

Appendix B – Time of Concentration and Rational Method Calculations

Pre-Development Hydrology

The natural hydrology of the site has been assessed in accordance with QUDM (IPWEAQ, 2017) Section 4.1. The time of concentration for all catchments has been determined using Friend's Equation as per QUDM Section 4.6.6, combined with a channel time flow calculation.

$$\text{Friend's Equation } t_c = (107nL^{0.333})/S^{0.2}$$

Table B.6-1 presents a summary of the catchment parameters used within Friend's Equation and the calculated time of concentration for the pre-development scenario.

Table B.6-1 Time of Concentration for Pre-Development Scenario

Catchment ID	Pre A
Overland Flow	
Estimated Length of Sheet	95
Horton's Roughness Value	0.035
Slope (%)	3.3
tc (mins)	13.48
TOTAL tc (mins)	13

Post-Development Hydrology – Unmitigated

Table B.6-2 presents a summary of the catchment parameters used for the calculated time of concentration for the post-development scenario. The time of concentration for the external catchment is presented in Table B.6-1 above.

Table B.6-2 Time of Concentration for Post-Development Scenario

Catchment ID	Post A
Standard Inlet Time	5
Pipe Flow Time	
Length of Pipe Flow (m)	90
Velocity (m/s)	1
tc (mins)	1.5
TOTAL tc (mins)	6.5 (6 mins)



Design storm event flows across the site were derived using the Rational Method as per the above-mentioned manuals. This involved:

- Determination of a C10 value (derived in accordance with QUDM Table 4.05.3(b) and Council guidelines). A value of 0.7 was applied to the pre-development catchment and 0.83 was applied to the post-development catchment;
- Adoption of design rainfall using BoM IFD data; and
- Calculation of design flows through the site for Q100, Q50, Q20, Q10, Q5, Q2, Q1 and Q3_{month}, where Q3_{month} is deemed to be 50% of Q1.

Summaries of the hydrologic calculations are contained in Table B.6-3 and Table B.6-4 for pre and post-development (un-mitigated) scenarios respectively.

Table B.6-3 Pre-Development Hydrology

Catch.	Area (ha)	t _c (min)	I ₁₀₀ (mm/hr)	C	Q ₁₀₀ (m ³ /s)	I ₅₀ (mm/hr)	C	Q ₅₀ (m ³ /s)	I ₂₀ (mm/hr)	C	Q ₂₀ (m ³ /s)	I ₁₀ (mm/hr)	C	Q ₁₀ (m ³ /s)	I ₅ (mm/hr)	C	Q ₅ (m ³ /s)	I ₂ (mm/hr)	C	Q ₂ (m ³ /s)	I ₁ (mm/hr)	C	Q ₁ (m ³ /s)	Q _{3month} (m ³ /s)
Pre A	0.21	13.00	203.00	0.78	0.09	184.00	0.75	0.08	158.00	0.68	0.06	138.00	0.65	0.05	118.00	0.62	0.04	86.80	0.55	0.03	76.70	0.52	0.02	0.01

Table B.6-4 Un-Mitigated Post-Development Hydrology

Catch.	Area (ha)	t _c (min)	I ₁₀₀ (mm/hr)	C	Q ₁₀₀ (m ³ /s)	I ₅₀ (mm/hr)	C	Q ₅₀ (m ³ /s)	I ₂₀ (mm/hr)	C	Q ₂₀ (m ³ /s)	I ₁₀ (mm/hr)	C	Q ₁₀ (m ³ /s)	I ₅ (mm/hr)	C	Q ₅ (m ³ /s)	I ₂ (mm/hr)	C	Q ₂ (m ³ /s)	I ₁ (mm/hr)	C	Q ₁ (m ³ /s)	Q _{3month} (m ³ /s)
Post A	0.21	6.00	292.00	1.00	0.17	119.60	0.95	0.07	223.00	0.87	0.11	193.60	0.83	0.09	163.80	0.79	0.08	119.60	0.71	0.05	105.30	0.66	0.02	0.0001





Appendix C – XP-SWMM Input Parameters

Laurenson Routing Parameters

In this study, the “Laurenson” routing method was applied to DRAINS for hydrograph generation. To enable this method to be used, each catchment must be split into pervious (undeveloped) and impervious (developed) portions. Adopted parameters for the Laurenson routing method included:

The fraction impervious has been determined by analysis of aerial photographs and the proposed development layout.

- Manning Roughness coefficient (n):
 - Pervious portion: 0.035; and
 - Impervious portion: 0.015.

Initial Loss (IL) and Continuing Losses (CL) have been applied to the hydrologic model. Details of IL and CL parameters applied in the DRAINS model are presented in Table C.6-5.

Table C.6-5 Adopted Initial & Continuing Losses

Impervious Area		Pervious Area	
IL (mm)	CL (mm/hr)	IL (mm)	CL (mm/hr)
0	0	27	1.6

Analysis of the catchment has been undertaken to determine the average slope, with the results of this being applied to the model.

Table C.6-6 Pre-Development Catchment Parameters

Impervious Area		Pervious Area	
Percentage %	Time of Concentration (mins)	Percentage %	Time of Concentration (mins)
15	6	75	13

Table C.6-7 Post-Development Catchment Parameters (Unmitigated)

Impervious Area		Pervious Area	
Percentage %	Time of Concentration (mins)	Percentage %	Time of Concentration (mins)
75	5	25	8





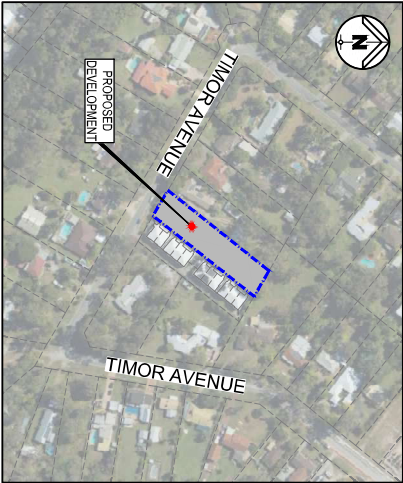
Appendix D – Burchills Engineering Solutions Civil Drawings



PROPOSED MULTIRESIDENTIAL DEVELOPMENT ON 38 TIMOR AVENUE LOGANHOLME, QUEENSLAND

CONCEPT MASTERPLAN ENGINEERING DRAWINGS CONTRACT BE260151-SK

DRAWING INDEX	
DWG NO.	DESCRIPTION
SK000	COVER SHEET
SK001	GENERAL NOTES
SK100	CONCEPT OVERALL SITE LAYOUT PLAN
SK200	CONCEPT BULK EARTHWORKS LAYOUT PLAN
SK201	EARTHWORKS SECTIONS
SK300	CONCEPT ROADWORKS ACCESS AND GRADING PLAN
SK400	CONCEPT STORMWATER LAYOUT PLAN
SK500	CONCEPT WATER LAYOUT PLAN
SK600	CONCEPT SEWER LAYOUT PLAN



LOCALITY PLAN

N.T.S.

