

# Technical Memorandum Pebble Creek

PLANS AND DOCUMENTS  
referred to in the PDA  
DEVELOPMENT APPROVAL

Approval no: DEV2017/887

Date: 03 December 2020



TO: Steve Korn – Orchard Property Group  
Marco Bonotto – Economic Development Queensland  
Matt Walsh – Logan Water

---

FROM: Troy Schultz – PEAKURBAN

---

SUBJECT: Rising Main – Alignment Options Assessment

---

DATE: 25 September 2018

---

OUR REFERENCE: 18-0042 - PEBBLE CREEK - RISING MAIN OPTIONS - TECHNICAL MEMORANDUM - 13-9-18.DOCX

---

## 1 INTRODUCTION

We refer to the abovementioned project and recent discussions in relation to the Rising Main required to ultimately service the development and broader catchment. We provide this technical memorandum for review and discussion by all parties with the intent to agree on a preferred option and move forward with the design of this infrastructure.

The following are relevant details associated with each option.

## 2 OPTION A1 AND A2

Option A is generally as per the alignment approved under the Development Approval and is as shown attached. Option A1 and A2 differ only in the proposed vertical alignment, i.e. Option A1 incorporates a deeper section of main which would be required to be directional drilled and Option A2 is proposed at nominal 1m depth to be installed via conventional trenching. These options and their key components are summarised as follows:

- Option A1
  - Approximately 2200m in total length.
  - Generally proposed to be installed at minimum cover to existing and proposed development levels.
  - Section of main from approximately CH 360 to 820 proposed to be deepened to reduce the high point to lower than the discharge level. This section would be installed via directional drilling. However, the practicality of installing this section via directional drilling is compromised by the available land at CH 560 to 600 and the inability of directional drilling to be completed at a radius of less than 400m.
  - The following appurtenances would be required:
    - Air release valve at CH 1220 at RL46.7m, being lower than the discharge.
    - Scour valve at CH 1020.
    - Air release valve at CH 350 at RL53.0m, being lower than the discharge.
    - Scour valve at CH 40 at the railway crossing.
- Option A2
  - Approximately 2200m in total length.



- Proposed to be installed at minimum cover to existing and proposed development levels.
- The following appurtenances would be required:
  - Air release valve at CH 1220 at RL46.7m, being lower than the discharge.
  - Scour valve at CH 1020.
  - Air release valve at CH 550 at RL59.0m, being higher than the discharge. Odour treatment would be required at this point to a greater degree due to the large volumes of air required to be exhausted from the main during pumping operation.
  - Scour valve at CH 40 at the railway crossing.
- The connection point to the SPS157 Rising Main for both Option A1 and A2 is as per Drawing Number LS305-05-S-SKE-CI-8560-Rev A attached.

Option A1 is not considered viable due to the challenges of directional drilling and the land pinch point mentioned above.

Option A2 is not considered viable due to the high point at CH 550 and associated ongoing maintenance implications.

Whilst neither options are considered viable, they have been included for discussion and comparison purposes.

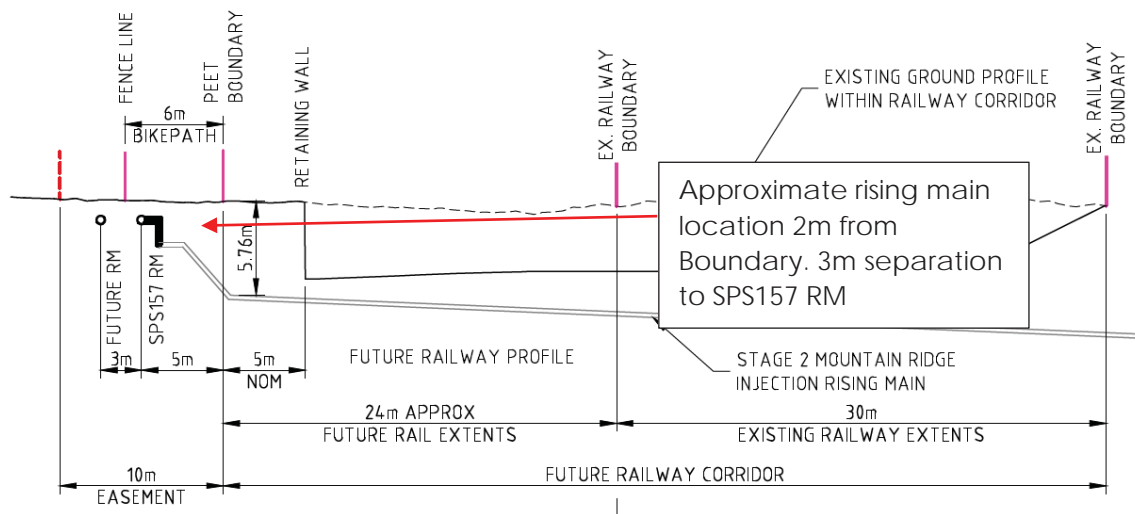
### 3 OPTION B

Option B is generally as per Option A2, however instead of a direct connection to the SPS157 Rising Main, it is proposed to extend the rising main to the ultimate discharge point of SPS157 also. Whilst this means additional length of main, there are benefits which make this a feasible option as described following.

Option B and its key components are summarised as follows:

- Approximately 2200m in length plus an additional 350m in parallel to SPS157 Rising Main.
- Proposed to be installed at minimum cover to existing and proposed development levels.
- The following appurtenances would be required:
  - Air release valve at CH 1220 at RL46.7m, being lower than the discharge.
  - Scour valve at CH 1020.
  - Air release valve at CH 550 at RL59.0m, being higher than the discharge. Odour treatment may be required at this point also, subject to further assessment.
  - Scour valve at CH 40 at the railway crossing.
  - Scours at same points as required for the SPS157 Rising Main.
- The key feature of Option B is that by discharging separately to SPS157 Rising Main, a barometric riser arrangement can be installed immediately prior to the discharge manhole which will ensure the rising main remains full and does not drain out during normal operation. This minimises potential issues such as:
  - repeated filling and emptying of the sewer rising main during operation;
  - low velocities at low points resulting in suspended solids settling; and
  - pump seeing a varied head during operation.

- On review of the corridor allocated for the SPS157 Rising Main and it's future duplication, it is envisaged that the main proposed as per this Option can be accommodated within the already allocated corridor, as follows:



This option is considered viable from a technical and physical/land perspective.

#### 4 OPTION C

Option C is an alternative alignment which has been investigated due to potential to remove the possible high point greater than the discharge level, or to reduce the requirements for directional drilling. Option C is shown generally as attached.

