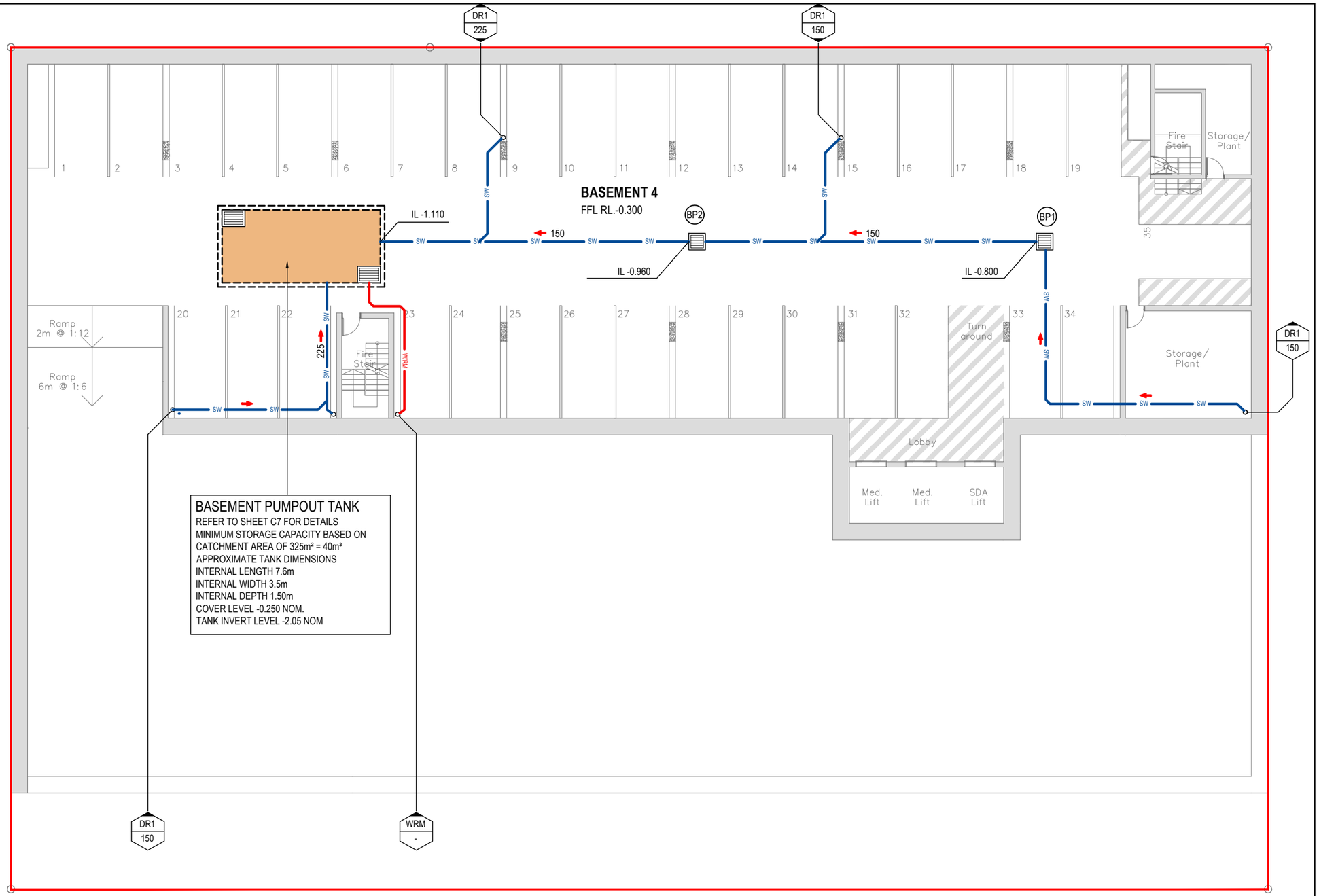
Drawing Title: COVER SHEET & NOTES

Drawn	Date	Scale A1	Q.A. Check	Date
SJ	05.07.22	AS NOTED	-	-
Designed	Project No.		Dwg. No.	Issue
BK	CC220233		C1	B

LEGEND

- RW — DENOTES 100mm DIA. FULLY SEALED UNDERGROUND RAINWATER SYSTEM PIPE U.N.O.
- SW — DENOTES 100mm DIA. UNDERGROUND STORMWATER / SURFACE WATER SYSTEM PIPE AT 1% MIN. GRADE U.N.O.
- 150 RW — DENOTES RAINWATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
- 150 SW — DENOTES STORMWATER/SURFACE WATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
- W/RM — DENOTES WATER RISER MAIN (BY OTHERS)
- 150 — DENOTES SEALED AERIAL LINE RAINWATER PIPE (UNDER SLAB) AND DIA. WHEN PIPE EXCEEDS 100mm DIA. INSTALLED IN ACCORDANCE WITH AS3500.3
- 150 — DENOTES SEALED AERIAL LINE STORMWATER PIPE (UNDER SLAB) AND DIA. WHEN PIPE EXCEEDS 100mm DIA. INSTALLED IN ACCORDANCE WITH AS3500.3
- DP 150 — DENOTES THE LOCATIONS OF DOWNPIPES AND SPECIFIED DIAMETER. FINAL LOCATIONS TO BE CONFIRMED BY THE ARCHITECT AT CC STAGE.
- DR1 150 — DENOTES THE LOCATIONS OF STORMWATER DROPPERS AND SPECIFIED DIAMETER.
- SO — DENOTES SURFACE OUTLET.
- PO — DENOTES PLANTER BOX OUTLET.
- TF — 260mm DIA 'SPS TRUFLO' INLET (150mm DIA INLET PIPE) OR EQUIVALENT.
- DENOTES PROPOSED SURFACE WATER FLOW PATH GENERATED BY DEVELOPMENT SITE CATCHMENT ONLY
- CC — DENOTES STORMWATER LINE CATCHMENT TO BE FINALISED AT CC STAGE DESIGN
- C2 — DENOTES STORMWATER LINE CONTINUATION REFERENCE DRAWING
- GD — DENOTES 100 WD x 100 DP GRATED DRAIN. LEVELS TO BE FINALISED AT CC STAGE
- DENOTES 30mm DEEP DRAINAGE CELLS COVERED IN GEOTEXTILE UNDER GRASSED AREAS. DIRECT SEEPAGE TO STORMWATER SYSTEM

PIT SCHEDULE			
PIT No.	TYPE	SIZE	TOP GRATE
BP1	HD GRATED INLET	600 x 600	-0.25
BP2	HD GRATED INLET	600 x 600	-0.25
PROPOSED PIT SURFACE LEVELS AND INVERTS TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION			



STORMWATER MANAGEMENT PLAN - BASEMENT 4

SCALE - 1:100/A1, 1:200/A3

0 1 2 4 6 8 10m

© COPYRIGHT of this design and plan is the property of ACOR Consultants (CC) Pty Ltd, ACN 127 012 104 ATF The ACOR (CC) Unit Trust ABN 81 392 991 647, all rights reserved. It must not be used, modified, reproduced or copied wholly or in part without written permission from ACOR Consultants (CC) Pty Ltd. ACOR Consultants is a trademark licensed to ACOR Consultants (CC) Pty Ltd by ACOR Consultants Pty Ltd.

Issue	Description	Date	Drawn	Approved
B	ISSUED FOR DEVELOPMENT APPLICATION	06.07.22	SJ	BK
A	ISSUED FOR CLIENT REVIEW	05.07.22	SJ	BK

1cm at full size 10cm

North

Client: CHP

Architect: ELEVATION ARCHITECTURE

ACOR Consultants (CC) Pty Ltd
Platinum Building, Suite 2.01, 4 Ilya Avenue
ERINA NSW 2250, Australia
T +61 2 4324 3499
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project: PROPOSED COMMERCIAL DEVELOPMENT
No.60, 62 & 64
SHOWGROUND ROAD
GOSFORD

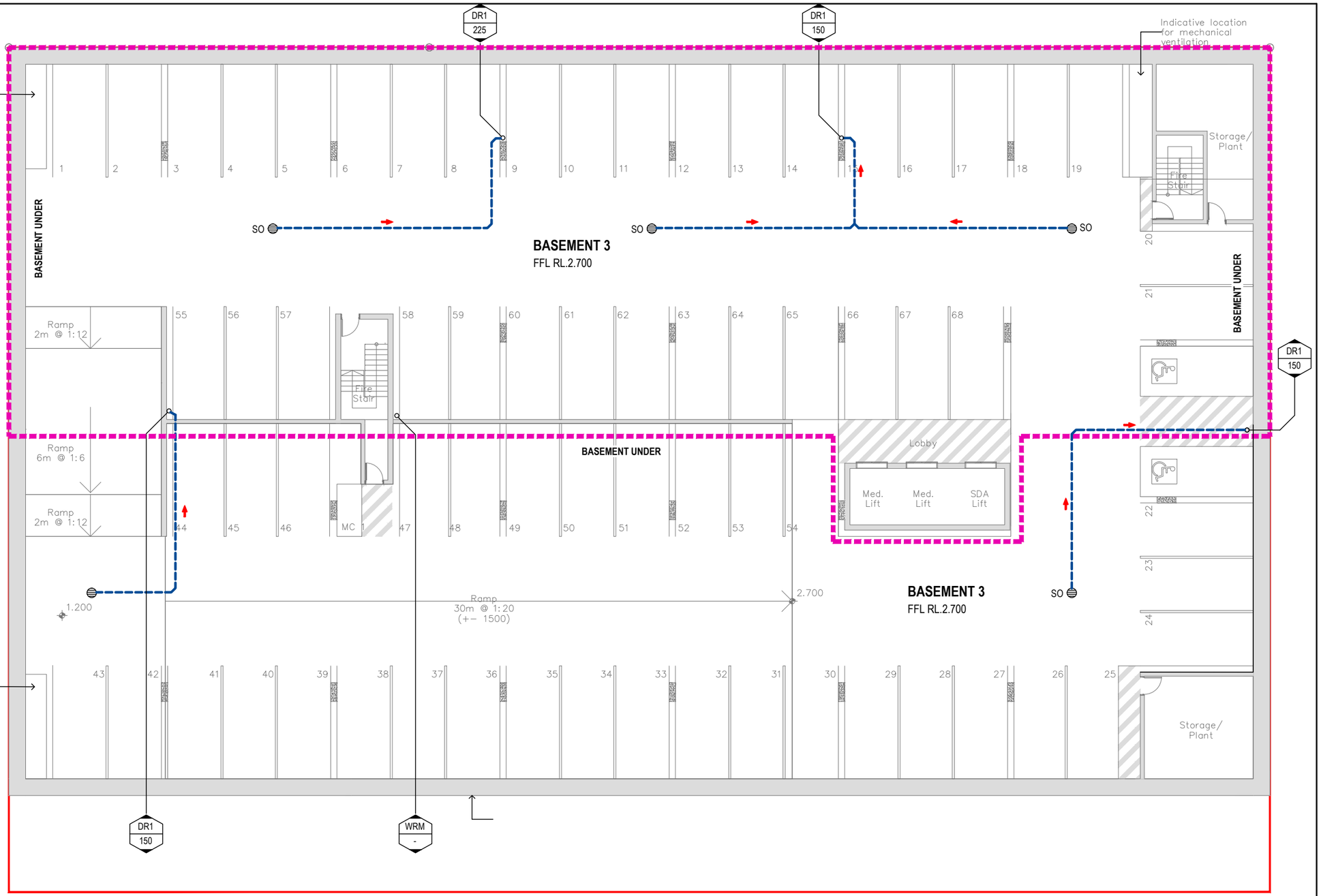
Drawing Title: STORMWATER MANAGEMENT PLAN - BASEMENT 4

