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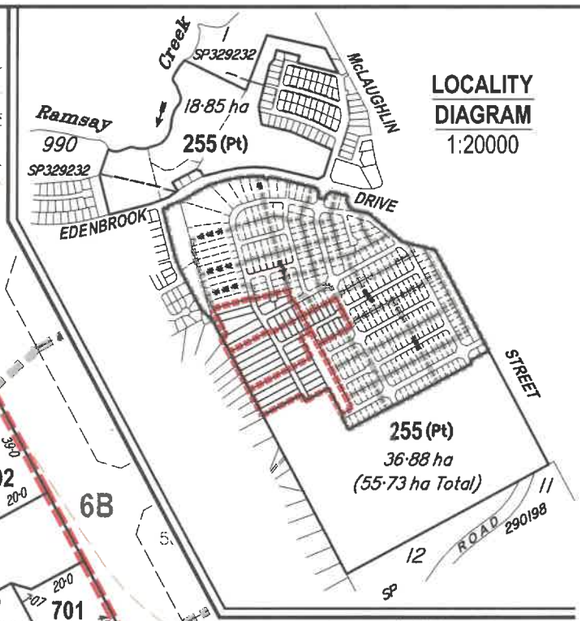

As amended by council 5/11/2024 SM

Stage 8D not approved as part of the application

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/69-2024

Dated: 25 November 2024

IMPORTANT NOTE

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In particular, no reliance should be placed on the information on this plan for any financial dealings involving the land.

This note is an integral part of this plan.

client

Edenbrook Land Pty Ltd
A.C.N. 112 588 182

project

Edenbrook Estate
Edenbrook Drive, Parkhurst

plan of

Reconfiguration Plan
Stage 8
(48 Lots + PUL + Balance)

rpd

Lot 255 on SP346283

lga

Rockhampton Regional Council

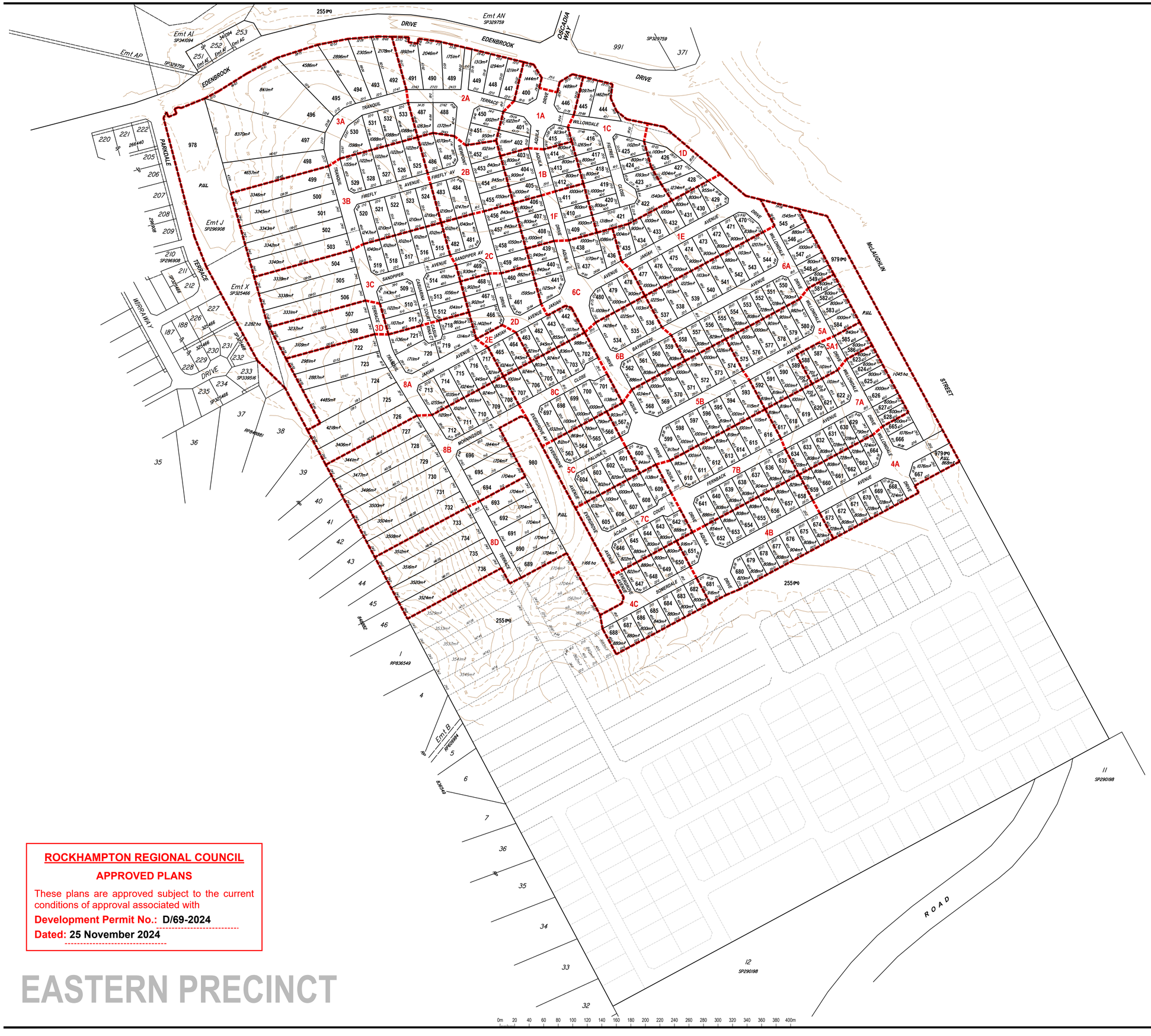
issue	date	details	authorised
A	13-02-2024	Initial Issue	RJKF
B	20-05-2024	Lot 737 removed	RJKF

created

capricornsurveygroupcq
SURVEYING & PLANNING SOLUTIONS

07 4927 5199 | reception@cosgcq.com.au | 132 Victoria Parade, Rockhampton QLD 4700

scale: 1:2000 @ A3
datum: AHD 2.5m Contours
sheet no.: 1 of 1
cad file: 8066-18-ROL-B
plan no.: 8066-18-ROL
issue: B



Staging

Stage Number	Lots
Stage 1	47
Stage 2	36
Stage 3	42
Stage 4	42
Stage 5	42
Stage 6	38
Stage 7	42
Stage 8	48
Total	337

IMPORTANT NOTE

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client

Edenbrook Land Pty Ltd
A.C.N. 112 588 182

project

Edenbrook Estate
Edenbrook Drive, Parkhurst

plan of

Concept Plan
1 Lot into 47 Lots (Stage 1) + 290 Lots + Bal)

rpd

Lot 255 on SP346283

lga

Rockhampton Regional Council

issue	date	details	authorised
A	18-12-2023	Initial Issue	RJKF
B	29-01-2024	Layout amended, prelim staging added	RJKF
C	13-02-2024	Sub-staging added	RJKF
D	12-06-2024	Stgs 2, 3, 6, 8, Lots 450, 451, 480 amended	RJKF
E	25-06-2024	Plan scale changed, Sub-stage 5A1 added	RJKF

created

capricornsurveygroupcq
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07 4927 5199 | reception@csgcq.com.au | 132 Victoria Parade, Rockhampton QLD 4700

scale **1:2000 @ A1**
datum **AHD 2.5m Contours**
sheet no. **1 of 1**
cad file **8066-EP-CPT E**
plan no. **8066-EP-CPT**
issue **E**

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/69-2024
Dated: 25 November 2024

EASTERN PRECINCT

ROCKHAMPTON REGIONAL COUNCIL

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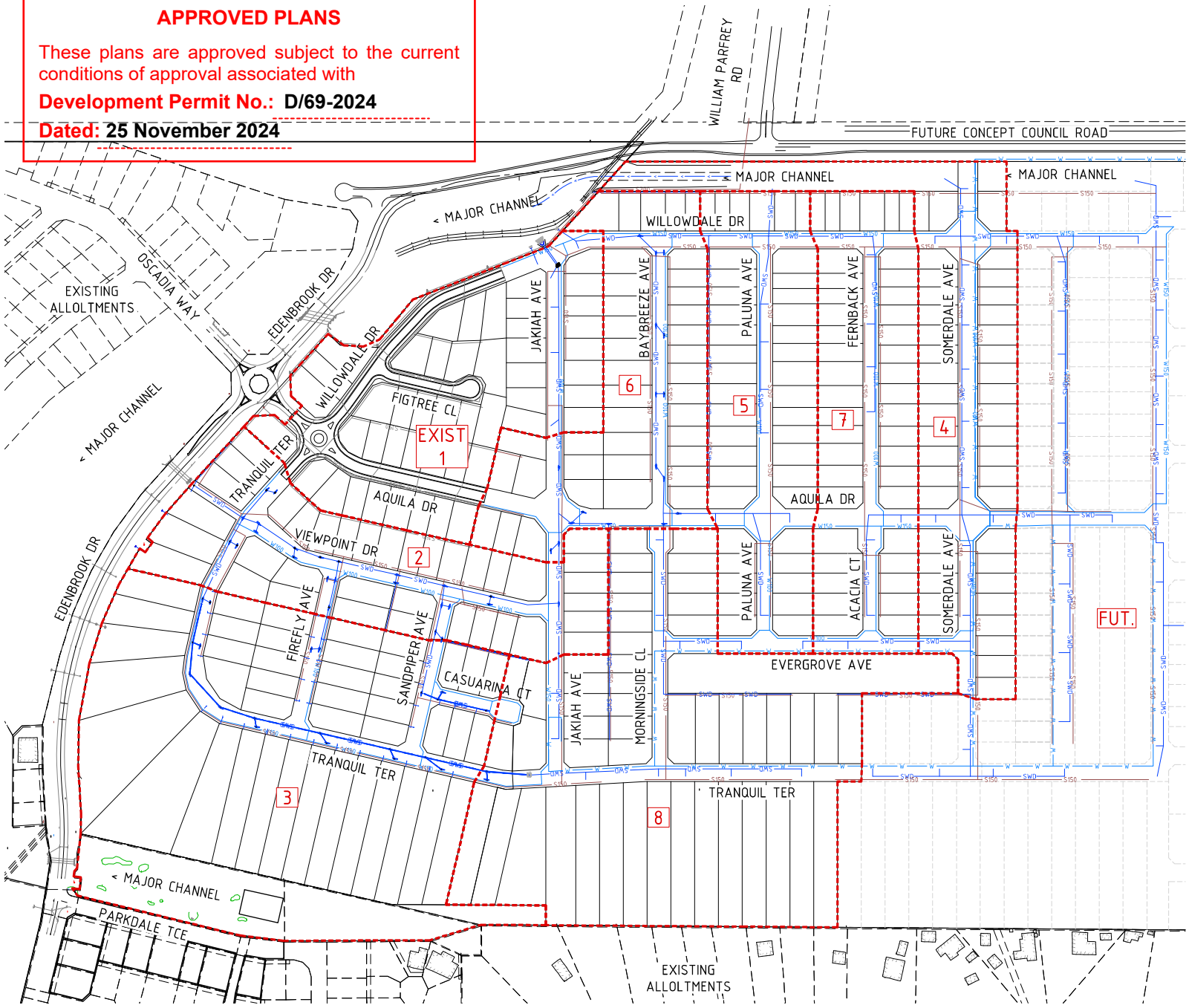
Dated: 25 November 2024



FUTURE LOTS NOT CURRENTLY CONSIDERED

PLAN
SCALE A1 - 1 : 2000
A3 - 1 : 4000

20 0 20 40 60 80 100m
SCALE 1:2000

DWG PRJ-0304-00-GN20-SERV-PLAN.dwg

Hartecs Group
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PH: 1300 220 195
EMAIL: admin@hartecs.com.au
OFFICE: ROCKHAMPTON

CLIENT
EDENBROOK DEVELOPMENTS PTY LTD

PROJECT
EDENBROOK - EASTERN PRECEINCT
LOT 255 on SP325466
EDENBROOK DRIVE, PARKHURST
QLD 4702 (REF: ####)

DRAWING TITLE
MASTER PLANNING CONCEPTS

CONCEPT SERVICES SITE PLAN

STATUS
CONCEPT ONLY

PROJ - DWG. No.
PRJ-0304-00-GN21

REV.
00

SHEET NO.

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Development Permit No.: D/69-2024

Dated: 25 November 2024

Hartecs Group Pty Ltd
ABN: 27 158 351 663

20/5/2022

Development Assessment Section
Rockhampton Regional Council
PO Box 1860, ROCKHAMPTON QLD 4700

Dear Sir/Madam

ROL APPLICATION – STAGE 4 OF 32 RESIDENTIAL LOTS EASTERN PRECINCT AT EDENBROOK DRIVE, PARKHURST

This engineering report is prepared on behalf of Edenbrook Developments to assist Council with assessment of an ROL application. It refers to the Capricorn Survey Group's proposal plan for Stage 4 on Drawing No 8066-04-ROL Issue C in Appendix A of this report.

The following Hartecs drawings are referenced and included as Appendix B of this report:

a) Cover Sheet – Eastern Precinct Stages 1 - 6 with the drawing listing
b) PRJ-0131-ROL1 Issue 3 - Site Plan
c) PRJ-0131-ROL2 Issue 3 - Lot Layout & Staging
d) PRJ-0131-ROL3 Issue 3 and PRJ-0131-ROL4 Issue 3 – Finished Surface Profile Post Bulk Earthworks and Finished Surface Depths Post Bulk Earthworks
e) PRJ-0131-ROL5 Issue 3 - Typical Site Sections
f) PRJ-0131-ROL6 Issue 3 – Services Layout Stage 1
g) PRJ-0131-ROL7 Issue 3 – Services Layout Stage 2
h) PRJ-0131-ROL8 Issue 3 – Services Layout Stage 3
i) PRJ-0131-ROL9 Issue 3 – Services Layout Stage 4
j) PRJ-0131-ROL10 Issue 3 – Services Layout Stage 5
k) PRJ-0131-ROL11 Issue 3 – Services Layout Stage 6
l) PRJ-0131-ROL12 Issue 3 Stormwater Management Flooding
m) PRJ-0131-ROL13 Issue 3 Stormwater Management Water Quality

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1.0 INTRODUCTION

1.1 This development application consists of Stages 4A and 4B in Edenbrook's Eastern Precinct for a total of 32 new residential allotments serviced from both the proposed new southern road connection onto Edenbrook Drive called Aquila Drive and from the new proposed Somerdale Avenue which will connect to McLaughlin Street.

A Site Plan is presented on Drawing No PRJ-0131-ROL1 Issue 3 in Appendix B.

A Lot Layout & Staging Plan is presented on Drawing No PRJ-0131-ROL2 Issue 3 in Appendix B.

1.2 Aquila Drive is proposed to connect to the roundabout intersection of Oscadia Way and Edenbrook Drive which are currently under construction.

Somerdale Avenue will be a new thoroughfare connection to McLaughlin Street.

1.3 The subject site will not be constrained by servicing; all services are available or can be made available and can be conditioned accordingly by Council.

2.0 EARTHWORKS & SLOPE STABILITY

2.1 Portions of the subject site of this undeveloped area of the Edenbrook land are captured by the Steep Land Overlay mapping wherein intermittent slopes greater than 15% are identified.

2.2 Douglas Partners has prepared an assessment of the site's geotechnical stability in accordance with the Council's Steep Land Overlay Code with the clear understanding that the Applicant proposes major earthworks to generally create lower sloped lots over the site and eliminate as much as possible the need for high retaining walls (> 1m). It will also serve to keep road grades to generally less than 5%.

2.3 The proposed cut depths are significant, up to 7 metres in places; similar depths of cut were undertaken on the adjacent Stage 12. Hence the proposed earthworks are a feasible, practical operation that will have benefits for road grades, for drainage and for future allotment development.

2.4 The proposed Bulk Earthworks Finished Profile Slopes and Bulk Earthworks Finished Profile Depths are presented on Drawing No's PRJ-0131-ROL3 Issue 3 and ROL4 Issue 3 in Appendix B of this report. Similar plans are incorporated within the Douglas Partners stability assessment report.

2.5 In summary the Douglas Partners assessment found that:

- There are no signs of instability present on this site.
- Provided the site's development is carried out in accordance with good engineering practice for hillside construction then:
    1) The risk to property and to properties adjacent the site is considered to be "Low".
    2) And instability failure will be "Unlikely" and/or "Rare".

Council's standard approval conditions and the normal follow up Operational Works application review and its procedures will oversee and ensure compliance with these requirements.

2.6 These findings by Douglas Partners are consistent with similar investigations undertaken on earlier stages of the Edenbrook development site immediately to the west.

2.7 These earlier investigations found no instability and instability was unlikely; and that landslide risk was low. Similar recommendations for future development were also made. Council should be confident there are no issues in this regard for the Eastern Precinct.

3.0 TRUNK INFRASTRUCTURE

3.1 The trunk infrastructure nominated for the Priority Infrastructure Area of Parkhurst
(or an equivalent RRC approved strategy) that affects immediate servicing of the subject proposal has been incorporated into the approval of the Oscadia development which lies immediately on the northern side of Edenbrook Drive from the subject site.

3.2 Council approved the Oscadia residential development with conditions to provide the necessary infrastructure in this locale in accordance with the Planning Scheme's schedule of works and Council policy in this regard. These works are designed, approved and currently under construction and include the extension to Edenbrook Drive and the Trunk Sewerage works to command the subject site. Trunk Water infrastructure has been previously provided by Edenbrook Developments including the VS Booster Pump Station that services Edenbrook and commands adjacent undeveloped residential land to the east.

3.3 McLaughlin Street – Trunk Transport Infrastructure & Drainage Structures

3.3.1 Council's preliminary interim design titled *ALEXANDRA STREET EXT. BELMONT DR TO EDENBROOK DR (PARKHURST) PROJECT NO 2020-229* includes the proposed construction of the McLaughlin Street link showing the following major culverts on Drawing No 2020-229-09; refer Appendix D for first 10 pages only with a diversion channel (in red) indicated schematically on page 10:

- DRAIN LINE 4 - 3/1800x1200 RCBC on McLaughlin Street at Ch 1290 for Catchment A = 28.5 ha
- DRAIN LINE 3 - 3/2400x1500 RCBC on William Palfry Road at Ch 75 to cater for Catchments A + B = 80 ha
- DRAIN LINE 2 - 4/2400x 1550 RCBC on McLaughlin Street at Ch 1510 to cater for Catchments A+ B + C = 98.2 ha

3.3.2 This RRC design and these culverts recognize and are consistent with the flowpaths and flood extents on the Creek Catchment Flood Overlay Map OM-8C-41.

The proposed allotments have been kept clear of inundation areas and Public Use Land (PUL) provided where required. The majority of the inundation borders the Eastern Precinct and encroachment (if any) is minor and is mostly within the redundant road reserve of Edenbrook Drive that arose with the redesign of McLaughlin Street. It is these drainage paths that precipitated the re-routing of McLaughlin Street and immediate road connections adjacent.

3.3.3 In addition, Edenbrook Developments proposes an offer to Council to re-direct Catchment A i.e., the upstream watercourse within Edenbrook land, before it naturally runs into Drain Line 4 across McLaughlin Street; i.e., to provide a diversion channel entirely on the western side of McLaughlin Street within Edenbrook's Eastern Precinct.

3.4 This proposal would have major benefits to Council when completing the proposed Trunk Transport Infrastructure on McLaughlin Street and William Palfry Drive. The proposed redirected flow from an area of 28.5 hectares would eliminate Drain Line 4 from being a cross culvert on McLaughlin Street.

3.5 It would also significantly reduce the catchments to DRAIN LINE 3 by some 35% and to DRAIN LINE 2 by around 29% i.e., the 28.5 hectares of Catchment A would be prevented from connecting to Catchment B and then to Catchment C.

3.6 This offer is made on the basis that it is then fair and reasonable for the works required for the effective redirection of Catchment A's 28.5 hectares to be deemed Trunk Infrastructure under Council's policy.

These works would include:

a) The equivalent hydraulic structure needed for Drain Line 4 relocated to the Edenbrook internal road leg connection immediately adjacent to McLaughlin Street to facilitate the redirected flowpath; plus

b) The necessary diversion channel and stabilization works of the diversion channel that will run parallel to McLaughlin Street but essentially within Edenbrook.

3.7 **McLaughlin Street – Trunk Transport Infrastructure & Road Construction**

3.7.1 Until the McLaughlin Street link connection is constructed, day to day traffic access to and from the Edenbrook's Eastern Precinct will be via Edenbrook Drive and Belmont Road.

Assuming the worst case (i.e., full development of the Oscadia precinct plus every lot developed in Stages 1 to 14 of the Edenbrook development), there will be 297 residential lots, both developed with houses and un-developed, that are connected to Edenbrook Drive prior to the release of any lots in Edenbrook's Eastern Precinct.

3.7.2 The construction of the McLaughlin Street link (T97) plus its intersection with Birkbeck Drive-Alexandra Street-Belmont Drive (T96) is an enormous undertaking (costing in the order of $11 million plus dollars) even if interim construction standards or alternative intersection controls reduce the financial impacts to the project funder.

3.7.3 To date Council has produced a preliminary design for these works and the estimated timing in the Planning Scheme's Schedule of Works is 2026. This timing is thus in advance and on track to cater for the next six proposed stages of Edenbrook's Eastern Precinct for a total of around 240 allotments.

3.7.4 Of the next six Eastern Precinct stages for a total of around 240 allotments, an optimistic projection is that 50 to 60 lots would be released over each of the next 4 years i.e., realistically through to mid to late 2027 allowing for the design, approval and construction processes.

Full traffic generation will not occur until several years after 2027 as these lots will only progressively develop with residential housing. Hence, the proposed 2026 timing for construction of the McLaughlin Street link will be in step with if not ahead of the release of lots in the Eastern Precinct .

3.7.5 The 600-metre section of Edenbrook Drive immediately connected to Belmont Road was constructed in 2014 and is the main constraining capacity link. It is constructed to a Minor Urban Collector standard with a 7.5m pavement but within a much wider 25m road reserve. The balance of Edenbrook Drive that is currently under construction to Major Urban Collector standard will have a 10m wide pavement within a 31m road reserve.

3.7.6 The Capricorn Municipal Development Guidelines nominates a Deemed-to-Comply capacity for traffic generation of 300 allotments for a Minor Urban Collector. This Deemed-to-Comply capacity is based on the *Queensland Streets* guidance for an "Environmental Capacity" of 3,000 vehicles per day for urban collectors. The actual traffic carrying ability will be several factors higher than this environmental capacity figure.

The significantly wider road reserve of 25 metres on the initial 600-metre section of Edenbrook Drive results in greater setback distances between houses which can then allow the road to accommodate higher traffic numbers for the same level of amenity.

3.7.7 Therefore, in the short term at the very least, a tolerance above 300 lots should be acceptable to Council given that the take up to 100% occupation of all lots in the Eastern Precinct catchment will not occur for some extended time well after 2026 even in the current climate and also given that the road reserve in this constrained section is significantly wider by nearly 40%.

3.7.8 It is recommended that the short-term capacity of the constrained section of Edenbrook Drive be tolerated and accepted as in the order of 500 lots i.e., somewhere above a Minor Urban Collector and less than a Major Urban Collector's environmental capacity. Then, the sequential release of an additional 240 lots plus the existing 297 (a total of around 537 allotments) can be allowed in the short term as within the capacity of the constrained section of Edenbrook Drive on the basis that timing for construction of the alternative route is controlled by Council.

3.8 Trunk Sewer

Currently a 300 dia Trunk Sewer is designed, approved and constructed across Edenbrook Drive to the Eastern Precinct to service the subject development and future stages.

This sewer line will command a majority of the future 500 to 600 allotments of Edenbrook's Eastern Precinct. Based on an area assessment alone, this sewer would also command a not dissimilar number of lots on the eastern side of McLaughlin Street (ie approximately 1,000 lots all up); i.e., just by a simple review of RRC Drawing 2020-229-09 Issue A in Appendix D, the 300 dia trunk sewer would command an area at least similar to the drainage Catchments A, B, C & D.

In other words, the Trunk Sewer could be extended up McLaughlin Street in order to command in the order of 1,000 allotments in the future. The 300 dia sewer is shown extended indicatively to approximately the location of Drain Line 4.

4.0 INTERNAL ROADS

4.1 Access to the proposed subject development is via the extension of Edenbrook Drive and McLaughlin Street of which the latter is proposed to be constructed by Rockhampton Regional Council.

The extension of Edenbrook Drive is deemed a Major Collector Road and is designated Transport Trunk Infrastructure. McLaughlin Street is a Sub-Arterial Road and is also designated Transport Trunk Infrastructure.

4.2 The Eastern Precinct, which encompasses the entire balance area of the Edenbrook Estate, is estimated to ultimately yield in the order of 500 to 600 allotments.

Initially the main connection to the subject development will be via the "Oscadia" roundabout on Edenbrook Drive with the connecting proposed Minor Urban Collector of Aquila Drive.

In the short to medium term, until Somerdale Avenue can physically connect to McLaughlin Street, Aquila Drive will cater for around 240 allotments which is within its nominated capacity as a Minor Urban Collector.

As development proceeds and McLaughlin Street is constructed past the site, Somerdale Avenue (and much later a third connection) can join to McLaughlin Street. This will keep traffic numbers on Aquila Drive to well within the traffic loading parameters of a Minor Urban Collector (preferred maximum 300 lots). These future connections are shown on Drawing No PRJ-0131-ROL1 Issue 2 - Site Plan in Appendix B.