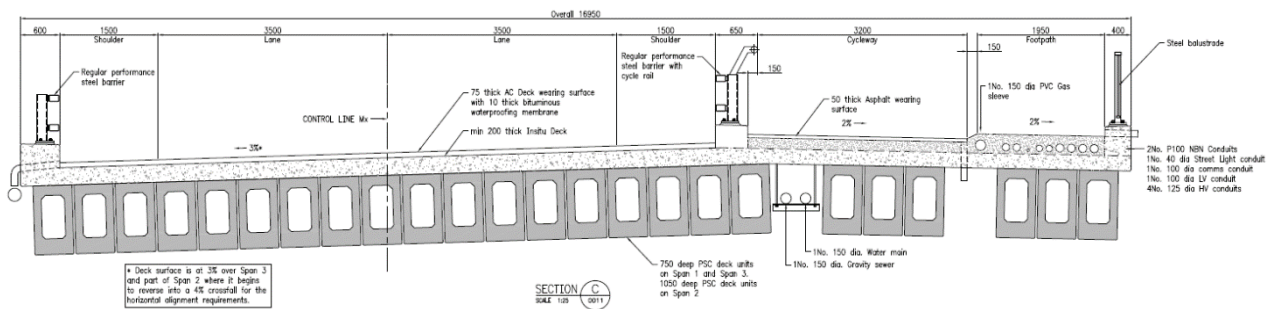
These options and their key components are summarised as follows:

- Option A1
  - Approximately 1650m in total length.
  - Generally proposed to be installed at minimum cover to existing and proposed development levels.
  - Section of main from approximately CH 1140 to 1450 proposed to be deepened to reduce the high point to lower than the discharge level. This section would be installed via directional drilling.
  - The following appurtenances would be required:
    - Air release valve at CH 450 at RL49.5m, being lower than the discharge.
    - Scour valve at CH 720.
    - Air release valve at CH 1450 at RL53.0m, being lower than the discharge.
    - Scour valve at CH 1600 at the railway crossing prior to connection to the SPS157 Rising Main.

Further to the above, it is noted that significant risks are associated with construction in Mountain Ridge Road which would need to be further investigated. This includes management of property access during construction, existing services and ground conditions.

Further to the above, the rising main would need to be accommodated in the proposed bridge across Flagstone Creek. The bridge has been developed to maximise efficiency and minimise costs.

Cross section is shown below and will likely need adjusting which will result in additional cost implications.



Whilst this option is considered viable, there are associated risks and cost implications which need to be considered.

## 5 OPTION D

Option D within this assessment is what was previously submitted as Option 2 within the Sewer IMP prepared by Morton Urban Solutions. This option is shown attached and consists of construction of new rising main, upgrade of existing pump station and upgrading of an existing rising main. The majority of these works are through existing areas and as such are considered to be prohibitive due to potential design/construction issues and cost.

## 6 OPTION E

Option E is partially as per Option A1/A2/B, however crosses the neighbouring property to the West before direct connection to the SPS157 Rising Main. Whilst this means additional length of main, there are benefits which make this a feasible option as described following.

Option B and it's key components are summarised as follows:

- Approximately 1700m in total length.
- Proposed to be installed at minimum cover to existing and proposed development levels. However, it is likely that some filling will be required to facilitate an appropriate vertical grading.

Whilst Option E is viable from a physical and technical perspective, the major barrier for this option will be securing the neighbouring owner's consent. It is understood that Logan City Council will attempt to make contact with the owner. If the owner is agreeable, the next challenge will be to select an appropriate alignment which may be difficult due to the unknown development layout for the site, i.e. selection of the alignment will be difficult to determine with no future impact on development.



## 7 COST COMPARISON

We have undertaken preliminary estimates of cost for each option, as attached. We note that whilst these costings are suitable for comparison purposes they are not necessarily representative of the final cost as this would be subject to further investigation, detailed design and tendering.

The preliminary estimate of costs of each option are summarised as follows (excluding contingency, consultants cost and GST):

Option	Estimated Construction Cost (excl. GST)
A1	\$1,374,425.00
A2	\$853,175.00
B	\$962,987.50
C	\$1,079,675.00
D	\$1,581,510.00
E	\$732,025.00

## 8 CLOSING

In reviewing the options presented above from both a technical and cost perspective, it is considered that three options are viable, being Option B, Option C and Option E. Option A1 is cost prohibitive and unlikely to be viable due to directional drilling constraints, Option A2 is deficient from a technical perspective due to the high point and Option D is cost prohibitive and high risk (and likely not commensurate with the ultimate strategy for the area).

Option E is likely the preferred option however will be subject to adjoining owner agreement, which is expected to be difficult to obtain. Option B, whilst technically feasible and cost effective, is likely to not be acceptable to Council's Operations team. Option C, whilst not without challenges, is considered to be the least hindered options of those considered viable.