SURVEY	PROVIDED BY:	SONTO PTY LTD
REPORT NO.:	P24824	
DATE:	17/05/2016	
SYSTEM:	AHD DERIVED VIA TOTAL STATION	

PREPARED FOR



PREPARED BY



GOLD COAST | BRISBANE | TOOWOOMBA
IPSWICH | MOUNTON DRY
PHONE: 17 5509 8400
FAX: 17 5509 8441
EMAIL: ADMIN@BURCHILLS.COM.AU
COOTE Burchills ENGINEERING PTY LTD
ABN 76 166 942 365

PROJECT NO.:	DRAWING NO.:	VERSION:	DATE:
BE260151-SK	SK000	B	06/05/26

GENERAL NOTES:

1. CONTRACT DOCUMENTATION
ALL INFORMATION ON THIS CONTRACT ARE TO BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATION.
2. SURVEY INFORMATION
CONTROL SURVEY INFORMATION WILL BE ESTABLISHED ON SITE BY THE PRINCIPAL'S SURVEYOR. SETOUT INFORMATION SHALL NOT BE OBTAINED BY SCALING FROM THESE DRAWINGS.
3. DATUM
ALL LEVELS SHOWN ON DRAWINGS ARE A.M.D. (DERIVED).
4. EXISTING SURVEY CONTROL STATIONS
EXISTING SURVEY CONTROL STATIONS ARE TO ENSURE THAT SURVEY CONTROL STATIONS ARE NOT DAMAGED OR DISTURBED IN ANY WAY BY CONSTRUCTION ACTIVITIES.
5. EXISTING SERVICES
EXISTING SERVICES LOCATIONS WHERE SHOWN ON THE DRAWINGS ARE INDICATIVE ONLY. THE CONTRACTOR SHALL CONTACT THE RELEVANT AUTHORITIES AND UNDERPINE A DIA-BEFORE-POUNDING SEARCH TO ASCERTAIN THE EXACT LOCATION OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORK AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO EXISTING SERVICES.
6. SITE ACCESS
THE CONTRACTOR SHALL GAIN ACCESS TO THE SITE AT LOCATIONS APPROVED BY THE SUPERINTENDENT. FREEDOM OF ACCESS TO OTHER WORK AREAS ON THE SITE SHALL BE MAINTAINED AT ALL TIMES.
7. PROVISION FOR TRAFFIC
PROVISION FOR TRAFFIC ON LOCAL ROADS IS TO BE IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AND LOCAL AUTHORITY REQUIREMENTS.
8. THE CONTRACTOR IS TO RESTRICT ACTIVITIES TO THOSE AREAS DESIGNATED AS WORK AREAS UNDER THIS CONTRACT. AT NO TIME SHALL THE CONTRACTOR ENTER ADJOINING PROPERTIES OR CONTRACT WORK AREAS ON THE SITE WITHOUT WRITTEN AUTHORISATION FROM THE SUPERINTENDENT.
9. TOPSOIL STRIPPING
ALL TOPSOIL STRIPPED FROM WORK AREAS SHALL BE STOCKPILED FOR LATER RE-SPREADING TO ALL FOOTPATHS, BATTERS AND EXISTING SERVICES (GENERAL).
10. ALL FILL MATERIAL PLACED SHALL BE COMPACTED AND TRIMMED TO FINAL EARTHWORKS LEVELS AND PROFILES SHOWN ON THE CONTRACT DRAWINGS AND TESTED IN ACCORDANCE WITH THE PROJECT SPECIFICATION.
11. TESTING AUTHORITY. CERTIFICATION FOR ALL EARTHWORKS CONSTRUCTION AND TESTING IS TO BE PROVIDED BY A REGISTERED PROFESSIONAL ENGINEER (QUEENSLAND IPRED) ENGAGED BY THE CONTRACTOR.
12. ALL FILL MATERIAL PLACED UNDER THIS CONTRACT SHALL BE COMPACTED IN ACCORDANCE WITH THE PROJECT SPECIFICATION AND CURRENT COUNCIL STANDARDS.
13. STORMWATER DRAINAGE
LOCATION AND ALIGNMENT OF ALL STORMWATER DRAIN LINES IS TO BE VERIFIED ON SITE WITH THE SUPERINTENDENT PRIOR TO EXCAVATION. THE DESIGN SURFACE LEVELS OF MANHOLES AND OTHER STRUCTURES ARE TO BE VERIFIED ON SITE WITH THE SUPERINTENDENT. ALL DRAINAGE CONSTRUCTION SHALL BE IN ACCORDANCE WITH COUNCIL STANDARD DRAWINGS AND SPECIFICATION.
14. THE DESIGN SURFACE LEVELS OF SEWER MANHOLES ARE TO BE VERIFIED ON SITE WITH THE SUPERINTENDENT PRIOR TO CONSTRUCTION. ALL SEWERAGE RETICULATION SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT SOUTH EAST QUEENSLAND SEWERAGE CODE (SE0 CODE) AND ASSOCIATED STANDARD DRAWINGS.
15. WATER RETICULATION
ALL WATER RETICULATION SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT SOUTH EAST QUEENSLAND SEWERAGE CODE (SE0 CODE) AND ASSOCIATED STANDARD DRAWINGS.
16. ALL TRENCHING AND CONDUIT WORKS ARE TO BE VERIFIED ON SITE WITH THE SUPERINTENDENT PRIOR TO EXCAVATION. ALL TRENCHING AND CONDUIT WORKS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE RELEVANT CONSULTANT'S DRAWINGS AND ENERGY SPECIFICATION UNDERGROUND DISTRIBUTION CONSTRUCTION.*
17. TESTING
ALL TESTING SHALL BE CARRIED OUT BY AN APPROVED N.A.T.A. TESTING AUTHORITY IN ACCORDANCE WITH THE PROJECT SPECIFICATION AND CURRENT STANDARDS.
18. MAINTENANCE OF SITE CONDITION
AT THE COMPLETION OF WORKS THE SITE IS TO BE LEFT IN A CLEAN AND TIDY CONDITION TO THE SATISFACTION OF THE SUPERINTENDENT AND RELEVANT COUNCIL REPRESENTATIVE.
19. REFERENCED DOCUMENTS
ALL WORKS TO BE CONSTRUCTED ARE TO BE IN CONJUNCTION WITH:
- LANDSCAPE ARCHITECT'S DRAWINGS
- HYDRAULIC AND TANK SUPPLIER DRAWINGS
- VEGETATION MANAGEMENT AND TREE CLEANING REQUIREMENTS

CONTRACTOR'S
This drawing is a copyright and its property of Burchills Engineering Solutions
Burchills Engineering Solutions
Burchills Engineering Solutions

DISCLAIMER
This drawing and its contents are not to be used for any purpose other than that for which it was prepared. It is not to be used for any other purpose without the written consent of Burchills Engineering Solutions.

NOTE
This is an uncontrolled document issued by Burchills Engineering Solutions. It is not to be used for any purpose other than that for which it was prepared. It is not to be used for any other purpose without the written consent of Burchills Engineering Solutions.