Drawn	Date	Scale	Q.A. Check	Date
SJ	05.07.22	AS NOTED A1	-	-

Designed	Project No.	Dwg. No.	Issue
BK	CC220233	C2	B

LEGEND

- RW — DENOTES 100mm DIA. FULLY SEALED UNDERGROUND RAINWATER SYSTEM PIPE U.N.O.
- SW — DENOTES 100mm DIA. UNDERGROUND STORMWATER / SURFACE WATER SYSTEM PIPE AT 1% MIN. GRADE U.N.O.
- 150 RW — DENOTES RAINWATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
- 150 SW — DENOTES STORMWATER/SURFACE WATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
- W/RM — DENOTES WATER RISER MAIN (BY OTHERS)
- 150 — DENOTES SEALED AERIAL LINE RAINWATER PIPE (UNDER SLAB) AND DIA. WHEN PIPE EXCEEDS 100mm DIA. INSTALLED IN ACCORDANCE WITH AS3500.3
- 150 — DENOTES SEALED AERIAL LINE STORMWATER PIPE (UNDER SLAB) AND DIA. WHEN PIPE EXCEEDS 100mm DIA. INSTALLED IN ACCORDANCE WITH AS3500.3
- DP 150 — DENOTES THE LOCATIONS OF DOWNPIPES AND SPECIFIED DIAMETER. FINAL LOCATIONS TO BE CONFIRMED BY THE ARCHITECT AT CC STAGE.
- DR1 150 — DENOTES THE LOCATIONS OF STORMWATER DROPPERS AND SPECIFIED DIAMETER.
- SO — DENOTES SURFACE OUTLET.
- PO — DENOTES PLANTER BOX OUTLET.
- TF — 260mm DIA 'SPS TRUFLO' INLET (150mm DIA INLET PIPE) OR EQUIVALENT.
- DENOTES PROPOSED SURFACE WATER FLOW PATH GENERATED BY DEVELOPMENT SITE CATCHMENT ONLY
- CC — DENOTES STORMWATER LINE CATCHMENT TO BE FINALISED AT CC STAGE DESIGN
- C2 — DENOTES STORMWATER LINE CONTINUATION REFERENCE DRAWING
- GD — DENOTES 100 WD x 100 DP GRATED DRAIN. LEVELS TO BE FINALISED AT CC STAGE
- DENOTES 30mm DEEP DRAINAGE CELLS COVERED IN GEOTEXTILE UNDER GRASSED AREAS. DIRECT SEEPAGE TO STORMWATER SYSTEM



STORMWATER MANAGEMENT PLAN - BASEMENT 3

SCALE - 1:100/A1, 1:200/A3

0 1 2 4 6 8 10m

© COPYRIGHT of this design and plan is the property of ACOR Consultants (CC) Pty Ltd, ACN 127 012 104 ATF The ACOR (CC) Unit Trust ABN 81 392 991 647, all rights reserved. It must not be used, modified, reproduced or copied wholly or in part without written permission from ACOR Consultants (CC) Pty Ltd. ACOR Consultants is a trademark licensed to ACOR Consultants (CC) Pty Ltd by ACOR Consultants Pty Ltd.

Issue	Description	Date	Drawn	Approved
B	ISSUED FOR DEVELOPMENT APPLICATION	06.07.22	SJ	BK
A	ISSUED FOR CLIENT REVIEW	05.07.22	SJ	BK

1cm at full size

North

Client: CHP

Architect: ELEVATION ARCHITECTURE

ACOR CONSULTANTS
ACOR Consultants (CC) Pty Ltd
Platinum Building, Suite 2.01, 4 Ilya Avenue
ERINA NSW 2250, Australia
T +61 2 4324 3499
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

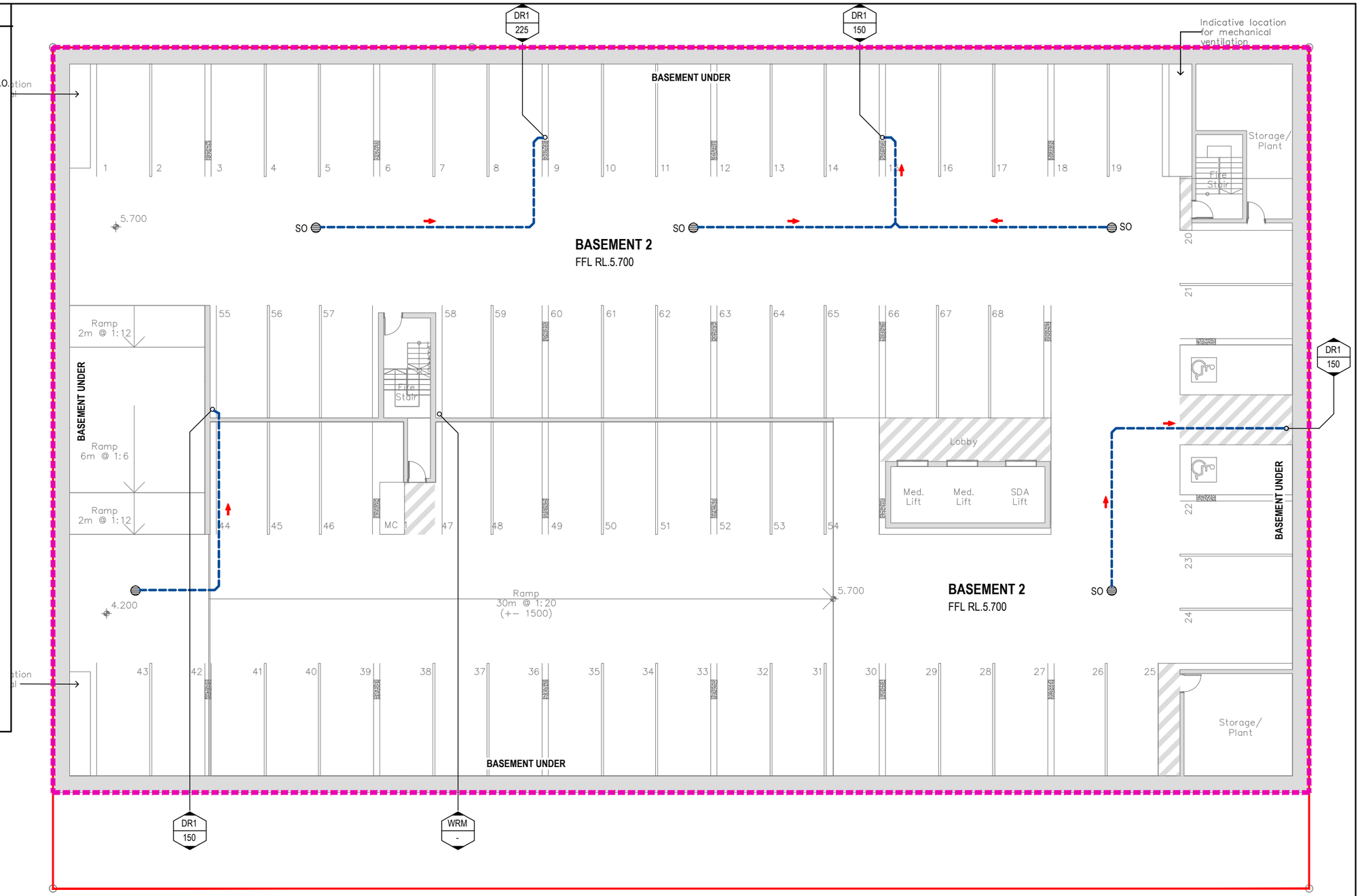
Project: PROPOSED COMMERCIAL DEVELOPMENT
No.60, 62 & 64
SHOWGROUND ROAD
GOSFORD

Drawing Title: STORMWATER MANAGEMENT PLAN - BASEMENT 3

Drawn	Date	Scale A1	Q.A. Check	Date
SJ	05.07.22	AS NOTED	-	-
Designed	Project No.		Dwg. No.	Issue
BK	CC220233		C3	B

LEGEND

- RW — DENOTES 100mm DIA. FULLY SEALED UNDERGROUND RAINWATER SYSTEM PIPE U.N.O.
- SW — DENOTES 100mm DIA. UNDERGROUND STORMWATER / SURFACE WATER SYSTEM PIPE AT 1% MIN. GRADE U.N.O.
- 150 RW — DENOTES RAINWATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
- 150 SW — DENOTES STORMWATER/SURFACE WATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
- W/RM — DENOTES WATER RISER MAIN (BY OTHERS)
- 150 — DENOTES SEALED AERIAL LINE RAINWATER PIPE (UNDER SLAB) AND DIA. WHEN PIPE EXCEEDS 100mm DIA. INSTALLED IN ACCORDANCE WITH AS3500.3
- 150 — DENOTES SEALED AERIAL LINE STORMWATER PIPE (UNDER SLAB) AND DIA. WHEN PIPE EXCEEDS 100mm DIA. INSTALLED IN ACCORDANCE WITH AS3500.3
- DP 150 — DENOTES THE LOCATIONS OF DOWNPIPES AND SPECIFIED DIAMETER. FINAL LOCATIONS TO BE CONFIRMED BY THE ARCHITECT AT CC STAGE.
- DR1 150 — DENOTES THE LOCATIONS OF STORMWATER DROPPERS AND SPECIFIED DIAMETER.
- SO — DENOTES SURFACE OUTLET.
- PO — DENOTES PLANTER BOX OUTLET.
- TF — 260mm DIA 'SPS TRUFLO' INLET (150mm DIA INLET PIPE) OR EQUIVALENT.
- DENOTES PROPOSED SURFACE WATER FLOW PATH GENERATED BY DEVELOPMENT SITE CATCHMENT ONLY
- CC — DENOTES STORMWATER LINE CATCHMENT TO BE FINALISED AT CC STAGE DESIGN
- C2 — DENOTES STORMWATER LINE CONTINUATION REFERENCE DRAWING
- GD — DENOTES 100 WD x 100 DP GRATED DRAIN. LEVELS TO BE FINALISED AT CC STAGE
- DENOTES 30mm DEEP DRAINAGE CELLS COVERED IN GEOTEXTILE UNDER GRASSED AREAS. DIRECT SEEPAGE TO STORMWATER SYSTEM



STORMWATER MANAGEMENT PLAN - BASEMENT 2

SCALE - 1:100/A1, 1:200/A3

0 1 2 4 6 8 10m

© COPYRIGHT of this design and plan is the property of ACOR Consultants (CC) Pty Ltd, ACN 127 012 104 ATF The ACOR (CC) Unit Trust ABN 81 392 991 647, all rights reserved. It must not be used, modified, reproduced or copied wholly or in part without written permission from ACOR Consultants (CC) Pty Ltd. ACOR Consultants is a trademark licensed to ACOR Consultants (CC) Pty Ltd by ACOR Consultants Pty Ltd.