SPS157 Transfer Rising Main

SPS157 Transfer Rising Main Discharge Point

Rising Main Option C

Rising Main Option E

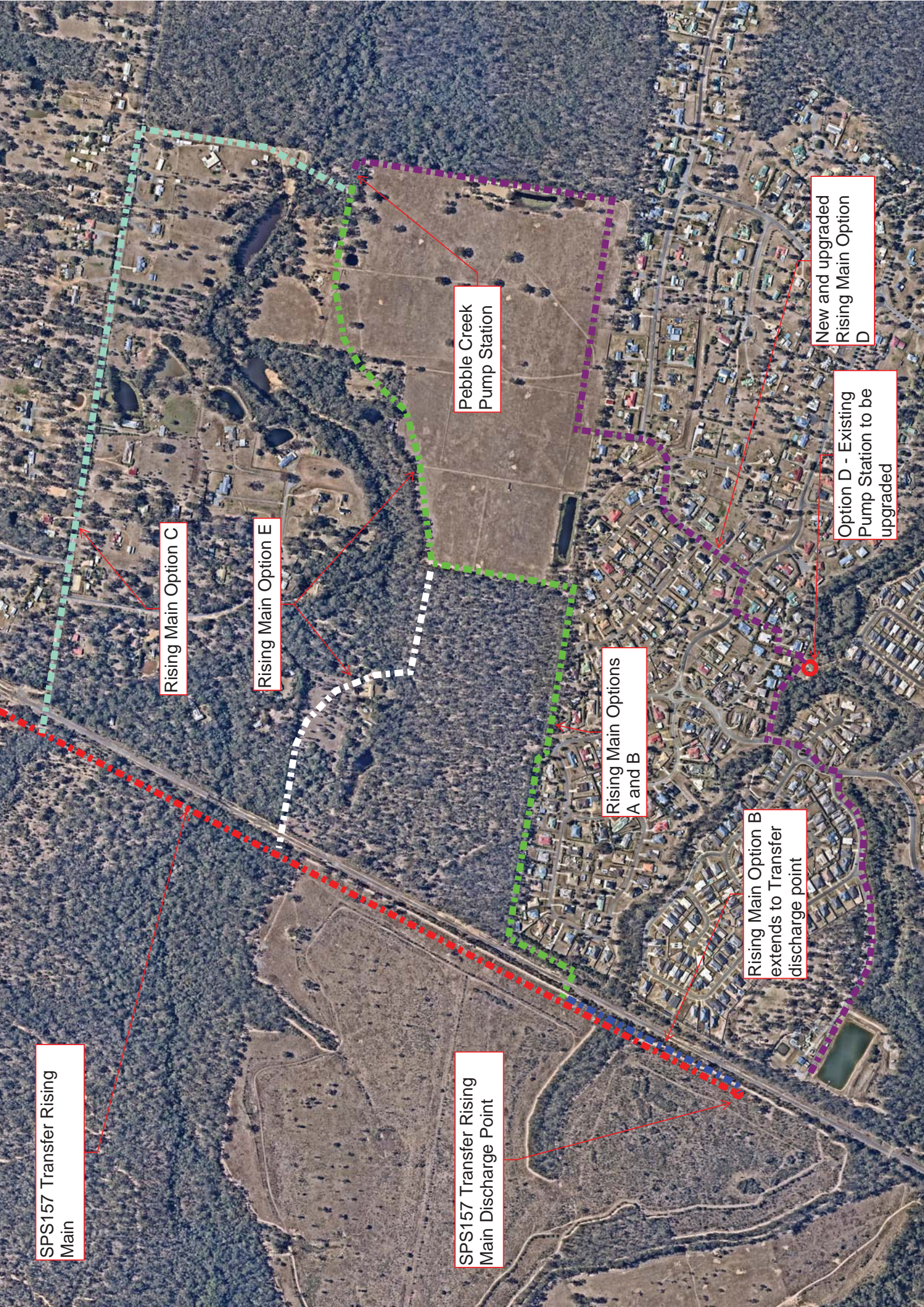
Pebble Creek Pump Station

Rising Main Options A and B

Rising Main Option B extends to Transfer discharge point

New and upgraded Rising Main Option D

Option D - Existing Pump Station to be upgraded





## Pebble Creek Rising Main - Option A Layout Plan



PROPOSED SEWER RISING MAIN - PHASE 1

PROPOSED SEWER RISING MAIN - PHASE 2



EXISTING  
CLIPCASE

— PROPOSED  
— FINISHED SURFACE

DATUM RI 300

DES SURFACE

EXIST SURFACE
CHAINAGES

[illegible]

CONCEPT ONLY

DRAWING TITLE  
CONCEPT SEWER RISING MAIN  
LAYOUT AND SURFACE PROFILE  
SHEET 1 OF 3

PROJECT NAME  
PEBBLE CREEK  
RESIDENTIAL DEVELOPMENT  
TRUNK EXTERNAL SERVICES

CLIENT

ORCHARD (PEBBLE CREEK)  
DEVELOPMENTS P.L.

Figure 1 shows a scale and a horizontal reference bar. The scale is marked from 0 to 50 cm. The horizontal bar is labeled 'HORIZONTAL'.



PEAKURBAN

NOT FOR  
CONSTRUCTION

DRAWN	STATUS
DESIGN	APPROVAL

[illegible]

PROJECT No.	DRAWING No.	REVISION
18-0042	SK300	1

MOUNTAIN RIDGE ROAD,  
SOUTH MACLEAN

ASSOCIATED CONSULTANT  
SURVEYOR: LANDPARTNERS  
PH: (07) 3842 1032

1:200

VERTICAL

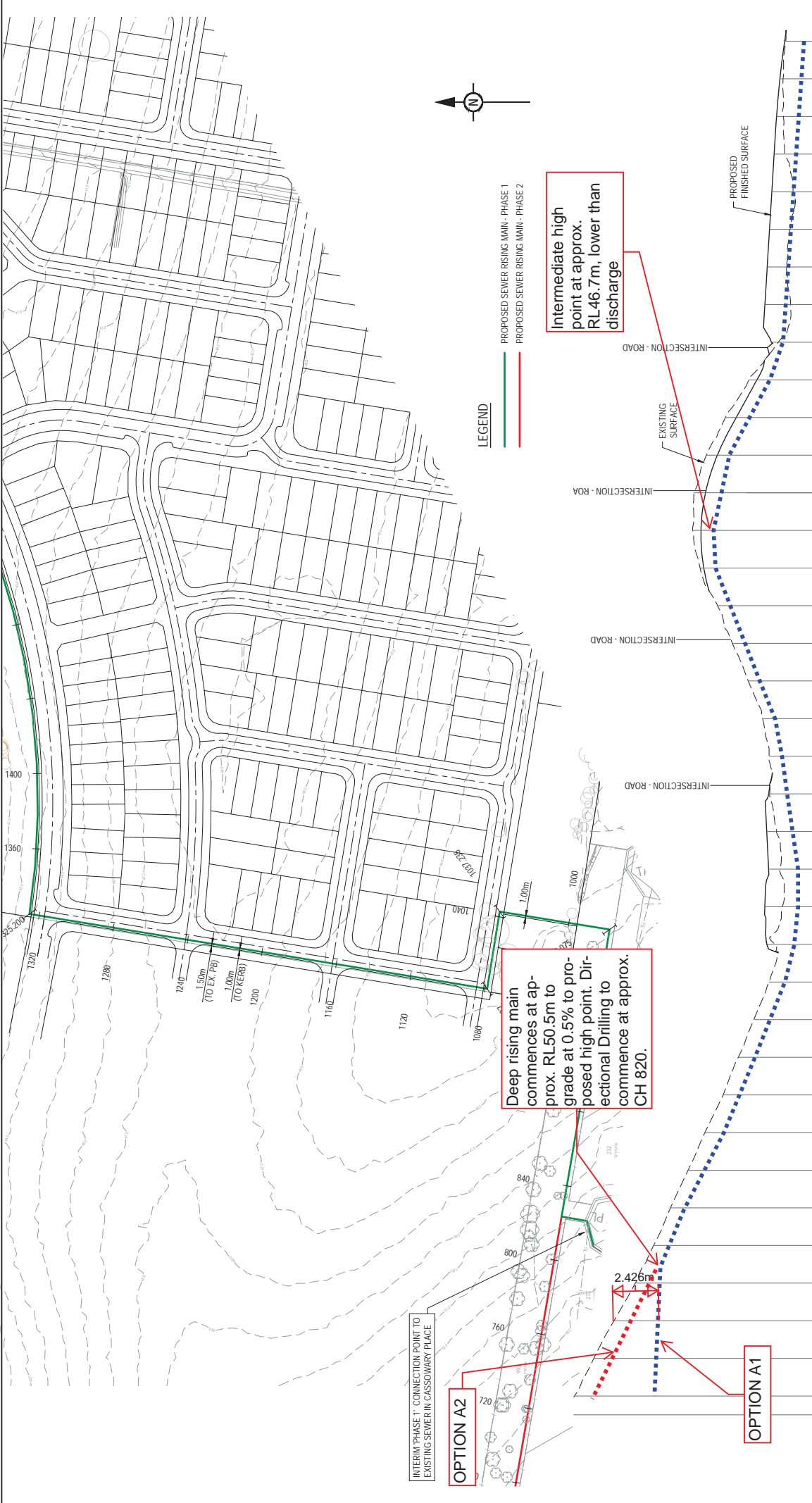
A3

ENQUIRIES@PEAKURBAN.COM.AU

CHULTZ RPEO 20631  
FOR AND ON BEHALF OF PEAKURBAN PTY LTD

TROY	
------	--

[illegible]



REV		DATE	DESIGN	DRAWN	CHECKED	ORIGINAL ISSUE	REVISION DETAILS		STATUS		NOT FOR CONSTRUCTION		PEAKURBAN		SCALE		CLIENT		PROJECT NAME		CONCEPT ONLY	
1																						
DES SURFACE																						
EXIST SURFACE																						
CHAINAGES																						

ORCHARD (PEBBLE CREEK) DEVELOPMENTS P.L.

