PROPOSED RETAIL DEVELOPMENT

42 FULLERTON COVE ROAD, FULLERTON COVE, 2318
CIVIL ENGINEERING PACKAGE

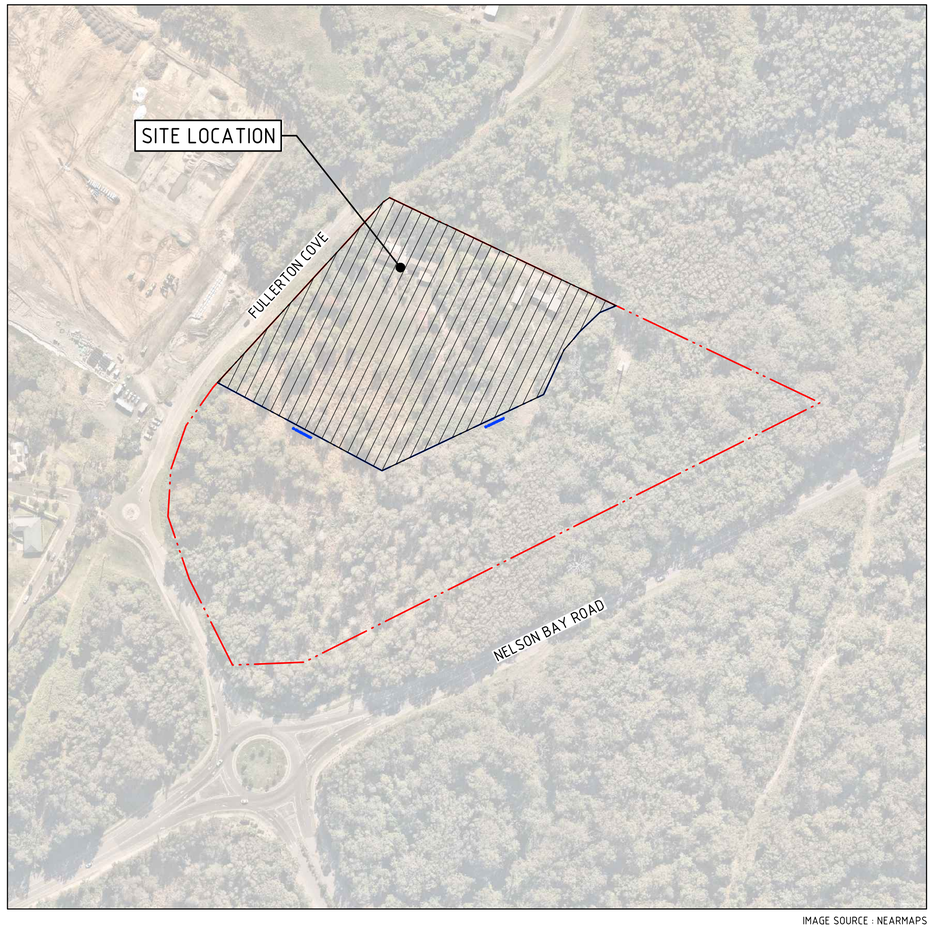

IMAGE SOURCE : NEARMAPS

LOCALITY PLAN

DRAWING LIST

DWG No.	DRAWING TITLE
DA-C01.01	COVER SHEET, DRAWING LIST AND LOCALITY PLAN
DA-C01.21	GENERAL ARRANGEMENT PLAN
DA-C02.01	EROSION AND SEDIMENT CONTROL PLAN
DA-C02.11	EROSION AND SEDIMENT CONTROL DETAILS
DA-C03.01	CUT AND FILL PLAN
DA-C03.21	CUT AND FILL SECTIONS
DA-C04.01	CIVIL WORKS PLAN - SHEET 1
DA-C04.02	CIVIL WORKS PLAN - SHEET 2
DA-C04.21	TYPICAL SECTIONS
DA-C05.01	SWEPT PATHS PLAN - B99 MANOEUVRES
DA-C05.02	SWEPT PATHS PLAN - SRV MANOEUVRES
DA-C05.03	SWEPTS PATH PLAN - MRV MANOEUVRES
DA-C05.04	SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 1
DA-C05.05	SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 2
DA-C05.06	SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 3
DA-C05.07	SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 4
DA-C05.08	SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 5
DA-C09.01	CIVIL DETAILS

DRAWN: D. MAVROUDIS DESIGNED: E. GEARING JOB MANAGER: K. SINCLAIR VERIFIER: K. SINCLAIR

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	DM	KS	EG	08.09.23
B	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	03.10.23
C	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	20.03.24

CLIENT: M&P Monteath & Powys

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ARCHITECT: EJE architecture

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SCALE 1:2000@ A1 — 0 20 40 60 80 100m

NORTHROP
Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT: **PROPOSED RETAIL DEVELOPMENT 42 FULLERTON COVER ROAD FULLERTON COVE 2318**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

COVER SHEET, DRAWING LIST AND LOCALITY PLAN

JOB NUMBER: **NL161067**

DRAWING NUMBER: **DA-C01.01**

REVISION: **C**

DRAWING SHEET SIZE = A1

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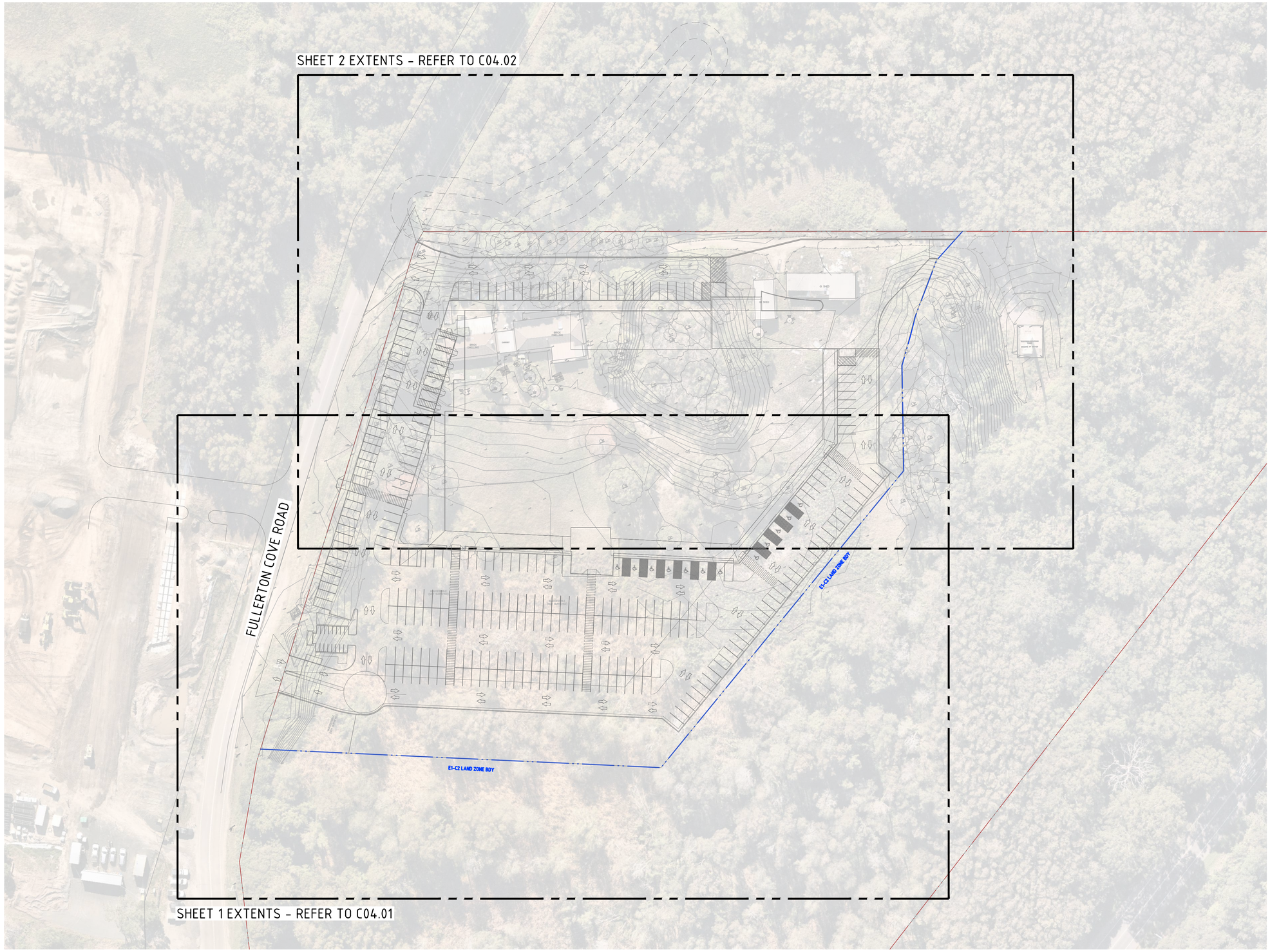

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CLIENT

Monteath & Powys M&P

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ARCHITECT

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0 5 10 15 20 25m

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Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT
PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE
CIVIL ENGINEERING PACKAGE

GENERAL ARRANGEMENT PLAN

JOB NUMBER **NL161067**

DRAWING NUMBER **DA-C01.21**

REVISION **F**

DRAWING SHEET SIZE = A1

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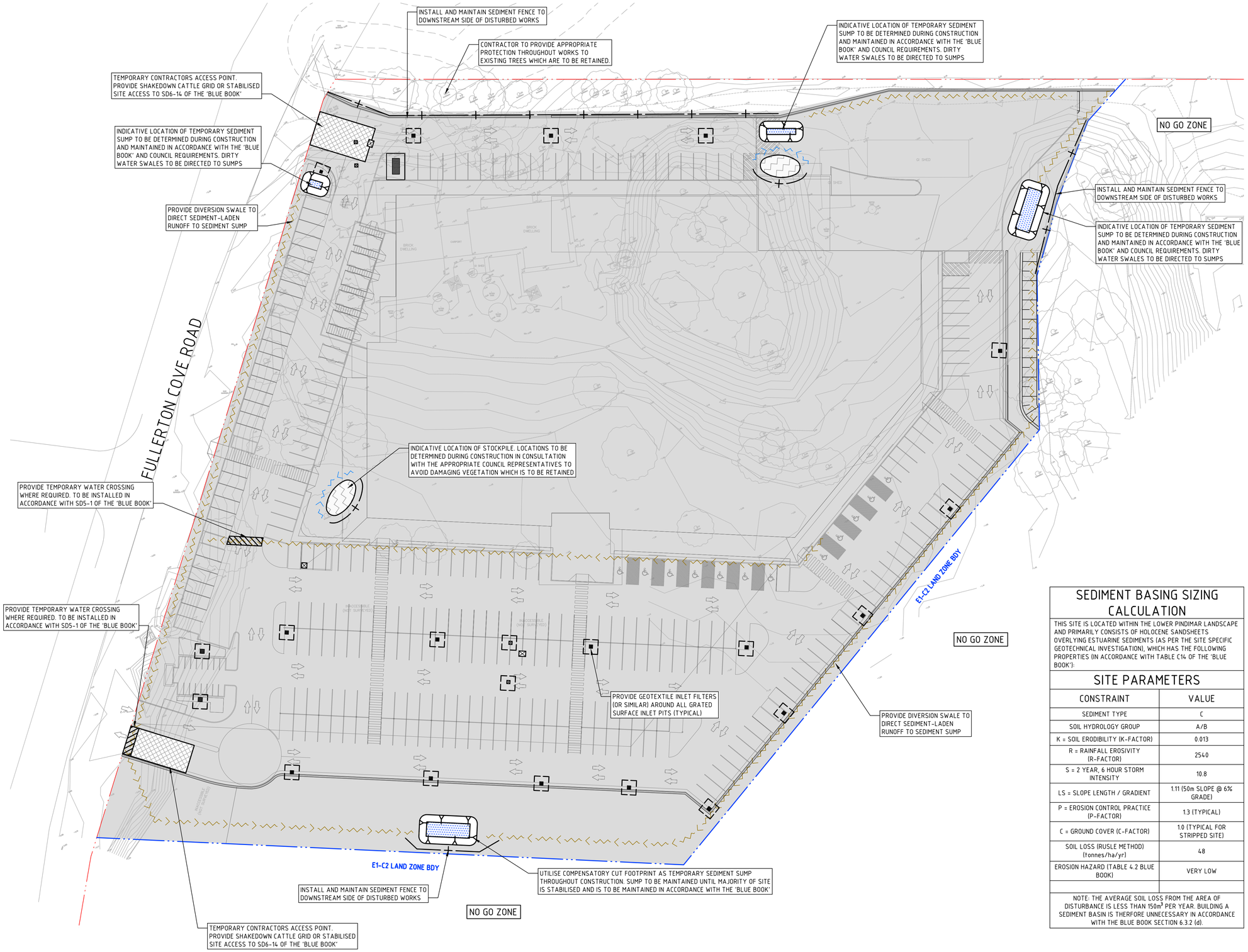

LEGEND

- SITE BOUNDARY LINE
- B1-E2 ZONE BOUNDARY
- SEDIMENT FENCE
- SECURITY FENCE
- GEOTEXTILE INLET FILTER
- DIVERSION DRAIN (CLEAN)
- DIVERSION DRAIN (DIRTY)
- STABILISED SITE ACCESS
- STOCKPILES
- EXISTING CONTOURS (X.Xm INTERVAL)
- INDICATIVE EXTENT OF DISTURBANCE
- SEDIMENT BASIN
- TEMPORARY WATER CROSSING

NOTES

1. ALL EROSION AND SEDIMENTATION CONTROL MEASURES MUST BE APPROPRIATE FOR THE SEDIMENT TYPE(S) OF THE SOILS ON-SITE, IN ACCORDANCE WITH THE 'BLUE BOOK' (MANAGING URBAN STORMWATER - SOILS AND CONSTRUCTION. LANDCOM, 2004), OR OTHER CURRENT RECOGNISED INDUSTRY STANDARDS FOR EROSION AND SEDIMENT CONTROL FOR AUSTRALIAN CONDITIONS. THIS INCLUDES SEDIMENT TRAPS AND LINING OF CHANNELS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING A DETAILED WRITTEN RECORD OF ALL EROSION AND SEDIMENT CONTROLS ON-SITE DURING THE CONSTRUCTION PERIOD. THIS RECORD SHALL BE UPDATED ON A DAILY BASIS AND SHALL CONTAIN DETAILS ON THE CONDITION OF CONTROLS AND ANY/ALL MAINTENANCE, CLEANING AND BREACHES. THIS RECORD SHALL BE KEPT ON-SITE AT ALL TIMES AND SHALL BE MADE AVAILABLE FOR INSPECTION BY THE PRINCIPAL CERTIFYING AUTHORITY AND THE SUPERINTENDENT DURING NORMAL WORKING HOURS.
3. INSTALL SEDIMENT PROTECTION FILTERS ON ALL NEW AND EXISTING STORMWATER INLET PITS IN ACCORDANCE WITH EITHER THE MESH AND GRAVEL INLET FILTER DETAIL SD6-11 OR THE GEOTEXTILE INLET FILTER DETAIL SD6-12 OF THE 'BLUE BOOK'.
4. ESTABLISH ALL REQUIRED SEDIMENT FENCES IN ACCORDANCE WITH DETAIL SD6-8 OF THE 'BLUE BOOK'.
5. INSTALL SEDIMENT FENCING, OR OTHER SEDIMENT CONTROL DEVICES, AROUND INDIVIDUAL BUILDING ZONES/AREAS AS REQUIRED AND AS DIRECTED BY THE SUPERINTENDENT OR APPROPRIATE COUNCIL OFFICER.
6. ALL TRENCHES INCLUDING ALL SERVICE TRENCHES AND SWALE EXCAVATION SHALL BE SIDE-CAST TO THE HIGH SIDE AND CLOSED AT THE END OF EACH DAYS WORK.
7. THE CONTRACTOR SHALL ENSURE THAT ALL VEGETATION (TREE, SHRUB AND GROUND COVER) WHICH IS TO BE RETAINED SHALL BE PROTECTED DURING THE DURATION OF CONSTRUCTION.
8. ALL VEGETATION TO BE REMOVED SHALL BE MULCHED ON-SITE AND SPREAD/STOCKPILED AS DIRECTED BY THE SUPERINTENDENT.
9. STRIP TOPSOIL IN AREAS DESIGNATED FOR STRIPPING AND STOCKPILE FOR RE-USE AS REQUIRED. ANY SURPLUS MATERIAL SHALL BE SPREAD ON-SITE AS DIRECTED BY THE SUPERINTENDENT OR REMOVED FROM SITE AND DISPOSED OF IN ACCORDANCE WITH EPA GUIDELINES.
10. CONSTRUCT AND MAINTAIN ALL MATERIAL STOCKPILES IN ACCORDANCE WITH DETAIL SD4-1 OF THE 'BLUE BOOK' (INCLUDING CUT-OFF SWALES TO THE HIGH SIDE AND SEDIMENT FENCES TO THE LOW SIDE).
11. ENSURE STOCKPILES DO NOT EXCEED 2.0m HIGH. PROVIDE WIND AND RAIN EROSION PROTECTION AS REQUIRED IN ACCORDANCE WITH THE 'BLUE BOOK'.
12. PROVIDE WATER TRUCKS OR SPRINKLER DEVICES DURING CONSTRUCTION AS REQUIRED TO SUPPRESS DUST.
13. ONCE CUT/FILL OPERATIONS HAVE BEEN FINALIZED ALL DISTURBED AREAS THAT ARE NOT BEING WORKED ON SHALL BE RE-VEGETATED AS SOON AS IS PRACTICAL.

SEDIMENT BASING SIZING CALCULATION

THIS SITE IS LOCATED WITHIN THE LOWER PINDIMAR LANDSCAPE AND PRIMARILY CONSISTS OF HOLOCENE SANDSHEETS OVERLYING ESTUARINE SEDIMENTS (AS PER THE SITE SPECIFIC GEOTECHNICAL INVESTIGATION), WHICH HAS THE FOLLOWING PROPERTIES (IN ACCORDANCE WITH TABLE C14 OF THE 'BLUE BOOK'):

SITE PARAMETERS

CONSTRAINT	VALUE
SEDIMENT TYPE	C
SOIL HYDROLOGY GROUP	A/B
K = SOIL ERODIBILITY (K-FACTOR)	0.013
R = RAINFALL EROSIVITY (R-FACTOR)	2540
S = 2 YEAR, 6 HOUR STORM INTENSITY	10.8
LS = SLOPE LENGTH / GRADIENT	1.11 (50m SLOPE @ 6% GRADE)
P = EROSION CONTROL PRACTICE (P-FACTOR)	1.3 (TYPICAL)
C = GROUND COVER (C-FACTOR)	1.0 (TYPICAL FOR STRIPPED SITE)
SOIL LOSS (RUSLE METHOD) (tonnes/ha/yr)	48
EROSION HAZARD (TABLE 4.2 BLUE BOOK)	VERY LOW

NOTE: THE AVERAGE SOIL LOSS FROM THE AREA OF DISTURBANCE IS LESS THAN 150m^3 PER YEAR. BUILDING A SEDIMENT BASIN IS THERFORE UNNECESSARY IN ACCORDANCE WITH THE BLUE BOOK SECTION 6.3.2 (d).

NOT FOR CONSTRUCTION

DRAWN: D.MAVROUDIS DESIGNED: E.GEARING JOB MANAGER: K.SINCLAIR VERIFIER: K.SINCLAIR

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F	RE-ISSUED FOR DA APPROVAL	BD	KS	EG	21.06.24
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ARCHITECT: EJE architecture

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NORTHROP
Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT: **PROPOSED RETAIL DEVELOPMENT 42 FULLERTON COVER ROAD FULLERTON COVE 2318**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

EROSION AND SEDIMENT CONTROL PLAN

JOB NUMBER: **NL161067**

DRAWING NUMBER: **DA-C02.01**

REVISION: **G**

DRAWING SHEET SIZE = A1

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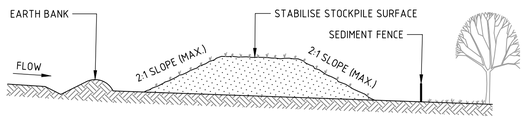
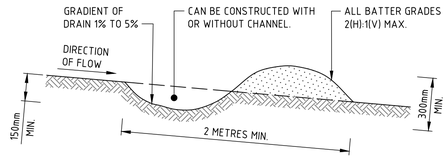


CONSTRUCTION NOTES

1. PLACE STOCKPILES MORE THAN 2m (PREFERABLY 5m) FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS (STANDARD DRAWING 5-5) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES (STANDARD DRAWING 6-8) 1 TO 2m DOWNSLOPE.

STOCKPILES (SD 4-1)

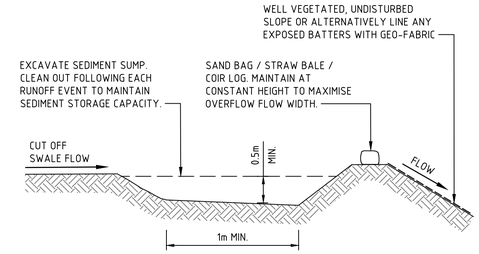


CONSTRUCTION NOTES

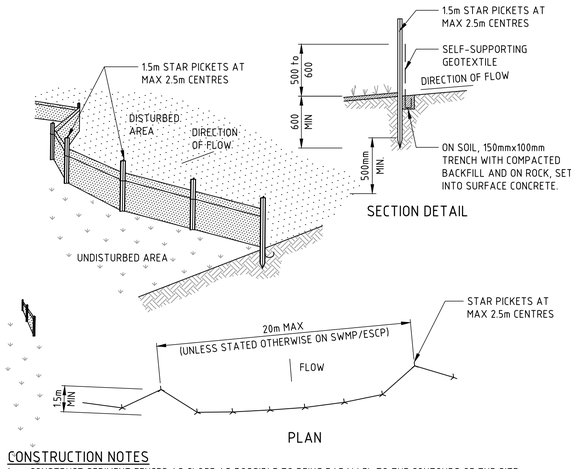
1. BUILD WITH GRADIENTS BETWEEN 1 AND 5 PERCENT.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE - WORK AROUND THEM.
3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW.
4. BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS, NOT V SHAPED.
5. ENSURE THE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE.
6. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION.

NOTE: ONLY TO BE USED AS TEMPORARY BANK
WHERE MAXIMUM UPSLOPE LENGTH IS 80 METRES.

EARTH BANK - LOW FLOW (SD 5-5)



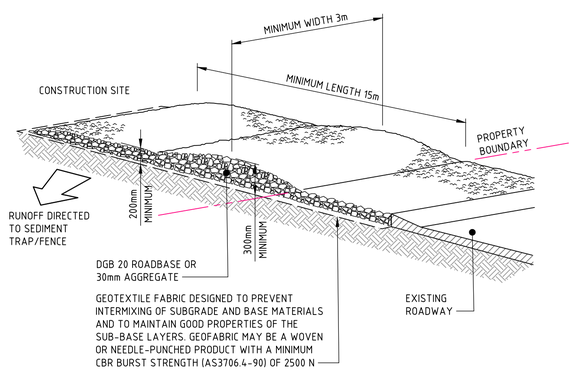
SEDIMENT TRAP DETAIL



CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND AT 2.5 METRE INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

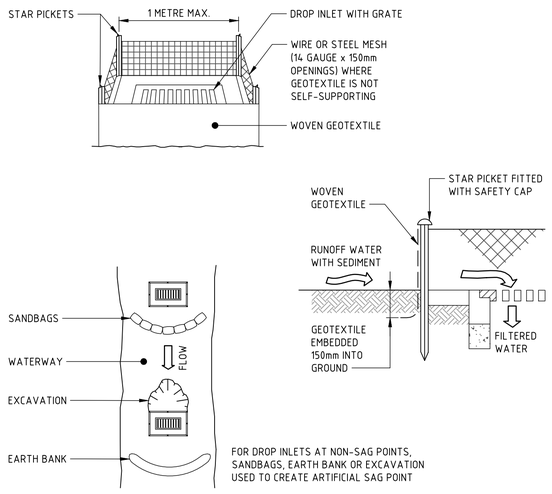
SEDIMENT FENCE (SD 6-8)



CONSTRUCTION NOTES

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30mm AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15 METRES LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3 METRES WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE.

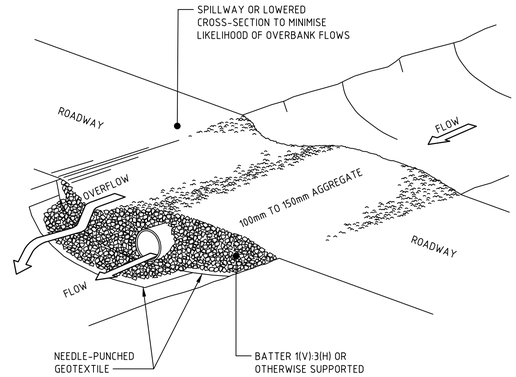
STABILISED SITE ACCESS (SD 6-14)



CONSTRUCTION NOTES

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. FOLLOW STANDARD DRAWING 6-7 AND STANDARD DRAWING 6-8 FOR INSTALLATION PROCEDURES FOR THE STRAW BALES OR GEOFABRIC. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

GEOTEXTILE INLET FILTER (SD 6-12)



CONSTRUCTION NOTES

1. PROHIBIT ALL TRAFFIC UNTIL THE ACCESS WAY IS CONSTRUCTED.
2. STRIP ANY TOPSOIL AND PLACE A NEEDLE-PUNCHED TEXTILE OVER THE BASE OF THE CROSSING.
3. PLACE CLEAN, RIGID, NON POLLUTING AGGREGATE OR GRAVEL IN THE 100mm TO 150mm SIZE CLASS OVER THE FABRIC TO A MINIMUM DEPTH OF 200mm.
4. PROVIDE A 3m WIDE CARRIAGEWAY WITH SUFFICIENT LENGTH OF CULVERT PIPE TO ALLOW LESS THAN A 3(H): 1 (V) SLOPE ON SIDE BATTERS.
5. INSTALL A LOWER SECTION TO ACT AS AN EMERGENCY SPILLWAY IN GREATER THAN DESIGN STORM EVENTS.
6. ENSURE THAT CULVERT OUTLETS EXTEND BEYOND THE TOE OF FILL EMBANKMENTS.

TEMPORARY WATERWAY CROSSING (SD 5-1)

NOT FOR CONSTRUCTION

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ARCHITECT: EVE architecture

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DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

EROSION AND SEDIMENT CONTROL DETAILS

JOB NUMBER: **NL161067**

DRAWING NUMBER: **DA-C02.11**

REVISION: **C**

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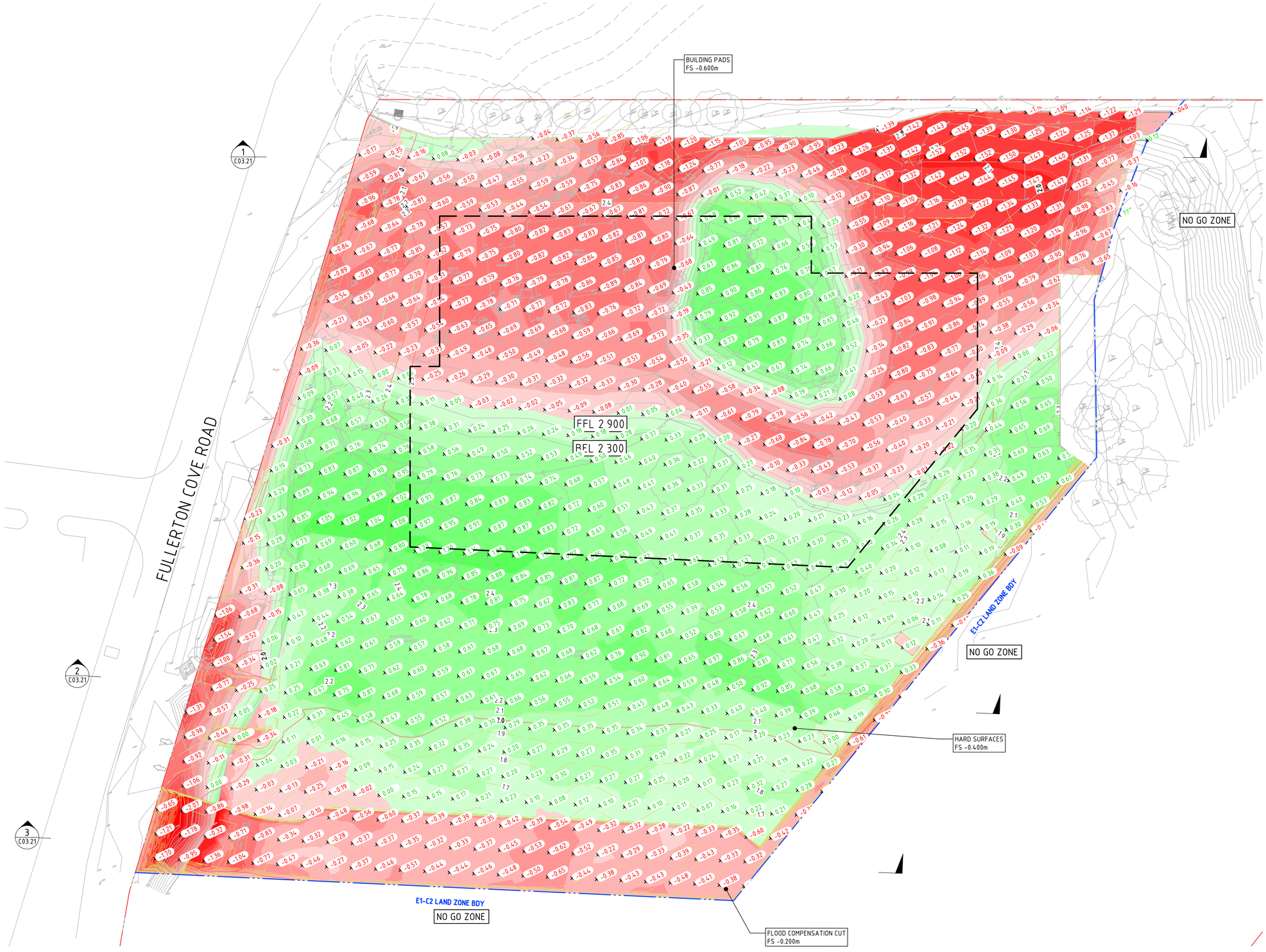

LEGEND

- SITE BOUNDARY LINE
- B1-E2 ZONE BOUNDARY
- FFL XX.XX — FINISHED FLOOR LEVEL
- BEL XX.XX — BULK EARTHWORKS LEVEL
- XX.XX — DESIGN CONTOURS (0.1m INTERVAL)

DEPTH OF CUT

- 999m	TO	- 2.0m
- 2.0m	TO	- 1.5m
- 1.5m	TO	- 1.25m
- 1.25m	TO	- 1.0m
- 1.0m	TO	- 0.75m
- 0.75m	TO	- 0.5m
- 0.5m	TO	- 0.25m
- 0.25m	TO	- 0.0m

DEPTH OF FILL

0.0m	TO	0.25m
0.25m	TO	0.5m
0.5m	TO	0.75m
0.75m	TO	1.0m
1.0m	TO	1.25m
1.25m	TO	1.5m
1.5m	TO	2.0m
2.0m	TO	999m

NOTES

1. BULK EARTHWORKS LEVELS AND VOLUMES ARE BASED ON A COMPARISON OF THE DESIGN BULK EARTHWORKS SURFACE AND THE EXISTING SURFACE LEVEL AS SURVEYED WITH NO ALLOWANCE FOR TOPSOIL STRIPPING. THE FOLLOWING ALLOWANCES HAVE BEEN MADE TO GENERATE DESIGN BULK EARTHWORKS SURFACE;

   FINISHED DESIGN SURFACE MINUS:

   - BUILDING PADS: 600mm
   - HARD SURFACES: 400mm
   - FLOOD COMPENSATION: 200mm

   - NOTE: ALL ASSUMED DEPTHS ARE PRELIMINARY ONLY AND WILL BE AMENDED BASED ON GEOTECHNICAL CONDITIONS WHEN AVAILABLE.

2. NO ALLOWANCE HAS BEEN MADE FOR SELECT LAYERS OR UNSUITABLE MATERIAL THAT IS LIKELY TO BE PRESENT.
3. NO ALLOWANCE HAS BEEN MADE FOR TEMPORARY SEDIMENT DAMS
4. NO ALLOWANCE HAS BEEN MADE FOR SAND LEVELING LAYER BENEATH BUILDING PADS
5. NO ALLOWANCE HAS BEEN MADE FOR SERVICE TRENCHES, DRAINAGE TRENCHES, DRAINAGE INFRASTRUCTURE (PITS, CULVERTS, ETC) IN THE LEVELS OR VOLUMES PRESENTED ON THIS PLAN.
6. NO ALLOWANCE FOR ANY TEMPORARY BATTERS DURING WORKS.
7. NO BULKING FACTORS HAVE BEEN CONSIDERED/ALLOWED FOR.
8. APPROXIMATE BULK EARTHWORKS VOLUMES BASED ON THE NOTES ABOVE ARE AS FOLLOWS;
   - BULK CUT = 7,920m³
   - BULK FILL = 6,.039m³

   BULK CUT/FILL BALANCE = 1,881m³ (EXCESS)
9. ALL BULK EARTHWORKS TO BE UNDERTAKEN IN ACCORDANCE WITH SITE SPECIFIC GEOTECHNICAL REPORT AND BULK EARTHWORKS NOTES.

NOT FOR CONSTRUCTION

DRAWN: D. MAVROUDIS DESIGNED: E. GEARING JOB MANAGER: K. SINCLAIR VERIFIER: K. SINCLAIR

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	DM	KS	EG	08.09.23
B	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	03.10.23
C	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	05.10.23
D	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	20.03.24
E	RE-ISSUED FOR DA APPROVAL	BD	KS	EG	21.06.24
F	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	29.11.24

CLIENT: M&P Monteath & Powys

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ARCHITECT: EJE architecture

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SCALE 1:500@A1 — 0 5 10 15 20 25m

NORTHROP
Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT: **PROPOSED RETAIL DEVELOPMENT 42 FULLERTON COVER ROAD FULLERTON COVE 2318**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

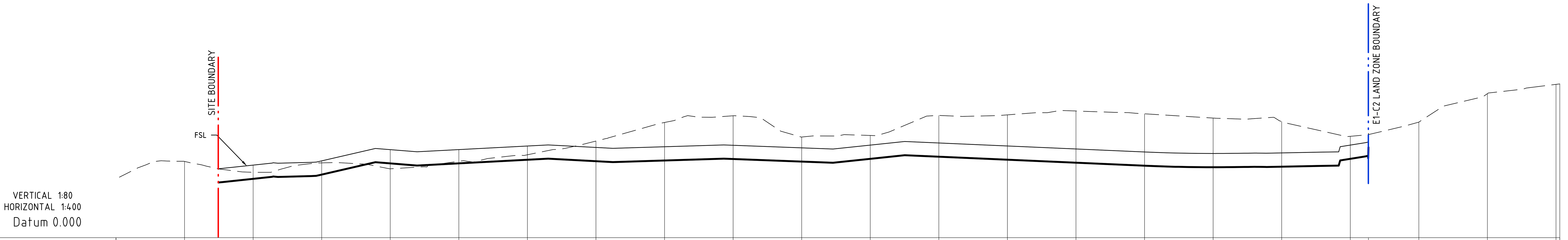
CUT AND FILL PLAN

JOB NUMBER: **NL161067**

DRAWING NUMBER: **DA-C03.01** REVISION: **F**

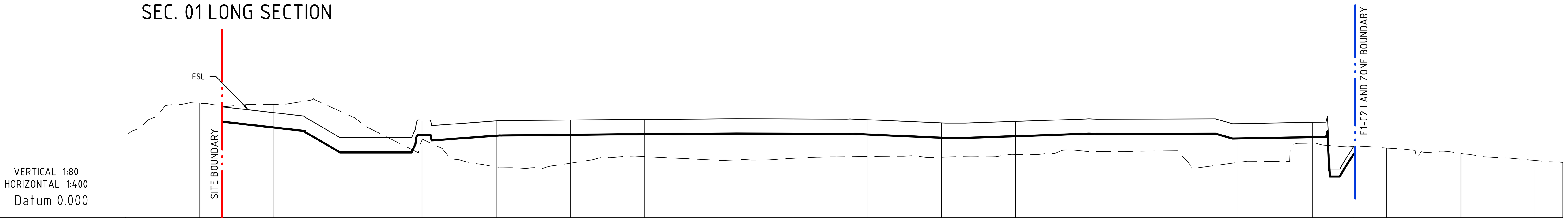
DRAWING SHEET SIZE = A1

Date: 29.11.2024 9:45 AM Plotted By: DIMITRI MAVROUDIS Found: O:\5 Pre-July 24 Projects\Newcastle\YEAR 2018 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C03.01 BULK EARTHWORKS.dwg



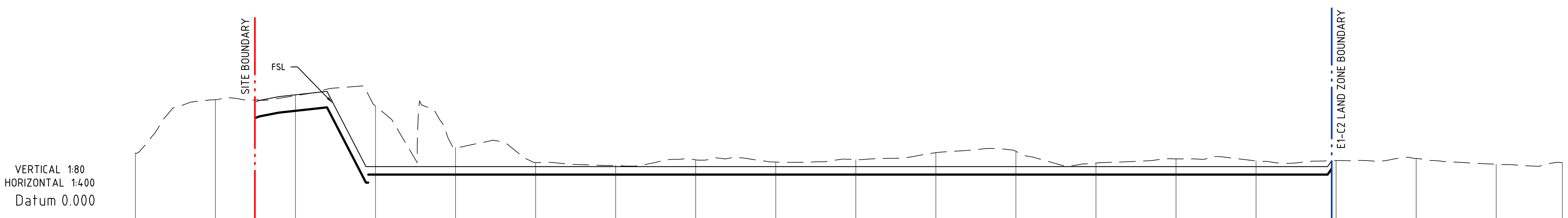
CHAINAGE	SUBGRADE DESIGN LEVELS	EXISTING LEVELS	DEPTH
0.000			
10.000		2.220	
20.000	1.713	1.902	-0.189
30.000	1.836	2.178	-0.342
40.000	2.162	2.004	0.158
50.000	2.164	2.223	-0.060
60.000	2.268	2.413	-0.144
70.000	2.226	2.812	-0.586
80.000	2.247	3.353	-1.106
90.000	2.290	3.549	-1.259
100.000	2.214	2.929	-0.715
110.000	2.294	2.975	-0.680
120.000	2.357	3.559	-1.202
130.000	2.270	3.575	-1.305
140.000	2.182	3.687	-1.505
150.000	2.095	3.605	-1.510
160.000	2.051	3.482	-1.432
170.000	2.067	3.381	-1.314
180.000	2.295	2.950	-0.655
182.652	2.630	3.000	-0.369
190.000		3.365	
200.000		4.193	
210.000		4.462	
210.557		4.476	

SEC. 01 LONG SECTION



CHAINAGE	SUBGRADE DESIGN LEVELS	EXISTING LEVELS	DEPTH
0.000			
10.000		3.073	
20.000	2.423	3.048	-0.625
30.000	1.750	2.766	-1.016
40.000	2.226	2.097	0.128
50.000	2.201	1.348	0.853
60.000	2.225	1.460	0.765
70.000	2.238	1.639	0.599
80.000	2.255	1.537	0.718
90.000	2.254	1.591	0.663
100.000	2.232	1.641	0.591
110.000	2.147	1.623	0.524
120.000	2.188	1.695	0.492
130.000	2.255	1.773	0.482
140.000	2.251	1.790	0.461
150.000	2.126	1.481	0.645
160.000	2.163	2.007	0.156
	1.255	1.941	-0.686
170.000		1.868	
180.000		1.725	
190.000		1.534	
193.748		1.481	

SEC. 02 LONG SECTION



CHAINAGE	SUBGRADE DESIGN LEVELS	EXISTING LEVELS	DEPTH
0.000		1.637	
10.000		2.971	
20.000	2.692	3.070	-0.378
30.000	1.100	2.812	-1.712
40.000	1.100	1.780	-0.680
50.000	1.100	1.401	-0.301
60.000	1.100	1.333	-0.233
70.000	1.100	1.468	-0.368
80.000	1.100	1.414	-0.314
90.000	1.100	1.476	-0.376
100.000	1.100	1.647	-0.547
110.000	1.100	1.681	-0.581
120.000	1.100	1.387	-0.287
130.000	1.100	1.493	-0.393
140.000	1.100	1.441	-0.341
149.430	1.242	1.445	-0.204
150.000		1.449	
160.000		1.503	
170.000		1.359	
178.263		1.399	

SEC. 03 LONG SECTION

DRAWN: D. MAVROUDIS DESIGNED: E. GEARING JOB MANAGER: K. SINCLAIR VERIFIER: K. SINCLAIR

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E	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	29.11.24

CLIENT: M&P

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ARCHITECT: EJE architecture

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Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT: PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE: CIVIL ENGINEERING PACKAGE
CUT AND FILL SECTIONS

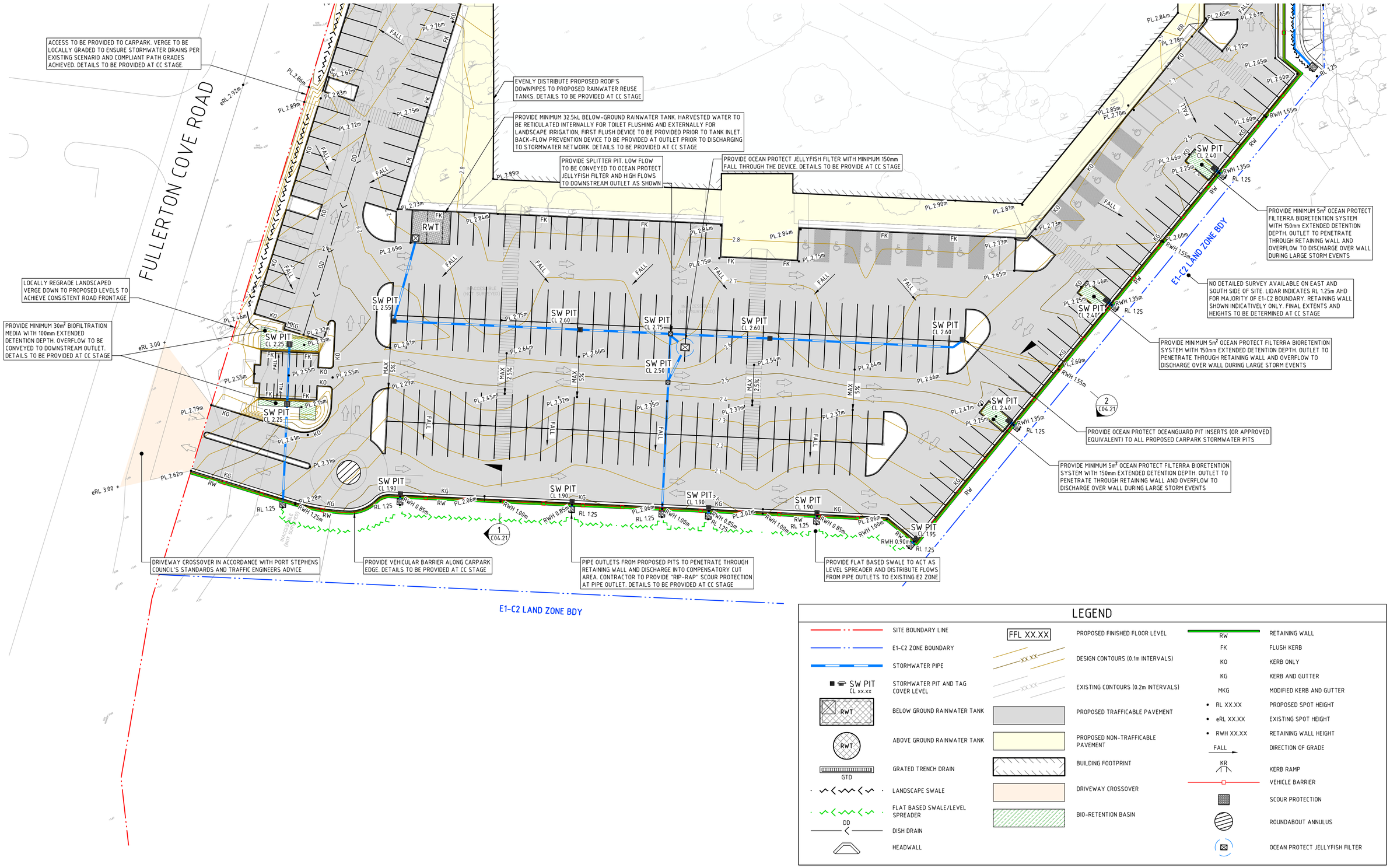
JOB NUMBER: NL161067

DRAWING NUMBER: DA-C03.21

REVISION: E

DRAWING SHEET SIZE = A1

Date: 29.11.2024 9:45 AM Plotted By: DIMITRI MAVROUDIS Found: O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C03.21 BE SECTIONS.dwg



LEGEND

- SITE BOUNDARY LINE
- E1-C2 ZONE BOUNDARY
- STORMWATER PIPE
- SW PIT CL xx.xx — STORMWATER PIT AND TAG COVER LEVEL
- RWT — BELOW GROUND RAINWATER TANK
- RWT — ABOVE GROUND RAINWATER TANK
- GTD — GRATED TRENCH DRAIN
- LANDSCAPE SWALE
- FLAT BASED SWALE/LEVEL SPREADER
- DD — DISH DRAIN
- HEADWALL
- FFL XX.XX — PROPOSED FINISHED FLOOR LEVEL
- XX.XX — DESIGN CONTOURS (0.1m INTERVALS)
- XX.XX — EXISTING CONTOURS (0.2m INTERVALS)
- PROPOSED TRAFFICABLE PAVEMENT
- PROPOSED NON-TRAFFICABLE PAVEMENT
- BUILDING FOOTPRINT
- DRIVEWAY CROSSOVER
- BIO-RETENTION BASIN
- RW — RETAINING WALL
- FK — FLUSH KERB
- KO — KERB ONLY
- KG — KERB AND GUTTER
- MKG — MODIFIED KERB AND GUTTER
- RL XX.XX — PROPOSED SPOT HEIGHT
- eRL XX.XX — EXISTING SPOT HEIGHT
- RWH XX.XX — RETAINING WALL HEIGHT
- FALL — DIRECTION OF GRADE
- KR — KERB RAMP
- VEHICLE BARRIER
- SCOUR PROTECTION
- ROUNDABOUT ANNULUS
- OCEAN PROTECT JELLYFISH FILTER

NOT FOR CONSTRUCTION

DRAWN: D. MAVROUDIS DESIGNED: E. GEARING JOB MANAGER: K. SINCLAIR VERIFIER: K. SINCLAIR

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D	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	20.03.24
E	RE-ISSUED FOR DA APPROVAL	BD	KS	EG	21.06.24
F	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	29.11.24

CLIENT: Monteath & Powys

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ARCHITECT: EJE architecture

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SCALE 1:300@A1 — 0 3 6 9 12 15m

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Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
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PROJECT: **PROPOSED RETAIL DEVELOPMENT 42 FULLERTON COVER ROAD FULLERTON COVE 2318**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

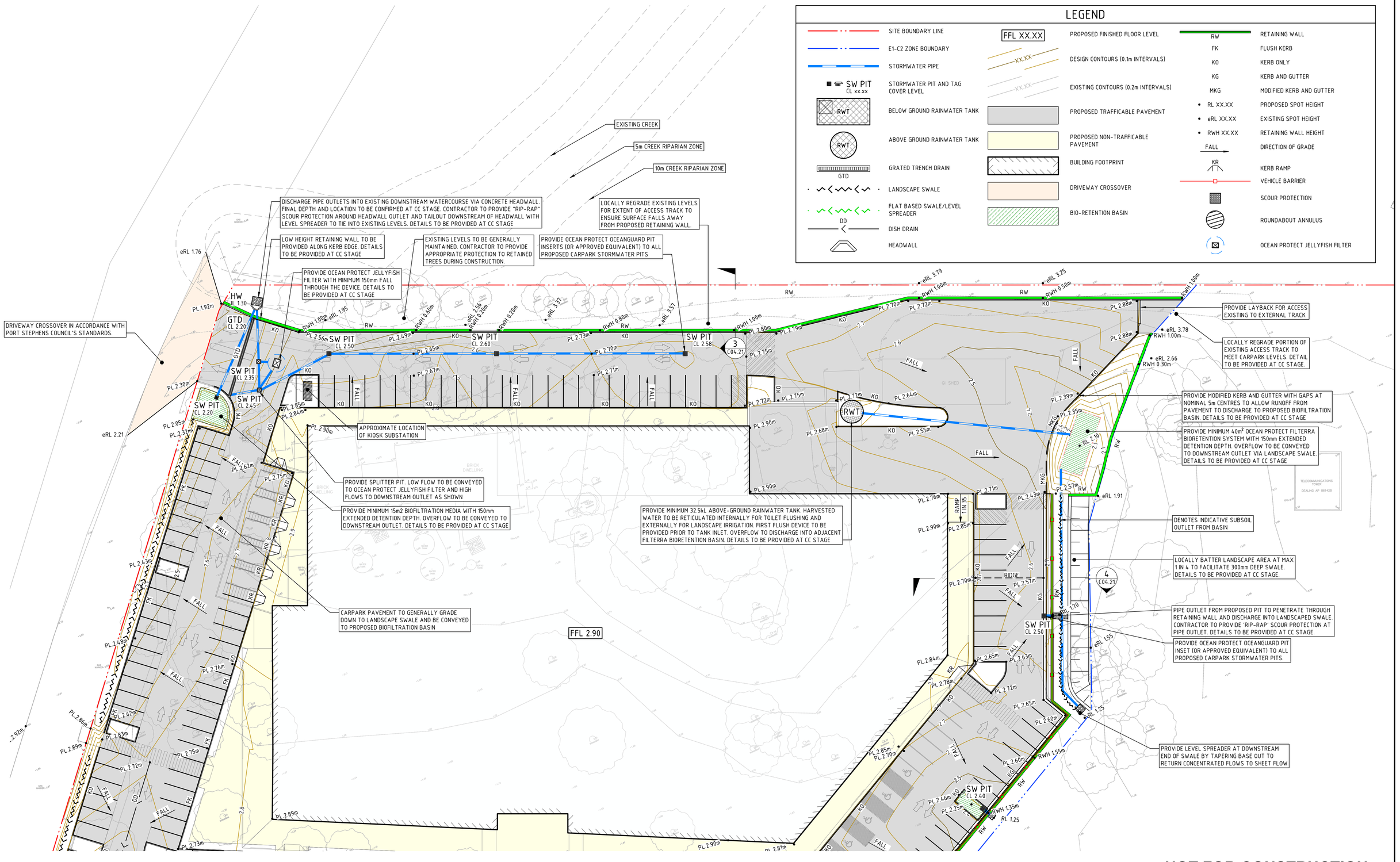
CIVIL WORKS PLAN - SHEET 1

JOB NUMBER: **NL161067**

DRAWING NUMBER: **DA-C04.01** REVISION: **F**

DRAWING SHEET SIZE = A1

Date: 29.11.2024 2:57 PM Plotted By: DIMITRI MAVROUDIS Found: O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C04.01 CIVIL WORKS PLAN.dwg



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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
B	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	03.10.23
C	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	05.10.23
D	ISSUED FOR DEVELOPMENT APPLICATION	BD	KS	EG	18.10.23
E	ISSUED FOR COORDINATION	DM	KS	EG	18.03.24
F	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	20.03.24
G	RE-ISSUED FOR DA APPROVAL	BD	KS	EG	21.06.24

CLIENT
M&P Mortlock & Powys

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ARCHITECT
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SCALE 1:300@A1 — 0 3 6 9 12 15m

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Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
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PROJECT
PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE
CIVIL ENGINEERING PACKAGE

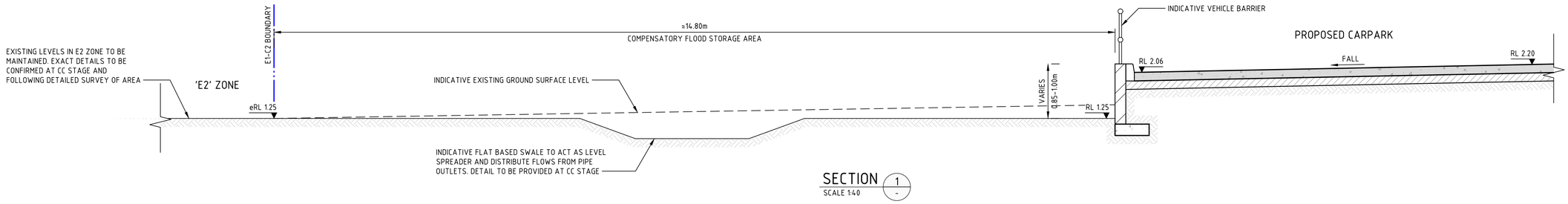
CIVIL WORKS PLAN - SHEET 2

JOB NUMBER **NL161067**

DRAWING NUMBER **DA-C04.02** REVISION **G**

DRAWING SHEET SIZE = A1

Date : 29.11.2024 2:54 PM Plotted By : DIMITRI MAVROUDIS Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O : Drawings\CIVIL\DA\NL161067-DA-C04-01 CIVIL WORKS PLAN.dwg



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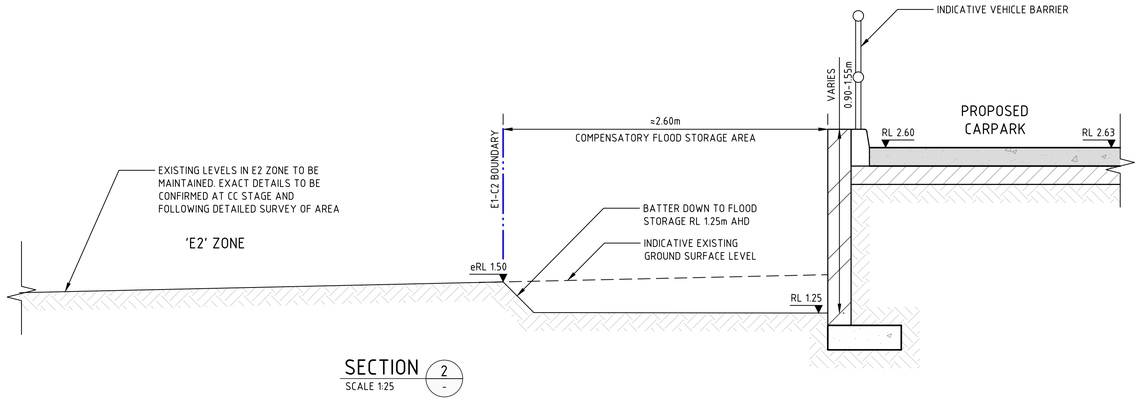
SCALE 1:40



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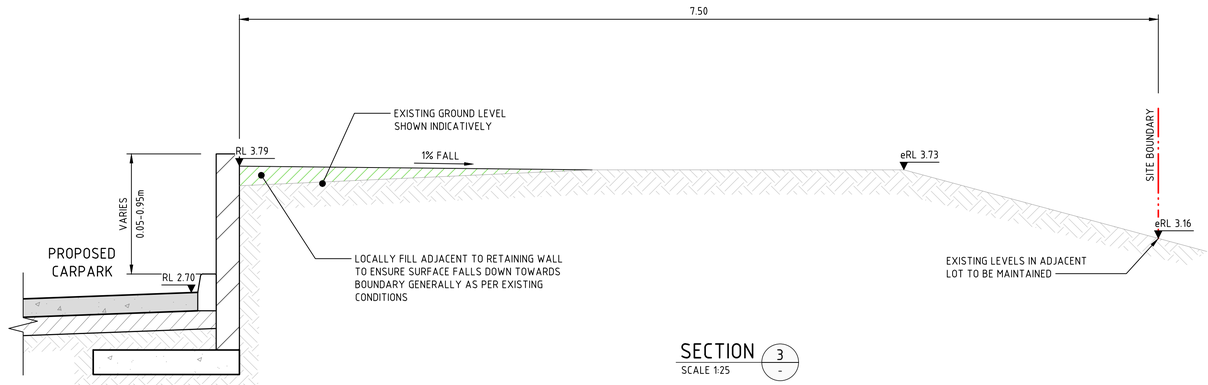
SCALE 1:25



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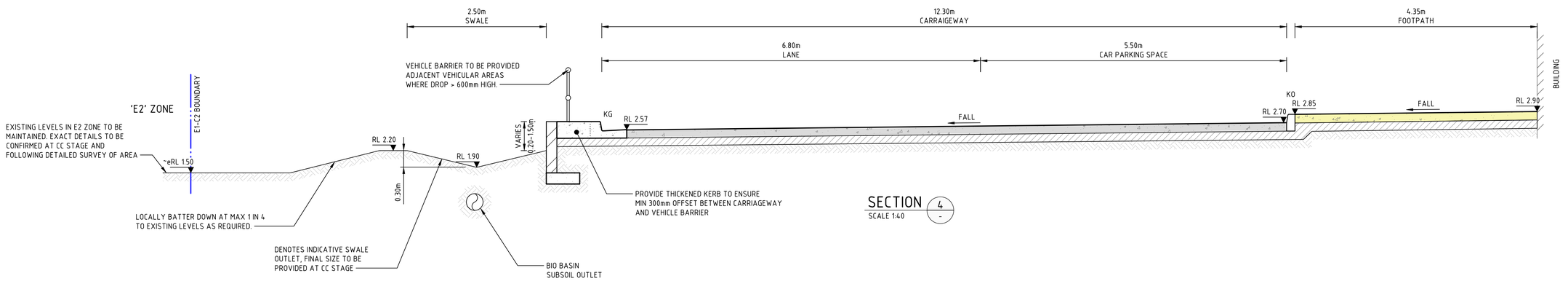
SCALE 1:25



SECTION 4
SCALE 1:40

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A	ISSUED FOR COORDINATION	DM	KS	EG	18.03.24
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C	RE-ISSUED FOR DA APPROVAL	BD	KS	EG	21.06.24
D	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	29.11.24

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SCALE 1:25@ A1 — 0 0.25 0.5 0.75 1 1.25m
SCALE 1:40@ A1 — 0 0.4 0.8 1.2 1.6 2m

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Newcastle
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Ph (02) 4943 1777 Email newcastle@northrop.com.au
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PROJECT
PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE
CIVIL ENGINEERING PACKAGE

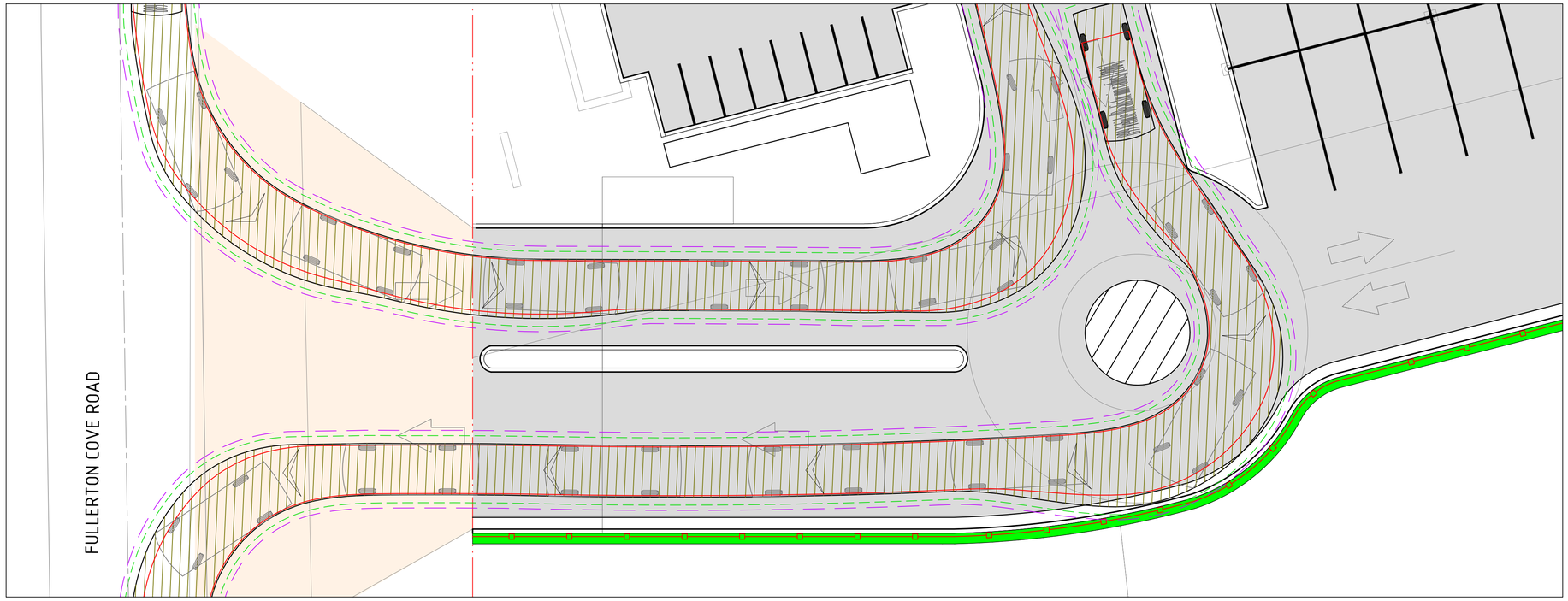
TYPICAL SECTIONS

JOB NUMBER **NL161067**

DRAWING NUMBER **DA-C04.21** REVISION **D**

DRAWING SHEET SIZE = A1

Date : 29.11.2024 9:46 AM Plotted By : DIMITRI MAVROUDIS Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C04.21 TYPICAL SECTIONS.dwg



B99 MULTIPLE VEHICLE ROUND-ABOUT MANOEUVRE

B99 SINGLE VEHICLE ROUND-ABOUT MANOEUVRE

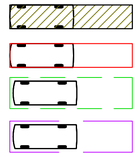
VEHICLE PROFILE

B99 VEHICLE (REALISTIC MIN RADIUS) (2004)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.878m
MIN BODY GROUND CLEARANCE	0.272m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.250m
TRAVELLING SPEED	5 km/h

VEHICLE MOVEMENTS

FORWARD MOVEMENT



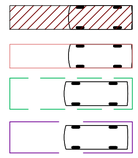
VEHICLE BODY

VEHICLE WHEELS

VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)

VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

REVERSE MOVEMENT



VEHICLE BODY

VEHICLE WHEELS

VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)

VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

DISCLAIMER

THE TURNING PATHS/TEMPLATES PROVIDED HAVE BEEN PRODUCED USING SIMULATION SOFTWARE AND ARE TO BE USED AS A GUIDE ONLY. THESE SIMULATIONS MAY NOT REFLECT ACTUAL DRIVER BEHAVIOUR AND/OR EXPERIENCE UNDER ACTUAL DRIVING CONDITIONS.