Issue	Description	Date	Drawn	Approved
B	ISSUED FOR DEVELOPMENT APPLICATION	06.07.22	SJ	BK
A	ISSUED FOR CLIENT REVIEW	05.07.22	SJ	BK

1cm at full size

North

Client: CHP

Architect: ELEVATION ARCHITECTURE

ACOR Consultants (CC) Pty Ltd
Platinum Building, Suite 2.01, 4 Ilya Avenue
ERINA NSW 2250, Australia
T +61 2 4324 3499
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

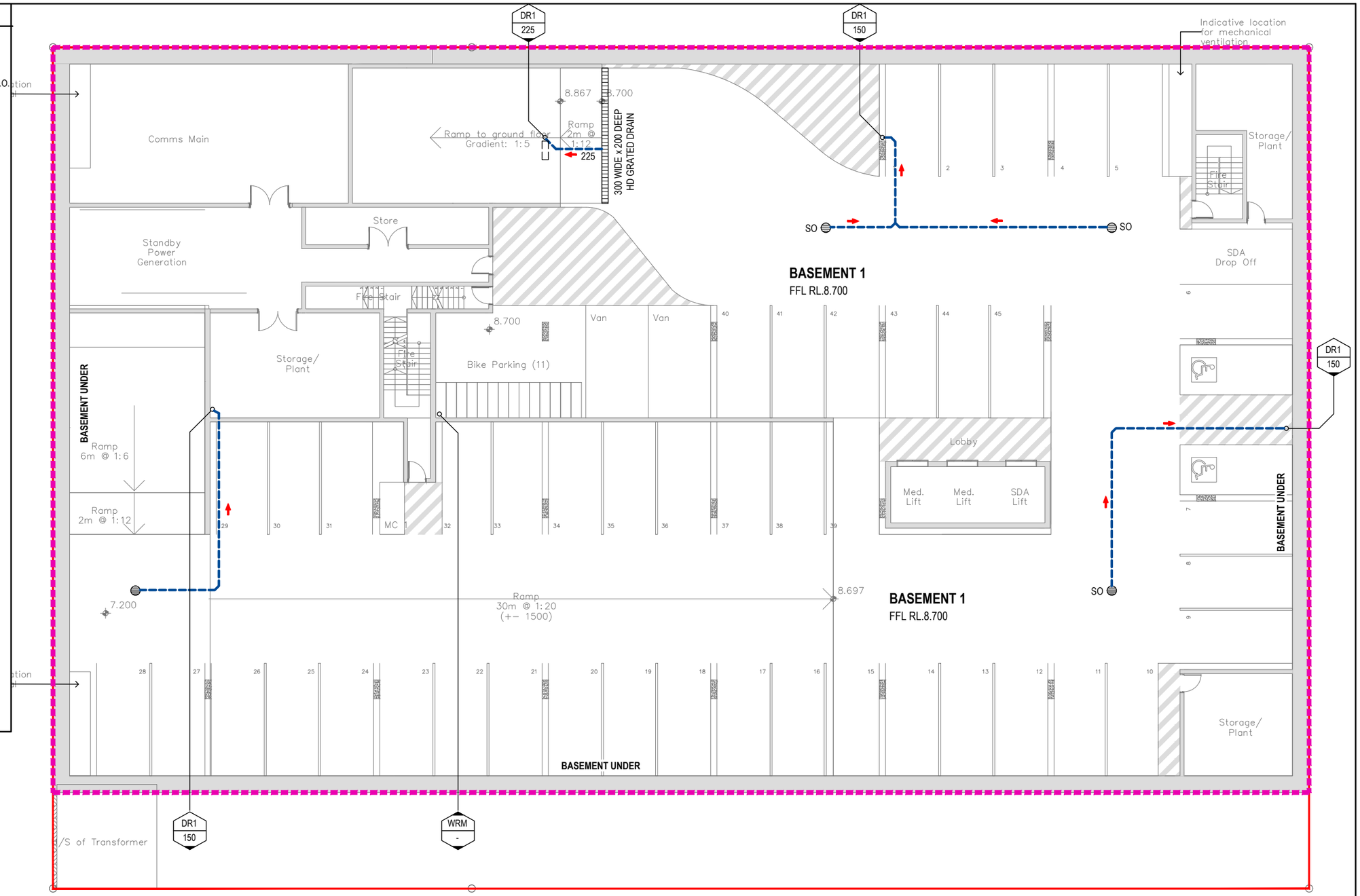
Project: PROPOSED COMMERCIAL DEVELOPMENT
No.60, 62 & 64
SHOWGROUND ROAD
GOSFORD

Drawing Title: STORMWATER MANAGEMENT PLAN - BASEMENT 2

Drawn	Date	Scale A1	Q.A. Check	Date
SJ	05.07.22	AS NOTED	-	-
Designed	Project No.		Dwg. No.	Issue
BK	CC220233		C4	B

LEGEND

- RW — DENOTES 100mm DIA. FULLY SEALED UNDERGROUND RAINWATER SYSTEM PIPE U.N.O.
- SW — DENOTES 100mm DIA. UNDERGROUND STORMWATER / SURFACE WATER SYSTEM PIPE AT 1% MIN. GRADE U.N.O.
- 150 RW — DENOTES RAINWATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
- 150 SW — DENOTES STORMWATER/SURFACE WATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
- W/RM — DENOTES WATER RISER MAIN (BY OTHERS)
- 150 — DENOTES SEALED AERIAL LINE RAINWATER PIPE (UNDER SLAB) AND DIA. WHEN PIPE EXCEEDS 100mm DIA. INSTALLED IN ACCORDANCE WITH AS3500.3
- 150 — DENOTES SEALED AERIAL LINE STORMWATER PIPE (UNDER SLAB) AND DIA. WHEN PIPE EXCEEDS 100mm DIA. INSTALLED IN ACCORDANCE WITH AS3500.3
- DP 150 — DENOTES THE LOCATIONS OF DOWNPIPES AND SPECIFIED DIAMETER. FINAL LOCATIONS TO BE CONFIRMED BY THE ARCHITECT AT CC STAGE.
- DR1 150 — DENOTES THE LOCATIONS OF STORMWATER DROPPERS AND SPECIFIED DIAMETER.
- SO — DENOTES SURFACE OUTLET.
- PO — DENOTES PLANTER BOX OUTLET.
- TF — 260mm DIA 'SPS TRUFLO' INLET (150mm DIA INLET PIPE) OR EQUIVALENT.
- DENOTES PROPOSED SURFACE WATER FLOW PATH GENERATED BY DEVELOPMENT SITE CATCHMENT ONLY
- CC — DENOTES STORMWATER LINE CATCHMENT TO BE FINALISED AT CC STAGE DESIGN
- C2 — DENOTES STORMWATER LINE CONTINUATION REFERENCE DRAWING
- GD — DENOTES 100 WD x 100 DP GRATED DRAIN. LEVELS TO BE FINALISED AT CC STAGE
- DENOTES 30mm DEEP DRAINAGE CELLS COVERED IN GEOTEXTILE UNDER GRASSED AREAS. DIRECT SEEPAGE TO STORMWATER SYSTEM



STORMWATER MANAGEMENT PLAN - BASEMENT 1

SCALE - 1:100/A1, 1:200/A3

0 1 2 4 6 8 10m

© COPYRIGHT of this design and plan is the property of ACOR Consultants (CC) Pty Ltd, ACN 127 012 104 ATF The ACOR (CC) Unit Trust ABN 81 392 991 647, all rights reserved. It must not be used, modified, reproduced or copied wholly or in part without written permission from ACOR Consultants (CC) Pty Ltd. ACOR Consultants is a trademark licensed to ACOR Consultants (CC) Pty Ltd by ACOR Consultants Pty Ltd.

Issue	Description	Date	Drawn	Approved
B	ISSUED FOR DEVELOPMENT APPLICATION	06.07.22	SJ	BK
A	ISSUED FOR CLIENT REVIEW	05.07.22	SJ	BK

1cm at full size 10cm

North

Client: CHP

Architect: ELEVATION ARCHITECTURE

ACOR Consultants (CC) Pty Ltd
Platinum Building, Suite 2.01, 4 Ilya Avenue
ERINA NSW 2250, Australia
T +61 2 4324 3499
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project: PROPOSED COMMERCIAL DEVELOPMENT
No.60, 62 & 64
SHOWGROUND ROAD
GOSFORD

Drawing Title: STORMWATER MANAGEMENT PLAN - BASEMENT 1

Drawn	Date	Scale A1	Q.A. Check	Date
SJ	05.07.22	AS NOTED	-	-
Designed	Project No.		Dwg. No.	Issue
BK	CC220233		C5	B

LEGEND

- RW — DENOTES 100mm DIA. FULLY SEALED UNDERGROUND RAINWATER SYSTEM PIPE U.N.O.
- SW — DENOTES 100mm DIA. UNDERGROUND STORMWATER / SURFACE WATER SYSTEM PIPE AT 1% MIN. GRADE U.N.O.
- 150 RW — DENOTES RAINWATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
- 150 SW — DENOTES STORMWATER/SURFACE WATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
- W/RM — DENOTES WATER RISER MAIN (BY OTHERS)
- 150 — DENOTES SEALED AERIAL LINE RAINWATER PIPE (UNDER SLAB) AND DIA. WHEN PIPE EXCEEDS 100mm DIA. INSTALLED IN ACCORDANCE WITH AS3500.3
- 150 — DENOTES SEALED AERIAL LINE STORMWATER PIPE (UNDER SLAB) AND DIA. WHEN PIPE EXCEEDS 100mm DIA. INSTALLED IN ACCORDANCE WITH AS3500.3
- DP 150 — DENOTES THE LOCATIONS OF DOWNPIPES AND SPECIFIED DIAMETER. FINAL LOCATIONS TO BE CONFIRMED BY THE ARCHITECT AT CC STAGE.
- DR1 150 — DENOTES THE LOCATIONS OF STORMWATER DROPPERS AND SPECIFIED DIAMETER.
- SO — DENOTES SURFACE OUTLET.
- PO — DENOTES PLANTER BOX OUTLET.
- TF — 260mm DIA 'SPS TRUFLO' INLET (150mm DIA INLET PIPE) OR EQUIVALENT.
- DENOTES PROPOSED SURFACE WATER FLOW PATH GENERATED BY DEVELOPMENT SITE CATCHMENT ONLY
- CC — DENOTES STORMWATER LINE CATCHMENT TO BE FINALISED AT CC STAGE DESIGN
- C2 — DENOTES STORMWATER LINE CONTINUATION REFERENCE DRAWING
- GD — DENOTES 100 WD x 100 DP GRATED DRAIN. LEVELS TO BE FINALISED AT CC STAGE
- DENOTES 30mm DEEP DRAINAGE CELLS COVERED IN GEOTEXTILE UNDER GRASSED AREAS. DIRECT SEEPAGE TO STORMWATER SYSTEM