ASSOCIATED CONSULTANTS SURVEYORS - LANDPARTNERS PH: (07) 3842 1032

PEBBLE CREEK RESIDENTIAL DEVELOPMENT TRUNK EXTERNAL SERVICES

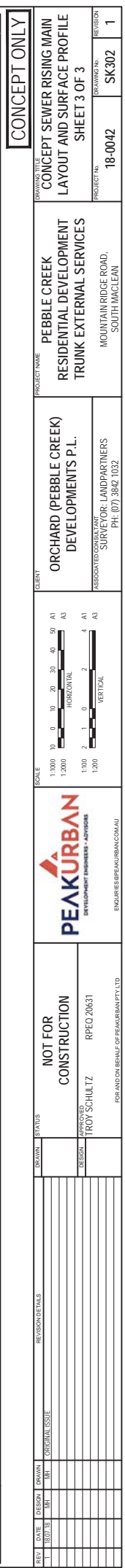
PROJECT NO. 18-0042 SK301

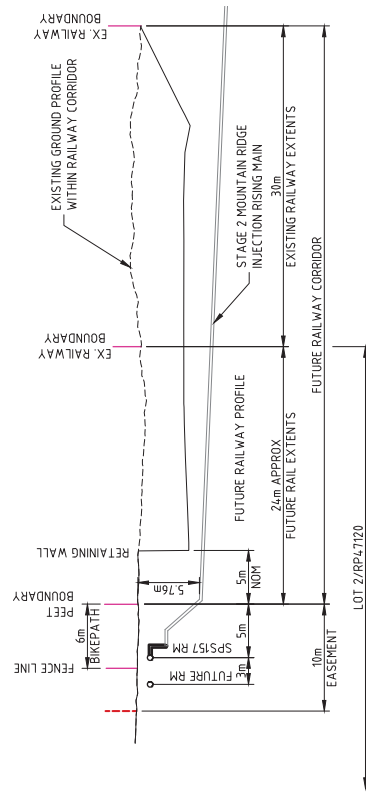
CONCEPT ONLY

CONCEPT SEWER RISING MAIN LAYOUT AND SURFACE PROFILE SHEET 2 OF 3

DRAWING NO. 18-0042 SK301







FOR INFORMATION

## GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE

PROJECT:	
DRAWING TITLE:	



**LOGAN**  
WATER INFRASTRUCTURE  
ALLIANCE

DRAWING No.  
LS305-05-S-SKE-CI-8560

MOUNTAIN RIDGE CONNECTION

DESIGN COMPANY: Logan W/LA  
TECH SERVICE: ORG M

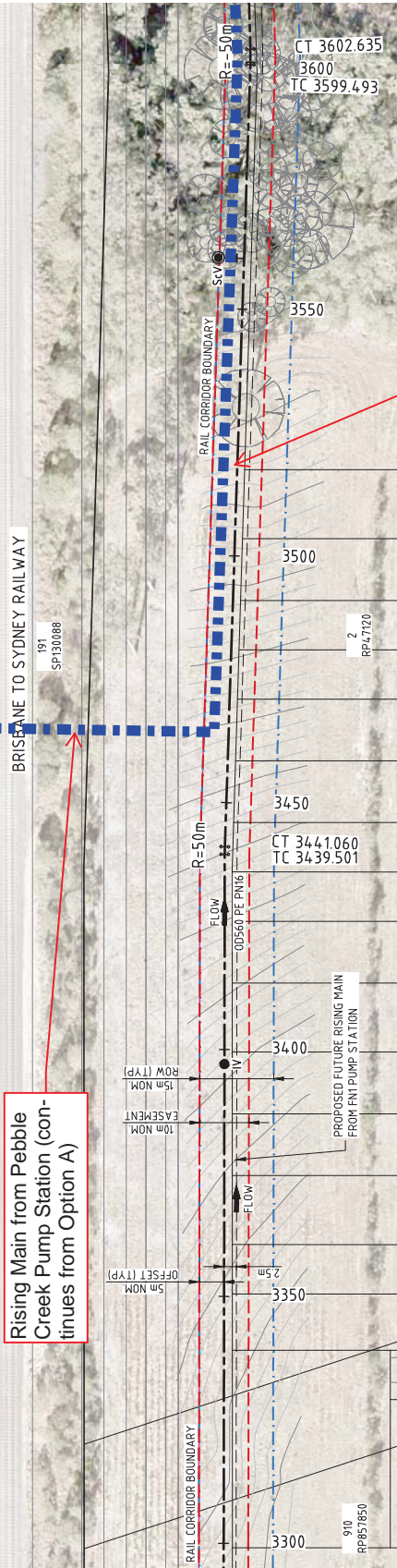
COPYRIGHT © THIS DRAWING SHALL REMAIN THE PROPERTY OF LOGAN CITY COUNCIL. UNAUTHORISED USE OF THIS DRAWING IS PROHIBITED.									
SHEET NO.		SHEET 1		SHEET 2		SHEET 3		SHEET 4	
PROJECT NO.		PROJECT 1		PROJECT 2		PROJECT 3		PROJECT 4	
FILE REFERENCE		FILE 1		FILE 2		FILE 3		FILE 4	
SHEET SIZE		A1		A1		A1		A1	
DESIGNED BY		V. VERGARA		V. VERGARA		V. VERGARA		V. VERGARA	
DRAFTED BY		S. ZOLLNER		S. ZOLLNER		S. ZOLLNER		S. ZOLLNER	
DESIGN CHECKED BY		P. ROY		P. ROY		P. ROY		P. ROY	
APPROVED BY		B. ROY		B. ROY		B. ROY		B. ROY	
DATE		18/08/2018		18/08/2018		18/08/2018		18/08/2018	
REV. No.		CONCEPT		CONCEPT		CONCEPT		CONCEPT	
DESCRIPTION		CONCEPT		CONCEPT		CONCEPT		CONCEPT	





Rising Main from Pebble Creek Pump Station (continues from Option A)

BRISBANE TO SYDNEY RAILWAY



PLAN  
SCALE 1:500

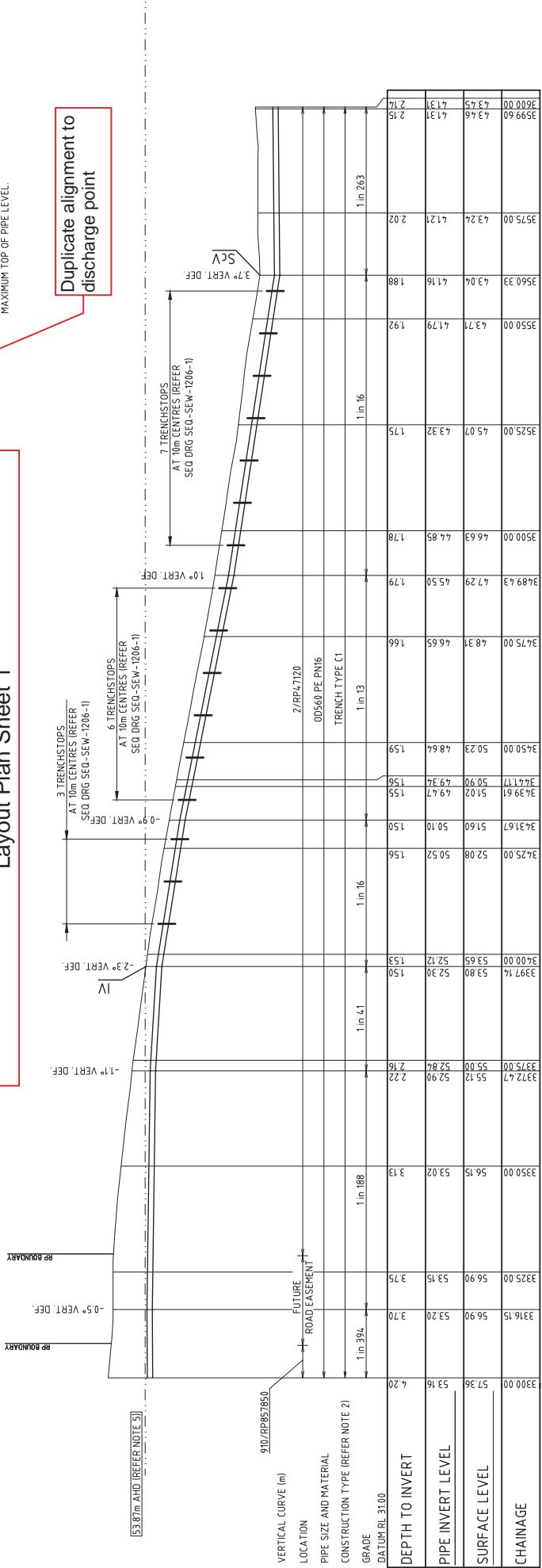
### Pebble Creek Rising Main - Option B Layout Plan Sheet 1