IT IS NORTHROP'S INTENTION TO UTILISE STANDARD VEHICLES NOMINATED IN AS2890.1 AND AS2890.2 FOR ALL DESIGN/CHECKING VEHICLE SIMULATIONS AT AN IDEAL MOVEMENT SPEED OF 10KM/H WITH A NOMINAL VEHICLE BODY OFFSET OF 500MM. WHERE MANOEUVRABILITY IS LIMITED AND SITE CONDITIONS ARE FAVOURABLE, AN ABSOLUTE MINIMUM SPEED OF 5KM/H WITH AND ABSOLUTE MINIMUM VEHICLE BODY CLEARANCE OF 300MM MAY BE ADOPTED.

IF THE USE OF SPECIFIC VEHICLES (NOT DETAILED UNDER AS2890) IS REQUESTED, IT IS TO BE NOTED THAT THEIR DIMENSIONS AND MANOEUVRING CHARACTERISTICS HAVE BEEN INTERPRETED INTO THE SIMULATION SOFTWARE FROM INFORMATION PROVIDED BY SERVICE PROVIDERS AND VEHICLE MANUFACTURES. NORTHROP ACCEPTS NO RESPONSIBILITY OF THE ACCURACY THESE VEHICLE MOVEMENTS, AND ANY MANOEUVRES PROVIDED SHOULD ONLY BE USED AS A GUIDE WITH ACTUAL DESIGN BEING BASED AROUND ENGINEERING ADVICE AND AUSTRALIAN STANDARDS.

AT ALL TIMES, STANDARD VEHICLE TURNING PATHS/TEMPLATES ARE TO TAKE DESIGN PRECEDENCE OVER ALL SPECIFIC VEHICLES. UNDER NO CIRCUMSTANCE DOES THE SIMULATION PROVIDED RELIEVE ANY PARTY OF THEIR ROLE AND RESPONSIBILITY FOR PROVIDING DESIGN SOLUTIONS IN ACCORDANCE WITH GOOD DESIGN PRACTICES.

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
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CLIENT

Monteath & Powys M&P

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ARCHITECT

EJE architecture

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SCALE 1:100 @ A1

0 1 2 3 4 5m

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Newcastle
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PROJECT
PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE
CIVIL ENGINEERING PACKAGE

SWEPT PATHS PLAN - B99 MANOEUVRES

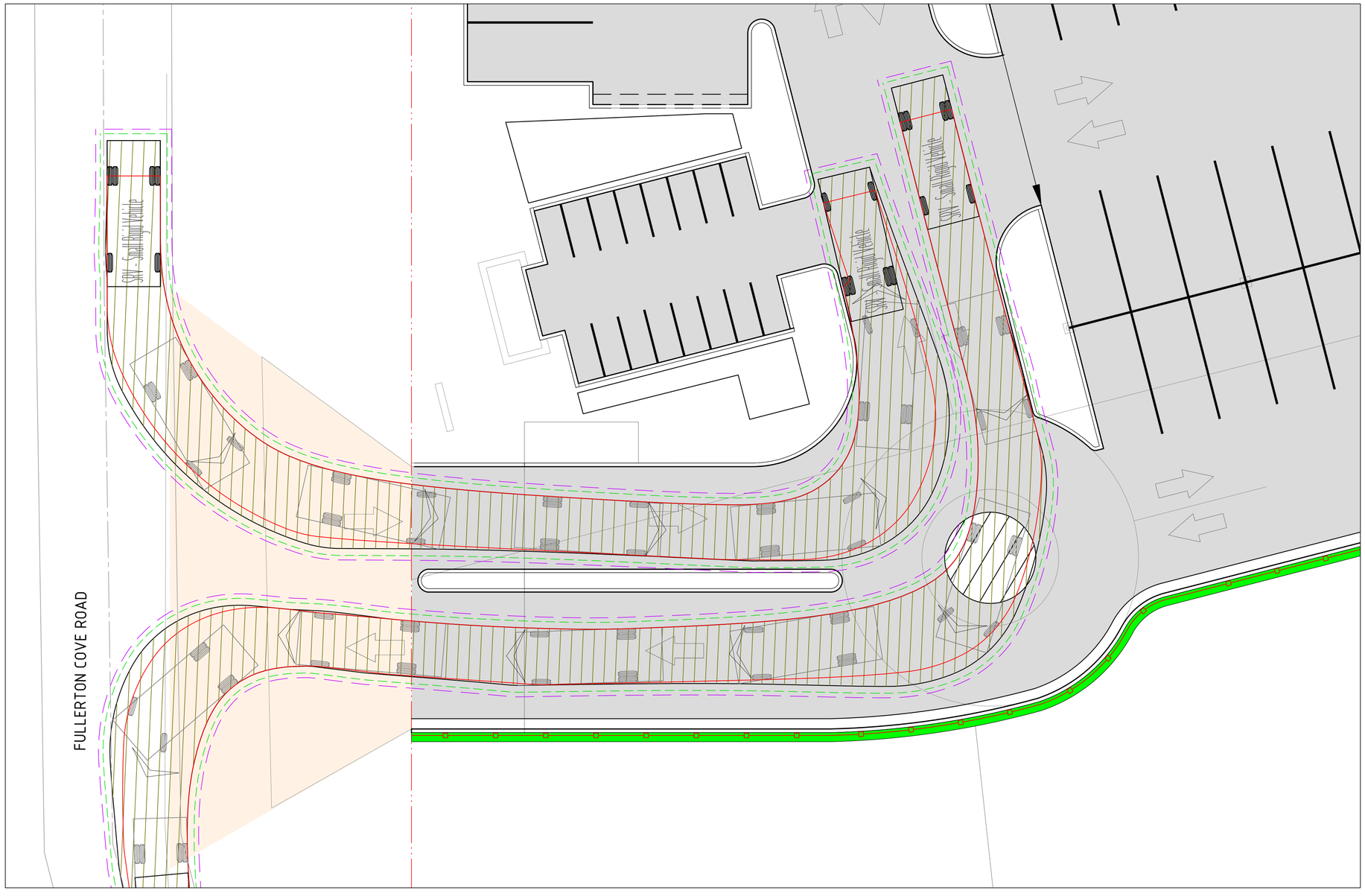
JOB NUMBER **NL161067**

DRAWING NUMBER **DA-C05.01**

REVISION **C**

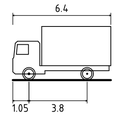
DRAWING SHEET SIZE = A1

Date : 29.11.2024 9:46 AM Plotted By : DIMITRI MAVROUDIS Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C05.01 SWEPT PATHS PLAN.dwg



SRV MULTIPLE VEHICLE ROUND-ABOUT MANOEUVRE

VEHICLE PROFILE



SRV - SMALL RIGID VEHICLE

OVERALL LENGTH	6.400m
OVERALL WIDTH	2.330m
OVERALL BODY HEIGHT	3.500m
MIN BODY GROUND CLEARANCE	0.398m
TRACK WIDTH	2.330m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	7.100m
TRAVELLING SPEED	5 km/h

VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

REVERSE MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

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DRAWN: D. MAVROUDIS DESIGNED: E. GEARING JOB MANAGER: K. SINCLAIR VERIFIER: K. SINCLAIR

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	DM	KS	EG	08.09.23
B	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	03.10.23
C	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	20.03.24

CLIENT: M&P Monteath & Powys

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ARCHITECT: EJE architecture

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SCALE 1:100 @ A1 (0 1 2 3 4 5m)

NORTHROP
Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT: **PROPOSED RETAIL DEVELOPMENT 42 FULLERTON COVE ROAD FULLERTON COVE 2318**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

SWEPT PATHS PLAN - SRV MANOEUVRES

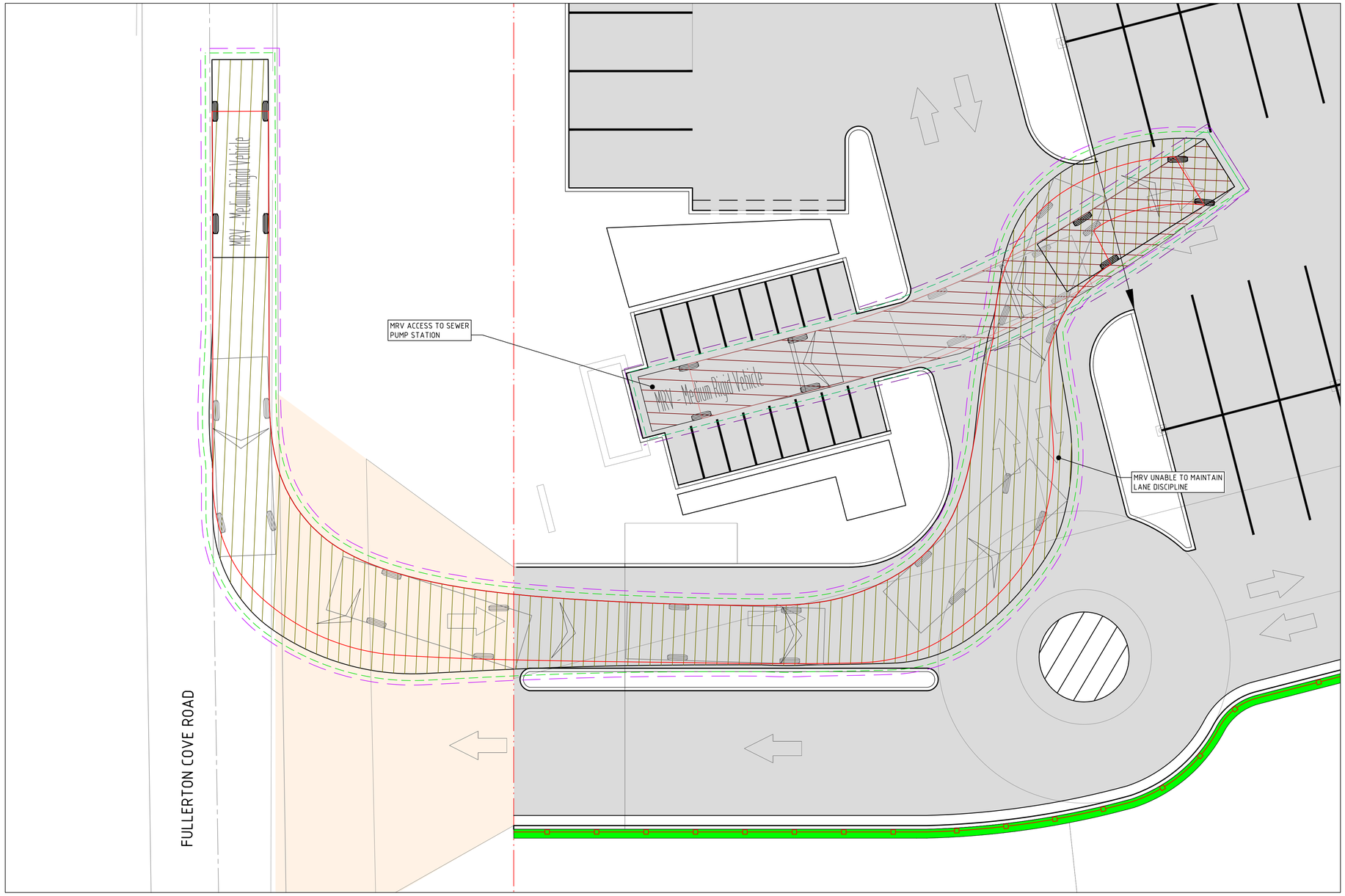
JOB NUMBER: **NL161067**

DRAWING NUMBER: **DA-C05.02**

REVISION: **C**

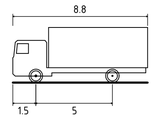
DRAWING SHEET SIZE = A1

Date : 29.11.2024 9:46 AM Plotted By : DIMITRI MAVROUDIS Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C05.01 SWEPT PATHS PLAN.dwg



MRV ACCESS TO PUMP STATION

VEHICLE PROFILE



MRV - MEDIUM RIGID VEHICLE

OVERALL LENGTH	8.800m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	3.633m
MIN BODY GROUND CLEARANCE	0.428m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	10.000m
TRAVELLING SPEED	5 km/h

VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

REVERSE MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

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CLIENT

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ARCHITECT

EJE architecture

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SCALE 1:100 @ A1

0 1 2 3 4 5m

NORTHROP
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Ph (02) 4943 1777 Email newcastle@northrop.com.au
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PROJECT
PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE
CIVIL ENGINEERING PACKAGE

SWEPTS PATH PLAN - MRV MANOEUVRES

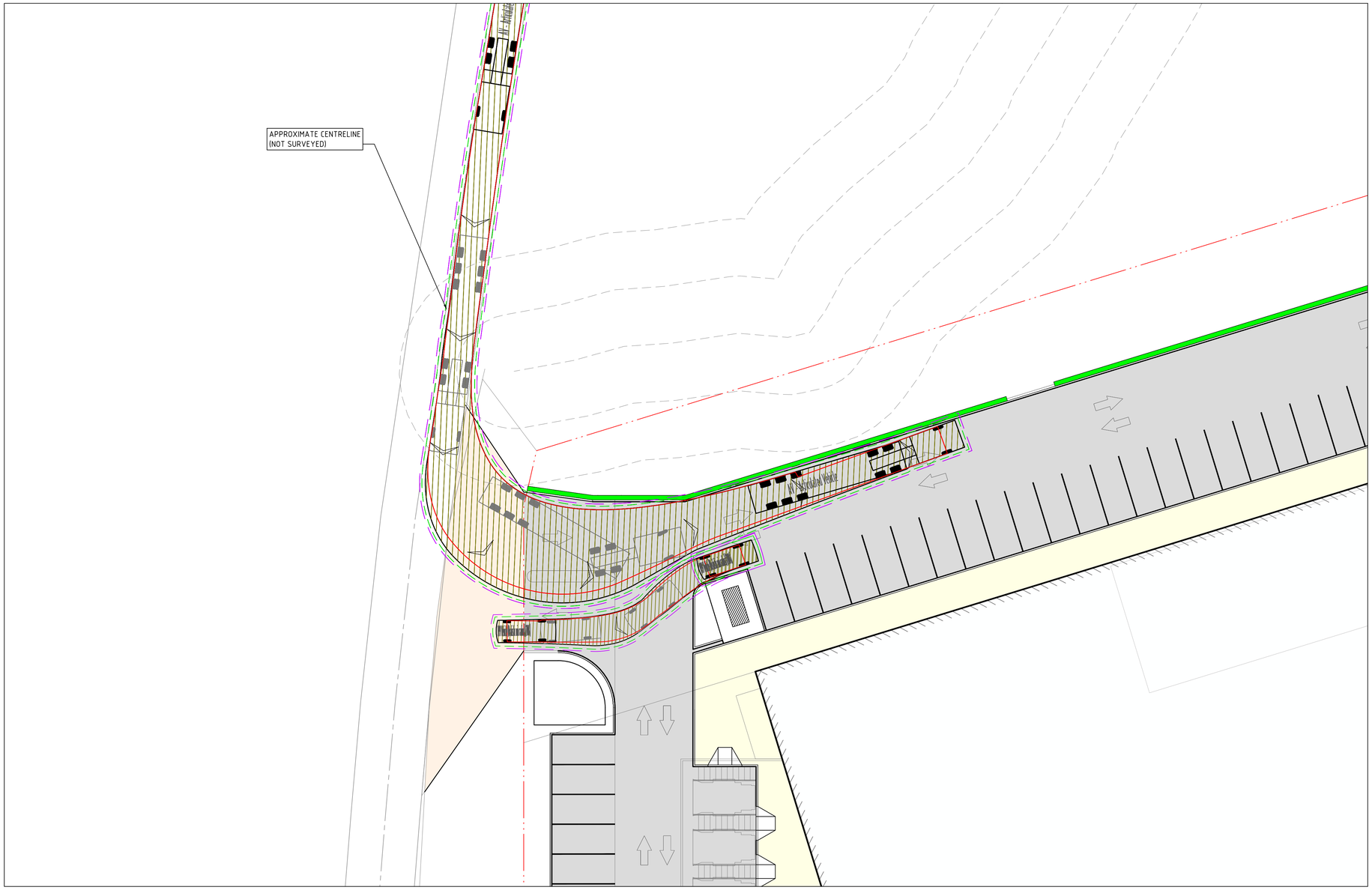
JOB NUMBER **NL161067**

DRAWING NUMBER **DA-C05.03**

REVISION **C**

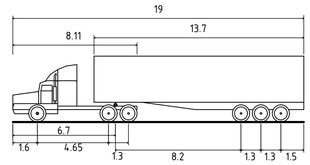
DRAWING SHEET SIZE = A1

Date : 29.11.2024 9:46 AM Plotted By : DIMITRI MAVROUDIS Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\0 - Drawings\CIVIL\DA\NL161067-DA-C05.01 SWEPT PATHS PLAN.dwg



ARTICULATED VEHICLE TURNING LEFT INTO SITE AND BYPASSING B99 VEHICLE MANOEUVRE

VEHICLE PROFILE



PRIME MOVER AND SEMI TRAILER (19m)

OVERALL LENGTH	19.000m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.540m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	5 km/h

VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

REVERSE MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
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CLIENT

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ARCHITECT

EJE architecture

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SCALE 1:200@ A1

0 2 4 6 8 10m

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PROJECT
PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE
CIVIL ENGINEERING PACKAGE

SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 1

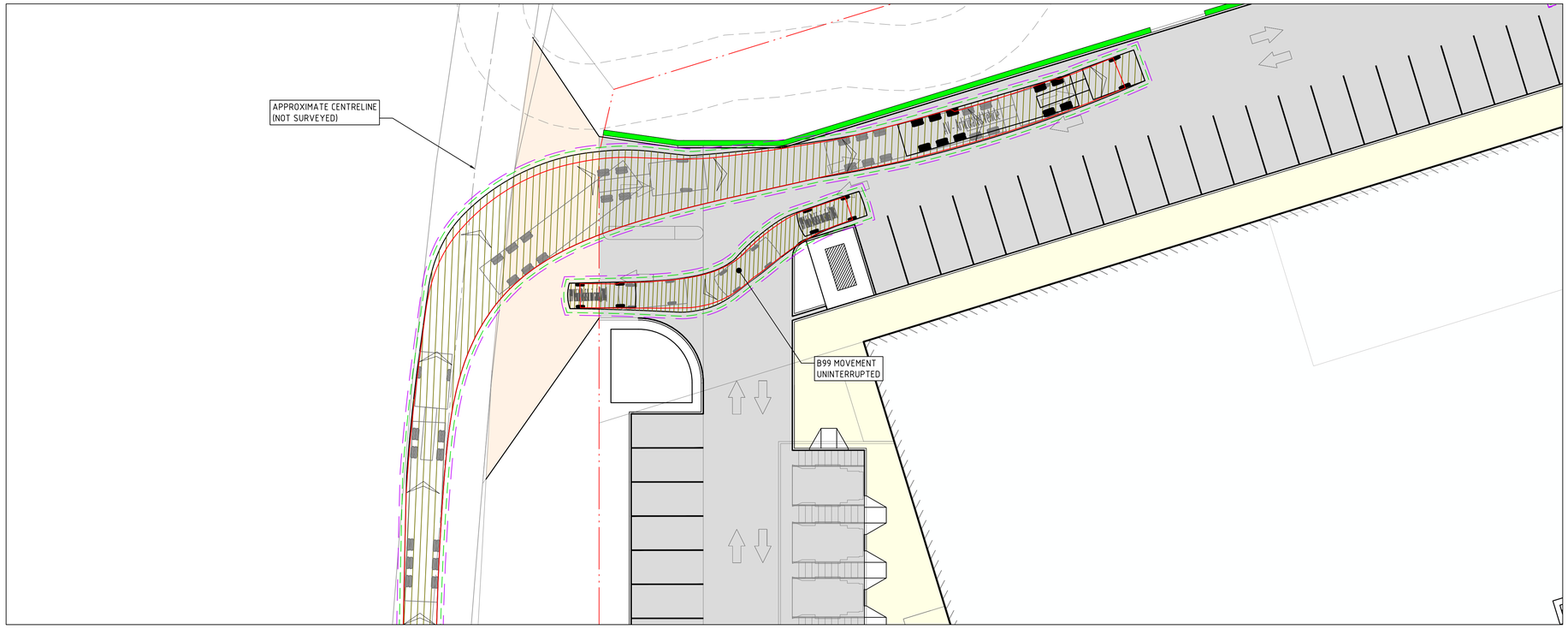
JOB NUMBER
NL161067

DRAWING NUMBER
DA-C05.04

REVISION
D

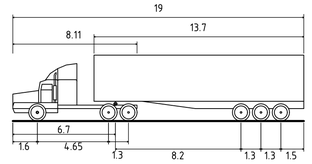
DRAWING SHEET SIZE = A1

Date : 29.11.2024 9:46 AM Plotted By : DIMITRI MAVROUDIS Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C05.01 SWEPT PATHS PLAN.dwg



ARTICULATED VEHICLE TURNING RIGHT INTO SITE MANOEUVRE

VEHICLE PROFILE



PRIME MOVER AND SEMI TRAILER (19m)

OVERALL LENGTH	19.000m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.540m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	5 km/h

VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

REVERSE MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
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CLIENT

Monteath & Powys

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ARCHITECT

EJE architecture

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SCALE 1:200@A1

0 2 4 6 8 10m

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PROJECT
PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE
CIVIL ENGINEERING PACKAGE

SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 2

JOB NUMBER **NL161067**

DRAWING NUMBER **DA-C05.05**

REVISION **D**

DRAWING SHEET SIZE = A1

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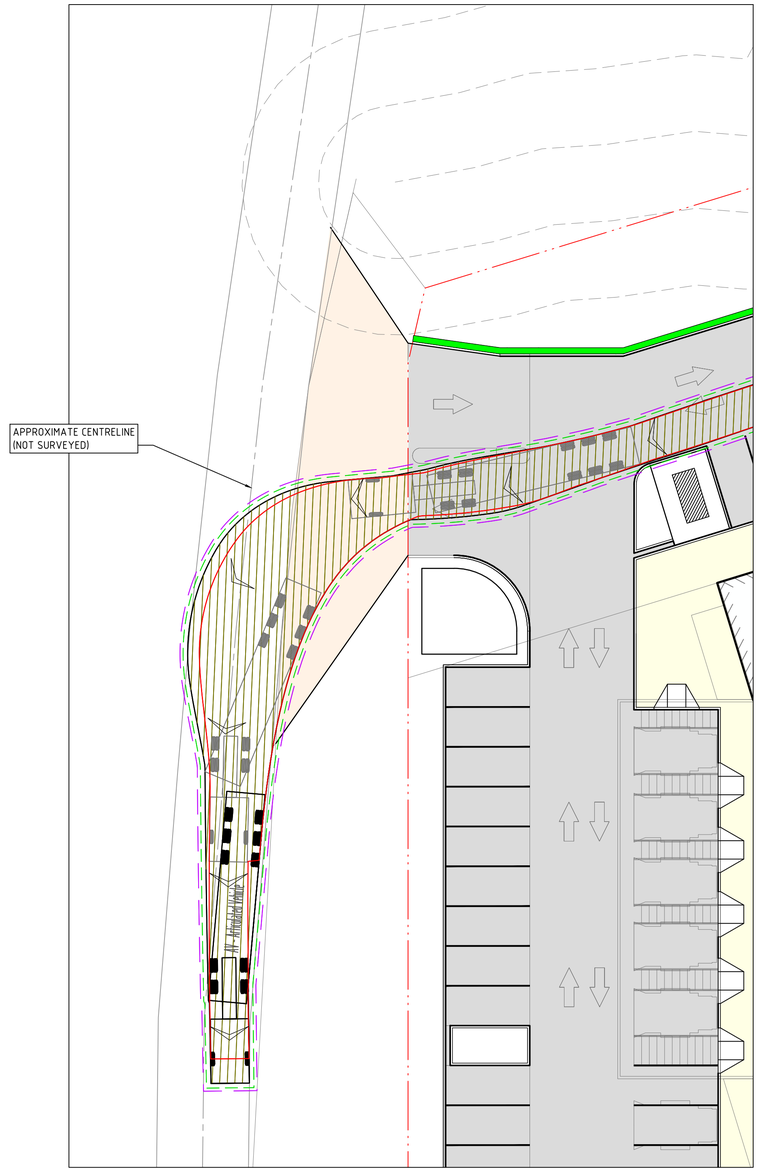
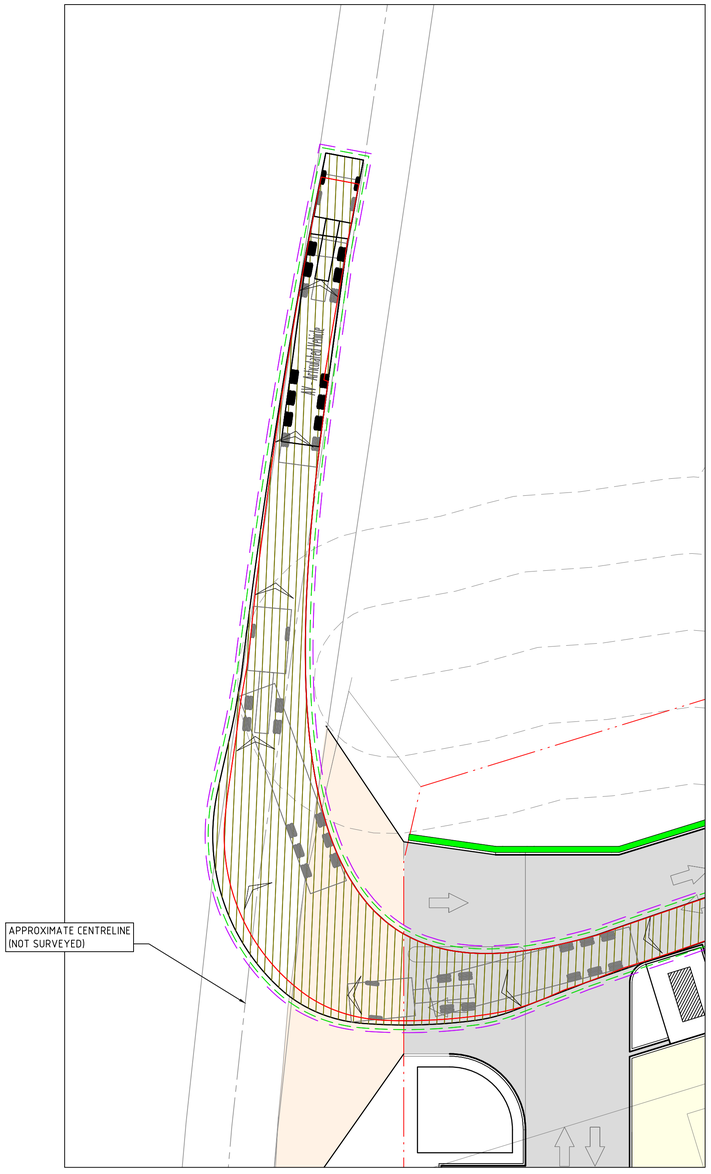
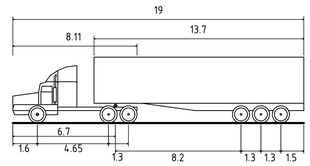


AV EXITING SITE LEFT TURN MANOEUVRE



AV EXITING SITE RIGHT TURN MANOEUVRE

VEHICLE PROFILE



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TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	5 km/h

VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

REVERSE MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
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CLIENT: M&P Monteath & Powys

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ARCHITECT: EJE architecture

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SCALE 1:200@A1 — 0 2 4 6 8 10m

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PROJECT: **PROPOSED RETAIL DEVELOPMENT 42 FULLERTON COVER ROAD FULLERTON COVE 2318**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

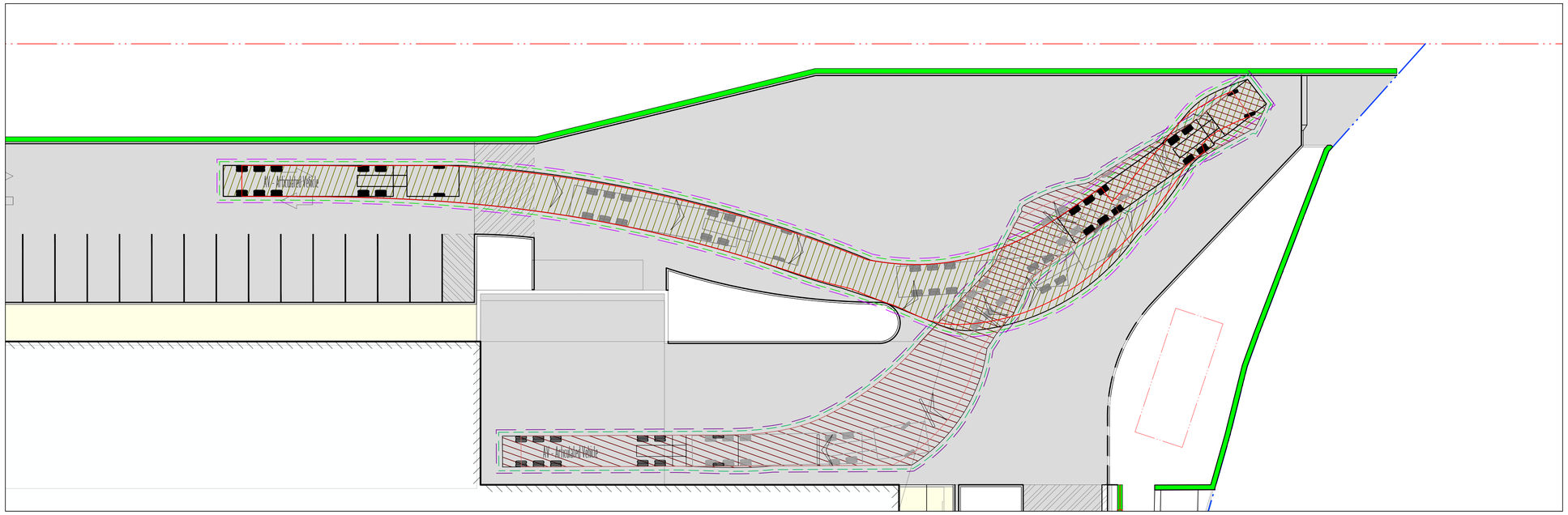
SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 3

JOB NUMBER: **NL161067**

DRAWING NUMBER: **DA-C05.06** REVISION: **D**

DRAWING SHEET SIZE = A1

Date: 29.11.2024 9:46 AM Plotted By: DIMITRI MAVROUDIS Found: O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C05.01 SWEPT PATHS PLAN.dwg



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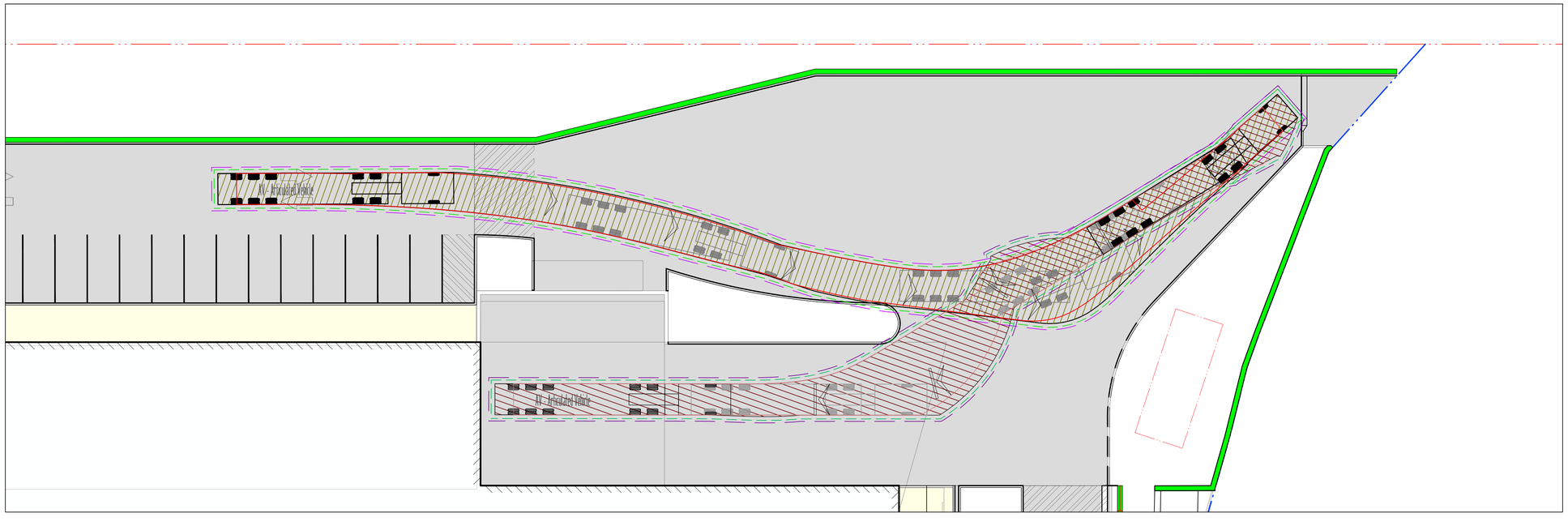
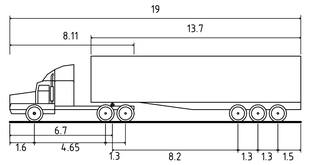


LOADING DOCK ENTRY MANOEUVRE B

VEHICLE PROFILE



PRIME MOVER AND SEMI TRAILER (19m)

OVERALL LENGTH	19.000m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.540m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	5 km/h

VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

REVERSE MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

DISCLAIMER

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D	ISSUED FOR COORDINATION	DM	KS	EG	18.03.24
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CLIENT

Monteath & Powys M&P

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ARCHITECT

EJE architecture

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SCALE 1:200@A1 0 2 4 6 8 10m

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Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT
PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE
CIVIL ENGINEERING PACKAGE

SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 4

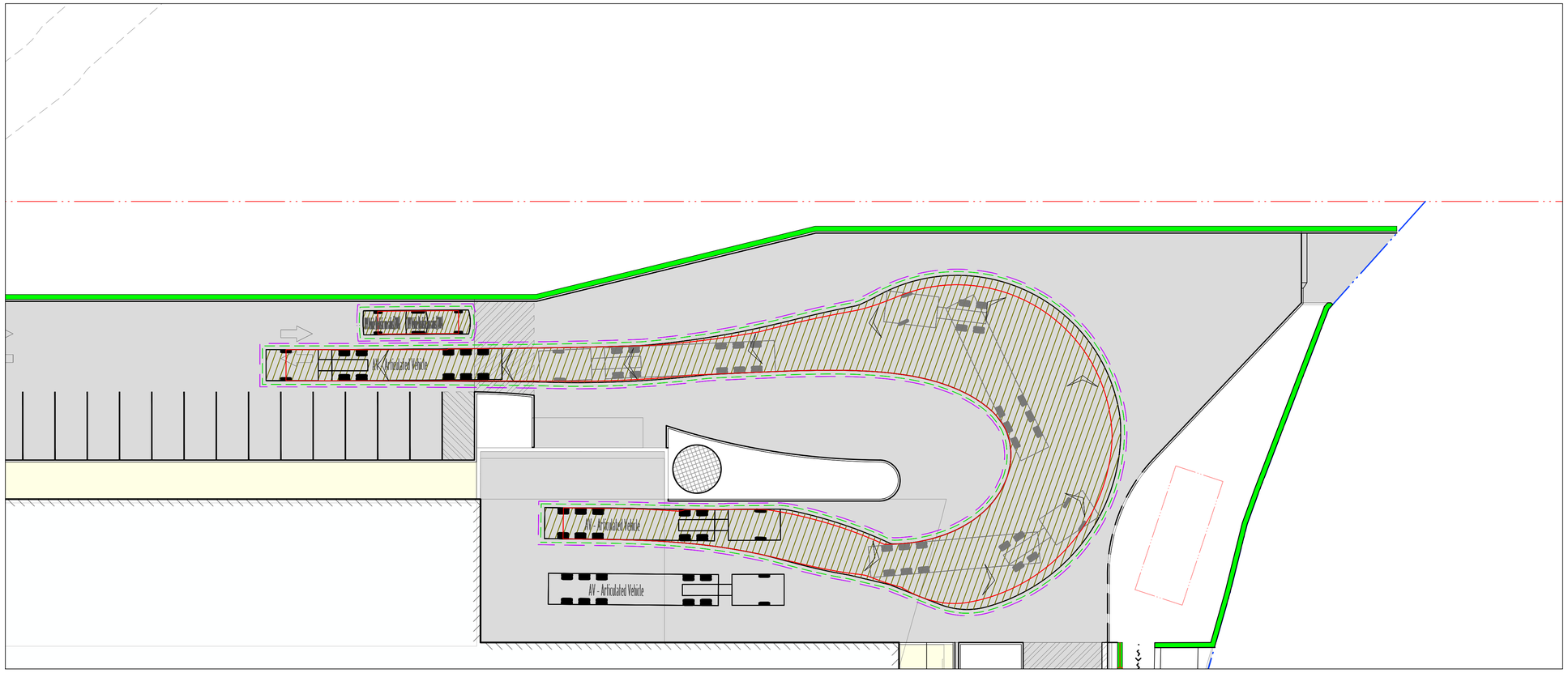
JOB NUMBER **NL161067**

DRAWING NUMBER **DA-C05.07**

REVISION **E**

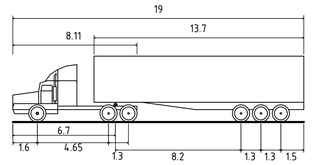
DRAWING SHEET SIZE = A1

Date : 29.11.2024 9:46 AM Plotted By : DIMITRI MAVROUDIS Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C05.01 SWEPT PATHS PLAN.dwg



LOADING DOCK EXIT MANOEUVRE

VEHICLE PROFILE



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CLIENT: Meinhardt & Powys

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ARCHITECT: EJE architecture

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SCALE 1:200@A1 — 0 2 4 6 8 10m

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Newcastle
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Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT: **PROPOSED RETAIL DEVELOPMENT 42 FULLERTON COVER ROAD FULLERTON COVE 2318**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 5

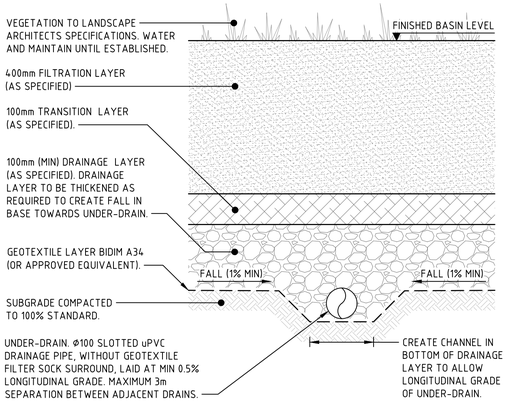
JOB NUMBER: **NL161067**

DRAWING NUMBER: **DA-C05.08**

REVISION: **D**

DRAWING SHEET SIZE = A1

Date: 29.11.2024 9:46 AM Plotted By: DIMITRI MAVROUDIS Found: O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C05.01 SWEPT PATHS PLAN.dwg



BIOFILTRATION MEDIA DETAIL

BIOFILTRATION MATERIAL SPECIFICATION

FILTRATION LAYER

HYDRAULIC CONDUCTIVITY – 200-300mm/hr

PARTICLE SIZE DISTRIBUTION

CLAY AND SILT	– 3%	(<0.05mm)
VERY FINE SAND	– 5-30%	(0.05-0.15mm)
FINE SAND	– 10-30%	(0.15-0.25mm)
MEDIUM TO COARSE SAND	– 40-60%	(0.25-1.0mm)
COARSE SAND	– 7-10%	(1.0-2.0mm)
FINE GRAVEL	– <3%	(2.0-3.4mm)

SOIL-BASED FILTER MEDIA PROPERTIES

TOTAL NITROGEN (TN) CONTENT	– <750mg/kg
ORTHOPHOSPHATE (PO_4^{3-}) CONTENT	– <40mg/kg
ORGANIC MATTER CONTENT	– >3%
pH	– 5.5-7.5
ELECTRICAL CONDUCTIVITY (EC)	– <1.2 dS/m

TRANSITION LAYER

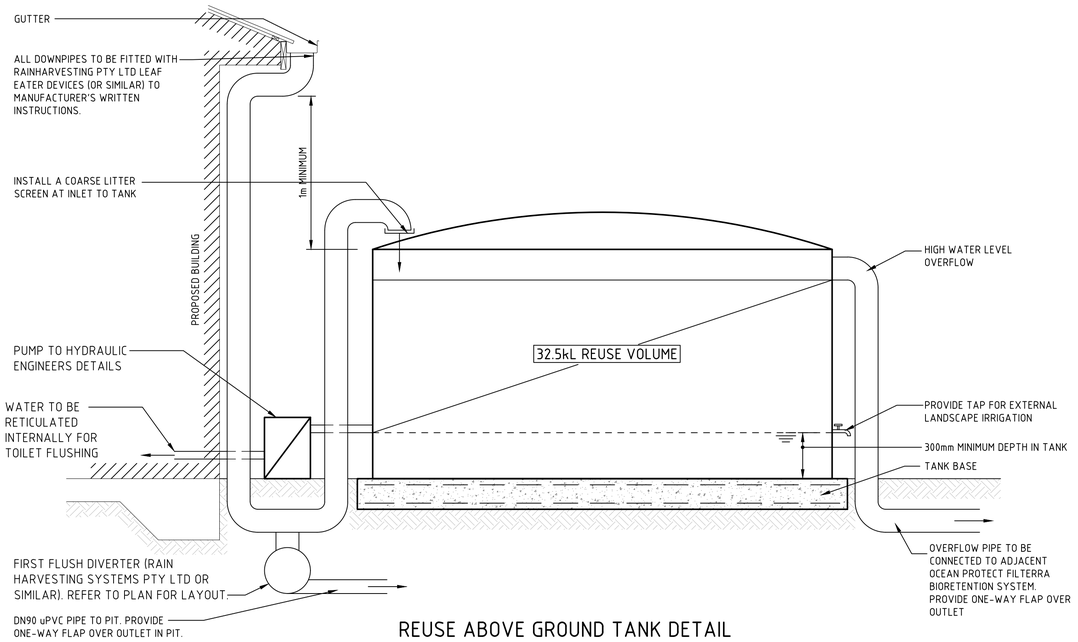
CLEAN, WELL-GRADED SAND / COARSE SAND MATERIAL.

% PASSING	– 1.4mm	100%
	– 1.0mm	80%
	– 0.7mm	44%
	– 0.5mm	8.4%

DRAINAGE LAYER

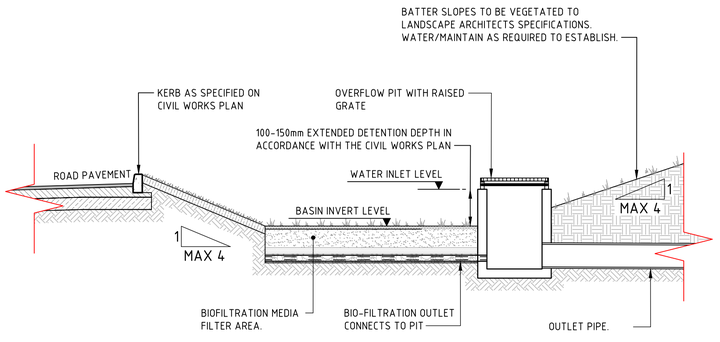
CLEAN, FINE GRAVEL (2-5mm WASHED SCREENINGS)

(REF: GUIDELINE SPECIFICATIONS FOR FILTER MEDIA IN BIORETENTION SYSTEMS, FACILITY FOR ADVANCING WATER BIOFILTRATION (2009))

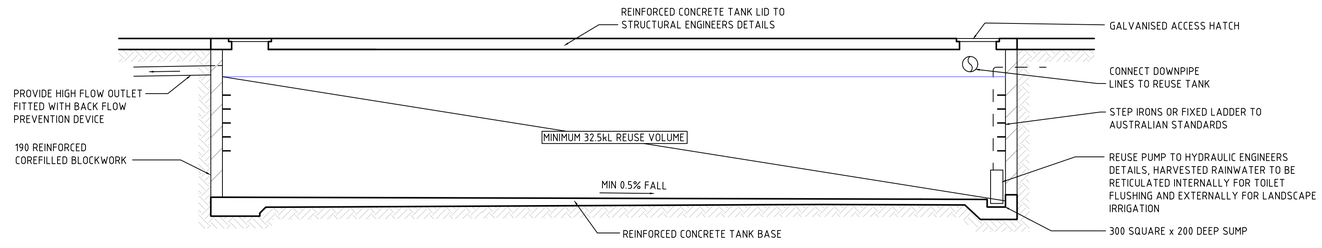


REUSE ABOVE GROUND TANK DETAIL

NOTE: THE ENTIRE PRESSURISED DOWNPIPE SYSTEM SHALL BE AIR TIGHT AND BE ABLE TO WITHSTAND ATMOSPHERIC PRESSURE. THE PIPING SYSTEM SHALL BE MINIMUM SN6 AND FITTINGS WITH INTERNAL ULTRA VIOLET STABILISING (OR APPROVED EQUIVALENT).