WALL 'A' TOP OF WALL TO BE 300mm MIN HIGHER THAN WALL 'B'

WALL 'B'

COLLECTION PIT WITH SPEL STORMSACK

SURFACE WATER DRAINAGE SYSTEM.
PIPE & PIT NETWORK TO BE DETERMINED AT CC STAGE DOCUMENTATION

PROVIDE 180 STEP

PROVIDE 180 STEP

GROUND FLOOR
FFL RL.11.700

GROUND FLOOR
FFL RL.11.700

RAINWATER RE-USE TANK (OSR)
PROVIDE COMBINED OSD / OSR TANK WITH:
OSR STORAGE VOLUME: 82m³
REFER TO SHEET C8 FOR DETAILS
TANK SIZE = 1.75m x 17.6m x 2.7m NOM. DEEP

CROSSOVER AND DRIVEWAY TO BE IN ACCORDANCE WITH COUNCIL REQUIREMENTS. THE LEVELS AND DESIGN OF THE CROSSOVER AND DRIVEWAY SHALL BE BY OTHERS.

BOUNDARY PIT WITH SPEL STORMSACK

JUNCTION PIT WITH SPEL STORMSACK

DISCHARGE STORMWATER TO EXISTING PIT TO THE SATISFACTION OF COUNCIL MAKE GOOD EXISTING CONSTRUCTION INVERT LEVEL OF OUTLET SHALL BE SITE CONFIRMED PRIOR TO COMMENCEMENT OF WORK.
DESIGN INVERT: IL 9.200 NOM. (TBC)

PIT SCHEDULE

PIT No.	TYPE	SIZE	TOP GRATE
P1	LD SOLID COVER	900 x 900	11.70
P2	LD GRATED INLET	900 x 900	11.30
P3 TO P6	LD GRATED INLET	450 x 450	TBA

PROPOSED PIT SURFACE LEVELS AND INVERTS TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION

STORMWATER MANAGEMENT PLAN - GROUND FLOOR

SCALE - 1:100/A1, 1:200/A3

0 1 2 4 6 8 10m

©COPYRIGHT of this design and plan is the property of ACOR Consultants (CC) Pty Ltd, ACN 127 012 104 ATF The ACOR (CC) Unit Trust ABN 81 392 991 647, all rights reserved. It must not be used, modified, reproduced or copied wholly or in part without written permission from ACOR Consultants (CC) Pty Ltd. ACOR Consultants is a trademark licensed to ACOR Consultants (CC) Pty Ltd by ACOR Consultants Pty Ltd.

Issue	Description	Date	Drawn	Approved
B	ISSUED FOR DEVELOPMENT APPLICATION	06.07.22	SJ	BK
A	ISSUED FOR CLIENT REVIEW	05.07.22	SJ	BK

1cm at full size 10cm

North

Client: CHP

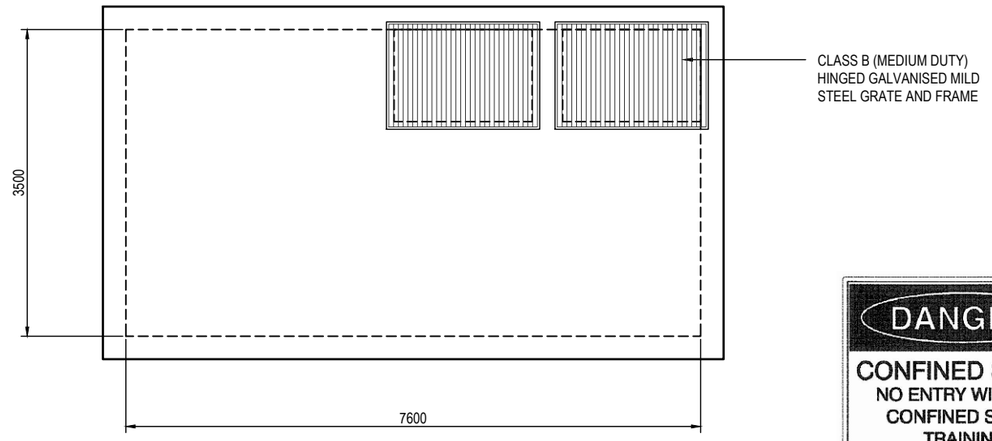
Architect: ELEVATION ARCHITECTURE

ACOR CONSULTANTS
ACOR Consultants (CC) Pty Ltd
Platinum Building, Suite 2.01, 4 Ilya Avenue
ERINA NSW 2250, Australia
T +61 2 4324 3499
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project: PROPOSED COMMERCIAL DEVELOPMENT
No.60, 62 & 64
SHOWGROUND ROAD
GOSFORD

Drawing Title: STORMWATER MANAGEMENT PLAN - GROUND FLOOR

Drawn	Date	Scale A1	Q.A. Check	Date
SJ	05.07.22	AS NOTED	-	-
Designed	Project No.		Dwg. No.	Issue
BK	CC220233		C6	B



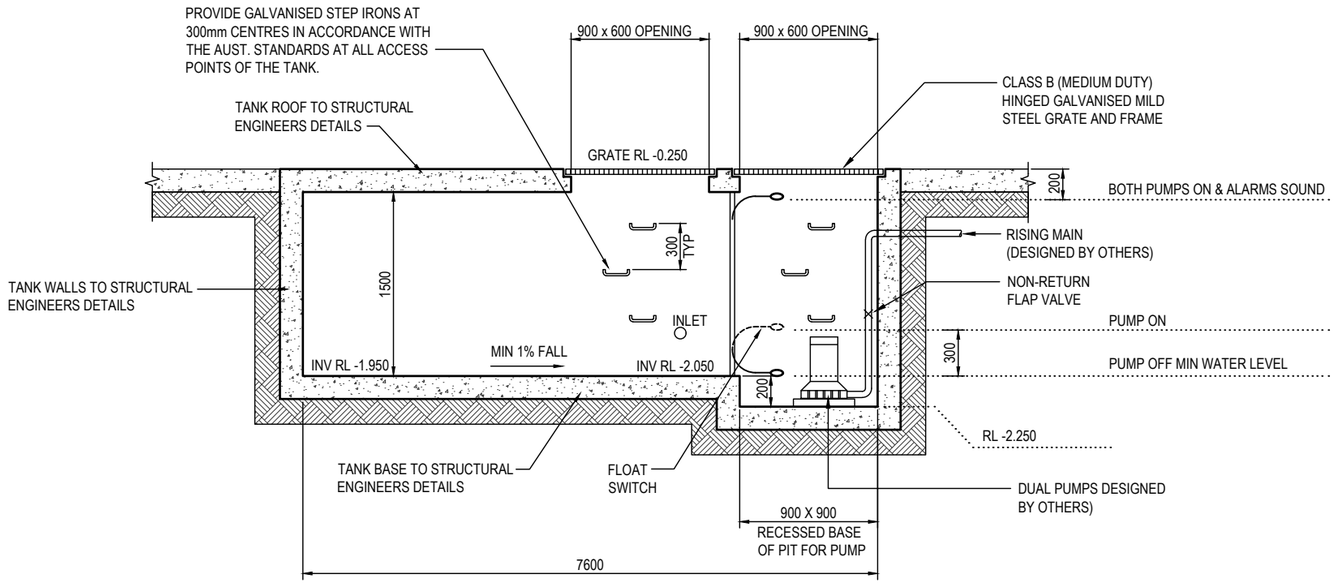
PUMP OUT TANK PLAN
SCALE 1:20/A1, 1:40/A3

INSTALL CONFINED SPACE WARNING SIGN

STANDARD PUMP OUT DESIGN NOTES

THE PUMP SYSTEM SHALL BE OPERATED IN THE FOLLOWING MANNER:-

1. THE PUMPS SHALL BE PROGRAMMED TO WORK ALTERNATELY TO ALLOW BOTH PUMPS TO HAVE AN EQUAL OPERATION LOAD AND PUMP LIFE
2. A FLOAT SHALL BE PROVIDED TO ENSURE THAT THE MINIMUM REQUIRED WATER LEVEL IS MAINTAINED WITHIN THE SUMP AREA OF THE BELOW GROUND TANK. IN THIS REGARD THIS FLOAT WILL FUNCTION AS AN OFF SWITCH FOR THE PUMPS AT THE MINIMUM WATER LEVEL. THE SAME FLOAT SHALL BE SET TO TURN ONE OF THE PUMPS ON UPON WATER LEVEL IN THE TANK RISING TO APPROXIMATELY 300mm ABOVE THE MINIMUM WATER LEVEL. THE PUMP SHALL OPERATE UNTIL THE TANK IS DRAINED TO THE MINIMUM WATER LEVEL.
3. A SECOND FLOAT SHALL BE PROVIDED AT A HIGH LEVEL, WHICH IS APPROXIMATELY THE ROOF LEVEL OF THE BELOW GROUND TANK. THIS FLOAT SHALL START THE OTHER PUMP THAT IS NOT OPERATING AND ACTIVATE THE ALARM.
4. AN ALARM SYSTEM SHALL BE PROVIDED WITH A FLASHING STROBE LIGHT AND A PUMP FAILURE WARNING SIGN WHICH ARE TO BE LOCATED AT THE DRIVEWAY ENTRANCE TO THE BASEMENT LEVEL. THE ALARM SYSTEM SHALL BE PROVIDED WITH A BATTERY BACK-UP IN CASE OF POWER FAILURE.
5. A CONFINED SPACE DANGER SIGN SHALL BE PROVIDED AT ALL ACCESS POINTS TO THE PUMP OUT STORAGE TANK.