#### NOTES

1. FOR GENERAL NOTES REFER TO STD DWGS PM001-01-S-DWG-ND-0020 AND ND-0021.
2. FOR TRENCH DETAILS REFER TO STD DWGS PM001-00-W-DWG-ND-0050 AND ND-0051.
3. FOR GAS RELEASE VALVE AND SCOUR VALVE DETAILS REFER TO STD DWGS PM001-01-S-DWG-CI-2100 AND CI-2101.
4. FOR ISOLATION VALVE DETAILS (IV) REFER TO DWG CI-2532.
5. DISCHARGE LEVEL IS AT RL53.87m AHD. THIS IS A DESIGN CONSTRAINT DEFINING MAXIMUM TOP OF PIPE LEVEL.

Duplicate alignment to discharge point

RIGHT OF WAY EXTENTS SHOWN WILL BE CLEARED BY LOGANWIA PRIOR TO CONSTRUCTION. NO ADDITIONAL TREE CLEARING UNLESS PRIOR APPROVAL FROM A LoganWIA REPRESENTATIVE.



LONGITUDINAL SECTION  
SCALE HOR: 1:500  
VER: 1:500

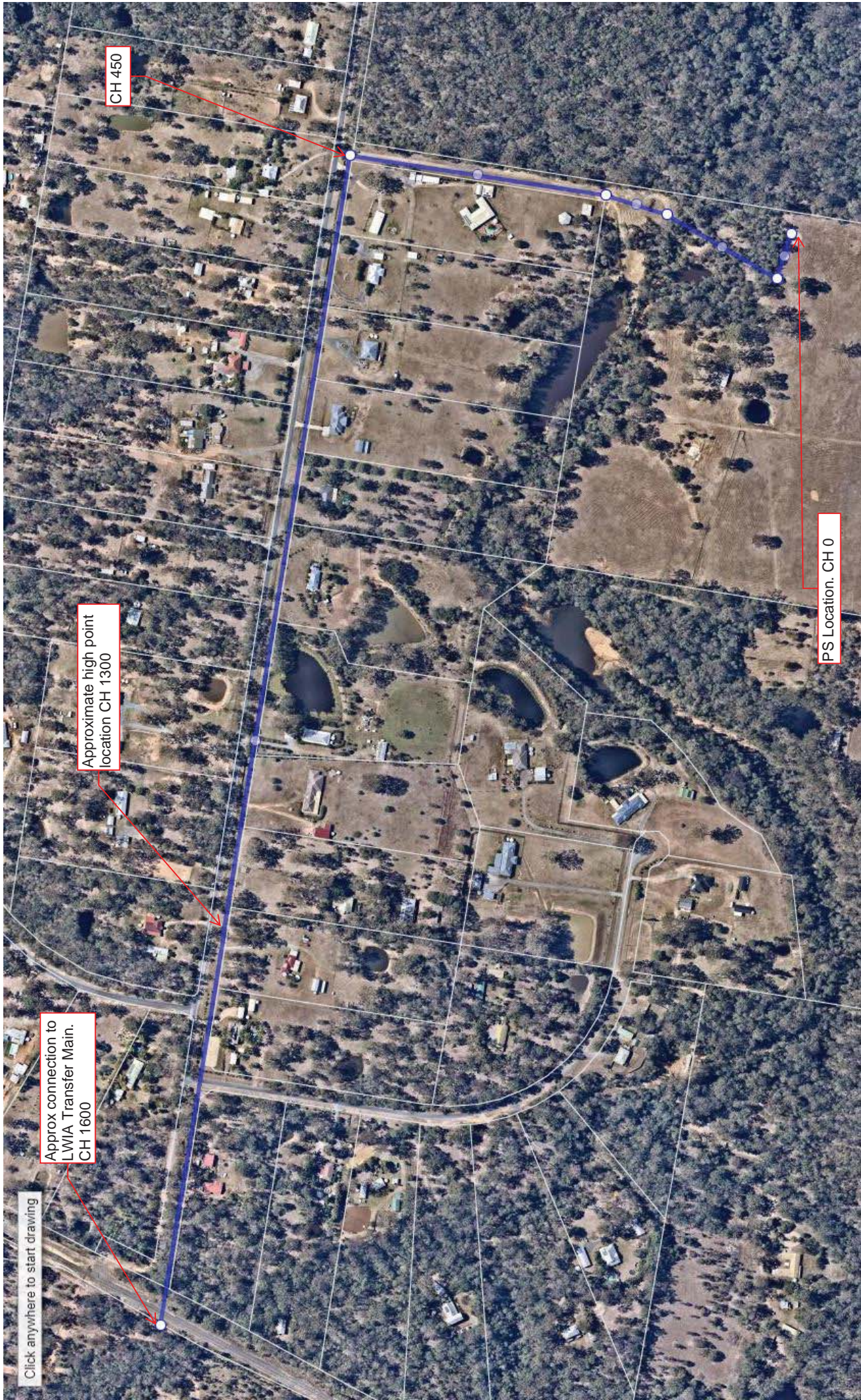


FOR TENDER

COPYRIGHT (C) THE DRAWING SHALL REMAIN THE PROPERTY OF LOGAN CITY COUNCIL. UNAUTHORISED USE OF THIS DRAWING IS PROHIBITED.				DESIGNED BY AL ATORRE				REFERENCES PROJECT No. LS305-05				PROJECT LOGAN CITY COUNCIL				DRAWING TITLE SPS157 RISING MAIN PLAN AND LONGITUDINAL SECTION				DRAWING No. LS305-05-S-DWG-CI-2511				DESIGN COMPANY LoganWIA				TECH SERVICES DRG No.				SHEET 12			
DRAFTED BY L CHRISTIE				DRAFTING CHECK BY F JESPERSEN				FILE REFERENCE				SHEET SIZE A1				DATING AND GDA 94 ZONE 56				REV. No.				REV. No.				REV. No.				REV. No.			
DESIGNED BY S DICKER				DESIGNED BY S DICKER				DESIGNED BY S DICKER				DESIGNED BY S DICKER				DESIGNED BY S DICKER				DESIGNED BY S DICKER				DESIGNED BY S DICKER				DESIGNED BY S DICKER				DESIGNED BY S DICKER			
DATE 24/08/2018				DATE 24/08/2018				DATE 24/08/2018				DATE 24/08/2018				DATE 24/08/2018				DATE 24/08/2018				DATE 24/08/2018				DATE 24/08/2018				DATE 24/08/2018			
DRAWN LC				DRAWN LC				DRAWN LC				DRAWN LC				DRAWN LC				DRAWN LC				DRAWN LC				DRAWN LC				DRAWN LC			
CHECKED DS				CHECKED DS				CHECKED DS				CHECKED DS				CHECKED DS				CHECKED DS				CHECKED DS				CHECKED DS				CHECKED DS			
APPROVED AL				APPROVED AL				APPROVED AL				APPROVED AL				APPROVED AL				APPROVED AL				APPROVED AL				APPROVED AL				APPROVED AL			
FOR TENDER 85% DESIGN DOCUMENTATION FOR 10% DOWR WORKSHOP				FOR TENDER 85% DESIGN DOCUMENTATION FOR 10% DOWR WORKSHOP				FOR TENDER 85% DESIGN DOCUMENTATION FOR 10% DOWR WORKSHOP				FOR TENDER 85% DESIGN DOCUMENTATION FOR 10% DOWR WORKSHOP				FOR TENDER 85% DESIGN DOCUMENTATION FOR 10% DOWR WORKSHOP				FOR TENDER 85% DESIGN DOCUMENTATION FOR 10% DOWR WORKSHOP				FOR TENDER 85% DESIGN DOCUMENTATION FOR 10% DOWR WORKSHOP				FOR TENDER 85% DESIGN DOCUMENTATION FOR 10% DOWR WORKSHOP				FOR TENDER 85% DESIGN DOCUMENTATION FOR 10% DOWR WORKSHOP			