TYPICAL BIOFILTRATION BASIN SECTION



BELOW GROUND REUSE TANK SCHEMATIC

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CLIENT: M&P Meinhardt & Powys

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ARCHITECT: EJE architecture

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SCALE VARIES

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Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT: **PROPOSED RETAIL DEVELOPMENT 42 FULLERTON COVER ROAD FULLERTON COVE 2318**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

CIVIL DETAILS

JOB NUMBER: **NL161067**

DRAWING NUMBER: **DA-C09.01**

REVISION: **C**

DRAWING SHEET SIZE = A1

Date : 29.11.2024 9:46 AM Plotted By : DIMITRI MAVROUDIS Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C09.01 CIVIL DETAILS.dwg

CHR(S)		Comments
V [km/h]	60 N3	
W [m]	3.60 N4	
W(T) [m]	3.10 N5	
X [m]	4.5 N6	
A [m]	52.0	
E [m]	33.5	
W(TR) [m]	2.0	
T [m]	11.0	
D (tbl)	25	AGRD04A Table 7.1
D grade	-0.5%	Average grade (Lidar)
D correction	1	AGRD04A Table 5.3
D [m]	25.0	
S [m]	36.8 N7	
B [m]	61.8	
R [m]	175.0	
N1 LHS [m]	99.85	
N2 RHS [m]	67	
CHAINAGE SETOUT CALCULATIONS		
X.E	0.0	Point X - end
A1.S	-99.8	Point A1 - start
E.E	-66.3	Point E - end
T.E	-55.3	Point T - end
A1.E	-47.8	Point A1 - end
X.S	-4.5	Point X - start
A2.S	15.0	Point A2 - start
A2.E	67.0	Point A2 - end

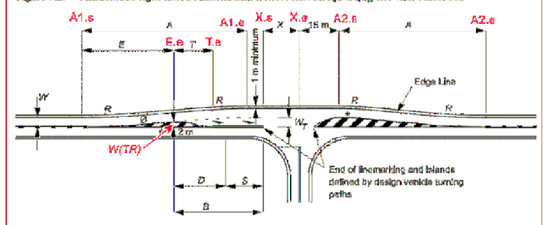
NOTES

N1: 'Left Hand Side' (X+B+E) total length treatment
N2: 'Right Hand Side' (15m+A) total length treatment
N3: The speed limit is 70km/h, however, the traffic report has justified 50km/h (+10km/h for operative/design speed)
N4: 3.50m + 0.10m widening for R300 curve
N5: 3.00m min, additional 0.10m on curve widening
N6: MRV@15kph 4.15m, rounded to 4.50m
N7: 8.8m MRV Design Vehicle + 4 * 7.0m (5.2m Passenger Vehicle + 1.8m gap)

Cross-section Elements (From LHS Footpath edge)	
LHS TOTAL	9.20
Footpath edge (footpath constructed by neighbouring development)	
Lane separation	2.50 N1
Lane	3.60 N2
R-Turn Lane	3.10 N3
RHS TOTAL	7.80
Lane (+Channel)	3.60 N2,N4
Kerb	0.20 N4
Verge	1.00
Shared path	2.00
Footpath only	
Verge	1.00
TOTAL	17.00

N1: Distance varies, min 2.50m, combination of Sealed Shoulder and Verge.
N2: 3.5m standard width + 0.10m widening on curve R300m.
N3: 3.0m min width + 0.10m on curve widening.
N4: 0.30m channel included in the Lane width

Figure 7.2: Channelised right-turn treatment with a short turn slot (CHR(S)) two-lane rural road



Notes:
6 – double barrier line not to be used this side of the island.
** – Islands are to comprise linemarking only, i.e. no raised or depressed medians. Diagonal rows of RRPMs within the painted islands should be used to improve the delineation of diagonal pavement marking.*
The holding line is typically placed in prolongation of the kerb line or edge line, however, it may be set back if there is a problem with the design vehicle over-running the holding line, or if it is desired to hold vehicles back some distance from the intersecting roadway (AS 1742.2 - 2009). The setback needs to be balanced such that sight distance is not negatively impacted to create a safety issue and the needs of pedestrians is met.
The dimensions of the treatment are defined below and values of A, D, R and T are shown in Table 7.1:

W = Nominal through lane width (m) (including widening for curves). For a new intersection on an existing road, the width is to be in accordance with the current link strategy
W_T = Nominal width of turn lane (m), including widening for curves based on the design turning vehicle = 3.0 m minimum
A = Length of lateral movement (Table 7.1)
B = Total length of auxiliary lane including taper, divergel/deceleration and storage (m)
E = Distance from start of taper to 2.0 m width (m) and is given by:

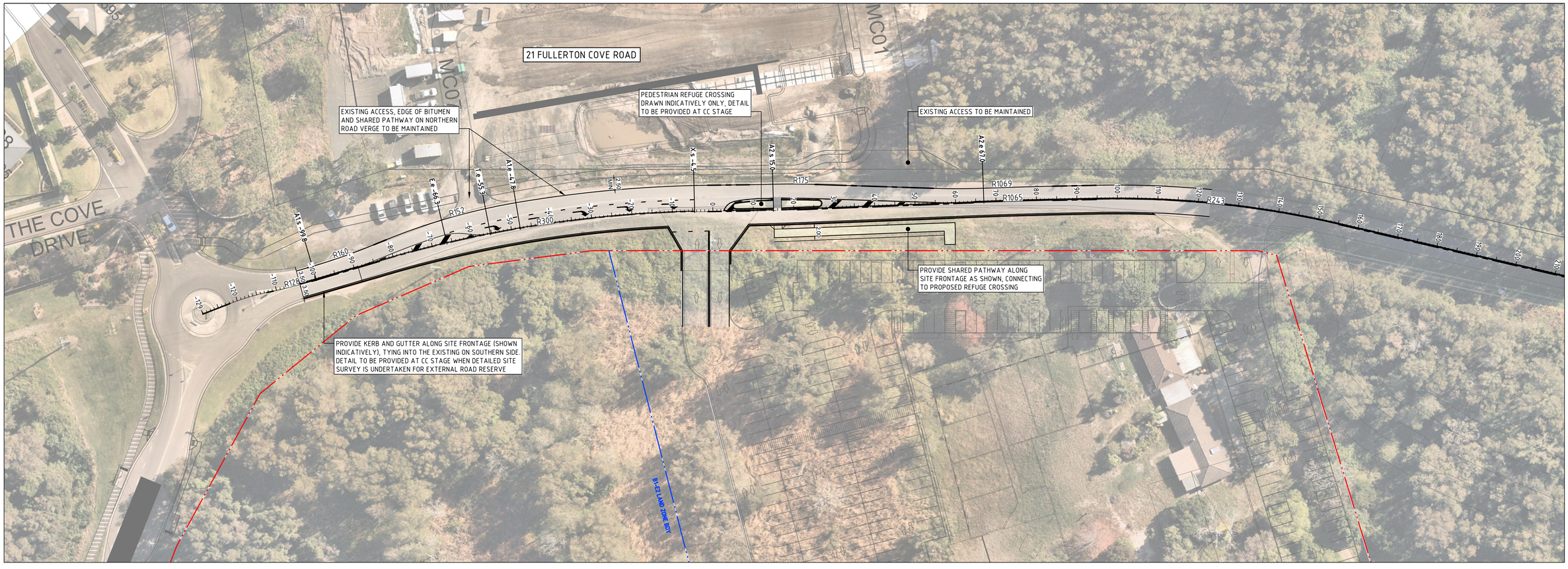
$$E = 2\left(\frac{A}{W_T}\right)$$

T = Taper length (m) and is given by:

$$T = \frac{0.33 W_T \cdot V}{3.6}$$

W(TR) = Taper lateral transition width, 2.0m

S = Storage length to cater for one design turning vehicle (m)
V = Design speed of major road approach (km/h)
X = Distance based on design vehicle turning path, typically 10–15 m



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1	ISSUED FOR INFORMATION	SV		KS	05.03.24
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CLIENT: M&P Mcintosh & Powys

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ARCHITECT: EJE architecture

SCALE 1:500@A1

0 5 10 15 20 25m

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PROJECT: **PROPOSED RETAIL DEVELOPMENT 42 FULLERTON COVER ROAD FULLERTON COVE 2318**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE EXTERNAL WORKS**

JOB NUMBER: **NL161067**

DRAWING NUMBER: **CSK-01.01**

REVISION: **3**

DRAWING SHEET SIZE = A1

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NORTHROP

CIVIL

Flooding & Stormwater Management Plan

for

42 Fullerton Cove Road, Fullerton Cove

for

Monteath and Powys Pty Ltd

NL161067 / 9 December 2024 / Revision C

Level 1, 215 Pacific Highway
Charlestown NSW 2290
02 4943 1777
newcastle@northrop.com.au
ABN 81 094 433 100

Contents

Acronyms

AEP	Annual Exceedance Probability
AHD	Australian Height Datum
ALS	Airborne Laser Survey (LiDAR)
ARI	Average Recurrence Interval
ARR	Australian Rainfall and Runoff 2019
BoM	Bureau of Meteorology
DCP	Development Control Plan
DTM	Digital Elevation Model
FPL	Flood Planning Level
LGA	Local Government Area
LiDAR	Light Detection and Ranging (also see ALS)
m	Measure of length / height / distance (metres)
m AHD	Meters above Australian High Datum
m/s	Measure of velocity (metres per second)
m^3/s	Measure of flow rate (cubic metres per second)
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
TUFLOW	Two-dimensional hydraulic modelling software

1. Introduction

1.1. General

Northrop Consulting Engineers have been engaged by Monteath and Powys to prepare a Stormwater and Flooding Management Plan for the proposed retail development at 42 Fullerton Cove Road, Fullerton Cove. The development proposes the construction of a new shopping complex containing a Woolworths Supermarket and various other tenancies. The centre will be serviced by a carpark with two vehicular access points off Fullerton Cove Road.

The purpose of this engineering report is to address civil engineering and stormwater items associated with the proposed development of the site, in particular:

- Stormwater collection.
- Stormwater quantity control.
- Stormwater quality control.
- Flood behaviour and risk.
- Flood impact.

The flood risk assessment aims to consider the existing flood risk, and likely changes to that risk due to the proposed development, and the proposed implementation of Council's policies relating to flood management.

Contained herein is a description of the subject site and development, and a summary of the stormwater quality and quantity and flooding assessments.

This report should be read in conjunction with the engineering drawings provided in Appendix A. This report intends to discuss items relating to the site at a level appropriate for a Development Application submission. It does not attempt to provide detailed design solutions to all issues, rather it will investigate the feasibility of solutions based on information that we have gathered from various sources and provide outcomes which will be developed further at Construction Certificate and Constructions phases of the project.

1.2. Site Description

The proposed development is located within the Port Stephens Council (PSC) Government Area and covers approximately 6.86ha. The site is illustrated in Figure 1 overleaf and is bounded by a rural residential property to the north-east, Fullerton Cove Road to the west and Nelson Bay Road to the south. The site is currently used for residential purposes, facilitating a house and sheds located predominantly in the northern corner.

Following rezoning of the site, the proposed retail development, hereafter referred to as 'the site', has an associated B1 Neighbourhood Centre boundary area of approximately 2.47 ha, external to this within the lot area exists E2 Environmental Conservation area. Soils in the area have been observed to vary between loamy sands at higher elevations, to clays in the lower areas to the south-east.

The site is low lying and generally flat for the southern and western portions, with elevations in the order of 1-2m AHD. A ridgeline runs along the north-western bound with the existing buildings on a pad at approximately 3m AHD and maximum.

Majority of the site currently drains to the south-west through a 450mm diameter RCP under Fullerton Cove Road. Runoff then passes through the TFNSW road reserve and into Lot 1 DP270695 "The Cove Village". A drainage easement through the village directs water through three 900mm diameter pipes under the Cove Drive towards Fullerton Cove.

Additionally, an existing watercourse has been identified to the north of the site on Lot 19 DP606361 (78 Fullerton Cove Road), which appears to convey flows under Fullerton Cove Road via a headwall prior to discharging to Fullerton Cove.

1.3. Proposed Development

The proposed development generally includes a new single storey shopping complex, carparking, loading dock and landscaping. Earthworks are proposed to raise the building platform to the flood planning level and ensure adequate fall across the site.

Compensatory cut is proposed to limit flood impacts of the development with an approximate area of 2,130m² and an invert level approximately of 1.25 m AHD.

The proposed civil design surface, building footprint (FFL 2.90m AHD, retaining wall extents and carparking are presented in Figure 2 overleaf, and in the Civil Drawings presented in Appendix A.

Legend

- Subject Site
- Cadastre

0 400 800 Metres

1:25,000

Figure 1

Locality

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial

Legend

- Subject Site
- Cadastre
- Proposed Building
- Carpark Marking
- Retaining Wall

Proposed Landform(mAHD)

- <= 1.7
- 1.7 - 2.0
- 2.0 - 2.3
- 2.3 - 2.6
- 2.6 - 3.0
- 3.0 - 3.3
- > 3.3

0 30 60 Metres

1:2,000

Figure 2

Proposed Development

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

9/12/2024 X:\PROJECTS\NEWCASTLE\YEAR 2016 Jobs\NL161067_FullertonCove\FIGURES2\NL161067_REV5_Figures.qgz

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial

2. Stormwater Management Strategy

2.1. General Requirements

The stormwater management system adopted is generally in accordance with the following:

- PSC's 2014 Development Control Plan (DCP), in particular:
  - Part B4 – Drainage and Water Quality.
- PSC's 0074 Stormwater Drainage Development Design Specification.
- Relevant Australian Standards.
- MUSIC Modelling Guidelines for South East Queensland (2010).

2.2. Area Summary

- Total site area = 24,700m^2
- Total development footprint = 22,570m^2
- Compensatory cut area = 2,130m^2
- Post-developed impervious area = 20,560m^2 (91.1%)
  - Total roof area = 8,470m^2
  - Total hardstand area = 12,090m^2
- Pervious area = 2,010m^2

2.3. Point of Discharge

The proposed development shall maintain the current intent of stormwater discharge from the site and convey the majority of the site's internal stormwater network to the existing Ø300 RCP discharge point to the south-west via overland flow. A portion of the proposed development hardstand and landscaped area (approximately 3,200m^2) is proposed to discharge to the northern watercourse via a headwall located within the site boundary. Which is comparable to the existing scenario based on survey levels.

2.4. Proposed Development Stormwater Philosophy

The following stormwater management strategy has been undertaken with considerations given to PSC's directions during the pre-lodgement meeting on 31 October 2022, and in accordance with PSC's DCP requirements. The stormwater philosophy can be summarised as follows, and should be read in conjunction with design drawings and Appendix B – Catchment Plan:

- Drainage from the northern section of staff parking will be captured by a pit and pipe network containing proprietary Ocean Protect pit inserts (or approved equivalent) prior to further treatment from a Jellyfish Filter device. The north-western portion of carpark pavement will be conveyed to a bioretention basin via a landscaped swale. These carpark and landscaped areas are proposed to discharge into the existing watercourse to the north via a concrete headwall with scour protection at the outlet to the pipes.

- Stormwater runoff from the eastern and southern areas of carpark are to be treated by a combination of pit inserts, an Ocean Protect Jellyfish Filter and both proprietary (utilising Ocean Protect Filterra) and standard bioretention basin systems. Ultimately discharging to a series of flat-based swales acting as a level spreader within the compensatory flood storage area at RL1.25m AHD and draining to the southern discharge point.
- Roof runoff shall be split and directed to an above and below-ground rainwater reuse storage system with a total volume of 65kL, located on the northern and southern side of the building, respectively. Harvested water is proposed to be reticulated internally for toilet flushing and externally for landscape irrigation. Overflow from the northern tank shall be conveyed to the Ocean Protect Filterra bioretention system and the southern to a Jellyfish device for further treatment prior to discharging to the southern discharge point.
- A small portion of the proposed northern driveway pavement will bypass all treatment measures and discharge into the northern watercourse.

2.4.1. Stormwater Quality

In order to minimise adverse impacts upon the downstream water ecology and aquatic ecosystems, Water Sensitive Urban Design (WSUD) principles have been implemented into the design. The water quality reduction targets as specified in PSC's DCP are shown in Table 1.

Table 1 - Required Water Quality Reductions

Pollutant Criteria	Required Stripping Target (%)
Total Suspended Solids (TSS)	90
Total Phosphorous (TP)	60
Total Nitrogen (TN)	45
Gross Pollutants	90

The site's stormwater quality management has been modelled in MUSIC (Version 6.3) to ensure the proposed treatment train for the development meets the above Council's stormwater quality stripping targets. Modelling was completed in accordance with PSC's DCP, Section B4.C Water Quality and PSC's "Water Sensitive Development Strategy Guidelines" (BMT WBM, 2011). The catchment areas as shown in Appendix B, included only the proposed works and excludes the compensatory cut area.

The following is a summary of the water quality treatment train that has been utilised in the MUSIC model:

Stormwater runoff from 2,110m^2 of northern carpark pavement and landscape area will be conveyed an Ocean Protect Jellyfish device via a pit and pipe network containing 3 OceanGuard pit inserts, prior to discharging to the northern watercourse. 1,070m^2 of north-western carpark area will be conveyed to a minimum 15m^2 biofilter media with an associated 150mm extended detention via a landscape swale. Overflow from the basin shall discharge into the northern watercourse via a concrete headwall.

4,235m^2 of roof runoff will be conveyed to a proposed 32.5kL below-ground rainwater tank located within the southern portion of carpark. Overflow from the tank is to discharge into the proposed Ocean Protect Jellyfish device located within the southern carpark.

4,235m^2 of roof runoff will be conveyed to a proposed 32.5kL above-ground rainwater tank located adjacent to the proposed Woolworths loading dock. Overflow from the tank is to discharge into the proposed Ocean Protect Filterra bioretention system located within the north-eastern landscape area adjacent the loading dock.

1,330m^2 of carpark hardstand and landscape shall be treated by a bioretention basin with a minimum of 30m^2 of filter media and 100mm extended detention located in the south-west corner of the site, adjacent to the motorbike parking.

The southern section of carpark is proposed to be managed by a total of 9 OceanGuard pit inserts with 1,830m^2 of hardstand and the below-ground rainwater tank being further treated by an Ocean Protect Jellyfish device. The other 3,360m^2 of southern carpark pavement and landscape discharging directly into a series of flat-based swales located within the southern compensatory cut area.

The loading dock pavement and landscape (2,400m^2) is proposed to be conveyed to an Ocean Protect Filterra Bioretention system via overland flow with minimum 40m^2 filter area and 150mm of extended detention. The above-ground rainwater tank shall also discharge into this system.

Stormwater runoff from 1,340m^2 of eastern carpark shall be catered for by a series of 4 Ocean Protect Filterra systems, each with minimum 5m^2 filter area and 150mm extended detention. Whilst the remaining 580m^2 shall be conveyed to a landscape swale via overland flow and down to the compensatory cut level.

A small portion of the proposed carpark driveway (80m^2) will bypass all treatment measures and discharge into the northern watercourse via overland flow.

Figure 3 below shows the proposed stormwater treatment train and effectiveness for the development as modelled in MUSIC.

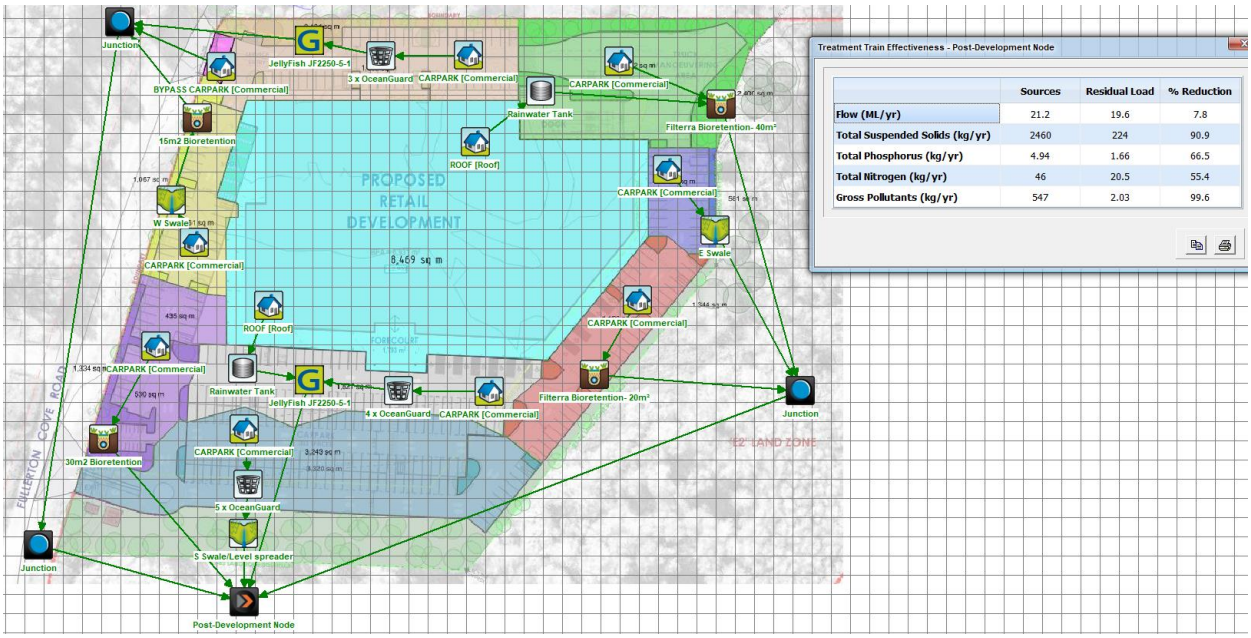


Figure 3 - MUSIC Treatment Train and Effectiveness

Table 2 summarises the results for the MUSIC model and compares the modelled reduction in pollutants to Council's stripping targets.

Table 2 - MUSIC Modelling Results

Pollutant	Sources (kg/ yr)	Residual Load (kg/ yr)	Reduction (%)	Council Stripping Target (%)
Total Suspended Solids (TSS)	2450	224	90.9	90
Total Phosphorus (TP)	5	1.67	66.7	60
Total Nitrogen (TN)	45.9	20.4	55.4	45
Gross Pollutants (GP)	547	2.03	99.6	90

Table 2 shows that the treatment train modelled in MUSIC is effective in meeting Council's stripping targets for reducing pollutants discharged from the development site in stormwater runoff. The MUSIC-Link report is provided in Appendix C. A copy of the MUSIC model can be provided upon request.

It will be the responsibility of the developer to manage and maintain all stormwater quality treatment devices.

Rainwater Reuse

In order to maximise the development's potential for reuse, each rainwater reuse tank has a proposed daily internal reuse parameter for toilet flushing and annual external irrigation demand applied.

To ensure that there is adequate draw down, the MUSIC model was used to assess the efficiency of the reuse tanks. The assumed water usage rate is outlined as follows.

- Irrigation usage

The total irrigation demand for the site has been determined using the MUSIC Modelling Guidelines for South East Queensland (2010). The guidelines state that for private gardens or low maintenance parklands an annual depth of 548mm over 75% of the pervious area is suitable for irrigation purposes.

Accordingly,

= 75% (irrigation ratio) x 548mm (low importance rate) x proposed irrigated area (m^2)

= 0.75m x 0.548m x 1,500m^2

= 620 kL/year (310kL/year per tank)

- Toilet flushing usage

For the preliminary analysis of the project, it was assumed that over the course of a 14-hour operational day, each of the 13 proposed restrooms in the retail development would be used on average every 15 minutes. This results in an estimated total average reuse demand for the retail development of 2.9kL/day (1.5kL/day per tank), assuming that two-thirds of all flushes are half flushes and that a half flush uses 3L while a full flush uses 6L.

The above reuse demands were split evenly between the two proposed tanks and the node water balance tool in MUSIC was used to ensure the general industry accepted minimum of 80% reuse efficiency was obtained. The results indicate that adequate draw down for the required reuse is attained for the proposed tank sizing and reuse scheme, with an 80.7% reuse efficiency achieved.

All downpipes are to be connected to a first flush device installed upstream of the tank inlet, to effectively remove sediment and attached pollutants. A one-way valve is to be installed at the outlet to prevent backflow entering the reuse tank.

2.4.2. Onsite Stormwater Detention – Stormwater Quantity

In accordance with previous discussions held with Council during the Pre-Lodgement meeting, the development proposes no dedicated onsite detention storage, on the basis that flood storage is provided onsite. We do not believe detention would be effective in this instance due to the proximity to receiving waters, elevated flood levels, and flood behaviour. The flood characteristics are generally flood storage, and unlikely to be affected by an increase in peak flow.

The flood modelling has not included detention and has assessed the impacts on this basis. Refer to *Results – Flood Impact* section of this report for further information.

It is noted that the 65kL of rainwater reuse storage and high reuse demands will further attenuate the quantity of flows from the site.

3. Flood Impact and Risk Assessment

3.1. General Requirements

This flood assessment has been prepared with the consideration of the following guidelines, reports and documents.

- Port Stephens Council Development Control Plan (PSC, 2023).
- Australian Rainfall and Runoff 2019 (AR&R 2019).
- NSW Floodplain Development Manual (NSW Government 2005).
- Williamtown/ Salt Ash Flood Study Review (BMT WBM, 2012).
- Williamtown - Salt Ash Floodplain Risk Management Study & Plan (BMT WBM, 2017).
- Flood Information Certificate for 42 Fullerton Cove Road, Fullerton Cove provided by Port Stephens Council and dated 30th of September 2020 (included as Appendix D).
- Flooding and Stormwater Management Study for Rezoning Proposal Submission at Lot 14 DP 258848 Fullerton Cove (Northrop, 2017).
- Architectural Drawings prepared by EJE Architecture.
- Civil Drawings and Design surfaces prepared by Northrop Consulting Engineers.

3.2. Methodology

The flood impact and risk assessment has been undertaken using the following procedure:

- Desktop review of all available information including design plans and latest survey data.
- Construction of an “Existing Case” one-dimensional DRAINS model using the latest procedures outlined in the 2019 Australian Rainfall and Runoff guidelines (AR&R 2019) to determine catchment runoff and estimate the critical storm duration for the 10%, 5%, 1% AEP, 1% AEP 2100 Climate Change horizon and PMF design storm events.
- Preparation of a “Existing Case” two-dimensional TUFLOW hydraulic model using the inflow hydrographs for the critical event derived by the one-dimensional DRAINS model.
- Preparation of a “Developed Case” two-dimensional TUFLOW model by modifying the existing case model to include the proposed development.
- A comparison of the results for the Existing and Developed Case scenarios to review the impact of the proposed development on the existing case flood behaviour.
- Review PSC DCP and assess the proposed development with respect to flood development controls of this document.

3.3. Study Area

The subject site is situated within the Fullerton Cove region which is expected to be subject to flooding through three mechanisms namely local catchment runoff, tidal inundation and flooding from the regional Fullerton Cove and Hunter River catchment.

The impact of fill on the existing flood behaviour within the subject site and general vicinity is expected to be greatest during the local catchment runoff and as such this mechanism is the focus of the flood impact portion of this assessment. Flood Planning Levels (FPL) for the subject site are based on the regional flood event which has been provided by Council in the Flood Information Certificate (ref: 83-2020-592-1).

The following Figure 4 presents the extent of the local catchment which has an approximate area of 228 hectares and terrain elevations ranging from approximately 0.1 metres AHD in the lower reaches to 26 metres AHD in upper reaches of the catchment. Land use throughout the local catchment is largely characterised as dense bushland, grassland and areas of residential subdivision.

3.4. Flood Model Setup

3.4.1. Hydrology

The hydrological model used in preparation of this study is the DRAINS one-dimensional software coupled with the Initial and Continuing Loss model. The combined hydrological and hydraulic computational capacity of DRAINS makes it ideal for this study as it enables storages to be included when reviewing the critical storm duration to be passed to the two-dimensional model.

Sub-Catchment Details

The latest Australian Rainfall and Runoff 2019 guidelines have been used for this study with a total of 21 sub-catchments delineated using a combination of LiDAR terrain data, cadastre aerial imagery and observations made during the site visit. The modelled sub-catchments are shown in Figure 4 with the catchment properties presented in the below Table 3.

Table 3 - Modelled sub-catchment properties

Catchment Reference	Area (ha)	Slope (%)	Catchment Reference	Area (ha)	Slope (%)
C01	5.76	2.4	**C12**	52.9	5.7
C02	4.29	17.8	**C13**	18.9	2.7
C03	8.21	10.6	**C14**	8.35	1.5
C04	3.36	4.9	**C15**	0.59	10.6
C05	16.1	10.6	**C16**	7.12	3.0
C06	14.6	1.8	**C17**	4.01	3.8
C07	2.42	3.8	**C18**	3.70	2.8
C08	17.1	3.9	**C19**	14.3	6.4
C09	11.8	2.5	**C20**	11.6	3.9
C10	6.99	3.3	**C21**	4.47	2.4
C11	11.3	3.9			

Burst Rainfall

The latest AR&R 2019 rainfall has been obtained from the BoM while the accompanying rainfall temporal patterns have been obtained by the AR&R Data Hub for a location over the study area. AR&R 2019 recommends the use of the storm ensemble method using 10 temporal patterns for each storm duration. For this investigation, storm durations ranging from the 6, 9, 12, 18, 24, 30, 36, 48, 72, 96, 120 and 144 hours events were assessed in the hydrological model to determine the critical storm event.

The PMP design storm event rainfall depths and temporal patterns were estimated using the GSDM for durations up to 6 hours. The durations 15, 30, 45 minutes and 1, 1.5, 2, 2.5, 3, 4, 5, 6 hours were modelled to define PMF.

The 2100 Climate Change horizon have also been considered as part of this investigation. An increase in rainfall depths of 19.7% has been used which is based on the worst case RCP8.5 Interim Climate Change Factor provided by the AR&R 2019 Data Hub.

Pre-Burst Rainfall

The latest NSW Specific Transformational Pre-Burst depths has also been used as part of the investigation. These were obtained from the AR&R Data Hub for a location over the study area. As recommended by the latest AR&R 2019 guidelines, the 60min pre-burst depths have been used for storm durations less than 60 minutes.

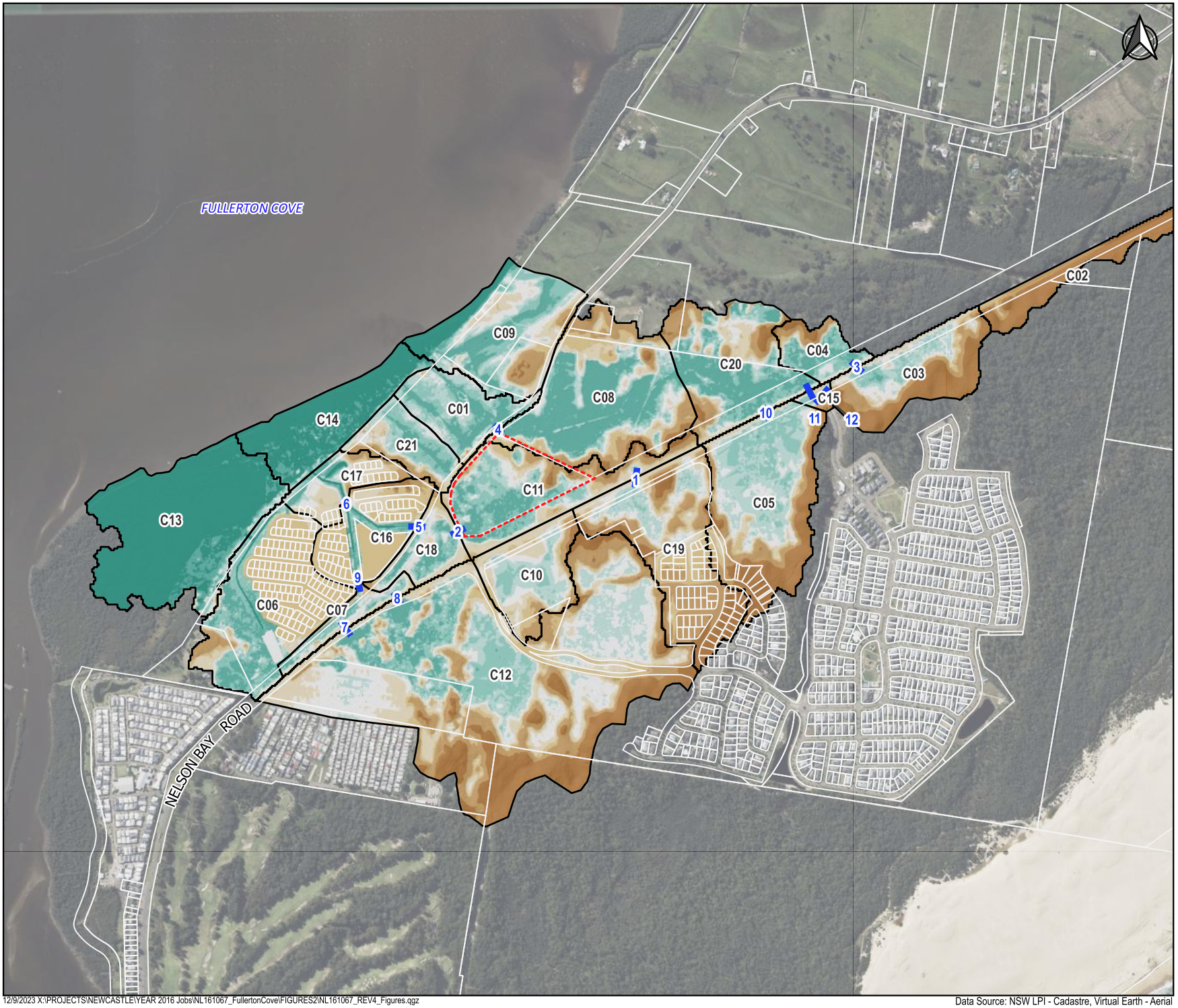
Infiltration Losses

As mentioned previously, the Initial and Continuing Loss model has been used for this study with the latest AR&R 2019 storm losses were obtained from the AR&R Data Hub for a location over the study area. The Initial and Continuing Loss method simulates catchment storage as an initial loss in rainfall followed by a constant loss rate (continuing loss).

The below presents the Initial and Continuing losses obtained from the AR&R Data Hub and the corresponding modelled loss rates. The latest OEH guidelines recommend reducing the continuing loss values provided by the AR&R Data Hub, by a factor 0.4 for un-calibrated models within NSW. As such, modelled continuing losses have been reduced accordingly.

Table 4 - Loss rates

Land Use	Initial Loss (mm)	Continuous Loss (mm/hr)
AR&R Data Hub Losses	13.0	2.80
Modelled Pervious Losses	13.0	1.12
Modelled Impervious Losses	1.5	0.00



Legend

- Subject Site
- Cadastre
- Subcatchments
- Culverts

Terrain (mAHD)

- <= 0.9
- 0.9 - 1.4
- 1.4 - 1.6
- 1.6 - 1.8
- 1.8 - 2.2
- 2.2 - 2.8
- 2.8 - 3.3
- 3.3 - 5.5
- > 5.5

0 200 400 Metres

1:15,000

Figure 4

Hydrologic Model Subcatchments, Existing Landform and Hydrailuc Structures

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial

3.4.2. Hydraulics

The hydraulic model used for this study is the two-dimensional TUFLOW hydrodynamic modelling software. The following provides a summary of the of the parameters and assumptions used in the development of the two-dimensional flood model. The TUFLOW model extent, boundary conditions, surface roughness and modelled 1D elements are shown on Figure 5 overleaf. TUFLOW version 2020-01-AA has been used for this study using the HPC GPU solver.

Digital Terrain Model

The DTM used for the two-dimensional model has been prepared as a combination of LiDAR elevation data, captured over the Fullerton Cove area in 2013, and the latest detailed survey of the subject site.

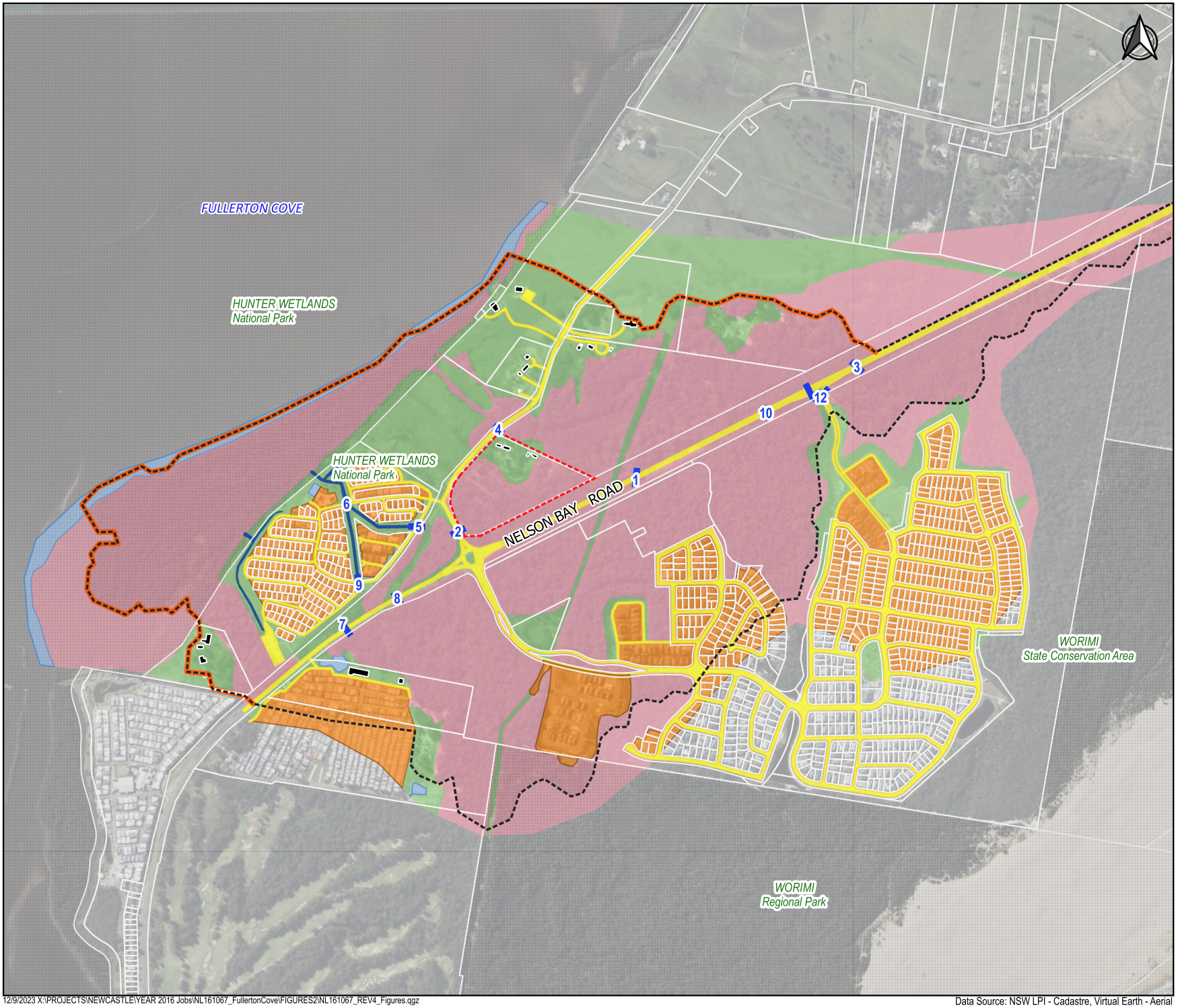
Some additional minor terrain modifications were also entered into the TUFLOW model manually to update the LiDAR elevation data to include observations made from the latest aerial imagery and during site visit.

The two-dimensional grid extent covers the full catchment extent presented in Figure 4. A three metre grid size has been adopted which was considered an appropriate balance between the representation of flows through open channels and model run-time.

Adopted Boundary Conditions

Critical storm inflow hydrographs for the 10%, 5%, 1% AEP and PMF design storm events, generated by the one-dimensional DRAINS model were entered into the two-dimensional model at sub-catchment storage zones and outlet locations.

Outflow tailwater conditions were based on information contained in the *Williamtown Salt Ash Flood Study (WBM, 2005)* with a dynamic outlet head boundary, simulating the 50% AEP tide with a maximum elevation of 1.17m AHD, entered into the model at the location shown in Figure 5 overleaf. These conditions represent a “Free Outfall” tailwater condition which have been adopted as a worst-case scenario for flood impact comparison purposes.



Legend

- Subject Site
- Cadastre
- TUFLOW Model Extent
- Downstream Boundary
- Culverts

Landuse - Manning's n

- Grassland (0.045)
- Sealed Roads (0.020)
- Bushland (0.070)
- Open Water (0.020)
- Channels (0.040)
- Residential (0.090)
- Buildings (0.100)

0 200 400 Metres

1:15,000

Figure 5

2D TUFLOW Model Setup

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

12/9/2023 X:\PROJECTS\NEWCASTLE\YEAR 2016 Jobs\NL161067_FullertonCove\FIGURES2\NL161067_REV4_Figures.qgz

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial

Hydraulic Structures

The location of the modelled below ground stormwater infrastructure entered the two-dimensional TUFLOW model is presented in Figure 5. The type, size and assumed blockage factors are summarised in in the below Table 5. Blockage is based on observations made during site inspection.

Table 5 - Modelled Hydraulic Structures (Culverts)

Culvert Reference	Culvert Type	Culvert Size	Blockage Factor
1	Pipe	450 mm	0%
2	Pipe	450 mm	50%
3	Pipe	600 mm	0%
4	Pipe	225 mm	90%
5	Pipe	600 mm	0%
6	Pipe	3 x 900 mm	0%
7	Pipe	600 mm	0%
8	Pipe	450 mm	0%
9	Pipe	3 x 900 mm	0%
10	Box	1200 mm x 600 mm	0%
11	Pipe	450 mm	0%
12	Pipe	375 mm	0%

3.5. Results

3.5.1. Critical Duration

To determine the critical storm duration for the 10%, 5% and 1% AEP design storm events, the guidance provided in the latest AR&R 2019 guidelines was considered as summarised below:

- Classification of the median value of the ten temporal patterns for each storm duration; and
- Selection of the duration that produces the maximum median value for each return interval.

For the 10%, 5% and 1% AEP design storm events, the one-dimensional DRAINS model was used to determine the critical storm durations which were then passed into the two-dimensional TUFLOW model. The one-dimensional DRAINS model incorporates hydrodynamic linkages (channels, culverts, overflow routes and storage basins) between sub-catchment nodes to ensure the catchment storage within the catchment is accounted for when determining the local catchment critical storm duration.

All durations ranging from the 15-minute to the 6-hour were run in the TUFLOW model to determine the critical event for the PMF design storm event. The below Table 6 presents the resultant critical storm durations for each return interval across the subject site.

Table 6 - Critical storm durations

Return Interval	Duration	Temporal Pattern
10% AEP	48-Hour	TP3
5% AEP	72-Hour	TP1
1% AEP	72-Hour	TP8
PMF	30-Minute	-

The results presented herein for the PMF are an envelope of all durations analysed however, the duration nominated in the above Table 6 was observed to produce the highest water level across the majority of the catchment and the subject site.

3.5.2. Existing Flood Behaviour

The existing case maximum flood depth, elevations, velocity and hazard across the subject site and the vicinity, for the 10%, 5%, 1%, 1% AEP Climate Change and PMF flood events are presented in **Figures B1** to **B5-2** of **Appendix E**.

Flood hazard is based on the latest AR&R 2019 and Australian Institute of Disaster Resilience (AIDR) hazard categories presented in Figure 6 below.

Due to the low lying and flat nature of the local catchment, flows derived by the upstream catchment are expected to pond across the subject site and in the upper reaches of the catchment before continuing downstream. Flows derived from the upstream catchment, pass across Nelson Bay Road before continuing in a north-westerly direction through the subject site and across Fullerton Cove Road located adjacent to the western boundary of the subject site. Downstream of the subject site, flows continue in a north-westerly direction, through an open channel located in the Cove Village before continuing in a northerly direction and discharging into Fullerton Cove.

During local catchment flood conditions, the results presented in **Figures B2** and **B3** demonstrate flood water is expected to begin overtopping Fullerton Cove Road and Nelson Bay Road during the 5% AEP flood event. Flood depths during the 1% AEP remain relatively shallow with **Figure B3** showing depths less than 250mm are expected across these roads. **Figure B3-2** suggests the 1% AEP flood hazard of H1 (safe for pedestrians and vehicles) is expected across Fullerton Cove Road.

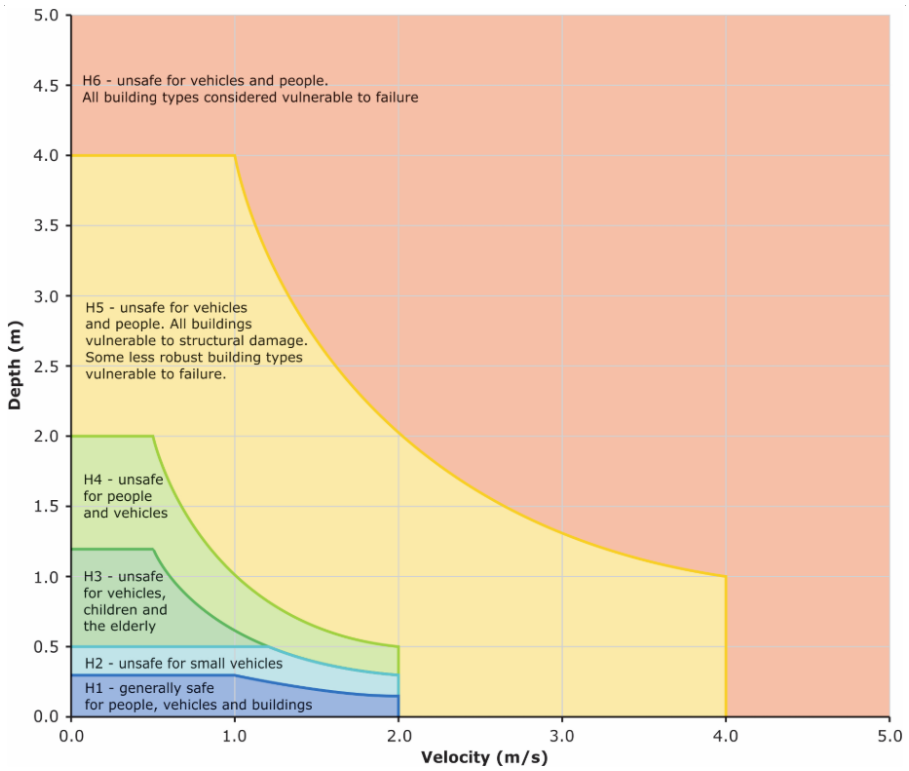


Figure 6 - Australian Rainfall and Runoff (2019) Hazard Categories

The following Table 7 summarises the modelled maximum water depth and elevations across the subject site during existing conditions for the 10%, 5%, 1%, 1% AEP Climate Change and PMF events.

Table 7 - Subject Site Existing Case Flood Depth and Elevation

Flood Event	Max Water Level (m AHD)	Max Water Depth (m)	Max Velocity (m/s)	Max Hazard (AR&R 2019)
10% AEP	1.84	0.94	0.11	H3
5% AEP	2.03	1.12	0.11	H3
1% AEP	2.11	1.20	0.14	H3
1% AEP Climate Change 2100	2.17	1.26	0.16	H3
PMF	2.83	1.92	0.39	H4

3.5.3. Developed Case

The modelled maximum flood depth, elevations, velocity, and hazard for the developed case scenario during the 10%, 5%, 1%, 1% AEP Climate Change and PMF flood events are presented in **Figures C1** to **C5-2** of **Appendix F**.

Flow conditions during the developed case remain largely unchanged when compared with the existing case. A summary of the modelled maximum flood elevation, depth, velocity, and hazard flow conditions across the subject site are summarised in the below Table 8.

Table 8 - Subject Site Developed Case Flood Behaviour

Flood Event	Max Water Level (m AHD)	Max Water Depth (m)	Max Velocity (m/s)	Max Hazard (AR&R 2019)
10% AEP	1.85	0.95	0.12	H3
5% AEP	2.04	1.13	0.11	H3
1% AEP	2.12	1.21	0.14	H3
1% AEP Climate Change 2100	2.17	1.26	0.16	H3
PMF	2.84	1.93	0.39	H4

A comparison of the available flood storage volumes within the subject site during the 10%, 5% and 1% AEP for both the existing and developed case scenarios is shown in Table 9 below.

Table 9 - Comparison of Available Flood Storage on the Site

Flood Event	Existing (m^3)	Developed (m^3)	Difference (m^3)	Difference (%)
10% AEP	15,757	15,178	-579	-4
5% AEP	24,452	22,289	-2,163	-9
1% AEP	28,680	25,564	-3,116	-11
1% AEP Climate Change 2100	31,489	27,636	-3,853	-12

The comparison presented in Table 9 above shows a decrease of up to 11% in available flood storage across the subject site during major flood event and a decrease of up to 4% during minor events. The reduction in flood storage does not have a significant adverse impact on the existing flood behaviour as discussed below.

3.5.4. Flood Impact

The impact of the proposed development on the existing flood conditions on the subject site and within adjacent properties during the 10%, 5%, 1%, 1% AEP Climate Change and PMF flood events is shown in the attached **Figures D1** to **D5** of **Appendix G**.

During the 10% AEP, **Figure D1** shows an insignificant increase in flood elevation up to approximately 12mm across the subject site and downstream.

During the 5% AEP, **Figure D2** shows an insignificant increase in flood elevation of approximately 13mm across the subject site and downstream. A localised increase approximately up to 78mm is observed immediately upstream of the Cove Drive culvert. This increase is a minor in extent and will not result a change of the exiting flood hazard conditions and is therefore not expected create a significant adverse impact.

Only minor changes are observed during the 1% and 1% AEP Climate Change flood events with **Figures D3 and D4** showing an increase in the order of 11mm and 6mm across the subject site and downstream areas during the 1% AEP and 1% AEP Climate Change events, respectively.

The **Figure D5** presents the impact of the proposed development on the existing flood behaviour during the PMF flood event. The results demonstrate an increase generally less than 7mm in adjacent properties but up to 10mm through the overland flow path in The Cove Village downstream. A commensurate decrease is also observed to the north of the subject site with these changes in flood

levels are expected to be due to the removal of a minor flow path across the proposed fill pad located in the north-eastern corner of the subject site. Given the magnitude of the event and the magnitude of the increase, these impacts are not expected to create a significant adverse impact on the subject site or within the adjacent properties.

The time of inundation across major road crossings and within catchment storage zones is not expected change significantly due to the introduction of the proposed development.

3.5.5. Flood Warning Time

The flood behaviour from the local catchment is likely to rise **within three hours** of rainfall commencing, and the warning for this mechanism is likely to come from Bureau of Meteorology forecasts the day before. This mechanism does not inundate the proposed floor level even in extreme events.

Flooding from the Hunter River is categorised as having a good warning time greater than **12 hours** due to the network of gauges within the catchment. This figure is quoted in the *Williamtown and Salt Ash Floodplain Risk Management Study and Plan* (BMT WBM, 2017). The Bureau of Meteorology quotes a target warning time of **18 hours** for predictions above major flood levels (such as those expected to inundate the floor level of the development) in their Service Level Specification.

3.5.6. Flood Duration

Flood duration for the local flood mechanism is likely to drain within a day and not cause significant disruption to the regional road network over a sustained period of time.

Fullerton Cove Road between the development and Nelson Bay Road commences overtopping in the 5% AEP and is inundated for **less than 12 hours** in the critical duration 1% AEP local catchment event. This road remains H1 hazard category and trafficable in this event should emergency services require access.

Flooding from the Hunter River mechanism is likely to be in the order of **three to seven days** and evacuation is required prior to this event occurring.

3.6. Discussion

3.6.1. Finished Floor Level

Habitable finished floor level of 2.90m AHD proposed across the proposed retail/commercial facility and meets minimum FFL requirements specified in the Council's Flood Information Certificate for habitable rooms.

Proposed driveway access to the development is located above the current day 1% AEP flood level of 2.12m AHD. Similarly, the majority of the open carparks are above this level. Some of the southern portion of the carpark is inundated in this event to maintain as much flood storage as possible, and is subject to H1 hazard category.

3.6.2. Council Requirements and Assessment

A summary of the compliance with the Port Stephens Local Environmental Plan 2013 is presented below in **Table 10**.

Table 10 – LEP Requirements

Requirement	Comment
(1) The objectives of this clause are as follows	
(a) to minimise the flood risk to life and property associated with the use of land,	This objective is noted. A response to this objective is outlined in the below Table 11 with respect to finished floor level and carpark area to manage the risk to property, and the *Flood Emergency Response Strategy* paragraph in this section of the report with respect to managing **residual** risk to life.
(b) to allow development on land that is compatible with the flood function and behaviour on the land, taking into account projected changes as a result of climate change,	This objective is noted. A response to this objective is presented in item 2(a) below.
(c) to avoid adverse or cumulative impacts on flood behaviour and the environment,	This objective is noted. A response to this objective is presented in item 2(b) below.
(d) to enable the safe occupation and efficient evacuation of people in the event of a flood.	This objective is noted. A response to this objective is presented in item 2(c) and 2(d) below.
(2) Development consent must not be granted to development on land the consent authority considers to be within the flood planning area unless the consent authority is satisfied the development	
(a) is compatible with the flood function and behaviour on the land, and	The development is located on land that is subject to high hazard flood storage, low hazard flood storage, and flood fringe. Compensatory cut has been provided as part of the development, and the minor changes noted as part of the modelling indicate the development is compatible with the flood function of the land.

Requirement	Comment
(b) will not adversely affect flood behaviour in a way that results in detrimental increases in the potential flood affectation of other development or properties, and	As noted in the Flood Impact Section of this report, the modelling prepared herein indicates there are only minor changes in flood behaviour. Refer to the *Flood Impact* section of this report.
(c) will not adversely affect the safe occupation and efficient evacuation of people or exceed the capacity of existing evacuation routes for the surrounding area in the event of a flood, and	A *Flood Emergency Response Strategy* is presented in this report. This recommends early evacuation or cancellation of operations in a flood event which we do not believe will result in an exceedance of the capacity of the existing evacuation route – particularly with the proximity to Nelson Bay Road.
(d) incorporates appropriate measures to manage risk to life in the event of a flood, and	The proposed development has been sited in accordance with Council's DCP and as such is considered to incorporate appropriate measures to manage risk to life in the event of a flood. **Residual flood risk** is then further mitigated through the preparation of a *Flood Emergency Response Strategy* is presented in this report. This nominates measures to manage the risk to life including preparation, response, and recovery measures. A *Concept Flood Emergency Response Plan* has also been prepared for the purpose of approval as a separate report.
(e) will not adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses.	Measures to manage water quality and mitigate effects on riverbanks or watercourses are described in the *Stormwater Quality* section of this report.
(3) In deciding whether to grant development consent on land to which this clause applies, the consent authority must consider the following matters	
(a) the impact of the development on projected changes to flood behaviour as a result of climate change,	An allowance for climate change has been included in the flood modelling and discussed in the *Results* sub-section of this section of the report. The FFL is located above the 1% AEP 2100 in accordance with Council's DCP.
(b) the intended design and scale of buildings resulting from the development,	This requirement is to be considered by others. Flood effects are minor and therefore flooding related development scale is considered appropriate.
(c) whether the development incorporates measures to minimise the risk to life and ensure the safe evacuation of people in the event of a flood,	This has been included. Refer to the responses to items 2(c) and 2(d).

Requirement	Comment
(d) the potential to modify, relocate or remove buildings resulting from development if the surrounding area is impacted by flooding or coastal erosion.	There is potential to demolish buildings if required.

The proposed development is categorised as commercial development (Fill / All other developments) and, as identified in the Council's Flood Information Certificate, and is located in the following flood hazard areas:

- High Hazard Flood Storage,
- Low Hazard Flood Storage, and
- Low Hazard Flood Fringe.

The below **Table 11** provides commentary responding to the flooding related development controls outlined in Chapter B5 of Port Stephens Council Development Control Plan 2023.