VER.
A
ORIGINAL ISSUE
DATE



GOLD COAST | BRISBANE | TOWOOMBA
PHOSPHORUS ROAD
FAX: +61 7 5509 8411
EMAIL: ADMIN@BURCHILLS.COM.AU
ABN 15 166 942 255

CLIENT:



DRAWING TITLE:

GENERAL NOTES

PROJECT:
PROPOSED MULTI-RESIDENTIAL DEVELOPMENT
38 TIMOR AVENUE
LOGANHOLME, QLD 4129

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1):

DATE: 06/06/20

DESIGNER: JIN

CHECKED: SHELTON WHITWORTH

APPROVED FOR AND ON BEHALF OF:
BURCHILLS ENGINEERING SOLUTIONS ABN 15 166 942 255

PROJECT NO.:

BE200151-SK

DRAWING NO.:

SK001

VERSION:

B



--- X.xx --- **EXISTING SURFACE CONTOURS**

--- X.xx --- **DESIGN SURFACE CONTOURS**

-
- FUTURE DRIVEWAY**

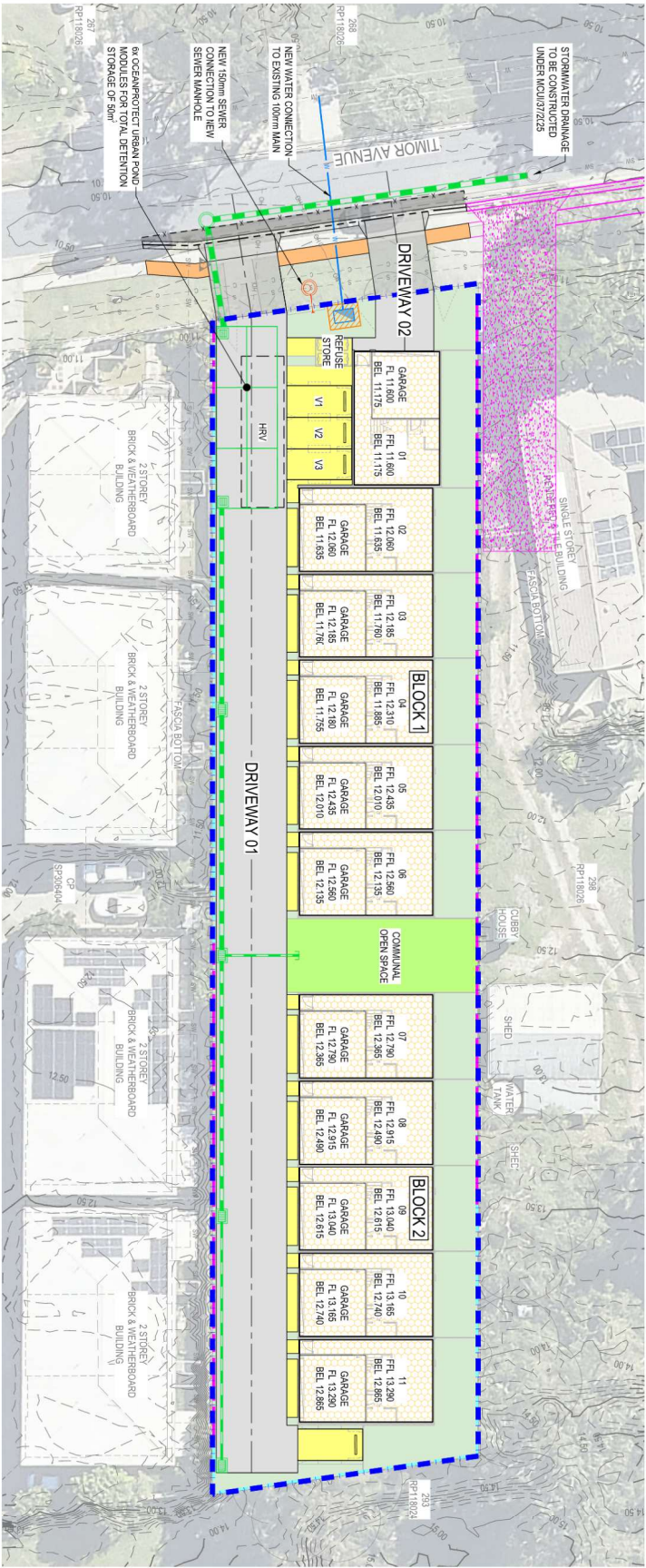
This drawing is copyright and the property of and its engineering solutions. It must not be retained, copied or used without the authority of Buehler Engineering Solutions.

This drawing and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended.

changed either manually or electronically by any third party.

Figured dimensions take precedence over scale. Do not scale reduced size drawings. Verify dimensions refer to construction and provide or

DESCRIPTION	DATE	VER.
off-site work or fabrication.		



DRAWING TITLE:

LOOMING CIVIL, QED 7123

SCALE AT FULL SIZE (A1) :