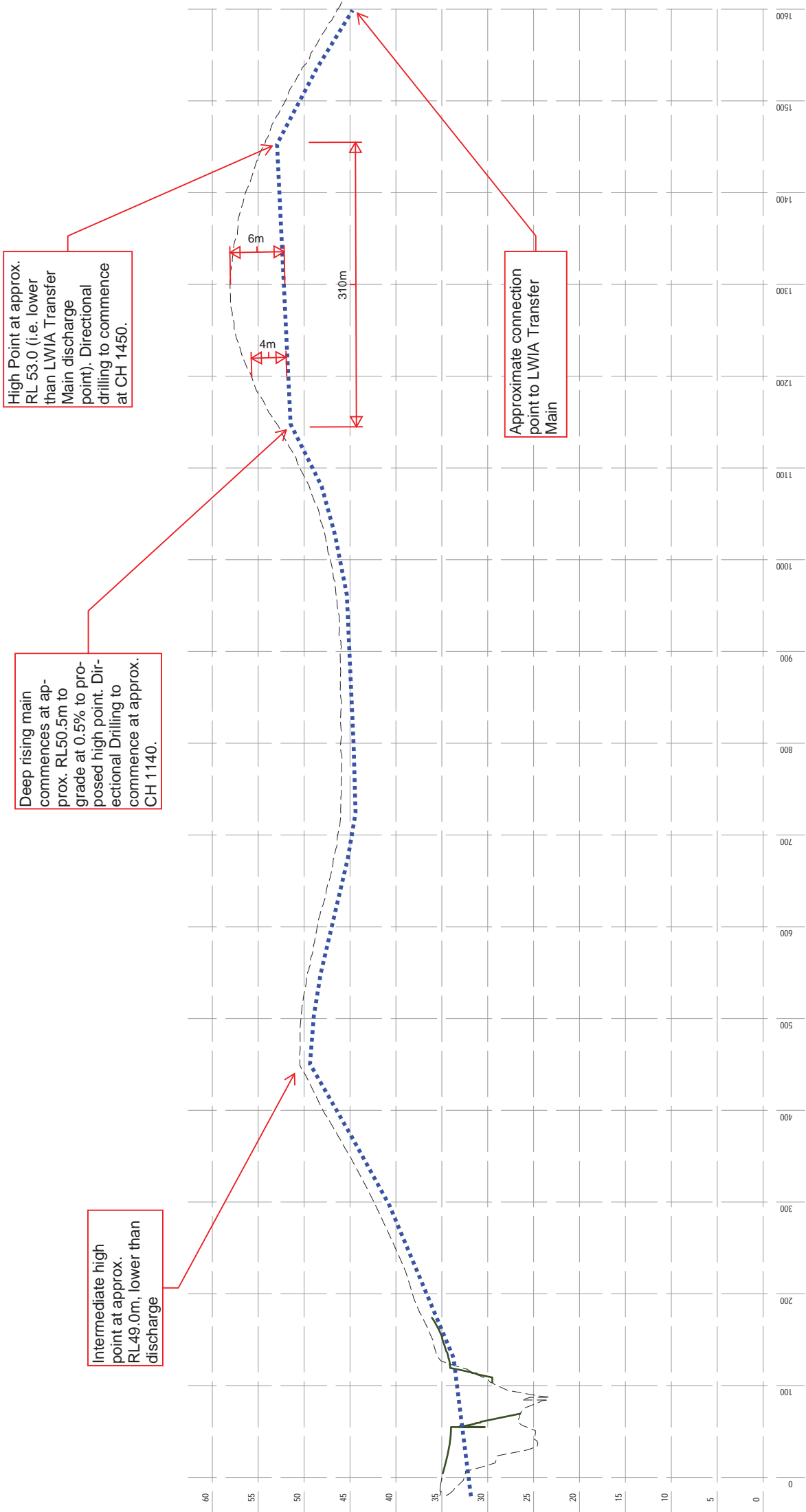






Pebble Creek Rising Main - Option C (Mountain Ridge Road)  
Layout Plan



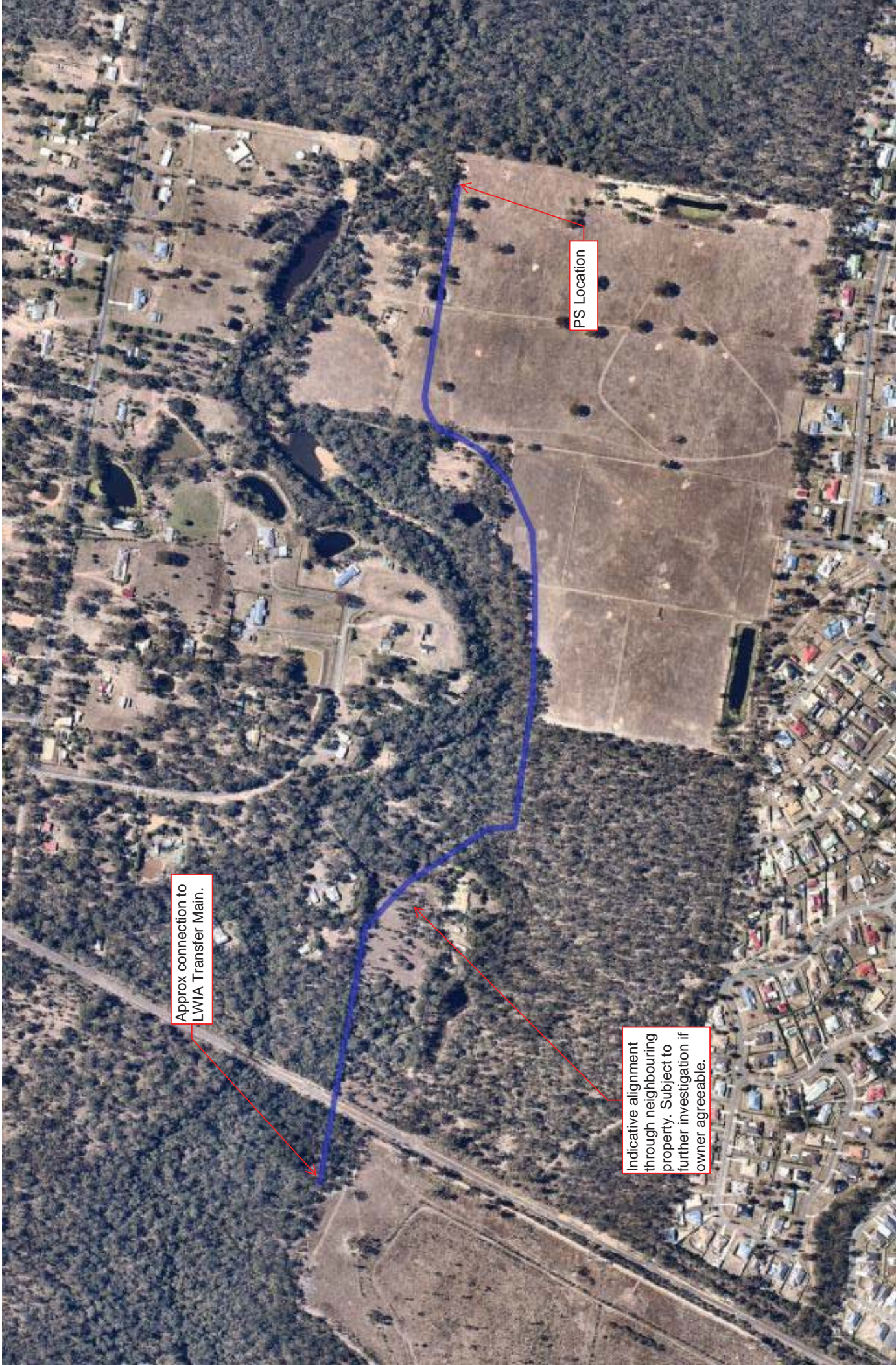


Pebble Creek Rising Main - Option C (Mountain Ridge Road)  
Long Section



## Pebble Creek Rising Main - Option D Layout Plan





Pebble Creek Rising Main - Option E (Mountain Ridge Road)  
Layout Plan



# Preliminary Estimate of Costs - Option A1



PROJECT NO.: 18-0042  
PROJECT NAME: Pebble Creek  
CLIENT: Orchard Property Group  
DATE: 7 September 2018

## SUMMARY OF CONSTRUCTION COSTS:

SCHEDULE 1.0: GENERAL	\$	145,925.00
SCHEDULE 2.0: SEWERAGE RETICULATION	\$	1,228,500.00
<b>Sub Total</b>	<b>\$</b>	<b>1,374,425.00</b>
G.S.T.	\$	137,442.50
<b>TOTAL (G.S.T. inclusive)</b>	<b>\$</b>	<b>1,511,867.50</b>





ITEM CODE	ITEM DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
<b>SCHEDULE 1.0: GENERAL</b>					
<b>1</b>					
a)	Establishment including all preliminary items and all incidental works required to complete the works including insurances, site information signs, demobilisation and compliance with WHS requirements upon completion of works, etc.	Item	1	61,425.00	\$ 61,425.00
b)	Preparation of as-constructed drawings and asset registers for all works (sewerage) in electronic and hard copy form in accordance with the relevant Authority standards and requirements. The Contractor shall familiarise themselves with the relevant Authority's requirements in this regard.	Item	1	7,500.00	\$ 7,500.00
<b>2</b>	Provision for traffic as required including supply, certification and implementation of traffic management plans (TMPs) and traffic permits where applicable.	Item	1	2,500.00	\$ 2,500.00
<b>3</b>	Clearing and grubbing of site including engagement of and certification from a suitably qualified fauna catcher/spotter and arborist (where required), felling of trees, mulching of timber, lawful disposal of grubbed material, demolition and removal of structures, septic tanks, disposal or selective respreading of mulch material as directed by the Superintendent, etc.	Item	1	25,000.00	\$ 25,000.00