4.3 The internal roads for Stage 4 of this new development include:

- Somerdale Avenue; catchment between 70 and 80 lots; an Access Street.
- Willowdale Drive; catchment between 60 and 70 lots; an Access Street.
- Aquila Drive; catchment less than 300 lots; a Minor Collector.

4.4 The indicative services & road layout Drawing No's PRJ-0131-ROL6 to ROL11 inclusive in Appendix B show all proposed pavement and road reserve widths compliant with or exceeding the Capricorn Municipal Development Guidelines preferences.

These nominated pavement widths and reserve widths including pathway location/routes may be adjusted at final design within the Operational Works application, but all will be compliant with the Capricorn Municipal Development Guidelines.

5.0 DRAINAGE

5.1 An indicative drainage network and strategy is shown on Drawing No's PRJ-0131-ROL6 to ROL12 inclusive in Appendix B.

All necessary drainage works both piped, road flows and channel flows will be designed and constructed in accordance with Operational Works Permit approved plans, Council's current policies and practices, the Capricorn Municipal Development Guidelines and the Queensland Urban Drainage Manual as relevant.

5.2 The proposed lots will be also covered by a Site Based Stormwater Management Plan to meet drainage and runoff quality requirements.

5.3 The subject development will address State Planning Policy in a not dissimilar manner to

- Edenbrook Stage 8;
- Edenbrook Stage 10; and
- Oscadia Pocket.

5.4 An indicative proposed water quality management strategy is shown on Drawing No PRJ-0131-ROL13 included in Appendix B.

The detailed final design water quality treatment train submission is not provided with this application for the following reasons:

a) The final strategy/solutions are determined and finalised in conjunction with discussions with Council and may well be developed on a stage-by-stage basis or several stages together depending on Council preferences.
b) There is an abundance of opportunities to provide treatments downstream and adjacent to the development and therefore there are many permutations of the final design to be determined with Council input.
c) Regardless of any treatment train presentation and outcomes provided at this time, Council will impose its standard conditions requiring State Planning Policy being addressed and signed off at Operational Works.

The Developer has a record of and demonstrated a willingness to address the water quality in consultation with Council. The Developer has provided high quality works in this regard. Council cannot doubt the Developer's diligence and application in this respect. Council's standard conditions are sufficient to address this matter.

5.5 The increase in runoff from the additional impermeable area from within this development is insignificant in the context of the Ramsey Creek catchment and its proximity to the Fitzroy River flood plain. It will have no impact downstream and will not cause any actionable nuisance.

All stormwater can drain to a legal point of discharge as defined by the Queensland Urban Drainage Manual with the placement of easements/reserves in favour of Council as necessary.

5.6 **Q100 FLOODING**

The peripheral edge of the Eastern Precinct is marginally impacted by the Creek Catchment Flood Overlay Map OM-8C-41. The proximity of inundation extents has been recognized and addressed in the proposed layout.

The flood flows and inundation extents have also been addressed during the approved design of the Edenbrook Drive extension and recognized in the Council's preliminary design of McLaughlin Street with Drain Lines 1, 2, 3 & 4.

A 1% AEP flood analysis has been previously submitted for the Edenbrook Estate and approved for the receiving waters of Ramsey Creek and the Fitzroy River. This provided a similar 1% AEP flooding line as the AURECON study on the Local Creek Catchments and AECOM's flooding line for the Fitzroy River.

5.7 The resulting 1% AEP inundation line with the recommended diversion channel is shown on attached Hartecs Drawing No PRJ-0131-ROL12 included in Appendix B. Inundation is clear of the proposed allotments.

6.0 WATER SUPPLY INFRASTRUCTURE

6.1 An indicative water reticulation layout is shown on attached Drawing No's PRJ-0131-ROL 6 to ROL12 inclusive in Appendix B.

6.2 A watermain network in 150mm diameter mains is proposed to connect off the existing Edenbrook Drive watermain, follow along Aquila Drive in 150 dia plus 150 dia mains are shown on the outer roads of the Eastern Precinct with a reconnection to the McLaughlin Street main. The numerous internal crosslinks of the network are all 100mm dia mains and ensure efficiency of the network.

6.3 The existing Edenbrook Drive 150mm watermain is connected to the VSD Pump Station system at the reservoir providing a minimum design pressure level equivalent to around RL 85 m AHD.

6.4 Given the proposed interconnected network and the subject site's final ground levels after earthworks will be less than RL 45m or 50m AHD, no further analysis is required.

7.0 SEWERAGE INFRASTRUCTURE

7.1 Indicative proposed sewer servicing layouts are provided on the Drawing No's PRJ-0131-ROL 6 to ROL12 inclusive in Appendix B.

7.2 This is based in part on a suggested extension of the 300mm trunk sewer and cross connections to the eastern side of McLaughlin Street if Council so requires. If Council determines that extending the 300 dia sewer is not warranted, replacement with a 225 or a 150mm dia main is a simple matter.

8.0 TELEPHONE AND ELECTRICITY

8.1 Ergon has confirmed that the existing supply has sufficient capability to service the proposed development.

8.2 Existing overhead power lines traverse the Eastern Precinct site and will need to be relocated and may impact the staging strategy.

This issue needs extensive design works negotiations with the electricity provider over the changeover strategy once an approval is received.

It will be resolved prior to Operational Works applications and Council's standard approval conditions are sufficient to address this aspect.

8.3 The NBN has accepted the whole development into its network.

9.0 STATE PLANNING POLICY

9.1 Acid Sulphate Soils

The proposed development site is located between RL 15m and RL 60m AHD. Excavation below RL 5 AHD is not required to install services or for construction. Hence acid sulphate soils are not an issue.

9.2 Slope Stability

A slope stability investigation has been undertaken; no instability is present. The report is appended in Appendix C. The recommendations of the report are standard industry practice and will be incorporated into any future Operational Works on the site.

9.3 Bushfire Management

The development site will be serviced with fully constructed sealed roads and an extensive reticulated water supply providing fire-fighting abilities to the statutory regulatory requirements. Therefore, evacuation will be able to be undertaken safely and adequate and accessible water supplies will be available.

9.4 Flood

The site and access to the site will be above the AECOM/AURECON determined 1% AEP flooding level and clear of the inundation area as depicted on the Flood Overlay mapping. Therefore, there are no adverse impacts on people's safety.

10.0 SUMMARY

10.1 The engineering submission herewith demonstrates that for Edenbrook's Eastern Precinct:-

a) There are no engineering impediments to the proposed development and/or the subject stage as presented on the proposal plan.

Council's standard ROL development approval conditions modified to be relevant are sufficient to address the engineering aspects of the proposal.

b) The Steep Land Overlay code has been addressed. Instability is not present on the site. The subject site can be safely developed with good engineering practice for hillside construction. Council's standard approval conditions and procedures will oversee and ensure compliance with the requirements of the Douglas Partners recommendations.

c) The 1% AEP inundation area as depicted on the Flood Overlay mapping has been catered for on the subject proposal plan and a drainage strategy provided.

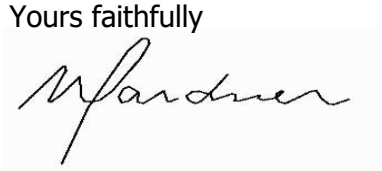
d) The first 600-metre section of Edenbrook Drive connected to Belmont Road has an increased reserve width which allows in the short term an increase in its nominal environmental capacity of 3,000 vehicle per day to be tolerated until the McLaughlin Street link scheduled for 2026 is completed.

e) Future detailed Operational Works Submissions are sufficient to address the details of the site works proposed, an acceptable water quality treatment train, road construction, water and sewer connections and drainage provisions for the proposed new allotments.

f) In the event Council accepts the Applicant's offer regarding DRAIN LINE 4 culvert and an integrated internal drainage channel, it would be reasonable for Council to adopt changes to its Trunk Infrastructure to address the changes to drainage infrastructure on McLaughlin Street.

g) It would be prudent for Council to investigate and review the need to extend the 300 dia Trunk Sewer further south along McLaughlin Street in order to command as much developable land as is possible as presented in this report.

Yours faithfully



Hartecs Group

Attachments

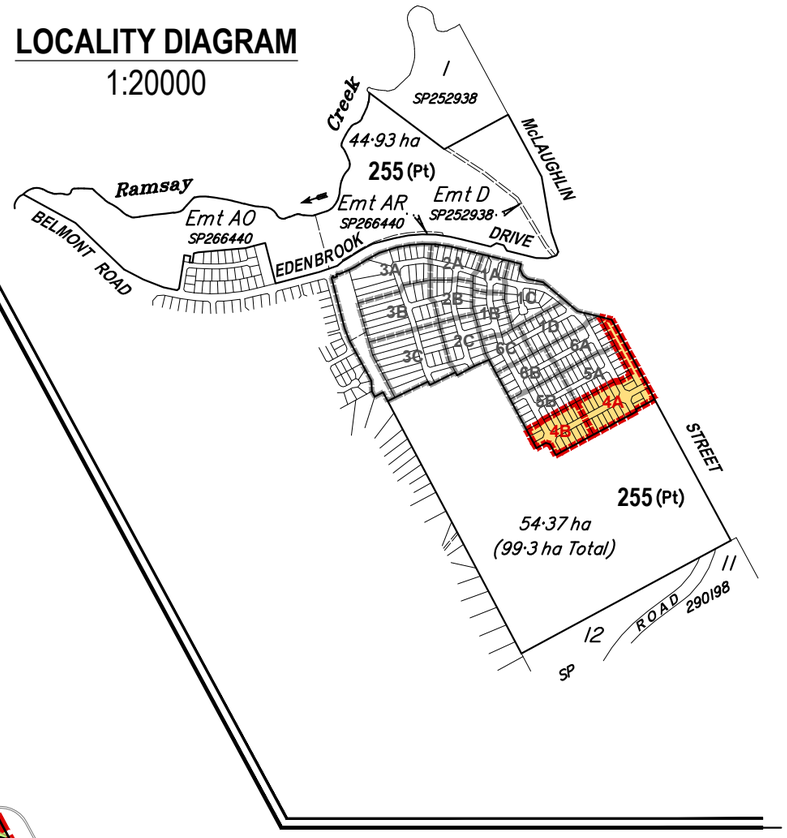
Appendix A	Capricorn Survey's proposal plan Drawing No 8066-04-ROL Issue C
Appendix B	Engineering Report Drawings
Appendix C	Douglas Partners Geotechnical Stability Assessment
Appendix D	RRC Preliminary Design Drawings for McLaughlin Street

Appendix A

Reconfiguration Proposal Plan

PRECINCT 2

LOCALITY DIAGRAM
1:20000



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capricornsurveygroupcq
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sheet no.: **1 of 1**
cad file: **8066-04-ROL-C**
plan no.: **8066-04-ROL**
issue: **C**

Appendix B

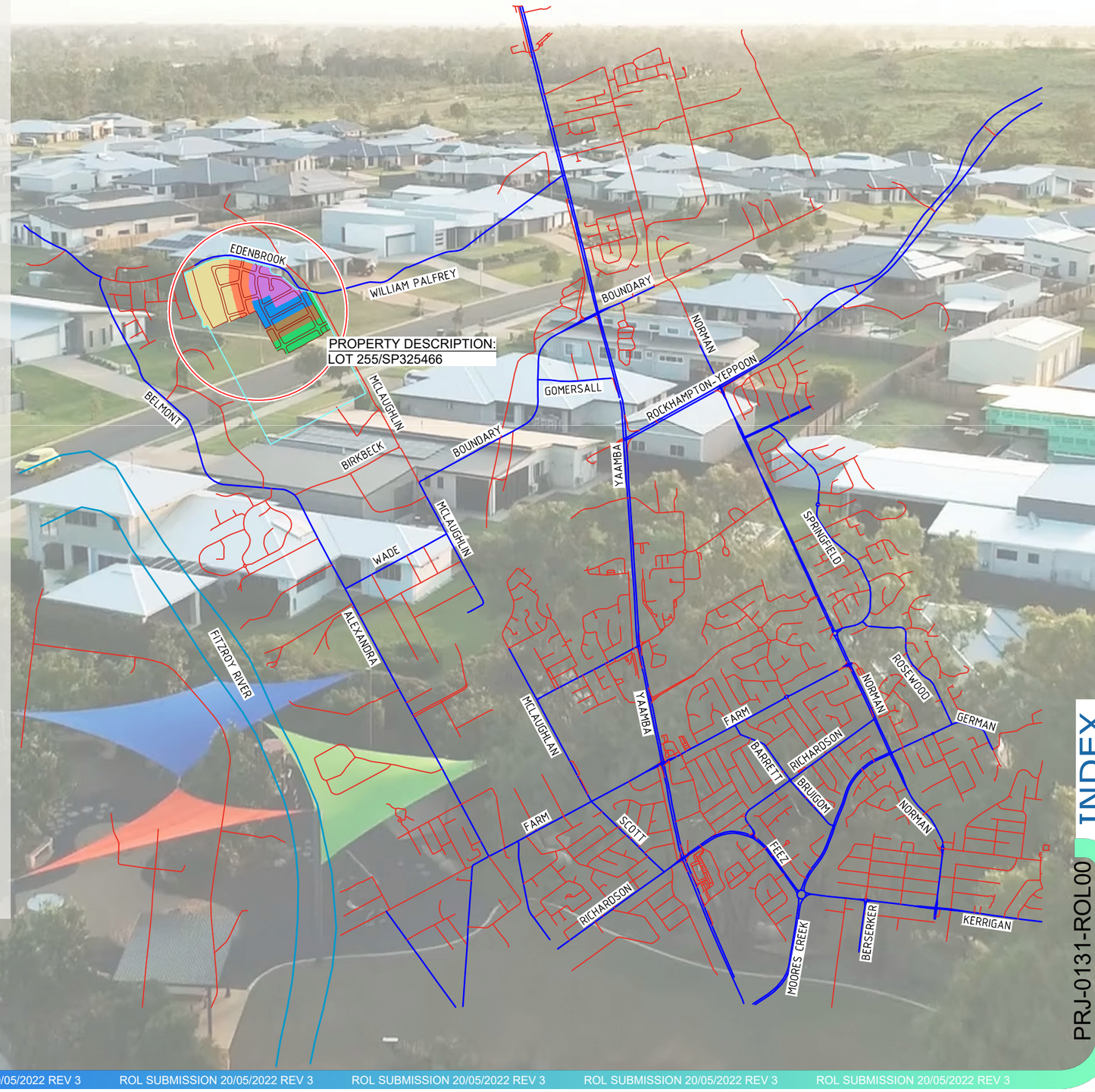
Engineering Report Drawings

EDENBROOK DEVELOPMENTS PTY LTD
ROL ENGINEERING SUBMISSION
EASTERN PRECINCT STAGES 1 - 6

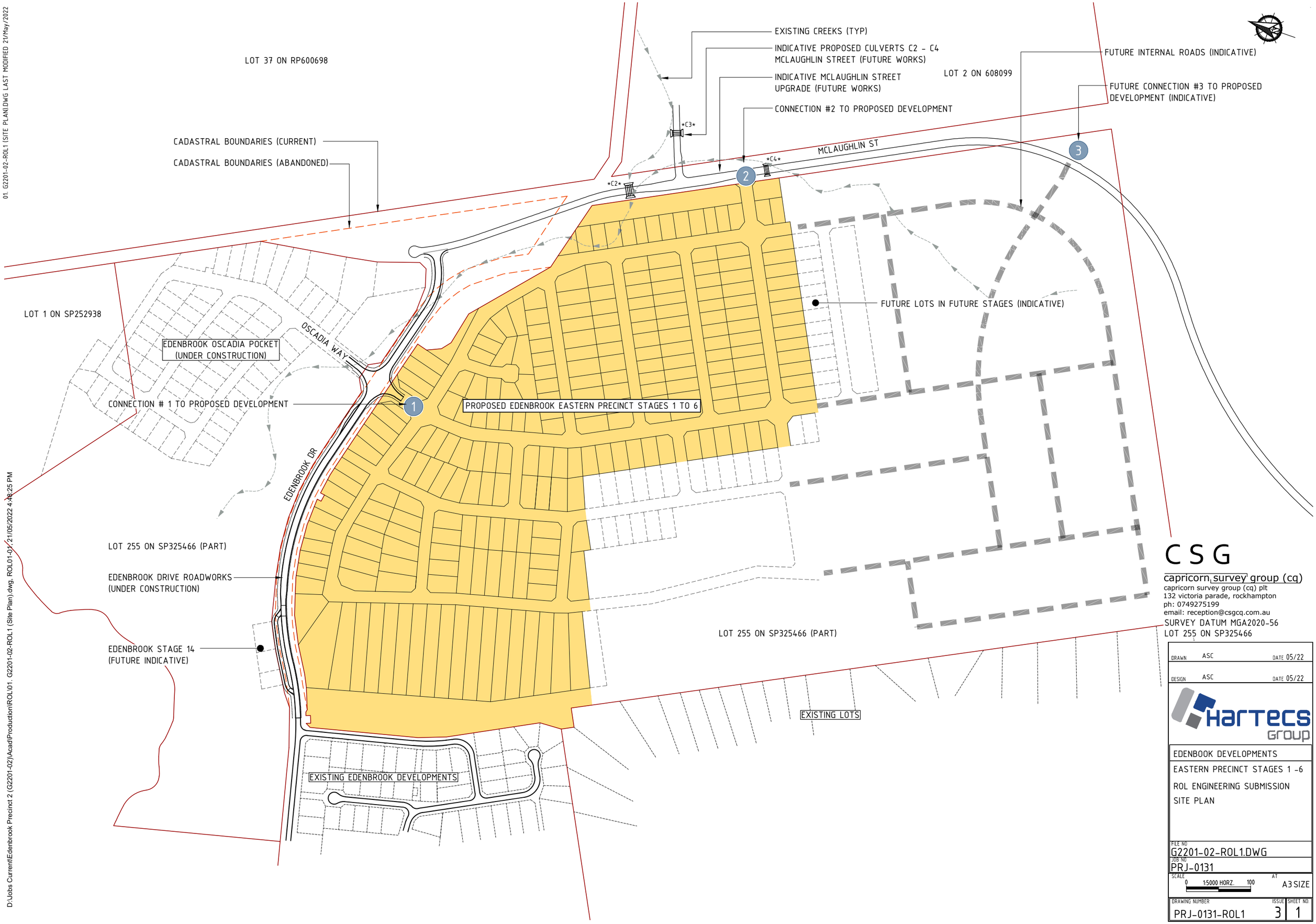
CSG
capricorn survey group (cq)
capricorn survey group (cq) plt
132 victoria parade, rockhampton
ph: 0749275199
email: reception@csgcq.com.au
SURVEY DATUM:
DATUM MGA2020-56

DRAWING INDEX

SHEET	DWG NO.	REV	DESCRIPTION
1	PRJ-0131-ROL1	3	SITE PLAN
2	PRJ-0131-ROL2	3	LOT LAYOUT AND STAGING
3	PRJ-0131-ROL3	3	FINISHED SURFACE PROFILE POST BULK EARTHWORKS
4	PRJ-0131-ROL4	3	FINISHED SURFACE DEPTHS POST BULK EARTHWORKS
5	PRJ-0131-ROL5	3	TYPICAL SITE SECTIONS
6	PRJ-0131-ROL6	3	INDICATIVE SERVICES & ROAD LAYOUT LAYOUT STAGE 1
7	PRJ-0131-ROL7	3	INDICATIVE SERVICES & ROAD LAYOUT STAGE 2
8	PRJ-0131-ROL8	3	INDICATIVE SERVICES & ROAD LAYOUT STAGE 3
9	PRJ-0131-ROL9	3	INDICATIVE SERVICES & ROAD LAYOUT STAGE 4
10	PRJ-0131-ROL10	3	INDICATIVE SERVICES & ROAD LAYOUT STAGE 5
11	PRJ-0131-ROL11	3	INDICATIVE SERVICES & ROAD LAYOUT STAGE 6
12	PRJ-0131-ROL12	3	STORM WATER MANAGEMENT Q100 FLOOD INUNDATION AREA
13	PRJ-0131-ROL13	3	STORM WATER MANAGEMENT WATER QUALITY



PRJ-0131-ROL00 INDEX



CSG
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SURVEY DATUM MGA2020-56
LOT 255 ON SP325466

DRAWN	ASC	DATE 05/22
DESIGN	ASC	DATE 05/22

Hartecs Group

EDENBROOK DEVELOPMENTS
EASTERN PRECINCT STAGES 1 -6
ROL ENGINEERING SUBMISSION
SITE PLAN

FILE NO G2201-02-ROL1.DWG
JOB NO PRJ-0131
SCALE 0 1:5000 HORZ. 100 AT A3 SIZE
DRAWING NUMBER PRJ-0131-ROL1 ISSUE 3 SHEET NO. 1

STAGING

- STAGE 1
- STAGE 2
- STAGE 3
- STAGE 4
- STAGE 5
- STAGE 6

LEGEND ROADS
WILLOWDALE DR (7.5/18) = ROAD NAME (NOM PAVEMENT WIDTH/ROAD RESERVE WIDTH)

MCLAUGHLIN ST

982 (Pt) P.U.L DRAINAGE CHANNEL

982 (Pt) P.U.L

981 P.U.L.

980 P.U.L

979 (Pt) P.U.L

978 P.U.L.

255 (Pt)

WILLOWDALE DR (7.5/18)

WILLOWDALE DR (7.5/20)

FIGTREE CL (7.5/18)

AQUILA DR (7.5/20)

JAKIAH AVE (7.5/18)

BAYBREEZE AVE (7.5/18)

FERNBANK AVE (7.5/18)

SOMERDALE AVE (7.5/20)

EDENBROOK DR

TRANQUIL TER (7.5/18)

SUNVIEW AVE (7.5/18)

PALUNA AVE (7.5/18)

VIEWPOINT DR (7.5/18)

FIREFLY AVE (7.5/18)

SANDPIPER AVE (7.5/18)

CONTOURS 5m NATURAL SURFACE

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SURVEY DATUM MGA2020-56
LOT 255 ON SP325466

DRAWN	ASC	DATE 05/22
DESIGN	ASC	DATE 05/22

Hartecs Group

EDENBOOK DEVELOPMENTS
EASTERN PRECINCT STAGES 1 -6
ROL ENGINEERING SUBMISSION
ALLOTMENT LAYOUT & STAGING

FILE NO: G2201-02-ROL2.DWG
JOB NO: PRJ-0131
SCALE: 0 1:3000 HORZ. 60 AT A3 SIZE
DRAWING NUMBER: PRJ-0131-ROL2 ISSUE: 3 SHEET NO: 2

02. G2201-02-ROL2 (LOT LAYOUT & STAGING).DWG LAST MODIFIED 21/May/2022

D:\Jobs Current\Edenbrook Precinct 2 (G2201-02)\Acad\Production\ROL\02. G2201-02-ROL2 (Lot Layout & Staging).dwg, ROL02-02, 21/05/2022 4:48:28 PM

03. G2201-02-ROL3 (FIN SURF PROFILE).DWG LAST MODIFIED @1/May/2022

D:\Jobs Current\Edenbrook Precinct 2 (G2201-02)\Acad\Production\ROL\03. G2201-02-ROL3 (Fin Surf Profile).dwg, ROL03-03, 21/05/2022 4:48:34 PM

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SURVEY DATUM MGA2020-56
LOT 255 ON SP325466

DRAWN	ASC	DATE 05/22
DESIGN	ASC	DATE 05/22

hartecs group

EDENBOOK DEVELOPMENTS
EASTERN PRECINCT STAGES 1 -6
ROL ENGINEERING SUBMISSION
FINISHED SURFACE PROFILE
POST BULK EARTHWORKS

FILE NO G2201-02-ROL3.DWG
JOB NO PRJ-0131
SCALE 0 1:3000 HORZ. 60 AT A3 SIZE
DRAWING NUMBER PRJ-0131-ROL3 ISSUE 3 SHEET NO. 3

LEGEND DEPTH
9.200m
0.000m
-8.300m

MCLAUGHLIN STREET

B ROL5

A ROL5

982 (Pt) P.U.L

981 P.U.L.

982 (Pt) P.U.L

WILLOWDALE DR

255 (Pt)

980 P.U.L

EDENBROOK DRIVE

979 (Pt) P.U.L

979 (Pt) P.U.L

FIGTREE CL

JAKIAH AVE

BAYBREEZE AVE

FERNBANK AVE

SOMERDALE AVE

AQUILA DR

TRANQUIL TER

SUNVIEW AVE

PALUNA AVE

VIEWPOINT DR

FIREFLY AVE

SANDPIPER AVE

TYPICAL SITE SECTION

255 (Pt)

SURVEY DATUM MGA2020-56
LOT 255 ON SP325466
DEPTH CONTOURS 0.5m FINISHED BULK EARTHWORKS SURFACE

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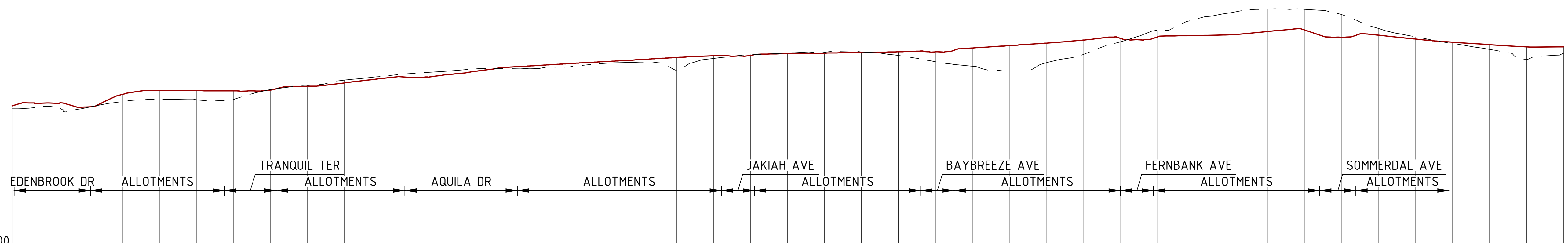
DRAWN	ASC	DATE 05/22
DESIGN	ASC	DATE 05/22