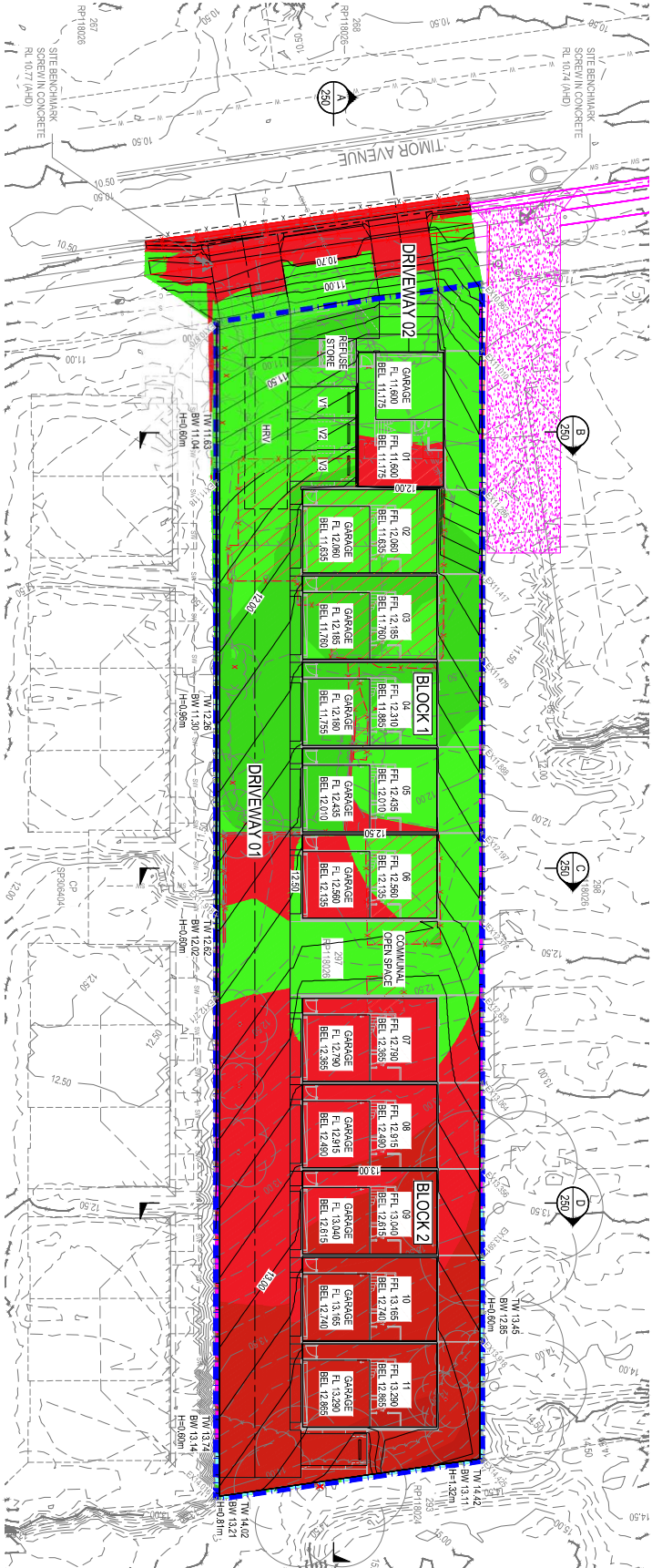


BE260151-SK	SK100	D
-------------	-------	---



LEGEND

- EXISTING SURFACE CONTOURS
- DESIGN SURFACE CONTOURS
- EXISTING LOT BOUNDARY
- EXISTING STORMWATER
- EXISTING WATER
- EXISTING SEWER AND RAINWATER
- EXISTING OVERHEAD ELECTRIC
- EXISTING COMMUNITIES
- EXISTING KERB
- EXISTING FOOTPATH
- EXISTING ROAD CONTROL LINE
- EXISTING KERB ADAPTER
- EXISTING WATER METER
- EXISTING TELSTRA PIT
- EXISTING TREE
- SURVEY BENCHMARK
- PROPOSED RETAINING WALL (0m-1.0m)
- PROPOSED RETAINING WALL (1.0m-2.0m)
- PROPOSED EARTHWORKS PLO
- DEVELOPMENT SITE BOUNDARY
- PROPOSED MOUNTABLE
- PROPOSED KERB (TYPE M)
- PROPOSED SAW-CUT
- FINISHED SURFACE LEVEL
- REFERENCED BENCH LEVEL
- EXISTING TREE TO BE REMOVED
- EXISTING STRUCTURE TO BE REMOVED



EARTHWORKS DEPTH ANALYSIS LEGEND

COLOUR	
UPPER	LOWER
-3.5m TO -3.0m	TO -4.0m
-2.5m TO -2.0m	TO -3.5m
-2.0m TO -1.5m	TO -2.5m
-1.5m TO -1.0m	TO -2.0m
-1.0m TO -0.5m	TO -1.5m
-0.5m TO 0.0m	TO -1.0m
0.0m TO 0.5m	TO -0.5m
0.5m TO 1.0m	TO 0.0m
1.0m TO 1.5m	TO 0.5m
1.5m TO 2.0m	TO 1.0m
2.0m TO 2.5m	TO 1.5m
2.5m TO 3.0m	TO 2.0m
3.0m TO 3.5m	TO 2.5m
3.5m TO 4.0m	TO 3.0m

CONCEPT BULK EARTHWORKS SUMMARY

STRUCTURAL FILLING	NETT SOLID FILL
AREA	474.187 cu.m.
OVERALL FILLING	
EXCAVATION	
AREA	NETT OUT
OVERALL EXCAVATION	455.731 cu.m.
SUMMARY:	
TOTAL MATERIAL ON LEADS (NET FILL) = 18.436 cu.m.	
I.e. 474.187 cu.m. - 455.731 cu.m. = 18.436 cu.m.	
ALLOWANCE FOR 420mm WASTE PODS	
ALLOWANCE FOR 280mm DRIVEWAY PAVEMENT	
ALLOWANCE FOR 225mm PARKING BAY PAVEMENT	
ALLOWANCE FOR 150mm FOOTPATH PAVEMENT	
NO BUILDING FACTOR HAS BEEN USED	

CONCEPT

DISCLAIMER

This drawing is a conceptual design and is not intended to be used for construction. It is intended to provide a general indication of the proposed development and is not intended to be used for any other purpose. The design is subject to change without notice. The client is responsible for ensuring that the design is suitable for the intended purpose. The design is not intended to be used for any other purpose. The client is responsible for ensuring that the design is suitable for the intended purpose.

NOTE: This is a conceptual drawing based on information provided by the client. It is not intended to be used for construction. The design is subject to change without notice. The client is responsible for ensuring that the design is suitable for the intended purpose. The design is not intended to be used for any other purpose. The client is responsible for ensuring that the design is suitable for the intended purpose.

VAR.	DESCRIPTION	DATE
B	IRI RESPONSE	06-06-20
A	ORIGINAL ISSUE	23-04-20

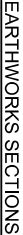
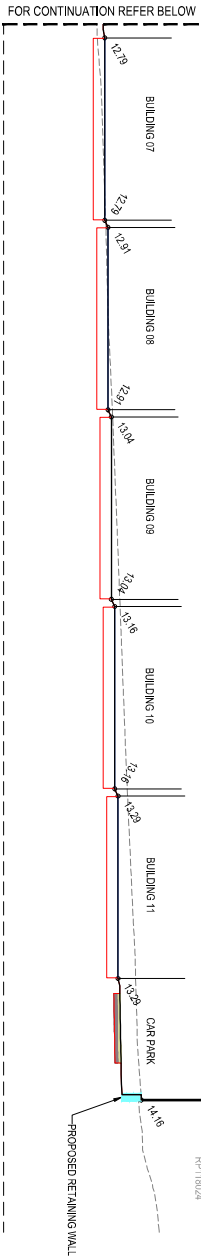
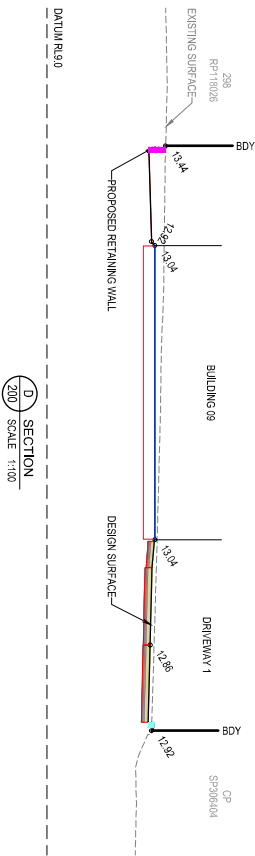
BURCHILLS
ENGINEERING SOLUTIONS
GOLD COAST | BRISBANE | TOWOOMBA
PHON: 07 5509 8411
FAX: 07 5509 8411
EMAIL: ADMIN@BURCHILLS.COM.AU
ABN 75 166 942 355

brockmoore
GROUP
CLIENT: *Grace Victoria Real Estate*

PROJECT: **CONCEPT BULK EARTHWORKS LAYOUT PLAN**
PROPOSED MULTI-RESIDENTIAL DEVELOPMENT
38 TIMOR AVENUE
LOGANHOLME, QLD 4129

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER
SCALE AT FULL SIZE (A1):
1:200 (FULL SIZE)