<b>4</b>	Strip, stockpile and respread topsoil (100mm thickness unless noted otherwise).	m <sup>3</sup>	2,250	12.00	\$ 27,000.00
<b>5</b>	Grass seeding/Hydromulching to Authority specifications to disturbed areas including footpaths, allotments, batters and drains.	m <sup>2</sup>	22,500	1.00	\$ 22,500.00
<b>6</b>	Alterations and maintaining existing services affected by the works (if ordered).	PC Item	1		\$ -
<b>TOTAL FOR SCHEDULE 1.0: General</b>					<b>\$ 145,925.00</b>

ITEM CODE	ITEM DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
<b>SCHEDULE 2.0: SEWERAGE RETICULATION</b>					
<b>1</b>	uPVC sewer rising main pipes including excavation (irrespective of the nature of the material), disposal of spoil, subgrade preparation, dewatering, bedding, supply, lay jointing complete including all bends, backfilling, and compaction:-				
a)	225mm dia				
i.	0 - 1.50m deep	m	1600	225.00	\$ 360,000.00
ii.	1.501 - 3.0m deep	m	650	300.00	\$ 195,000.00
<b>2</b>	Sewer rising main appertenances				
a)	Scour Valve	No	2	12,000.00	\$ 24,000.00
b)	Air Valve - Smart Valve or similar	No	2	6,000.00	\$ 12,000.00
c)	Odour Control - Vent Pole	No	2	7,500.00	\$ 15,000.00
d)	Odour Control - Carbon Treatment	No		15,000.00	\$ -
<b>3</b>	QA Testing of sewerage reticulation to Authority requirements (including CCTV, pressure testing, ovality, etc.).	Item	1	22500.00	\$ 22,500.00
<b>4</b>	Tunnel boring/direction drilling sewer pipe as detailed on design plans or as specified:-				
a)	OD280mm dia (PE) - through high point	m	460	1200.00	\$ 552,000.00
b)	OD280mm dia (PE) - beneath rail line	m	40	1200.00	\$ 48,000.00
<b>TOTAL FOR SCHEDULE 4.0: Sewerage Reticulation</b>					<b>\$ 1,228,500.00</b>



# Preliminary Estimate of Costs - Option A2



PROJECT NO.: 18-0042  
PROJECT NAME: Pebble Creek  
CLIENT: Orchard Property Group  
DATE: 7 September 2018