Hartecs Group

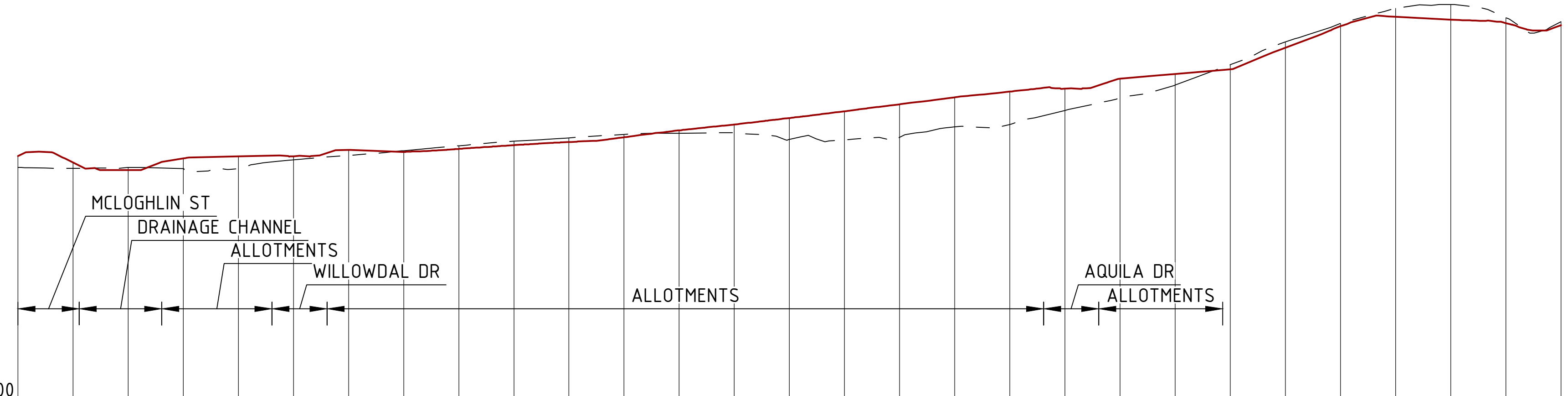
EDENBOOK DEVELOPMENTS
EASTERN PRECINCT STAGES 1 -6
ROL ENGINEERING SUBMISSION
FINISHED SURFACE DEPTHS
POST BULK EARTHWORKS

FILE NO G2201-02-ROL4.DWG
JOB NO PRJ-0131
SCALE 0 1:2500 HORZ. 50 AT A3 SIZE
DRAWING NUMBER PRJ-0131-ROL4 ISSUE 3 SHEET NO. 4



CHAINAGE	BULK EARTHWORKS FINISHED SURFACE	NATURAL SURFACE
0.000	14.366	13.757
20.000	15.171	14.237
40.000	14.075	13.841
60.000	17.520	15.580
80.000	18.507	16.170
100.000	18.480	16.027
120.000	18.444	16.137
140.000	18.647	18.795
160.000	19.702	19.940
180.000	20.601	21.367
200.000	21.788	22.367
220.000	22.029	23.270
240.000	23.035	23.965
260.000	24.320	24.484
280.000	25.170	24.439
300.000	25.782	24.898
320.000	26.348	25.861
340.000	26.908	26.212
360.000	27.499	23.918
380.000	27.967	27.231
400.000	27.966	28.230
420.000	28.520	28.700
440.000	28.679	28.852
460.000	28.837	28.997
480.000	29.019	28.044
500.000	29.012	26.339
520.000	30.065	25.131
540.000	30.692	23.822
560.000	31.379	26.056
580.000	32.184	28.286
600.000	32.702	31.693
620.000	33.016	34.791
640.000	33.432	37.736
660.000	33.620	39.635
680.000	34.519	40.625
700.000	34.894	40.542
720.000	32.960	39.113
740.000	33.508	35.304
760.000	32.483	33.102
780.000	31.619	31.287
800.000	30.956	29.686
820.000	30.360	26.995
840.000	30.359	28.625

Scale Horizontal 1:2500 Vertical 1:1250 SITE SECTION A



CHAINAGE	BULK EARTHWORKS FINISHED SURFACE	NATURAL SURFACE
0.000	19.215	17.149
20.000	18.052	16.986
40.000	16.679	17.134
60.000	18.801	16.951
80.000	19.155	16.914
100.000	19.192	18.552
120.000	20.320	19.343
140.000	19.978	20.193
160.000	20.518	21.085
180.000	21.192	21.905
200.000	21.766	22.526
220.000	22.634	23.144
240.000	23.877	23.374
260.000	24.939	23.444
280.000	26.111	22.226
300.000	27.341	22.161
320.000	28.606	22.618
340.000	29.870	24.518
360.000	30.905	24.956
380.000	31.440	27.495
400.000	33.239	29.706
420.000	34.101	32.104
440.000	34.959	35.771
460.000	38.852	39.892
480.000	42.767	43.272
500.000	44.474	46.019
520.000	43.957	46.708
540.000	43.281	44.308
560.000	42.938	43.576

Scale Horizontal 1:2500 Vertical 1:1250 SITE SECTION B

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SURVEY DATUM MGA2020-56
LOT 255 ON SP325466

DRAWN ASC DATE 05/22
DESIGN ASC DATE 05/22

HARTECS group

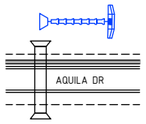
EDENBOOK DEVELOPMENTS
EASTERN PRECINCT STAGES 1 -6
ROL ENGINEERING SUBMISSION
TYPICAL SITE SECTIONS
POST BULK EARTHWORKS

FILE NO G2201-02-ROL4.DWG
JOB NO PRJ-0131
SCALE 0 1:2500 HORZ. 50 / 0 1:1250 VERT 25 AT A3 SIZE
DRAWING NUMBER PRJ-0131-ROL5 ISSUE 3 SHEET NO. 5

05. G2201-02-ROL5 (SERVICES-1).DWG LAST MODIFIED 22/May/2022

LEGEND SERVICES

- W100 — WATER 100ø
- S150 — SEWER 150ø
- S300 — TRUNK SEWER 300ø
- E/C — ELECTRICITY/COMMS



ROAD DRAINAGE; UNDERGROUND PIPES; ROAD GULLY INLET PITS; & HEADWALL

ROADS; ROAD NAME & CULVERT CROSSING; EDGE FOOTPATH (DASHED); CONCRETE PATH (SHADED)

ALL EXISTING; CURRENTLY UNDER CONSTRUCTION & FUTURE INDICATIVE SERVICES ARE SHOWN LILAC. ROADS UNDER CONSTRUCTION & FUTURE INDICATIVE ARE SHOWN GREYED.

255 (PT)

EDENBROOK DR

CONNECTION TO EXIST. TRUNK SEWER

980 P.U.L

WILLOWDALE DR

FIGTREE CL

979 (PT) P.U.L

979 (PT) P.U.L

TRANQUIL TER

AQUILA DR

AQUILA DR

JAKIAH AVE

SUNVIEW AVE

BAYBREEZE AVE

P.U.L.

CONTOURS 2.5m FINSHED SURFACE POST BULK EARTHWORKS SURFACE

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SURVEY DATUM MGA2020-56
LOT 255 ON SP325466

DRAWN	ASC	DATE 05/22
DESIGN	ASC	DATE 05/22

Hartecs Group

EDENBOOK DEVELOPMENTS

EASTERN PRECINCT STAGES 1 -6

ROL ENGINEERING SUBMISSION

INDICATIVE SERVICES & ROAD LAYOUT STAGE 1

FILE NO: G2201-02-ROL5.DWG
JOB NO: PRJ-0131
SCALE: 0 1:1250 HORZ. 25 AT A3 SIZE
DRAWING NUMBER: PRJ-0131-ROL6
ISSUE: 3
SHEET NO.: 6

05. G2201-02-ROL5 (SERVICES-1).DWG LAST MODIFIED 21/May/2022

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979 (P1) PUL

979 (P1) PUL

JAKIAH AVE

AQUILA DR

AQUILA DR

TRANQUIL TER

SUNVIEW AVE

VIEWPOINT DR

FIREFLY AVE

SANDPIPER AVE

TRANQUIL TER

401 447 448 449 450 451 452 453 482 483 484 485 456 455 457 454 458 525 524 519 523 520 521 402 403 404 405 406 407 408 481 480 479 478 477 476 475 474 461 460 462 463 464 465 466 467 468 518 517 515 514 513 512 511 516 509 510 507 508 416 415 414 413 412 411 410 417 418 419 420 421 434 435 567 568 569 437 436 566 565 564 409 526 527 528 529 530 531 473 472 471 470

LEGEND SERVICES

W100	WATER 100ø
S150	SEWER 150ø
S300	TRUNK SEWER 300ø
E/C	ELECTRICITY/COMMS
	ROAD DRAINAGE; UNDERGROUND PIPES; ROAD GULLY INLET PITS; & HEADWALL
AQUILA DR	ROADS; ROAD NAME & CULVERT CROSSING; EDGE FOOTPATH (DASHED); CONCRETE PATH (SHADED)

ALL EXISTING; CURRENTLY UNDER CONSTRUCTION & FUTURE INDICATIVE SERVICES ARE SHOWN LILAC. ROADS UNDER CONSTRUCTION & FUTURE INDICATIVE ARE SHOWN GREYED.

CONTOURS 2.5m FINSHED SURFACE POST BULK EARTHWORKS SURFACE

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SURVEY DATUM MGA2020-56
LOT 255 ON SP325466

DRAWN	ASC	DATE 05/22
DESIGN	ASC	DATE 05/22

Hartecs Group

EDENBOOK DEVELOPMENTS

EASTERN PRECINCT STAGES 1 -6

ROL ENGINEERING SUBMISSION

INDICATIVE SERVICES & ROAD LAYOUT STAGE 2

FILE NO G2201-02-ROL5.DWG
JOB NO PRJ-0131
SCALE 0 1:1250 HORZ. 25 AT A3 SIZE

DRAWING NUMBER	ISSUE	SHEET NO.
PRJ-0131-ROL7	3	7

05. G2201-02-ROL5 (SERVICES-1).DWG LAST MODIFIED 21/May/2022

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LEGEND SERVICES

- W100 — WATER 100ø
- S150 — SEWER 150ø
- S300 — TRUNK SEWER 300ø
- E/C — ELECTRICITY/COMMS
- ROAD DRAINAGE; UNDERGROUND PIPES; ROAD GULLY INLET PITS; & HEADWALL
- AQUILA DR — ROADS; ROAD NAME & CULVERT CROSSING; EDGE FOOTPATH (DASHED); CONCRETE PATH (SHADED)

ALL EXISTING; CURRENTLY UNDER CONSTRUCTION & FUTURE INDICATIVE SERVICES ARE SHOWN LILAC. ROADS UNDER CONSTRUCTION & FUTURE INDICATIVE ARE SHOWN GREYED.

VIEWPOINT DR

FIREFLY AVE

SANDPIPER AVE

TRANQUIL TER

978 P.U.L.

CONTOURS 2.5m FINSHED SURFACE POST BULK EARTHWORKS SURFACE

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SURVEY DATUM MGA2020-56
LOT 255 ON SP325466

DRAWN	ASC	DATE 05/22
DESIGN	ASC	DATE 05/22

Hartecs Group

EDENBOOK DEVELOPMENTS

EASTERN PRECINCT STAGES 1 -6

ROL ENGINEERING SUBMISSION

INDICATIVE SERVICES & ROAD LAYOUT STAGE 3

FILE NO: G2201-02-ROL5.DWG
JOB NO: PRJ-0131
SCALE: 1:1250 HORZ. (0, 25) AT A3 SIZE
DRAWING NUMBER: PRJ-0131-ROL8
ISSUE: 3
SHEET NO.: 8

AQUILA DR

FERNBACK AVE

SOMERDALE AVE

WILLOWDALE DR

MCLAUGHLIN ST

982 (Pt) P.U.L DRAINAGE CHANNEL

982 (Pt) P.U.L

570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590

605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636

DRAINAGE CHANNEL

CULVERT CROSSING 3/2400x1200 RCBC (PRELIMINARY SIZING)

TYPE AUL INTERSECTION WITH MCLOUGHLIN STREET

TRUNK SEWER FUTURE EXTENSION

55 (Pt)

LEGEND SERVICES

- W100 — WATER 100ø
- S150 — SEWER 150ø
- S300 — TRUNK SEWER 300ø
- E/C — ELECTRICITY/COMMS
- ROAD DRAINAGE; UNDERGROUND PIPES; ROAD GULLY INLET PITS; & HEADWALL
- AQUILA DR — ROADS; ROAD NAME & CULVERT CROSSING; EDGE FOOTPATH (DASHED); CONCRETE PATH (SHADED).

ALL EXISTING; CURRENTLY UNDER CONSTRUCTION & FUTURE INDICATIVE SERVICES ARE SHOWN LILAC. ROADS UNDER CONSTRUCTION & FUTURE INDICATIVE ARE SHOWN GREYED.

CONTOURS 2.5m FINSHED SURFACE POST BULK EARTHWORKS SURFACE

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SURVEY DATUM MGA2020-56
LOT 255 ON SP325466

DRAWN	ASC	DATE 05/22
DESIGN	ASC	DATE 05/22

Hartecs Group

EDENBOOK DEVELOPMENTS

EASTERN PRECINCT STAGES 1 -6

ROL ENGINEERING SUBMISSION

INDICATIVE SERVICES & ROAD LAYOUT STAGE 4

FILE NO G2201-02-ROL6.DWG

JOB NO PRJ-0131

SCALE 0 1:1250 HORZ. 25 AT A3 SIZE

DRAWING NUMBER	ISSUE	SHEET NO.
PRJ-0131-ROL9	3	9

BAYBREEZE AVE

FERNBACK AVE

SOMERDALE AVE

PALUNA AVE

AQUILA DR

WILLOWDALE DR

MCLAUGHLIN ST

P.U.L. 981

982 (PT) P.U.L DRAINAGE CHANNEL

PROVISION OF SEWER CONNECTION TO ADJACENT LANDS. LOCATION AND NUMBER TO BE CONFIRMED BY COUNCIL

DRAINAGE CHANNEL

CULVERT CROSSING 3/2400x1200 RCBC (PRELIMINARY SIZING)

CONTOURS 2.5m FINSHED SURFACE POST BULK EARTHWORKS SURFACE

LEGEND SERVICES

- W100 — WATER 100ø
- S150 — SEWER 150ø
- S300 — TRUNK SEWER 300ø
- E/C — ELECTRICITY/COMMS
- ROAD DRAINAGE; UNDERGROUND PIPES; ROAD GULLY INLET PITS; & HEADWALL
- AQUILA DR — ROADS; ROAD NAME & CULVERT CROSSING; EDGE FOOTPATH (DASHED); CONCRETE PATH (SHADED).

ALL EXISTING; CURRENTLY UNDER CONSTRUCTION & FUTURE INDICATIVE SERVICES ARE SHOWN LILAC. ROADS UNDER CONSTRUCTION & FUTURE INDICATIVE ARE SHOWN GREYED.

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SURVEY DATUM MGA2020-56
LOT 255 ON SP325466

DRAWN ASC DATE 05/22
DESIGN ASC DATE 05/22

Hartecs Group

EDENBOOK DEVELOPMENTS
EASTERN PRECINCT STAGES 1 -6
ROL ENGINEERING SUBMISSION
INDICATIVE SERVICES & ROAD LAYOUT STAGE 5

FILE NO G2201-02-ROL6.DWG
JOB NO PRJ-0131
SCALE 0 1:1250 HORZ. 25 AT A3 SIZE
DRAWING NUMBER PRJ-0131-ROL10 ISSUE 3 SHEET NO 10

LEGEND SERVICES

- W100 — WATER 100ø
- S150 — SEWER 150ø
- S300 — TRUNK SEWER 300ø
- E/C — ELECTRICITY/COMMS
- ROAD DRAINAGE; UNDERGROUND PIPES; ROAD GULLY INLET PITS; & HEADWALL
- AQUILA DR — ROADS; ROAD NAME & CULVERT CROSSING; EDGE FOOTPATH (DASHED); CONCRETE PATH (SHADED).

ALL EXISTING; CURRENTLY UNDER CONSTRUCTION & FUTURE INDICATIVE SERVICES ARE SHOWN LILAC. ROADS UNDER CONSTRUCTION & FUTURE INDICATIVE ARE SHOWN GREYED.

SUNVIEW AVE
FIGTREE CL
WILLOWDALE DR
JAKIAH AVE
BAYBREEZE AVE
FERNBACK AVE
PALUNA AVE
AQUILA DR
MCLAUGHLIN ST
DRAINAGE CHANNEL
P.U.L. 981
982 (PT) P.U.L DRAINAGE CHANNEL
PROVISION OF SEWER CONNECTION TO ADJACENT LANDS. LOCATION AND NUMBER TO BE CONFIRMED BY COUNCIL

CONTOURS 2.5m FINSHED SURFACE POST BULK EARTHWORKS SURFACE

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SURVEY DATUM MGA2020-56
LOT 255 ON SP325466

DRAWN	ASC	DATE 05/22
DESIGN	ASC	DATE 05/22

Hartecs Group

EDENBOOK DEVELOPMENTS
EASTERN PRECINCT STAGES 1 -6
ROL ENGINEERING SUBMISSION
INDICATIVE SERVICES & ROAD LAYOUT STAGE 6

FILE NO G2201-02-ROL6.DWG
JOB NO PRJ-0131
SCALE 0 1:1250 HORZ. 25 AT A3 SIZE
DRAWING NUMBER PRJ-0131-ROL11
ISSUE 3
SHEET NO. 11

NOTES

FLOOD DEPTH RANGES AND INUNDATION EXTENTS HAVE BEEN PROVIDED FOR THE ULTIMATE CATCHMENT DEVELOPMENT CASE. THIS IS AN EXTENSION OF THE THE PREVIOUS APPROVED FLOOD STUDY & INUNDATION MAPPING DONE FOR THE DOWNSTREAM EDENBROOK DRIVE UPGRADE WORKS AND OSCADIA POCKET DEVELOPMENT. THE CATCHMENT MODEL IS THE SAME AND THE 2D SURFACE MODEL HAS BEEN UPDATED TO INCLUDE THE EASTERN PRECINCT DEVELOPMENT AND THE ASSOCIATED CHANNEL ALONG MCLAUGHLIN STREET.

MODELLING

1D/2D HYDRAULIC MODELING AS PER CURRENT AR&R 2019; AR&R RAINFALL 2016 IFD DATA & TEMPORAL PATTERNS; XPSTORM COMPUTER PACKAGE

- LAURENSON ROUTING METHOD.
- PREDOMINANT LAND USAGE RESIDENTIAL.
- LOSS MODELS – UNIFORM LOSS & SEPARATE IMPERVIOUS AND PERVIOUS AREAS. PERVIOUS AREAS INITIAL LOSS 0mm, CONTINUING LOSS 2.5mm/hr; IMPERVIOUS AREA INITIAL & CONTINUING LOSS 0mm.

FOR THE NOMINATED AEP A RANGE OF STORM DURATIONS HAVE BEEN SELECTED FOR ANALYSIS, EACH STORM COMPRISING AN ASSEMBLE OF 10 DIFFERENT PATTERNS. THE PEAK FLOW FOR EACH ENSEMBLE HAVE BEEN STATISTICALLY ANALYSED AND THE WORST CASE PEAK MEDIAN FLOW HAS BEEN ADOPTED AS THE DESIGN STORM/FLOW.

LEGEND
MAX WATER DEPTHS

3.000
2.667
2.333
2.000
1.667
1.333
1.000
0.667
0.333
0.000

** ALL CATCHMENT FLOWS FROM FUTURE DEVELOPMENT ON EASTERN SIDE OF MCLAUGLIN STREET TO ENTER CHANNEL DOWNSTREAM OF SOMERDALE AVE CULVERT CROSSING **

CULVERT CROSSING 3/2400x1200 RCBC (PRELIMINARY SIZING)

DRAINAGE CHANNEL

DIRECTION OF MAIN FLOWS

MCLAUGHLIN ST

WILLOWDALE DR

SOMERDALE AVE

EDENBROOK DR

CULVERT CROSSING 5/3000x1500 RCBC

FIGTREE CL

JAKIAH AVE

BAYBREEZE AVE

FERNBANK AVE

PROPOSED EDENBROOK EASTERN PRECINCT

CONTOURS 2.5m FINSHED SURFACE POST BULK EARTHWORKS SURFACE =

CSG
capricorn survey group (cq)
capricorn survey group (cq) plt
132 victoria parade, rockhampton
ph: 0749275199
email: reception@csgcq.com.au

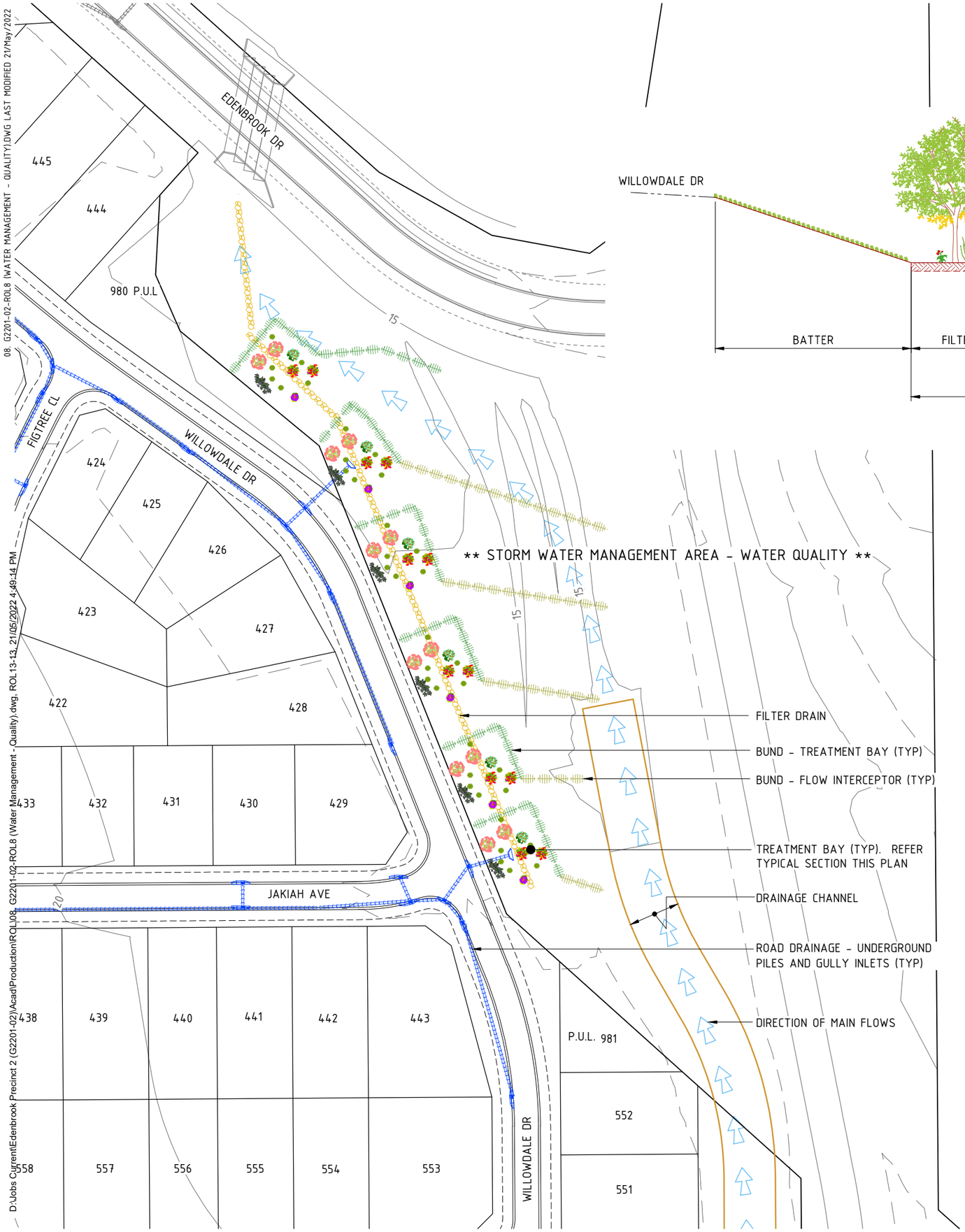
SURVEY DATUM MGA2020-56
LOT 255 ON SP325466

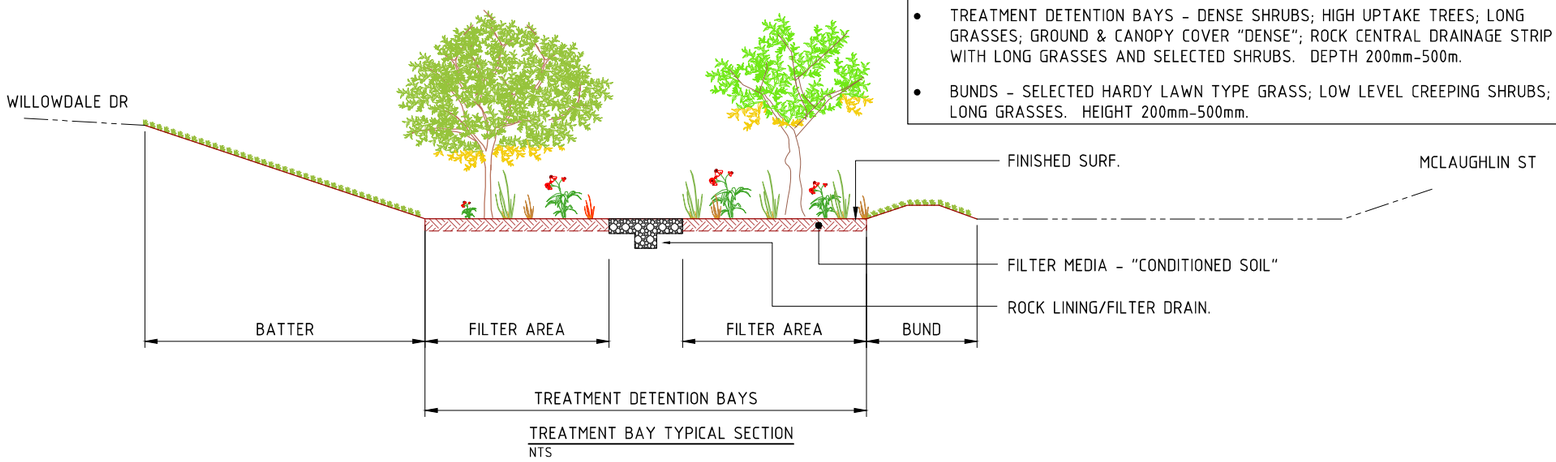
DRAWN	ASC	DATE 05/22
DESIGN	ASC	DATE 05/22

Hartecs Group

EDENBOOK DEVELOPMENTS
EASTERN PRECINCT STAGES 1 -6
ROL ENGINEERING SUBMISSION
STORM WATER MANAGEMENT
Q100 FLOOD INUNDATION AREA

FILE NO G2201-02-ROL7.DWG
JOB NO PRJ-0131
SCALE 0 1:1500 HORZ. 25 AT A3 SIZE
DRAWING NUMBER PRJ-0131-ROL12 ISSUE 3 SHEET NO. 12





TREATMENT BAY TYPICAL SECTION
NTS

PROPOSED STORM WATER TREATMENT METHODOLOGY SAME AS ADOPTED FOR PREVIOUS EDENBROOK STAGES 8 & 10 - "STREET TREE" CONCEPT WITH CONCENTRATED END OF LINE TREATMENT AREA

- BATTERS - GROUND COVER COMPRISING MIXTURE OF NATURAL GRASSES.
- TREATMENT DETENTION BAYS - DENSE SHRUBS; HIGH UPTAKE TREES; LONG GRASSES; GROUND & CANOPY COVER "DENSE"; ROCK CENTRAL DRAINAGE STRIP WITH LONG GRASSES AND SELECTED SHRUBS. DEPTH 200mm-500m.
- BUNDS - SELECTED HARDY LAWN TYPE GRASS; LOW LEVEL CREEPING SHRUBS; LONG GRASSES. HEIGHT 200mm-500mm.