Table 11 - Development Controls (PSC DCP, 2023)

Item	Item Reference	Response
Site selection		
B5.1	If multiple flood hazard categories are specified for a site on a flood certificate, the proposed development must be located on the land with the lowest flood risk.	The majority of development area is located in Low Hazard Flood Storage and Low Hazard Flood Fringe zones.
Finished floor level (FFL)		
B5.2	Development must meet the minimum **FFL** as specified in Figure BJ. Note: The National Construction Code may provide minimum **FFL**s for some categories of development which prevail to the extent of any inconsistency with these controls. The finished surface of open space car parking, carports and driveways should be designed having regard to vehicle stability, including consideration of depths and velocity during inundation by flood waters.	Refer to the *Finished Floor Level* paragraph in this section of the report. The finished floor level of the building is set at the flood planning level of 2.9m AHD. The carpark and driveway access is generally compliant, with the majority above the current day 1% AEP event.
Flood compatible design		
B5.3	Development for a building (and/or an associated driveway or access) must be of a **flood compatible design** and construction and shall meet the relevant	We recommend that flood compatible materials are adopted below the Flood Planning Level. We expect this will be

Item	Item Reference	Response
	requirements in the Construction of Buildings in Flood Hazard Areas (Australian Building Codes Board). Council may also require **structural certification** for development proposed on land which becomes a floodway in the **PMF**.	considered at the Construction Certificate phase. We do not believe structural certification in the PMF will be required.
Fencing		
B5.4	Fencing on **flood prone land** should be stable in events up to the current day **1% AEP flood event** and not obstruct the flow of floodwater.	Proposed fences located within flooded areas will be designed to be of open style in accordance with this requirement, so as to not impede the flow of flood water.
Electrical features		
B5.5	All incoming main power service equipment, including all metering equipment, and all electrical fixtures, such as power points, light fittings, switches, heating, ventilation and other service facilities must be located above the **FPL**, or where possible above the **PMF**. Where the above cannot be achieved, the following features shall be used: • Electrical cabling is not to be installed within walls, or chased into walls; and • Any circuit containing switches, power points or any other electrical fitting that are located below the **FPL**, shall connect to the power supply through an individual Residual Current Device (**RCD**), located in the meter box.	This is not expected to be limiting in design and will be considered during to Construction Certificate Phase.
Potentially hazardous and/or polluting		
B5.6	The storage of hazardous or potentially hazardous materials, potentially polluting material or material that could be washed from site and cause harm downstream must be stored above the **FPL** with appropriate bunding.	Hazardous or potentially polluting materials are to be stored above the Flood Planning Level.
B5.7	Items that may wash away during flood events (e.g. rainwater tanks, hot water tanks, gas cylinders, shipping containers) must be elevated above the **1% AEP flood event** level in the year 2100	These items are to be elevated and anchored above the 1% AEP 2100 flood event level.

Item	Item Reference	Response
	(without **freeboard**) or anchored to resist buoyancy and impact forces	
Flood impact and risk assessment		
B5.8	A **flood impact and risk assessment** is required for: • Any **fill** on land identified as **floodway**. • Any **fill** located in a **flood storage area**, unless: ○ The net volume of **fill** does not exceed the lesser of 20% or 2000m^3 of the **flood volume** of the lot in the 1% AEP flood event in the year 2100 (this includes consideration of previous **fill** volumes); and ○ It is demonstrated that the **fill** does not adversely affect local drainage patterns of all events up to the 1% AEP flood event in the year 2100. Note: Fill in **flood storage areas** greater than the abovementioned volume can be offset by **flood storage**. Offsetting can be achieved through consolidation of lots and/or assigning an 'easement to flood land' on the compensatory lot/s. Compensatory lots must be located within the zone of influence of the proposed **fill** (as demonstrated by the **flood impact and risk assessment**) or adjacent to the proposed **fill** and be of the same hazard category of the subject site. • Any **fill** for the purposes of a **livestock flood refuge mound**, unless the **livestock flood refuge mound** is located in an identified **flood fringe** area: ○ The volume/size and location of the livestock flood refuge mound meets the criteria in Figure BK; and	The impact of the proposed filling has been reviewed as part of this flood impact and risk assessment. It is concluded that the proposed development is not expected to create a significant adverse impact on local drainage pattern and adjacent properties. Refer to the *Flood Impact* section of this report

Item	Item Reference	Response
	○ The size of the mound must have regard to the agricultural capacity of the land. The design and size of the mound shall be determined by reference to the *NSW Department of Primary Industries –Agriculture. 2009, 'Primefacts: Livestock flood refuge mounds*'; and • Where the proposed development could change flood behaviour, affect existing flood risk, or expose people to flood risks that require management or; • If Council determines a **flood impact and risk assessment** is necessary for any other reason.	
Ongoing flood adaptation		
B5.9	For residential accommodation, subdivision, commercial premises, industrial premises, garages, open car parking spaces and carports, a reduced planning horizon of 50 years from the date of determination will be accepted where the design facilitates ongoing flood adaptation (ie the future raising of the building).	Not applicable.
Minor alterations and additions to existing residential accommodation		
B5.10	Where proposed alterations and additions to existing **residential accommodation** is less than 40% of the **gross floor area** of the existing **residential accommodation** and does not involve a net increase in the number of bedrooms, Council will consider a **FFL** lower than the **flood planning level (FPL)**, but not lower than the existing floor level. Any additional flood risk must include mitigation measures to reduce the overall flood risk of the development.	Not applicable.
Driveways and access		
B5.11	Access from the building envelope to the public road is to have a minimum **finished access level** of:	This item is compliant. See above *Finished Floor Level* paragraph in this section of the report.

Item	Item Reference	Response
	• The **flood immunity** of the connecting public road; or • The current day **1% AEP flood event** level for the site.	
B5.12	Earthworks for driveways and access must satisfy the objectives of B3.C of the **DCP** and **LEP**. Note: Impacts on local drainage and localised flooding should be considered and addressed. Driveways should be designed and constructed in accordance with Councils standard design drawings.	Refer to Civil Drawings provided in *Appendix A.*
Subdivision		
B5.13	Subdivision that creates the ability to erect additional dwellings is to indicate building envelopes above the **FPL** and comply with the requirements of B5.11, B5.12 and B5.14 of this Part.	N/A
Emergency onsite flood refuge		
B5.14	If evacuation egress from residential accommodation, a commercial premises, an industrial premises, fill or development vulnerable to emergency response and critical infrastructure to flood free areas cannot be achieved via a route that is flood free in the current day **1% AEP flood event** or is a **low hazard flood area**, an onsite **flood refuge** must be provided meeting the following criteria: • Is located above the **PMF** level; • Is intrinsically accessible to all people on the site, plainly evident and self-directing; • Is accessible in sufficient time for all occupants with fail safe access and no reliance on elevators; • Has unobstructed external access for emergency boats during flooding; • Caters for the number of persons that could reasonably be expected on-site at any one time (approx. 2m² per person);	The proposed evacuation route is to the south via Fullerton Cove Road and Seaside Boulevarde to a higher ground in Fern Bay Seaside Village. Fullerton Cove Road and Seaside Boulevarde are flood free or have low flood hazard during the 1% AEP flood event (refer to flood hazard figures of this report). We note the finished floor level is flood free in the local catchment PMF, and the 1% AEP plus 500mm 50 years from now. The only event where the building is inundated is the regional PMF where there is expected to be 18 hours warning time for trigger levels in excess of 3.5m. (http://www.bom.gov.au/nsw/NSW_SLS_Current.pdf)

Item	Item Reference	Response
	• Provides adequate shelter from the storm and has natural lighting and ventilation; and • Contains sufficient clean water, a first aid kit, portable radio with spare batteries and a torch with spare batteries. Note: If a **flood refuge** is required, the DA must be accompanied by **structural certification**.	
Development on land identified as overland flow path		
B5.15	A site based overland flow report must be submitted for development located within a designated overland flow path. The purpose of this report is to demonstrate that the development: • Will not result in material increase in flood level or flood hazard upstream, downstream or surrounding properties; and • Will provide acceptable management of flood risk with appropriate development levels to ensure the safety of people.	Development is not located on land identified as overland flow path.

3.6.3. Drainage Under Fullerton Cove Road

Consideration was given to upgrading the drainage under Fullerton Cove Road from a 450mm diameter RCP to 2 x 2.4m wide x 0.6m high RCBC. This had no significant change in water level (+/- 10mm) due to the lack of hydraulic grade with downstream of Fullerton Cove Road, and the limiting infrastructure within the downstream neighbouring lot.

We do not expect upgrading this downstream infrastructure would be feasible without owners' consent, and we do not believe this would be forthcoming due to the likely increases in flood level within this neighbouring lot.

3.6.4. Flood Emergency Response Strategy

The following flood emergency response strategy is proposed as part of the development. The philosophy of the strategy is to prioritise eliminating all future occupants of the centre from the flood risk through avoidance, early evacuation ahead of heavy local rain, or mandated cancellation of services when a major Hunter River flood, or extreme local rainfall is predicted.

On-site refuge is not proposed as part of this development. Temporarily waiting out heavy rainfall in the building is directed to minimise the likelihood of people driving through hazardous flood water.

This strategy is to be formalised as a Flood Emergency Response Plan (FERP) prior to occupation. A concept FERP has been prepared as a separate document and includes a summary of the flood behaviour (outlined in Sections 3.5 of this report), summary of available warning products, nomination of responsible personnel and outline of response actions.

The strategy involves three stages: preparation, response, and recovery. An outline of what we believe is required in each of these stages is outlined below.

Preparation

The following measures are to be undertaken

- **Nomination of flood wardens**. Nominate flood wardens responsible for emergency management.
- **Sign up for alerts**. Flood wardens to download the Hazards Near Me app. This allows for the dissemination of relevant Bureau of Meteorology warnings and State Emergency Service warnings for the subject site.
- **Awareness.** An outline of the expected flood hazard is included in tenancy contracts and staff inundation procedures. This is to include maintaining a copy of the FERP in each tenancy to raise awareness and promote compliance with the recommended actions.
- **Flood Emergency Response Kit.** Prepare and maintain a flood emergency kit in each tenancy. This is to include first aid supplies and a loudspeaker and airhorn for communicating warnings in a flood event when the power is out.
- **Conduct evacuation drills yearly.** Each tenancy to simulate an evacuation response yearly. This may be undertaken in conjunction with other hazard response drills.

Response

Trigger 1

- Severe weather warning, or
- Daily rainfall locally exceeding 100mm.

Action 1

- Monitor the weather situation.
- Use caution travelling and do not walk or drive through flood water.
- Reconsider whether trips are necessary or leave site prior to rain commencing.

Trigger 2

- Severe weather warning, and
- Daily rainfall locally exceeding 100mm, and
- Heavy rainfall commenced.

Action 2

- Seek refuge in the building on-site as the floor level is located above the local PMF and the Hunter River 1% AEP.

Trigger 3

- Hunter River Flooding Predicted Above Major Levels (3.5m AHD at Raymond Terrace Gauge or 3.8m AHD at Hexham Bridge Gauge).
- Daily rainfall locally exceeding 250mm (The critical duration 1% AEP rainfall depth is 373mm for comparison, and the critical duration 5% AEP rainfall depth is 260mm).

Action 3

- Cancel operations.
- Evacuate to higher ground as refuge in the building is not appropriate.

Recovery

- **Inspection and remediation**. Once the “all clear” has been received inspect structures and infrastructure and remediate as necessary prior to occupation.
- **Access assistance**. Access State Government disaster recovery resources as required.

4. Conclusion

The proposed Stormwater Management Strategy is considered to effectively meet the objectives of the PSC's DCP.

It was concluded that the proposed development will not create any significant adverse impacts to flood behaviour on the subject site and on the properties surrounding the subject site.

Furthermore, flood risk in the developed case has been adequately managed through the preparation of a flood emergency response strategy, selection of floor levels, driveway access levels, and flood compensatory cut.

We trust this meets with Council's requirements however should you have any queries, please feel free to contact the undersigned on (02) 4943 1777.

Yours faithfully,

Stormwater Management

Emma Gearing

Civil Engineer

BEng (Civil)

Flood Management

Angus Brien

Principal | Flood Engineer

BEng (Civil) (Hons) MIEAust CPEng NER RPEQ Member SIA FMA

Limitation Statement

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Document Register

Rev	Status	Prepared	Approved	Date
A	Approval	RB/EG	GB/KS	13 September 2023
B	Revised for Approval	GB	GB	5 December 2024
C	Revised for Approval	GB	GB	9 December 2024

Appendix A – Engineering Drawings

PROPOSED RETAIL DEVELOPMENT

42 FULLERTON COVE ROAD, FULLERTON COVE, 2318
CIVIL ENGINEERING PACKAGE

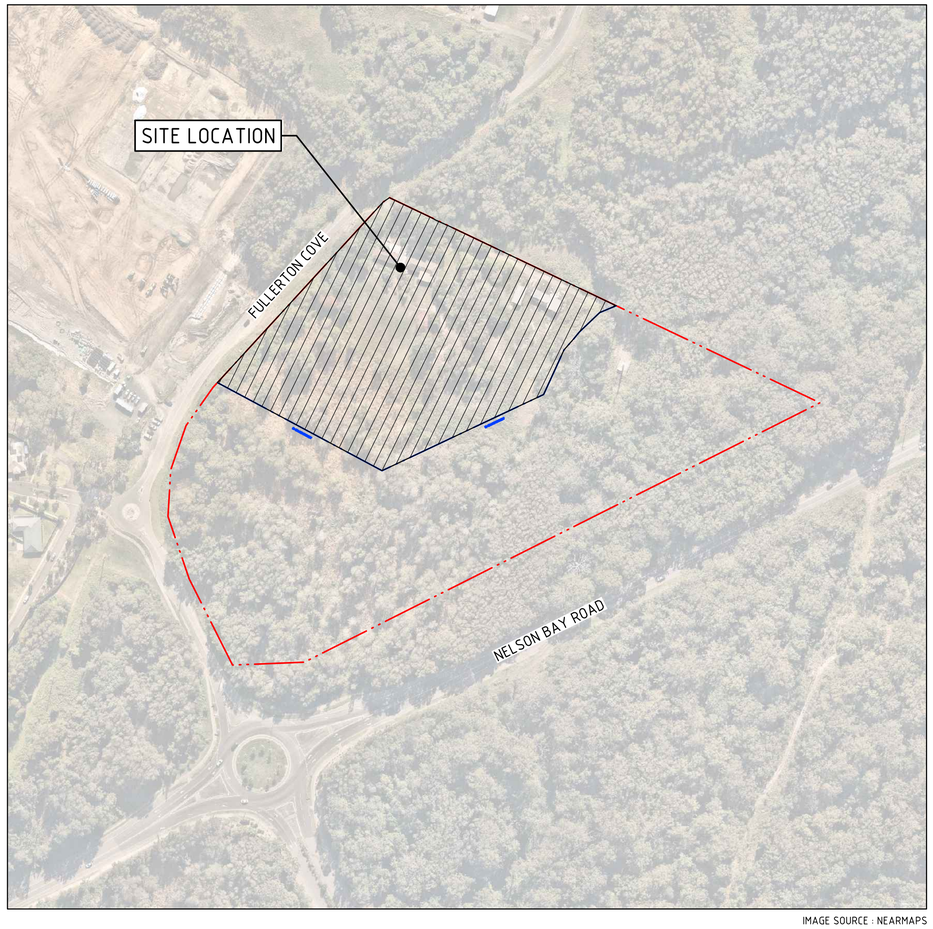

IMAGE SOURCE : NEARMAPS

LOCALITY PLAN

DRAWING LIST

DWG No.	DRAWING TITLE
DA-C01.01	COVER SHEET, DRAWING LIST AND LOCALITY PLAN
DA-C01.21	GENERAL ARRANGEMENT PLAN
DA-C02.01	EROSION AND SEDIMENT CONTROL PLAN
DA-C02.11	EROSION AND SEDIMENT CONTROL DETAILS
DA-C03.01	CUT AND FILL PLAN
DA-C03.21	CUT AND FILL SECTIONS
DA-C04.01	CIVIL WORKS PLAN - SHEET 1
DA-C04.02	CIVIL WORKS PLAN - SHEET 2
DA-C04.21	TYPICAL SECTIONS
DA-C05.01	SWEPT PATHS PLAN - B99 MANOEUVRES
DA-C05.02	SWEPT PATHS PLAN - SRV MANOEUVRES
DA-C05.03	SWEPTS PATH PLAN - MRV MANOEUVRES
DA-C05.04	SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 1
DA-C05.05	SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 2
DA-C05.06	SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 3
DA-C05.07	SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 4
DA-C05.08	SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 5
DA-C09.01	CIVIL DETAILS

DRAWN: D. MAVROUDIS DESIGNED: E. GEARING JOB MANAGER: K. SINCLAIR VERIFIER: K. SINCLAIR

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	DM	KS	EG	08.09.23
B	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	03.10.23
C	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	20.03.24

CLIENT: M&P Monteath & Powys

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NORTHROP
Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT: **PROPOSED RETAIL DEVELOPMENT 42 FULLERTON COVER ROAD FULLERTON COVE 2318**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

COVER SHEET, DRAWING LIST AND LOCALITY PLAN

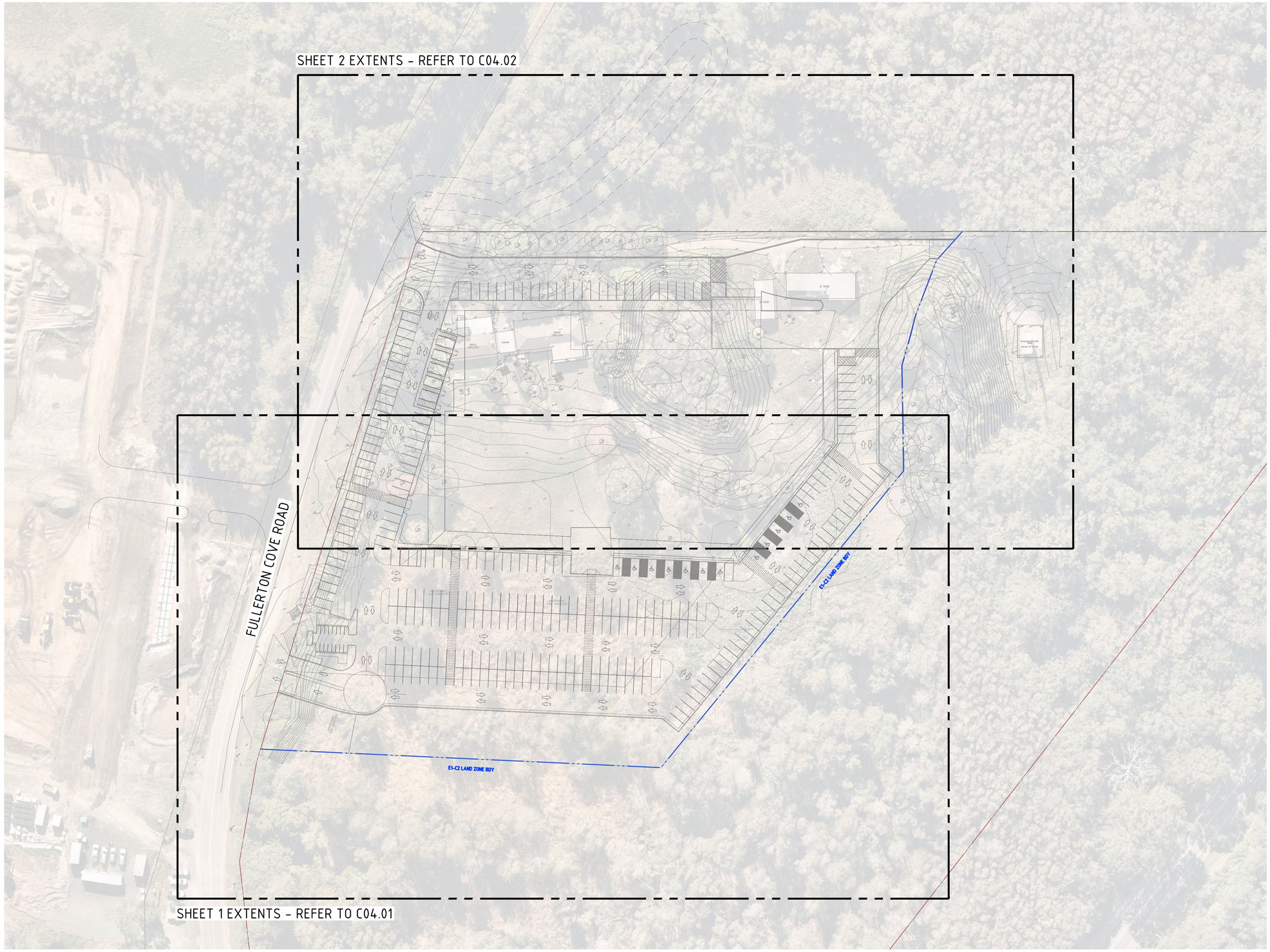
JOB NUMBER: **NL161067**

DRAWING NUMBER: **DA-C01.01**

REVISION: **C**

DRAWING SHEET SIZE = A1

Date : 29.11.2024 9:44 AM Plotted By : DIMITRI MAVROUDIS Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C01.01 COVER SHEET.dwg



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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	DM	KS	EG	08.09.23
B	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	03.10.23
C	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	05.10.23
D	ISSUED FOR DEVELOPMENT APPLICATION	BD	KS	EG	18.10.23
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NORTHROP
Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT
PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE
CIVIL ENGINEERING PACKAGE

GENERAL ARRANGEMENT PLAN

JOB NUMBER **NL161067**

DRAWING NUMBER **DA-C01.21**

REVISION **F**

DRAWING SHEET SIZE = A1

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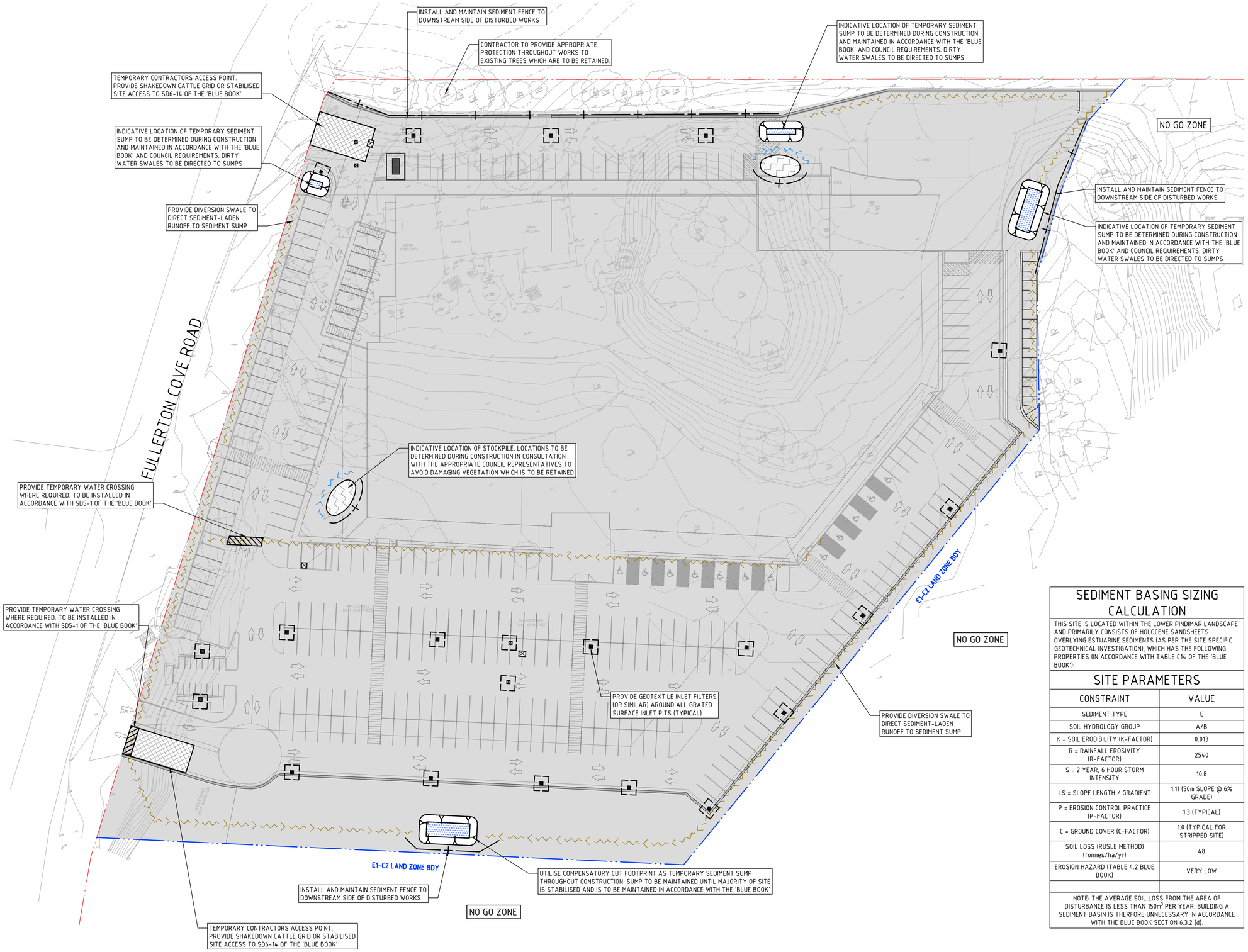

LEGEND

- SITE BOUNDARY LINE
- B1-E2 ZONE BOUNDARY
- SEDIMENT FENCE
- SECURITY FENCE
- GEOTEXTILE INLET FILTER
- DIVERSION DRAIN (CLEAN)
- DIVERSION DRAIN (DIRTY)
- STABILISED SITE ACCESS
- STOCKPILES
- EXISTING CONTOURS (X.Xm INTERVAL)
- INDICATIVE EXTENT OF DISTURBANCE
- SEDIMENT BASIN
- TEMPORARY WATER CROSSING

NOTES

1. ALL EROSION AND SEDIMENTATION CONTROL MEASURES MUST BE APPROPRIATE FOR THE SEDIMENT TYPE(S) OF THE SOILS ON-SITE, IN ACCORDANCE WITH THE 'BLUE BOOK' (MANAGING URBAN STORMWATER - SOILS AND CONSTRUCTION. LANDCOM, 2004), OR OTHER CURRENT RECOGNISED INDUSTRY STANDARDS FOR EROSION AND SEDIMENT CONTROL FOR AUSTRALIAN CONDITIONS. THIS INCLUDES SEDIMENT TRAPS AND LINING OF CHANNELS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING A DETAILED WRITTEN RECORD OF ALL EROSION AND SEDIMENT CONTROLS ON-SITE DURING THE CONSTRUCTION PERIOD. THIS RECORD SHALL BE UPDATED ON A DAILY BASIS AND SHALL CONTAIN DETAILS ON THE CONDITION OF CONTROLS AND ANY/ALL MAINTENANCE, CLEANING AND BREACHES. THIS RECORD SHALL BE KEPT ON-SITE AT ALL TIMES AND SHALL BE MADE AVAILABLE FOR INSPECTION BY THE PRINCIPAL CERTIFYING AUTHORITY AND THE SUPERINTENDENT DURING NORMAL WORKING HOURS.
3. INSTALL SEDIMENT PROTECTION FILTERS ON ALL NEW AND EXISTING STORMWATER INLET PITS IN ACCORDANCE WITH EITHER THE MESH AND GRAVEL INLET FILTER DETAIL SD6-11 OR THE GEOTEXTILE INLET FILTER DETAIL SD6-12 OF THE 'BLUE BOOK'.
4. ESTABLISH ALL REQUIRED SEDIMENT FENCES IN ACCORDANCE WITH DETAIL SD6-8 OF THE 'BLUE BOOK'.
5. INSTALL SEDIMENT FENCING, OR OTHER SEDIMENT CONTROL DEVICES, AROUND INDIVIDUAL BUILDING ZONES/AREAS AS REQUIRED AND AS DIRECTED BY THE SUPERINTENDENT OR APPROPRIATE COUNCIL OFFICER.
6. ALL TRENCHES INCLUDING ALL SERVICE TRENCHES AND SWALE EXCAVATION SHALL BE SIDE-CAST TO THE HIGH SIDE AND CLOSED AT THE END OF EACH DAYS WORK.
7. THE CONTRACTOR SHALL ENSURE THAT ALL VEGETATION (TREE, SHRUB AND GROUND COVER) WHICH IS TO BE RETAINED SHALL BE PROTECTED DURING THE DURATION OF CONSTRUCTION.
8. ALL VEGETATION TO BE REMOVED SHALL BE MULCHED ON-SITE AND SPREAD/STOCKPILED AS DIRECTED BY THE SUPERINTENDENT.
9. STRIP TOPSOIL IN AREAS DESIGNATED FOR STRIPPING AND STOCKPILE FOR RE-USE AS REQUIRED. ANY SURPLUS MATERIAL SHALL BE SPREAD ON-SITE AS DIRECTED BY THE SUPERINTENDENT OR REMOVED FROM SITE AND DISPOSED OF IN ACCORDANCE WITH EPA GUIDELINES.
10. CONSTRUCT AND MAINTAIN ALL MATERIAL STOCKPILES IN ACCORDANCE WITH DETAIL SD4-1 OF THE 'BLUE BOOK' (INCLUDING CUT-OFF SWALES TO THE HIGH SIDE AND SEDIMENT FENCES TO THE LOW SIDE).
11. ENSURE STOCKPILES DO NOT EXCEED 2.0m HIGH. PROVIDE WIND AND RAIN EROSION PROTECTION AS REQUIRED IN ACCORDANCE WITH THE 'BLUE BOOK'.
12. PROVIDE WATER TRUCKS OR SPRINKLER DEVICES DURING CONSTRUCTION AS REQUIRED TO SUPPRESS DUST.
13. ONCE CUT/FILL OPERATIONS HAVE BEEN FINALIZED ALL DISTURBED AREAS THAT ARE NOT BEING WORKED ON SHALL BE RE-VEGETATED AS SOON AS IS PRACTICAL.

SEDIMENT BASING SIZING CALCULATION

THIS SITE IS LOCATED WITHIN THE LOWER PINDIMAR LANDSCAPE AND PRIMARILY CONSISTS OF HOLOCENE SANDSHEETS OVERLYING ESTUARINE SEDIMENTS (AS PER THE SITE SPECIFIC GEOTECHNICAL INVESTIGATION), WHICH HAS THE FOLLOWING PROPERTIES (IN ACCORDANCE WITH TABLE C14 OF THE 'BLUE BOOK'):

SITE PARAMETERS

CONSTRAINT	VALUE
SEDIMENT TYPE	C
SOIL HYDROLOGY GROUP	A/B
K = SOIL ERODIBILITY (K-FACTOR)	0.013
R = RAINFALL EROSIVITY (R-FACTOR)	2540
S = 2 YEAR, 6 HOUR STORM INTENSITY	10.8
LS = SLOPE LENGTH / GRADIENT	1.11 (50m SLOPE @ 6% GRADE)
P = EROSION CONTROL PRACTICE (P-FACTOR)	1.3 (TYPICAL)
C = GROUND COVER (C-FACTOR)	1.0 (TYPICAL FOR STRIPPED SITE)
SOIL LOSS (RUSLE METHOD) (tonnes/ha/yr)	48
EROSION HAZARD (TABLE 4.2 BLUE BOOK)	VERY LOW

NOTE: THE AVERAGE SOIL LOSS FROM THE AREA OF DISTURBANCE IS LESS THAN 150m^3 PER YEAR. BUILDING A SEDIMENT BASIN IS THERFORE UNNECESSARY IN ACCORDANCE WITH THE BLUE BOOK SECTION 6.3.2 (d).

NOT FOR CONSTRUCTION

DRAWN: D.MAVROUDIS DESIGNED: E.GEARING JOB MANAGER: K.SINCLAIR VERIFIER: K.SINCLAIR

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
B	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	03.10.23
C	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	05.10.23
D	ISSUED FOR DEVELOPMENT APPLICATION	BD	KS	EG	18.10.23
E	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	20.03.24
F	RE-ISSUED FOR DA APPROVAL	BD	KS	EG	21.06.24
G	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	29.11.24

CLIENT: M&P Mirvac Knight & Powys

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ARCHITECT: EJE architecture

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SCALE 1:400@ A1 (0, 4, 8, 12, 16, 20m)

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Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT: **PROPOSED RETAIL DEVELOPMENT 42 FULLERTON COVER ROAD FULLERTON COVE 2318**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

EROSION AND SEDIMENT CONTROL PLAN

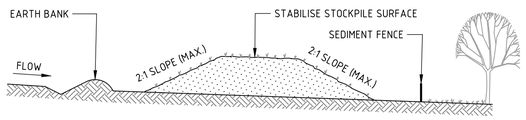
JOB NUMBER: **NL161067**

DRAWING NUMBER: **DA-C02.01**

REVISION: **G**

DRAWING SHEET SIZE = A1

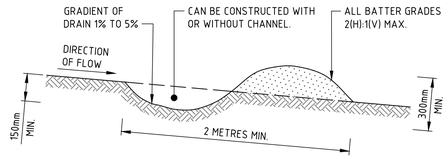
Date: 29.11.2024 9:44 AM Plotted By: DIMITRI MAVROUDIS Found: O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C02.01 ESC PLAN.dwg



CONSTRUCTION NOTES

1. PLACE STOCKPILES MORE THAN 2m (PREFERABLY 5m) FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS (STANDARD DRAWING 5-5) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES (STANDARD DRAWING 6-8) 1 TO 2m DOWNSLOPE.

STOCKPILES (SD 4-1)

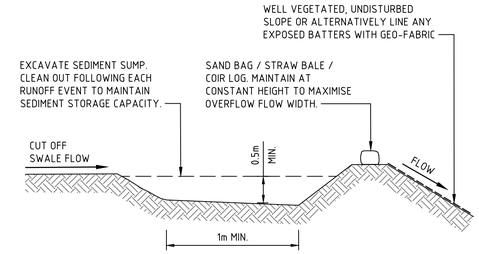


CONSTRUCTION NOTES

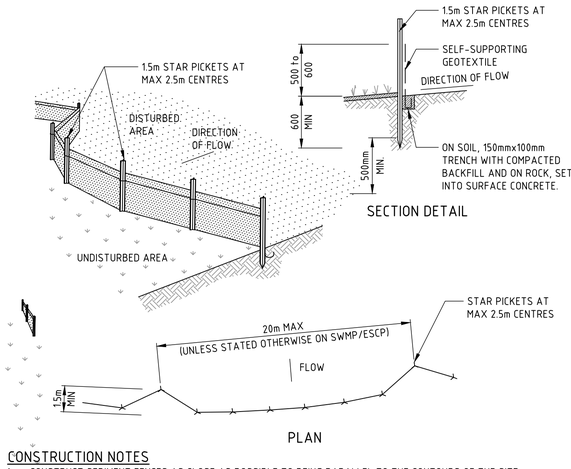
1. BUILD WITH GRADIENTS BETWEEN 1 AND 5 PERCENT.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE - WORK AROUND THEM.
3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW.
4. BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS, NOT V SHAPED.
5. ENSURE THE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE.
6. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION.

NOTE: ONLY TO BE USED AS TEMPORARY BANK
WHERE MAXIMUM UPSLOPE LENGTH IS 80 METRES.

EARTH BANK - LOW FLOW (SD 5-5)



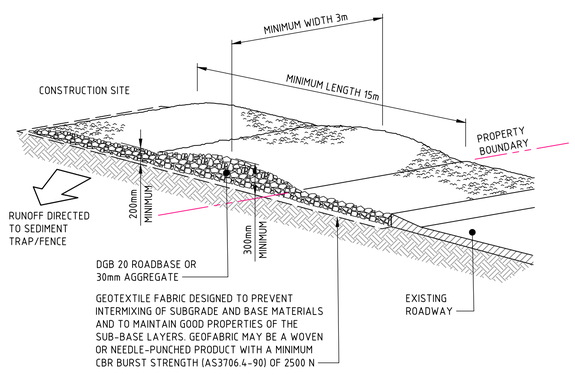
SEDIMENT TRAP DETAIL



CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND AT 2.5 METRE INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

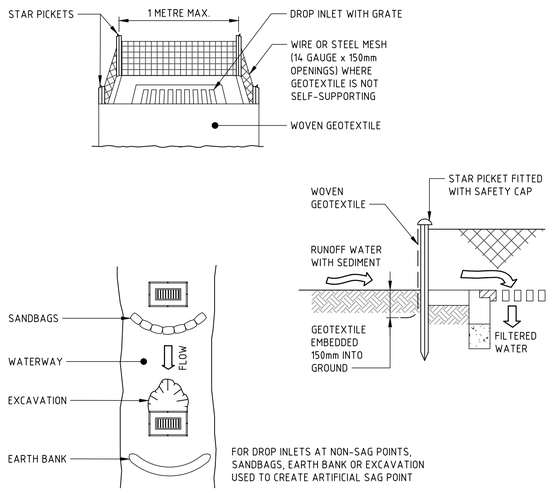
SEDIMENT FENCE (SD 6-8)



CONSTRUCTION NOTES

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30mm AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15 METRES LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3 METRES WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE.

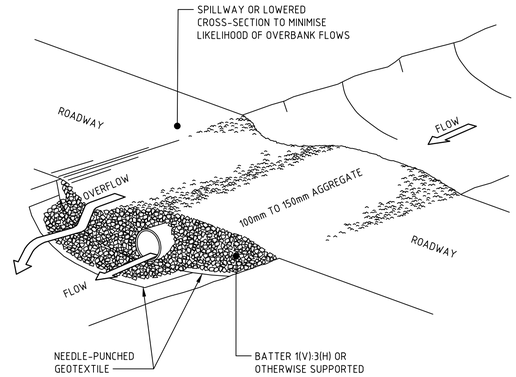
STABILISED SITE ACCESS (SD 6-14)



CONSTRUCTION NOTES

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. FOLLOW STANDARD DRAWING 6-7 AND STANDARD DRAWING 6-8 FOR INSTALLATION PROCEDURES FOR THE STRAW BALES OR GEOFABRIC. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

GEOTEXTILE INLET FILTER (SD 6-12)



CONSTRUCTION NOTES

1. PROHIBIT ALL TRAFFIC UNTIL THE ACCESS WAY IS CONSTRUCTED.
2. STRIP ANY TOPSOIL AND PLACE A NEEDLE-PUNCHED TEXTILE OVER THE BASE OF THE CROSSING.
3. PLACE CLEAN, RIGID, NON POLLUTING AGGREGATE OR GRAVEL IN THE 100mm TO 150mm SIZE CLASS OVER THE FABRIC TO A MINIMUM DEPTH OF 200mm.
4. PROVIDE A 3m WIDE CARRIAGEWAY WITH SUFFICIENT LENGTH OF CULVERT PIPE TO ALLOW LESS THAN A 3(H): 1 (V) SLOPE ON SIDE BATTERS.
5. INSTALL A LOWER SECTION TO ACT AS AN EMERGENCY SPILLWAY IN GREATER THAN DESIGN STORM EVENTS.
6. ENSURE THAT CULVERT OUTLETS EXTEND BEYOND THE TOE OF FILL EMBANKMENTS.

TEMPORARY WATERWAY CROSSING (SD 5-1)

NOT FOR CONSTRUCTION

DRAWN: D. MAVROUDIS DESIGNED: E. GEARING JOB MANAGER: K. SINCLAIR VERIFIER: K. SINCLAIR

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	DM	KS	EG	08.09.23
B	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	03.10.23
C	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	20.03.24

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ARCHITECT: EVE architecture

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NORTHROP
Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT: **PROPOSED RETAIL DEVELOPMENT 42 FULLERTON COVER ROAD FULLERTON COVE 2318**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

EROSION AND SEDIMENT CONTROL DETAILS

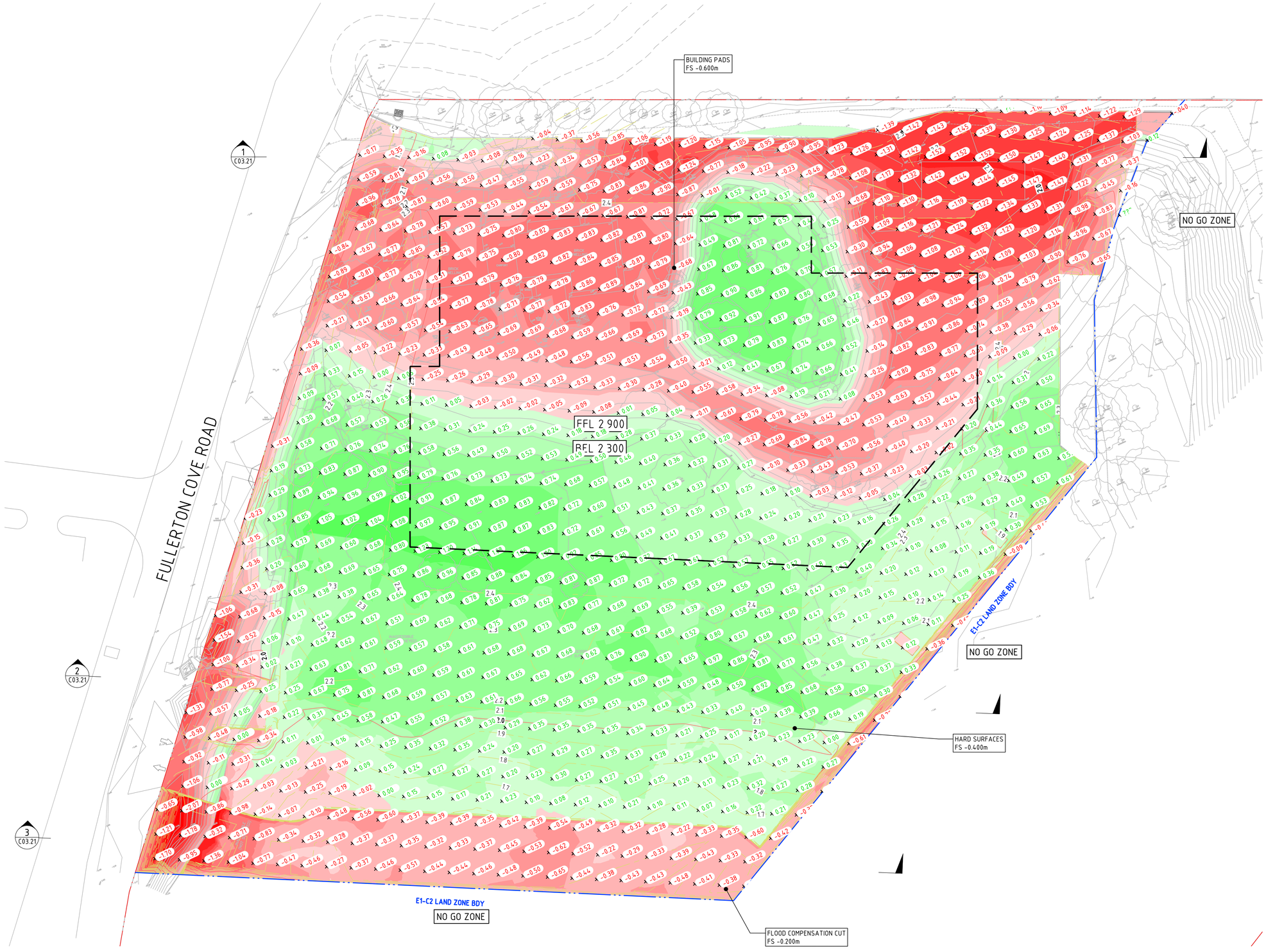
JOB NUMBER: **NL161067**

DRAWING NUMBER: **DA-C02.11**

REVISION: **C**

DRAWING SHEET SIZE = A1

Date : 29.11.2024 9:44 AM Plotted By : DIMITRI MAVROUDIS Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C02.01 ESC PLAN.dwg



LEGEND

- SITE BOUNDARY LINE
- B1-E2 ZONE BOUNDARY
- FFL XX.XX — FINISHED FLOOR LEVEL
- BEL XX.XX — BULK EARTHWORKS LEVEL
- XX.XX — DESIGN CONTOURS (0.1m INTERVAL)

DEPTH OF CUT

- 999m	TO	- 2.0m
- 2.0m	TO	- 1.5m
- 1.5m	TO	- 1.25m
- 1.25m	TO	- 1.0m
- 1.0m	TO	- 0.75m
- 0.75m	TO	- 0.5m
- 0.5m	TO	- 0.25m
- 0.25m	TO	- 0.0m

DEPTH OF FILL

0.0m	TO	0.25m
0.25m	TO	0.5m
0.5m	TO	0.75m
0.75m	TO	1.0m
1.0m	TO	1.25m
1.25m	TO	1.5m
1.5m	TO	2.0m
2.0m	TO	999m

NOTES

1. BULK EARTHWORKS LEVELS AND VOLUMES ARE BASED ON A COMPARISON OF THE DESIGN BULK EARTHWORKS SURFACE AND THE EXISTING SURFACE LEVEL AS SURVEYED WITH NO ALLOWANCE FOR TOPSOIL STRIPPING. THE FOLLOWING ALLOWANCES HAVE BEEN MADE TO GENERATE DESIGN BULK EARTHWORKS SURFACE;

   FINISHED DESIGN SURFACE MINUS:

   - BUILDING PADS: 600mm
   - HARD SURFACES: 400mm
   - FLOOD COMPENSATION: 200mm

   - NOTE: ALL ASSUMED DEPTHS ARE PRELIMINARY ONLY AND WILL BE AMENDED BASED ON GEOTECHNICAL CONDITIONS WHEN AVAILABLE.

2. NO ALLOWANCE HAS BEEN MADE FOR SELECT LAYERS OR UNSUITABLE MATERIAL THAT IS LIKELY TO BE PRESENT.
3. NO ALLOWANCE HAS BEEN MADE FOR TEMPORARY SEDIMENT DAMS
4. NO ALLOWANCE HAS BEEN MADE FOR SAND LEVELING LAYER BENEATH BUILDING PADS
5. NO ALLOWANCE HAS BEEN MADE FOR SERVICE TRENCHES, DRAINAGE TRENCHES, DRAINAGE INFRASTRUCTURE (PITS, CULVERTS, ETC) IN THE LEVELS OR VOLUMES PRESENTED ON THIS PLAN.
6. NO ALLOWANCE FOR ANY TEMPORARY BATTERS DURING WORKS.
7. NO BULKING FACTORS HAVE BEEN CONSIDERED/ALLOWED FOR.
8. APPROXIMATE BULK EARTHWORKS VOLUMES BASED ON THE NOTES ABOVE ARE AS FOLLOWS;
   - BULK CUT = 7,920m³
   - BULK FILL = 6,.039m³

   BULK CUT/FILL BALANCE = 1,881m³ (EXCESS)
9. ALL BULK EARTHWORKS TO BE UNDERTAKEN IN ACCORDANCE WITH SITE SPECIFIC GEOTECHNICAL REPORT AND BULK EARTHWORKS NOTES.