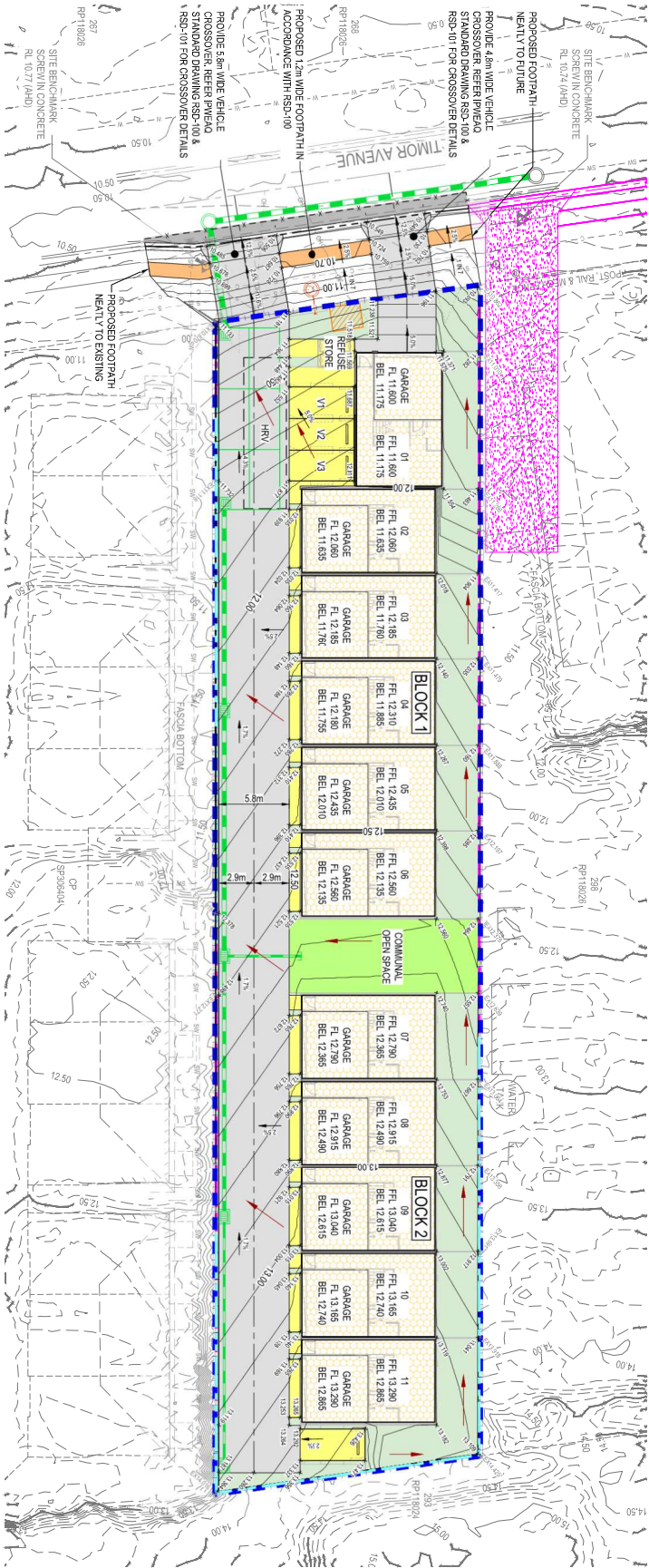
PROJECT NO.	DRAWING NO.	VERSION
BE200151-SK	SK200	B

[illegible]



LEGEND

- EXISTING SURFACE CONTOURS
- DESIGN SURFACE CONTOURS
- EXISTING LOT BOUNDARY
- EXISTING STORMWATER
- EXISTING WATER
- EXISTING SEWER AND MAIN/OLE
- EXISTING OVERHEAD ELECTRIC
- EXISTING COMMUNITIES
- EXISTING KERB
- EXISTING FOOTPATH
- EXISTING ROAD CONTROL LINE
- EXISTING KERB ADAPTER
- EXISTING WATER METER
- EXISTING TELSTRA PIT
- EXISTING TREE
- SURVEY BENCHMARK
- PROPOSED TLOW ARROW
- PROPOSED STORMWATER
- PROPOSED LOT BOUNDARY
- PROPOSED ROAD CONTROL LINE
- PROPOSED RETAINING WALL (0m-4.6m)
- PROPOSED RETAINING WALL (0.0m-1m)
- RANSIED SURFACE LEVEL
- EXISTING SURFACE LEVEL
- DEVELOPMENT SITE BOUNDARY
- PROPOSED MOUNTABLE
- PROPOSED KERB (TYPE M3)
- FUTURE FEATURES
- LIT 36 APPROVED DEVELOPMENT
- PROPOSED CONCRETE DRIVEWAY
- PROPOSED DRIVEWAY PAVEMENT
- PROPOSED FOOTPATH PAVEMENT
- PROPOSED CARPARK PAVEMENT
- BUILDINGS AREA
- LANDSCAPING AREA
- COMMUNAL OPEN SPACE
- FUTURE DRIVEWAY



CONCEPT ROADWORKS ACCESS AND GRADING PLAN

PROPOSED MUL TIRESDENTIAL DEVELOPMENT

38 TIMOR AVENUE

LOGANHOLME, QLD 4129

PRELIMINARY

NOT FOR CONSTRUCTION OR TENDER

DATE: 16/06/2016

PROJECT: 38 TIMOR AVENUE

DESIGNER: BIRCHILLS ENGINEERING SOLUTIONS

CHECKED: SHELDON WHITWORTH

PROJECT NO: BE260151-SK

DRAWING NO: SK300

VERSION: B

BIRCHILLS ENGINEERING SOLUTIONS

GOLD COAST | BRISBANE | TOOWOOMBA

PRODUCTION MANAGER: JASON BIRCHILLS

PHONE: +61 7 5509 8410

FAX: +61 7 5509 8411

EMAIL: ADMIN@BIRCHILLS.COM.AU

WEBSITE: WWW.BIRCHILLS.COM.AU

ABN 15 166 942 265

brockmoore GROUP

Group Finance & Audit

CONCEPT ROADWORKS ACCESS AND GRADING PLAN

PROPOSED MUL TIRESDENTIAL DEVELOPMENT

38 TIMOR AVENUE

LOGANHOLME, QLD 4129

PRELIMINARY

NOT FOR CONSTRUCTION OR TENDER

DATE: 16/06/2016

PROJECT: 38 TIMOR AVENUE

DESIGNER: BIRCHILLS ENGINEERING SOLUTIONS

CHECKED: SHELDON WHITWORTH

PROJECT NO: BE260151-SK

DRAWING NO: SK300

VERSION: B



LEGEND

- | | | |
|-----|-----|-------------------------------|
| | X-X | EXISTING SURFACE CONTOURS |
| --- | --- | EXISTING LOT BOUNDARY |
| --- | --- | EXISTING STORMWATER |
| --- | --- | EXISTING WATER |
| —○— | —○— | EXISTING SEWER AND MANHOLE |
| --- | --- | EXISTING OVERHEAD ELECTRIC |
| --- | --- | EXISTING COMMUNITIES |
| --- | --- | EXISTING KERB |
| --- | --- | EXISTING FOOTPATH |
| --- | --- | EXISTING ROAD CONTROL LINE |
| × | × | EXISTING KERB ADAPTER |
| ⊖ | ⊖ | EXISTING WATER METER |
| ⊖ | ⊖ | EXISTING TELSTRA PIT |
| ⚠ | ⚠ | SURVEY BENCHMARK |
| ■ | ■ | PROPOSED WATER METER |
| ■ | ■ | PROPOSED STORMWATER |
| — | — | PROPOSED WATER |
| — | — | PROPOSED SEWER |
| — | — | PROPOSED LOT BOUNDARY |
| ⊕ | ⊕ | PROPOSED STORMWATER STRUCTURE |
| ⊕ | ⊕ | PROPOSED STORMWATER LINE |
| --- | --- | PROPOSED ROAD CONTROL LINE |
| --- | --- | PROPOSED RETAINING WALL |
| --- | --- | DEVELOPMENT SITE BOUNDARY |
| --- | --- | PROPOSED MOUNTABLE |
| --- | --- | PROPOSED KERB (TYPE 10) |
| --- | --- | PROPOSED SAW-CUT |
| --- | --- | FUTURE FEATURES |
| --- | --- | LOT 36 APPROVED DEVELOPMENT |
| --- | --- | PROPOSED CONCRETE DRIVEWAY |
| --- | --- | PROPOSED DRIVEWAY PAVEMENT |
| --- | --- | PROPOSED FOOTPATH PAVEMENT |
| --- | --- | PROPOSED CARPARK PAVEMENT |
| --- | --- | BUILDINGS AREA |
| --- | --- | LANDSCAPING AREA |
| --- | --- | COMMUNAL OPEN SPACE |
| --- | --- | FUTURE DRIVEWAY |

NOTE:
ALL FIELD INLETS TO BE FITTED WITH OCEANPROTECT
OCEANGUARD PIT BASKETS.