CONTOURS 2.5m FINSHED SURFACE POST BULK EARTHWORKS SURFACE

CSG
capricorn survey group (cq)
capricorn survey group (cq) plt
132 victoria parade, rockhampton
ph: 0749275199
email: reception@csgcq.com.au

SURVEY DATUM MGA2020-56
LOT 255 ON SP325466

DRAWN	ASC	DATE 05/22
DESIGN	ASC	DATE 05/22

Hartecs Group

EDENBOOK DEVELOPMENTS
EASTERN PRECINCT STAGES 1 -6
ROL ENGINEERING SUBMISSION
STORM WATER MANAGEMENT
QUALITY (INDICATIVE)

FILE NO G2201-02-ROL8.DWG
JOB NO PRJ-0131
SCALE 0 1:1250 HORZ. 25 AT A3 SIZE
DRAWING NUMBER PRJ-0131-ROL13 ISSUE 3 SHEET NO. 13

Appendix C

Slope Stability Report

Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Geotechnical Stability Assessment

Proposed Subdivision
Edenbrook Estate (Precinct 2)
Edenbrook Drive, Parkhurst

Prepared for
Hartecs Group Pty Ltd

Project 213255.00
May 2022

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

Project No.	213255.00	Document No.	R.001.RevA
Document title	Report on Geotechnical Stability Assessment Proposed Subdivision		
Site address	Edenbrook Estate (Precinct 2), Edenbrook Drive, Parkhurst		
Report prepared for	Hartecs Group Pty Ltd		
File name	213255.00.R.001.RevA		

Document status and review

Status	Prepared by	Reviewed by	Date issued
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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		
Reviewer		9 May 2022

bsi. ISO 9001 Quality Management
FS 604853

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Douglas Partners
Geotechnics / Environment / Groundwater

Table of Contents

Report on Geotechnical Stability Assessment
Proposed Subdivision
Edenbrook Estate (Precinct 2), Edenbrook Drive, Parkhurst

1. Introduction

This report presents the results of a geotechnical stability assessment undertaken by Douglas Partners Pty Ltd (DP) for Precinct 2 as part of the Edenbrook Estate development on Edenbrook Drive, Parkhurst.

The geotechnical assessment was undertaken at the request of Hartecs Group Pty Ltd on behalf of Edenbrook Developments in accordance with DP's proposal 213255.00.P.001 dated 17 February 2022.

The aim of the assessment was to assess the stability of the proposed development in accordance with the requirements of the Rockhampton Regional Council's (RCC) steep land overlay code. The assessment comprised the review of regional geology, previous investigation results, historical aerial photographs, and available online mapping; followed by a site walk-over inspection by a senior geotechnical engineer, stability assessment and reporting.

This report must be read in conjunction with the notes entitled *"About This Report"* in Appendix A along with any other attached explanatory notes and should be kept in its entirety without separation of individual pages or sections.

2. Site Description and Proposed Development

The development site is described as Lot 255 on SP325466, which encompasses both the northern and southern sides of Edenbrook Drive, Parkhurst (refer to Figure 1).

It is understood that the proposed residential development will comprise approximately 500 to 600 residential lots ranging in size. Supporting infrastructure will include subdivisional roads, water, sewerage and stormwater.

It is further understood that the proposed earthworks for a portion of the overall site will consist of bulk excavations up to approximately 7 m in height along the ridgeline and spurs, and filling up to approximately 9 m in the low lying re-entrants between the spurs (refer to Figure 2); generally creating relatively flat and level building platforms, some locally increasing up to approximately 15%. It is anticipated that similar earthworks will be required for the remainder of the site.

Figure 1: Site Location.

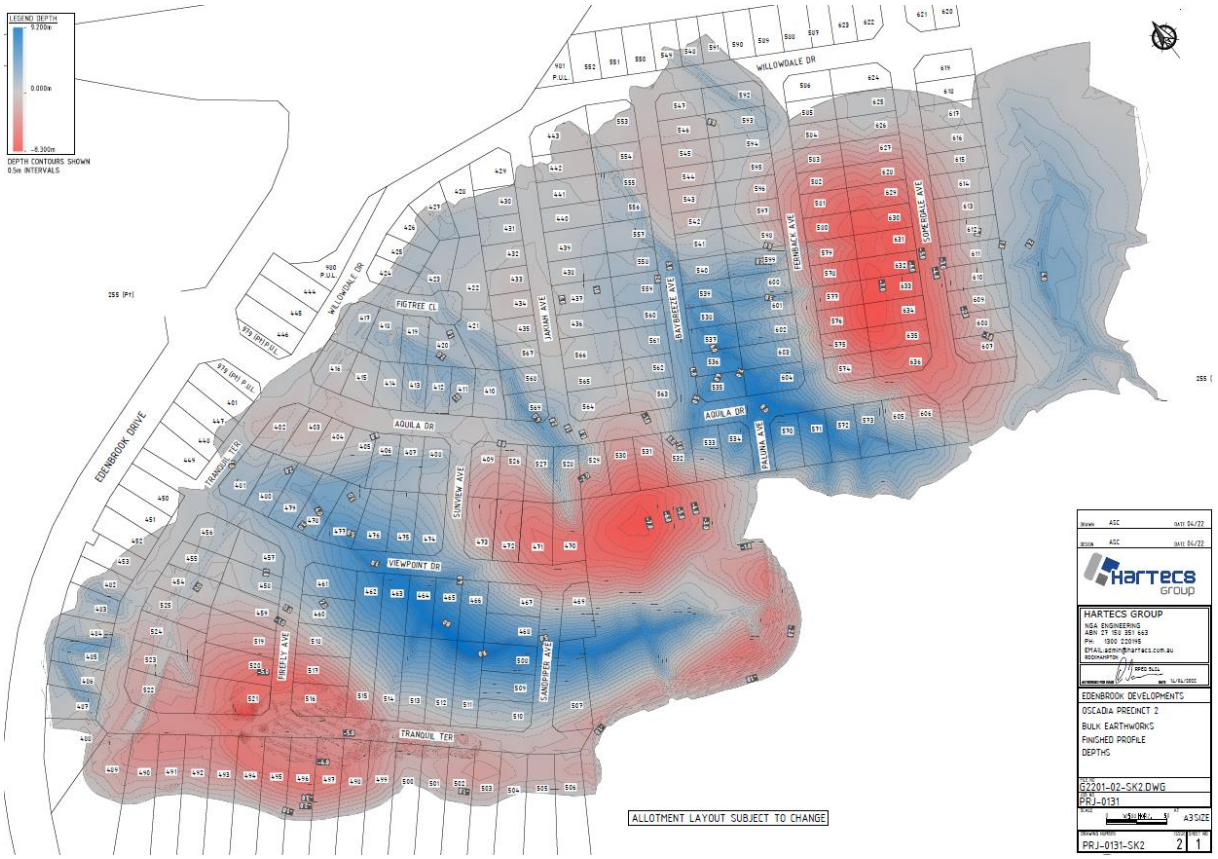


Figure 2: Proposed earthworks for a proportion of the overall site.

3. Published Data

3.1 Regional Geology

Reference to the Geological Survey of Queensland's 1:100,000 scale Rockhampton Region geological map indicates the site is located in an area underlain by the Early Carboniferous aged Rockhampton Group described as typically comprising *"mudstone, siltstone, oolitic sandstone, and conglomerate, oolitic and crinoidal limestone"* with local folds dipping moderately to steeply to the east.

3.2 Topography

Reference to RCC's online contour mapping, the site is dominated by two prominent topographical features of high relief with a saddle connecting the two along the western part of the site. An elongated spur runs off to the north, with a number of smaller moderately sloping (between 10° and 15°) spurs running off to the north-east, to the east and to the south. A knoll is located atop of a spur towards the eastern part of the site. Steep (between 15° and 20°) re-entrants are located between the spurs. The site is also dominated by a second feature of high relief along the southern boundary of the site. As the site extends to the north-east, it generally flattens out.

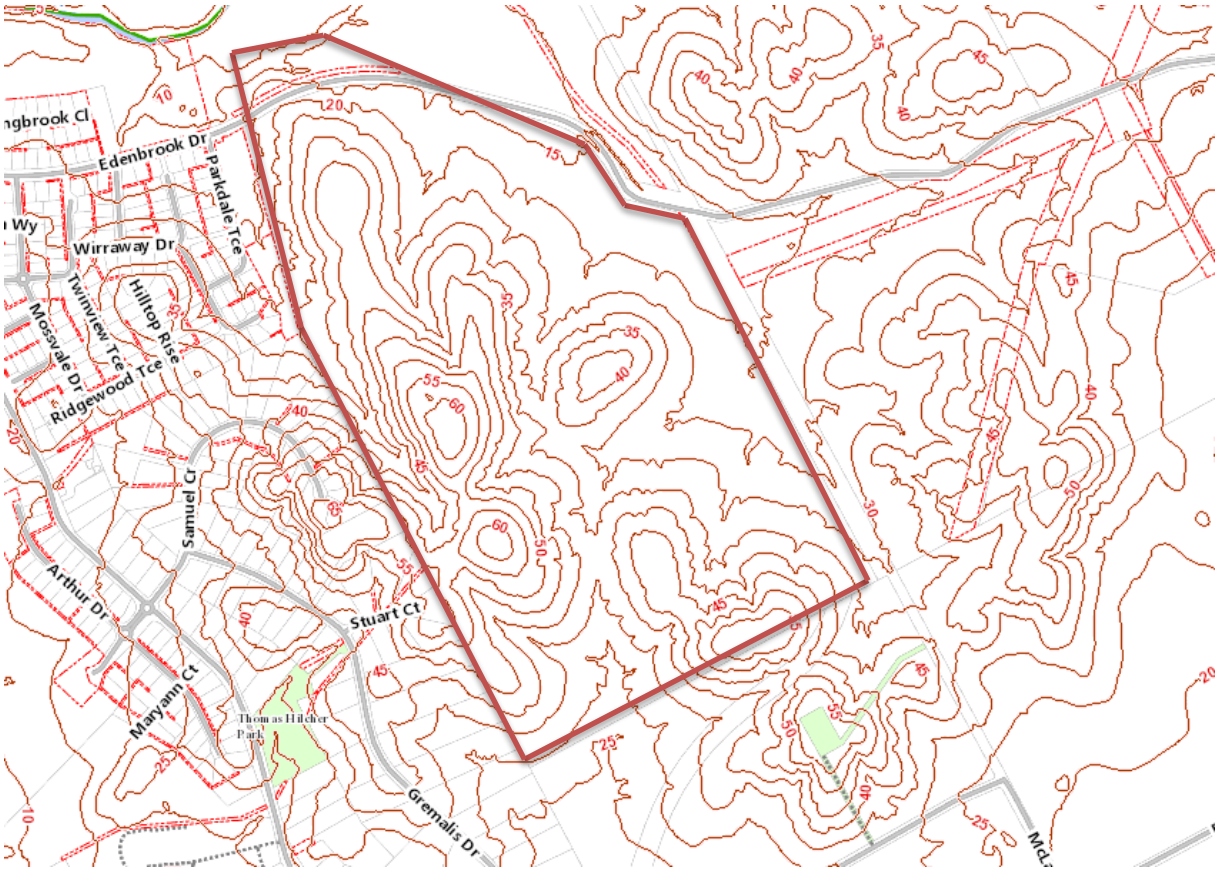


Figure 3: RRC Contour Mapping.

3.3 Steep Land

RCC's Steep Land Overlay identifies land with a slope of 15% or greater as being land potentially susceptible to landslide. Reference to the steep land overlay map (Figure 4), typically the moderately sloping side slopes of the spurs, and steeply sloping re-entrants are identified as steep land.

It should be noted that the steep land overlay map is a broad scale indication of the potential landslide susceptibility based on topography alone, and does not consider other factors such as regional geology or evidence of past instability.

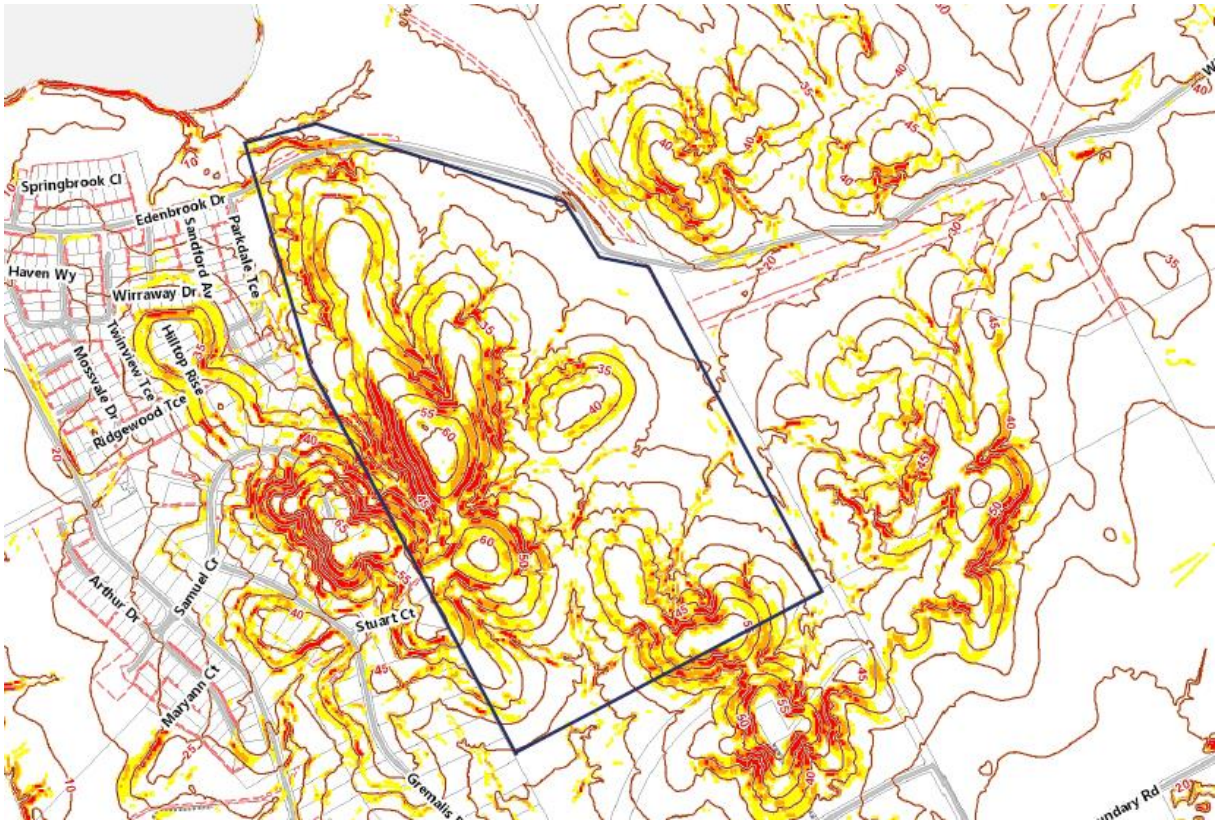


Figure 4: RRC Steep Land Overlay.

3.4 Previous Investigations

The drill logs from previous drilling carried out by CQ Drilling and Blasting Pty Ltd were provided by the client. The previous bores were typically drilled across the western part of the site. The drilling conditions are generally described as being "soft" to between 0.5 m and 2.0 m depth. The "soft" conditions are inferred to be typical of residual soils overlying extremely weathered material, with conditions becoming harder with depth and penetration into less weathered and subsequently stronger rock.

3.5 Aerial Photographs

Aerial photographs from 1956 to present were reviewed to assess for evidence of significant past instability.

The photos indicate no significant evidence of instability or changes in topography on the site.

4. Field Work

The field work was carried out on 16 March 2022 and comprised a walk-over inspection by a senior geotechnical engineer from DP in order to make an appraisal of the general condition of the site in regard to topography, drainage, vegetation cover, geology, erosion and slope stability.

During the site walk-over, topographical features specific to the site were noted, and ground slopes were measured using a hand-held inclinometer.

The exposed conditions on site generally indicate shallow residual soils overlying weathered siltstone, which is consistent with the above described geology and previous borehole drilling by others.

No obvious or significant scarps, naturally hummocky or visibly disturbed ground surface, or tension cracks were observed; which would usually indicate the presence of local or global instability. Any large trees on the slopes were also generally straight.

No signs of groundwater seepage (ie. surface 'springs') were observed at the time of inspection. Surface water from the slopes appear to be naturally diverted towards the re-entrants and typically drain to the north-east or south-west. Localised scour and erosion was noted in a drainage gully located in the south-western corner of the site.

5. Comments

5.1 Slope Stability Risk Assessment

The terminology of the Australian Geomechanics Society (AGS) Practice Note Guidelines for Landslide Risk Management 2007 has been used in the descriptions of hazards and the qualitative assessment of likelihood, consequence and risk of slope instability. Terminology and risk matrix tables from the AGS Practice Note Guidelines are included in Appendix B.

A qualitative assessment of the likelihood, consequence and risk has been carried out for the site, based on the results of the site walk-over and experience in similar projects, provided that development of the site is carried out in accordance with good engineering practice for hillside developments and the recommendations within this report.

Table 1: Slope Instability Risk Assessment to Property

Hazard	Likelihood	Consequence to Property	Risk to Property	Comments
Shallow failure in proposed fill or unsupported cuts	"Unlikely"	"Minor to Medium"	"Low"	The proposed fill is retained by engineered designed retaining walls, with long batters no steeper than 2H:1V
Shallow rotational or translational slide in residual soils	"Unlikely"	"Minor to Medium"	"Low"	The likelihood of a shallow failure through the residual soils is considered unlikely due to the overall strength of these materials and no evidence of previous movement.
Deep rotational failure in residual soils or weathered bedrock	"Rare"	"Major"	"Low	The base geology is generally not adversely bedded or otherwise structured to be prone to deep instability.

Based on the results of the slope stability assessment, considering the geology of the site, relatively shallow depth to rock and the lack of evidence of any previous landslips, the risk to property and to properties adjacent to the site is considered to be "low". The AGS Guidelines suggest that a low level of risk is "usually acceptable" by regulators.

5.2 Geotechnical Constraints

The potential impacts on slope stability for the proposed development have been assessed, and the measures recommended below in particular with reference to the AGS guidelines on hillside constructions have been designed to mitigate those impacts.

5.2.1 Earthworks

Suitable unsurcharged temporary and permanent dry cut and fill batter slopes up to 3 m in height are presented in Table 2. Advice should be sought from DP for batter slopes greater than 3 m in height. Where groundwater seepage is encountered, batter slopes will need to be considerably flatter.

Table 2: Batter Slopes (unsurcharged, up to 3 m in height)

Material	Safe Batter Slope (H:V)	
	Short Term	Long Term
Controlled fill*, residual soils	1:1	2:1
Weathered rock	1:1	1.5:1

Notes: * Depends on fill material type and level of compaction. Assumes clayey material compacted under 'Level 1' inspection and testing to minimum dry density ratio of 95% for Standard compaction.

Temporary excavations up to 1.5 m in depth may remain near vertical for short periods of time, provided that they remain dry at the time of construction and provided there are no loads, services, structures or traffic located within a distance from the crest equal to the batter height.

The above batter slopes are suggested with respect to slope stability only and do not allow for lateral stress relaxation which may result in movement of nearby in-ground services or shallow footings. If such services or footings are settlement sensitive, then the excavation may have to be positively supported.

Slopes may need to be flattened to 4H:1V or less, in order to allow vehicle access for maintenance of the slopes. It is recommended that all batters incorporate crest and toe drainage. The batters should also be covered with topsoil and vegetation (or similar) to provide long term erosion protection.

Long term cuts in very low strength (or stronger) rock is dependent upon the joint orientation within the rock mass. The above batter slopes are contingent upon geotechnical inspections during construction to verify that no adverse jointing and/or defects are present in the batter face. Steeper batters may be possible with the inclusion of passive nails/dowels, anchors and surface protection, but would be subject to detailed stability assessment.

It is recommended that where fill is to be placed over sloping ground, the slope should be benched to allow for the fill to be 'keyed' into the existing slope. These procedures will provide for greater stability of the fill and allow for adequate compaction to be achieved throughout the full depth of the fill. Filled batters should also be overfilled and then cut back to the required design batter angle in order to maximise compaction of the material in the batter faces.

Approved bulk fill should be placed in layers not exceeding 0.3 m 'loose' thickness, with each layer compacted to a minimum dry density ratio of 95% relative to Standard compaction. Where fill has a significant clay content, moisture content within the fill should be maintained within 2% of OMC during and after compaction. The upper 0.3 m of pavement subgrade and unbound pavement gravels should be compacted to a minimum dry density ratio of 100% relative to Standard compaction and to within the same moisture content range as given above.

Care should be taken not to use over-wet clayey soils as this can lead to problems associated with trafficability and workability. Clayey soils should also not be over-compacted (ie. not more than 102% Standard) or placed too dry of OMC, as this can lead to future swelling and softening with changes to moisture content or inundation from water.

Field density testing should be carried out to confirm the standard of compaction has been achieved and the placement moisture content. The frequency of testing should be carried out in accordance with AS 3798 (2007) and distributed reasonably evenly throughout the full depth and area of filling.

Level 1 inspection and testing of filling must be undertaken where the fill is to support buildings or pavements. It is also recommended that Level 1 inspection and testing be adopted for all trench backfill greater than 1.5 m deep in areas to support buildings or pavements as settlement of deep trench backfill can have significant impact on these works.

5.2.2 Retaining Walls

The design of flexible and rigid retaining walls could be undertaken using a triangular pressure distribution and the earth pressure parameters given in Table 3. Flexible walls are those which are free to rotate or tilt (such as cantilevered walls) and should be designed using an active (Ka) earth pressure coefficient. Rigid walls are those which are restrained against rotation or tilt (ie. single anchored/propped walls) and should be designed using the at-rest earth pressure (Ko).

Passive resistance (Kp) at the toe of the wall should be ignored in the zone where future disturbance (eg. services trenches) could occur.