PUMP OUT TANK
AVERAGE HEIGHT = 1.5m
WIDTH = 3.5m
LENGTH = 7.60m
VOLUME PROVIDED = 40.0m³

TYPICAL SECTION THROUGH PUMP OUT TANK
SCALE 1:20/A1, 1:40/A3

PUMP-OUT TANK MAINTENANCE SCHEDULE

MAINTENANCE CONTRACT

NOTE: A 24 HOUR X 12 MONTHLY EMERGENCY AND MAINTENANCE CONTRACT SHALL BE OBTAINED FROM A COMPANY CAPABLE OF EXECUTING THE WORK AND SHALL BE KEPT IN FORCE BY THE PROPERTY OWNER(S) FOR THE LIFE OF THE BUILDING.

THE MAINTENANCE CONTRACT SHALL BE CARRIED OUT EVERY THREE (3) MONTHS AND SHALL INCLUDE THE FOLLOWING ACTIVITIES:

1. CLEAN OUT ALL PITS OF SILT AND DEBRIS.
2. CHECK AND CLEAN OUT, IF NECESSARY, ALL PIPELINES.
3. CHECK:
   - 3.1. PUMPS FOR WEAR
   - 3.2. PUMP OIL SEALS
   - 3.3. PUMP STRAINER AND CLEAN
4. CARRY OUT ROUTINE MAINTENANCE TO PUMPS AS RECOMMENDED BY THE MANUFACTURER.
5. CHECK OPERATIONAL SEQUENCE OF LEVEL SWITCHES, PUMPS AND CONTROL PANEL.
6. THE EMERGENCY CONTRACT SHALL PROVIDE FOR A 24 HOUR X 7 DAY PER WEEK SERVICE.

THE CONTRACTOR SHALL PROVIDE A NAME PLATE STATING NAME, WORKING HOURS, TELEPHONE NUMBER AND OUT OF HOURS NUMBER AND SUCH NAME PLATE SHALL BE FIXED TO THE FRONT OF THE CONTROL PANEL.

©COPYRIGHT of this design and plan is the property of ACOR Consultants (CC) Pty Ltd, ACN 127 012 104 ATF The ACOR (CC) Unit Trust ABN 81 392 991 647, all rights reserved. It must not be used, modified, reproduced or copied wholly or in part without written permission from ACOR Consultants (CC) Pty Ltd. ACOR Consultants is a trademark licensed to ACOR Consultants (CC) Pty Ltd by ACOR Consultants Pty Ltd.

Issue	Description	Date	Drawn	Approved
B	ISSUED FOR DEVELOPMENT APPLICATION	06.07.22	SJ	BK
A	ISSUED FOR CLIENT REVIEW	05.07.22	SJ	BK

North

1cm at full size

Client: CHP

Architect: ELEVATION ARCHITECTURE

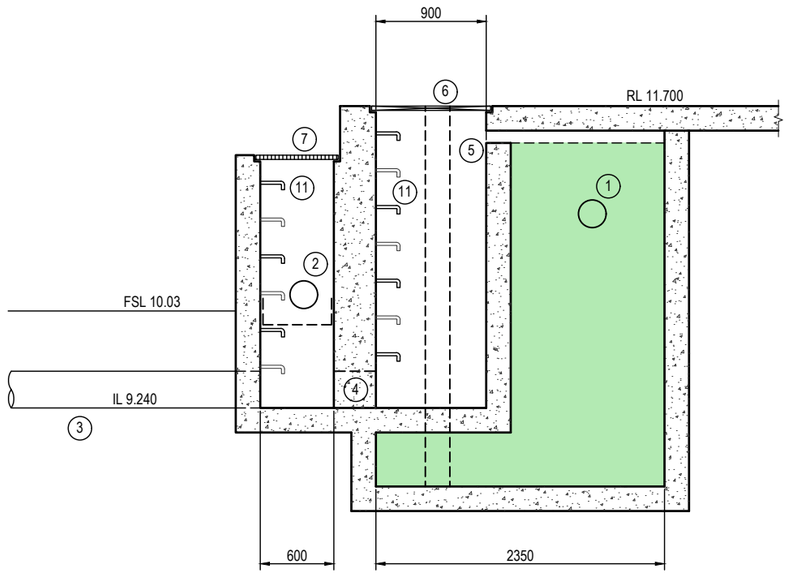
ACOR Consultants (CC) Pty Ltd
Platinum Building, Suite 2.01, 4 Ilya Avenue
ERINA NSW 2250, Australia
T +61 2 4324 3499
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project: PROPOSED COMMERCIAL DEVELOPMENT
No.60, 62 & 64
SHOWGROUND ROAD
GOSFORD

Drawing Title: STORMWATER MANAGEMENT DETAILS SHEET No.1

Drawn	Date	Scale A1	Q.A. Check	Date
SJ	05.07.22	AS NOTED	-	-

Designed	Project No.	Dwg. No.	Issue
BK	CC220233	C7	B

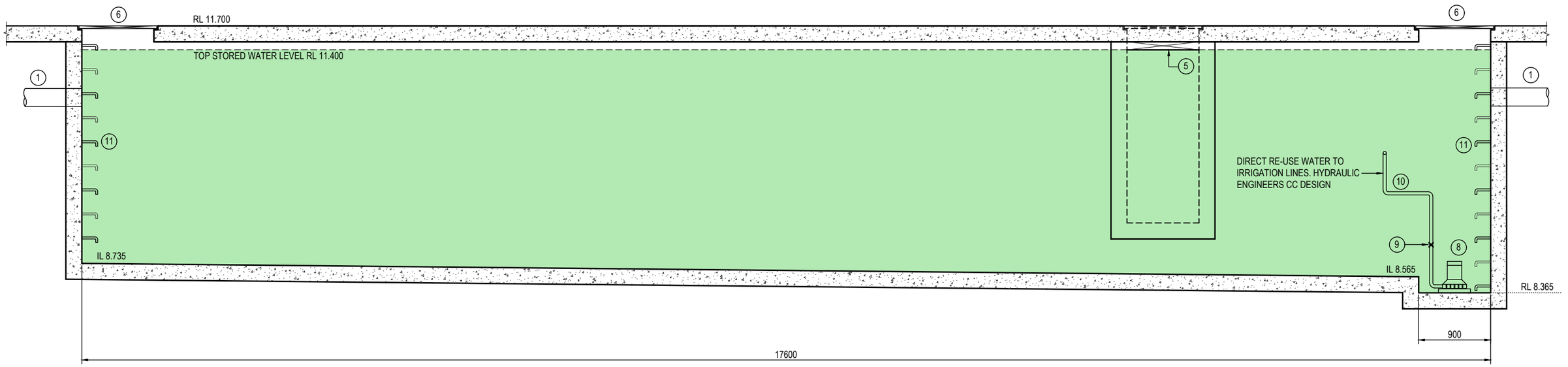


SECTION A
SCALE: 1:25/A1, 1:50/A3
C6

LEGEND

1	ROOFWATER INLET PIPE
2	SURFACE WATER INLET PIPE
3	300 DIA DISCHARGE PIPE
4	300 DIA LINK PIPE
5	OSR OVERFLOW WEIR
6	900 x 900 SOLID COVER BOLTED DOWN
7	900 x 600 ID GRATED INLET BOLTED DOWN
8	RE-USE PUMP TO MANUFACTURERS SPECIFICATIONS
9	NON-RETURN VALVE
10	50 DIA PVC PIPE CLASS '16' RISING MAIN
11	PROVIDE GALVANISED STEP IRONS AT 300mm CENTRES WHERE DEPTH EXCEEDS 1100mm IN ACCORDANCE WITH THE AUST. STANDARDS AT ALL ACCESS POINTS OF THE TANK, TYP.
12	TANK STRUCTURE TO STRUCTURAL ENGINEERS DETAILS

PROVIDE CONFINED SPACE SIGNAGE AT ENTRY POINTS INTO TANK.



SECTION B
SCALE: 1:25/A1, 1:50/A3
C6

©COPYRIGHT of this design and plan is the property of ACOR Consultants (CC) Pty Ltd, ACN 127 012 104 ATF The ACOR (CC) Unit Trust ABN 81 392 991 647, all rights reserved. It must not be used, modified, reproduced or copied wholly or in part without written permission from ACOR Consultants (CC) Pty Ltd. ACOR Consultants is a trademark licensed to ACOR Consultants (CC) Pty Ltd by ACOR Consultants Pty Ltd.

Issue	Description	Date	Drawn	Approved
B	ISSUED FOR DEVELOPMENT APPLICATION	06.07.22	SJ	BK
A	ISSUED FOR CLIENT REVIEW	05.07.22	SJ	BK

North

1cm at full size

Client: CHP

Architect: ELEVATION ARCHITECTURE

ACOR Consultants (CC) Pty Ltd
Platinum Building, Suite 2.01, 4 Ilya Avenue
ERINA NSW 2250, Australia
T +61 2 4324 3499
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project: PROPOSED COMMERCIAL DEVELOPMENT
No.60, 62 & 64
SHOWGROUND ROAD
GOSFORD

Drawing Title: STORMWATER MANAGEMENT DETAILS SHEET No.2

Drawn	Date	Scale A1	Q.A. Check	Date
SJ	05.07.22	AS NOTED	-	-
Designed	Project No.		Dwg. No.	Issue
BK	CC220233		C8	B

ON-SITE STORMWATER DETENTION REPORT

1.1. METHODOLOGY

1.1.1. THE DRAINS PROGRAM WAS ADOPTED AS AN APPROPRIATE MODEL FOR THIS PROJECT. PRE-DEVELOPED AND POST-DEVELOPED HYDROLOGICAL AND HYDRAULIC MODELS WERE DEVELOPED FOR THE 1, 2, 5, 10, 20, 50 AND 100 YEAR ARI DESIGN STORM EVENTS, ASSESSING STACKED RAINFALL PATTERNS RANGING FROM 5 MINUTES TO 2 HOURS. THE ADOPTED PRE & POST DEVELOPED FLOWS ARE THOSE ASSIGNED TO THEIR RESPECTIVE PEAKS.

1.2. PRE-DEVELOPED DRAINS MODEL

1.2.1. THE PRE-DEVELOPED DRAINS MODEL COMPRISED A SINGLE SUB-CATCHMENT DISCHARGING TO A DUMMY NODE. THE PARAMETERS INPUT TO THE DRAINS MODEL FOR THE SUB-CATCHMENT ARE IDENTIFIED IN THE DRAINS SUB-CATCHMENT DATA INPUT FILE. REFER TO DRAINS FILE "CC220233.drn" THE CATCHMENT AREA ADOPTED IS 0.2438ha. THE PRE & POST DEVELOPED IMPERVIOUS AREAS ADOPTED IN THE MODEL ARE 0% AND 90% RESPECTIVELY.