NOT FOR CONSTRUCTION

DRAWN: D. MAVROUDIS DESIGNED: E. GEARING JOB MANAGER: K. SINCLAIR VERIFIER: K. SINCLAIR

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
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E	RE-ISSUED FOR DA APPROVAL	BD	KS	EG	21.06.24
F	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	29.11.24

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ARCHITECT: EJE architecture

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SCALE 1:500@A1 — 0 5 10 15 20 25m

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Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
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PROJECT: **PROPOSED RETAIL DEVELOPMENT 42 FULLERTON COVER ROAD FULLERTON COVE 2318**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

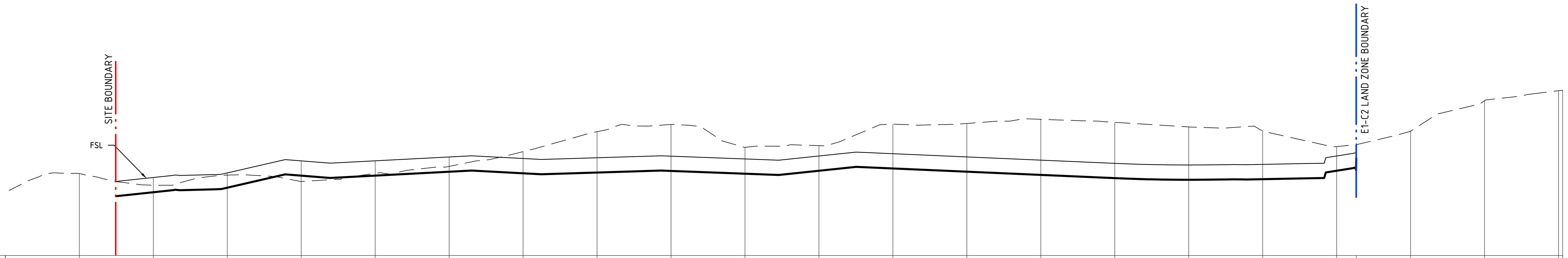
CUT AND FILL PLAN

JOB NUMBER: **NL161067**

DRAWING NUMBER: **DA-C03.01** REVISION: **F**

DRAWING SHEET SIZE = A1

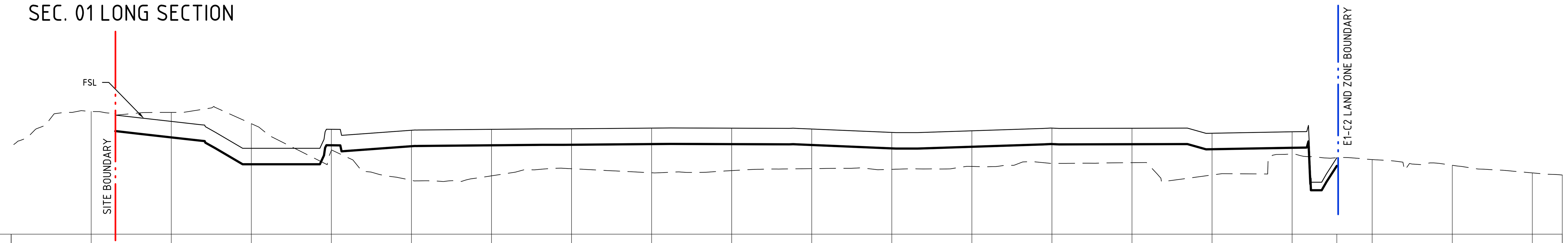
Date: 29.11.2024 9:45 AM Plotted By: DIMITRI MAVROUDIS Found: O:\5 Pre-July 24 Projects\Newcastle\YEAR 2018 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C03.01 BULK EARTHWORKS.dwg



VERTICAL 1:80
HORIZONTAL 1:400
Datum 0.000

SUBGRADE DESIGN LEVELS			1.713	1.836	2.162	2.164	2.268	2.226	2.247	2.290	2.214	2.294	2.357	2.270	2.182	2.095	2.051	2.067	2.295	2.630				
EXISTING LEVELS		2.220	1.902	2.178	2.004	2.223	2.413	2.812	3.353	3.549	2.929	2.975	3.559	3.575	3.687	3.605	3.482	3.381	2.950	3.000	3.365	4.193	4.462	4.476
DEPTH			-0.189	-0.342	0.158	-0.060	-0.144	-0.586	-1.106	-1.259	-0.715	-0.680	-1.202	-1.305	-1.505	-1.510	-1.432	-1.314	-0.655	-0.369				
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	182.652	190.000	200.000	210.000	210.557

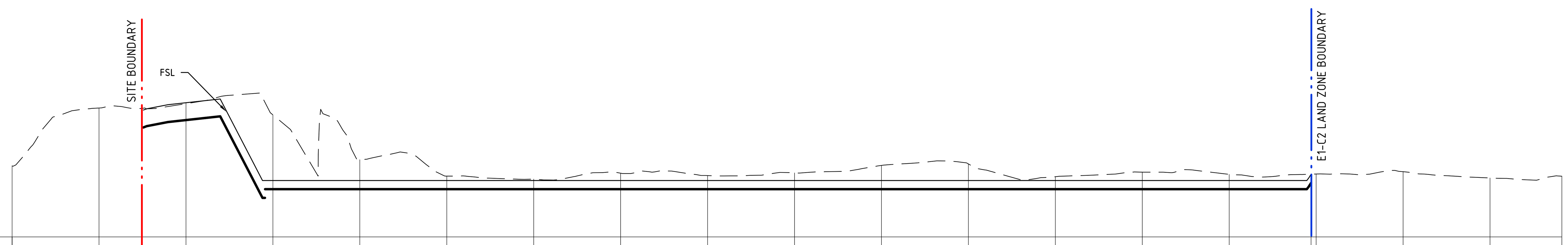
SEC. 01 LONG SECTION



VERTICAL 1:80
HORIZONTAL 1:400
Datum 0.000

SUBGRADE DESIGN LEVELS			2.423	1.750	2.226	2.201	2.225	2.238	2.255	2.254	2.232	2.147	2.188	2.255	2.251	2.126	2.163	1.255				
EXISTING LEVELS		3.073	3.048	2.766	2.097	1.348	1.460	1.639	1.537	1.591	1.641	1.623	1.695	1.773	1.790	1.481	2.007	1.941	1.868	1.725	1.534	1.481
DEPTH			-0.625	-1.016	0.128	0.853	0.765	0.599	0.718	0.663	0.591	0.524	0.492	0.482	0.461	0.645	0.156	-0.686				
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000		170.000	180.000	190.000	193.748

SEC. 02 LONG SECTION



VERTICAL 1:80
HORIZONTAL 1:400
Datum 0.000

SUBGRADE DESIGN LEVELS			2.692	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.242				
EXISTING LEVELS	1.637	2.971	3.070	2.812	1.780	1.401	1.333	1.468	1.414	1.476	1.647	1.681	1.387	1.493	1.441	1.445	1.449	1.503	1.359	1.399
DEPTH			-0.378	-1.712	-0.680	-0.301	-0.233	-0.368	-0.314	-0.376	-0.547	-0.581	-0.287	-0.393	-0.341	-0.204				
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	149.430	150.000	160.000	170.000	178.263

SEC. 03 LONG SECTION

DRAWN: D. MAVROUDIS DESIGNED: E. GEARING JOB MANAGER: K. SINCLAIR VERIFIER: K. SINCLAIR

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E	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	29.11.24

CLIENT
M& P
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ARCHITECT
E/E architecture

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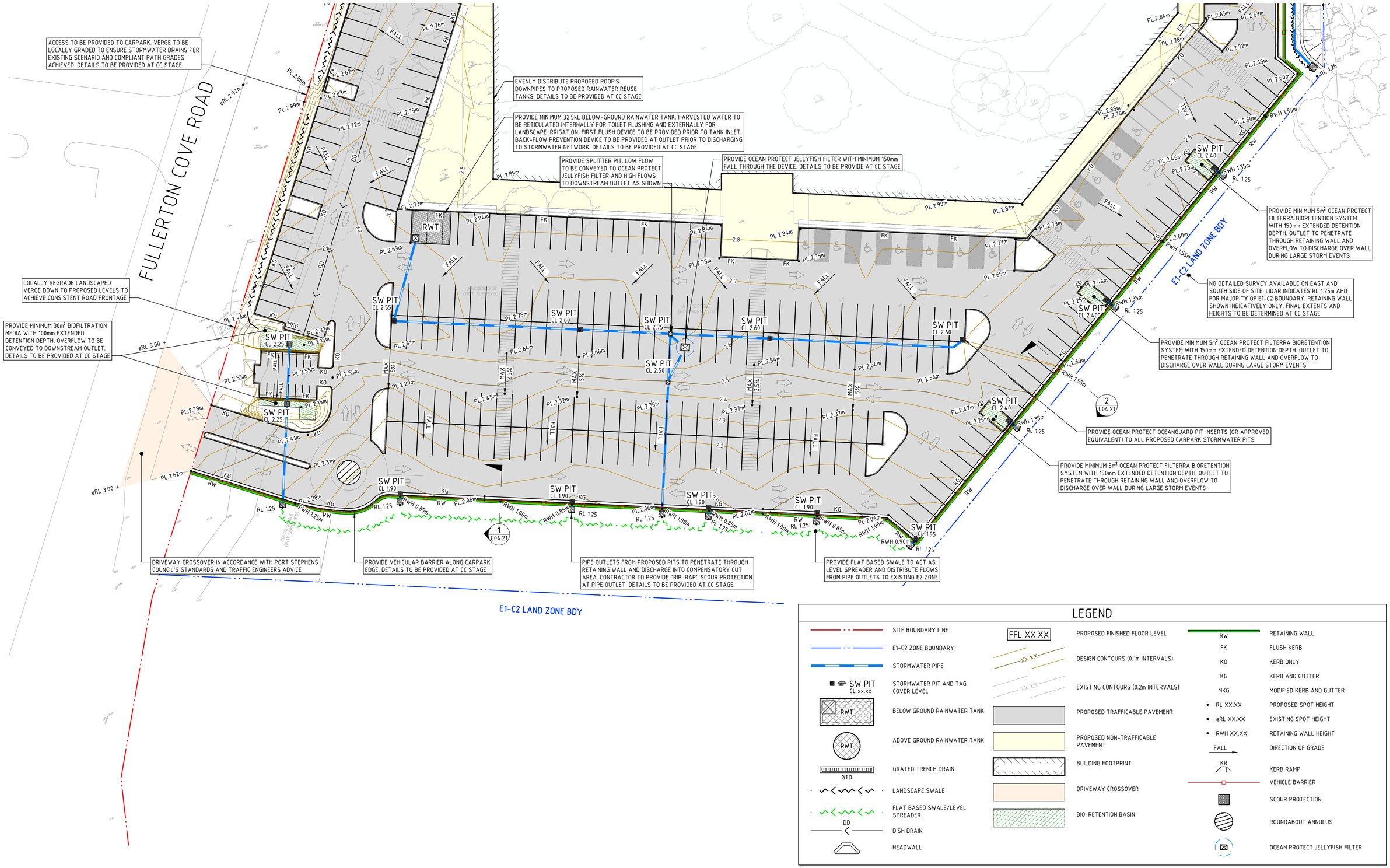
NORTHROP
Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT
PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
CUT AND FILL SECTIONS

JOB NUMBER NL161067
DRAWING NUMBER DA-C03.21
REVISION E
DRAWING SHEET SIZE = A1

Date: 29.11.2024 9:45 AM Plotted By: DIMITRI MAVROUDIS



LEGEND

- SITE BOUNDARY LINE
- E1-C2 ZONE BOUNDARY
- STORMWATER PIPE
- SW PIT CL xx.xx — STORMWATER PIT AND TAG COVER LEVEL
- RWT — BELOW GROUND RAINWATER TANK
- RWT — ABOVE GROUND RAINWATER TANK
- GTD — GRATED TRENCH DRAIN
- LANDSCAPE SWALE
- FLAT BASED SWALE/LEVEL SPREADER
- DD — DISH DRAIN
- HEADWALL
- FFL XX.XX — PROPOSED FINISHED FLOOR LEVEL
- XX.XX — DESIGN CONTOURS (0.1m INTERVALS)
- XX.XX — EXISTING CONTOURS (0.2m INTERVALS)
- PROPOSED TRAFFICABLE PAVEMENT
- PROPOSED NON-TRAFFICABLE PAVEMENT
- BUILDING FOOTPRINT
- DRIVEWAY CROSSOVER
- BIO-RETENTION BASIN
- RW — RETAINING WALL
- FK — FLUSH KERB
- KO — KERB ONLY
- KG — KERB AND GUTTER
- MKG — MODIFIED KERB AND GUTTER
- RL XX.XX — PROPOSED SPOT HEIGHT
- eRL XX.XX — EXISTING SPOT HEIGHT
- RWH XX.XX — RETAINING WALL HEIGHT
- FALL — DIRECTION OF GRADE
- KR — KERB RAMP
- VEHICLE BARRIER
- SCOUR PROTECTION
- ROUNDABOUT ANNULUS
- OCEAN PROTECT JELLYFISH FILTER

NOT FOR CONSTRUCTION

DRAWN: D. MAVROUDIS DESIGNED: E. GEARING JOB MANAGER: K. SINCLAIR VERIFIER: K. SINCLAIR

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	DM	KS	EG	08.09.23
B	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	03.10.23
C	ISSUED FOR COORDINATION	DM	KS	EG	18.03.24
D	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	20.03.24
E	RE-ISSUED FOR DA APPROVAL	BD	KS	EG	21.06.24
F	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	29.11.24

CLIENT: Monteath & Powys

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ARCHITECT: EJE architecture

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SCALE 1:300@A1 — 0 3 6 9 12 15m

NORTHROP
Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT: **PROPOSED RETAIL DEVELOPMENT 42 FULLERTON COVER ROAD FULLERTON COVE 2318**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

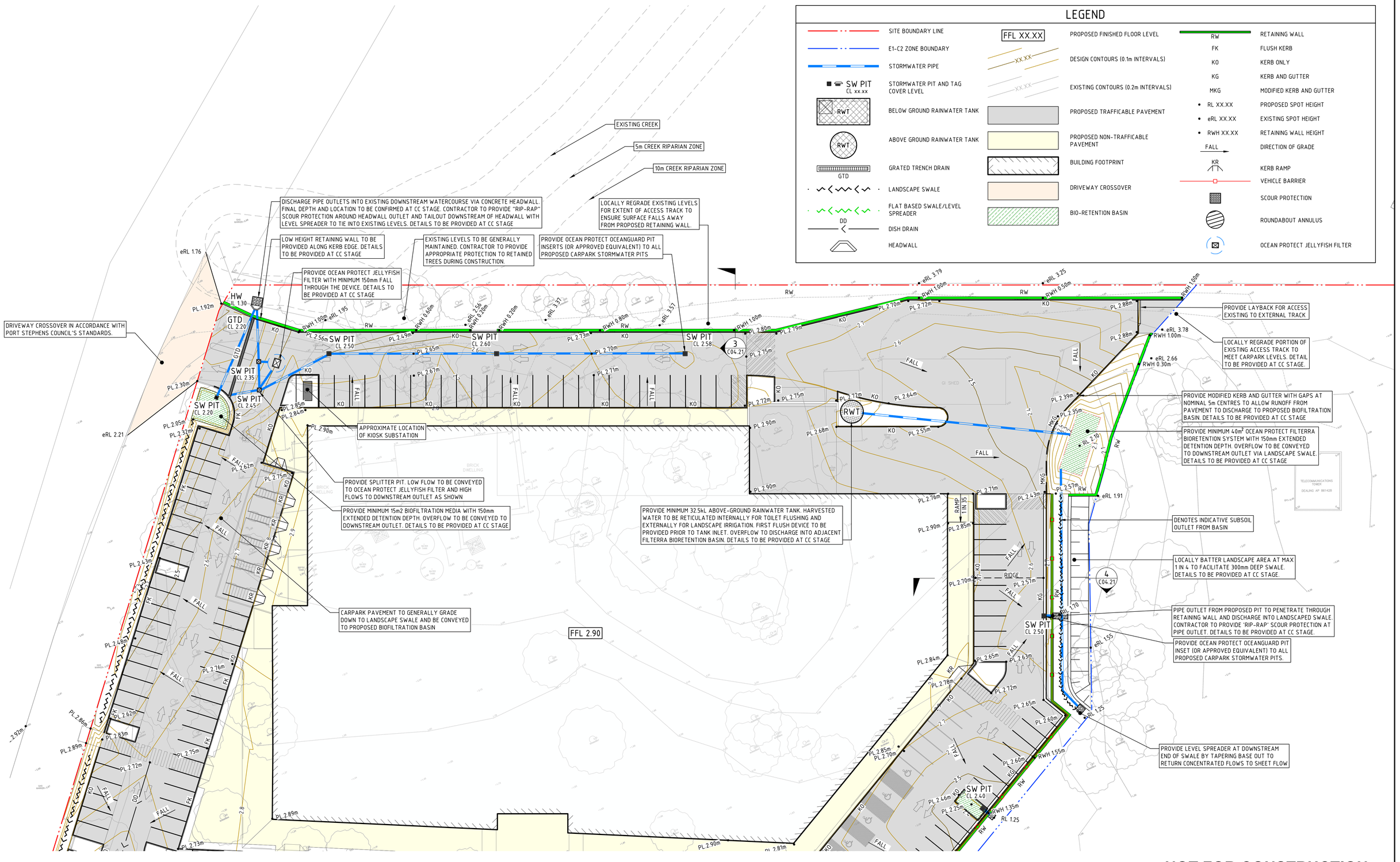
CIVIL WORKS PLAN - SHEET 1

JOB NUMBER: **NL161067**

DRAWING NUMBER: **DA-C04.01** REVISION: **F**

DRAWING SHEET SIZE = A1

Date: 29.11.2024 2:57 PM Plotted By: DIMITRI MAVROUDIS Found: O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C04.01 CIVIL WORKS PLAN.dwg



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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
B	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	03.10.23
C	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	05.10.23
D	ISSUED FOR DEVELOPMENT APPLICATION	BD	KS	EG	18.10.23
E	ISSUED FOR COORDINATION	DM	KS	EG	18.03.24
F	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	20.03.24
G	RE-ISSUED FOR DA APPROVAL	BD	KS	EG	21.06.24

CLIENT
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ARCHITECT
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SCALE 1:300@A1 — 0 3 6 9 12 15m

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Ph (02) 4943 1777 Email newcastle@northrop.com.au
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PROJECT
PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE
CIVIL ENGINEERING PACKAGE

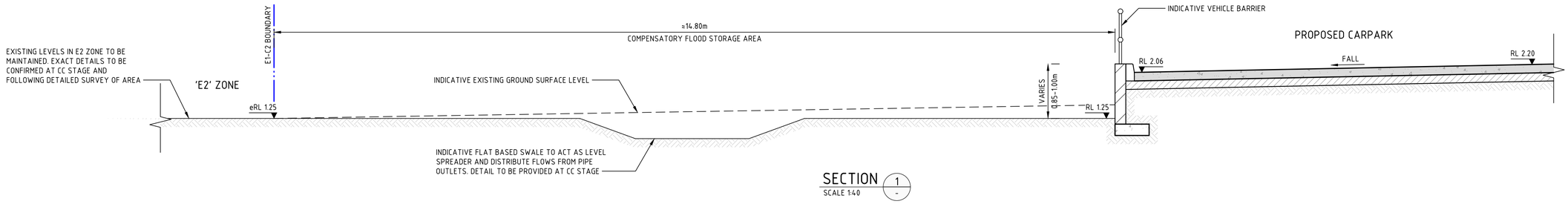
CIVIL WORKS PLAN - SHEET 2

JOB NUMBER **NL161067**

DRAWING NUMBER **DA-C04.02** REVISION **G**

DRAWING SHEET SIZE = A1

Date : 29.11.2024 2:54 PM Plotted By : DIMITRI MAVROUDIS Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O : Drawings\CIVIL\DA\NL161067-DA-C04-01 CIVIL WORKS PLAN.dwg



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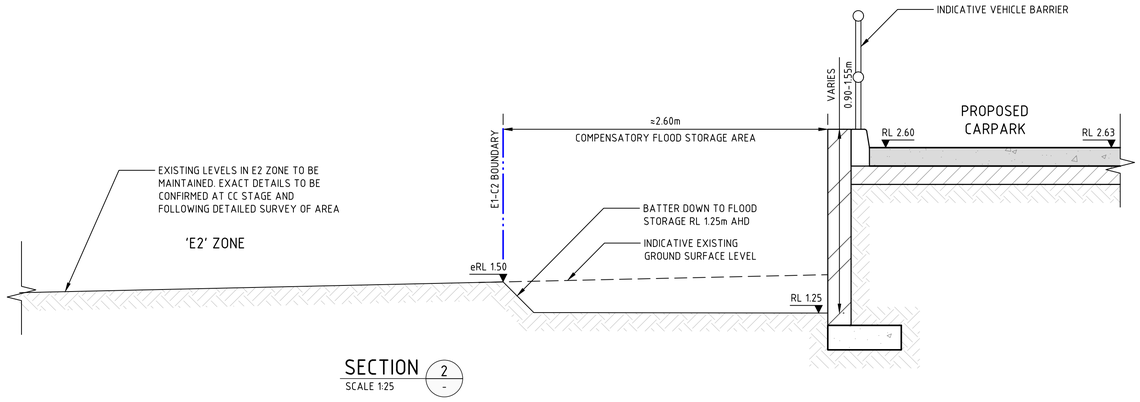
SCALE 1:40



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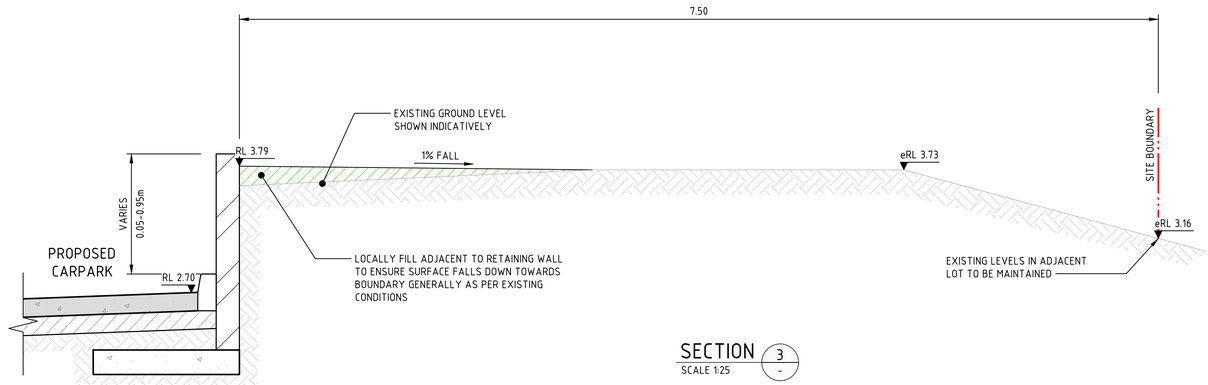
SCALE 1:25



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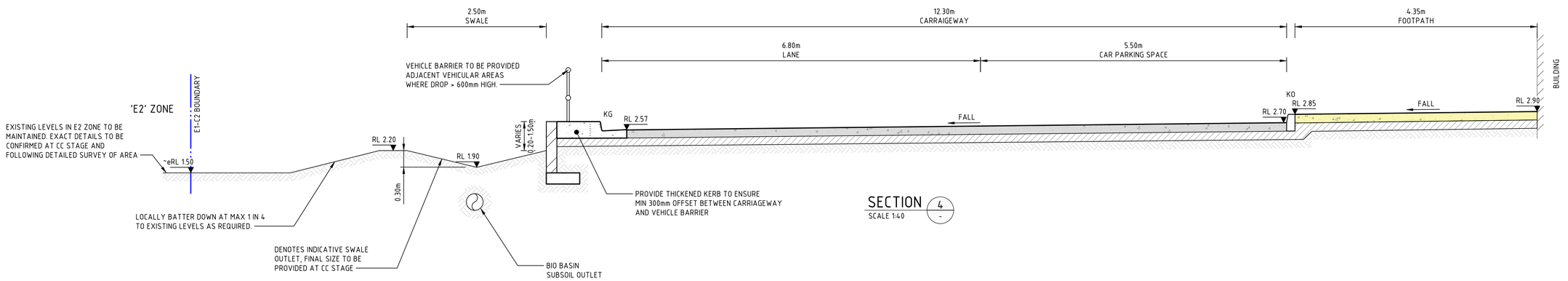

SECTION 4
SCALE 1:40

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D	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	29.11.24

CLIENT
Monteath & Powys

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ARCHITECT
EJE architecture

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SCALE 1:25@ A1 — 0 0.25 0.5 0.75 1 1.25m
SCALE 1:40@ A1 — 0 0.4 0.8 1.2 1.6 2m

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Newcastle
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Ph (02) 4943 1777 Email newcastle@northrop.com.au
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PROJECT
PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE
CIVIL ENGINEERING PACKAGE

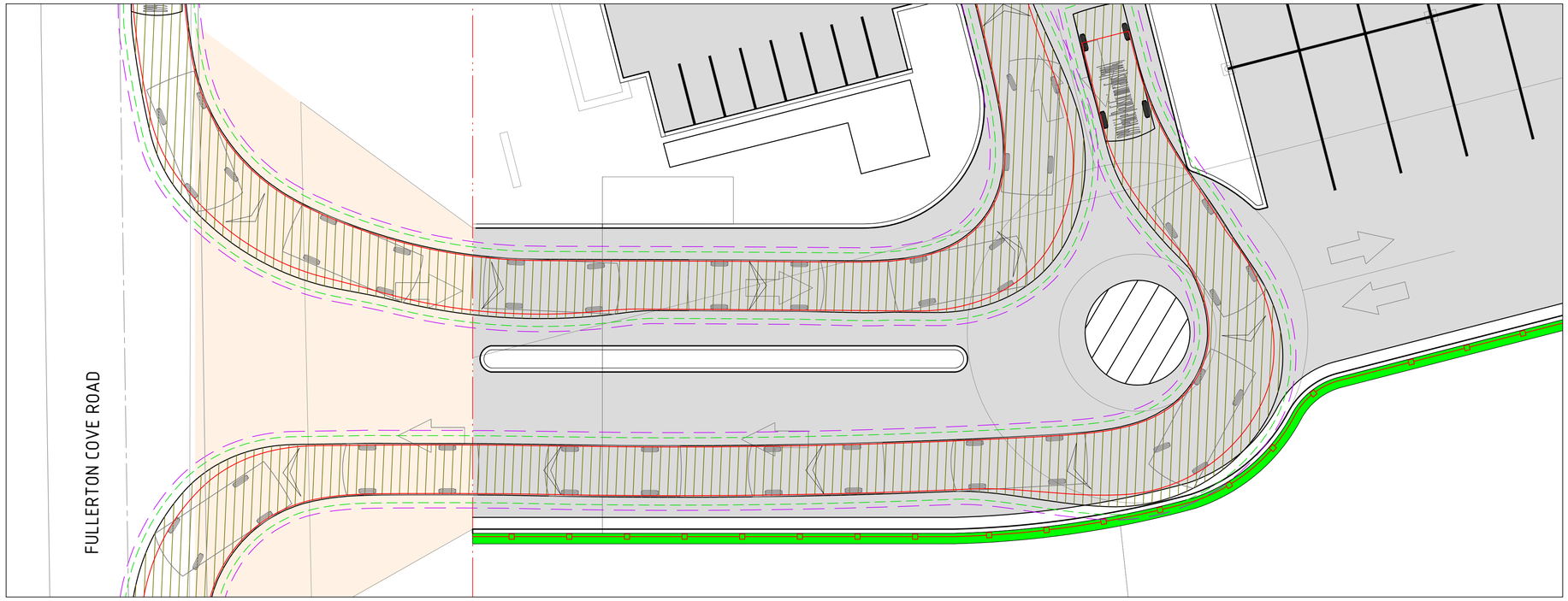
TYPICAL SECTIONS

JOB NUMBER **NL161067**

DRAWING NUMBER **DA-C04.21** REVISION **D**

DRAWING SHEET SIZE = A1

Date : 29.11.2024 9:46 AM Plotted By : DIMITRI MAVROUDIS Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C04.21 TYPICAL SECTIONS.dwg



B99 MULTIPLE VEHICLE ROUND-ABOUT MANOEUVRE

B99 SINGLE VEHICLE ROUND-ABOUT MANOEUVRE

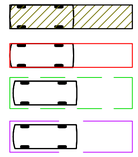
VEHICLE PROFILE

B99 VEHICLE (REALISTIC MIN RADIUS) (2004)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.878m
MIN BODY GROUND CLEARANCE	0.272m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.250m
TRAVELLING SPEED	5 km/h

VEHICLE MOVEMENTS

FORWARD MOVEMENT



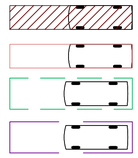
VEHICLE BODY

VEHICLE WHEELS

VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)

VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

REVERSE MOVEMENT



VEHICLE BODY

VEHICLE WHEELS

VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)

VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

DISCLAIMER

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DRAWN: D. MAVROUDIS DESIGNED: E. GEARING JOB MANAGER: K. SINCLAIR VERIFIER: K. SINCLAIR

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CLIENT

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ARCHITECT

EJE architecture

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SCALE 1:100 @ A1

0 1 2 3 4 5m

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Newcastle
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Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT
PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE
CIVIL ENGINEERING PACKAGE

SWEPT PATHS PLAN - B99 MANOEUVRES

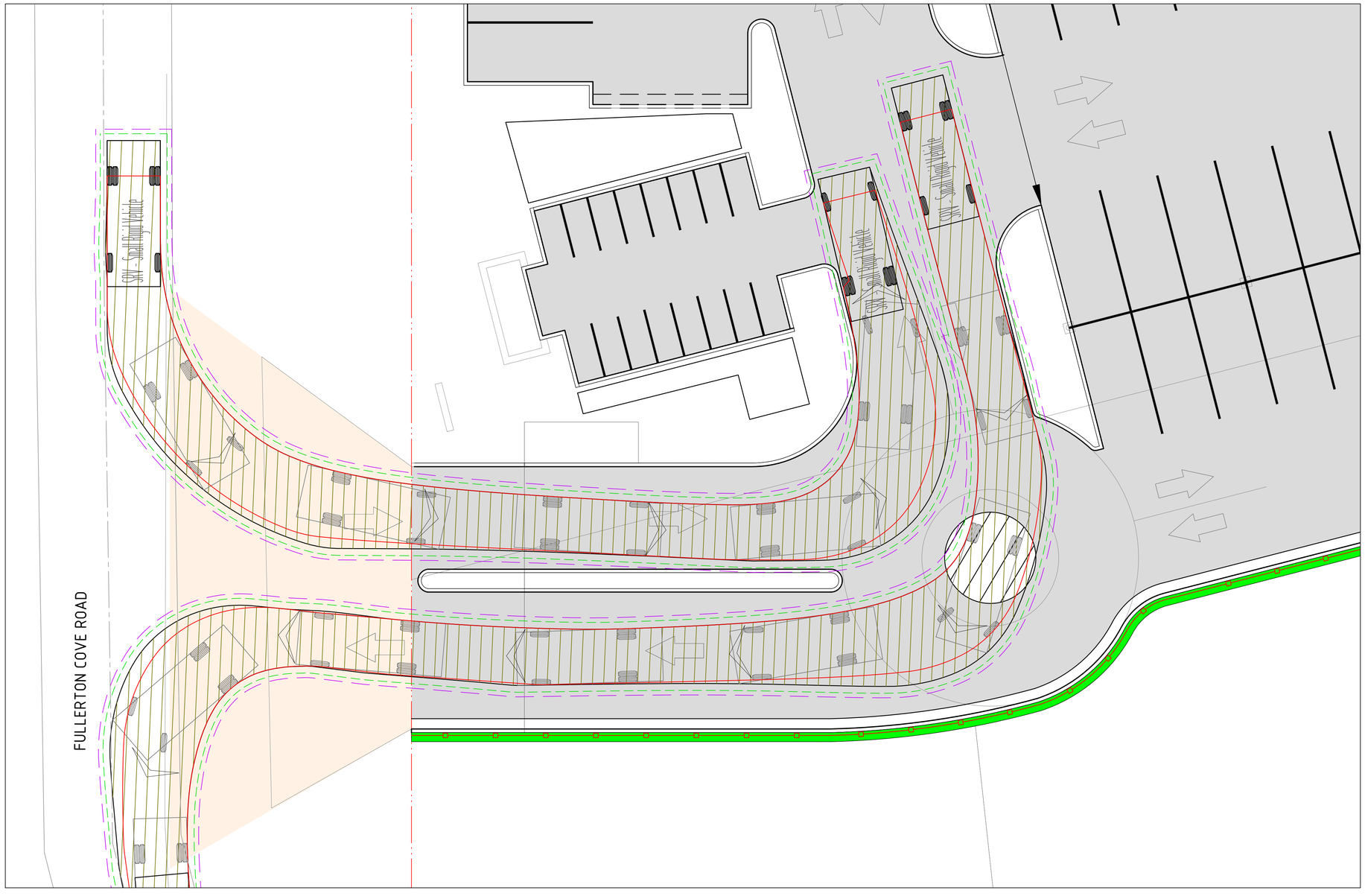
JOB NUMBER **NL161067**

DRAWING NUMBER **DA-C05.01**

REVISION **C**

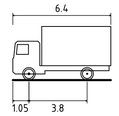
DRAWING SHEET SIZE = A1

Date : 29.11.2024 9:46 AM Plotted By : DIMITRI MAVROUDIS Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C05.01 SWEPT PATHS PLAN.dwg



SRV MULTIPLE VEHICLE ROUND-ABOUT MANOEUVRE

VEHICLE PROFILE



SRV - SMALL RIGID VEHICLE

OVERALL LENGTH	6.400m
OVERALL WIDTH	2.330m
OVERALL BODY HEIGHT	3.500m
MIN BODY GROUND CLEARANCE	0.398m
TRACK WIDTH	2.330m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	7.100m
TRAVELLING SPEED	5 km/h

VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

REVERSE MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

DISCLAIMER

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ARCHITECT: EJE architecture

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SCALE 1:100 @ A1 (0 1 2 3 4 5m)

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PROJECT: **PROPOSED RETAIL DEVELOPMENT 42 FULLERTON COVE ROAD FULLERTON COVE 2318**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

SWEPT PATHS PLAN - SRV MANOEUVRES

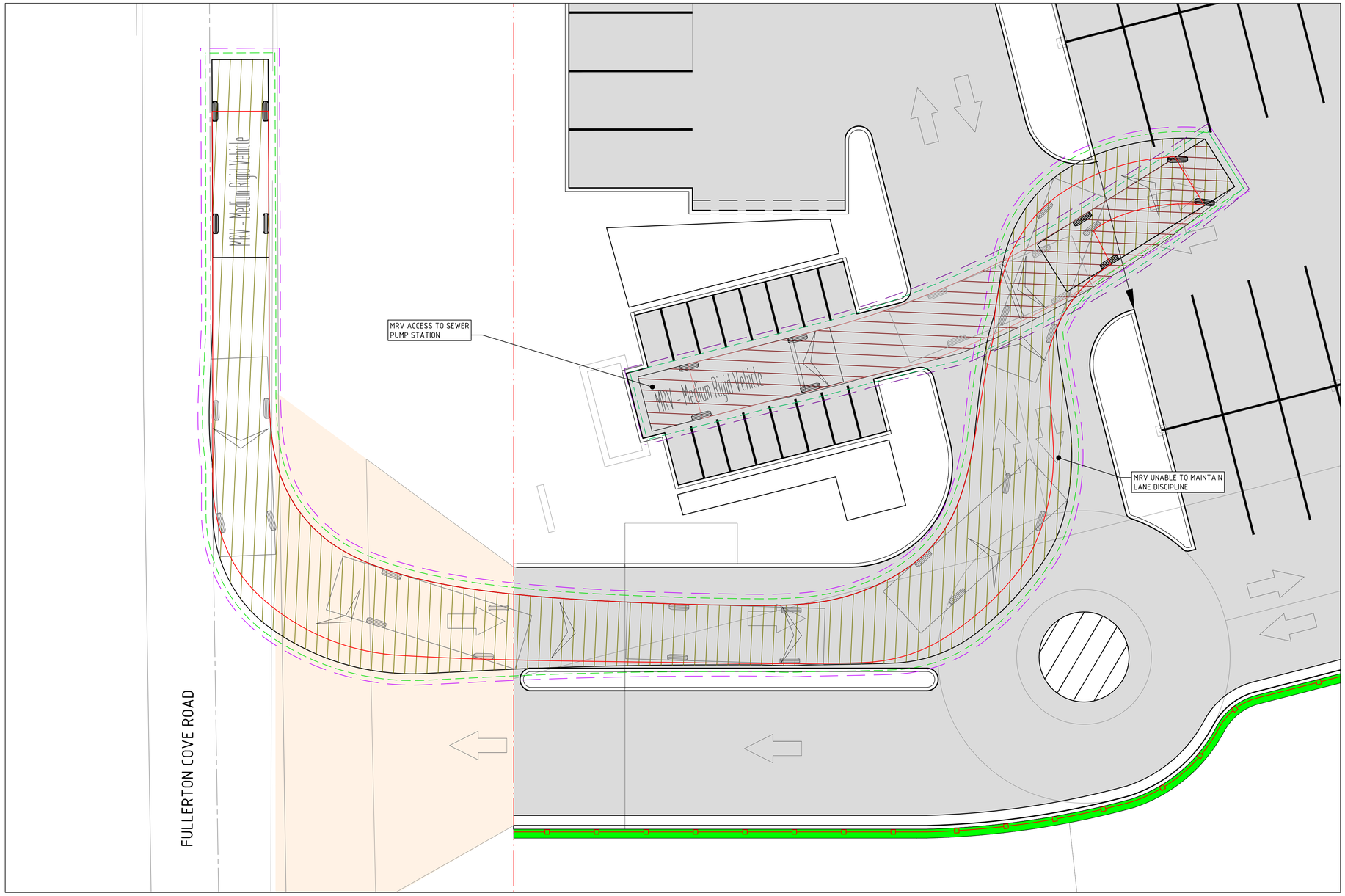
JOB NUMBER: **NL161067**

DRAWING NUMBER: **DA-C05.02**

REVISION: **C**

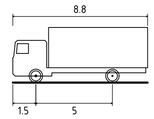
DRAWING SHEET SIZE = A1

Date : 29.11.2024 9:46 AM Plotted By : DIMITRI MAVROUDIS Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C05.01 SWEPT PATHS PLAN.dwg



MRV ACCESS TO PUMP STATION

VEHICLE PROFILE



MRV - MEDIUM RIGID VEHICLE

OVERALL LENGTH	8.800m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	3.633m
MIN BODY GROUND CLEARANCE	0.428m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	10.000m
TRAVELLING SPEED	5 km/h

VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

REVERSE MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

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CLIENT

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ARCHITECT

EJE architecture

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SCALE 1:100 @ A1

0 1 2 3 4 5m

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PROJECT
PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE
CIVIL ENGINEERING PACKAGE

SWEPTS PATH PLAN - MRV MANOEUVRES

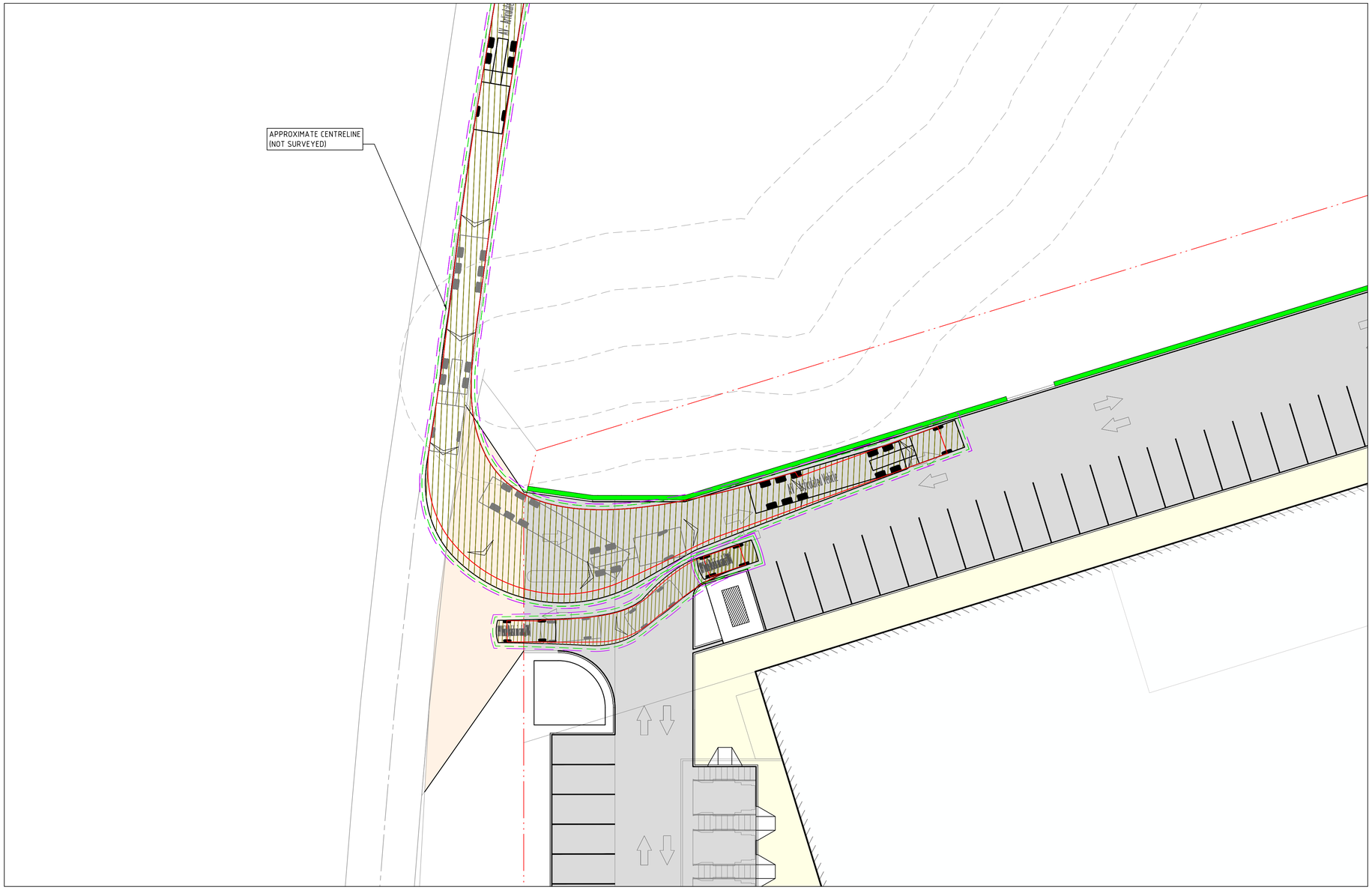
JOB NUMBER **NL161067**

DRAWING NUMBER **DA-C05.03**

REVISION **C**

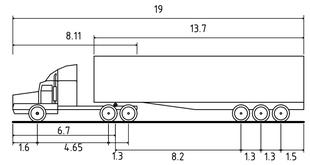
DRAWING SHEET SIZE = A1

Date : 29.11.2024 9:46 AM Plotted By : DIMITRI MAVROUDIS Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\0 - Drawings\CIVIL\DA\NL161067-DA-C05.01 SWEPT PATHS PLAN.dwg



ARTICULATED VEHICLE TURNING LEFT INTO SITE AND BYPASSING B99 VEHICLE MANOEUVRE

VEHICLE PROFILE



PRIME MOVER AND SEMI TRAILER (19m)

OVERALL LENGTH	19.000m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.540m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	5 km/h

VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

REVERSE MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

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NOT FOR CONSTRUCTION

DRAWN: D. MAVROUDIS DESIGNED: E. GEARING JOB MANAGER: K. SINCLAIR VERIFIER: K. SINCLAIR

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C	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	05.10.23
D	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	20.03.24

CLIENT

Meinhardt & Powys

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ARCHITECT

EJE architecture

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SCALE 1:200@ A1

0 2 4 6 8 10m

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Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT
PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE
CIVIL ENGINEERING PACKAGE

SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 1

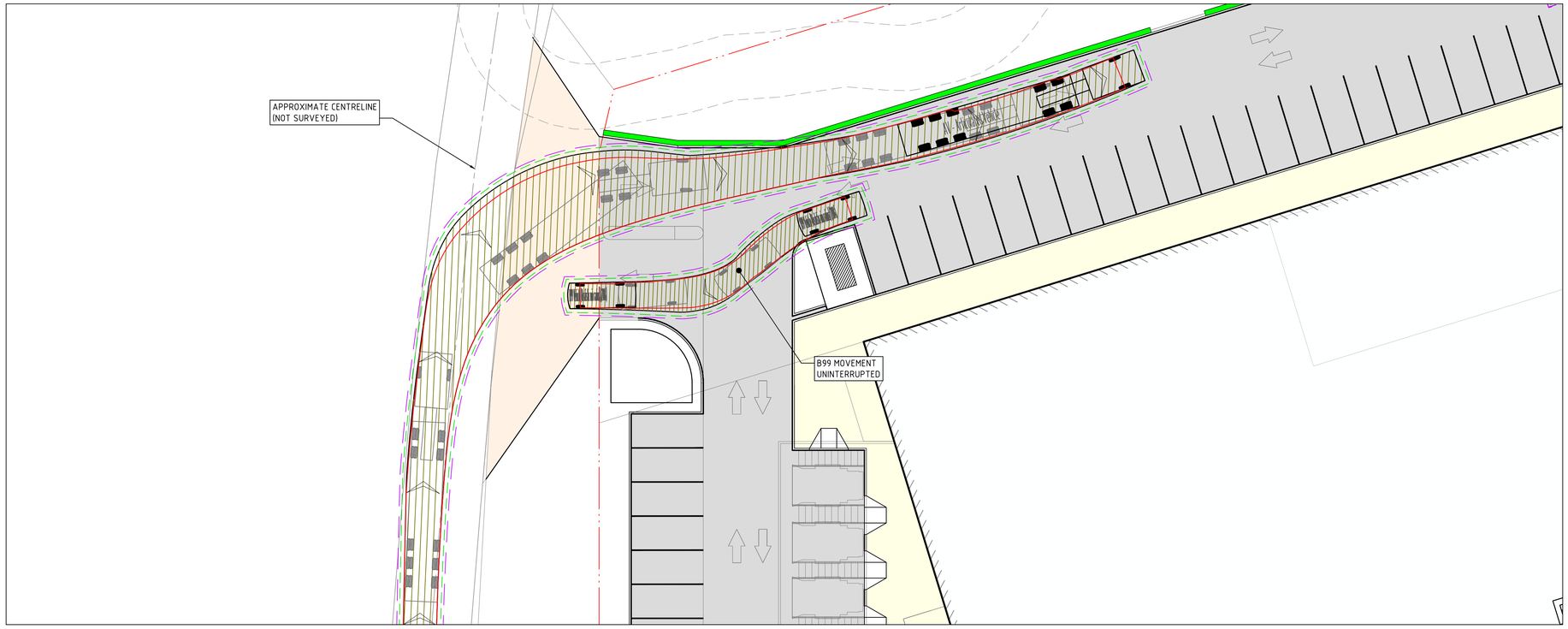
JOB NUMBER
NL161067

DRAWING NUMBER
DA-C05.04

REVISION
D

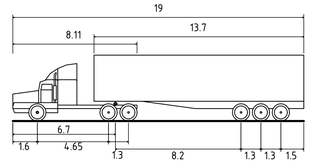
DRAWING SHEET SIZE = A1

Date : 29.11.2024 9:46 AM Plotted By : DIMITRI MAVROUDIS Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C05.01 SWEPT PATHS PLAN.dwg



ARTICULATED VEHICLE TURNING RIGHT INTO SITE MANOEUVRE

VEHICLE PROFILE



PRIME MOVER AND SEMI TRAILER (19m)

OVERALL LENGTH	19.000m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.540m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	5 km/h

VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

REVERSE MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

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CLIENT

Monteath & Powys

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ARCHITECT

EJE architecture

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SCALE 1:200@A1

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Newcastle
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PROJECT
PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE
CIVIL ENGINEERING PACKAGE

SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 2

JOB NUMBER **NL161067**

DRAWING NUMBER **DA-C05.05**

REVISION **D**

DRAWING SHEET SIZE = A1

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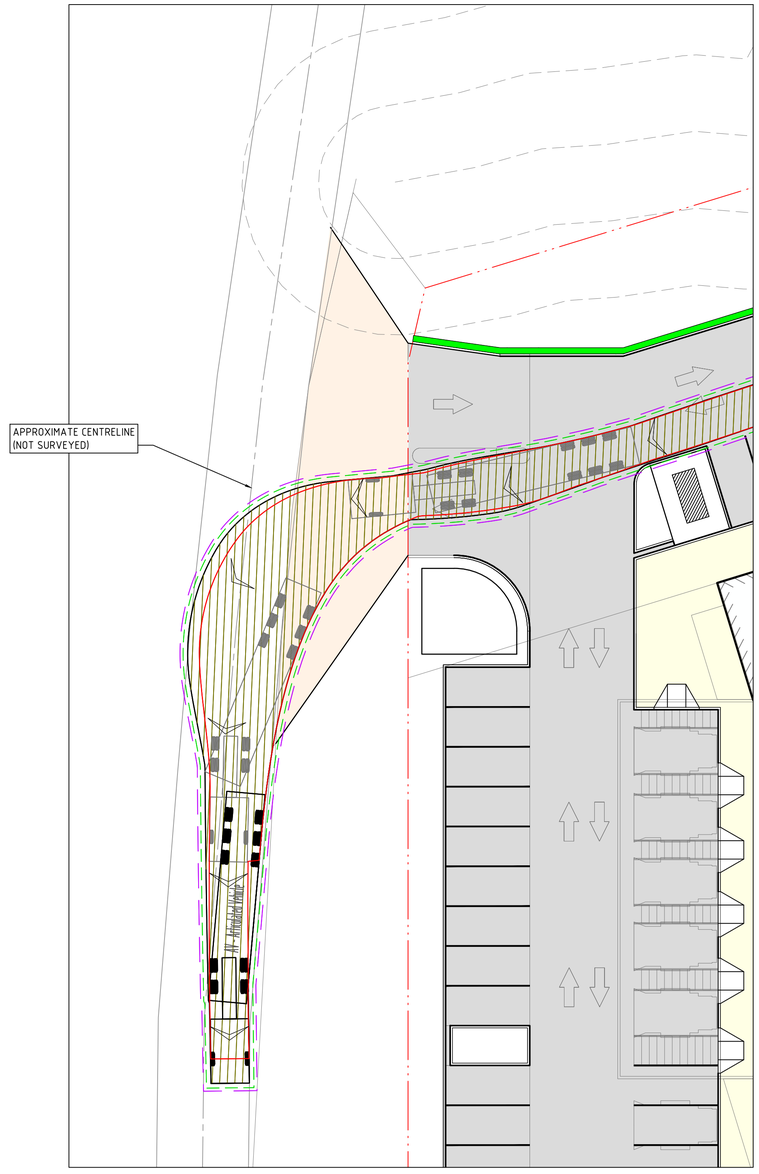
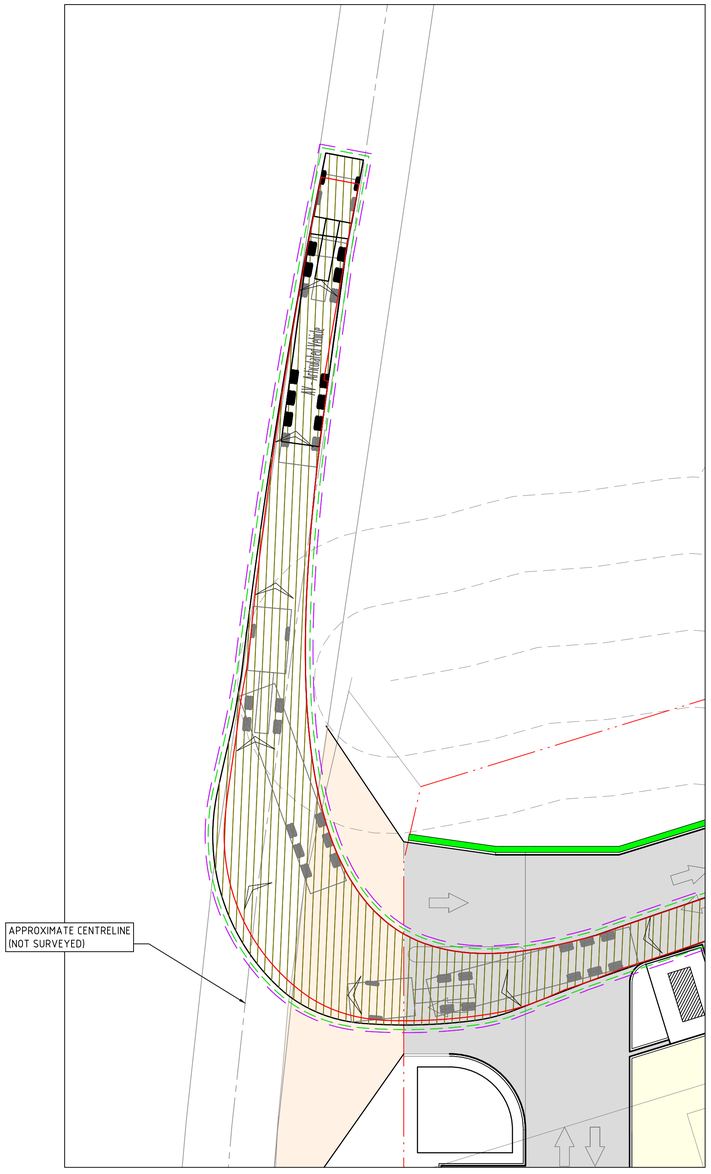
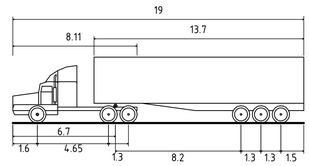


AV EXITING SITE LEFT TURN MANOEUVRE



AV EXITING SITE RIGHT TURN MANOEUVRE

VEHICLE PROFILE



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OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.540m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	5 km/h

VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

REVERSE MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

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C	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	05.10.23
D	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	20.03.24

CLIENT: M&P Monteath & Powys

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ARCHITECT: EJE architecture

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SCALE 1:200@A1 — 0 2 4 6 8 10m

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ABN 81 094 433 100

PROJECT: **PROPOSED RETAIL DEVELOPMENT 42 FULLERTON COVER ROAD FULLERTON COVE 2318**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 3

JOB NUMBER: **NL161067**

DRAWING NUMBER: **DA-C05.06** REVISION: **D**

DRAWING SHEET SIZE = A1

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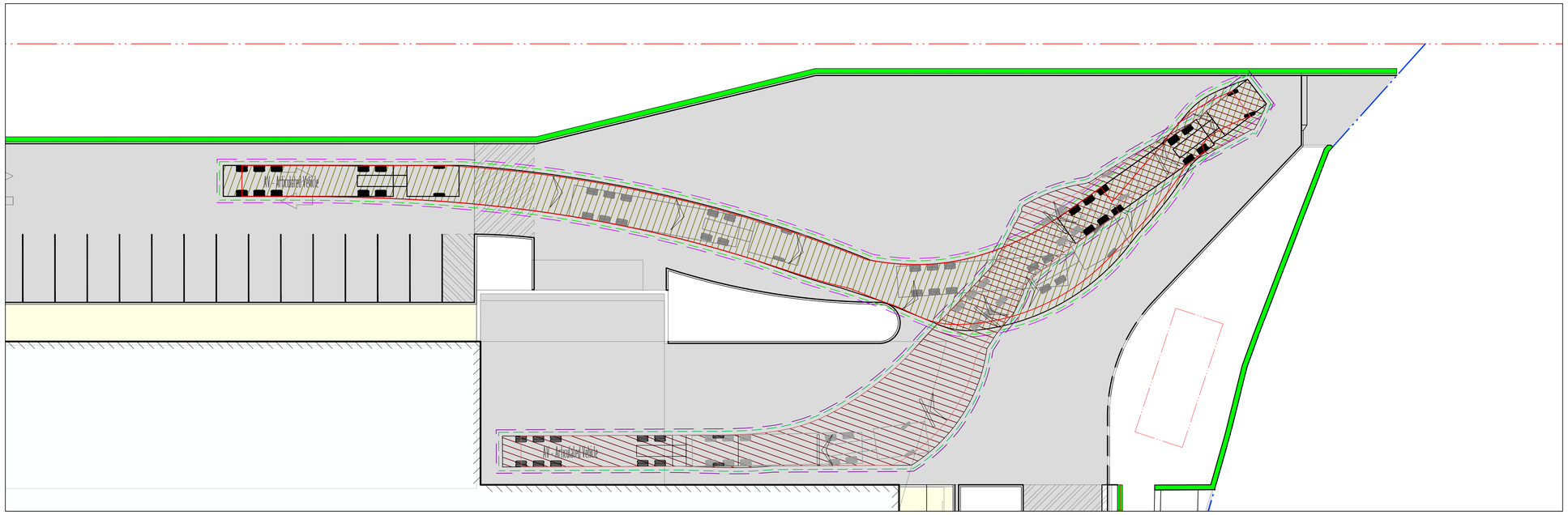
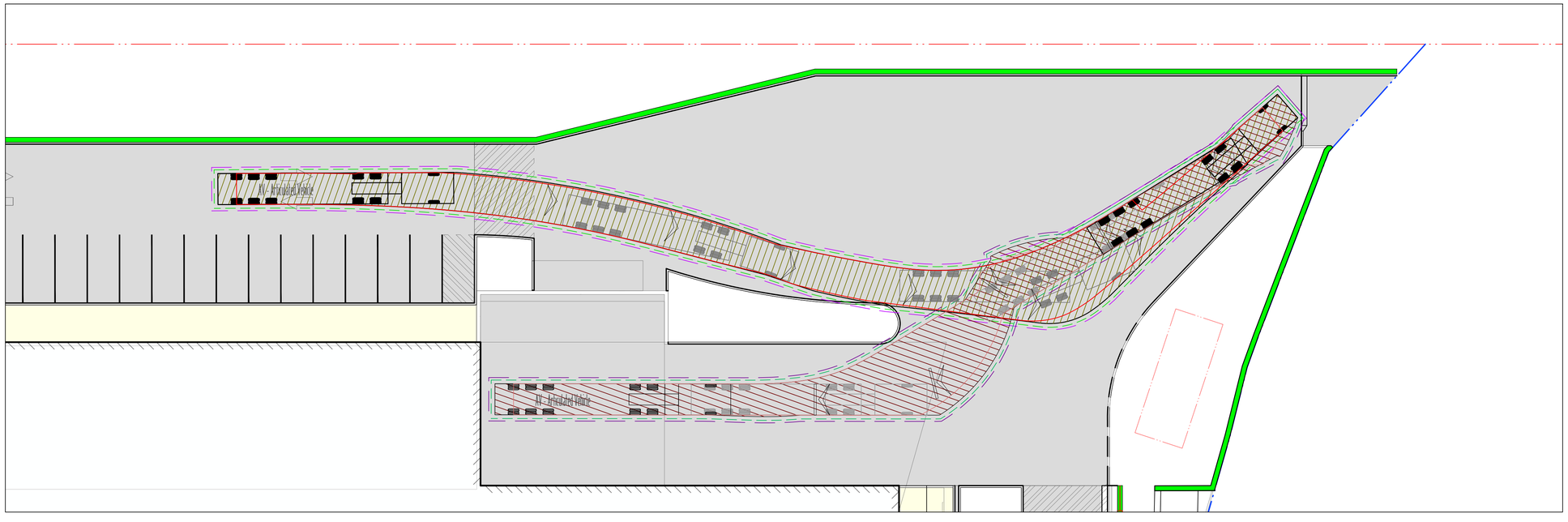


LOADING DOCK ENTRY MANOEUVRE A



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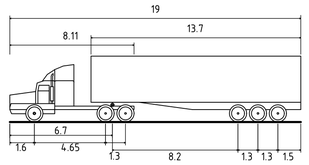
VEHICLE PROFILE



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OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.540m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	5 km/h

VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

REVERSE MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
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D	ISSUED FOR COORDINATION	DM	KS	EG	18.03.24
E	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	20.03.24

CLIENT

Monteath & Powys M&P

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ARCHITECT

EJE architecture

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PROJECT
PROPOSED RETAIL DEVELOPMENT
42 FULLERTON COVER ROAD
FULLERTON COVE
2318

DRAWING TITLE
CIVIL ENGINEERING PACKAGE

SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 4

JOB NUMBER **NL161067**

DRAWING NUMBER **DA-C05.07**

REVISION **E**

DRAWING SHEET SIZE = A1

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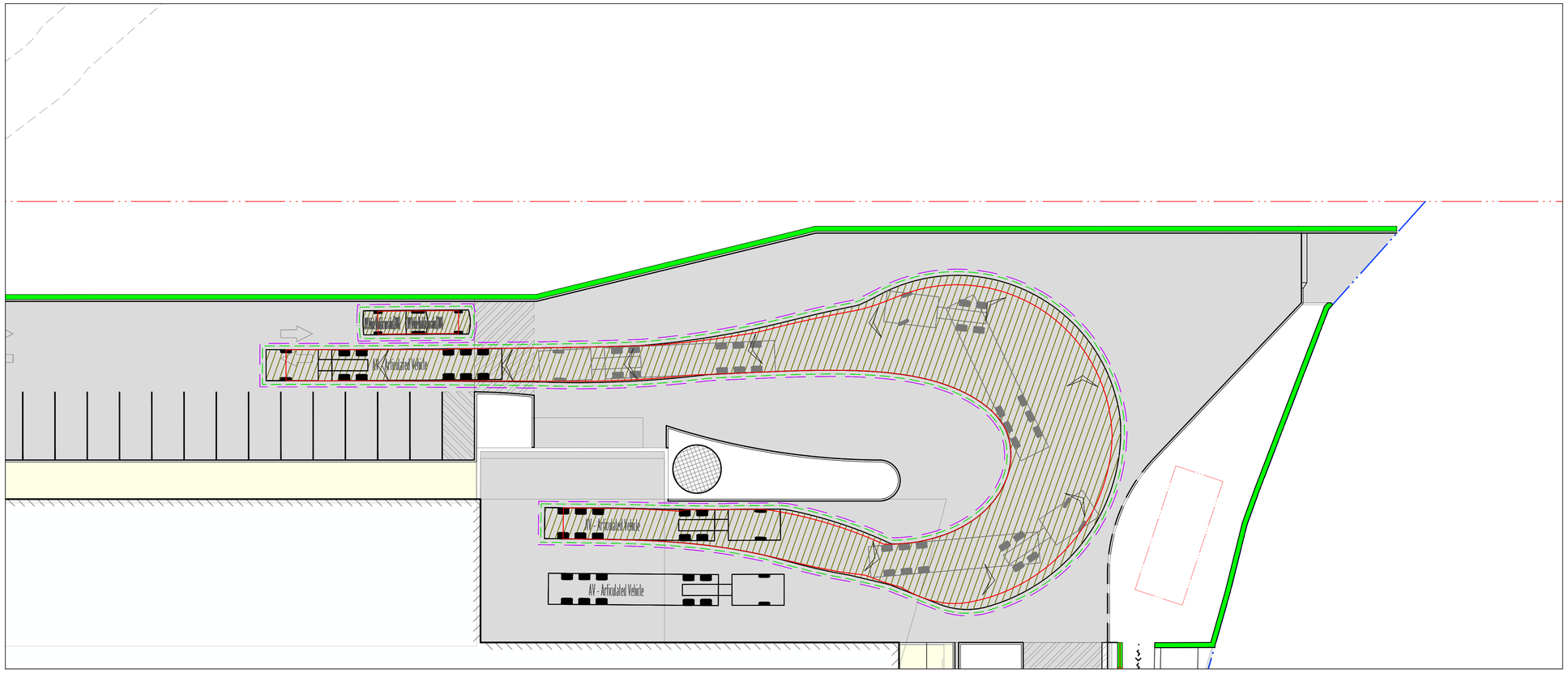
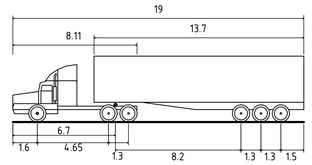


LOADING DOCK EXIT MANOEUVRE

VEHICLE PROFILE



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TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	5 km/h

VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

REVERSE MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE LATERAL CLEARANCE (0.3m FROM BODY)
- VEHICLE LATERAL CLEARANCE (0.5m FROM BODY)

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D	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	20.03.24

CLIENT: Meinhardt & Powys

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ARCHITECT: EJE architecture

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DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

SWEPT PATHS PLAN - AV MANOEUVRES - SHEET 5

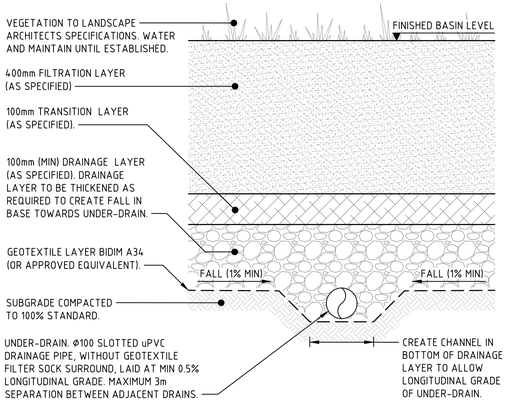
JOB NUMBER: **NL161067**

DRAWING NUMBER: **DA-C05.08**

REVISION: **D**

DRAWING SHEET SIZE = A1

Date: 29.11.2024 9:46 AM Plotted By: DIMITRI MAVROUDIS Found: O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C05.01 SWEPT PATHS PLAN.dwg



BIOFILTRATION MEDIA DETAIL

BIOFILTRATION MATERIAL SPECIFICATION

FILTRATION LAYER

HYDRAULIC CONDUCTIVITY – 200-300mm/hr

PARTICLE SIZE DISTRIBUTION

CLAY AND SILT	– 3%	(<0.05mm)
VERY FINE SAND	– 5-30%	(0.05-0.15mm)
FINE SAND	– 10-30%	(0.15-0.25mm)
MEDIUM TO COARSE SAND	– 40-60%	(0.25-1.0mm)
COARSE SAND	– 7-10%	(1.0-2.0mm)
FINE GRAVEL	– <3%	(2.0-3.4mm)

SOIL-BASED FILTER MEDIA PROPERTIES

TOTAL NITROGEN (TN) CONTENT	– <750mg/kg
ORTHOPHOSPHATE (PO_4^{3-}) CONTENT	– <40mg/kg
ORGANIC MATTER CONTENT	– >3%
pH	– 5.5-7.5
ELECTRICAL CONDUCTIVITY (EC)	– <1.2 dS/m

TRANSITION LAYER

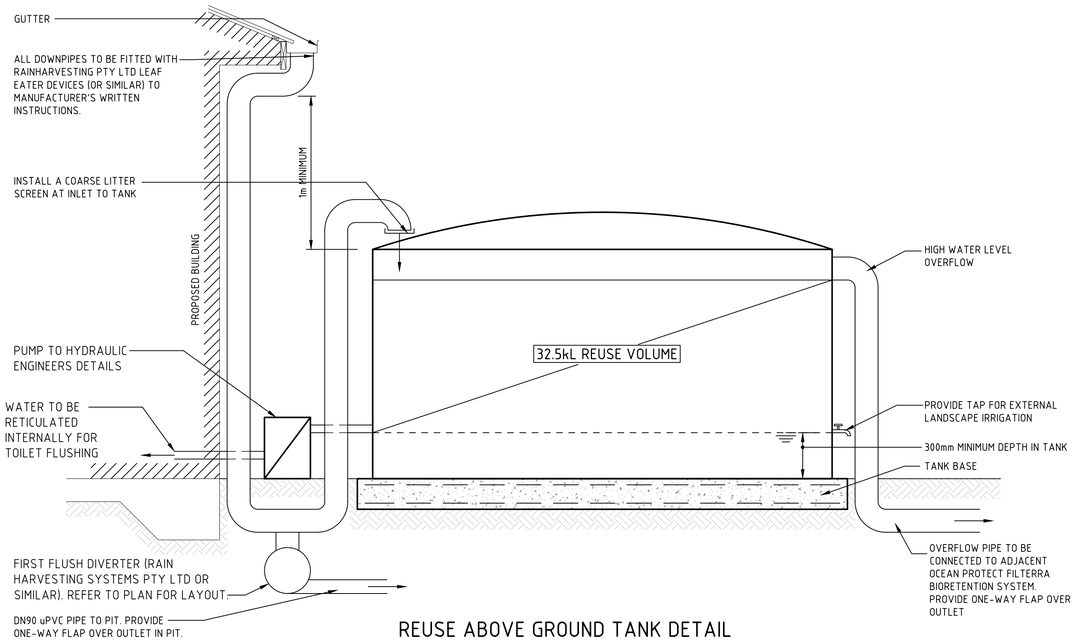
CLEAN, WELL-GRADED SAND / COARSE SAND MATERIAL.