Table 3: Earth Pressure Coefficients (non-sloping crest backfill)

Material	Unit Weight (kN/m^3)	Friction Angle (degrees)	Active Ka	At Rest Ko	Passive Kp
Controlled fill*, residual clay soils	19	26	0.40	0.55	2.5
Weathered rock	21	36	0.25	0.40	3.6

Notes: * Depends on fill material type and level of compaction. Assumes clayey material compacted under 'Level 1' inspection and testing.

Allowance should be made for hydrostatic pressure build-up behind the retaining wall. It is recommended that all retaining walls be drained for full height in order to minimise hydrostatic pressure build-up behind the wall. Additional guidelines on wall drainage are provided in Appendix G of AS 4678 (2002).

Allowance for surcharge loads and sloping crest should also be made as appropriate. The effect of surcharge should be included by multiplying the vertical pressure developed by the surcharge by the appropriate lateral earth pressure coefficient as given in Table 3.

Preference should be given to adopting thin soil layers and using small hand-controlled compaction equipment during backfilling against retaining walls. This is in order to limit the stress applied to the walls during construction. Should heavy compaction be required, then wall stresses will be well in excess of Ko and temporary propping should be used.

Clayey backfill should not be placed too dry of optimum moisture content, as this can lead to increased future swelling with changes to moisture content or inundation from water creating additional load on the back of the wall.

It is recommended that factors of safety of 2 against overturning and sliding stability and 1.5 for global stability, be adopted in the design of all retaining walls.

For limit state design methods, the ultimate parameters provided above in Table 3 will need to be factored in accordance with AS 4678. Guidance on the selection of material strength partial factors is provided in Section 5.2 of AS 4678 and is dependent upon the nature and state of the insitu soils.

5.2.3 Footing Design

Provided that earthworks is carried out in accordance with the recommendations in this report, it is considered that high level pad and/or strip footings founded in either controlled fill, competent residual soils or weathered rock may be adopted. Where the change in depth of fill is significant across a building platform (especially where there is cut to fill), the potential for differential movements should be noted, and if these are significant then piers through the fill and founding into natural should be adopted.

Slabs supported on high level footings should be stiffened to suit the expected ground surface movements due to potential soil reactivity. This should be confirmed following future site investigations on individual lots as required for building design.

'Pole' type houses are generally preferred on moderate to steeply sloping lots (if any), unless the buildings are benched into the hillslope.

Embedment required for retaining wall footings will be dependent on global stability checks as part of the retaining wall design.

All footing excavations should be inspected and tested by an experienced geotechnical to confirm bearing pressures prior to casting of concrete.

The above footing recommendations are considered to be the minimum requirements from a slope stability viewpoint and final footing design details will be dependent upon the extent of earthworks, proposed development loads and what is considered acceptable in terms of settlement and cost.

5.2.4 Drainage

For subdivisional works, all stormwater collected on site should be prevented from discharging directly onto the slope or from ponding on the proposed building envelopes. All stormwater and surface water is to be directed via an approved stormwater containment system in a controlled manner to appropriate discharge points.

6. References

AGS. (2007). *Practice Note Guidelines for Landslide Risk Management.* Australian Geomechnics, Volume 42, No 1: Australian Geomechanics Society, Landslide Taskforce, Landslide Practice Note Working Group.

AS 3798. (2007). *Guidelines on Earthworks for Commercial and Residential Developments.* Standards Australia.

AS 4678. (2002). *Earth-retaining structures.* Standards Australia.

7. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for Precinct 2 as part of the Edenbrook Estate, Edenbrook Drive, Parkhurst in accordance with DP's proposal 213255.00.P.001 dated 17 February 2022. This report is provided for the exclusive use of Hartecs Group Pty Ltd and Edenbrook Developments for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

DP's advice is based upon the conditions encountered during previous investigations and observed during the site walk-over. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Douglas Partners Pty Ltd

Appendix A

About This Report

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix B

AGS Guidelines

APPENDIX C: – QUALITATIVE TERMINOLOGY FOR USE IN ASSESSING RISK TO PROPERTY (CONTINUED)

QUALITATIVE RISK ANALYSIS MATRIX – LEVEL OF RISK TO PROPERTY

LIKELIHOOD		CONSEQUENCES TO PROPERTY (With Indicative Approximate Cost of Damage)				
	Indicative Value of Approximate Annual Probability	**1: CATASTROPHIC 200%**	**2: MAJOR 60%**	**3: MEDIUM 20%**	**4: MINOR 5%**	**5: INSIGNIFICANT 0.5%**
A – ALMOST CERTAIN	10^{-1}	VH	VH	VH	H	M or **L** (5)
B - LIKELY	10^{-2}	VH	VH	H	M	**L**
C - POSSIBLE	10^{-3}	VH	H	M	M	**VL**
D - UNLIKELY	10^{-4}	H	M	**L**	**L**	**VL**
E - RARE	10^{-5}	M	**L**	**L**	**VL**	**VL**
F - BARELY CREDIBLE	10^{-6}	**L**	**VL**	**VL**	**VL**	**VL**

Notes: (5) For Cell A5, may be subdivided such that a consequence of less than 0.1% is Low Risk.
(6) When considering a risk assessment it must be clearly stated whether it is for existing conditions or with risk control measures which may not be implemented at the current time.

RISK LEVEL IMPLICATIONS

Risk Level		**Example Implications** (7)
VH	VERY HIGH RISK	Unacceptable without treatment. Extensive detailed investigation and research, planning and implementation of treatment options essential to reduce risk to Low; may be too expensive and not practical. Work likely to cost more than value of the property.
H	HIGH RISK	Unacceptable without treatment. Detailed investigation, planning and implementation of treatment options required to reduce risk to Low. Work would cost a substantial sum in relation to the value of the property.
M	MODERATE RISK	May be tolerated in certain circumstances (subject to regulator's approval) but requires investigation, planning and implementation of treatment options to reduce the risk to Low. Treatment options to reduce to Low risk should be implemented as soon as practicable.
L	LOW RISK	Usually acceptable to regulators. Where treatment has been required to reduce the risk to this level, ongoing maintenance is required.
VL	VERY LOW RISK	Acceptable. Manage by normal slope maintenance procedures.

Note: (7) The implications for a particular situation are to be determined by all parties to the risk assessment and may depend on the nature of the property at risk; these are only given as a general guide.

PRACTICE NOTE GUIDELINES FOR LANDSLIDE RISK MANAGEMENT 2007

APPENDIX C: LANDSLIDE RISK ASSESSMENT

QUALITATIVE TERMINOLOGY FOR USE IN ASSESSING RISK TO PROPERTY

QUALITATIVE MEASURES OF LIKELIHOOD

Approximate Annual Probability		Implied Indicative Landslide Recurrence Interval		Description	Descriptor	Level
Indicative Value	Notional Boundary					
10^{-1}	$5x10^{-2}$	10 years	20 years	The event is expected to occur over the design life.	ALMOST CERTAIN	A
10^{-2}	$5x10^{-3}$	100 years	200 years	The event will probably occur under adverse conditions over the design life.	LIKELY	B
10^{-3}	$5x10^{-4}$	1000 years	2000 years	The event could occur under adverse conditions over the design life.	POSSIBLE	C
10^{-4}	$5x10^{-5}$	10,000 years	20,000 years	The event might occur under very adverse circumstances over the design life.	UNLIKELY	D
10^{-5}	$5x10^{-6}$	100,000 years	200,000 years	The event is conceivable but only under exceptional circumstances over the design life.	RARE	E
10^{-6}		1,000,000 years		The event is inconceivable or fanciful over the design life.	BARELY CREDIBLE	F

Note: (1) The table should be used from left to right; use Approximate Annual Probability or Description to assign Descriptor, not *vice versa*.

QUALITATIVE MEASURES OF CONSEQUENCES TO PROPERTY

Approximate Cost of Damage		Description	Descriptor	Level
Indicative Value	Notional Boundary			
200%	100%	Structure(s) completely destroyed and/or large scale damage requiring major engineering works for stabilisation. Could cause at least one adjacent property major consequence damage.	CATASTROPHIC	1
60%	40%	Extensive damage to most of structure, and/or extending beyond site boundaries requiring significant stabilisation works. Could cause at least one adjacent property medium consequence damage.	MAJOR	2
20%	10%	Moderate damage to some of structure, and/or significant part of site requiring large stabilisation works. Could cause at least one adjacent property minor consequence damage.	MEDIUM	3
5%	1%	Limited damage to part of structure, and/or part of site requiring some reinstatement stabilisation works.	MINOR	4
0.5%		Little damage. (Note for high probability event (Almost Certain), this category may be subdivided at a notional boundary of 0.1%. See Risk Matrix.)	INSIGNIFICANT	5

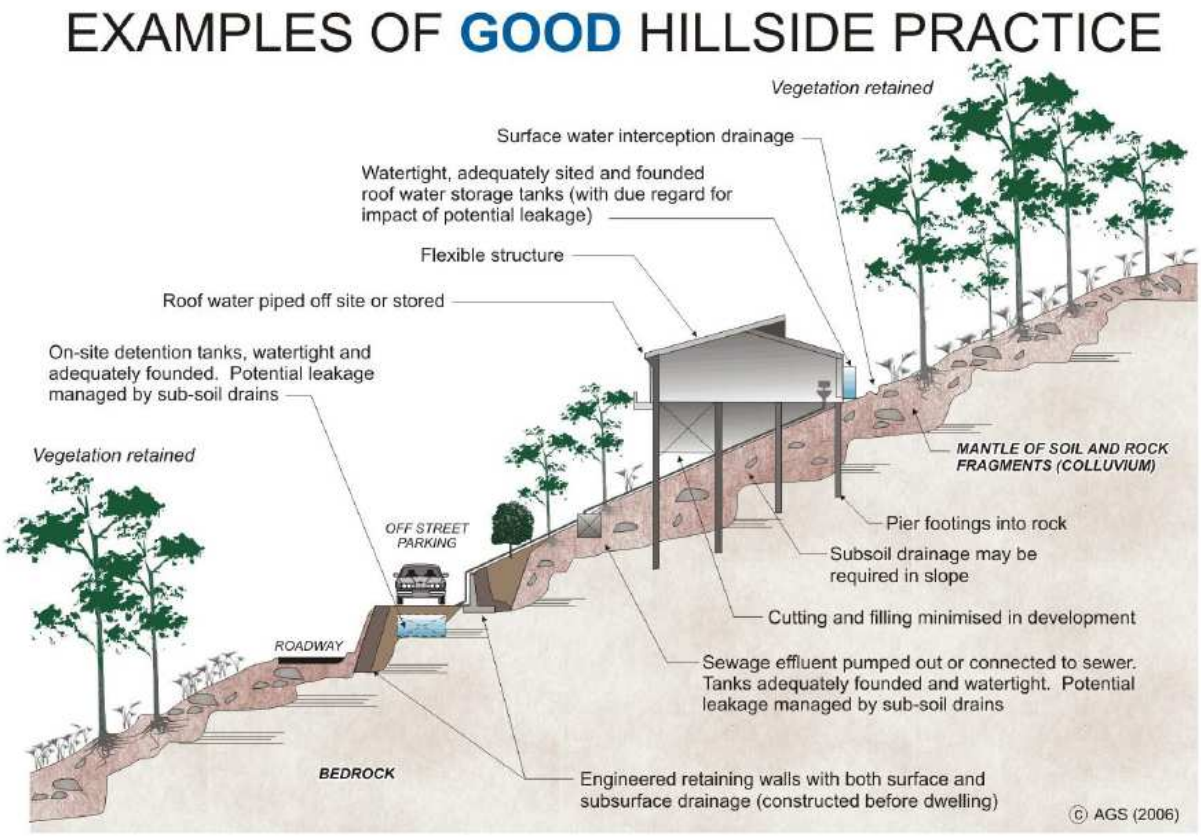
Notes: (2) The Approximate Cost of Damage is expressed as a percentage of market value, being the cost of the improved value of the unaffected property which includes the land plus the unaffected structures.

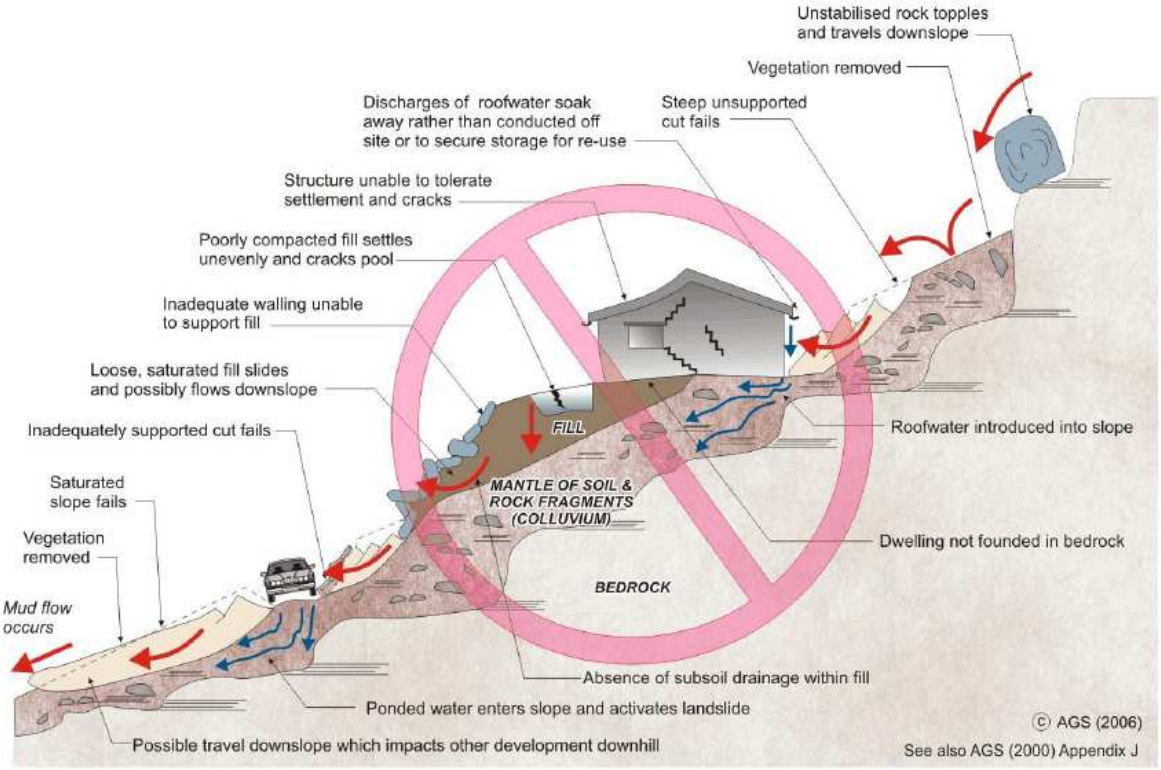
(3) The Approximate Cost is to be an estimate of the direct cost of the damage, such as the cost of reinstatement of the damaged portion of the property (land plus structures), stabilisation works required to render the site to tolerable risk level for the landslide which has occurred and professional design fees, and consequential costs such as legal fees, temporary accommodation. It does not include additional stabilisation works to address other landslides which may affect the property.

(4) The table should be used from left to right; use Approximate Cost of Damage or Description to assign Descriptor, not vice versa

APPENDIX G - SOME GUIDELINES FOR HILLSIDE CONSTRUCTION

	GOOD ENGINEERING PRACTICE	*POOR ENGINEERING PRACTICE*
ADVICE		
GEOTECHNICAL ASSESSMENT	Obtain advice from a qualified, experienced geotechnical practitioner at early stage of planning and before site works.	Prepare detailed plan and start site works before geotechnical advice.
PLANNING		
SITE PLANNING	Having obtained geotechnical advice, plan the development with the risk arising from the identified hazards and consequences in mind.	Plan development without regard for the Risk.
DESIGN AND CONSTRUCTION		
HOUSE DESIGN	Use flexible structures which incorporate properly designed brickwork, timber or steel frames, timber or panel cladding. Consider use of split levels. Use decks for recreational areas where appropriate.	Floor plans which require extensive cutting and filling. Movement intolerant structures.
SITE CLEARING	Retain natural vegetation wherever practicable.	Indiscriminately clear the site.
ACCESS & DRIVEWAYS	Satisfy requirements below for cuts, fills, retaining walls and drainage. Council specifications for grades may need to be modified. Driveways and parking areas may need to be fully supported on piers.	Excavate and fill for site access before geotechnical advice.
EARTHWORKS	Retain natural contours wherever possible.	Indiscriminatory bulk earthworks.
CUTS	Minimise depth. Support with engineered retaining walls or batter to appropriate slope. Provide drainage measures and erosion control.	Large scale cuts and benching. Unsupported cuts. Ignore drainage requirements
FILLS	Minimise height. Strip vegetation and topsoil and key into natural slopes prior to filling. Use clean fill materials and compact to engineering standards. Batter to appropriate slope or support with engineered retaining wall. Provide surface drainage and appropriate subsurface drainage.	Loose or poorly compacted fill, which if it fails, may flow a considerable distance including onto property below. Block natural drainage lines. Fill over existing vegetation and topsoil. Include stumps, trees, vegetation, topsoil, boulders, building rubble etc in fill.
ROCK OUTCROPS & BOULDERS	Remove or stabilise boulders which may have unacceptable risk. Support rock faces where necessary.	Disturb or undercut detached blocks or boulders.
RETAINING WALLS	Engineer design to resist applied soil and water forces. Found on rock where practicable. Provide subsurface drainage within wall backfill and surface drainage on slope above. Construct wall as soon as possible after cut/fill operation.	Construct a structurally inadequate wall such as sandstone flagging, brick or unreinforced blockwork. Lack of subsurface drains and weepholes.
FOOTINGS	Found within rock where practicable. Use rows of piers or strip footings oriented up and down slope. Design for lateral creep pressures if necessary. Backfill footing excavations to exclude ingress of surface water.	Found on topsoil, loose fill, detached boulders or undercut cliffs.
SWIMMING POOLS	Engineer designed. Support on piers to rock where practicable. Provide with under-drainage and gravity drain outlet where practicable. Design for high soil pressures which may develop on uphill side whilst there may be little or no lateral support on downhill side.	
DRAINAGE		
SURFACE	Provide at tops of cut and fill slopes. Discharge to street drainage or natural water courses. Provide general falls to prevent blockage by siltation and incorporate silt traps. Line to minimise infiltration and make flexible where possible. Special structures to dissipate energy at changes of slope and/or direction.	Discharge at top of fills and cuts. Allow water to pond on bench areas.
SUBSURFACE	Provide filter around subsurface drain. Provide drain behind retaining walls. Use flexible pipelines with access for maintenance. Prevent inflow of surface water.	Discharge roof runoff into absorption trenches.
SEPTIC & SULLAGE	Usually requires pump-out or mains sewer systems; absorption trenches may be possible in some areas if risk is acceptable. Storage tanks should be water-tight and adequately founded.	Discharge sullage directly onto and into slopes. Use absorption trenches without consideration of landslide risk.
EROSION CONTROL & LANDSCAPING	Control erosion as this may lead to instability. Revegetate cleared area.	Failure to observe earthworks and drainage recommendations when landscaping.
DRAWINGS AND SITE VISITS DURING CONSTRUCTION		
DRAWINGS	Building Application drawings should be viewed by geotechnical consultant	
SITE VISITS	Site Visits by consultant may be appropriate during construction/	
INSPECTION AND MAINTENANCE BY OWNER		
OWNER'S RESPONSIBILITY	Clean drainage systems; repair broken joints in drains and leaks in supply pipes. Where structural distress is evident see advice. If seepage observed, determine causes or seek advice on consequences.	


EXAMPLES OF GOOD HILLSIDE PRACTICE
Vegetation retained
Surface water interception drainage
Watertight, adequately sited and founded roof water storage tanks (with due regard for impact of potential leakage)
Flexible structure
Roof water piped off site or stored
On-site detention tanks, watertight and adequately founded. Potential leakage managed by sub-soil drains
Vegetation retained
MANTLE OF SOIL AND ROCK FRAGMENTS (COLLUVIUM)
OFF STREET PARKING
Pier footings into rock
Subsoil drainage may be required in slope
Cutting and filling minimised in development
ROADWAY
Sewage effluent pumped out or connected to sewer. Tanks adequately founded and watertight. Potential leakage managed by sub-soil drains
BEDROCK
Engineered retaining walls with both surface and subsurface drainage (constructed before dwelling)
© AGS (2006)


EXAMPLES OF POOR HILLSIDE PRACTICE
Unstabilised rock topples and travels downslope
Vegetation removed
Discharges of roofwater soak away rather than conducted off site or to secure storage for re-use
Steep unsupported cut fails
Structure unable to tolerate settlement and cracks
Poorly compacted fill settles unevenly and cracks pool
Inadequate walling unable to support fill
Loose, saturated fill slides and possibly flows downslope
Inadequately supported cut fails
FILL
Roofwater introduced into slope
Saturated slope fails
MANTLE OF SOIL & ROCK FRAGMENTS (COLLUVIUM)
Vegetation removed
Dwelling not founded in bedrock
BEDROCK
Mud flow occurs
Absence of subsoil drainage within fill
Ponded water enters slope and activates landslide
Possible travel downslope which impacts other development downhill
© AGS (2006)
See also AGS (2000) Appendix J

Appendix D

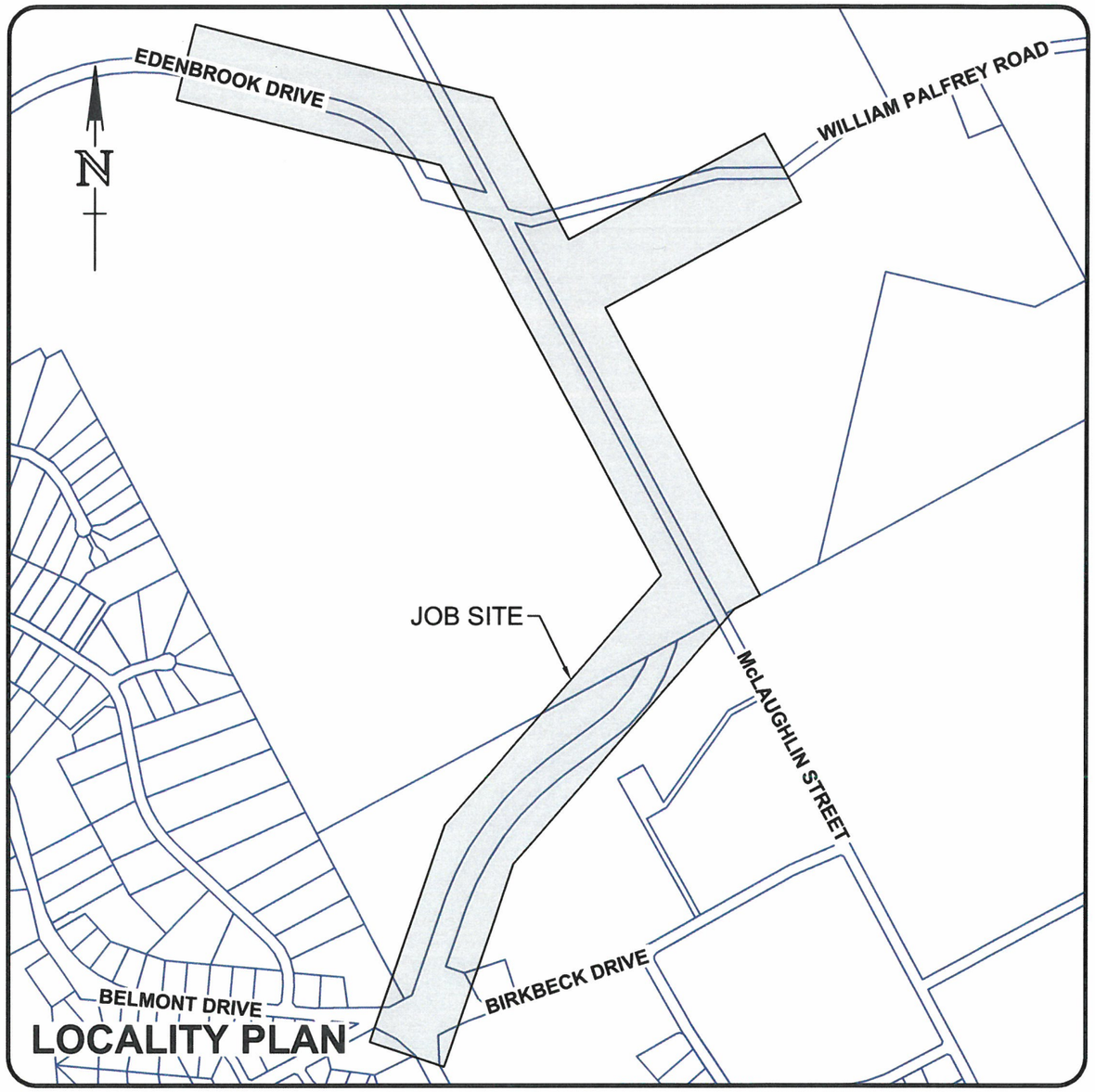
RRC PRELIMINARY DESIGN

FOR MCLAUGHLIN STREET

(first 10 drawings of RRC set only)