1.2.2. THE PRE-DEVELOPED PEAK FLOWRATES CALCULATED BY THE DRAINS PROGRAM ARE SUMMARISED BELOW:

SITE AREA (m^2)	2438 (0% IMPERVIOUS)
ARI (YEARS)	PEAK FLOWRATE (PRE-DEVELOPED) (L/s)
1	36
2	56
5	76
10	88
20	103
50	113
100	128

1.3. POST-DEVELOPED MODEL

1.3.1. THE POST DEVELOPED DRAINS MODEL COMPRISES OF ONE SUB CATCHMENT FORMED BY THE POST DEVELOPED ROOF AREA WHICH DRAINS TO COMBINED OSD / OSR TANKS. REFER TO DRAINS MODEL "CC220233.drn" FOR DETAIL.

1.3.2. THE PARAMETERS INPUT INTO THE DRAINS MODEL FOR THE POST-DEVELOPED DETENTION TANKS ARE IDENTIFIED IN THE DRAINS SUB-CATCHMENT DATA. REFER TO DRAINS MODEL "CC220233.drn" FOR DETAILS.

1.3.3 THE OSD STORAGE/OUTFLOW PARAMETERS ADOPTED IN THE DRAINS MODEL ARE IDENTIFIED IN DRAINS MODEL "CC220233.drn"

1.3.4 THE PEAK STORAGE VOLUME CALCULATED BY THE DRAINS MODEL OCCURS DURING THE 100 YEAR ARI 25 MINUTE DESIGN STORM EVENT. THE VOLUMETRIC GRAPH FOR THIS STORM EVENT IS IDENTIFIED IN DRAINS MODEL "CC220233.drn".

1.3. POST-DEVELOPED MODEL (CONTINUED)

1.3.5. THE INFLOW AND OUTFLOW HYDROGRAPH FOR THIS STORM EVENT IS IDENTIFIED IN DRAINS MODEL "CC220233.drn"

1.3.6. THE PEAK FLOWRATES AND WATER SURFACE LEVELS DEVELOPED BY THE DRAINS MODEL FOR THE 100 YEAR ARI DESIGN STORM EVENT. REFER TO DRAINS MODEL "CC220233.drn" FOR DETAIL.

ARI (YEARS)	PRE - DEVELOPED FLOW RATE (L/s)	POST - DEVELOPED TOTAL FLOW RATE (L/s)	STORAGE VOLUME (m^3)
1	36	47	6
2	56	53	10
5	76	60	19
10	88	65	24
20	103	70	28
50	113	74	36
100	128	114	41

1.5 CONCLUSION

1.1.6. BASED ON THE FOREGOING AN OSD TANK OF 41 m^3 WILL ATTENUATE POST-DEVELOPED PEAK FLOWRATES TO EQUIVALENT FLOWRATES OR LESS THAN THE COMPARABLE PRE-DEVELOPED FLOWRATES. THE PEAK FLOWRATES FOR THE PRE & POST-DEVELOPED STORM EVENTS FOR THE ENTIRE CATCHMENT DISCHARGE TO THE EXISTING STORMWATER SYSTEM.

IN ACCORDANCE WITH CENTRAL COAST COUNCIL DCP SECTION 6.7.7.4.4, THE OSD REQUIREMENT OF 41 m^3 HAS BEEN OFFSET BY 50% OF THE RAINWATER RE-USE TANK PROVIDED. IN THIS REGARD 82 m^3 RAINWATER RE-USE IS PROPOSED AND SUBSEQUENTLY THE OSD REQUIREMENT IS OFFSET ENTIRELY BY THE PROVISION OF THE RAINWATER TANK.

©COPYRIGHT of this design and plan is the property of ACOR Consultants (CC) Pty Ltd, ACN 127 012 104 ATF The ACOR (CC) Unit Trust ABN 81 392 991 647, all rights reserved. It must not be used, modified, reproduced or copied wholly or in part without written permission from ACOR Consultants (CC) Pty Ltd. ACOR Consultants is a trademark licensed to ACOR Consultants (CC) Pty Ltd by ACOR Consultants Pty Ltd.

Issue	Description	Date	Drawn	Approved
B	ISSUED FOR DEVELOPMENT APPLICATION	06.07.22	SJ	BK
A	ISSUED FOR CLIENT REVIEW	05.07.22	SJ	BK

North

Client: CHP

Architect: ELEVATION ARCHITECTURE

ACOR CONSULTANTS
ACOR Consultants (CC) Pty Ltd
Platinum Building, Suite 2.01, 4 Ilya Avenue
ERINA NSW 2250, Australia
T +61 2 4324 3499
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project: PROPOSED COMMERCIAL DEVELOPMENT
No.60, 62 & 64
SHOWGROUND ROAD
GOSFORD

Drawing Title: STORMWATER DETENTION REPORT

Drawn	Date	Scale A1	Q.A. Check	Date
SJ	05.07.22	AS NOTED	-	-

Designed	Project No.	Dwg. No.	Issue
BK	CC220233	C10	B

WATER QUALITY REPORT

1. INTRODUCTION

A CATCHMENT BASED WATER QUALITY MODEL WAS DEVELOPED TO INVESTIGATE STORMWATER RUNOFF QUALITY FROM THE SUBJECT SITE IN ACCORDANCE WITH GOSFORD CITY COUNCIL'S DEVELOPMENT CONTROL PLAN 2013 PART 6.7 "WATER CYCLE MANAGEMENT." THE REQUIREMENTS ARE TABLED FOLLOWING AS EXTRACTED FROM CLAUSE 6.7.7.3.2:

POLLUTANT	% RETENTION OF THE ANNUAL AVERAGE LOAD (kg/ha/yr)
GROSS POLLUTANTS	90%
TOTAL SUSPENDED SOLIDS	80%
TOTAL PHOSPHORUS	45%
TOTAL NITROGEN	45%

1.1 ON - SITE RETENTION TARGET

THE TABLE BELOW IDENTIFIES THE REQUIRED STORMWATER RETENTION TARGET UNDER THE GOSFORD CITY COUNCIL DCP 2013.

Table 2 Stormwater Retention Volume Target (m^3)

Total Site Area (m^2) \ Fraction Impervious (%)	0	10	20	30	40	50	60	70	80	90	100
50000	0	20	80	180	320	500	720	980	1280	1620	2000
10000	0	4.0	16	36	64	100	144	196	256	324	400
5000	0	2.0	8.0	18	32	50	72	98	128	162	200
2000	0	0.8	3.2	7.2	13	20	29	39	51	65	80
1500	0	0.6	2.4	5.4	9.6	15	22	29	38	49	60
1000	0	0.4	1.6	3.6	6.4	10	14	20	26	32	40
900	0	0.4	1.4	3.2	5.8	9.0	13	18	23	29	36
800	0	0.3	1.3	2.9	5.1	8.0	12	16	20	26	32
700	0	0.3	1.1	2.5	4.5	7.0	10	14	18	23	28
600	0	0.2	1.0	2.2	3.8	6.0	8.6	12	15	19	24
500	0	0.2	0.8	1.8	3.2	5.0	7.2	9.8	13	16	20
400	0	0.2	0.6	1.4	2.6	4.0	5.8	7.8	10	13	16

RESPONSE: TOTAL RETENTION REQUIRED FOR SITE AREA OF 2438 m^2 WHICH IS 90% IMPERVIOUS EQUALS 79 m^3
TOTAL RETENTION PROVIDED FROM RAIN WATER TANK (82 m^3)

2. STUDY METHODOLOGY

THE OBJECTIVES OF THIS REPORT ARE TO:

- ASSESS THE STORMWATER QUALITY FOR THE POST DEVELOPMENT SCENARIO AND PROVIDE RECOMMENDATIONS TO ENSURE THE DEVELOPMENT MEETS FLOOD RUNOFF QUALITY STANDARDS WHERE REQUIRED.

THE REPORT IS BASED ON THE APPLICATION OF MUSIC (MODEL FOR URBAN STORMWATER IMPROVEMENT CONCEPTUALISATION) MODELLING WHICH INCLUDED THE FOLLOWING:

- A STORMWATER QUALITY MODEL TO CONVERT RAINFALL AND EVAPOTRANSPIRATION ON THE CATCHMENT INTO RUNOFF.
- ESTIMATE STORMWATER FLOW AND POLLUTION GENERATION BY SIMULATING THE PERFORMANCE OF STORMWATER TREATMENT DEVICES INDIVIDUALLY AND AS PART OF A TREATMENT TRAIN.

THE MODEL DEFINES WATER QUALITY PROFILES FOR THE POST DEVELOPED TREATED AND UNTREATED SCENARIOS. THE TREATED POST DEVELOPED MODEL INCLUDES POLLUTANT REDUCTION PERCENTAGES, WHICH REFLECT WORKS THAT ARE ESSENTIAL TO MEET THE RELEVANT REQUIREMENTS SCRIBED BY COUNCIL FOR A PROJECT OF THIS NATURE.

3. RAINFALL AND EVAPOTRANSPIRATION DATA

FOR THE PURPOSE OF THIS REPORT DATA HAS BEEN OBTAINED FROM CENTRAL COAST COUNCIL'S MUSIC LINK VERSION 6.34 FOR A SITE LOCATED WITHIN THE LOWLAND REGION.

4. STORMWATER QUALITY MODELLING

4.1 GENERAL

THE FOLLOWING PARAMETERS WERE ASSESSED IN THE HYDROLOGICAL MODELLING ASSOCIATED WITH THE CATCHMENT.

- RAINFALL/RUNOFF AND EVAPOTRANSPIRATION.
- SUB CATCHMENT DIVERSIONS.
- LAND USE (PERVIOUS AND IMPERVIOUS)

4.2 RAINFALL/RUNOFF AND EVAPOTRANSPIRATION

THE DEFAULT MONTHLY AVERAGE POTENTIAL EVAPOTRANSPIRATION PROVIDED BY CENTRAL COAST COUNCIL'S MUSIC LINK VERSION 6.34 WAS UTILISED IN THIS STUDY.

THE DETAILS ARE SUMMARISED IN TABLE 4.1 AND 4.2 FOLLOWING:

TABLE 4.1 - DETAILS OF DAILY RAINFALL DATA			
STATION	NAME	PERIOD	TIMESTEP
066062	SYDNEY OBSERVATORY HILL	01/01/1974-01/01/1994	6 min

TABLE 4.2 - SUMMARY OF POTENTIAL EVAPOTRANSPIRATION (PET)					
JAN	FEB	MAR	APR	MAY	JUN
180.11	134.96	128.03	84.90	57.97	42.90
JUL	AUG	SEP	OCT	NOV	DEC
43.09	57.97	87.90	127.10	152.10	163.06

4.3 CATCHMENT DEFINITION

THE CATCHMENT AREA UNDER POST DEVELOPMENT SCENARIO IS DIVIDED INTO THREE (4) SUB-CATCHMENTS, WHICH WERE DEFINED BASED ON FUNCTIONAL AREAS AND ANTICIPATED OVERLAND FLOW PATHS. THE DETAILS OF THE SUB-CATCHMENTS ARE SUMMARISED IN FOLLOWING TABLE 4.3.