% PASSING	– 1.4mm	100%
	– 1.0mm	80%
	– 0.7mm	44%
	– 0.5mm	8.4%

DRAINAGE LAYER

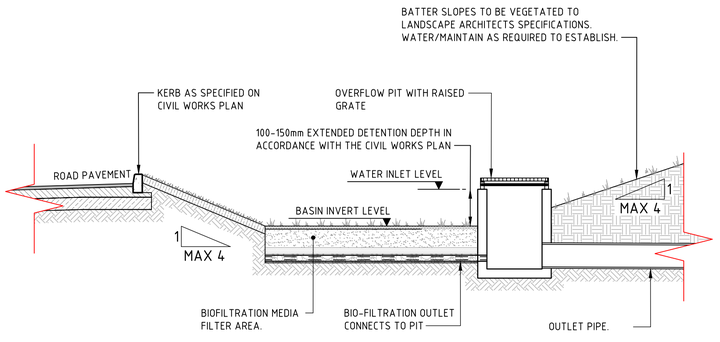
CLEAN, FINE GRAVEL (2-5mm WASHED SCREENINGS)

(REF: GUIDELINE SPECIFICATIONS FOR FILTER MEDIA IN BIORETENTION SYSTEMS, FACILITY FOR ADVANCING WATER BIOFILTRATION (2009))

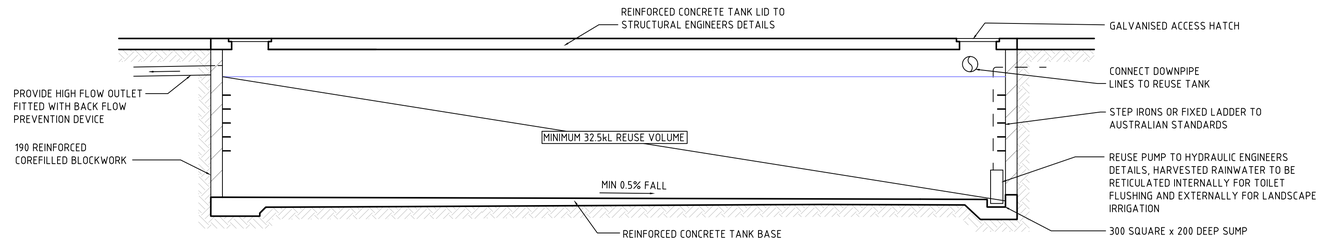


REUSE ABOVE GROUND TANK DETAIL

NOTE: THE ENTIRE PRESSURISED DOWNPIPE SYSTEM SHALL BE AIR TIGHT AND BE ABLE TO WITHSTAND ATMOSPHERIC PRESSURE. THE PIPING SYSTEM SHALL BE MINIMUM SN6 AND FITTINGS WITH INTERNAL ULTRA VIOLET STABILISING (OR APPROVED EQUIVALENT).



TYPICAL BIOFILTRATION BASIN SECTION



BELOW GROUND REUSE TANK SCHEMATIC

DRAWN: D. MAVROUDIS DESIGNED: E. GEARING JOB MANAGER: K. SINCLAIR VERIFIER: K. SINCLAIR

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	DM	KS	EG	08.09.23
B	ISSUED FOR DEVELOPMENT APPLICATION	DM	KS	EG	03.10.23
C	RE-ISSUED FOR DA APPROVAL	DM	KS	EG	20.03.24

CLIENT: M&P Meinhardt & Powys

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ARCHITECT: EJE architecture

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SCALE VARIES

NORTHROP
Newcastle
Level 1, 215 Pacific Hwy, Charlestown NSW 2290
Ph (02) 4943 1777 Email newcastle@northrop.com.au
ABN 81 094 433 100

PROJECT: **PROPOSED RETAIL DEVELOPMENT 42 FULLERTON COVER ROAD FULLERTON COVE 2318**

DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

CIVIL DETAILS

JOB NUMBER: **NL161067**

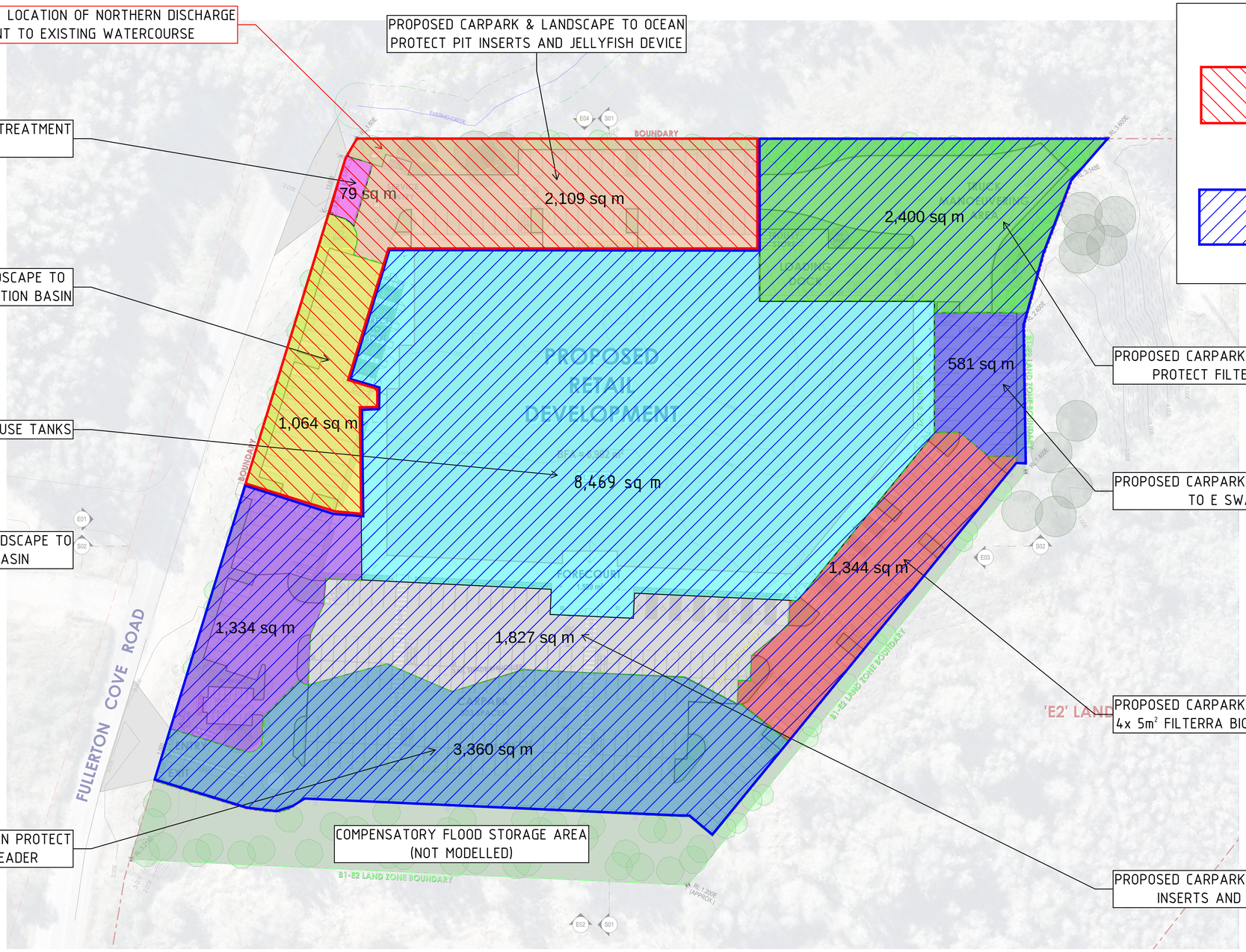
DRAWING NUMBER: **DA-C09.01**

REVISION: **C**

DRAWING SHEET SIZE = A1

Date : 29.11.2024 9:46 AM Plotted By : DIMITRI MAVROUDIS Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2016 Jobs\NL161067\O - Drawings\CIVIL\DA\NL161067-DA-C09.01 CIVIL DETAILS.dwg

Appendix B – Catchment Plan



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REV	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	EG		KS	13.09.23

CLIENT: Monteath & Powys

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ARCHITECT: EJE architecture

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NORTHROP
Newcastle
Suite 4, 215 Pacific Hwy, Charlestown NSW 2290
P.O. Box 180, Charlestown NSW 2290
Ph (02) 4943 1777 Fax (02) 4943 1577
Email newcastle@northrop.com.au ABN 81 094 433 100

PROJECT: 42 FULLERTON ROAD, FULLERTON COVE

DRAWING TITLE: STORMWATER QUALITY CATCHMENT PLAN

JOB NUMBER: NL161067

DRAWING NUMBER:

REVISION: A

DRAWING SHEET SIZE = A1

VERIFIER:
JOB MANAGER:
DESIGNED:
DRAWN:

Appendix C – MUSIC Link Report

PORT STEPHENS COUNCIL

music*e*link

MUSIC-*link* Report

Project Details		Company Details	
Project:	NL161067 - Fullerton Cove Retail Development	**Company:**	Northrop Consulting Engineers
Report Export Date:	11/09/2023	**Contact:**	Emma Gearing
Catchment Name:	NL161067_FULLERTON COVE RETAIL DEVELOPMENT	**Address:**	Level 1, 215 Pacific Highway, Charlestown NSW 2290
Catchment Area:	2.258ha	**Phone:**	02 4943 1777
Impervious Area*:	91.25%	**Email:**	egearing@northrop.com.au
Rainfall Station:	WILLIAMTOWN RAAF - Station 061078 - Zone B		
Modelling Time-step:	6 Minutes		
Modelling Period:	1/01/1998 - 31/12/2007 11:54:00 PM		
Mean Annual Rainfall:	1125mm		
Evapotranspiration:	1394mm		
MUSIC Version:	6.3.0		
MUSIC-link data Version:	6.34		
Study Area:	Williamtown		
Scenario:	Sensitive Catchment - Sandy soils		

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

Treatment Train Effectiveness		Treatment Nodes		Source Nodes	
Node: Post-Development Node	**Reduction**	**Node Type**	**Number**	**Node Type**	**Number**
Flow	7.8%	Rain Water Tank Node	2	Urban Source Node	11
TSS	90.9%	Swale Node	3		
TP	66.7%	Bio Retention Node	4		
TN	55.4%	Generic Node	2		
GP	99.6%	GPT Node	3		

Comments

The preliminary development treatment train proposes the use of the Ocean Protect proprietary products including the Oceanguard pit inserts, Jellyfish filter and Filterra Bioretention basin. The MUSIC model implements Ocean Protect's standard treatment nodes for these products based on NSW treatment standards.

Swale bed fails to meet 1% minimum grade

-W Swale: the site boundary levels, maximum carpark grade and swale location do not allow adequate fall in the swale to then ensure the downstream bioretention basin has sufficient depth to treat and drain to the outlet.

-S Swale/Level Spreader the proposed location of the swale is within the flood storage are and accordingly does not facilitate enough fall through the swale to achieve minimum 1%. The intent of the swale is to convert concentrated flows to sheet flow by distributing flows evenly across the top of the swale, whilst providing some treatment through storage of the water.

Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Bio	15m2 Bioretention	Hi-flow bypass rate (cum/sec)	None	None	100
Bio	15m2 Bioretention	PET Scaling Factor	2.1	2.1	2.1
Bio	30m2 Bioretention	Hi-flow bypass rate (cum/sec)	None	None	100
Bio	30m2 Bioretention	PET Scaling Factor	2.1	2.1	2.1
Bio	Filterra Bioretention- 20m	Hi-flow bypass rate (cum/sec)	None	None	100
Bio	Filterra Bioretention- 20m	PET Scaling Factor	2.1	2.1	2.1
Bio	Filterra Bioretention- 40m	Hi-flow bypass rate (cum/sec)	None	None	100
Bio	Filterra Bioretention- 40m	PET Scaling Factor	2.1	2.1	2.1
GPT	3 x OceanGuard	Hi-flow bypass rate (cum/sec)	None	99	0.06
GPT	4 x OceanGuard	Hi-flow bypass rate (cum/sec)	None	99	0.08
GPT	5 x OceanGuard	Hi-flow bypass rate (cum/sec)	None	99	0.1
Post	Post-Development Node	% Load Reduction	None	None	7.8
Post	Post-Development Node	GP % Load Reduction	90	None	99.6
Post	Post-Development Node	TN % Load Reduction	45	None	55.4
Post	Post-Development Node	TP % Load Reduction	60	None	66.7
Post	Post-Development Node	TSS % Load Reduction	90	None	90.9
Rain	Rainwater Tank	% Reuse Demand Met	None	None	80.68
Rain	Rainwater Tank	% Reuse Demand Met	None	None	80.68
Swale	E Swale	Bed slope	0.01	0.05	0.0325
Urban	BYPASS CARPARK	Area Impervious (ha)	None	None	0.008
Urban	BYPASS CARPARK	Area Pervious (ha)	None	None	0
Urban	BYPASS CARPARK	Total Area (ha)	None	None	0.008
Urban	CARPARK	Area Impervious (ha)	None	None	0.183
Urban	CARPARK	Area Impervious (ha)	None	None	0.167
Urban	CARPARK	Area Impervious (ha)	None	None	0.168
Urban	CARPARK	Area Impervious (ha)	None	None	0.120
Urban	CARPARK	Area Impervious (ha)	None	None	0.086
Urban	CARPARK	Area Impervious (ha)	None	None	0.052
Urban	CARPARK	Area Impervious (ha)	None	None	0.096
Urban	CARPARK	Area Impervious (ha)	None	None	0.329
Urban	CARPARK	Area Pervious (ha)	None	None	0
Urban	CARPARK	Area Pervious (ha)	None	None	0.072
Urban	CARPARK	Area Pervious (ha)	None	None	0.042
Urban	CARPARK	Area Pervious (ha)	None	None	0.013
Urban	CARPARK	Area Pervious (ha)	None	None	0.020
Urban	CARPARK	Area Pervious (ha)	None	None	0.005
Urban	CARPARK	Area Pervious (ha)	None	None	0.036
Urban	CARPARK	Area Pervious (ha)	None	None	0.006
Urban	CARPARK	Total Area (ha)	None	None	0.183
Urban	CARPARK	Total Area (ha)	None	None	0.24

Only certain parameters are reported when they pass validation

Node Type	Node Name	Parameter	Min	Max	Actual
Urban	CARPARK	Total Area (ha)	None	None	0.211
Urban	CARPARK	Total Area (ha)	None	None	0.134
Urban	CARPARK	Total Area (ha)	None	None	0.107
Urban	CARPARK	Total Area (ha)	None	None	0.058
Urban	CARPARK	Total Area (ha)	None	None	0.133
Urban	CARPARK	Total Area (ha)	None	None	0.336
Urban	ROOF	Area Impervious (ha)	None	None	0.424
Urban	ROOF	Area Impervious (ha)	None	None	0.424
Urban	ROOF	Area Pervious (ha)	None	None	0
Urban	ROOF	Area Pervious (ha)	None	None	0
Urban	ROOF	Total Area (ha)	None	None	0.424
Urban	ROOF	Total Area (ha)	None	None	0.424

Only certain parameters are reported when they pass validation

Failing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Bio	Filterra Bioretention- 20m²	Orthophosphate Content in Filter (mg/kg)	40	50	1
Bio	Filterra Bioretention- 20m²	Saturated Hydraulic Conductivity (mm/hr)	100	100	3550
Bio	Filterra Bioretention- 20m²	Total Nitrogen Content in Filter (mg/kg)	750	950	500
Bio	Filterra Bioretention- 40m²	Orthophosphate Content in Filter (mg/kg)	40	50	1
Bio	Filterra Bioretention- 40m²	Saturated Hydraulic Conductivity (mm/hr)	100	100	3550
Bio	Filterra Bioretention- 40m²	Total Nitrogen Content in Filter (mg/kg)	750	950	500
Swale	S Swale/Level spreader	Bed slope	0.01	0.05	0.005
Swale	W Swale	Bed slope	0.01	0.05	0.0067

Only certain parameters are reported when they pass validation

Appendix D – Flood Certificate

FLOOD CERTIFICATE

File No: PSC2013-05401
Issue date: 30-Sep-20
Property ID: 14269

Laurence Gitzel
Level 1, 215 Pacific Highway
Charlestown NSW 2290

Certificate number: 83-2020-592-1

Property details: 42 Fullerton Cove Road FULLERTON COVE LOT: 14 DP: 258848

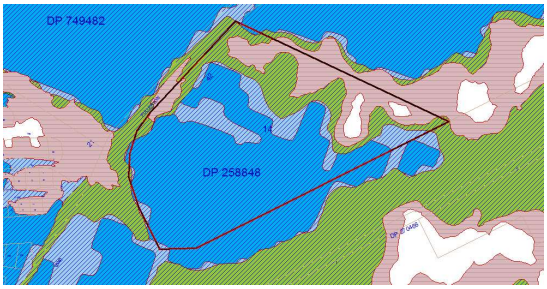
Thank you for your recent flood enquiry regarding the above property. This certificate confirms that this property **is** located in a **flood prone** area. This **is** a "flood control lot" for the purposes of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*.

Flood Planning Level	**2.9 metres AHD** (velocity = 0.1 m/s)	(This level defines the minimum floor level for habitable rooms and land that is subject to flood-related development controls (refer to Port Stephens LEP Section 7.3, Port Stephens DCP Section B5).
Highest Hazard Category	**High Hazard Flood Storage**	

Flood levels that may be useful are:

Probable maximum flood level	5.3 metres AHD (velocity = 1.0 m/s)	(The highest flood level that could conceivably occur at this location. If required, onsite flood refuges are built at or above this level, refer to the Port Stephens Development Control Plan B5.2)
Current day 1% AEP flood level	1.7 metres AHD	(This level is useful for insurance purposes, refer to your insurance policy and the Insurance Contracts Regulation 1985 (Cwealth).)
Adaptable minimum floor level	2.7 metres AHD	(The 1% AEP flood level plus 0.5m, 50 years from now, refer to the Port Stephens Development Control Plan B5.2.)
Minimum onsite wastewater level	1.8 metres AHD	(The 5% AEP level 50 years from now, refer to the Port Stephens On-site Sewage Management Development Assessment Framework and AS/NZS 1547:2012 5.5 land application system design.)

Flooding extent on subject lot, categorised by hazard



Flood Hazard Categories

- Flood Prone Land
- Flood Planning Level
- Low Hazard Flood Fringe area
- Low Hazard Flood Storage area
- Low Hazard Overland Flow Path area
- Low Hazard Floodway area
- High Hazard Flood Fringe area
- High Hazard Flood Storage area
- High Hazard Overland Flow Path area
- High Hazard Floodway area
- Flood Prone Land subject to further investigation

Information derived from Port Stephens Council 2017, Williamtown / Salt Ash Floodplain Risk Management Study & Plan, BMT WBM, Newcastle.

PORT STEPHENS COUNCIL

116 Adelaide Street
Raymond Terrace NSW 2324

PO Box 42
Raymond Terrace NSW 2324

Phone: 02 4980 0255
Email: council@portstephens.nsw.gov.au

www.portstephens.nsw.gov.au
ABN 16 744 377 876

IMPORTANT INFORMATION

This Certificate is provided in good faith and in accordance with the provisions of section 733 of the Local Government Act 1993. This certificate provides an estimate of real flood characteristics. Any particular flood may be different to the conditions that were assumed to determine the information shown in this certificate.

The provided flood information has been compiled from information provided by external consultants and flood studies completed by Council in accordance with the NSW Floodplain Development Manual. The information has not been independently verified or checked beyond the agreed scope of work and Council does not accept liability in connection with unverified information.

Council acknowledges that its flood information may be incomplete and varying in accuracy, however it is the best information available to Council at the time of issue.

The information is provided to give the applicant an understanding as to the extent of flooding affecting the property as well as assist in the preparation of a Floodplain Risk Management Report. The information is subject to change if more accurate data becomes available to Council. Accordingly the information in this certificate is not warranted after the day of issue.

Council is not responsible for updating flood data when site conditions have change from the time of the original flood study and does not accept responsibility arising from any change in site conditions.

Where the relevant information is available, Council's Flood Planning Levels include the estimated impact of climate change.

Council recommends that the information contained in this Certificate be interpreted by a suitably qualified professional. It is the responsibility of the applicant to obtain survey level data (in metres AHD) for the site.

Council disclaims responsibilities to any other person other than the person nominated on the Flood Certificate arising from or in connection with the information provided.

The floor level survey for the property (if available) is based on the conditions on the date of the survey. Any changes to buildings since the survey may alter the appropriate floor level. Refer to the Port Stephens LEP 2013 Section 7.3 and Port Stephens Development Control Plan Section B5 for details on development controls on flood prone land.

For information, the insurance industry uses its own estimates of flood risk and its own definitions for flooding, which may differ when compared with Council's information and the NSW Floodplain Development Manual. You should contact your insurance company to find out if a flood certificate may influence your insurance premium.

The information provided may contain personal information as defined under the Privacy and Personal Information Protection Act 1998. The purpose of collecting this information is to enable Council to consider matters under related legislation, issue related documentation where required and other associated matters as provided by law and will be utilised by Council officers in assessing the proposal and other associated activities. The information may also be made available to other persons in accordance with the relevant Acts and regulations, such as the Government Information (Public Access) Act 2009 and will be stored in Council's record system.

DEFINITIONS

"Flood Planning Level" defines the area of land below the 1% AEP flood event in the year 2100 plus freeboard and is the area of land subject to flood-related development controls (refer to Port Stephens LEP Section 7.3, Port Stephens Development Control Plan Section B5). The Flood Planning Level defines the minimum floor level for habitable rooms.

"Freeboard" is a safety margin applied to the estimation of flood levels to compensate for uncertainties due to factors such as wave action, localised hydraulic behaviour (eg flow path blockages caused by natural and urban debris such as trees, 'wheelie' bins, cars, containers) and changes in rainfall patterns and ocean water levels as a result of the changing climate (refer Flood Manual Section 4).

"Habitable room" in a residential situation is a living or working area, such as a lounge room, dining room, rumpus room, kitchen, bedroom or workroom; in an industrial or commercial situation is an area used for offices or to store valuable possessions susceptible to flood damage (refer Flood Manual Section 4).

"Adaptable minimum floor level" is the reduced flood planning level allowed in Council's Development Control Plan where the proposed development facilitates ongoing flood adaptation (for example, where the design facilitates building raising in the future, such as a pier and beam housing design).

"Probable maximum flood level" is the flood level that arises from the largest flood that could conceivably occur at a particular location (the "PMF" or extreme design event). This level does not include any freeboard and provides an upper limit of flooding and associated consequences for the problem being investigated. It is used for emergency response planning purposes to address the safety of people and defines the floodplain and identifies "Flood Prone" land.

"AEP" (Annual Exceedance Probability) is the chance of a flood of a given or larger size occurring in any one year (for example, the 1% AEP event has a 1% chance of occurring every year; the 5% AEP event has a 5% chance of occurring every year).

"Surveyed floor level" is the surveyed level at the entrance to the residence, usually measured as part of the floodplain risk management plan undertaken for the area.

"AHD" (Australian Height Datum) a common national survey level datum, approximately corresponding to mean sea level set in the mid to late 1960s.

Hazard Categories

"High hazard" flood area is the area of flood which poses a possible danger to personal safety, where the evacuation of trucks would be difficult, where able-bodied adults would have difficulty wading to safety or where there is a potential for significant damage to buildings (refer Flood Manual Appendix L).

"Low hazard" flood area is the area of flood where, should it be necessary, a truck could evacuate people and their possessions or an able-bodied adult would have little difficulty in wading to safety (refer Flood Manual Appendix L).

Hydraulic Categories

"Floodways" are those areas where a significant volume of water flows during floods and are often aligned with obvious natural channels. They are areas that, even if only partially blocked, would cause a significant increase in flood levels and/or a significant redistribution of flood flow, which may in turn adversely affect other areas (refer Flood Manual Section 4).

"Overland flow path" is land inundated by local runoff on its way to a waterway, rather than overbank flow from a stream, river, estuary, lake or dam (refer Flood Manual Section 4).

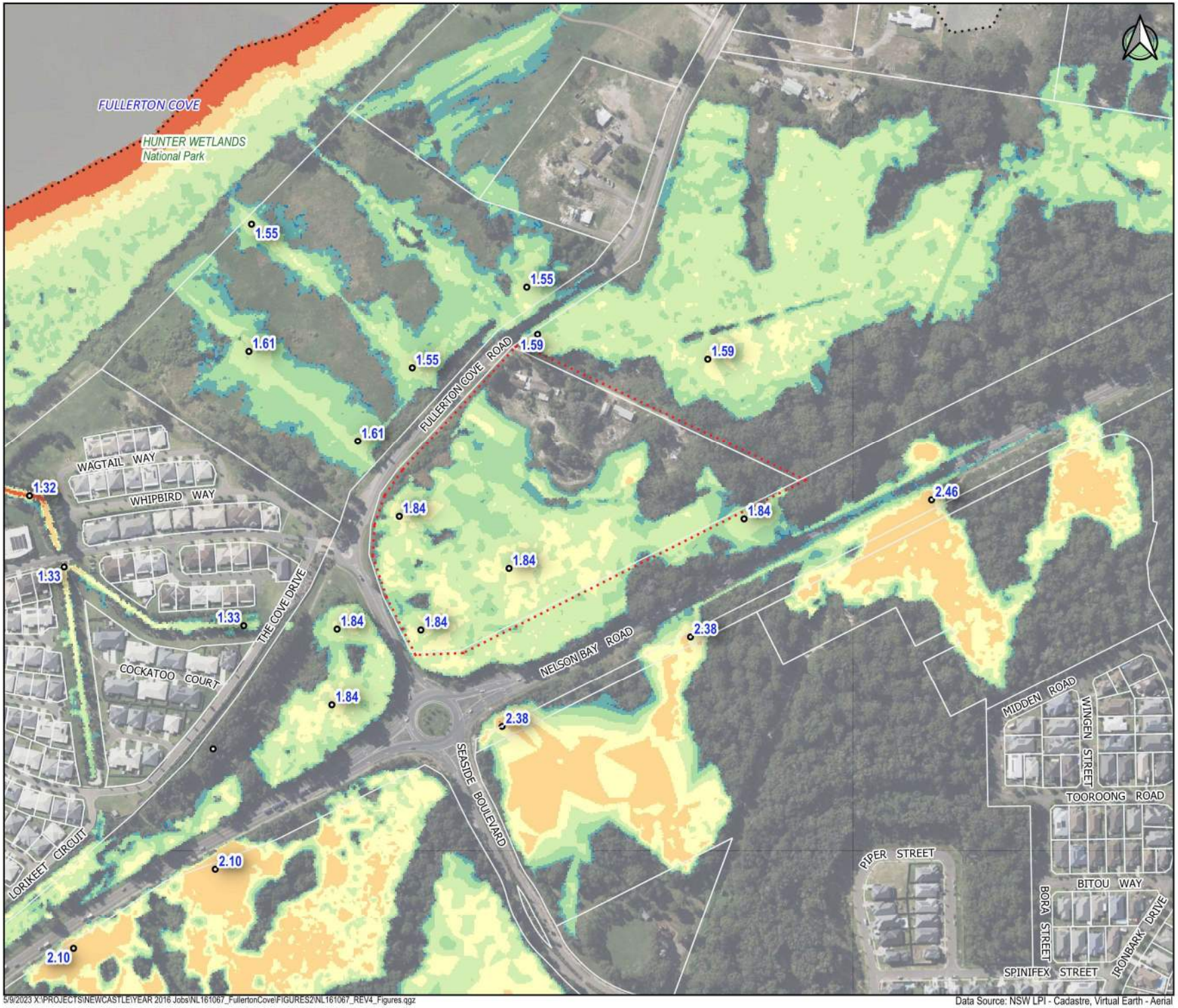
"Flood Storage" areas are those parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood. The loss of storage areas may increase the severity of flood impacts by reducing natural flood attenuation (refer Flood Manual Section 4).

"Flood Fringe" is the remaining land in the Flood Planning Area after the Floodway area and Flood Storage area have been defined (refer Flood Manual Section 4).

"Flood Prone Land subject to further investigation" refers to the area of land susceptible to flooding where a comprehensive technical investigation of flood behaviour (to define the variation over time of flood levels, extent, velocity, flood hazard and the Flood Planning Level up to and including the probable maximum flood) has not yet been carried out (refer Flood Manual Appendix F).

"Minimal Risk Flood Prone Land" is land on the floodplain that is above the Flood Planning Level. This means that there are no flood-related development controls that apply to residential development, but critical emergency response and recovery facilities, such as evacuation centres and vulnerable development types, such as aged care and child care facilities, may not be appropriate in this location.

Appendix E – Existing Case Figures



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Water Level (mAHD)

Depth(m)

- < 0.01
- 0.01 - 0.10
- 0.10 - 0.30
- 0.30 - 0.50
- 0.50 - 0.70
- 0.70 - 1.00
- 1.00 - 1.50
- > 1.50

0 80 160 Metres

1:5,000

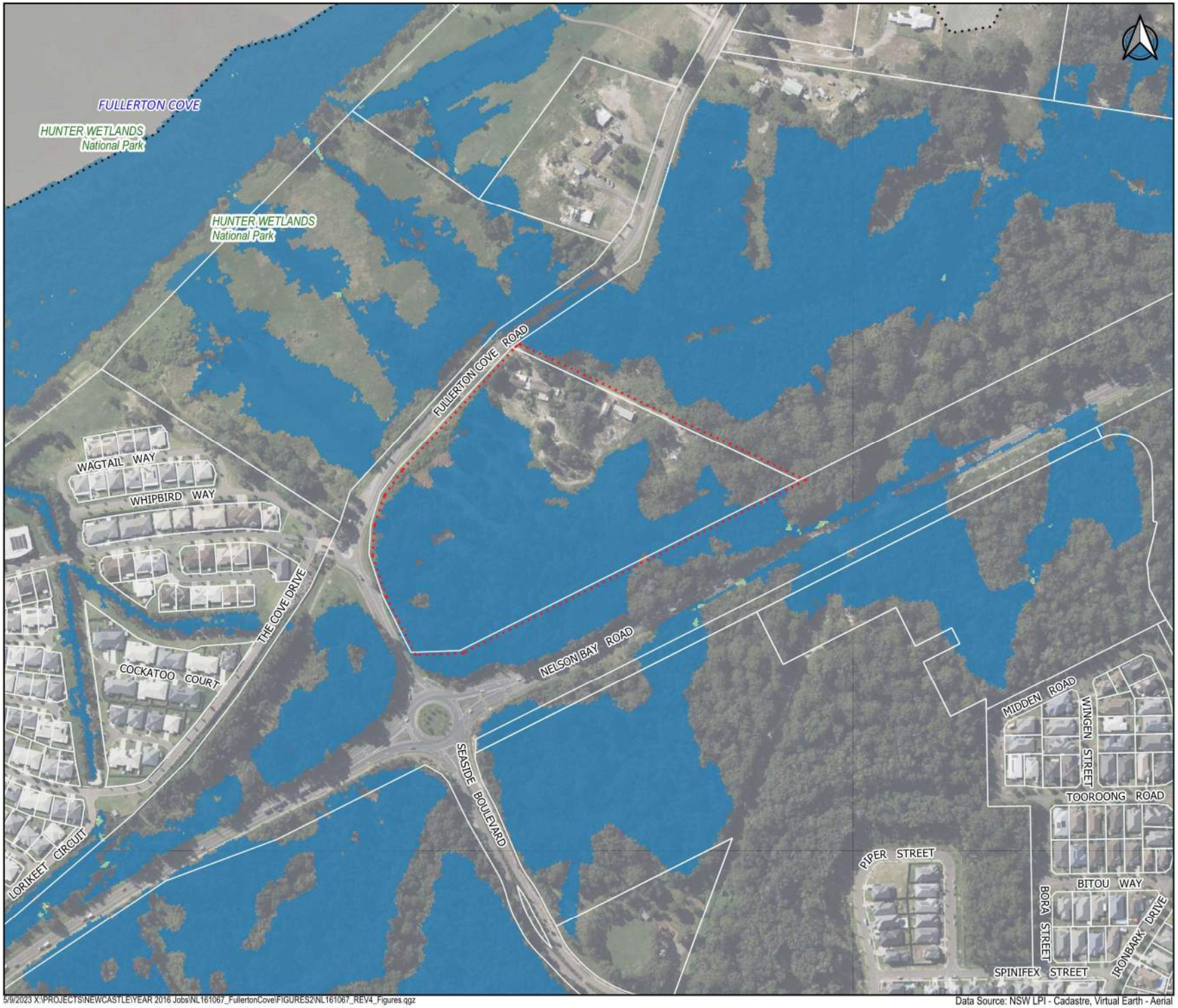
Figure B1

10% AEP Flood Depth and Elevation Existing Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre

Velocity(m/s)

- < 0.25
- 0.25 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

0 80 160 Metres

1:5,000

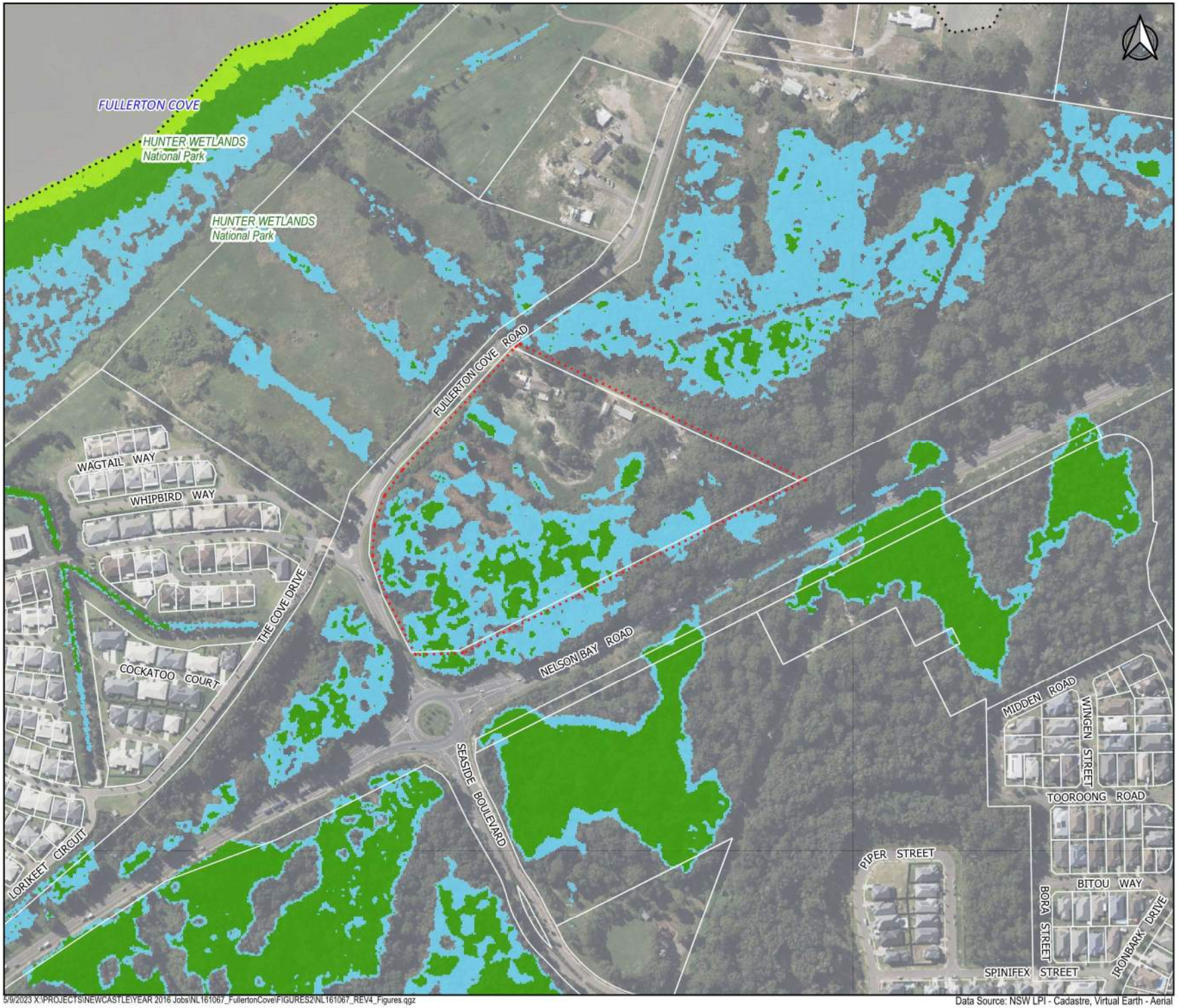
Figure B1-1

10% AEP Flood Velocity
Existing Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre

Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

0 80 160 Metres

1:5,000

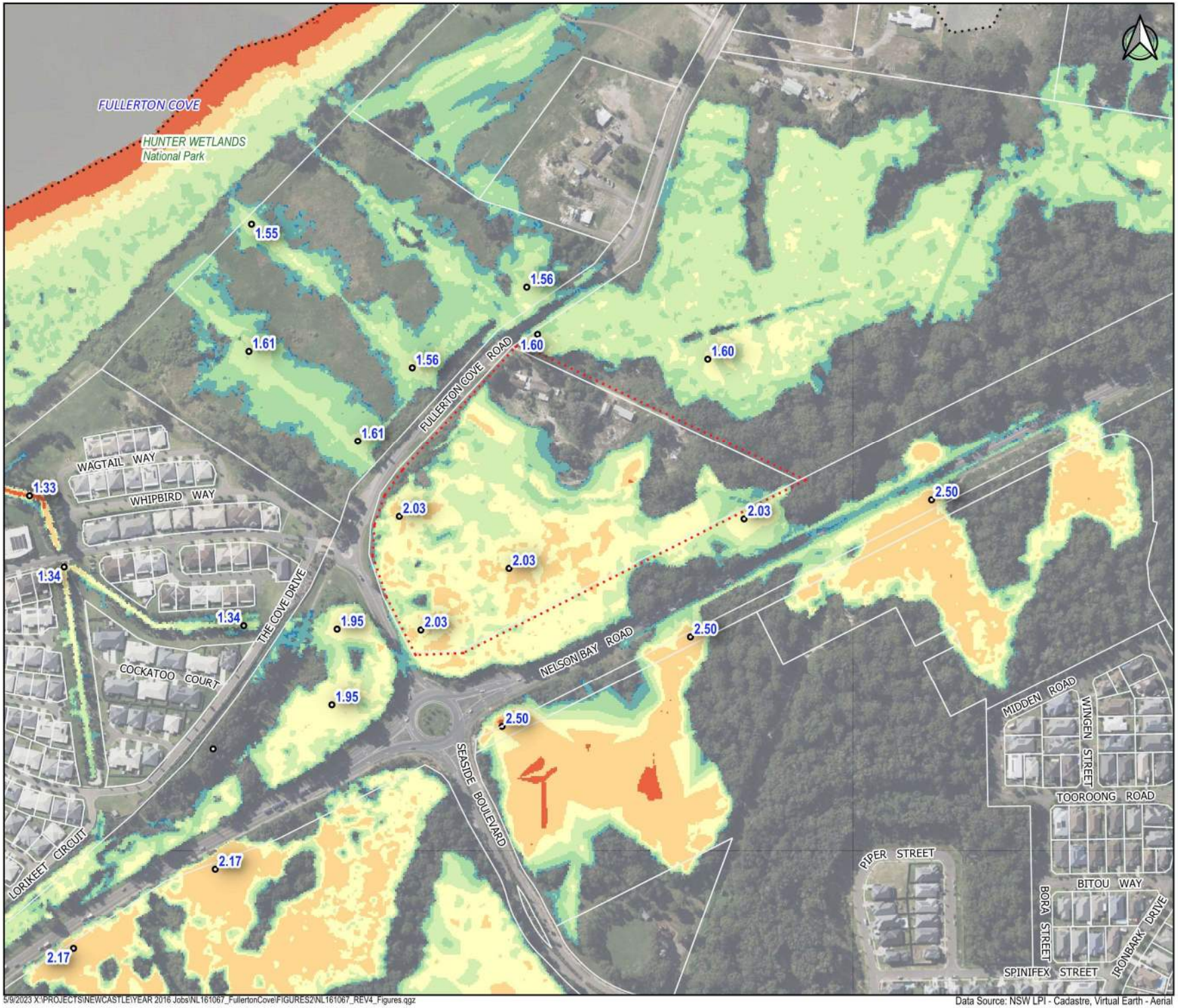
Figure B1-2

10% AEP Flood Hazard Existing Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Water Level (mAHD)

Depth(m)

- < 0.01
- 0.01 - 0.10
- 0.10 - 0.30
- 0.30 - 0.50
- 0.50 - 0.70
- 0.70 - 1.00
- 1.00 - 1.50
- > 1.50

0 80 160 Metres

1:5,000

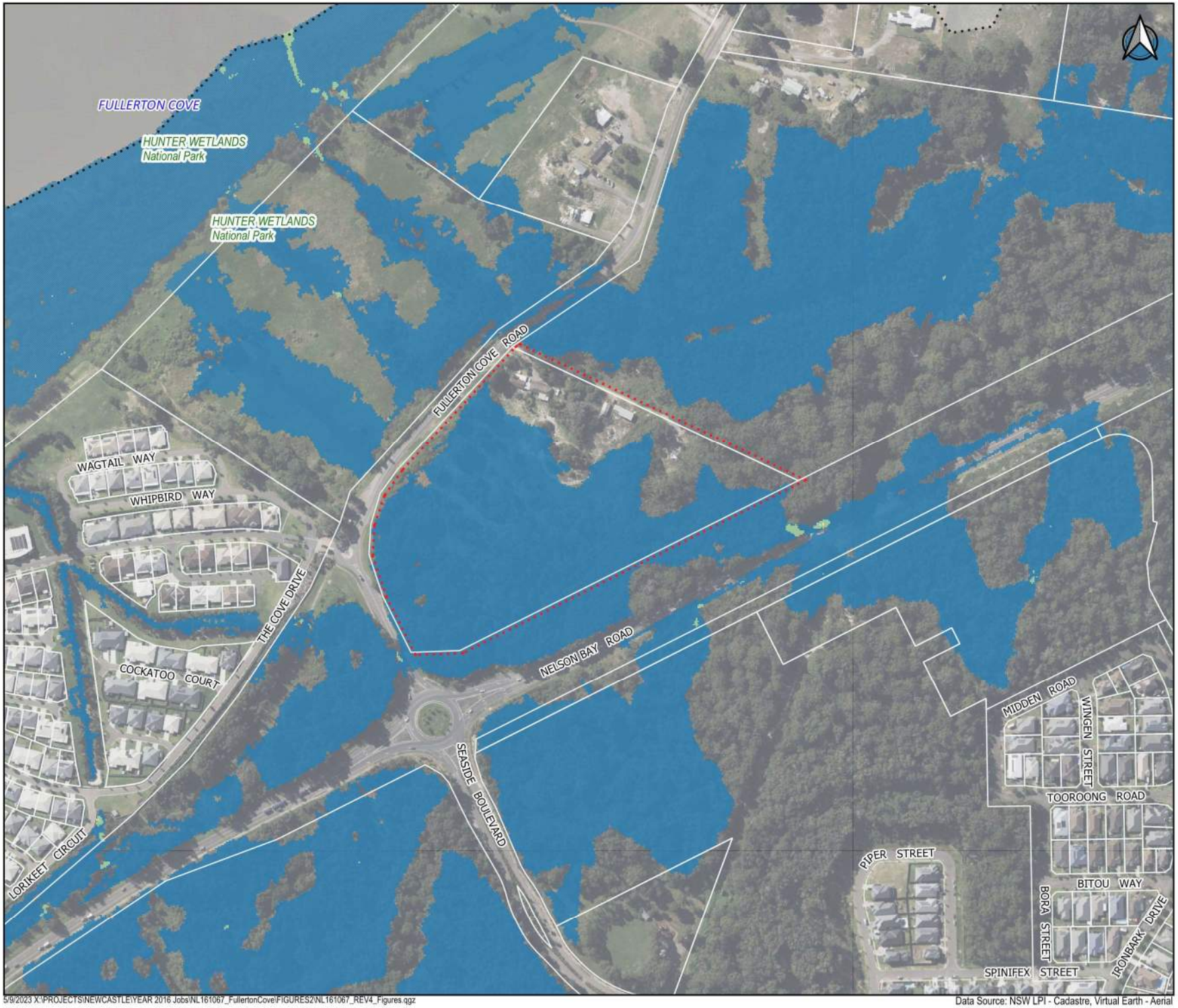
Figure B2

5% AEP Flood Depth and Elevation Existing Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre

Velocity(m/s)

- < 0.25
- 0.25 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

0 80 160 Metres

1:5,000

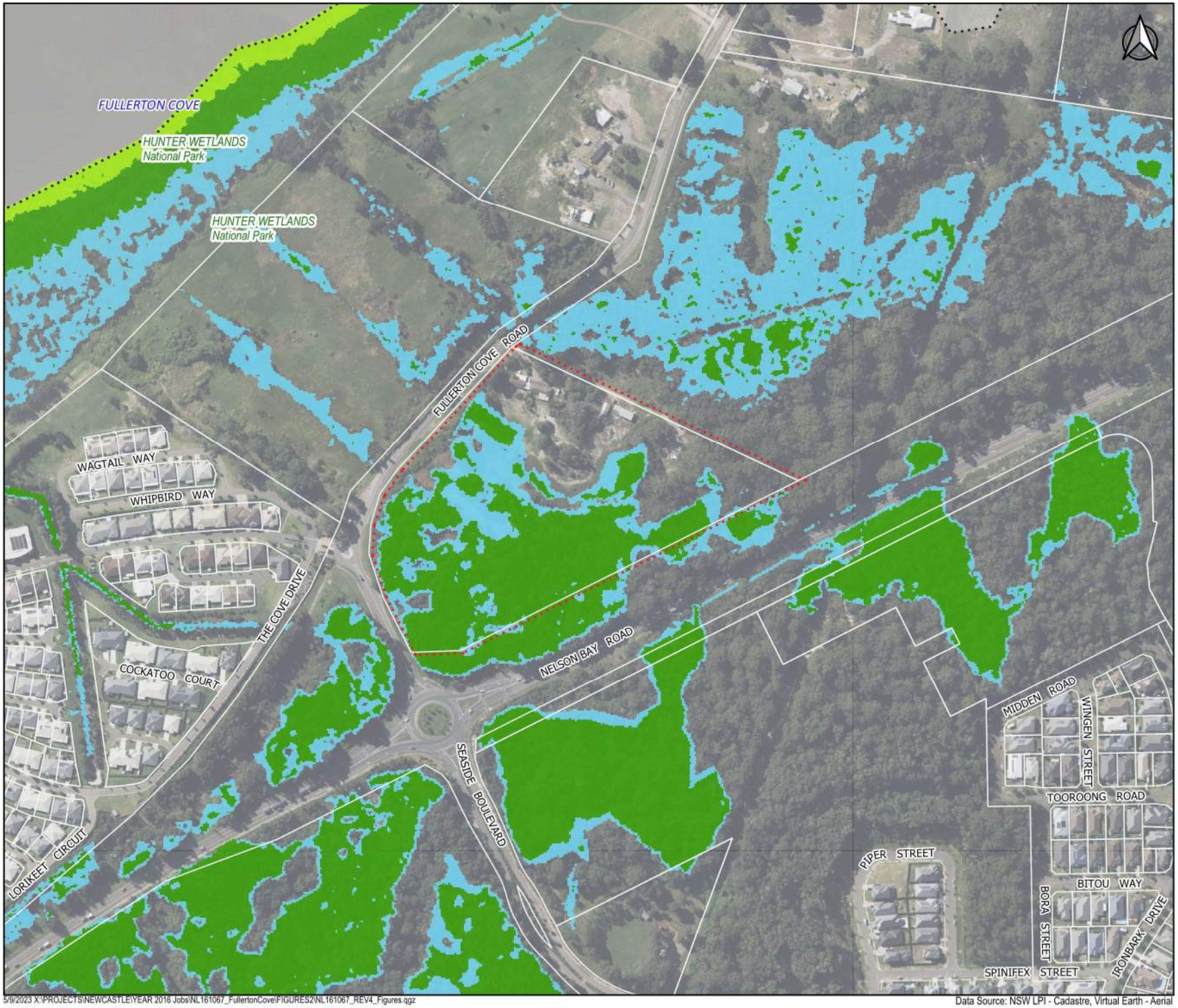
Figure B2-1

5% AEP Flood Velocity Existing Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre

Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

0 80 160 Metres

1:5,000

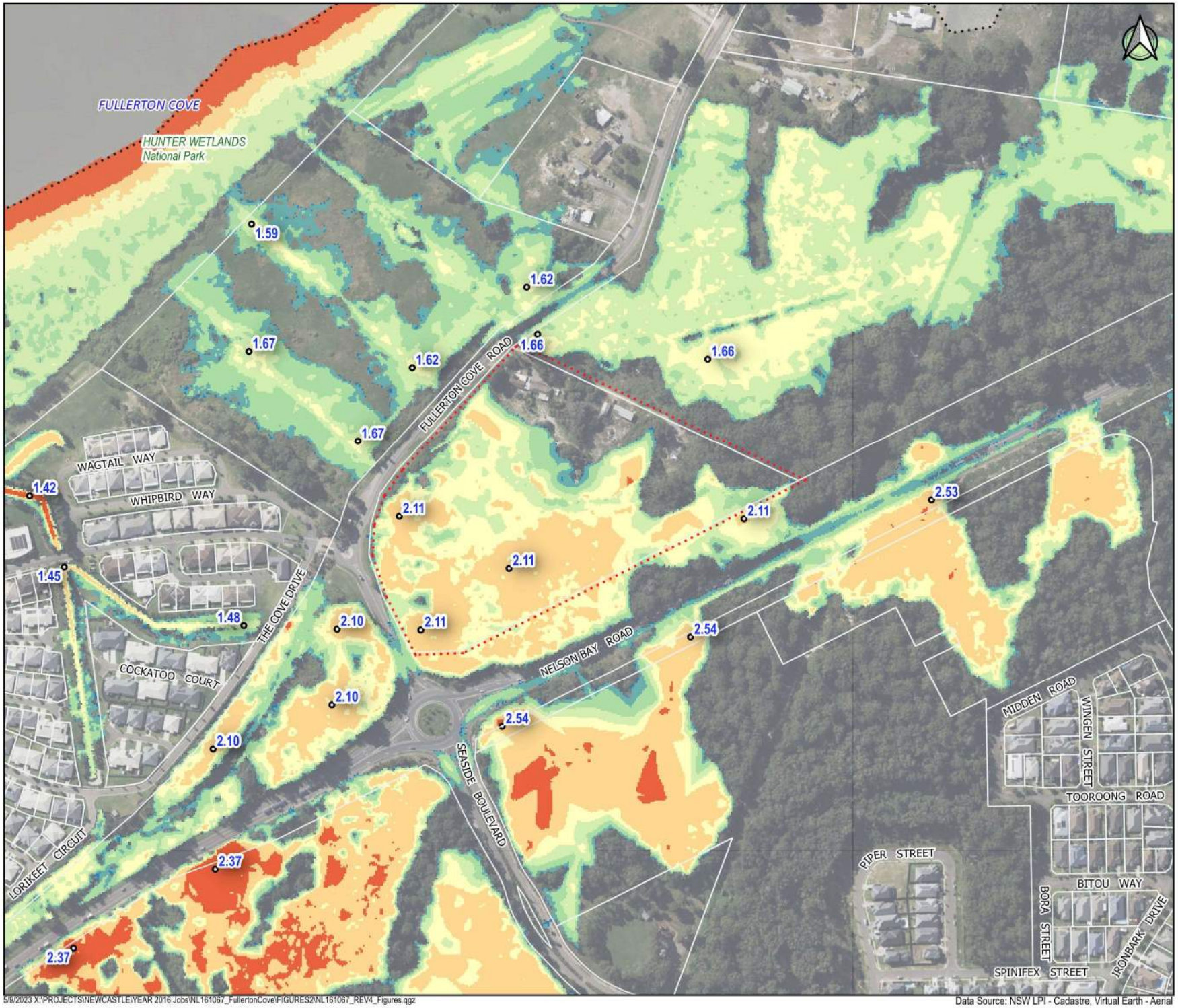
Figure B2-2

5% AEP Flood Hazard
Existing Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Water Level (mAHD)

Depth(m)

- < 0.01
- 0.01 - 0.10
- 0.10 - 0.30
- 0.30 - 0.50
- 0.50 - 0.70
- 0.70 - 1.00
- 1.00 - 1.50
- > 1.50

0 80 160 Metres

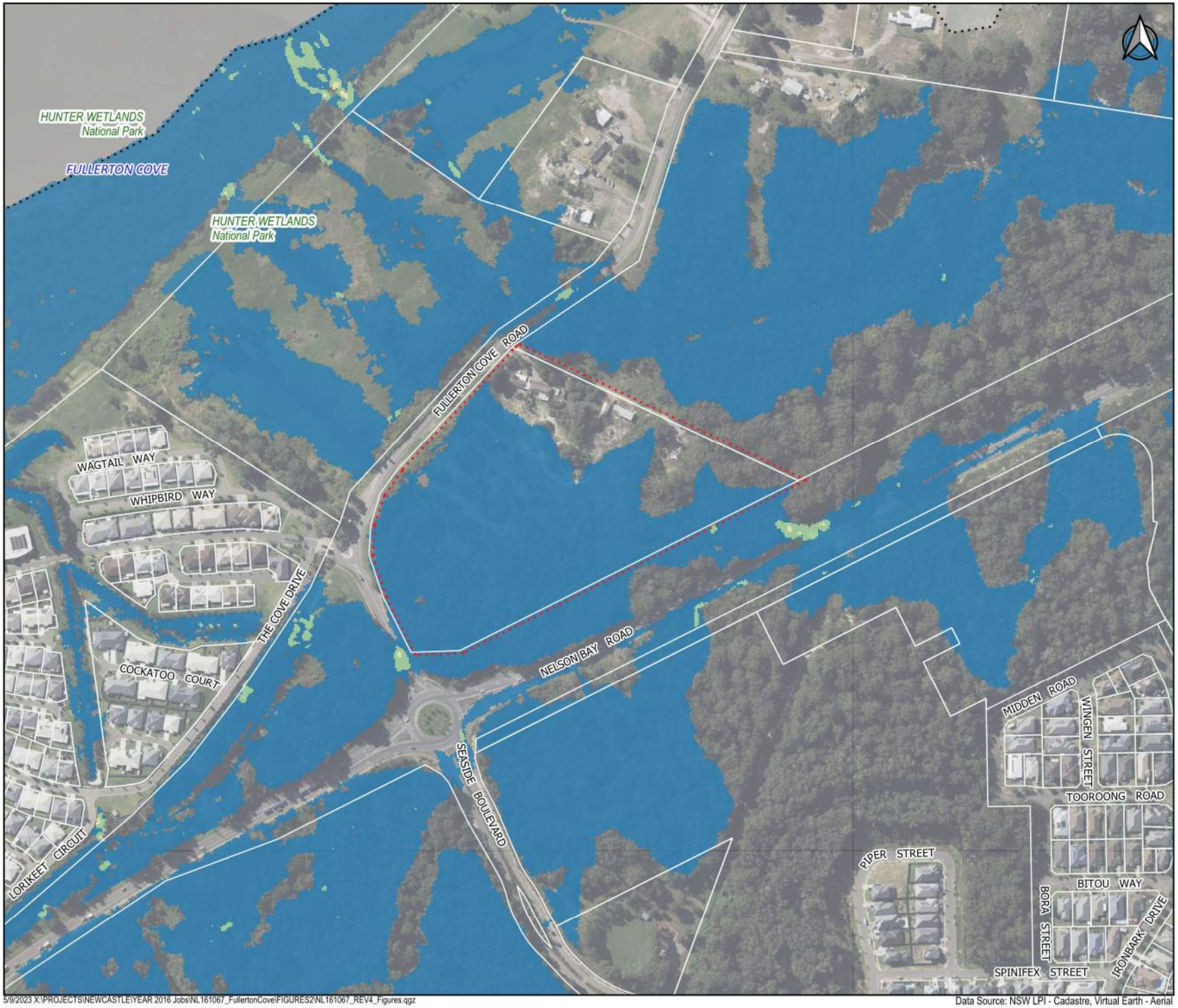
1:5,000

Figure B3

1% AEP Flood Depth and Elevation Existing Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre

Velocity(m/s)

- < 0.25
- 0.25 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

0 80 160 Metres

1:5,000

Figure B3-1

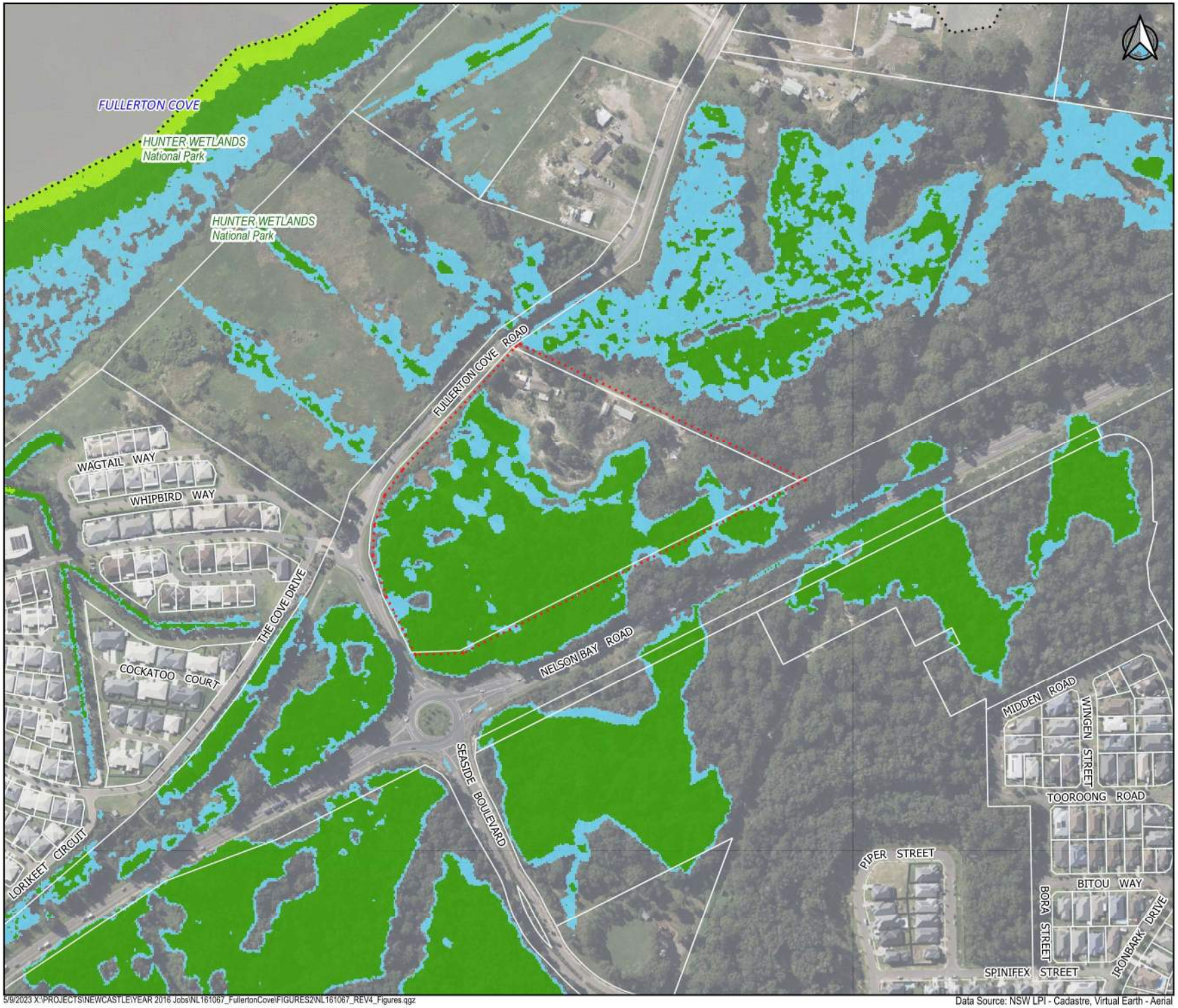
1% AEP Flood Velocity
Existing Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

5/9/2023 X:\PROJECTS\NEWCASTLE\YEAR 2016 Jobs\NL161067_FullertonCove\FIGURES2\NL161067_REV4_Figures.qgz

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre

Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

0 80 160 Metres

1:5,000

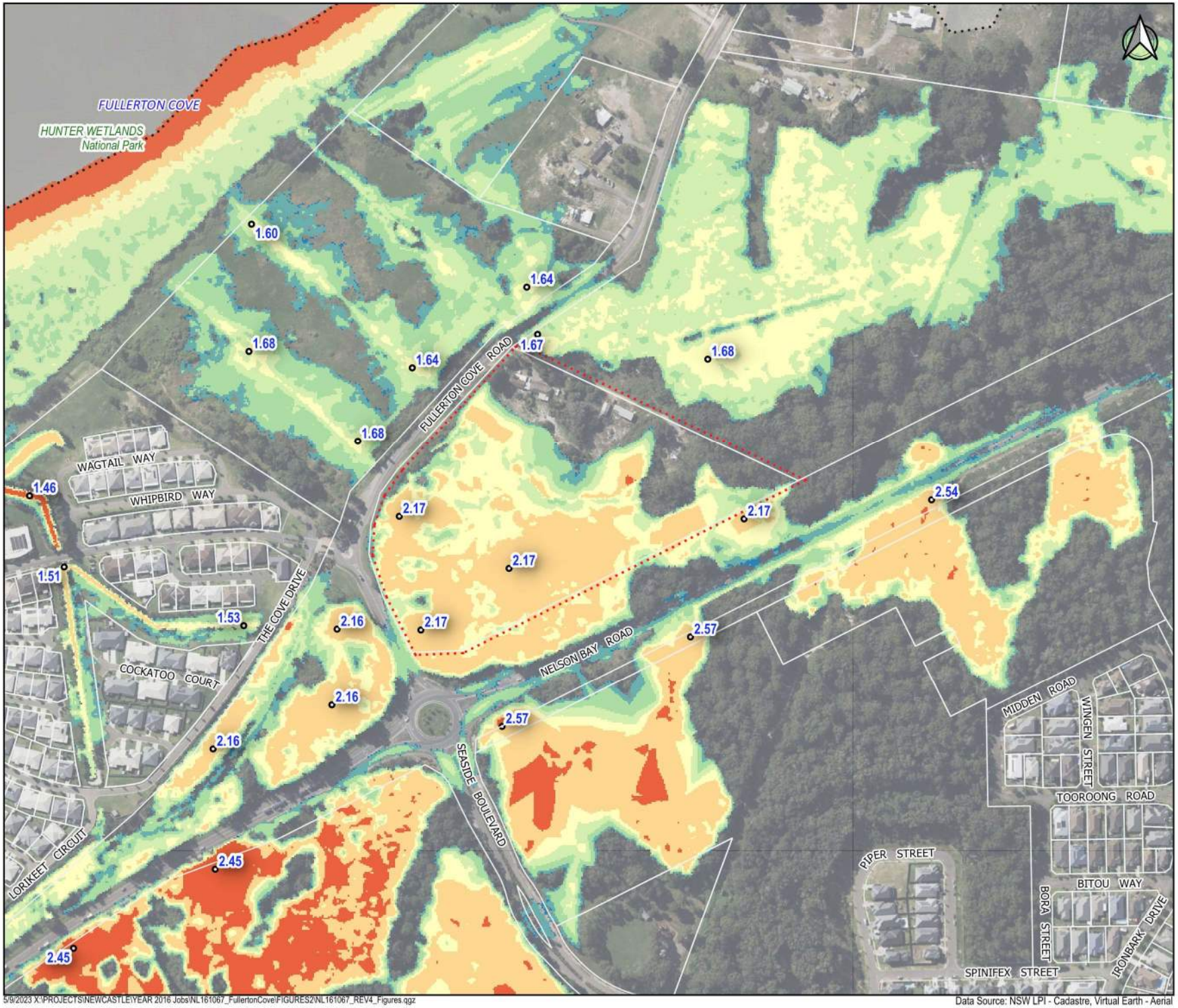
Figure B3-2

1% AEP Flood Hazard
Existing Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Water Level (mAHD)

Depth(m)

- < 0.01
- 0.01 - 0.10
- 0.10 - 0.30
- 0.30 - 0.50
- 0.50 - 0.70
- 0.70 - 1.00
- 1.00 - 1.50
- > 1.50

0 80 160 Metres

1:5,000

Figure B4

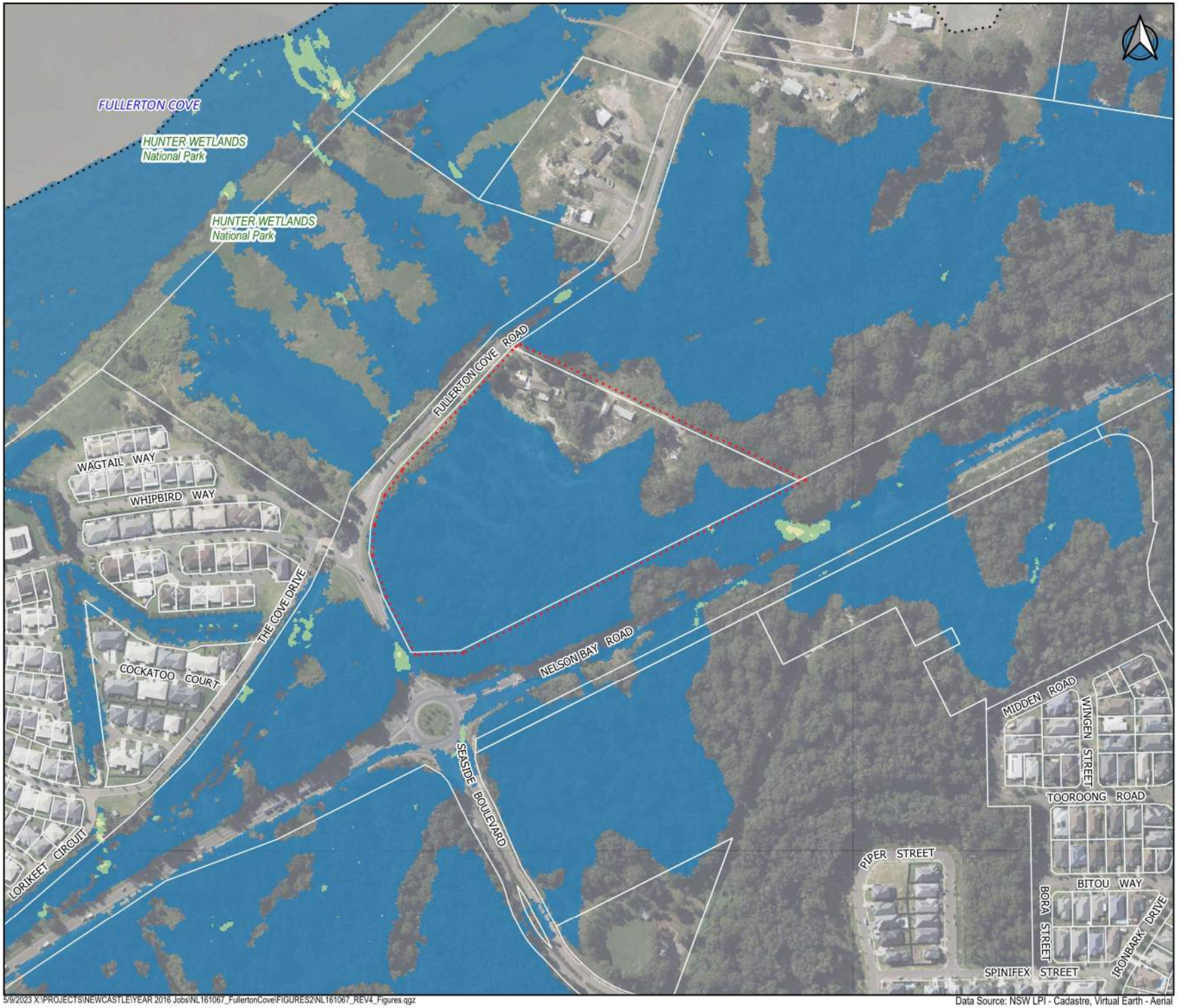
1% AEP Flood Depth and Elevation Existing Case Climate Change 2100 Scenario

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

5/9/2023 X:\PROJECTS\NEWCASTLE\YEAR 2016 Jobs\NL161067_FullertonCove\FIGURES2\NL161067_REV4_Figures.qgz

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre

Velocity(m/s)

- < 0.25
- 0.25 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

0 80 160 Metres

1:5,000

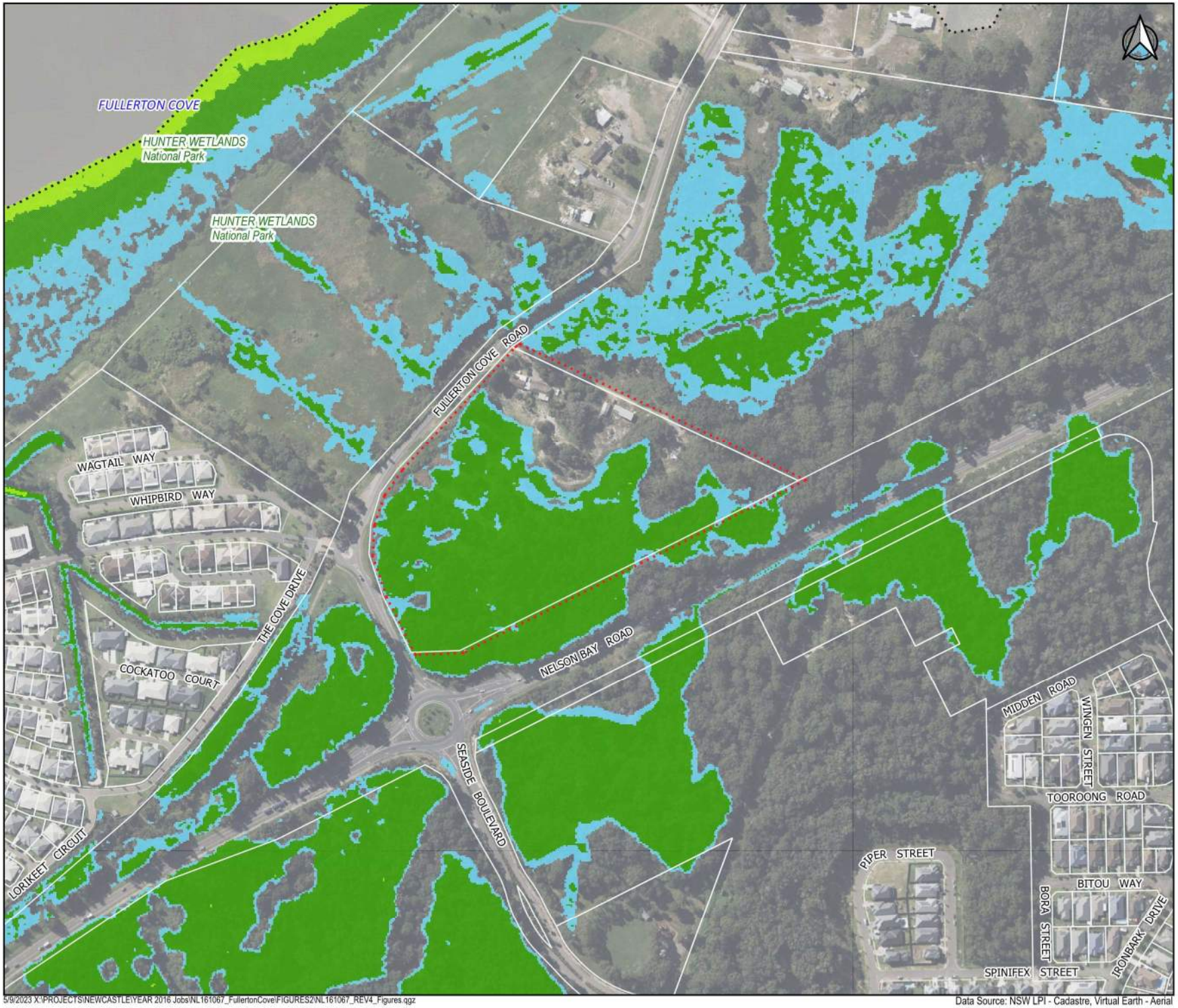
Figure B4-1

1% AEP Flood Velocity
Existing Case
Climate Change 2100
Scenario

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre

Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

0 80 160 Metres

1:5,000

Figure B4-2

1% AEP Flood Hazard
Existing Case
Climate Change 2100
Scenario

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

5/9/2023 X:\PROJECTS\NEWCASTLE\YEAR 2016 Jobs\NL161067_FullertonCove\FIGURES2\NL161067_REV4_Figures.qgz

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial

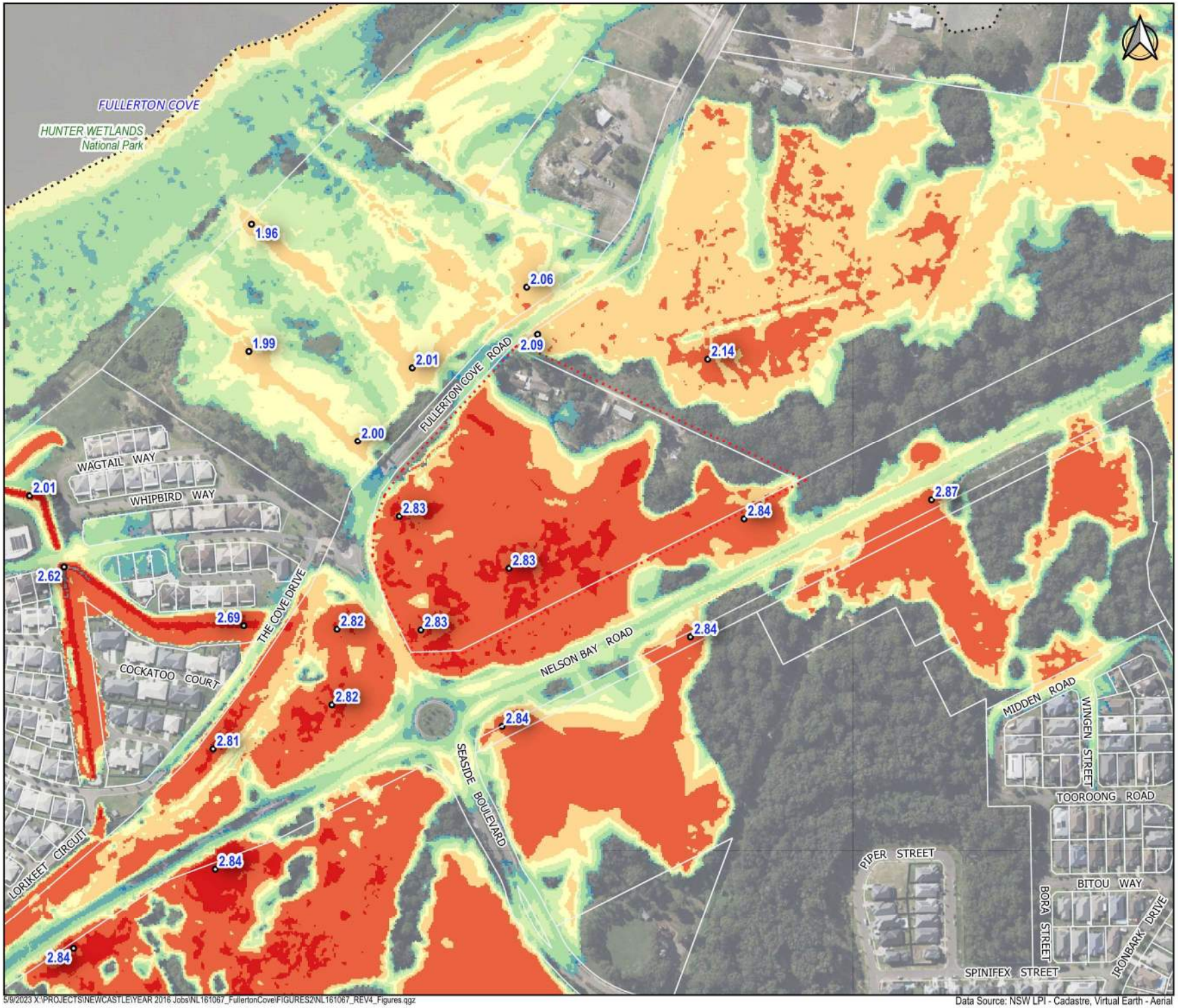


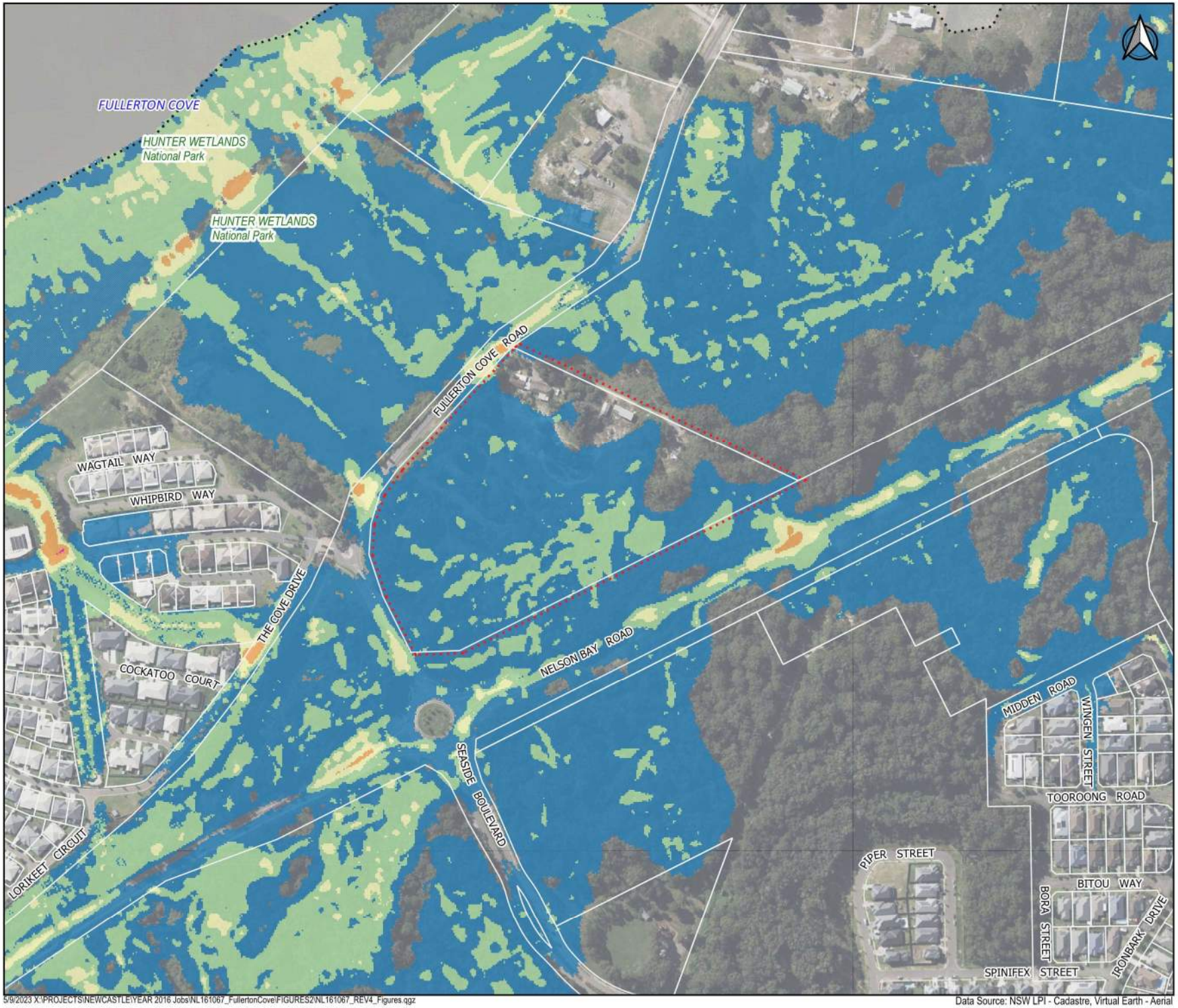
Figure B5

PMF Flood Depth and Elevation Existing Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre

Velocity(m/s)

- < 0.25
- 0.25 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

0 80 160 Metres

1:5,000

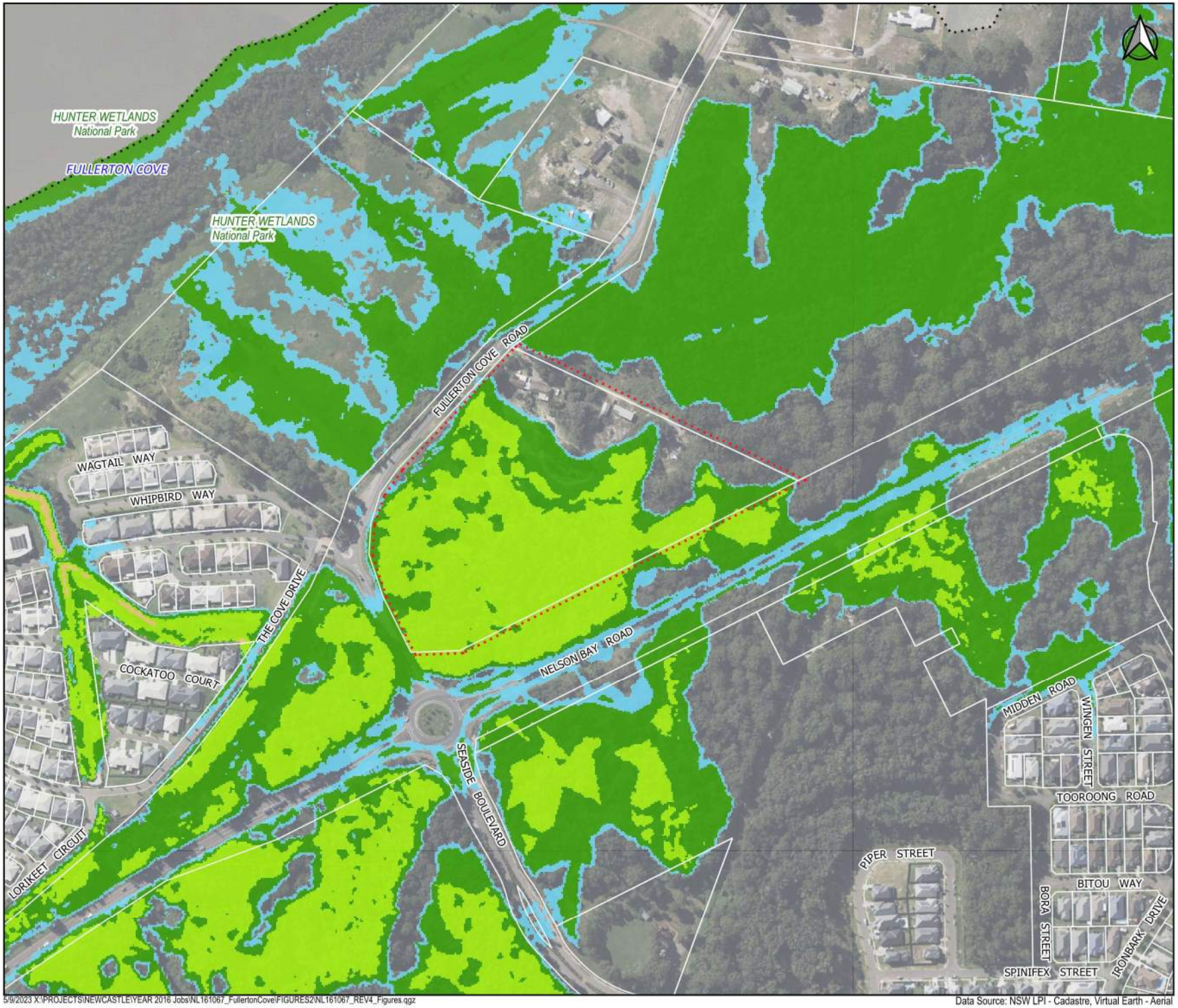
Figure B5-1

PMF Flood Velocity
Existing Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre

Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

0 80 160 Metres

1:5,000

Figure B5-2

PMF Flood Hazard
Existing Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial

Appendix F – Developed Case Figures

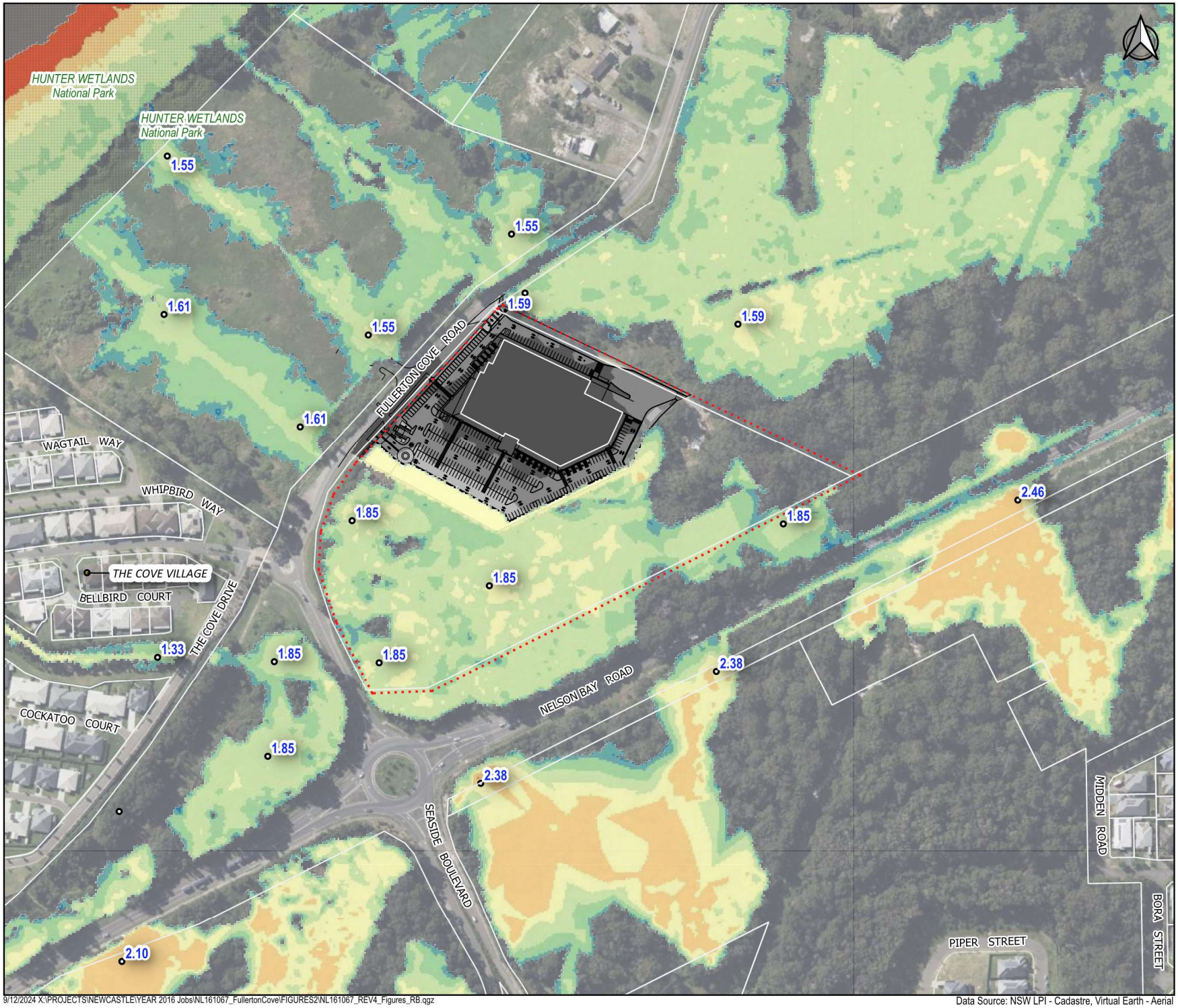


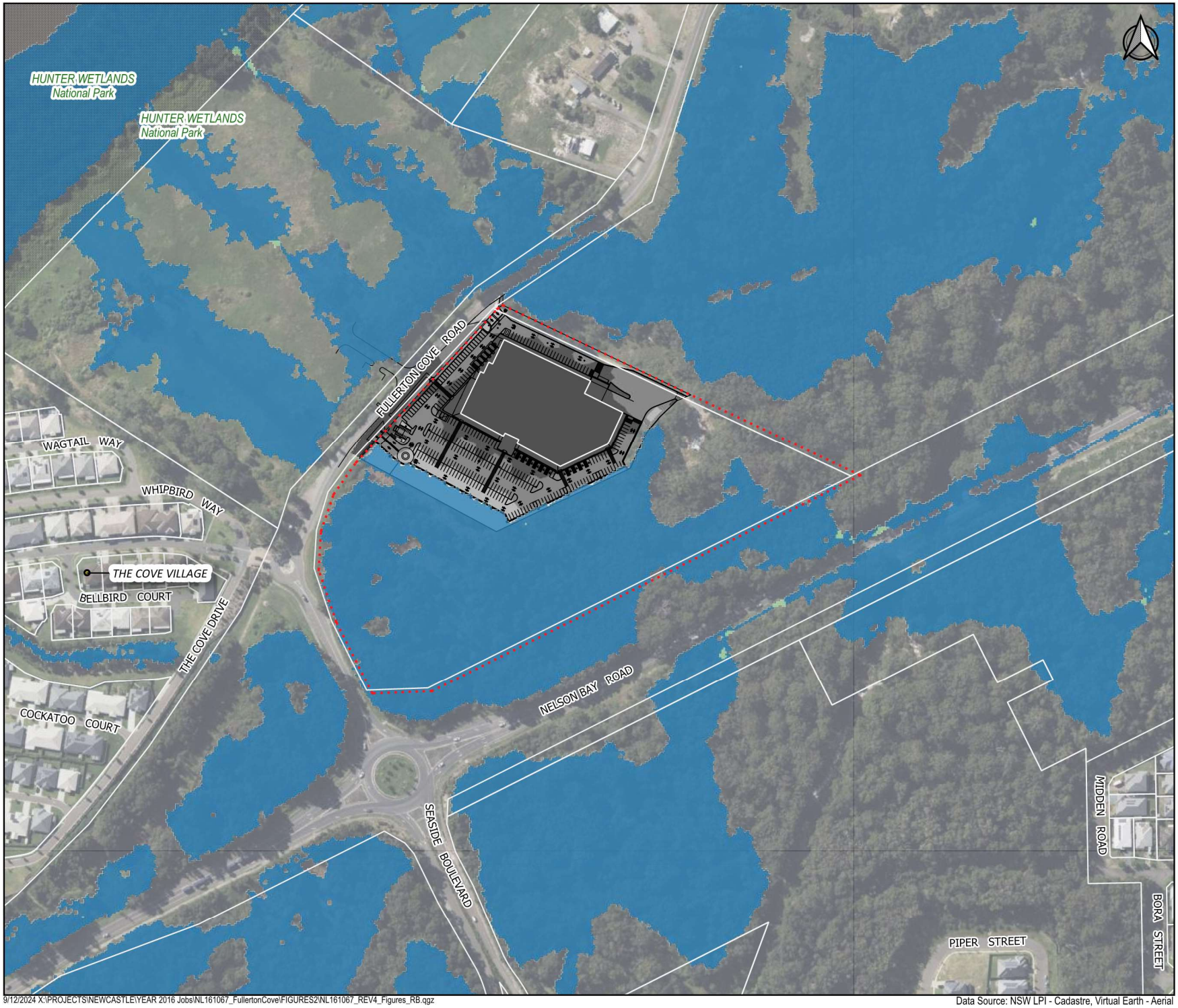
Figure C1

10% AEP Flood Depth and Elevation Developed Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Velocity(m/s)

- < 0.25
- 0.25 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

0 70 140 Metres

1:4,000

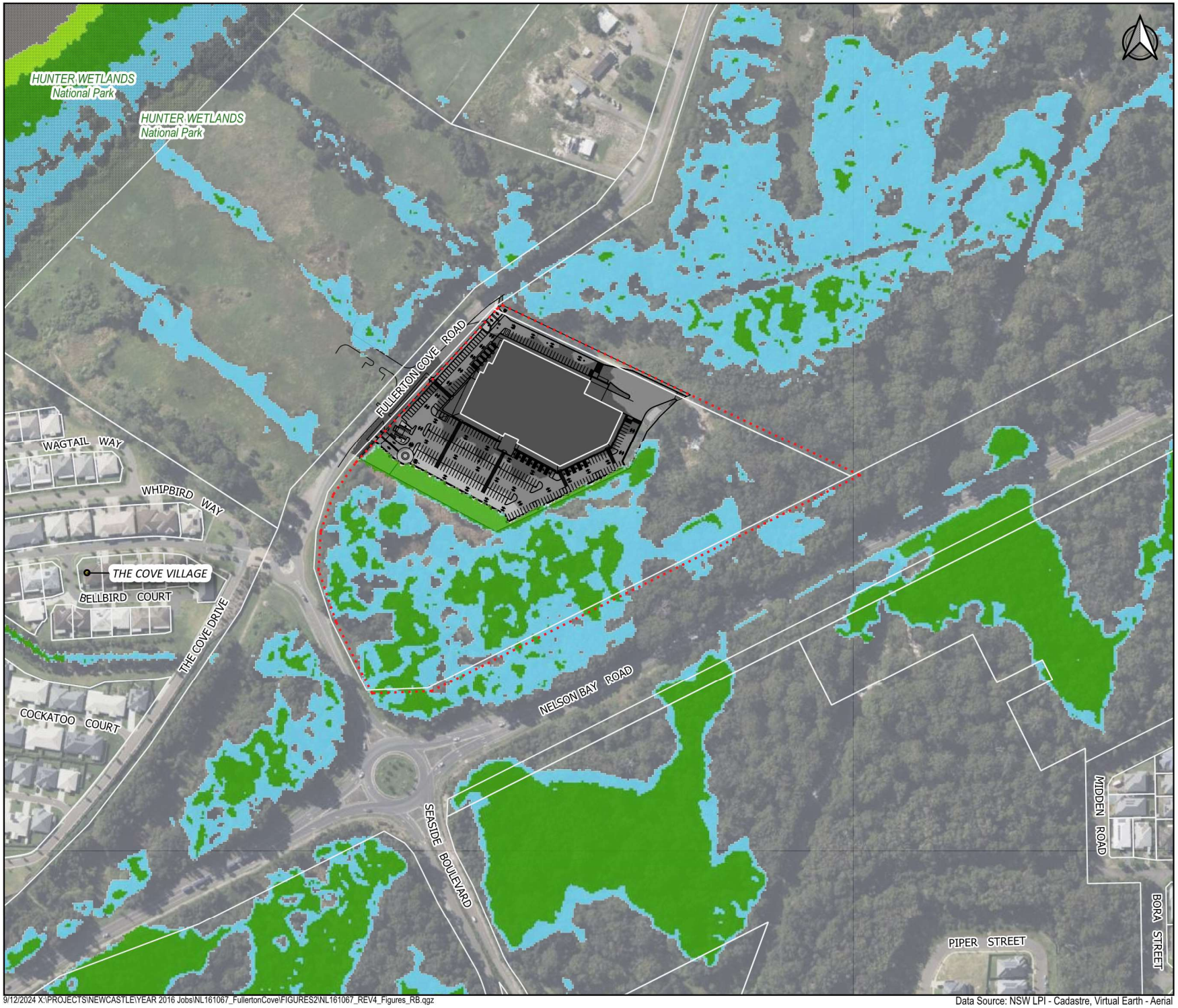
Figure C1-1

10% AEP Flood Velocity Developed Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

0 70 140 Metres

1:4,000

Figure C1-2

10% AEP Flood Hazard Developed Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial

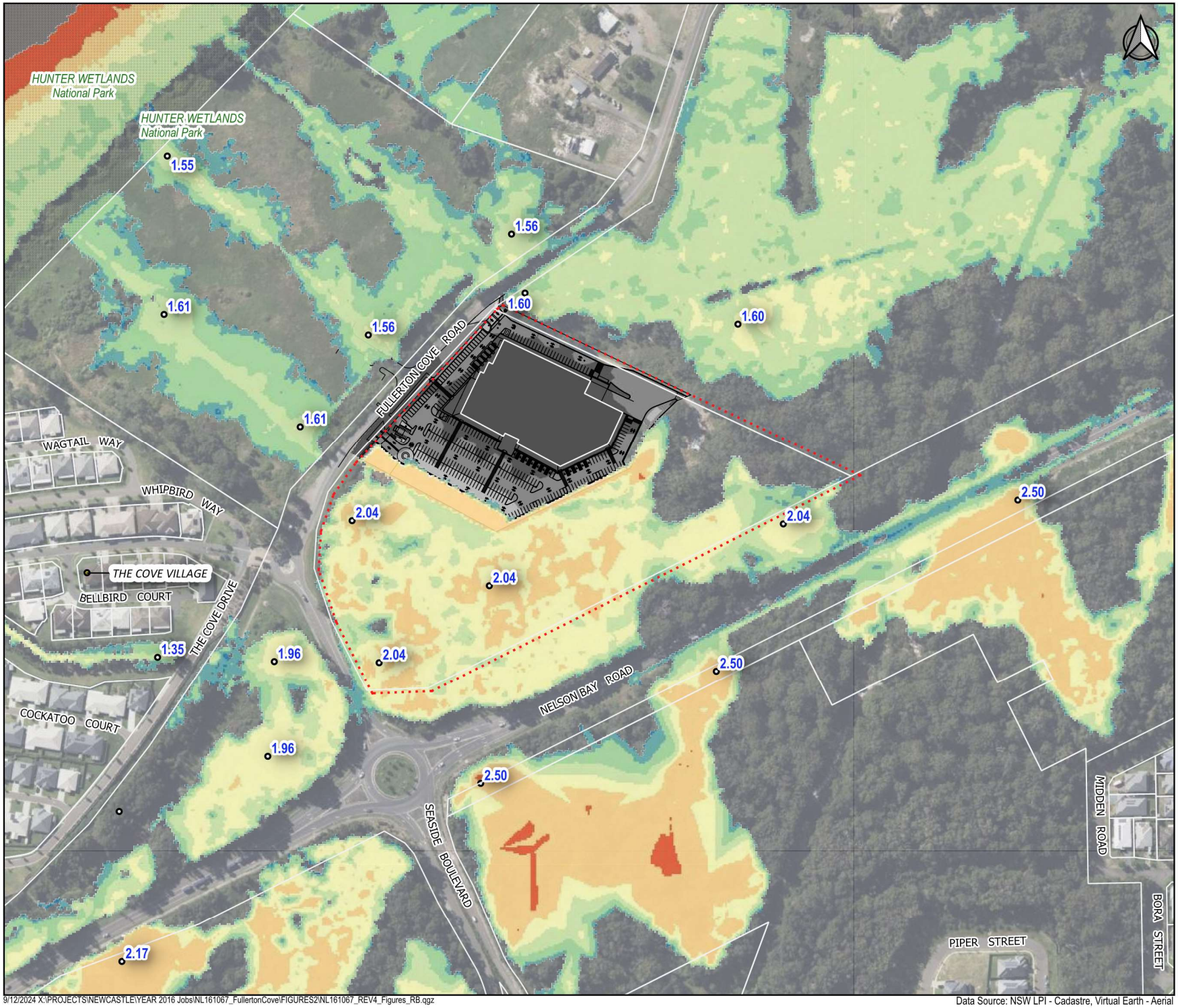


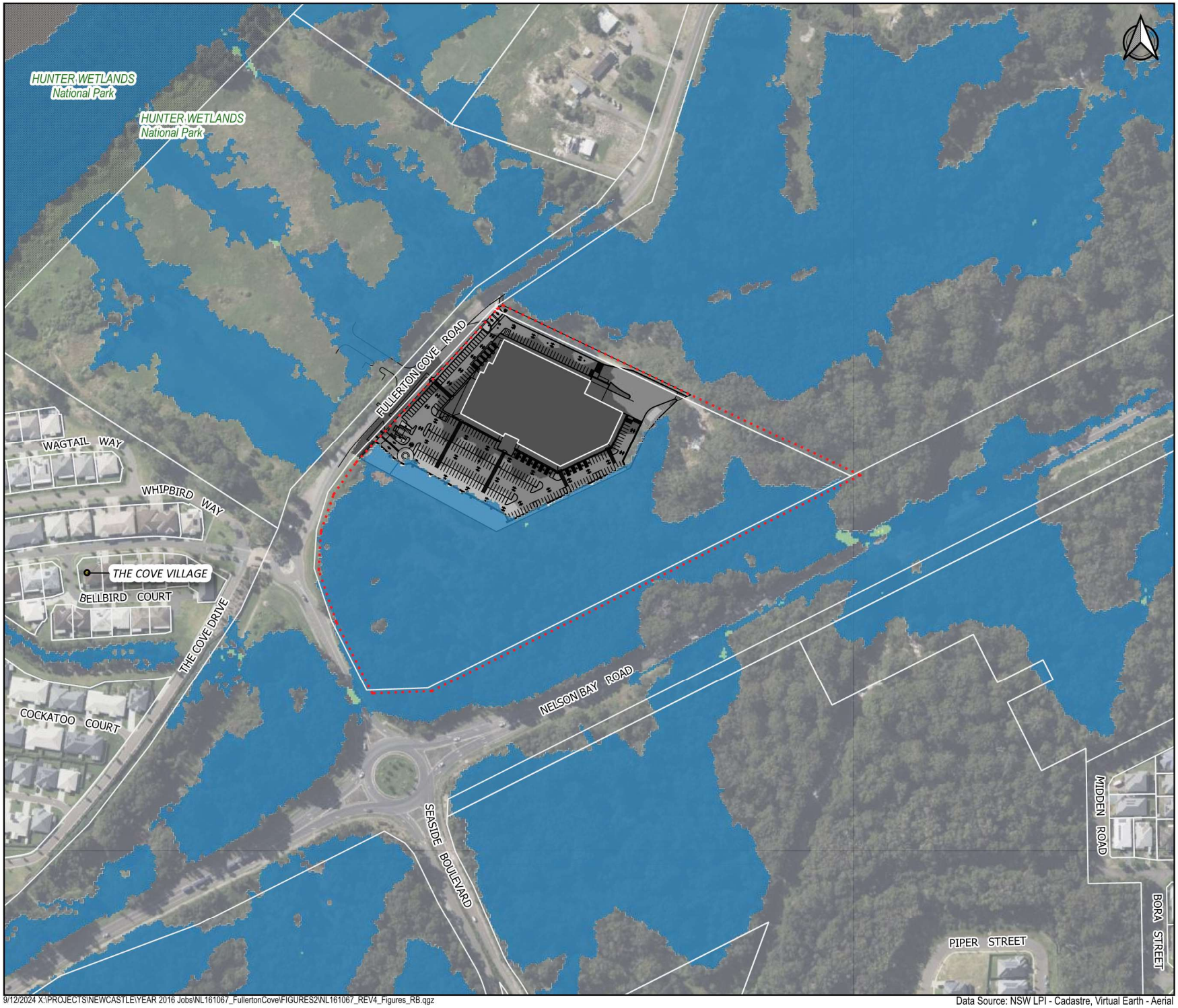
Figure C2

5% AEP Flood Depth and Elevation Developed Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Velocity(m/s)