Rockhampton Regional Council

DWG No.	DRAWING INDEX
	ROADWORKS CONSTRUCTION
2020-229-01	OVERALL LAYOUT PLAN
2020-229-02	TYPICAL SECTIONS & DETAILS
2020-229-03	WORKING PLAN - CONTROL LINE 1 - SHEET 1 OF 4
2020-229-04	WORKING PLAN - CONTROL LINE 1 - SHEET 2 OF 4
2020-229-05	WORKING PLAN - CONTROL LINE 1 - SHEET 3 OF 4
2020-229-06	WORKING PLAN - CONTROL LINE 1 - SHEET 4 OF 4
2020-229-07	WORKING PLAN - CONTROL LINE 2
2020-229-08	WORKING PLAN - CONTROL LINE 3
2020-229-09	DRAINAGE CATCHMENT PLAN
2020-229-10	DRAINAGE DETAILS - DRAIN LINE 1
2020-229-11	DRAINAGE DETAILS - DRAIN LINE 2
2020-229-12	DRAINAGE DETAILS - DRAIN LINE 3
2020-229-13	DRAINAGE DETAILS - DRAIN LINE 4
2020-229-14	CROSS SECTIONS - CONTROL LINE 1 - SH 1 OF 21
2020-229-15	CROSS SECTIONS - CONTROL LINE 1 - SH 2 OF 21
2020-229-16	CROSS SECTIONS - CONTROL LINE 1 - SH 3 OF 21
2020-229-17	CROSS SECTIONS - CONTROL LINE 1 - SH 4 OF 21
2020-229-18	CROSS SECTIONS - CONTROL LINE 1 - SH 5 OF 21
2020-229-19	CROSS SECTIONS - CONTROL LINE 1 - SH 6 OF 21
2020-229-20	CROSS SECTIONS - CONTROL LINE 1 - SH 7 OF 21
2020-229-21	CROSS SECTIONS - CONTROL LINE 1 - SH 8 OF 21
2020-229-22	CROSS SECTIONS - CONTROL LINE 1 - SH 9 OF 21
2020-229-23	CROSS SECTIONS - CONTROL LINE 1 - SH 10 OF 21
2020-229-24	CROSS SECTIONS - CONTROL LINE 1 - SH 11 OF 21
2020-229-25	CROSS SECTIONS - CONTROL LINE 1 - SH 12 OF 21
2020-229-26	CROSS SECTIONS - CONTROL LINE 1 - SH 13 OF 21
2020-229-27	CROSS SECTIONS - CONTROL LINE 1 - SH 14 OF 21
2020-229-28	CROSS SECTIONS - CONTROL LINE 1 - SH 15 OF 21
2020-229-29	CROSS SECTIONS - CONTROL LINE 1 - SH 16 OF 21
2020-229-30	CROSS SECTIONS - CONTROL LINE 1 - SH 17 OF 21
2020-229-31	CROSS SECTIONS - CONTROL LINE 1 - SH 18 OF 21
2020-229-32	CROSS SECTIONS - CONTROL LINE 1 - SH 19 OF 21
2020-229-33	CROSS SECTIONS - CONTROL LINE 1 - SH 20 OF 21
2020-229-34	CROSS SECTIONS - CONTROL LINE 1 - SH 21 OF 21
2020-229-35	CROSS SECTIONS - CONTROL LINE 2 - SH 1 OF 6
2020-229-36	CROSS SECTIONS - CONTROL LINE 2 - SH 2 OF 6
2020-229-37	CROSS SECTIONS - CONTROL LINE 2 - SH 3 OF 6
2020-229-38	CROSS SECTIONS - CONTROL LINE 2 - SH 4 OF 6
2020-229-39	CROSS SECTIONS - CONTROL LINE 2 - SH 5 OF 6
2020-229-40	CROSS SECTIONS - CONTROL LINE 2 - SH 6 OF 6
2020-229-41	CROSS SECTIONS - CONTROL LINE 3 - SH 1 OF 2
2020-229-42	CROSS SECTIONS - CONTROL LINE 3 - SH 2 OF 2



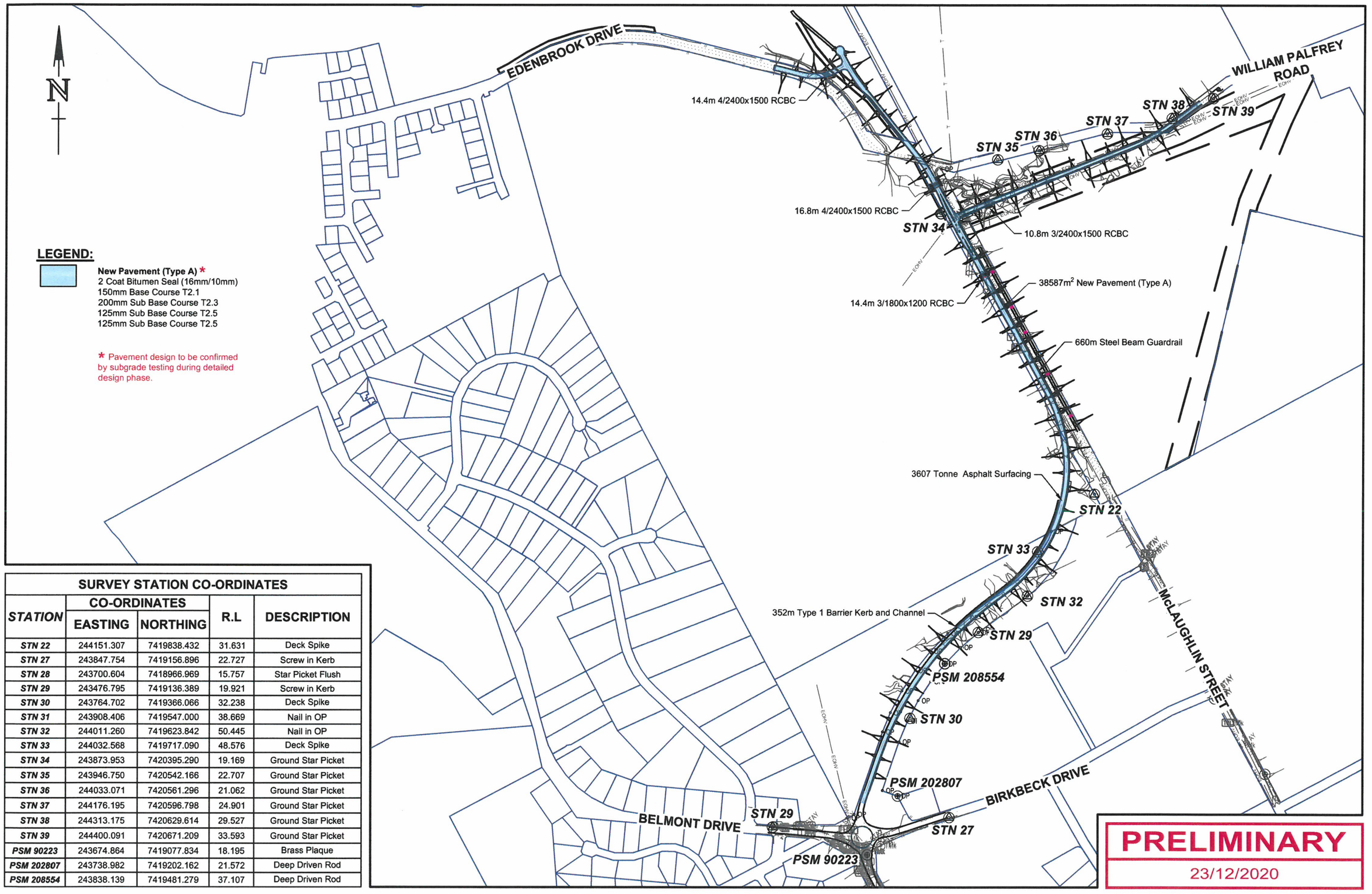
LOCALITY PLAN

ALEXANDRA STREET EXT.

BELMONT DR TO EDENBROOK DR (PARKHURST)

ROADWORKS CONSTRUCTION

PROJECT No. 2020-229



LEGEND:

New Pavement (Type A) *
2 Coat Bitumen Seal (16mm/10mm)
150mm Base Course T2.1
200mm Sub Base Course T2.3
125mm Sub Base Course T2.5
125mm Sub Base Course T2.5

* Pavement design to be confirmed by subgrade testing during detailed design phase.

SURVEY STATION CO-ORDINATES

STATION	CO-ORDINATES EASTING	CO-ORDINATES NORTHING	R.L	DESCRIPTION
STN 22	244151.307	7419838.432	31.631	Deck Spike
STN 27	243847.754	7419156.896	22.727	Screw in Kerb
STN 28	243700.604	7418966.969	15.757	Star Picket Flush
STN 29	243476.795	7419136.389	19.921	Screw in Kerb
STN 30	243764.702	7419366.066	32.238	Deck Spike
STN 31	243908.406	7419547.000	38.669	Nail in OP
STN 32	244011.260	7419623.842	50.445	Nail in OP
STN 33	244032.568	7419717.090	48.576	Deck Spike
STN 34	243873.953	7420395.290	19.169	Ground Star Picket
STN 35	243946.750	7420542.166	22.707	Ground Star Picket
STN 36	244033.071	7420561.296	21.062	Ground Star Picket
STN 37	244176.195	7420596.798	24.901	Ground Star Picket
STN 38	244313.175	7420629.614	29.527	Ground Star Picket
STN 39	244400.091	7420671.209	33.593	Ground Star Picket
PSM 90223	243674.864	7419077.834	18.195	Brass Plaque
PSM 202807	243738.982	7419202.162	21.572	Deep Driven Rod
PSM 208554	243838.139	7419481.279	37.107	Deep Driven Rod

PRELIMINARY
23/12/2020

Surveyed: NS	Date: SEPT '20		
Ref Mark: PSM 207582	R.L. 18.946		
Datum: Horiz.GDA 2020 Vert. AHD			
Zone: 56	Survey Book:NS06		
XREF: 2020-229-00.dwg			
Aux Plans:			

0 75 150m 1:7500 Plan
SCALES
FULL SIZE A3

	AMENDMENTS DESCRIPTION	DRAWN	APPR'D	DATE
A	Original Issue	ARM		

Rockhampton Regional Council

Designed	ARM	OCT '20	
Checked			
Examined			
Recomm.			

APPROVAL
RPEQ No _____ DATE _____
MANAGER INFRASTRUCTURE PLANNING

ALEXANDRA STREET EXT.
BELMONT DR TO EDENBROOK DR (PARKHURST)
ROADWORKS CONSTRUCTION
OVERALL LAYOUT PLAN

Dwg No. 2020-229-01
Sheet No. 1 of 42
Job No: C.1077722.
A

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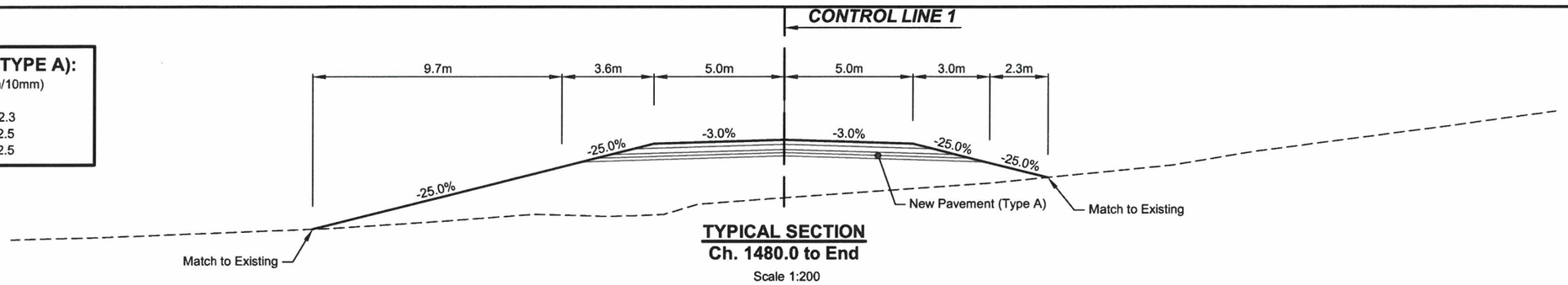
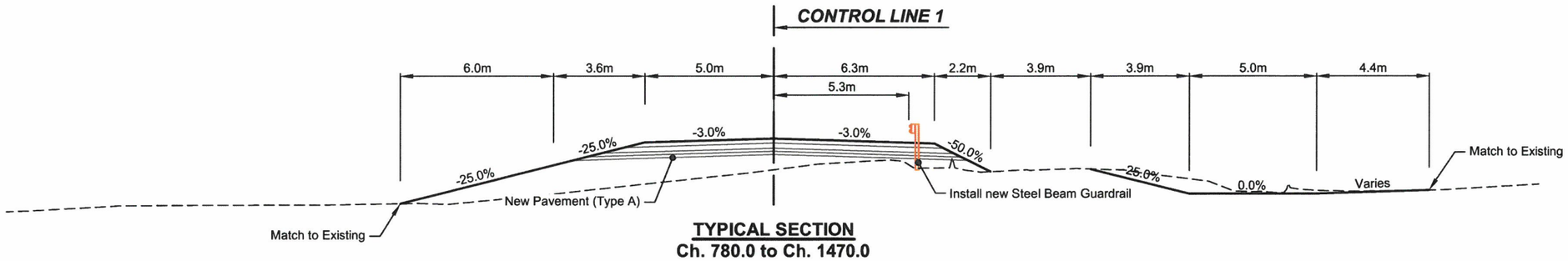
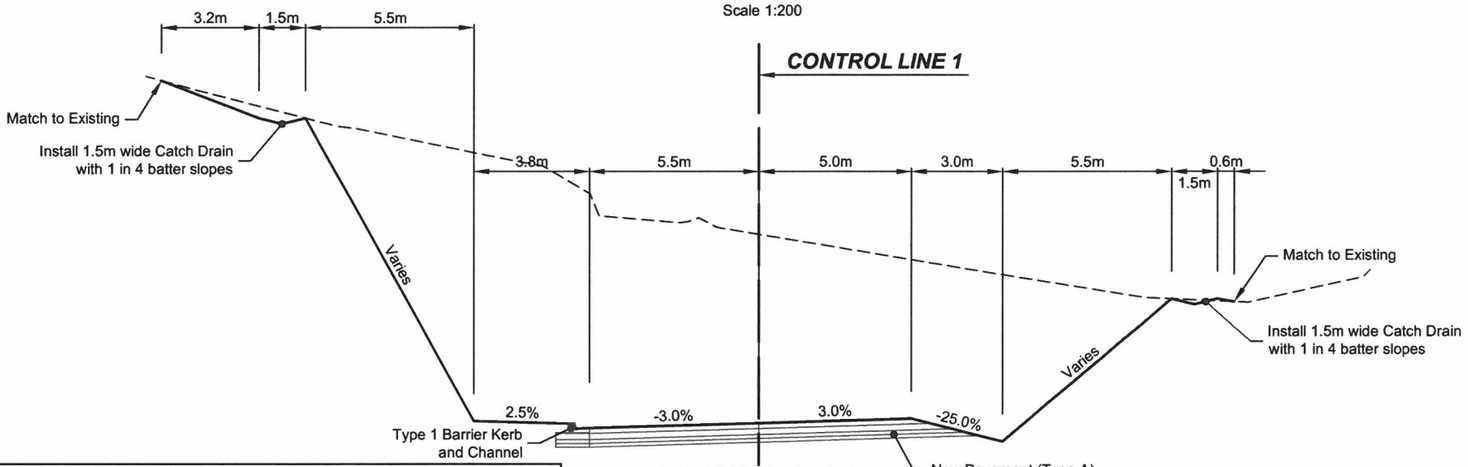
NEW PAVEMENT (TYPE A):
2 Coat Bitumen Seal (16mm/10mm)
150mm Base Course T2.1
200mm Sub Base Course T2.3
125mm Sub Base Course T2.5
125mm Sub Base Course T2.5



TYPICAL SECTION
Ch. 1480.0 to End
Scale 1:200



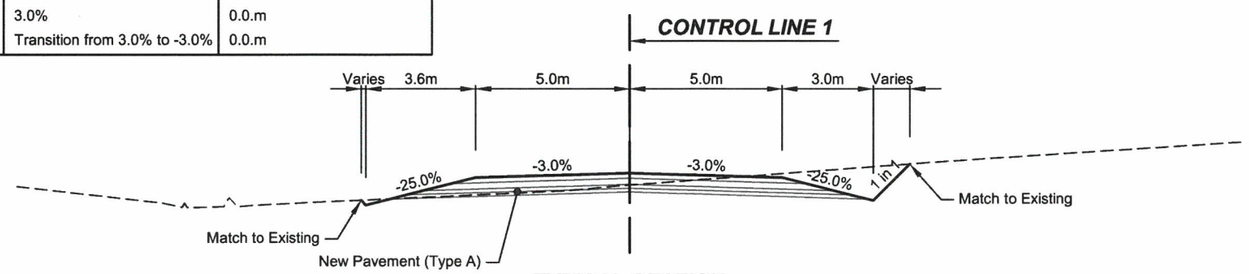
TYPICAL SECTION
Ch. 780.0 to Ch. 1470.0
Scale 1:200



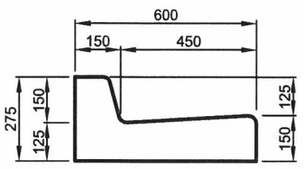
TYPICAL SECTION
Ch. 430.0 to Ch. 770.0
Scale 1:200

TABLE OF CROSSFALLS

CHAINAGE	LEFT HAND SIDE		RIGHT HAND SIDE	
	CROSSFALL	CURVE WIDENING	CROSSFALL	CURVE WIDENING
515.5 to 553.5	-3.0%	0.0m	Transition from -3.0% to 3.0%	0.0m
553.5 to 985.9	-3.0%	0.0m	3.0%	0.0.m
985.9 to 1023.9	-3.0%	0.0m	Transition from 3.0% to -3.0%	0.0.m



TYPICAL SECTION
Ch. 0.0 to Ch. 420.0
Scale 1:200



TYPE 1 - BARRIER KERB AND CHANNEL
Scale - 1:20

STANDARD KERB & CHANNEL PROFILE
(Dimensions in millimeters)

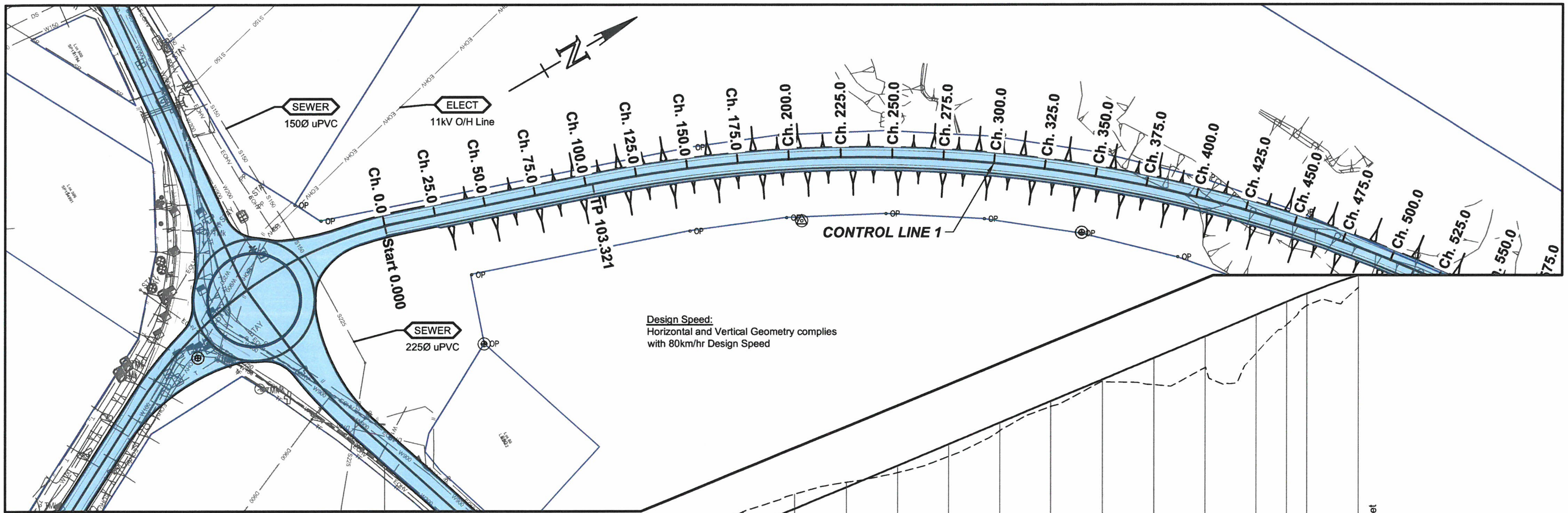
PRELIMINARY
21/12/2020

Surveyed: NS	Date: SEPT '20		AMENDMENTS DESCRIPTION	DRAWN	APPR'D	DATE	Designed	ARM	OCT '20
Ref Mark: PSM 207582	R.L. 18.946						Checked		
Datum: Horiz.GDA 2020 Vert. AHD		0 2 4m Sections 1:200					Examined		
Zone: 56	Survey Book:NS06						Recomm.		
XREF: 2020-229-00.dwg							APPROVAL		
Aux Plans:		SCALES FULL SIZE A3	A Original Issue	ARM			RPEQ No DATE		
							MANAGER INFRASTRUCTURE PLANNING		

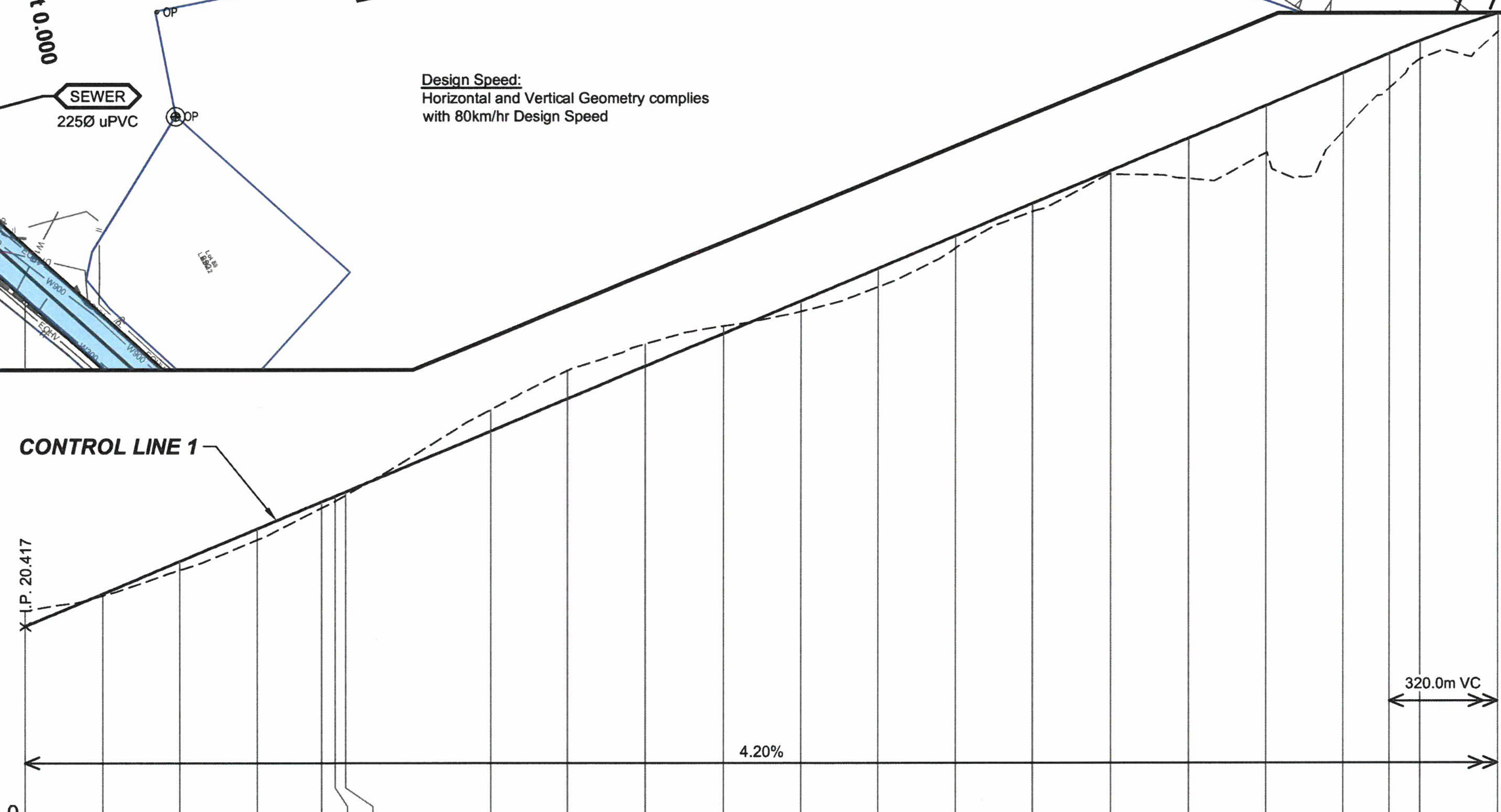
Rockhampton Regional Council

ALEXANDRA STREET EXT.
BELMONT DR TO EDENBROOK DR (PARKHURST)
ROADWORKS CONSTRUCTION
TYPICAL SECTIONS & DETAILS

Dwg No. 2020-229-02
Sheet No. 2 of 42
Job No: C.1077722.
A



All services located from plans provided by the relevant service authority and shown indicatively only.



LEGEND:

New Pavement (Type A) *
2 Coat Bitumen Seal (16mm/10mm)
150mm Base Course T2.1
200mm Sub Base Course T2.3
125mm Sub Base Course T2.5
125mm Sub Base Course T2.5

* Pavement design to be confirmed by subgrade testing during detailed design phase.