TABLE 4.3 - POST DEVELOPMENT SUB CATCHMENT DETAILS			
SUB CATCHMENT ID	SUB CATCHMENT AREA (ha)	% IMPERVIOUS AREA	% PERVIOUS AREA
COMBINED ROOF TO RAINWATER TANK	0.138	100	0
FOOTPATHS AND LANDSCAPING	0.049	60	40
OPEN ROOFTOP PLANTER AREAS	0.032	0	100
ROOFTOP TERRACE AREA	0.025	100	0

©COPYRIGHT of this design and plan is the property of ACOR Consultants (CC) Pty Ltd, ACN 127 012 104 ATF The ACOR (CC) Unit Trust ABN 81 392 991 647, all rights reserved. It must not be used, modified, reproduced or copied wholly or in part without written permission from ACOR Consultants (CC) Pty Ltd. ACOR Consultants is a trademark licensed to ACOR Consultants (CC) Pty Ltd by ACOR Consultants Pty Ltd.

Issue	Description	Date	Drawn	Approved
B	ISSUED FOR DEVELOPMENT APPLICATION	06.07.22	SJ	BK
A	ISSUED FOR CLIENT REVIEW	05.07.22	SJ	BK

North

Client: CHP

Architect: ELEVATION ARCHITECTURE

ACOR Consultants (CC) Pty Ltd
Platinum Building, Suite 2.01, 4 Ilya Avenue
ERINA NSW 2250, Australia
T +61 2 4324 3499
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project: PROPOSED COMMERCIAL DEVELOPMENT
No.60, 62 & 64
SHOWGROUND ROAD
GOSFORD

Drawing Title: WATER QUALITY REPORT SHEET 1

Drawn	Date	Scale A1	Q.A. Check	Date
SJ	05.07.22	AS NOTED	-	-
Designed	Project No.		Dwg. No.	Issue
BK	CC220233		C11	B

5. MUSIC MODEL

THE MUSIC MODEL WAS CREATED BASED ON A 6 min RAINFALL-RUNOFF MODEL IN CONJUNCTION WITH RESENTATIVE BASEFLOW AND STORMFLOW EVENT MEAN CONCENTRATION (EMCs).

5.1 WATER QUALITY PARAMETERS

THE ADOPTED VALUES OF VARIOUS MUSIC RAINFALL AND RUNOFF PARAMETERS ARE SUMMARISED IN TABLE 5.1.

TABLE 5.1 - ADOPTED MUSIC RAINFALL/RUNOFF PARAMETERS

PARAMETER	VALUE
IMPERVIOUS AREA PROPERTIES	
RAINFALL THRESHOLD (mm/DAY)	1.0
PERVIOUS AREA PROPERTIES	
SOIL STORAGE CAPACITY (mm)	200
SOIL INITIAL STORAGE (% OF CAPACITY)	30
FIELD CAPACITY (mm)	80
INFILTRATION CAPACITY COEFFICIENT - a	200
INFILTRATION CAPACITY EXPONENT - b	1
GROUNDWATER PROPERTIES	
INITIAL DEPTH (mm)	10
DAILY RECHARGE RATE (%)	0
DAILY BASEFLOW RATE (%)	0
DAILY DEEP SEEPAGE RATE (%)	2.0

STORMWATER QUALITY IS CHARACTERISED USING EVENT MEAN CONCENTRATION (EMCs) UNDER STORM AND BASE FLOW CONDITIONS. THE VALUE OF WATER QUALITY PARAMETERS ADOPTED IN THIS STUDY IS SUMMARISED IN TABLE 5.2

TABLE 5.2 - ADOPTED MUSIC WATER QUALITY PARAMETERS

LAND-USE CATEGORY		Log_{10} TSS (mg/L)		Log_{10} TP (mg/L)		Log_{10} TN (mg/L)	
		STORM FLOW	BASE FLOW	STORM FLOW	BASE FLOW	STORM FLOW	BASE FLOW
GENERAL URBAN	MEAN	2.15	1.20	-0.60	-0.85	0.30	0.11
	STD DEV	0.32	0.17	0.25	0.19	0.19	0.12
ROADS	MEAN	2.43	*	-0.3	*	0.34	*
	STD DEV	0.32	*	0.25	*	0.19	*
ROOFS	MEAN	1.30	*	-0.89	*	0.30	*
	STD DEV	0.32	*	0.25	*	0.19	*

* BASE FLOWS ARE ONLY GENERATED FROM PERVIOUS AREAS; THEREFORE THESE PARAMETERS ARE NOT RELEVANT.

5.2 STORMWATER TREATMENT MEASURES

THE STORMWATER TREATMENT MEASURES THAT WERE ASSESSED USING MUSIC INCLUDED ONE OSR TANK (COMBINED FOR THE DEVELOPMENT) AND TWO SPEL STORMSACK INSERTS OR APPROVED EQUAL. THE CONCEPTUAL PLAN FOR THE PROPERTY IS SHOWN ON SHEET C9. THE ADOPTED WATER QUALITY TREATMENT TRAIN DEVICES ARE LISTED IN TABLE 5.3 AND THE PROPERTIES OF THE RAINWATER TANK AND RE-USE IS SHOWN IN FIGURE 5.1.

TABLE 5.3 - TREATMENT TRAIN DEVICES

	OSR VOLUME	OSD	SPEL STORMSACK
COMBINED ROOF FOR THE DEVELOPMENT	82 kL	OSD OFFSET BY RAINWATER TANK	2 X 600 SQ

5.3 MODEL DEFINITION

THE MODEL LAYOUT FOR THE AND POST DEVELOPED SCENARIOS IS DEPICTED ON THIS SHEET.

6. RESULTS & CONCLUSION

BASED ON THE FOREGOING THE PROPOSED NUTRIENT CONTROL MEASURES ACHIEVE THE REQUIRED NUTRIENT REMOVAL TARGET LEVELS. THE RESULTS OF MUSIC MODELLING ARE SUMMARISED IN TABLE 6.1 FOLLOWING. ALSO REFER MUSIC LINK REPORT REFERENCE CC220233 musicLink Report.pdf

TABLE 6.1 - SUMMARY OF MUSIC RESULTS

PARAMETER	SOURCE RUNOFF	DISCHARGE FROM SITE	REDUCTION	
POST-DEVELOPMENT NO TREATMENT				
FLOW (ML/y)	5.09	5.09	0%	
TSS (kg/y)	675	v	0%	
TP (kg/y)	1.27	1.27	0%	
TN (kg/y)	11.1	11.1	0%	
GROSS POLLUTANTS (kg/y)	54.4	54.4	0%	
POST-DEVELOPMENT				REDUCTION TARGET
FLOW (ML/y)	5.09	3.66	28.1%	
TSS (kg/y)	675	119	82.4%	80%
TP (kg/y)	1.27	0.513	59.6%	45%
TN (kg/y)	11.1	6.01	45.8%	45%
GROSS POLLUTANTS (kg/y)	54.4	0	100%	90%

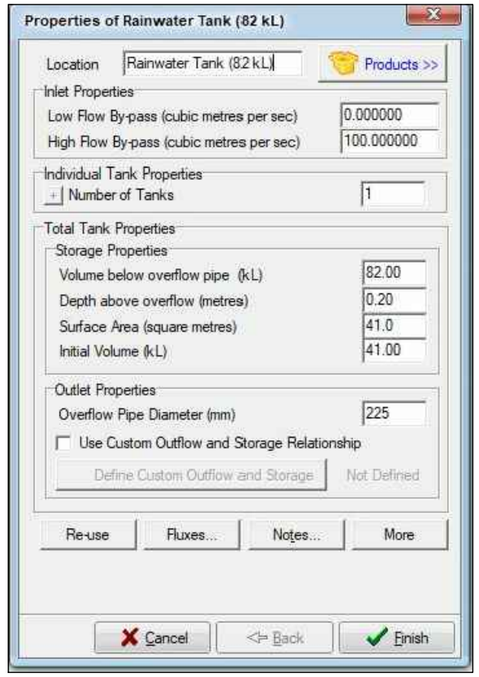


FIGURE 5.1 - RAINWATER TANK PROPERTIES

RAINWATER RE-USE HAS BEEN DETERMINED BASED ON ANTICIPATED IRRIGATION USAGE TO SERVICE THE GARDEN AND PLANTER AREAS WITH 20mm WATER PER WEEK.

© COPYRIGHT of this design and plan is the property of ACOR Consultants (CC) Pty Ltd, ACN 127 012 104 ATF The ACOR (CC) Unit Trust ABN 81 392 991 647, all rights reserved. It must not be used, modified, reproduced or copied wholly or in part without written permission from ACOR Consultants (CC) Pty Ltd. ACOR Consultants is a trademark licensed to ACOR Consultants (CC) Pty Ltd by ACOR Consultants Pty Ltd.

Issue	Description	Date	Drawn	Approved
B	ISSUED FOR DEVELOPMENT APPLICATION	06.07.22	SJ	BK
A	ISSUED FOR CLIENT REVIEW	05.07.22	SJ	BK