COPYRIGHT ©

The drawing, a copyright and the property of Burch Engineering Solutions, must not be reprinted, copied or used without the permission of Burch Engineering Solutions.

DISCLAIMER

This drawing and its contents are electronically generated; are confidential and may contain errors. Burch Engineering Solutions does not accept any responsibility for any consequences arising from the use of the drawing by other than the intended recipient. The user agrees to hold Burch Engineering Solutions harmless either manually or electronically by any third party.

NOTE

This is an ancillary document issued for information purposes only, unless the attached documents are signed or countersigned. It is not intended to constitute a contract. No liability shall be accepted or assumed. Any alterations or amendments must be agreed in writing before being implemented. Any alterations or amendments must be agreed in writing before being implemented. Any alterations or amendments must be agreed in writing before being implemented.

VER.	DESCRIPTION	DATE
B	RFI RESPONSE	06-03-26
A	ORIGINAL ISSUE	23-04-26



GOLD COAST | BRISBANE | TOOWOOMBA
IPSWICH | MORETON BAY
PHONE: +61 7 5509 8400
FAX: +61 7 5509 6411
EMAIL: ADMIN@BURCHILLS.COM.AU
COOTE BURCHILLS ENGINEERING PTY LTD
ABN 76 166 942 365



CLIENT:

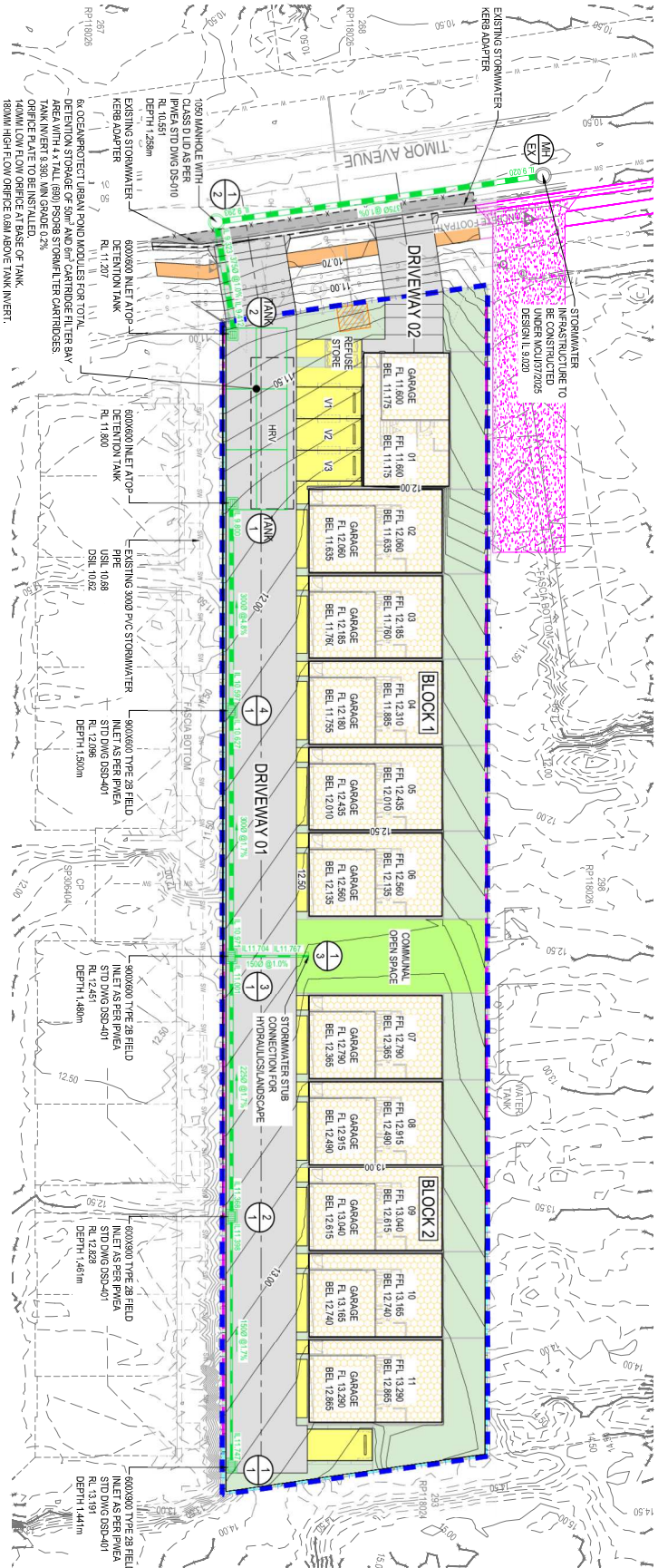
DRAWING TITLE: CONCEPT STORMWATER LAYOUT PLAN	PROJECT: PROPOSED MULTIRESIDENTIAL DEVELOPMENT 38 TIMOR AVENUE LOGANHOLME, QLD 4129
---	---

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1)