CUT / FILL	-0.496	+0.059	+0.286	+0.359	+0.199	+0.158	+0.113	-0.248	-0.693	-0.905	-0.713	-0.244
DESIGN SURFACE	20.417	21.467	22.517	23.567	24.437	24.617	24.756	25.667	26.717	27.767	28.817	29.867
EXISTING SURFACE	20.913	21.408	22.231	23.208	24.238	24.459	24.643	25.915	27.410	28.672	29.530	30.111
CHAINAGE	0.000	25.000	50.000	75.000	95.724	100.000	103.321	125.000	150.000	175.000	200.000	225.000
HORIZONTAL GEOMETRY	103.321m STRAIGHT											

CUT / FILL	+0.337	+0.597	+0.397	+0.263	+0.115	+1.301	+1.527	+1.885	+1.117	+0.587	+0.610
DESIGN SURFACE	30.917	31.967	33.017	34.067	35.117	36.167	37.217	38.267	38.897	39.303	40.196
EXISTING SURFACE	30.580	31.370	32.620	33.804	35.002	34.866	35.690	36.382	37.780	38.716	39.586
CHAINAGE	250.000	275.000	300.000	325.000	350.000	375.000	400.000	425.000	440.000	450.000	475.000
HORIZONTAL GEOMETRY				408.947m R680.0m							

PRELIMINARY
21/12/2020

Surveyed: NS Date: SEPT '20
Ref Mark: PSM 207582 R.L. 18.946
Datum: Horiz. GDA 2020
Vert. AHD
Zone: 56 Survey Book: NS06
XREF: 2020-229-00.dwg
Aux Plans:

SCALES: Plan & Horiz. 1:2000 (0 – 20 – 40m); Vertical 1:200 (0 – 2 – 4m); FULL SIZE A3

AMENDMENTS DESCRIPTION	DRAWN	APPR'D	DATE
A Original Issue	ARM		

Rockhampton Regional Council

Designed	ARM	OCT '20
Checked		
Examined		
Recomm.		

APPROVAL ____________
RPEQ No ________ DATE ________
MANAGER INFRASTRUCTURE PLANNING

ALEXANDRA STREET EXT.
BELMONT DR TO EDENBROOK DR (PARKHURST)
ROADWORKS CONSTRUCTION
WORKING PLAN - CONTROL LINE 1 - SHEET 1 OF 4

Dwg No. 2020-229-03
Sheet No. 3 of 42
Job No: C.1077722.
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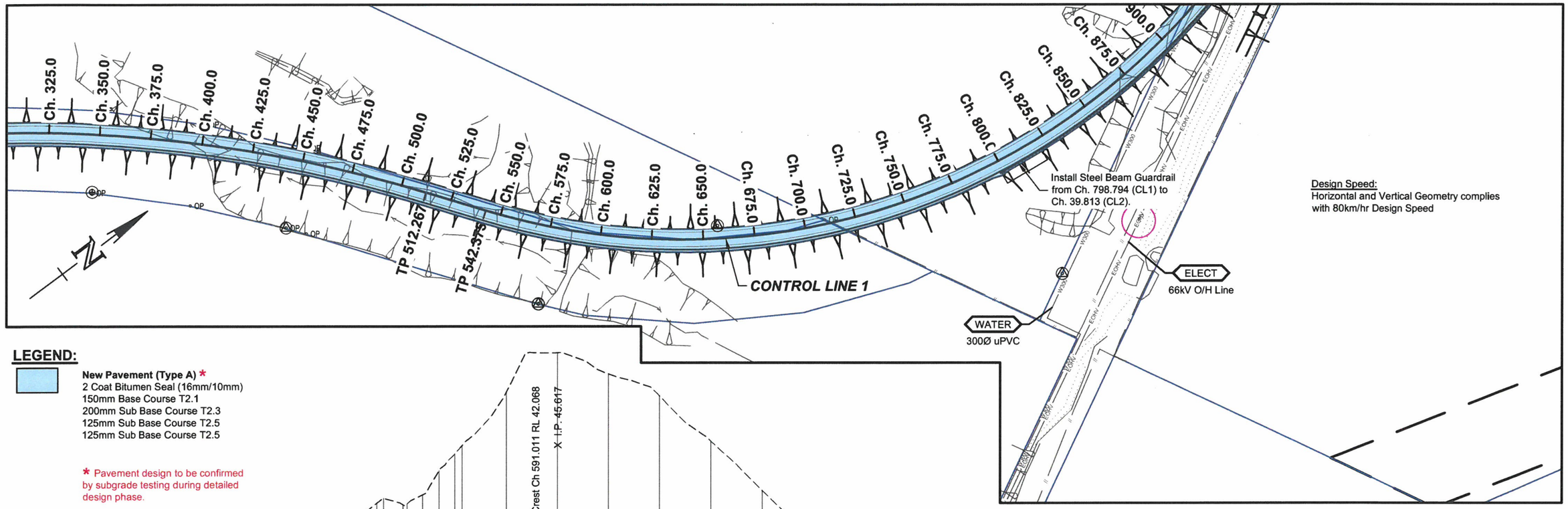
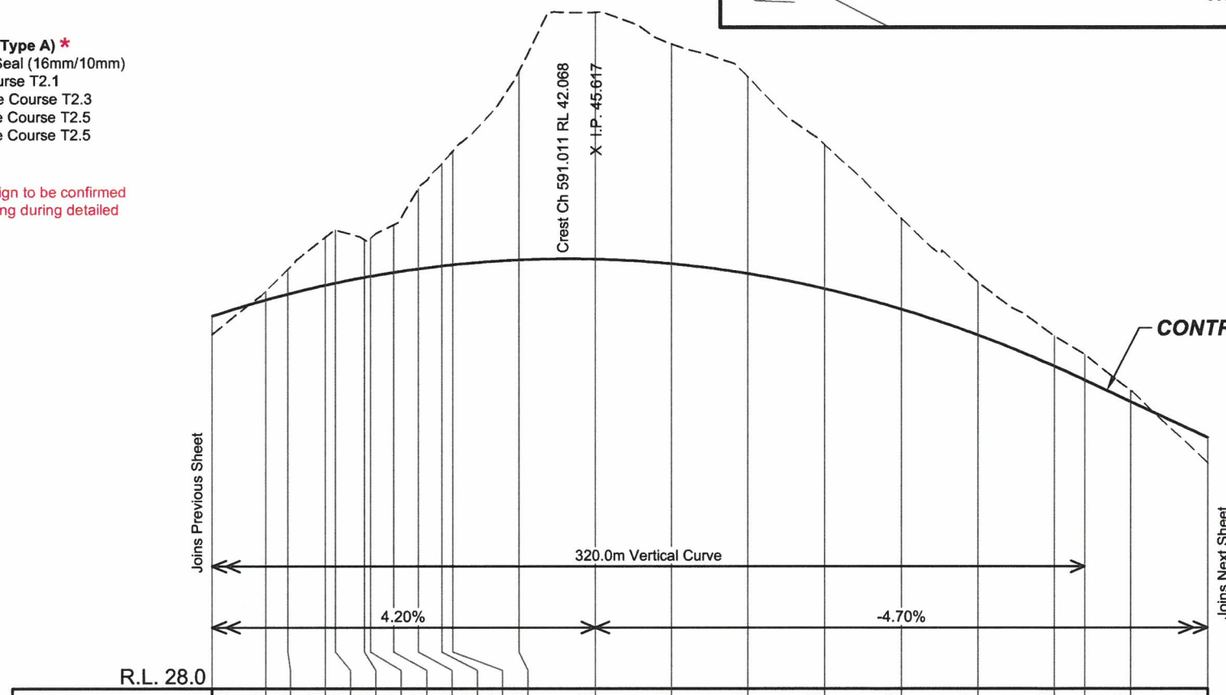


LEGEND:

New Pavement (Type A) *
2 Coat Bitumen Seal (16mm/10mm)
150mm Base Course T2.1
200mm Sub Base Course T2.3
125mm Sub Base Course T2.5
125mm Sub Base Course T2.5

* Pavement design to be confirmed by subgrade testing during detailed design phase.



CUT / FILL	+0.610	-0.288	-0.812	-1.570	-1.735	-1.235	-1.242	-1.558	-2.624	-3.348	-3.723	-6.178	-8.072	-7.190	-6.434	-4.716	-2.969	-1.737	-0.988	-0.841	-0.370	+0.830	
DESIGN SURFACE	40.196	40.722	40.916	41.206	41.276	41.462	41.497	41.625	41.739	41.834	41.873	42.032	42.057	41.907	41.584	41.087	40.416	39.571	38.553	38.097	37.392	36.217	
EXISTING SURFACE	39.586	41.010	41.728	42.776	43.011	42.697	42.739	43.183	44.363	45.182	45.596	48.210	50.129	49.097	48.018	45.803	43.385	41.308	39.541	38.938	37.762	35.387	
CHAINAGE	475.000	492.643	500.000	512.267	515.536	525.000	526.936	534.536	542.375	550.000	553.536	575.000	600.000	625.000	650.000	675.000	700.000	725.000	750.000	760.000	775.000	800.000	
HORIZONTAL GEOMETRY	408.947m R680.0m				30.108m STRAIGHT					470.234m -R330.0m													

All services located from plans provided by the relevant service authority and shown indicatively only.

CONTROL LINE 1 SETOUT TABLE

	CHAINAGE	EASTING	NORTHING	RADIUS	LENGTH	BEARING
START	0.000	243664.685	7419188.975	STRAIGHT	103.321m	18°50'19"
END	103.321	243698.048	7419286.761			
TP	103.321	243698.048	7419286.761	680.00m	408.947m	18°50'19"
TP	512.267	243935.197	7419612.364			53°17'45"
START	512.267	243935.197	7419612.364	STRAIGHT	30.108m	53°17'45"
END	542.375	243959.336	7419630.359			
TP	542.375	243959.336	7419630.359	330.00m	470.234m	53°17'45"
TP	1012.609	244052.528	7420051.622			331°39'08"
START	1012.609	244052.528	7420051.622	STRAIGHT	515.158m	331°39'08"
END	1527.767	243807.921	7420505.003			
TP	1527.767	243807.921	7420505.003	240.00m	44.890m	331°39'08"
TP	1572.657	243783.046	7420542.293			320°56'08"
START	1572.657	243783.046	7420542.293	STRAIGHT	187.400m	320°56'08"
END	1760.057	243664.947	7420687.797			
TP	1760.057	243664.947	7420687.797	405.00m	108.216m	320°56'08"
TP	1868.273	243608.718	7420779.881			336°14'42"

PRELIMINARY
21/12/2020

Surveyed: NS	Date: SEPT '20		
Ref Mark: PSM 207582	R.L. 18.946		
Datum: Horiz. GDA 2020	Vert. AHD		
Zone: 56	Survey Book: NS06		
XREF: 2020-229-00.dwg			
Aux Plans:			

SCALES: 0 20 40m Plan & Horiz. 1:2000; 0 2 4m Vertical 1:200; FULL SIZE A3

AMENDMENTS DESCRIPTION	DRAWN	APPR'D	DATE
A Original Issue	ARM		

Rockhampton Regional Council

Designed	ARM	OCT '20	
Checked			
Examined			
Recomm.			

APPROVAL_____
RPEQ No_____ DATE_____
MANAGER INFRASTRUCTURE PLANNING

ALEXANDRA STREET EXT.
BELMONT DR TO EDENBROOK DR (PARKHURST)
ROADWORKS CONSTRUCTION
WORKING PLAN - CONTROL LINE 1 - SHEET 2 OF 4

Dwg No. 2020-229-04
Sheet No. 4 of 42
Job No: C.1077722.
A

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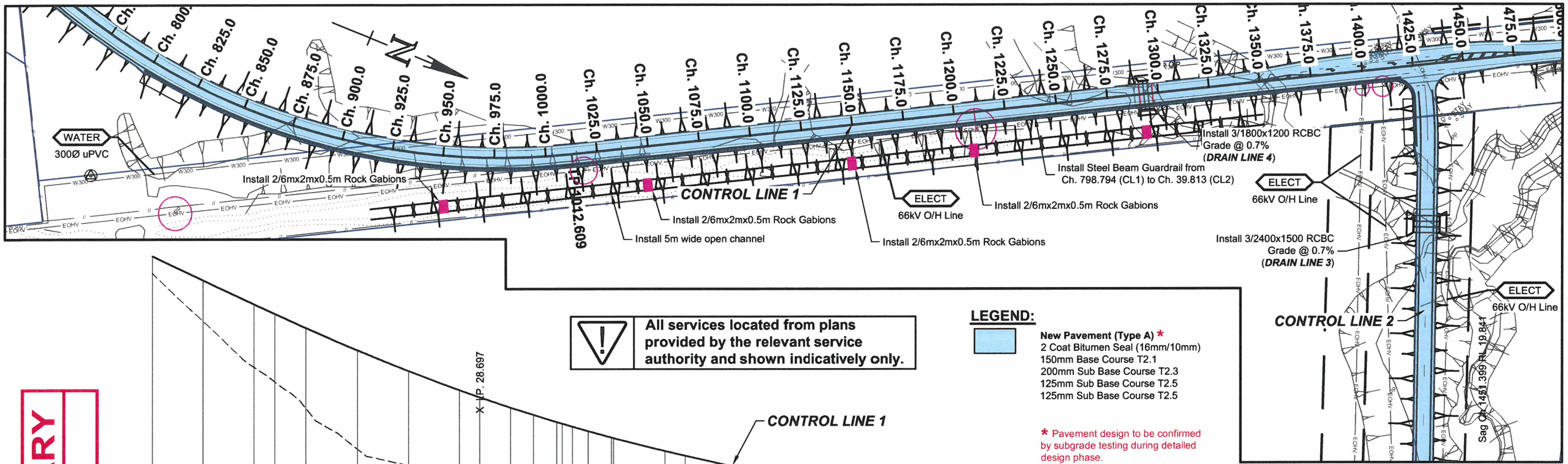


All services located from plans provided by the relevant service authority and shown indicatively only.

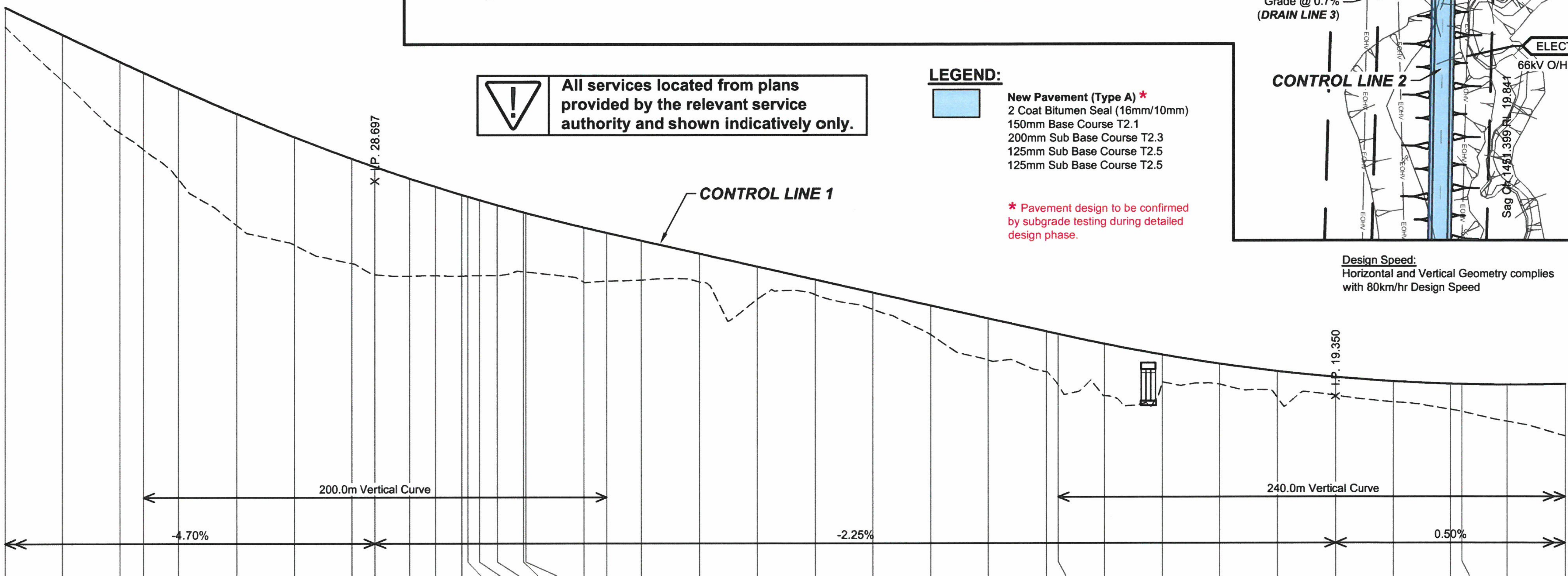
LEGEND:

New Pavement (Type A) *
2 Coat Bitumen Seal (16mm/10mm)
150mm Base Course T2.1
200mm Sub Base Course T2.3
125mm Sub Base Course T2.5
125mm Sub Base Course T2.5

* Pavement design to be confirmed by subgrade testing during detailed design phase.

Design Speed:
Horizontal and Vertical Geometry complies with 80km/hr Design Speed

PRELIMINARY
21/12/2020



R.L. 11.0

CHAINAGE	EXISTING SURFACE	DESIGN SURFACE	CUT / FILL
800.000	35.387	36.217	+0.830
825.000	33.056	35.042	+1.986
850.000	30.793	33.867	+3.074
860.000	30.073	33.397	+3.324
875.000	28.777	32.706	+3.929
900.000	26.781	31.615	+4.834
925.000	25.932	30.600	+4.668
950.000	25.128	29.662	+4.534
960.000	24.647	29.309	+4.662
975.000	24.585	28.801	+4.216
985.971	24.597	28.447	+3.850
997.371	24.583	28.095	+3.512
1000.000	24.591	28.016	+3.425
1004.971	24.600	27.869	+3.269
1012.609	24.596	27.649	+3.053
1023.971	24.764	27.335	+2.571
1025.000	24.753	27.308	+2.555
1050.000	24.313	26.676	+2.363
1060.000	24.359	26.445	+2.086
1075.000	24.402	26.107	+1.705
1100.000	24.316	25.544	+1.228
1125.000	23.563	24.981	+1.418
1150.000	23.768	24.418	+0.650
1175.000	23.126	23.854	+0.728
1200.000	22.031	23.291	+1.260
1225.000	20.925	22.728	+1.803
1250.000	20.419	22.165	+1.746
1255.000	19.839	22.053	+2.214
1275.000	19.378	21.625	+2.247
1300.000	19.930	21.155	+1.225
1325.000	19.870	20.757	+0.887
1350.000	19.299	20.431	+1.132
1375.000	19.379	20.176	+0.797
1400.000	19.095	19.992	+0.897
1425.000	18.774	19.881	+1.107
1430.003	18.681	19.867	+1.186
1450.000	18.253	19.841	+1.588
1475.000	17.625	19.065	+1.440

HORIZONTAL GEOMETRY: 470.234m -R330.0m (Ch. 800.000 to 1012.609); 515.158m STRAIGHT (Ch. 1012.609 to 1475.000)

Surveyed: NS	Date: SEPT '20
Ref Mark: PSM 207582	R.L. 18.946
Datum: Horiz. GDA 2020, Vert. AHD	
Zone: 56	Survey Book: NS06
XREF: 2020-229-00.dwg	
Aux Plans:	

SCALES: 0 20 40m Plan & Horiz. 1:2000; 0 2 4m Vertical 1:200; FULL SIZE A3

	AMENDMENTS DESCRIPTION	DRAWN	APPR'D	DATE
A	Original Issue	ARM		

Rockhampton Regional Council

Designed	ARM	OCT '20
Checked		
Examined		
Recomm.		

APPROVAL______
RPEQ No______ DATE______
MANAGER INFRASTRUCTURE PLANNING

ALEXANDRA STREET EXT.
BELMONT DR TO EDENBROOK DR (PARKHURST)
ROADWORKS CONSTRUCTION
WORKING PLAN - CONTROL LINE 1 - SHEET 3 OF 4

Dwg No. 2020-229-05
Sheet No. 5 of 42
Job No: C.1077722.
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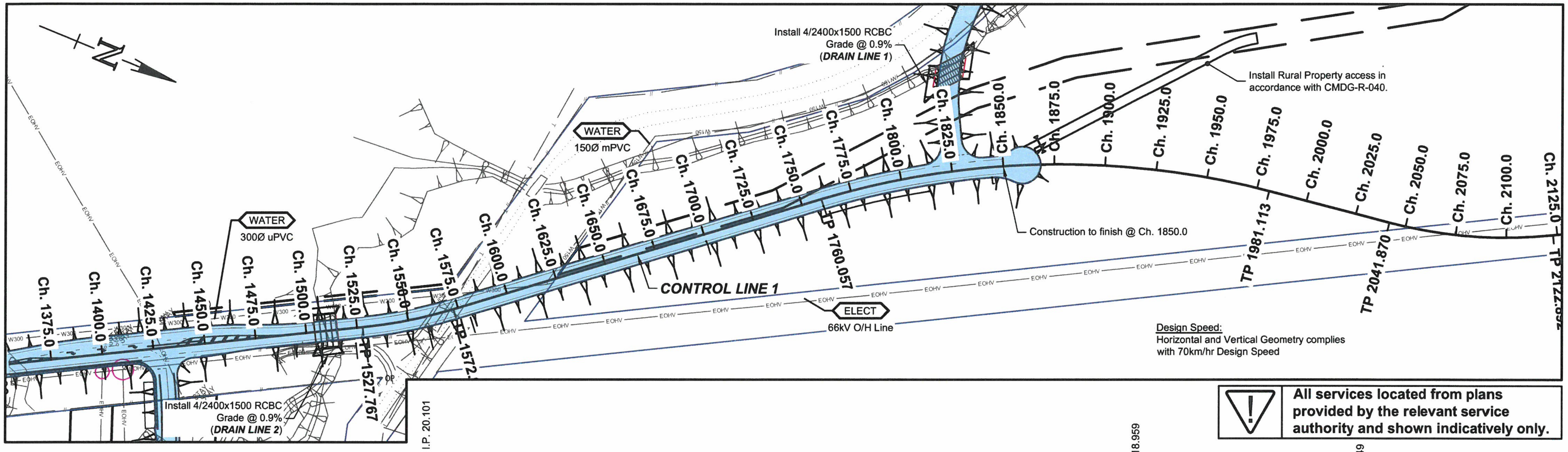
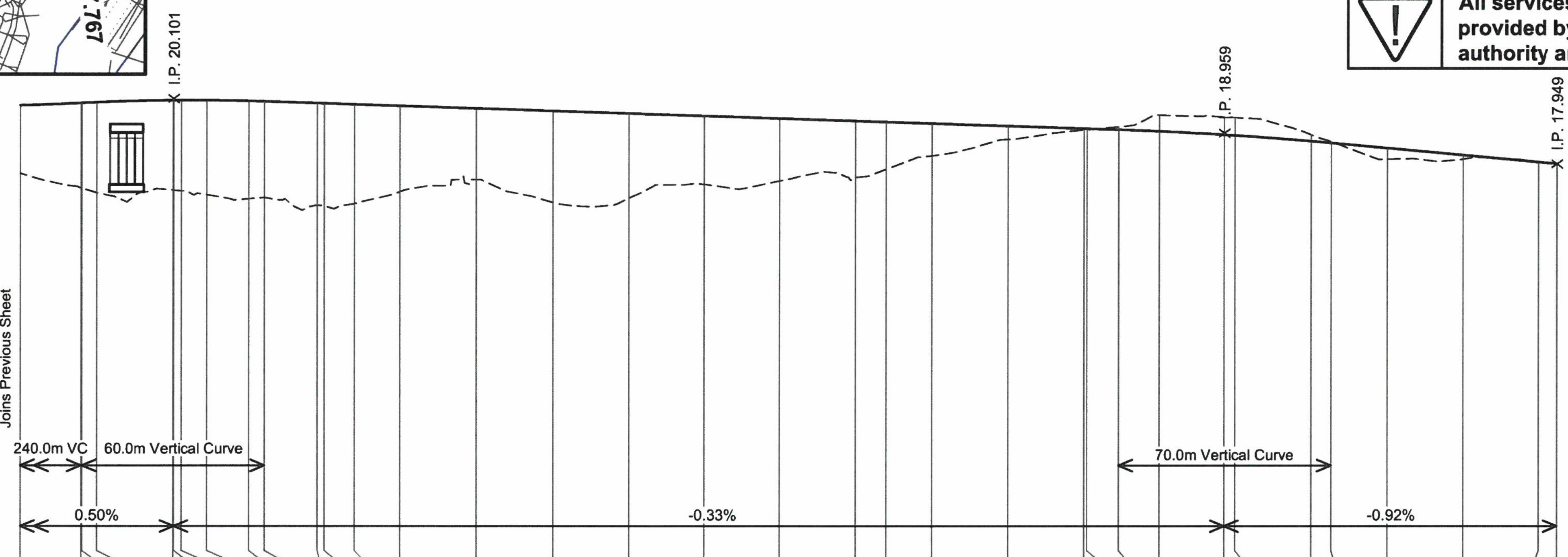


All services located from plans provided by the relevant service authority and shown indicatively only.