North

1 0 1cm at full size 10cm

Client: CHP

Architect: ELEVATION ARCHITECTURE

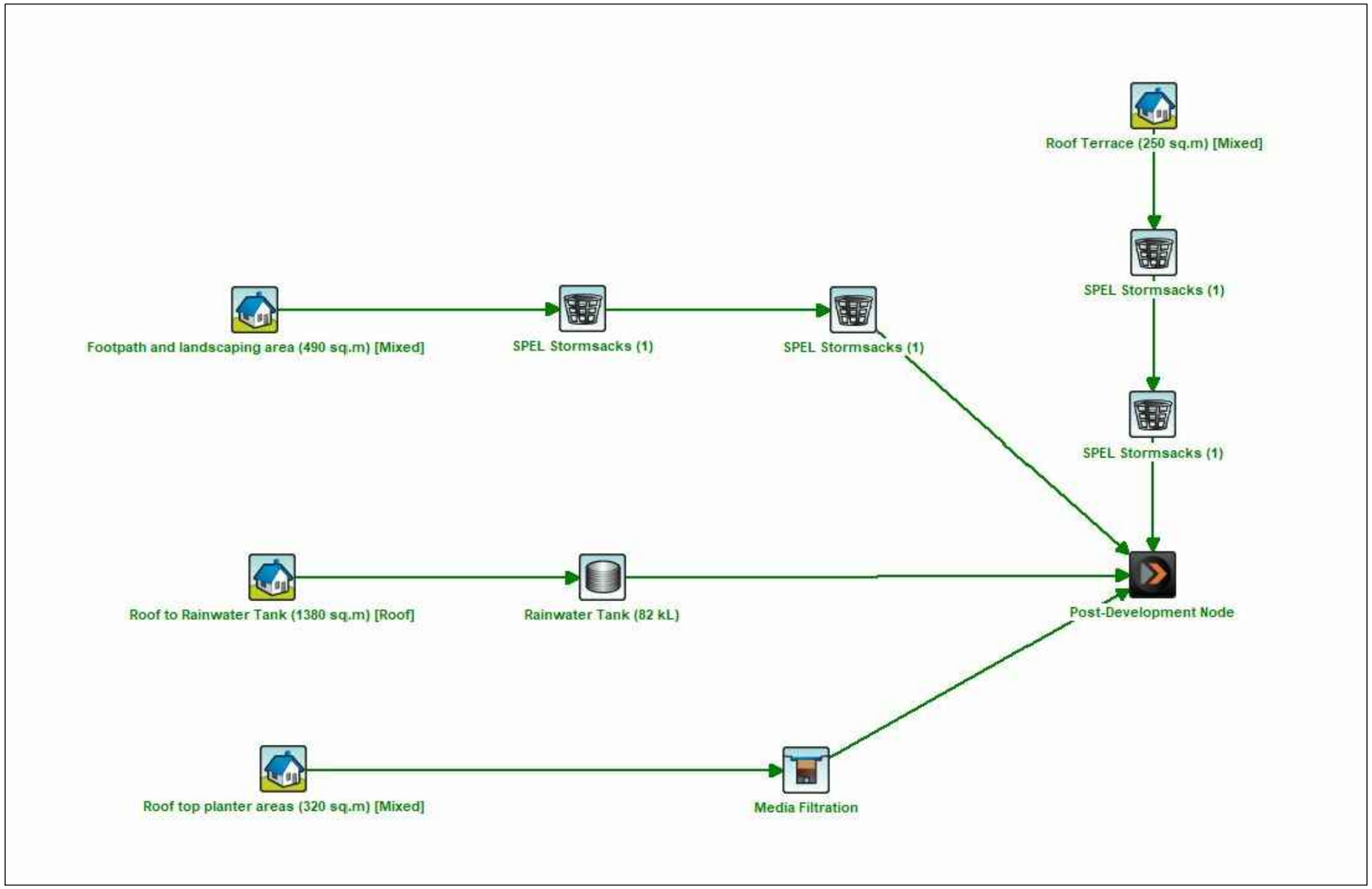
ACOR CONSULTANTS
ACOR Consultants (CC) Pty Ltd
Platinum Building, Suite 2.01, 4 Ilya Avenue
ERINA NSW 2250, Australia
T +61 2 4324 3499
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project: PROPOSED COMMERCIAL DEVELOPMENT
No.60, 62 & 64
SHOWGROUND ROAD
GOSFORD

Drawing Title: WATER QUALITY REPORT SHEET 2

Drawn	Date	Scale A1	Q.A. Check	Date
SJ	05.07.22	AS NOTED	-	-

Designed	Project No.	Dwg. No.	Issue
BK	CC220233	C12	B



& POST-DEVELOPMENT MUSIC MODEL

SCALE - NTS

©COPYRIGHT of this design and plan is the property of ACOR Consultants (CC) Pty Ltd, ACN 127 012 104 ATF The ACOR (CC) Unit Trust ABN 81 392 991 647, all rights reserved. It must not be used, modified, reproduced or copied wholly or in part without written permission from ACOR Consultants (CC) Pty Ltd. ACOR Consultants is a trademark licensed to ACOR Consultants (CC) Pty Ltd by ACOR Consultants Pty Ltd.

Issue	Description	Date	Drawn	Approved
B	ISSUED FOR DEVELOPMENT APPLICATION	06.07.22	SJ	BK
A	ISSUED FOR CLIENT REVIEW	05.07.22	SJ	BK

1 0 10m at full size 10cm

North

Client: CHP

Architect: ELEVATION ARCHITECTURE

ACOR Consultants (CC) Pty Ltd
Platinum Building, Suite 2.01, 4 Ilya Avenue
ERINA NSW 2250, Australia
T +61 2 4324 3499
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project: PROPOSED COMMERCIAL DEVELOPMENT
No.60, 62 & 64
SHOWGROUND ROAD
GOSFORD

Drawing Title: WATER QUALITY REPORT SHEET 3

Drawn	Date	Scale A1	Q.A. Check	Date
SJ	05.07.22	AS NOTED	-	-

Designed	Project No.	Dwg. No.	Issue
BK	CC220233	C13	B

FLOODING AND LOCAL OVERLAND DRAINAGE SUMMARY

1.1. LOCAL FLOOD BEHAVIOUR

THE SITE IS IMPACTED BY 1% AEP FLOODWATERS PONDING IN THE LOWPOINT IN SHOWGROUND ROAD. FLOOD BEHAVIOUR IN THE VICINITY OF THE SITE IS DESCRIBED IN 'GOSFORD CBD LOCAL OVERLAND FLOW FLOOD STUDY' PREPARED BY CARDNO, PROJECT No. W4816, VERSION 10, DATED 18 SEPTEMBER 2013. THE SAG WITHIN SHOWGROUND ROAD ADJACENT TO THE SITE HAS BEEN IDENTIFIED IN CARDNO 2013 AS REFERENCE LOCATION GC-1. TABLE A.1 IN CARDNO 2013 PROVIDES A SUMMARY OF PEAK FLOODWATER LEVELS IMPACTING THE SAG IN SHOWGROUND ROAD WHICH ARE APPLICABLE TO THE SUBJECT SITE. THESE LEVELS HAVE BEEN REPRODUCED IN TABLE 1 BELOW.

TABLE 1 - APPLICABLE FLOOD LEVELS AND FLOOD PLANNING LEVELS

FLOOD LEVEL INFORMATION FOR LOCATION GC-1 BASED ON INFORMATION DERIVED FROM GOSFORD CBD OVERLAND FLOW FLOOD STUDY.			
STORM EVENT	FLOOD LEVEL (m AHD)	FLOOD PLANNING LEVEL (COMMERCIAL LAND USE)	FLOOD PLANNING LEVEL (SENSITIVE LAND USE)
10% AEP	10.10	10.76 m AHD	11.9 m AHD
5% AEP	10.14		
2% AEP	10.17		
1% AEP	10.26		
PMF	11.9		

1.2. FLOOD RELATED DEVELOPMENT CONTROLS

1.2.1. THE FLOOD RELATED DEVELOPMENT CONTROLS APPLICABLE TO THE PROPOSED DEVELOPMENT ARE IDENTIFIED IN TABLE 4 - FLOOD CONTROL MATRIX IN CENTRAL COAST DCP 2013 PART 6.7.7.6.

IN THIS REGARD, THE FLOOD PLANNING LEVELS APPLICABLE TO THE PROPOSED DEVELOPMENT ARE LISTED IN TABLE 1 ABOVE.

1.3. PROPOSED FLOOR LEVEL COMPLIANCE

THE APPLICANT PROPOSES A GROUND FLOOR LEVEL COMPRISING COMMERCIAL DEVELOPMENT OF APPROXIMATELY 11.7 m AHD. THIS LEVEL PROVIDES 1.44 m FREEBOARD TO THE 1% AEP FLOOD LEVEL OF RL 10.26 m AHD WITHIN SHOWGROUND ROAD.

THE UPPER FLOOR LEVELS PROPOSED FOR SPECIALIST DISABILITY ACCOMMODATION PROVIDES A MINIMUM HABITBALE FLOOR LEVEL OF RL 16.5 m AHD. THIS LEVEL PROVIDES 4.6 m FREEBOARD TO THE PROBABLE MAXIMUM FLOOD LEVEL OR RL 11.9 m AHD WITHIN SHOWGROUND ROAD.

1.4 FLOOD IMPACTS

WE REFER TO FIGURE 4.21 OF CARDNO 2013 WHICH DEPICTS THE 1% AEP FLOODWATER EXTENTS AND HYDRAULIC CATEGORY WITHIN SHOWGROUND ROAD ADJACENT TO THE SITE. WE NOTE THAT THE EXTENT OF FLOOD STORAGE AREA IS GENERALLY CONTAINED WITHIN THE ROAD RESERVE. BASED ON THE FOREGOING, WE ANTICIPATE THE PROPOSED DEVELOPMENT WILL RESULT IN NEGLIGIBLE LOSS OF FLOOD STORAGE AND RESULT IN NEGLIGIBLE IMPACT TO EXISTING 1% AEP FLOOD BEHAVIOUR WITHIN SHOWGROUND ROAD.

1.5 EVACUATION

WE NOTE THAT THE PROPOSED HABITIABEL FLOORS ARE LOCATED ABOVE THE PMF FLOOD LEVEL OF RL 11.9 m AHD. IN THIS REGARD, OCCUPANTS OF THE PROPOSE DEVELOPMENT ARE ABLE TO REMAIN ON SITE DURING ALL FLOOD EVENTS.

1.6 CONCLUSION

BASED ON THE FOREGOING, WE HAVE FORMED THE VIEW THAT THE PROPOSED DEVELOPMENT WILL NOTE RESULT IN SIGNIFICANT ADVERSE IMPACTS TO EXISTING 1% AEP FLOOD BEHAVIOUR AND GENERALLY COMPLIES WITH THE MINIMUM FLOOR LEVEL REQUIREMENTS OF CENTRAL COAST COUNCIL FOR A DEVELOPMENT OF THIS NATURE.

© COPYRIGHT of this design and plan is the property of ACOR Consultants (CC) Pty Ltd, ACN 127 012 104 ATF The ACOR (CC) Unit Trust ABN 81 392 991 647, all rights reserved. It must not be used, modified, reproduced or copied wholly or in part without written permission from ACOR Consultants (CC) Pty Ltd. ACOR Consultants is a trademark licensed to ACOR Consultants (CC) Pty Ltd by ACOR Consultants Pty Ltd.

Issue	Description	Date	Drawn	Approved
B	ISSUED FOR DEVELOPMENT APPLICATION	06.07.22	SJ	BK
A	ISSUED FOR CLIENT REVIEW	05.07.22	SJ	BK

North

1 0 1cm at full size 10cm

Client: CHP

Architect: ELEVATION ARCHITECTURE

ACOR CONSULTANTS
ACOR Consultants (CC) Pty Ltd
Platinum Building, Suite 2.01, 4 Ilya Avenue
ERINA NSW 2250, Australia
T +61 2 4324 3499
ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

Project: PROPOSED COMMERCIAL DEVELOPMENT
No.60, 62 & 64
SHOWGROUND ROAD
GOSFORD

Drawing Title: FLOOD SUMMARY

Drawn	Date	Scale A1	Q.A. Check	Date
SJ	05.07.22	AS NOTED	-	-

Designed	Project No.	Dwg. No.	Issue
BK	CC220233	C14	B