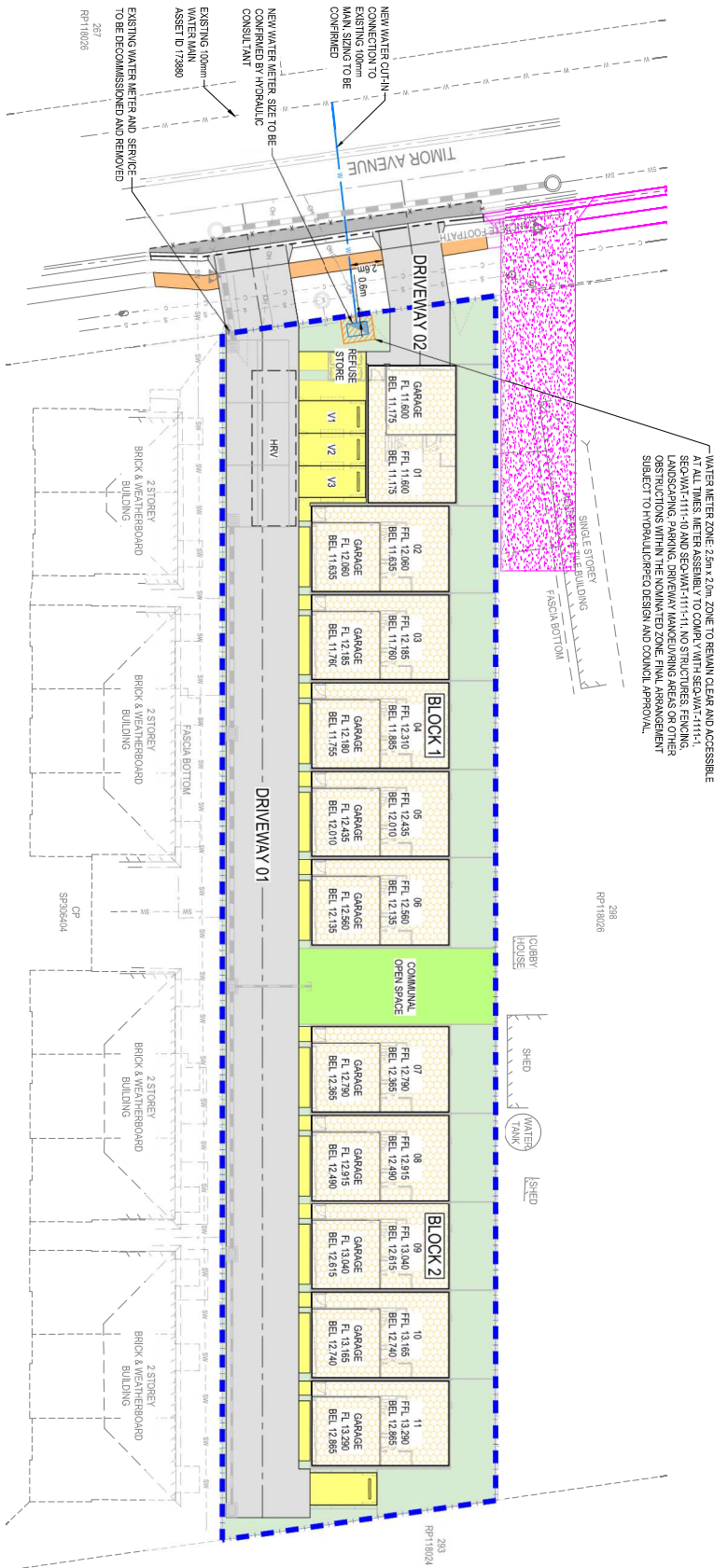
DATE: 06-26-26	
DEVELOPER: No.:	DESIGNER: TM
PROJECT LEADER: CHAS HUNTER	
DRAFTSPERSON: WM	CHECKED: SHELBY WATFORTH
APPROVED FOR AND ON BEHALF OF: BIRCHILLS ENGINEERING SOLUTIONS, 48476 166 842 365	
PROJECT NO.:	VERSION:
BE260151-SK	B
DRAWING NO.:	
SK400	





LEGEND

- EXISTING LOT BOUNDARY
- EXISTING STORMWATER
- EXISTING WATER
- EXISTING SEWER AND MANHOLE
- EXISTING OVERHEAD ELECTRIC
- EXISTING COMMUNITIES
- EXISTING KERB
- EXISTING FOOTPATH
- EXISTING ROAD CONTROL LINE
- EXISTING KERB ADAPTER
- EXISTING WATER METER
- EXISTING TELSTRA PIT
- SURVEY BENCHMARK
- PROPOSED WATER METER
- PROPOSED STORMWATER
- PROPOSED WATER
- PROPOSED SEWER
- PROPOSED LOT BOUNDARY
- PROPOSED ROAD CONTROL LINE
- DEVELOPMENT SITE BOUNDARY
- PROPOSED MOUNTABLE
- PROPOSED KERB (TYPE M3)
- PROPOSED SAW-CUT
- FUTURE FEATURES
- LOT 36 APPROVED DEVELOPMENT
- PROPOSED CONCRETE DRIVEWAY
- PROPOSED DRIVEWAY PAVEMENT
- PROPOSED FOOTPATH PAVEMENT
- PROPOSED CARPARK PAVEMENT
- BUILDINGS AREA
- LANDSCAPING AREA
- COMMUNAL OPEN SPACE
- FUTURE DRIVEWAY



CONCEPT WATER LAYOUT PLAN

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It is not to be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without the prior written permission of Burchills Engineering Solutions.		DISCLAIMER This drawing and its contents are advisory in nature and are not intended to constitute a contract. It is the responsibility of the client to ensure that the design is suitable for the intended purpose and to obtain all necessary approvals and permits. The client acknowledges that the design is provided on an 'as is' basis and that Burchills Engineering Solutions does not warrant the accuracy or completeness of the design. The client agrees to indemnify and hold Burchills Engineering Solutions harmless from and against all claims, damages, losses, and expenses, including legal costs, arising from the use of the design, whether or not such claims, damages, losses, and expenses are caused in whole or in part by the negligence of Burchills Engineering Solutions.	
VER.	DATE	DESCRIPTION	DATE
A	2024-06-28	INITIAL ISSUE	
B		REVISED	
C			
D			
E			
F			
G			
H			
I			
J			
K			
L			
M			
N			
O			
P			
Q			
R			
S			
T			
U			
V			
W			
X			
Y			
Z			

CLIENT:	PROJECT:
brookmoore GROUP	PROPOSED MULTIRESIDENTIAL DEVELOPMENT
	38 TIMOR AVENUE
	LOGANHOLME, QLD 4129

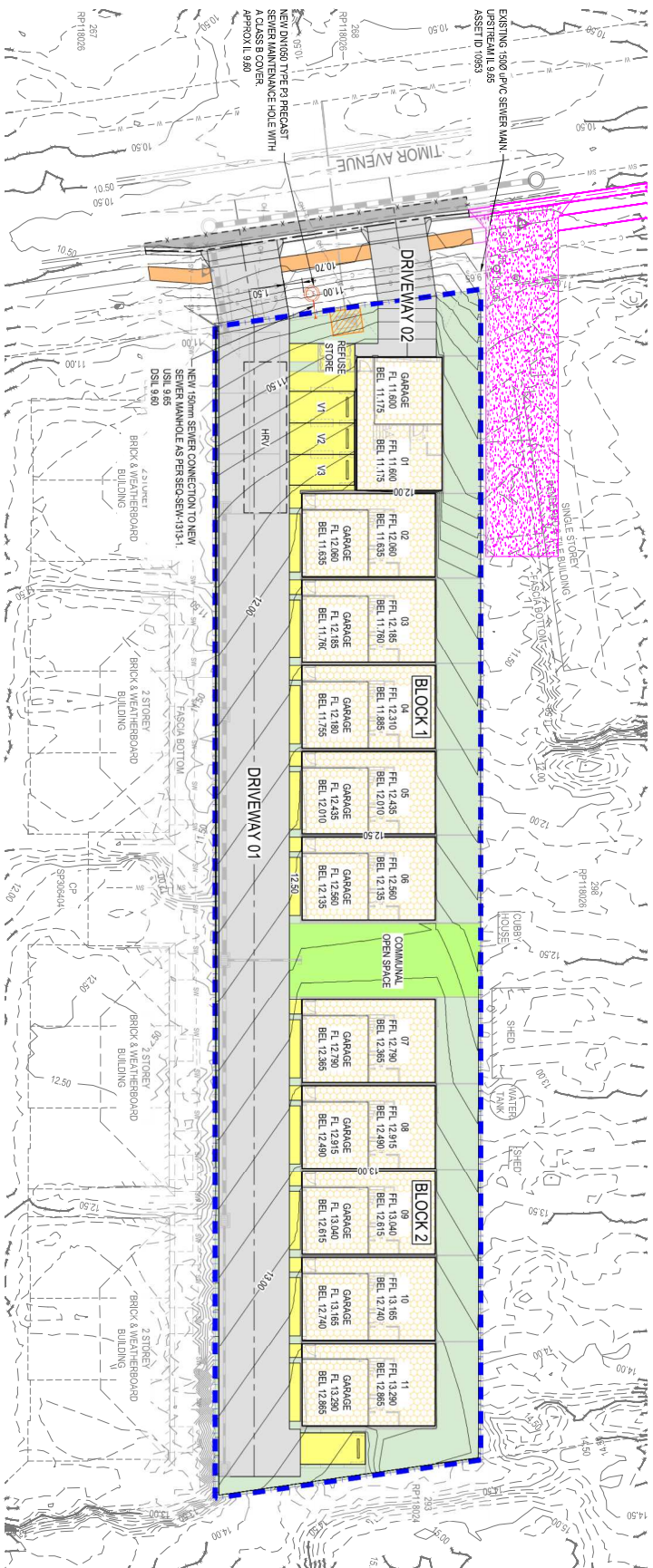
DRAWING TITLE:	SCALE AT FULL SIZE (M):
CONCEPT WATER LAYOUT PLAN	1:200 (FULL SIZE)