LEGEND:

New Pavement (Type A) *
2 Coat Bitumen Seal (16mm/10mm)
150mm Base Course T2.1
200mm Sub Base Course T2.3
125mm Sub Base Course T2.5
125mm Sub Base Course T2.5

* Pavement design to be confirmed by subgrade testing during detailed design phase.



CUT / FILL	+2.248	+2.800	+2.809	+2.982	+2.959	+2.961	+2.987	+3.115	+3.224	+3.166	+3.368	+3.380
DESIGN SURFACE	19.873	19.950	19.951	19.973	20.039	20.039	20.041	20.040	20.018	20.002	19.945	19.937
EXISTING SURFACE	17.625	17.150	17.142	16.991	17.080	17.078	17.054	16.925	16.794	16.836	16.577	16.557
CHAINAGE	1475.000	1495.000	1495.236	1500.000	1525.000	1525.236	1527.767	1536.152	1550.000	1555.236	1572.657	1575.000

CUT / FILL	+3.272	+2.828	+2.351	+3.016	+2.796	+2.252	+2.063	+1.863	+1.552	+1.065	+0.443	+0.052
DESIGN SURFACE	19.904	19.854	19.772	19.689	19.607	19.524	19.442	19.359	19.326	19.277	19.194	19.112
EXISTING SURFACE	16.632	17.026	17.421	16.673	16.811	17.272	17.379	17.496	17.774	18.212	18.751	19.060
CHAINAGE	1584.881	1600.000	1625.000	1650.000	1675.000	1700.000	1725.000	1750.000	1760.057	1775.000	1800.000	1825.000

CUT / FILL	+0.041	-0.092	-0.532	-0.583	-0.585	-0.209	-0.043	+0.368	+0.136	-0.012	+0.000
DESIGN SURFACE	19.109	19.074	19.022	18.907	18.884	18.694	18.636	18.465	18.235	18.005	17.949
EXISTING SURFACE	19.068	19.166	19.554	19.490	19.469	18.903	18.679	18.097	18.099	18.017	17.949
CHAINAGE	1825.868	1836.475	1850.000	1871.475	1875.000	1900.000	1906.475	1925.000	1950.000	1975.000	1981.113

HORIZONTAL GEOMETRY: 515.158m STRAIGHT | 44.890m -R240.0m | 187.400m STRAIGHT | 221.055m R405.0m

PRELIMINARY
21/12/2020

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Surveyed: NS	Date: SEPT '20		
Ref Mark: PSM 207582	R.L. 18.946		
Datum: Horiz. GDA 2020	Vert. AHD		
Zone: 56	Survey Book: NS06		
XREF: 2020-229-00.dwg			
Aux Plans:			

SCALES: 0 20 40m 1:2000 Plan & Horiz. — 0 2 4m 1:200 Vertical — FULL SIZE A3

	AMENDMENTS DESCRIPTION	DRAWN	APPR'D	DATE
A	Original Issue	ARM		

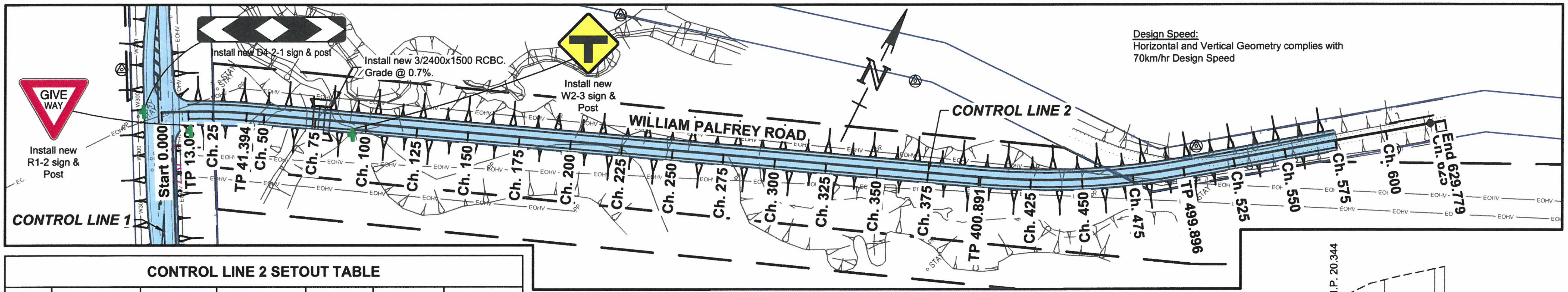
Rockhampton Regional Council

Designed	ARM	OCT '20
Checked		
Examined		
Recomm.		

APPROVAL______
RPEQ No______ DATE______
MANAGER INFRASTRUCTURE PLANNING

ALEXANDRA STREET EXT.
BELMONT DR TO EDENBROOK DR (PARKHURST)
ROADWORKS CONSTRUCTION
WORKING PLAN - CONTROL LINE 1 - SHEET 4 OF 4

Dwg No. 2020-229-06
Sheet No. 6 of 42
Job No: C.1077722.
A



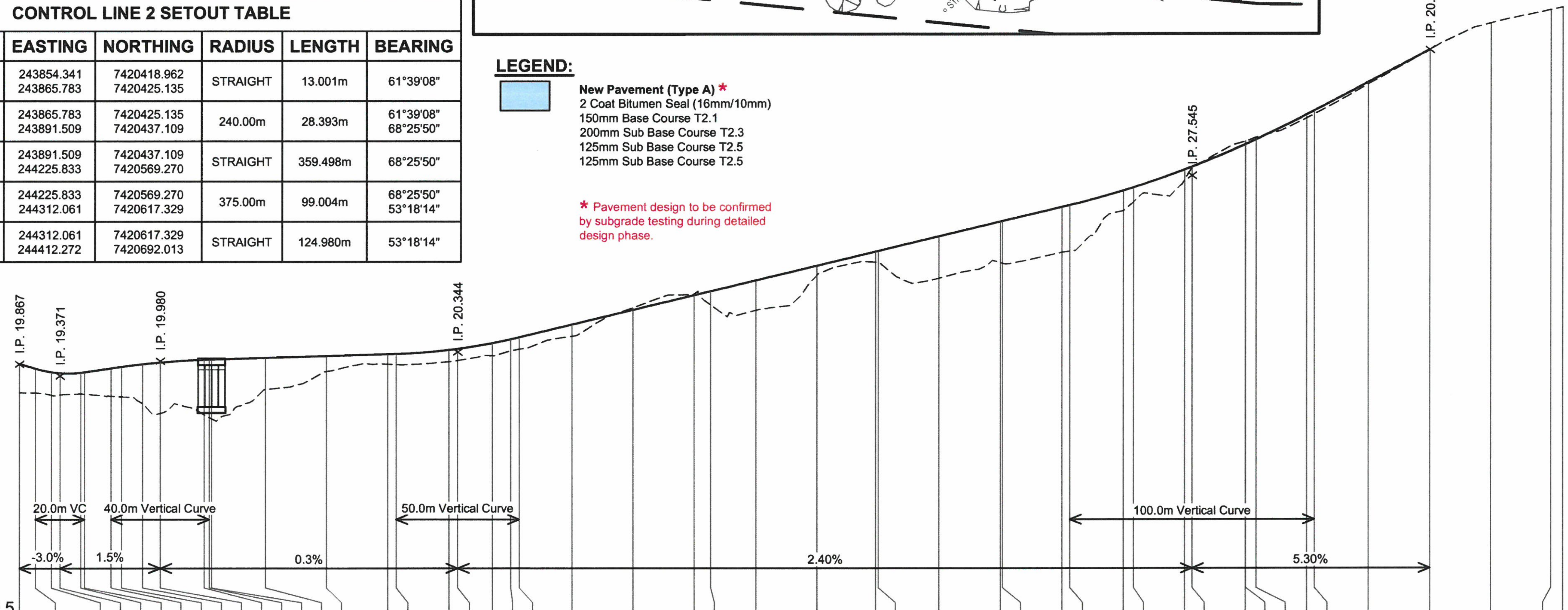
CONTROL LINE 2 SETOUT TABLE

	CHAINAGE	EASTING	NORTHING	RADIUS	LENGTH	BEARING
START END	0.000 13.001	243854.341 243865.783	7420418.962 7420425.135	STRAIGHT	13.001m	61°39'08"
TP TP	13.001 41.394	243865.783 243891.509	7420425.135 7420437.109	240.00m	28.393m	61°39'08" 68°25'50"
START END	41.394 400.891	243891.509 244225.833	7420437.109 7420569.270	STRAIGHT	359.498m	68°25'50"
TP TP	400.891 499.896	244225.833 244312.061	7420569.270 7420617.329	375.00m	99.004m	68°25'50" 53°18'14"
START END	499.896 624.875	244312.061 244412.272	7420617.329 7420692.013	STRAIGHT	124.980m	53°18'14"

LEGEND:

New Pavement (Type A) *
2 Coat Bitumen Seal (16mm/10mm)
150mm Base Course T2.1
200mm Sub Base Course T2.3
125mm Sub Base Course T2.5
125mm Sub Base Course T2.5

* Pavement design to be confirmed by subgrade testing during detailed design phase.



CHAINAGE	EXISTING SURFACE	DESIGN SURFACE	CUT / FILL
0.000	18.681	19.867	+1.186
6.533	18.676	19.671	+0.995
13.001	18.583	19.524	+0.941
16.533	18.593	19.484	+0.891
25.000	18.638	19.501	+0.863
26.533	18.627	19.521	+0.894
37.083	18.541	19.680	+1.139
41.394	18.515	19.741	+1.226
50.000	18.234	19.848	+1.614
57.083	17.842	19.920	+2.078
75.000	17.780	20.033	+2.253
77.083	17.662	20.040	+2.378
78.015	17.616	20.042	+2.426
100.000	18.799	20.108	+1.309
125.000	19.554	20.183	+0.629
150.000	19.849	20.258	+0.409
153.462	19.831	20.269	+0.438
175.000	19.951	20.431	+0.480
178.462	19.997	20.475	+0.478
192.614	20.190	20.708	+0.518
200.000	20.395	20.864	+0.469
203.462	20.459	20.944	+0.485
225.000	20.985	21.462	+0.477
250.000	22.153	22.063	-0.090
275.000	22.706	22.663	-0.043
281.614	22.274	22.822	+0.548
300.000	22.043	23.264	+1.221
325.000	23.474	23.865	+0.391
348.872	24.011	24.439	+0.428
350.000	24.001	24.466	+0.465
375.000	23.354	25.067	+1.713
400.000	23.993	25.667	+1.674
400.891	23.967	25.689	+1.722
425.000	24.412	26.268	+1.856
428.122	24.458	26.343	+1.885
450.000	26.113	26.938	+0.825
454.028	26.469	27.063	+0.594
475.000	27.363	27.788	+0.425
478.122	27.846	27.907	+0.061
499.896	28.943	28.814	-0.129
500.000	28.946	28.819	-0.127
504.337	29.103	29.016	-0.087
525.000	29.888	30.030	+0.142
528.122	30.051	30.195	+0.144
550.000	31.274	31.354	+0.080
575.000	32.685	32.679	-0.006
600.000	33.764	-	-
625.000	34.307	-	-
629.779	34.411	-	-

HORIZONTAL GEOMETRY: 13.001m STRAIGHT | 28.393m R240.0m | 359.498m STRAIGHT | 99.004m -R375.0m | 129.883m STRAIGHT

PRELIMINARY
21/12/2020

Surveyed: NS	Date: SEPT '20
Ref Mark: PSM 207582	R.L. 18.946
Datum: Horiz. GDA 2020, Vert. AHD	
Zone: 56	Survey Book: NS06
XREF: 2020-229-00.dwg	
Aux Plans:	

SCALES: 0 20 40m 1:2000 Plan & Horiz. — 0 2 4m 1:200 Vertical — FULL SIZE A3

	AMENDMENTS DESCRIPTION	DRAWN	APPR'D	DATE
A	Original Issue	ARM		

Rockhampton Regional Council

Designed	ARM	OCT '20
Checked		
Examined		
Recomm.		

APPROVAL______
RPEQ No______ DATE______
MANAGER INFRASTRUCTURE PLANNING

ALEXANDRA STREET EXT.
BELMONT DR TO EDENBROOK DR (PARKHURST)
ROADWORKS CONSTRUCTION
WORKING PLAN - CONTROL LINE 2

Dwg No. 2020-229-07
Sheet No. 7 of 42
Job No: C.1077722.
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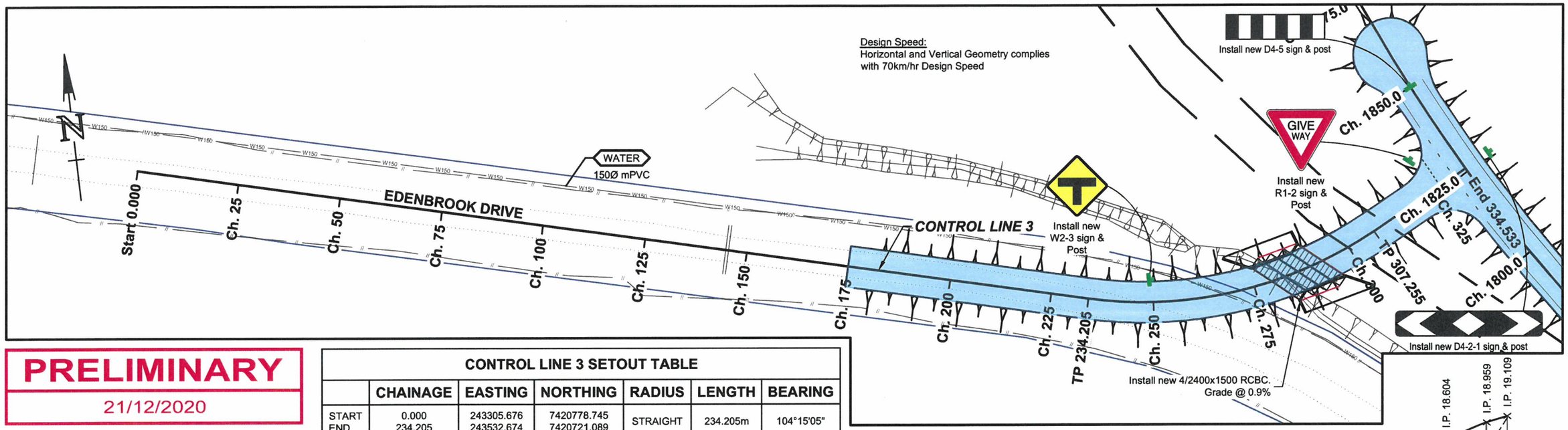


PRELIMINARY

21/12/2020

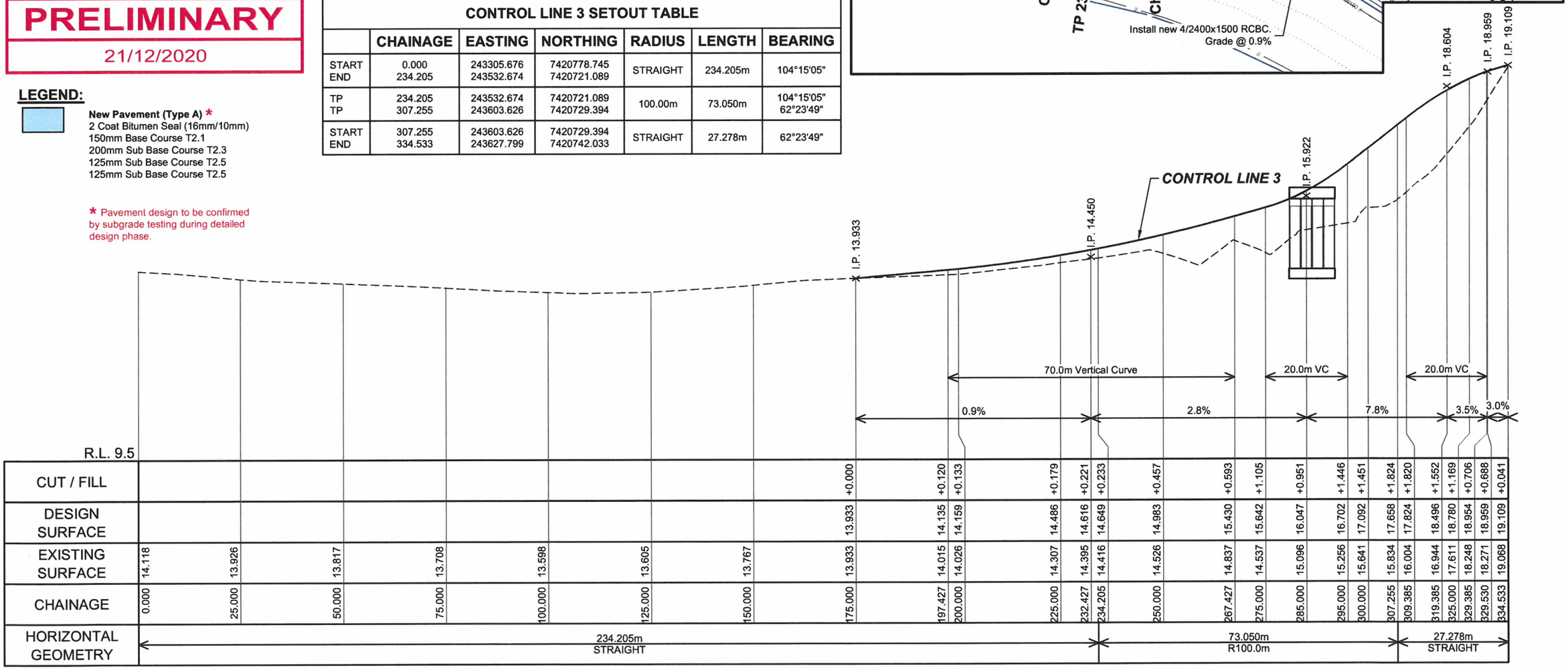
LEGEND:

New Pavement (Type A) *
2 Coat Bitumen Seal (16mm/10mm)
150mm Base Course T2.1
200mm Sub Base Course T2.3
125mm Sub Base Course T2.5
125mm Sub Base Course T2.5

* Pavement design to be confirmed by subgrade testing during detailed design phase.

CONTROL LINE 3 SETOUT TABLE

	CHAINAGE	EASTING	NORTHING	RADIUS	LENGTH	BEARING
START END	0.000 234.205	243305.676 243532.674	7420778.745 7420721.089	STRAIGHT	234.205m	104°15'05"
TP TP	234.205 307.255	243532.674 243603.626	7420721.089 7420729.394	100.00m	73.050m	104°15'05" 62°23'49"
START END	307.255 334.533	243603.626 243627.799	7420729.394 7420742.033	STRAIGHT	27.278m	62°23'49"



CHAINAGE	EXISTING SURFACE	DESIGN SURFACE	CUT / FILL
0.000	14.118	13.933	+0.000
25.000	13.926		
50.000	13.817		
75.000	13.708		
100.000	13.598		
125.000	13.605		
150.000	13.767		
175.000	13.933	13.933	+0.000
197.427	14.015	14.135	+0.120
200.000	14.026	14.159	+0.133
225.000	14.307	14.486	+0.179
232.427	14.395	14.616	+0.221
234.205	14.416	14.649	+0.233
250.000	14.526	14.983	+0.457
267.427	14.837	15.430	+0.593
275.000	14.537	15.642	+1.105
285.000	15.096	16.047	+0.951
295.000	15.256	16.702	+1.446
300.000	15.641	17.092	+1.451
307.255	15.834	17.658	+1.824
309.385	16.004	17.824	+1.820
319.385	16.944	18.496	+1.552
325.000	17.611	18.780	+1.169
329.385	18.248	18.954	+0.706
329.530	18.271	18.959	+0.688
334.533	19.068	19.109	+0.041

Surveyed: NS	Date: SEPT '20		AMENDMENTS DESCRIPTION	DRAWN	APPR'D	DATE
Ref Mark: PSM 207582	R.L. 18.946					
Datum: Horiz. GDA 2020 Vert. AHD						
Zone: 56	Survey Book: NS06					
XREF: 2020-229-00.dwg						
Aux Plans:			A Original Issue	ARM		

0 10 20m 1:1000 Plan & Horiz.
0 1.0 2.0m 1:100 Vertical
SCALES FULL SIZE A3

Rockhampton Regional Council

Designed	ARM	OCT '20
Checked		
Examined		
Recomm.		

APPROVAL_____
RPEQ No_____ DATE_____
MANAGER INFRASTRUCTURE PLANNING

ALEXANDRA STREET EXT.

BELMONT DR TO EDENBROOK DR (PARKHURST)
ROADWORKS CONSTRUCTION
WORKING PLAN - CONTROL LINE 3

Dwg No. 2020-229-08
Sheet No. 8 of 42
Job No: C.1077722.
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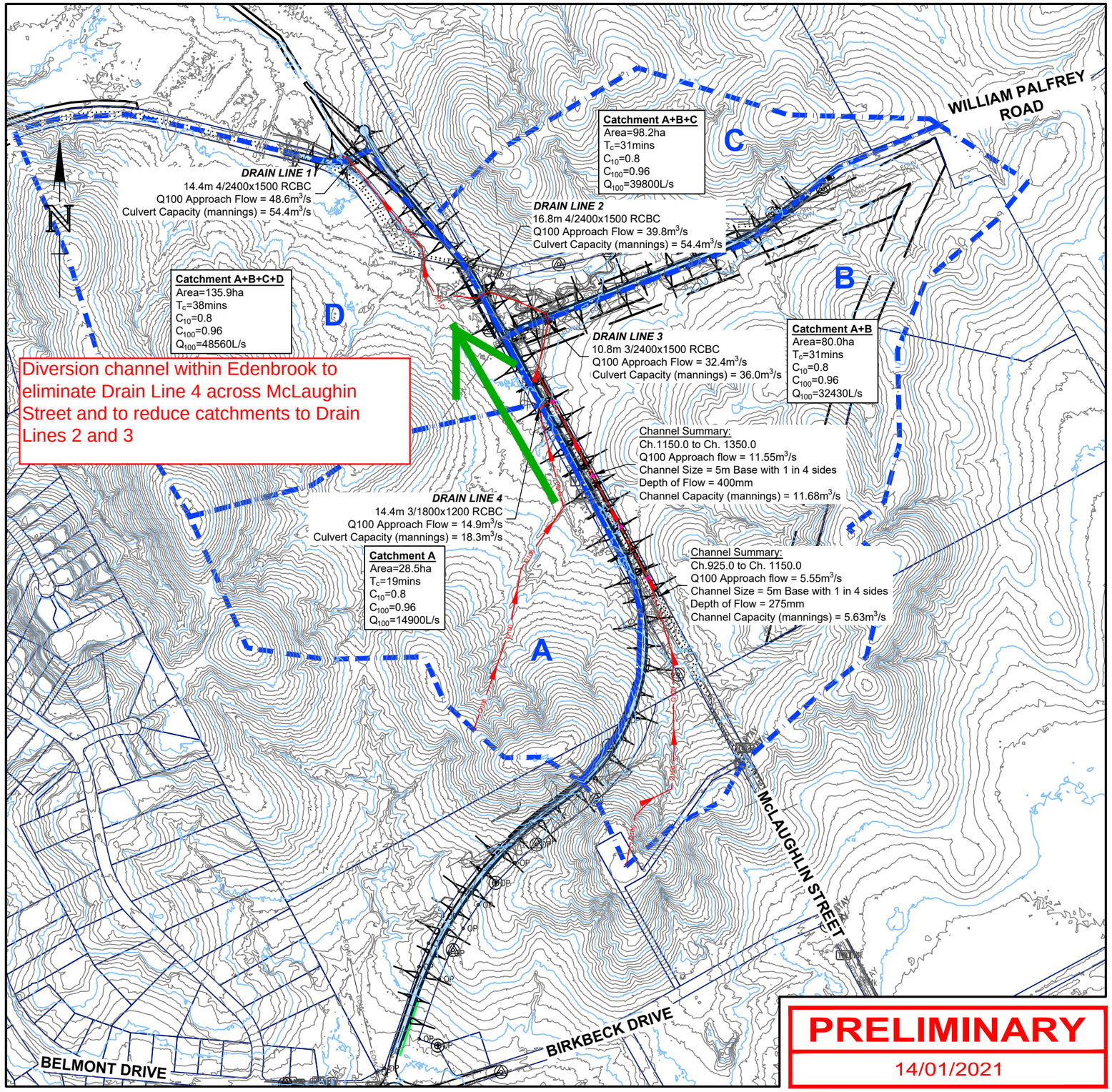
LEGEND:

Catchment Boundary



PRELIMINARY

14/01/2021

Surveyed: NS	Date: SEPT '20	AMENDMENTS DESCRIPTION	DRAWN	APPR'D	DATE
Ref Mark: PSM 207582	R.L. 18.946				
Datum: Horiz.GDA 2020 Vert. AHD					
Zone: 56	Survey Book:NS06				
XREF: 2020-229-00.dwg					
Aux Plans:					
SCALES	FULL SIZE A3	A Original Issue	ARM		

0 75 150m Plan 1:7500

Rockhampton Regional Council

Designed	ARM	OCT '20
Checked		
Examined		
Recomm.		

APPROVAL _____

RPEQ No _____ DATE _____

MANAGER INFRASTRUCTURE PLANNING

ALEXANDRA STREET EXT.

BELMONT DR TO EDENBROOK DR (PARKHURST)

ROADWORKS CONSTRUCTION

DRAINAGE CATCHMENT PLAN

Dwg No. 2020-229-09

Sheet No. 9 of 42

Job No: C.1077722.

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