- < 0.25
- 0.25 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

0 70 140 Metres

1:4,000

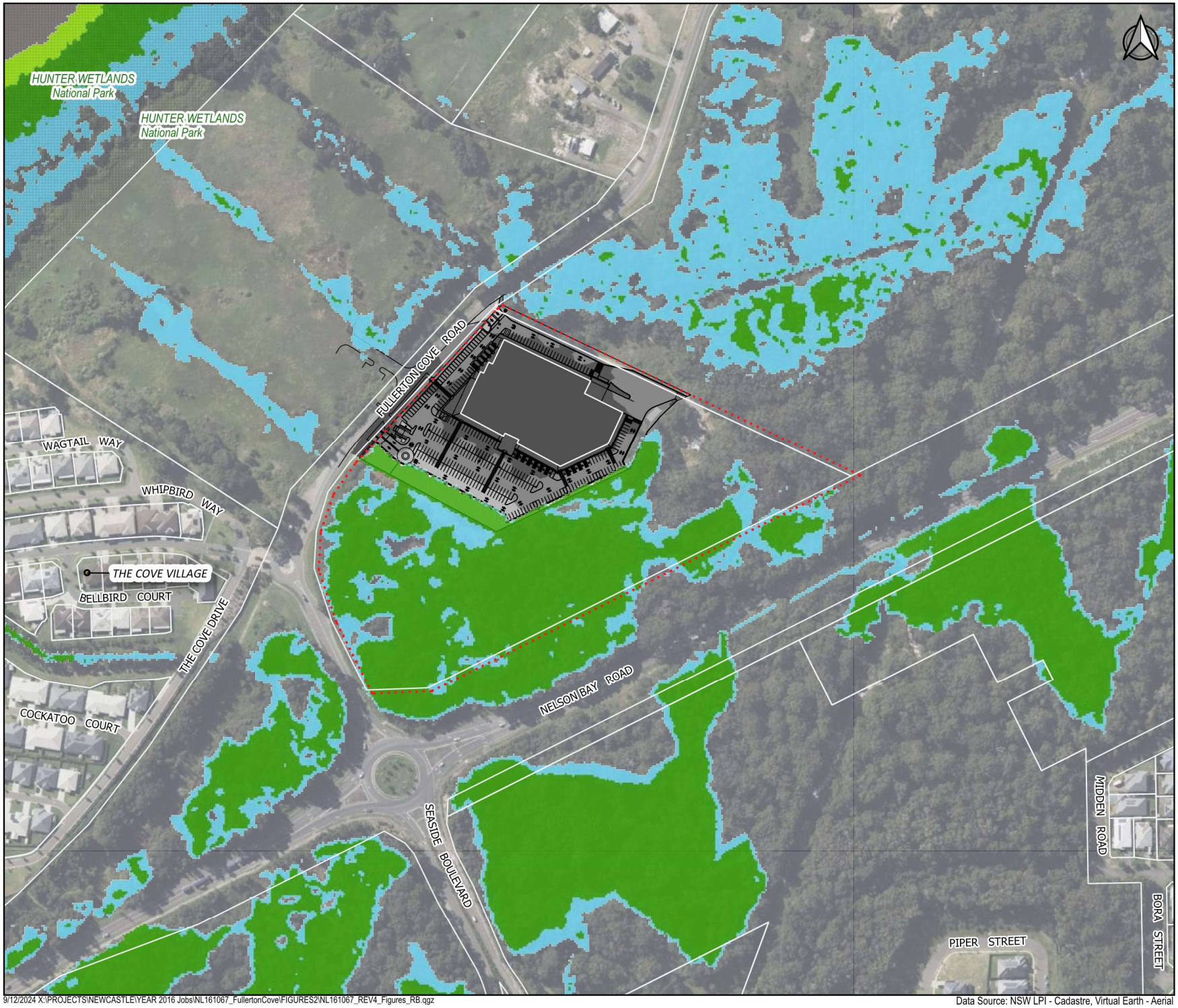
Figure C2-1

5% AEP Flood Velocity Developed Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

0 70 140 Metres

1:4,000

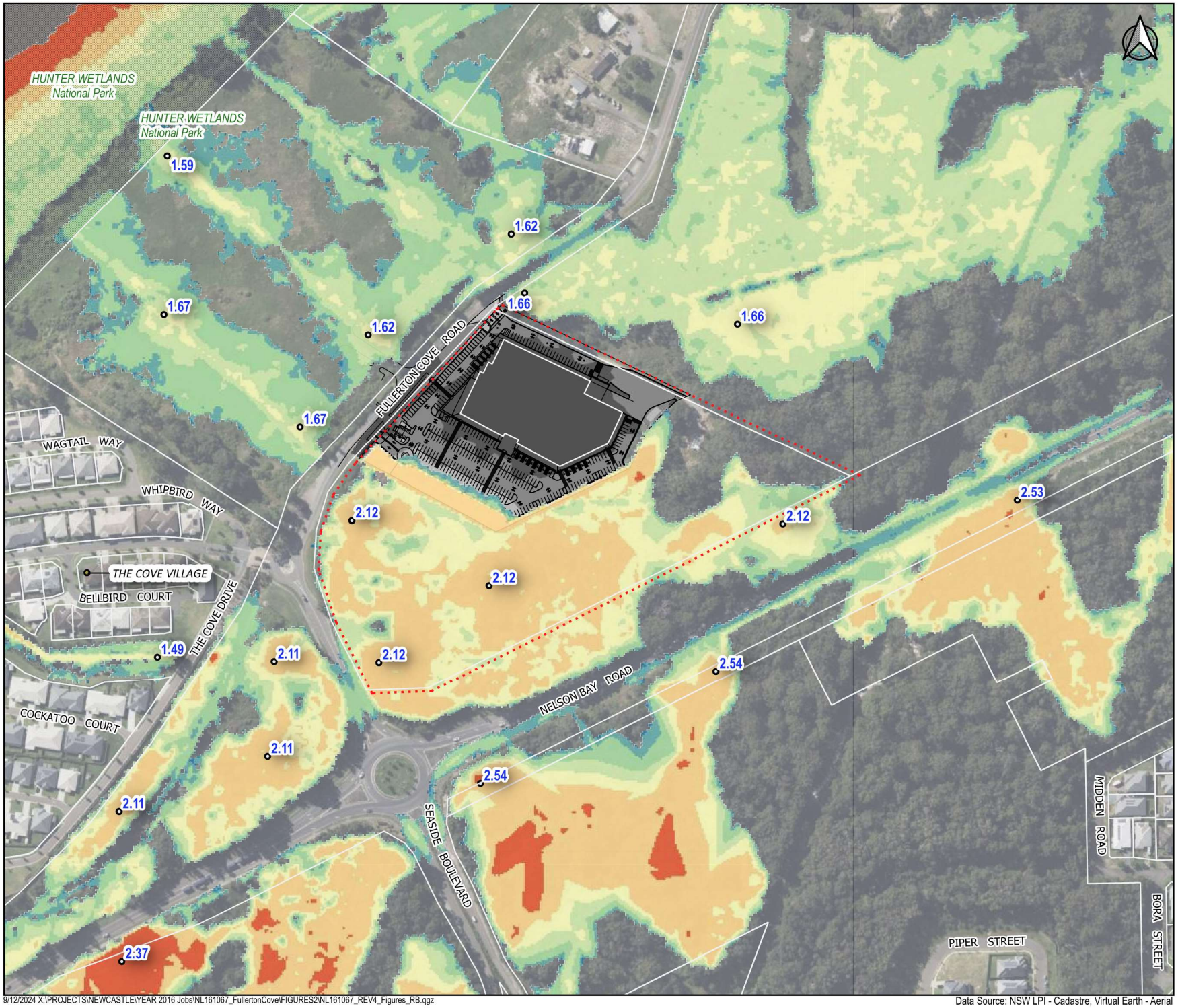
Figure C2-2

5% AEP Flood Hazard Developed Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Water Level (mAHD)
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Depth(m)

- < 0.01
- 0.01 - 0.10
- 0.10 - 0.30
- 0.30 - 0.50
- 0.50 - 0.70
- 0.70 - 1.00
- 1.00 - 1.50
- > 1.50

0 70 140 Metres

1:4,000

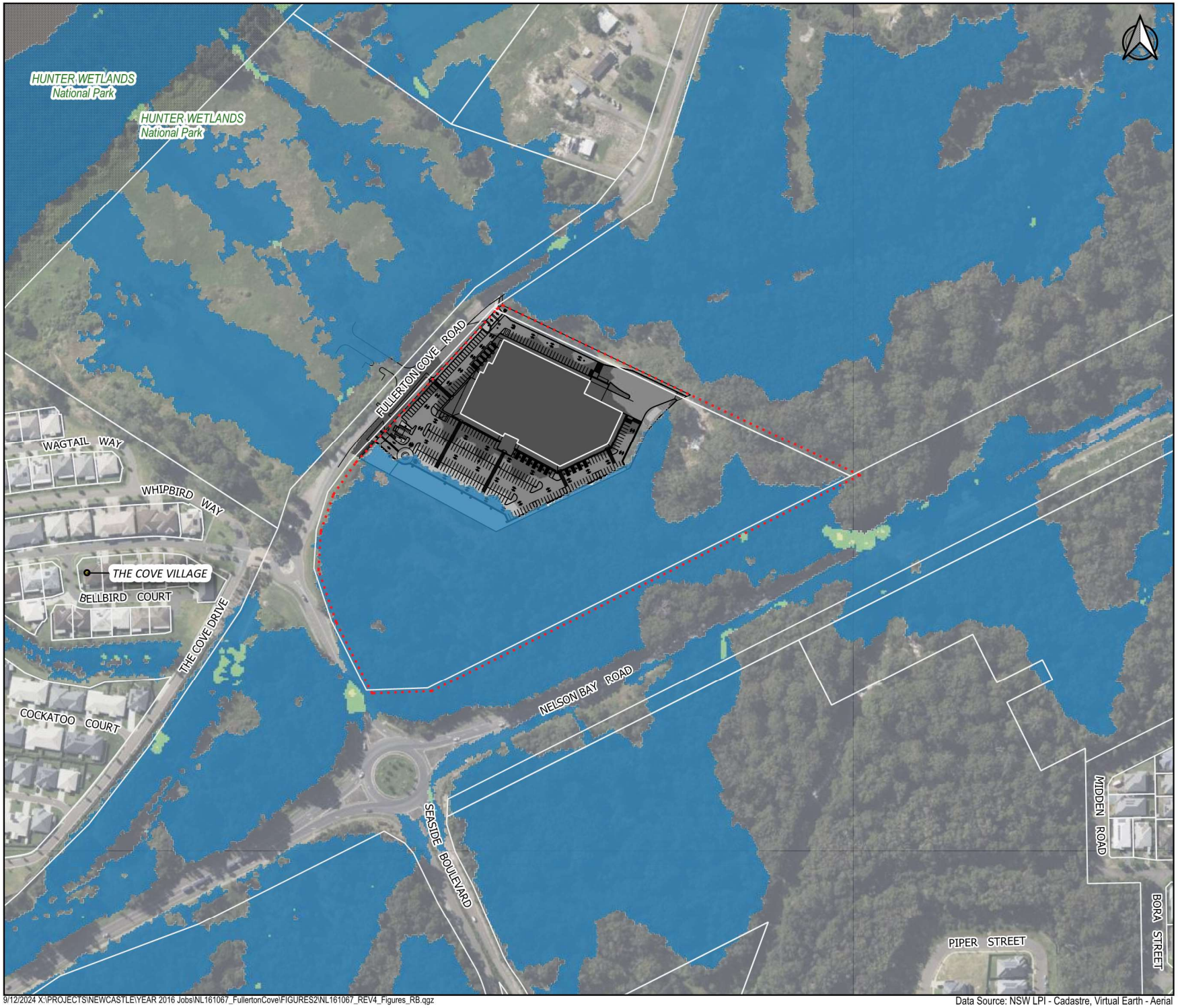
Figure C3

1% AEP Flood Depth and Elevation Developed Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Velocity(m/s)

- < 0.25
- 0.25 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

0 70 140 Metres

1:4,000

Figure C3-1

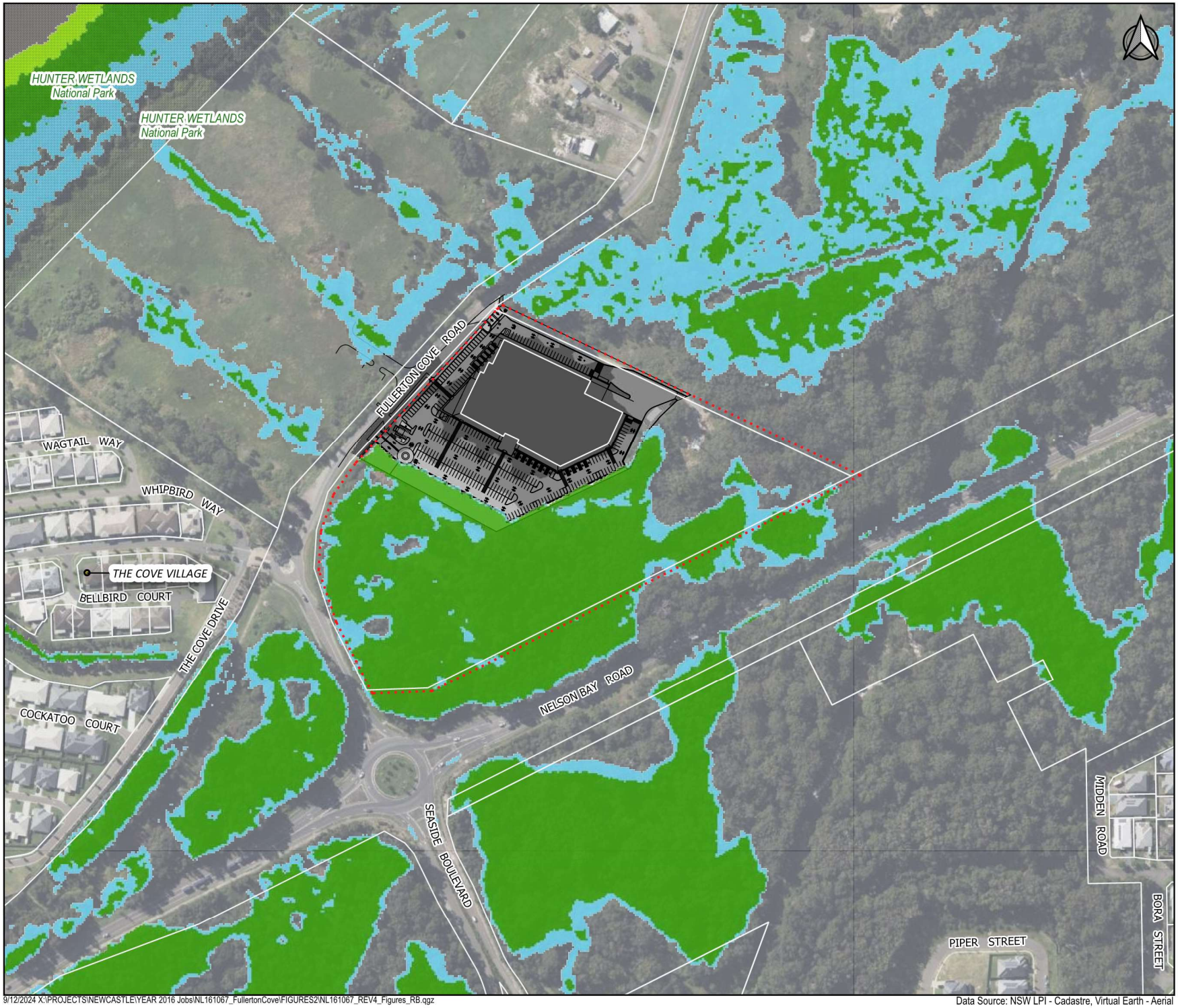
1% AEP Flood Velocity Developed Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

9/12/2024 X:\PROJECTS\NEWCASTLE\YEAR 2016 Jobs\NL161067_FullertonCove\FIGURES2\NL161067_REV4_Figures_RB.qgz

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

0 70 140 Metres

1:4,000

Figure C3-2

1% AEP Flood Hazard Developed Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial

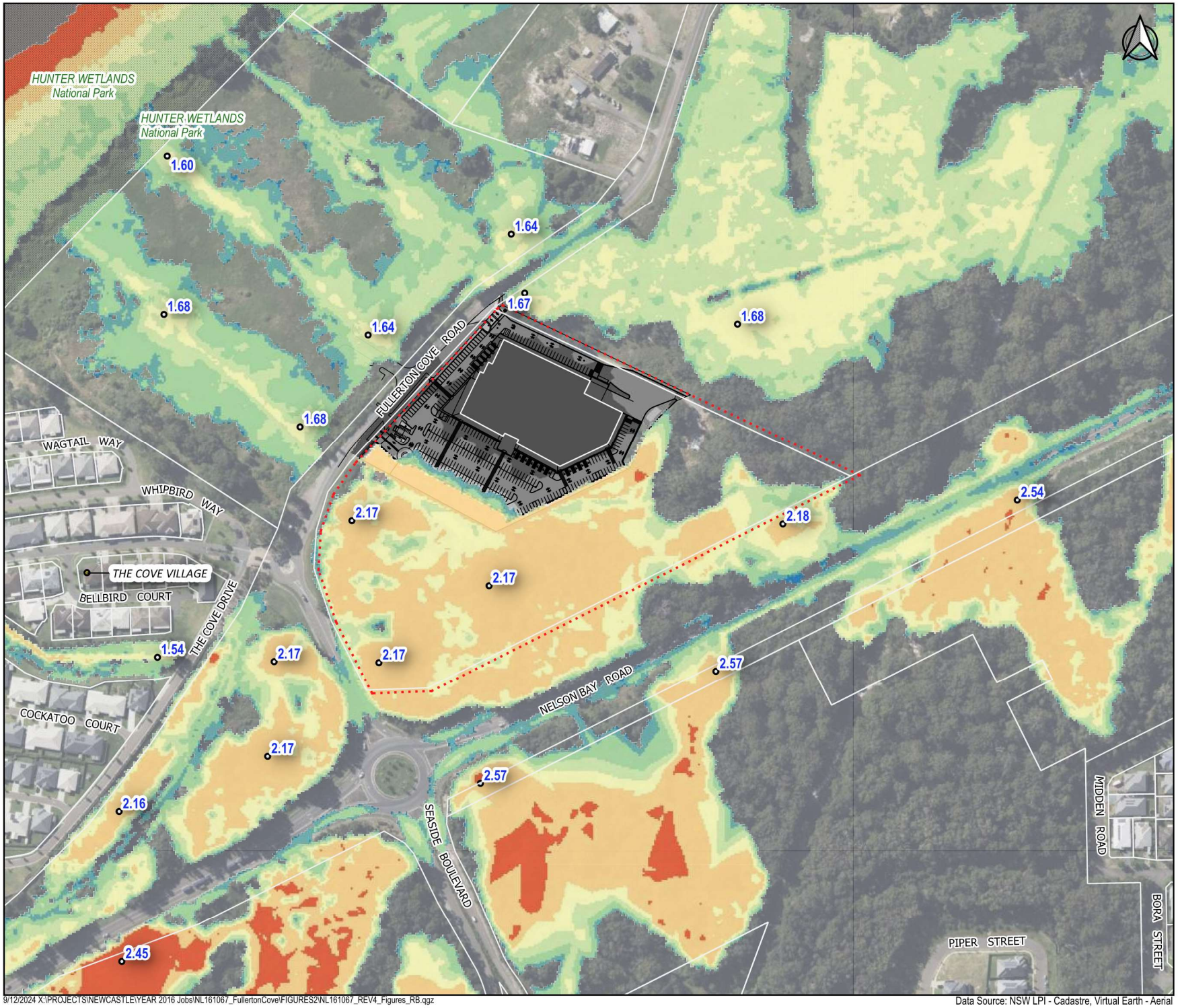


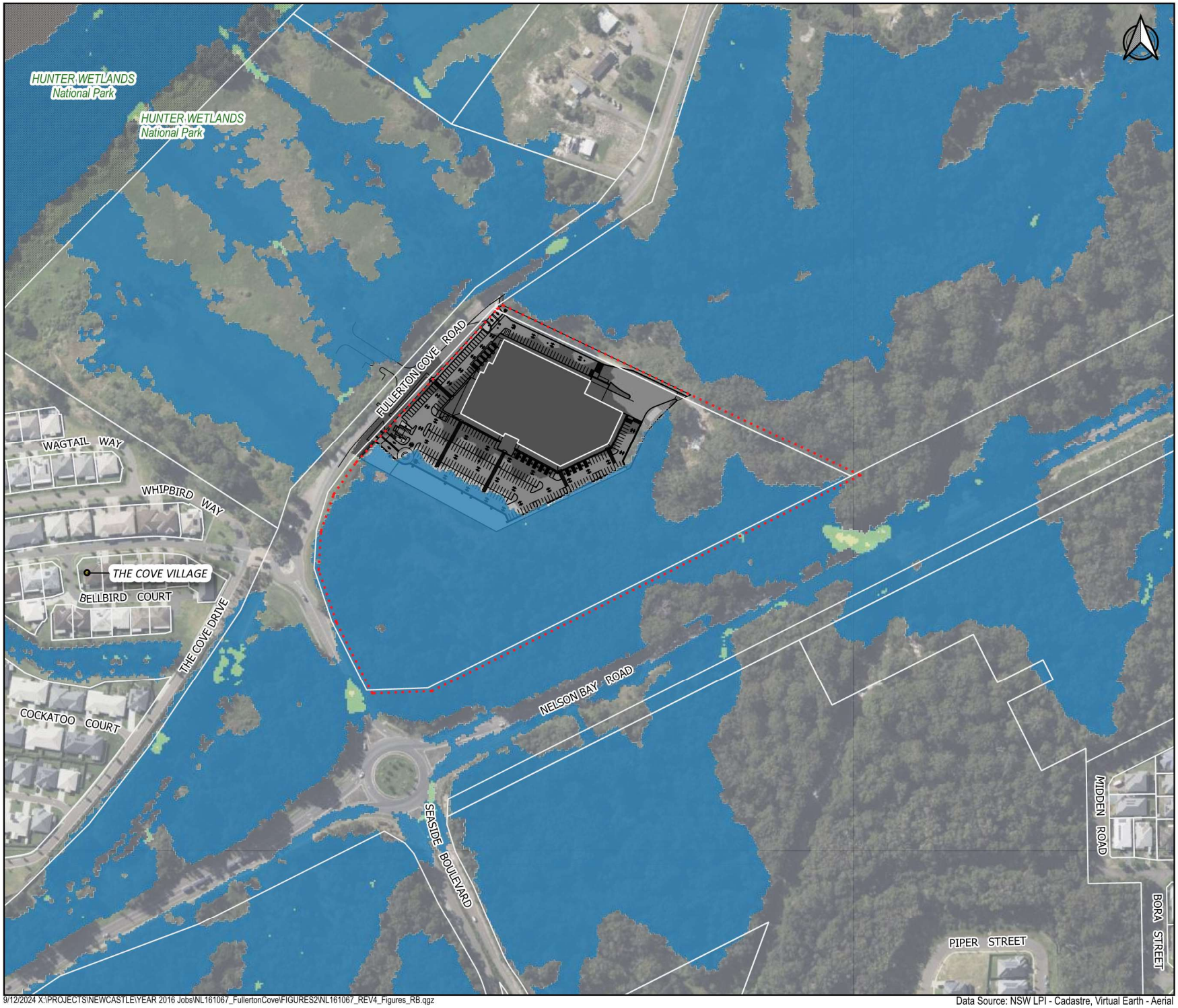
Figure C4

1% AEP Flood Depth and Elevation Developed Case Climate Change 2100 Scenario

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Velocity(m/s)

- < 0.25
- 0.25 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

0 70 140 Metres

1:4,000

Figure C4-1

1% AEP Flood Velocity
Developed Case
Climate Change 2100

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

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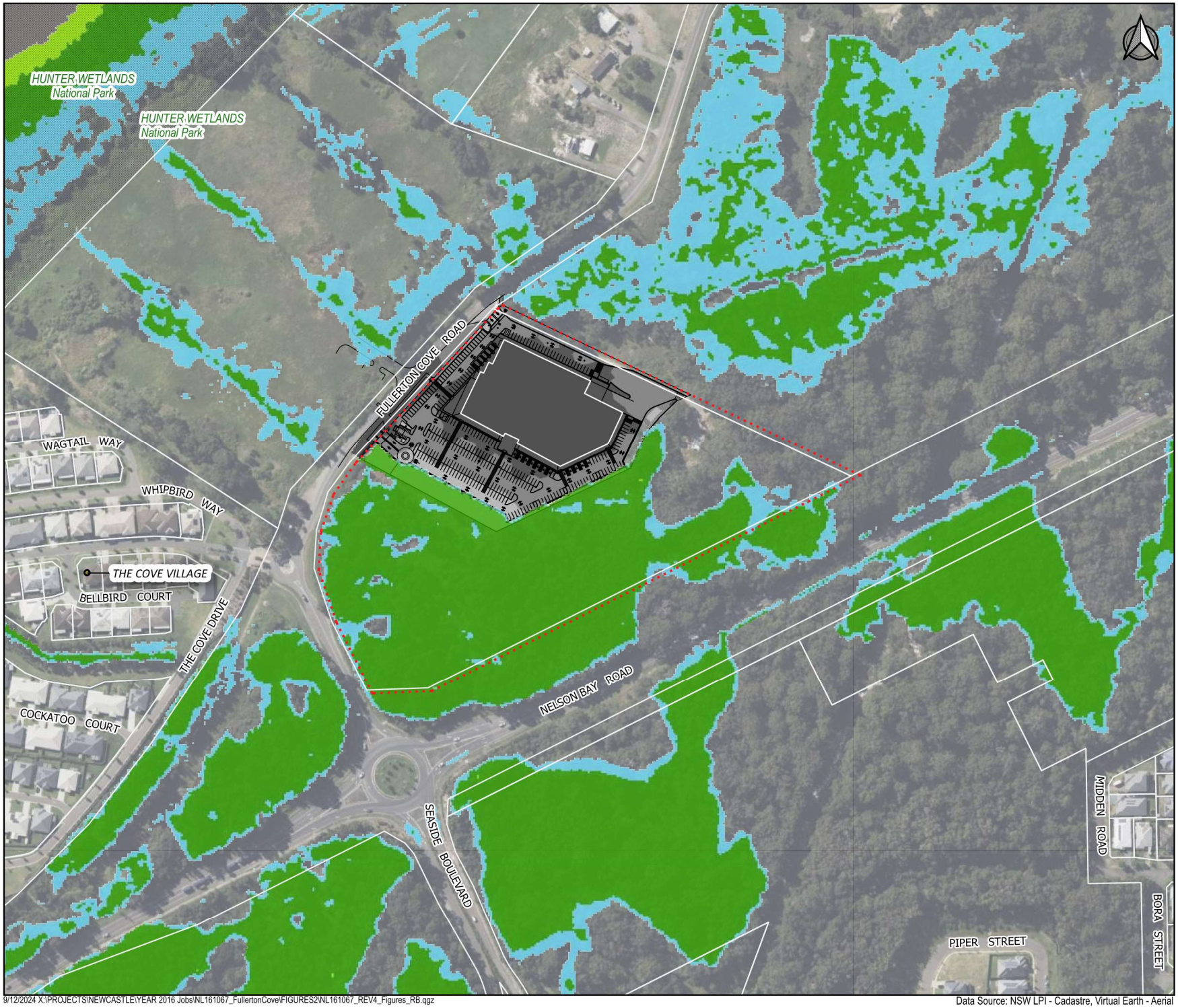
Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

0 70 140 Metres

1:4,000

Figure C4-2

1% AEP Flood Hazard Developed Case Climate Change 2100 Scenario

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial

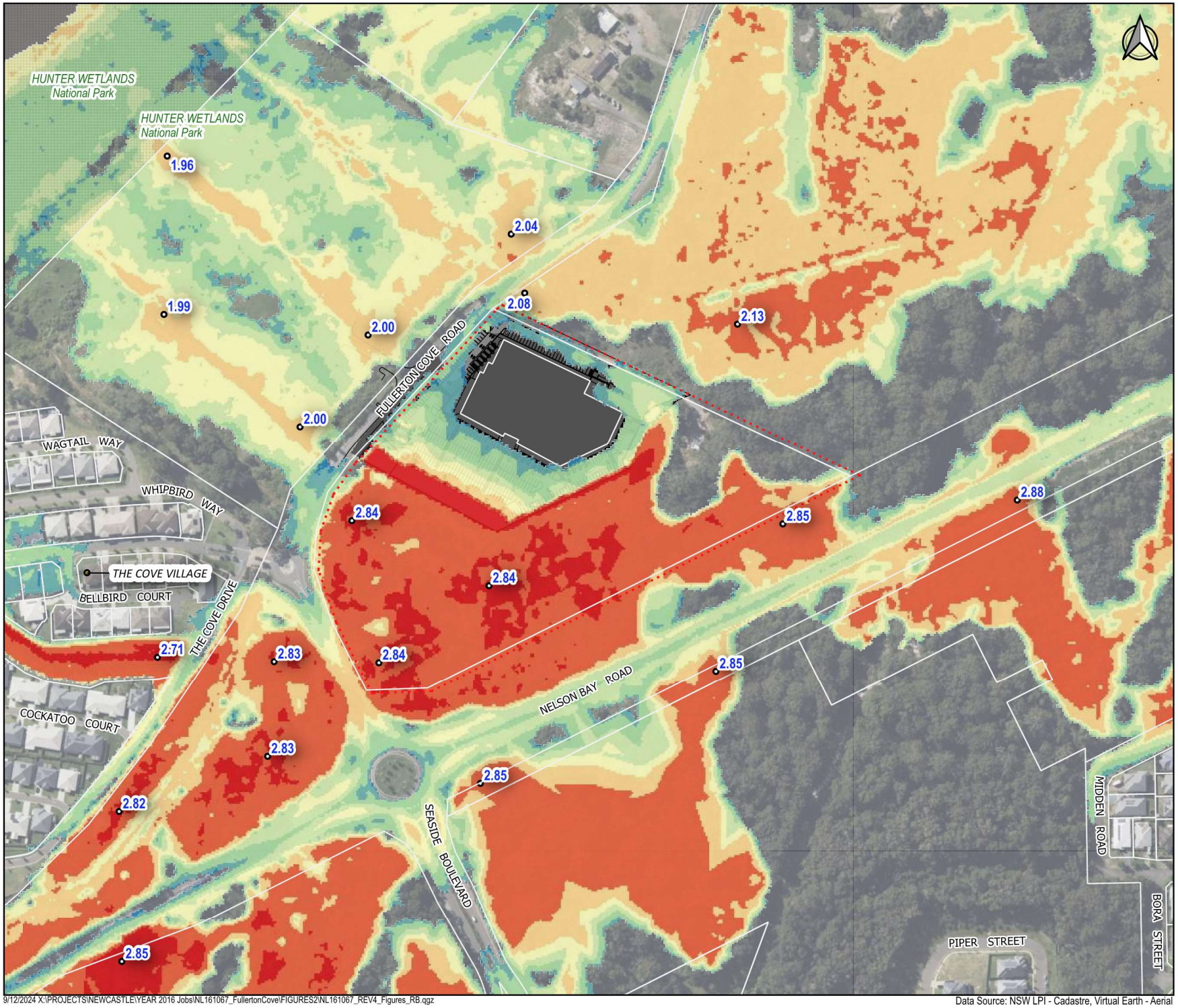


Figure C5

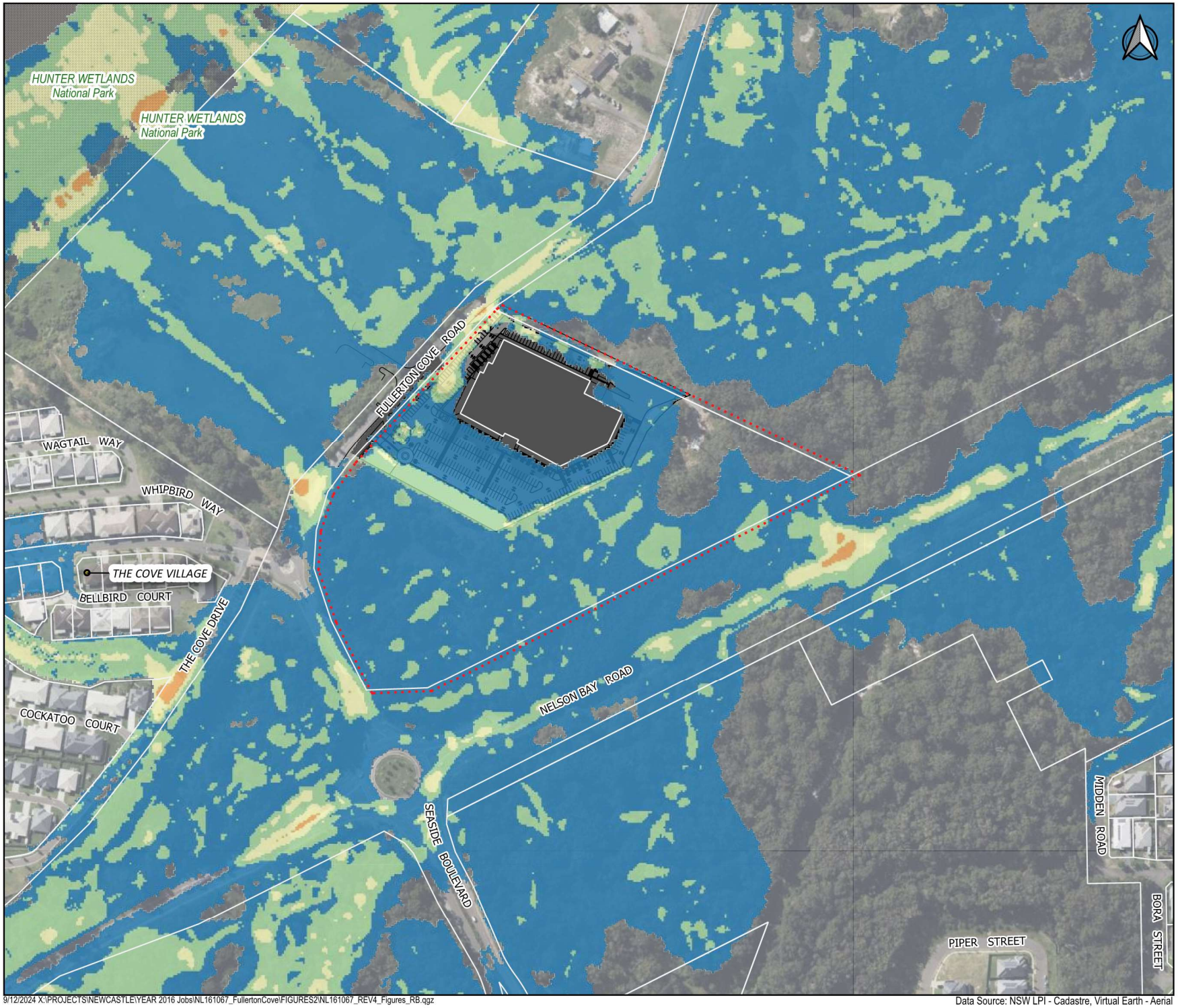
PMF Flood Depth and Elevation Developed Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

9/12/2024 X:\PROJECTS\NEWCASTLE\YEAR 2016 Jobs\NL161067_FullertonCove\FIGURES2\NL161067_REV4_Figures_RB.qgz

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Velocity(m/s)

- < 0.25
- 0.25 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

0 70 140 Metres

1:4,000

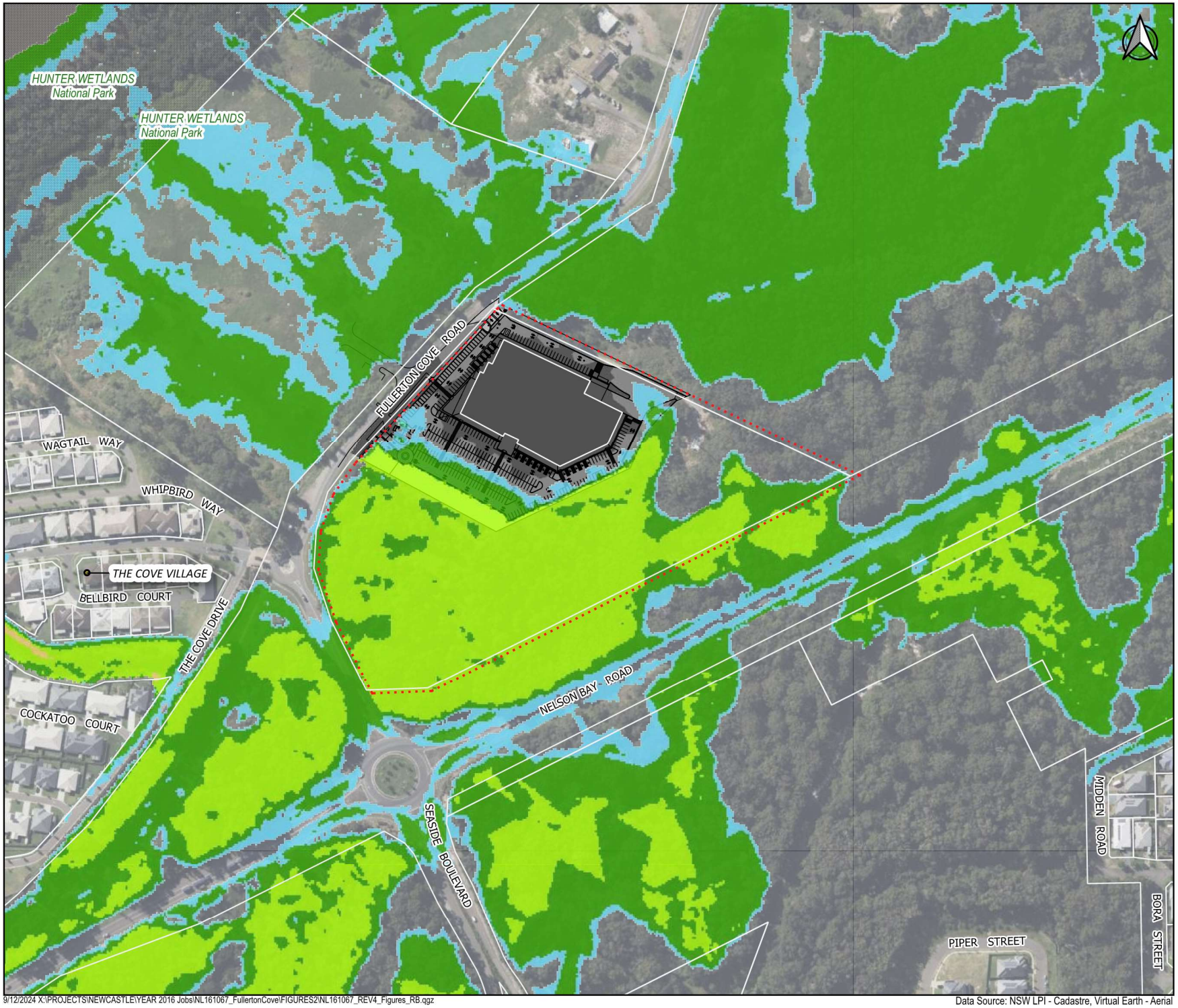
Figure C5-1

PMF Flood Velocity Developed Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

0 70 140 Metres

1:4,000

Figure C5-2

PMF Flood Hazard
Developed Case

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial

Appendix G – Flood Comparison Figures

Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Difference(m)

- <-0.10
- -0.10 - -0.05
- -0.05 - -0.01
- -0.01 - -0.005
- Less than +/-5mm
- 0.005 - 0.01
- 0.01 - 0.05
- 0.05 - 0.10
- >0.10

0 70 140 Metres

1:4,000

Figure D1

10% AEP Flood Elevation Difference Developed Case minus Existing

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial

Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Difference(m)

- <-0.10
- -0.10 - -0.05
- -0.05 - -0.01
- -0.01 - -0.005
- Less than +/-5mm
- 0.005 - 0.01
- 0.01 - 0.05
- 0.05 - 0.10
- >0.10

0 70 140 Metres

1:4,000

Figure D2

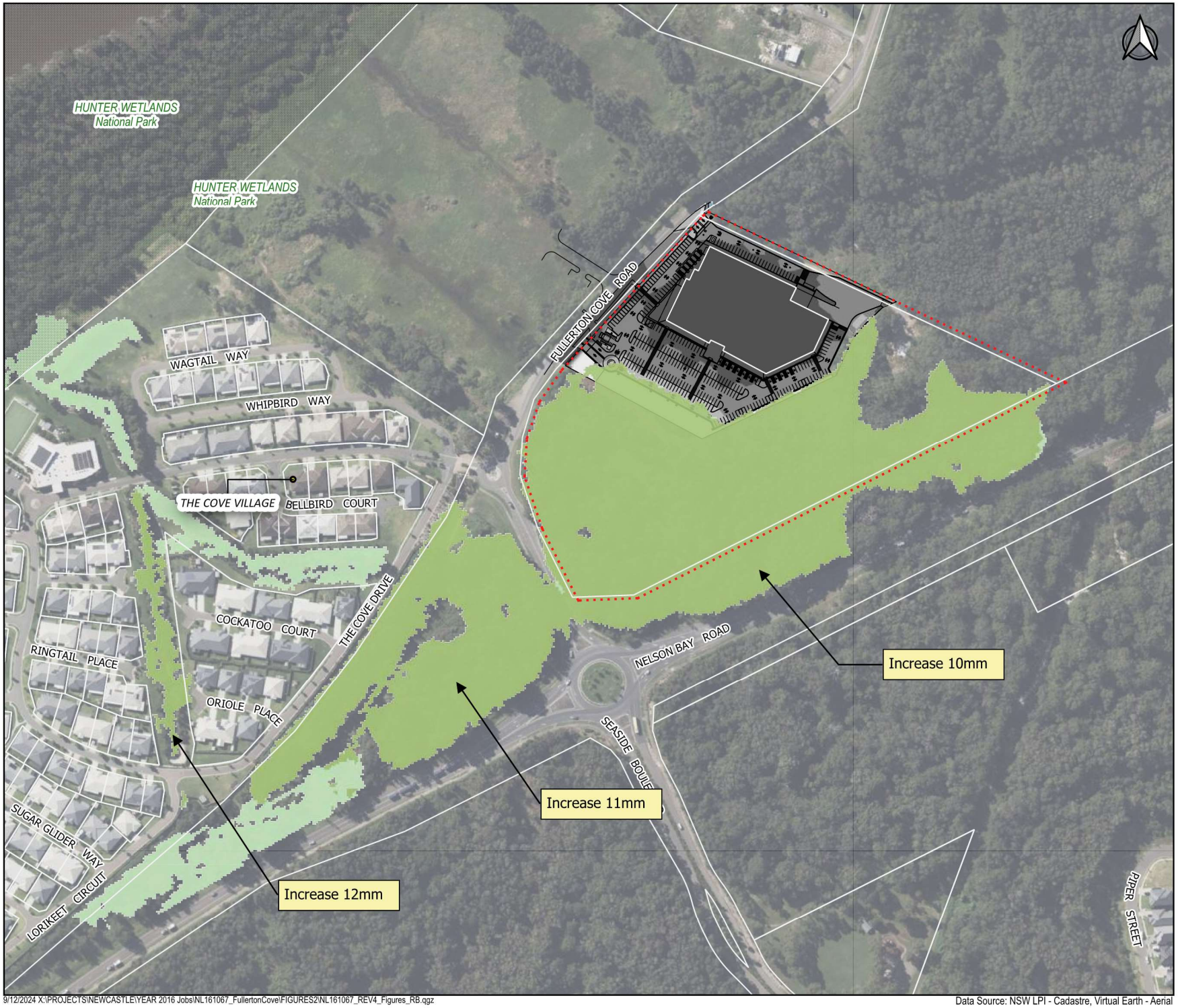
5% AEP Flood Elevation Difference Developed Scenario minus Existing

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

9/12/2024 X:\PROJECTS\NEWCASTLE\YEAR 2016 Jobs\NL161067_FullertonCove\FIGURES2\NL161067_REV4_Figures_RB.qgz

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Difference(m)

- <-0.10
- -0.10 - -0.05
- -0.05 - -0.01
- -0.01 - -0.005
- Less than +/-5mm
- 0.005 - 0.01
- 0.01 - 0.05
- 0.05 - 0.10
- >0.10

0 70 140 Metres

1:4,000

Figure D3

1% AEP Flood Elevation Difference Developed Case minus Existing

42 Fullerton Cove Road
Fullerton Cove

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9/12/2024 X:\PROJECTS\NEWCASTLE\YEAR 2016 Jobs\NL161067_FullertonCove\FIGURES2\NL161067_REV4_Figures_RB.qgz

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial

Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Difference(m)

- <-0.10
- -0.10 - -0.05
- -0.05 - -0.01
- -0.01 - -0.005
- Less than +/-5mm
- 0.005 - 0.01
- 0.01 - 0.05
- 0.05 - 0.10
- >0.10

0 70 140 Metres

1:4,000

Figure D4

1% AEP Flood Elevation Difference Climate Change 2100 Scenario Developed Case minus Existing

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial

Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Difference(m)

- <-0.10
- -0.10 - -0.05
- -0.05 - -0.01
- -0.01 - -0.005
- Less than +/-5mm
- 0.005 - 0.01
- 0.01 - 0.05
- 0.05 - 0.10
- >0.10

0 70 140 Metres

1:4,000

Figure D5

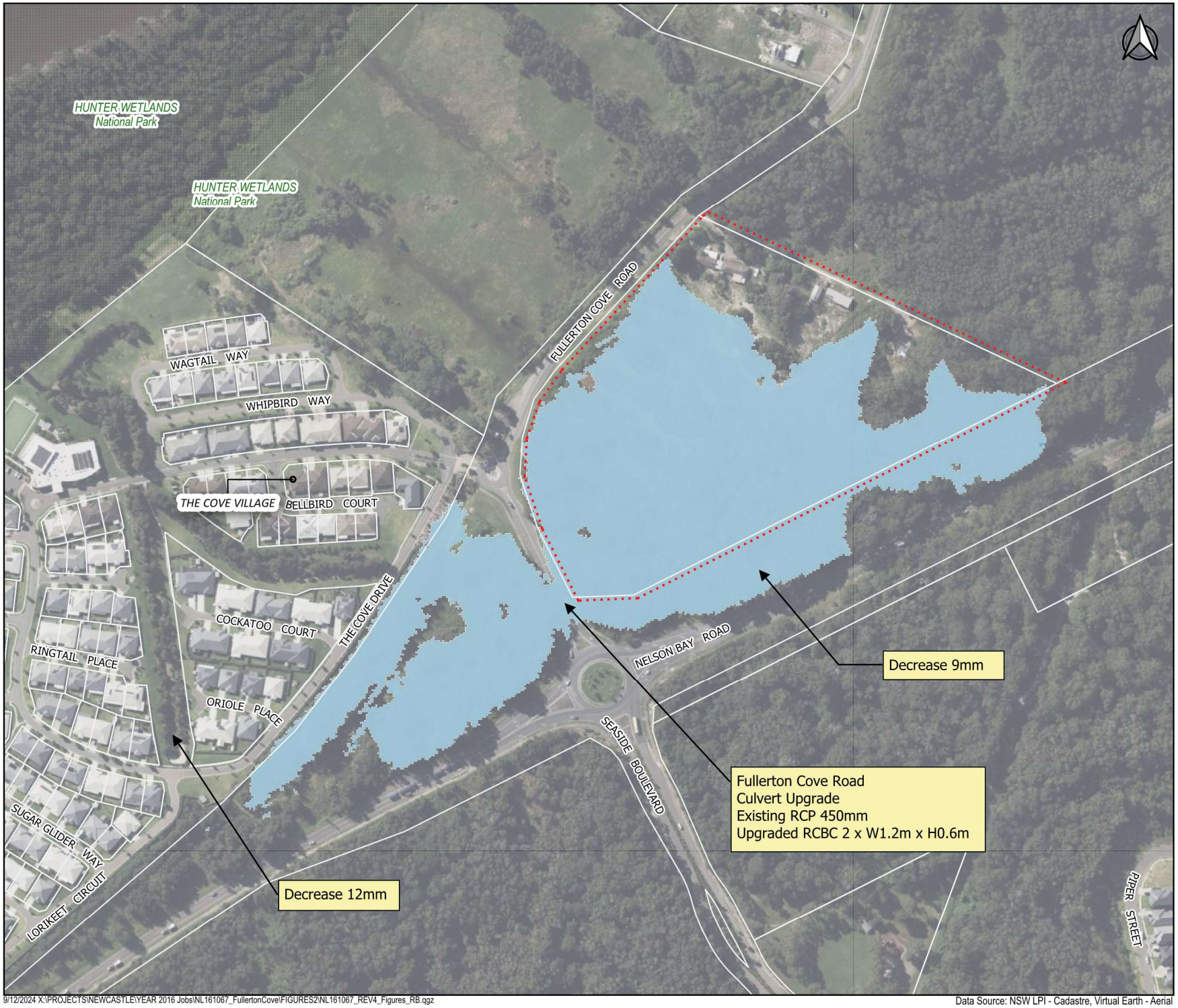
PMF Flood Elevation Difference Developed Case minus Existing

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

9/12/2024 X:\PROJECTS\NEWCASTLE\YEAR 2016 Jobs\NL161067_FullertonCove\FIGURES2\NL161067_REV4_Figures_RB.qgz

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Difference(m)

- <-0.10
- -0.10 - -0.05
- -0.05 - -0.01
- -0.01 - -0.005
- Less than +/-5mm
- 0.005 - 0.01
- 0.01 - 0.05
- 0.05 - 0.10
- >0.10

0 70 140 Metres

1:4,000

Figure D6

1% AEP Flood Elevation Difference Sensitivity Culvert Upgrade

42 Fullerton Cove Road
Fullerton Cove

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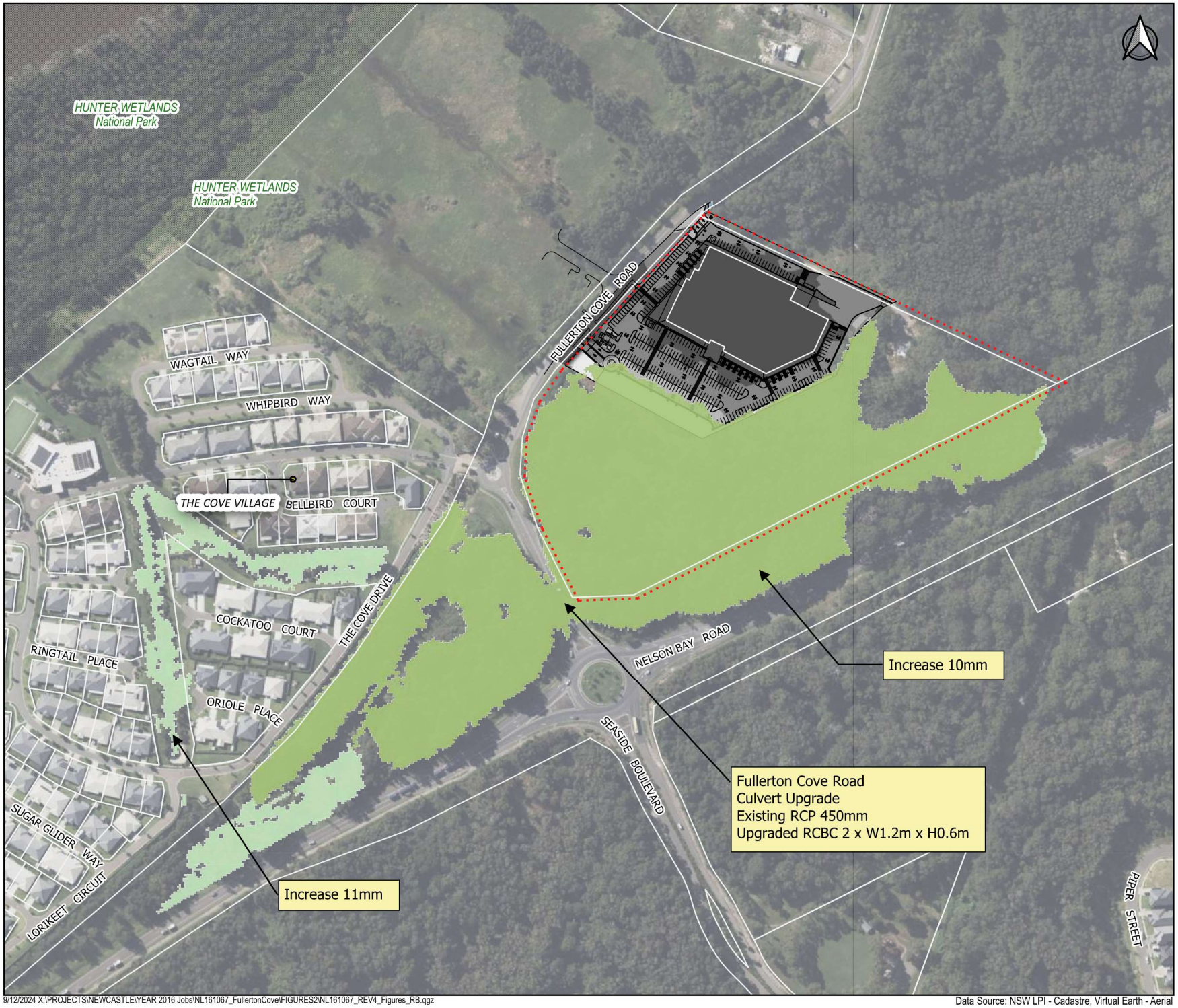
Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial



Legend

- Subject Site
- TUFLOW Model Extent
- Cadastre
- Proposed Building
- Carpark Marking

Proposed Landform(mAHD)

- <= 1.8
- 1.8 - 2.2
- 2.2 - 2.7
- 2.7 - 3.2
- > 3.2

Difference(m)

- <-0.10
- -0.10 - -0.05
- -0.05 - -0.01
- -0.01 - -0.005
- Less than +/-5mm
- 0.005 - 0.01
- 0.01 - 0.05
- 0.05 - 0.10
- >0.10

0 70 140 Metres

1:4,000

Figure D7

1% AEP Flood Elevation Difference
Culvert Upgrade Sensitivity
Developed Case minus Existing

42 Fullerton Cove Road
Fullerton Cove

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth - Aerial