DATE: 2024-06-28	PROJECT LEADER: CHAD HARTER	DESIGNER: TIM
	DRAWING NO.: BE200151-SK	CHECKED: SHELDON WHITWORTH
		APPROVED FOR AND ON BEHALF OF: BIRCHILLS ENGINEERING SOLUTIONS A/N 15 186 942 265
		PROJECT NO.: BE200151-SK
		DRAWING NO.: SK500
		VERSION: B



--- X.xx --- EXISTING SURFACE CONTOURS
--- X.xx ---
--- X.xx --- DESIGN SURFACE CONTOURS

- | | |
|--|-----------------------------|
| | DESIGN SURFACE CONTOURS |
| | EXISTING TOPO BOUNDARY |
| | EXISTING STORMWATER |
| | EXISTING WATER |
| | EXISTING OVERHEAD ELECTRIC |
| | EXISTING COMMUNITIES |
| | EXISTING KERB |
| | EXISTING FOOTPATH |
| | EXISTING ROAD CONTROL LINE |
| | EXISTING KERB ADAPTER |
| | EXISTING WATER METER |
| | EXISTING TESSERA PIT |
| | SURVEY BENCHMARK |
| | PROPOSED WATER METER |
| | PROPOSED STORMWATER |
| | PROPOSED WATER |
| | PROPOSED SEWER |
| | PROPOSED TOPO BOUNDARY |
| | PROPOSED ROAD CONTROL LINE |
| | DEVELOPMENT SITE BOUNDARY |
| | PROPOSED MOUNTABLE |
| | PROPOSED KERB (TYPE M) |
| | PROPOSED SAW-CUT |
| | FUTURE FEATURES |
| | FUT 36 APPROVED DEVELOPMENT |
| | PROPOSED CONCRETE DRIVEWAY |
| | PROPOSED DRIVEWAY PAVEMENT |
| | PROPOSED FOOTPATH PAVEMENT |
| | PROPOSED CARPARK PAVEMENT |
| | BUILDINGS AREA |
| | LANDSCAPING AREA |
| | COMMUNAL OPEN SPACE |
| | FUTURE DRIVEWAY |



CONCEPT SEWER LAYOUT PLAN

CONCEPT SEWER LAYOUT PLAN

PROPOSED MULTIRESIDENTIAL DEVELOPMENT
38 TIMOR AVENUE
LOGANHOLME, QLD 4129

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER



PROJECT NO.:	BE260151-SK	DRAWING NO.:	SK600	VERSION:	B
DETAIL PARTS NO.:		DATE:	06-06-26		
PROJECT LEADER:	CHRIS HUNTER	DESIGNER:	TM		
DRAWING PERSON:	WM	CHECKED:	SHELDON WHITMORTON		
APPROVED FOR AND ON BEHALF OF BIRCHALLS ENGINEERING SOLUTIONS ABN74 196 942 365					



Appendix E – MUSIC Input Parameters

Rainfall and Evapotranspiration Parameters

MUSIC modelling was based on 6-minute interval data obtained from the Bureau of Meteorology (BoM) for rainfall station 40715 at Shailer Park, as summarised below.

Rainfall and Evapotranspiration Parameters	
Input	Data Used in Modelling
Rainfall station	Shailer Park - 40715
Time step	6 minute
Modelling period	1990 - 1999
Mean annual rainfall (mm)	1155

Catchment Parameters

Based on the proposed land uses within the development, the site has been modelled as urban land use. The Site has been divided into roof and ground level source nodes as shown below.

Land Use Parameters			
Catchment ID	Area (ha)	Land use	Total Impervious (%)
Road	0.0715	Mixed	100
Roof	0.089	Mixed	100
Landscape	0.0517	Mixed	0

Rainfall Parameters

The runoff parameters and pollutant loads for each source node have been based on the data from the Water by Design MUSIC Modelling Guidelines (2018), as summarised below.

Rainfall Runoff Parameters	
Parameter	All Nodes
Landuse	Mixed
Rainfall threshold (mm)	1.00
Soil storage capacity (mm)	18
Initial storage (% capacity)	10
Field capacity (mm)	80
Infiltration capacity coefficient a	243
Infiltration capacity exponent b	0.6
Initial depth (mm)	50
Daily recharge rate (%)	0
Daily baseflow rate (%)	31
Daily deep seepage rate (%)	0





Pollutant Load Parameters

Urban Residential	Total Suspended Solids (log mg/L)		Total Phosphorus (log mg/L)		Total Nitrogen (log mg/L)	
	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
Storm Flow Concentration	1.3 ⁽¹⁾ 2.43 ⁽²⁾ 2.16 ⁽³⁾	0.38	-0.89 ⁽¹⁾ -0.3 ⁽²⁾ -0.39 ⁽³⁾	0.34	0.37	0.34
Base Flow Concentration	0 ⁽¹⁾ 0.78 ^(2,3)	0 ⁽¹⁾ 0.39 ^(2,3)	0 ⁽¹⁾ -0.6 ^(2,3)	0 ⁽¹⁾ 0.5 ^(2,3)	0 ⁽¹⁾ 0.32 ^(2,3)	0 ⁽¹⁾ 0.3 ^(2,3)

(1) Values applied to "Roof" areas. (2) Values applied to "Road" areas. (3) Values applied to "Landscape" areas.

Treatment Nodes

Ocean Protect OceanGuard Parameters

Parameter	Value
Low-Flow Bypass (m ³ /s)	0.000
High-Flow Bypass (m ³ /s)	0.02
Target Element	Gross Pollutants (kg/ML)
Gross Pollutant Concentration Based Capture Efficiency	Input: 0.00 – 1000.00 Output: 0.00 – 0.00
TSS Concentration Based Capture Efficiency	Input: 0.00 – 1000.00 Output: 0.00 – 484.00
TP Concentration Based Capture Efficiency	Input: 0.00 – 10.00 Output: 0.00 – 3.53
TN Concentration Based Capture Efficiency	Input: 0.00 – 100.00 Output: 0.00 – 75.10

Ocean Protect StormFilter Parameters

Parameter	Value
Low-Flow Bypass (m ³ /s)	0.000
High-Flow Bypass (m ³ /s)	0.00504
Gross Pollutant Concentration Based Capture Efficiency	Input: 0.00 – 1000.00 Output: 0.00 – 0.00
TSS Concentration Based Capture Efficiency	Input: 0.00 – 1000.00 Output: 0.00 – 114.00
TP Concentration Based Capture Efficiency	Input: 0.00 – 10.00 Output: 0.00 – 2.29
TN Concentration Based Capture Efficiency	Input: 0.00 – 100.00 Output: 0.00 – 38.10