## SUMMARY OF CONSTRUCTION COSTS:

SCHEDULE 1.0: GENERAL	\$	149,675.00
SCHEDULE 2.0: SEWERAGE RETICULATION	\$	703,500.00
<b>Sub Total</b>	<b>\$</b>	<b>853,175.00</b>
G.S.T.	\$	85,317.50
<b>TOTAL (G.S.T. inclusive)</b>	<b>\$</b>	<b>938,492.50</b>

ITEM CODE	ITEM DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
<b>SCHEDULE 1.0: GENERAL</b>					
<b>1</b>					
a)	Establishment including all preliminary items and all incidental works required to complete the works including insurances, site information signs, demobilisation and compliance with WHS requirements upon completion of works, etc.	Item	1	35,175.00	\$ 35,175.00
b)	Preparation of as-constructed drawings and asset registers for all works (sewerage) in electronic and hard copy form in accordance with the relevant Authority standards and requirements. The Contractor shall familiarise themselves with the relevant Authority's requirements in this regard.	Item	1	7,500.00	\$ 7,500.00
<b>2</b>	Provision for traffic as required including supply, certification and implementation of traffic management plans (TMPs) and traffic permits where applicable.	Item	1	2,500.00	\$ 2,500.00
<b>3</b>	Clearing and grubbing of site including engagement of and certification from a suitably qualified fauna catcher/spotter and arborist (where required), felling of trees, mulching of timber, lawful disposal of grubbed material, demolition and removal of structures, septic tanks, disposal or selective respreading of mulch material as directed by the Superintendent, etc.	Item	1	40,000.00	\$ 40,000.00
<b>4</b>	Strip, stockpile and respread topsoil (100mm thickness unless noted otherwise).	m <sup>3</sup>	2,250	12.00	\$ 27,000.00
<b>5</b>	Grass seeding/Hydromulching to Authority specifications to disturbed areas including footpaths, allotments, batters and drains.	m <sup>2</sup>	22,500	1.00	\$ 22,500.00
<b>6</b>	Alterations and maintaining existing services affected by the works (if ordered).	PC Item	1		\$ -
<b>7</b>	Reinstatement of Silverwood Drive	Item	1	15,000.00	\$ 15,000.00
<b>TOTAL FOR SCHEDULE 1.0: General</b>					<b>\$ 149,675.00</b>



ITEM CODE	ITEM DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
<b>SCHEDULE 2.0: SEWERAGE RETICULATION</b>					
<b>1</b>	uPVC sewer rising main pipes including excavation (irrespective of the nature of the material), disposal of spoil, subgrade preparation, dewatering, bedding, supply, lay jointing complete including all bends, backfilling, and compaction:-				
a)	225mm dia				
i.	0 - 1.50m deep	m	1600	225.00	\$ 360,000.00
ii.	1.501 - 3.0m deep	m	650	300.00	\$ 195,000.00
<b>2</b>	Sewer rising main appertenances				
a)	Scour Valve	No	2	12,000.00	\$ 24,000.00
b)	Air Valve - Smart Valve or similar	No	2	6,000.00	\$ 12,000.00
c)	Odour Control - Vent Pole	No	2	7,500.00	\$ 15,000.00
d)	Odour Control - Carbon Treatment	No	1	15,000.00	\$ 15,000.00
<b>3</b>	QA Testing of sewerage reticulation to Authority requirements (including CCTV, pressure testing, ovality, etc.).	Item	1	22500.00	\$ 22,500.00
<b>4</b>	Tunnel boring/direction drilling sewer pipe as detailed on design plans or as specified:-				
a)	OD280mm dia (PE) - beneath rail line	m	40	1500.00	\$ 60,000.00
<b>TOTAL FOR SCHEDULE 4.0: Sewerage Reticulation</b>					<b>\$ 703,500.00</b>

# Preliminary Estimate of Costs - Option A1



PROJECT NO.: 18-0042  
PROJECT NAME: Pebble Creek  
CLIENT: Orchard Property Group  
DATE: 7 September 2018

## SUMMARY OF CONSTRUCTION COSTS:

SCHEDULE 1.0: GENERAL	\$	162,237.50
SCHEDULE 2.0: SEWERAGE RETICULATION	\$	800,750.00
<b>Sub Total</b>	<b>\$</b>	<b>962,987.50</b>
G.S.T.	\$	96,298.75
<b>TOTAL (G.S.T. inclusive)</b>	<b>\$</b>	<b>1,059,286.25</b>



ITEM CODE	ITEM DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
<b>SCHEDULE 1.0: GENERAL</b>					
<b>1</b>					
a)	Establishment including all preliminary items and all incidental works required to complete the works including insurances, site information signs, demobilisation and compliance with WHS requirements upon completion of works, etc.	Item	1	40,037.50	\$ 40,037.50
b)	Preparation of as-constructed drawings and asset registers for all works (sewerage) in electronic and hard copy form in accordance with the relevant Authority standards and requirements. The Contractor shall familiarise themselves with the relevant Authority's requirements in this regard.	Item	1	7,500.00	\$ 7,500.00
<b>2</b>	Provision for traffic as required including supply, certification and implementation of traffic management plans (TMPs) and traffic permits where applicable.	Item	1	2,500.00	\$ 2,500.00
<b>3</b>	Clearing and grubbing of site including engagement of and certification from a suitably qualified fauna catcher/spotter and arborist (where required), felling of trees, mulching of timber, lawful disposal of grubbed material, demolition and removal of structures, septic tanks, disposal or selective respreading of mulch material as directed by the Superintendent, etc.	Item	1	40,000.00	\$ 40,000.00
<b>4</b>	Strip, stockpile and respread topsoil (100mm thickness unless noted otherwise).	m <sup>3</sup>	2,600	12.00	\$ 31,200.00
<b>5</b>	Grass seeding/Hydromulching to Authority specifications to disturbed areas including footpaths, allotments, batters and drains.	m <sup>2</sup>	26,000	1.00	\$ 26,000.00
<b>6</b>	Alterations and maintaining existing services affected by the works (if ordered).	PC Item	1		\$ -
<b>7</b>	Reinstatement of Silverwood Drive	Item	1	15,000.00	\$ 15,000.00
<b>TOTAL FOR SCHEDULE 1.0: General</b>					<b>\$ 162,237.50</b>

ITEM CODE	ITEM DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
<b>SCHEDULE 2.0: SEWERAGE RETICULATION</b>					
<b>1</b>	uPVC sewer rising main pipes including excavation (irrespective of the nature of the material), disposal of spoil, subgrade preparation, dewatering, bedding, supply, lay jointing complete including all bends, backfilling, and compaction:-				
a)	225mm dia				
i.	0 - 1.50m deep	m	1950	225.00	\$ 438,750.00
ii.	1.501 - 3.0m deep	m	650	300.00	\$ 195,000.00
<b>2</b>	Sewer rising main appertenances				
a)	Scour Valve	No	2	12,000.00	\$ 24,000.00
b)	Air Valve - Smart Valve or similar	No	2	6,000.00	\$ 12,000.00
c)	Odour Control - Vent Pole	No	2	7,500.00	\$ 15,000.00
d)	Barometric Discharge Arrangement	No	1	30,000.00	\$ 30,000.00
<b>3</b>	QA Testing of sewerage reticulation to Authority requirements (including CCTV, pressure testing, ovality, etc.).	Item	1	26000.00	\$ 26,000.00
<b>4</b>	Tunnel boring/direction drilling sewer pipe as detailed on design plans or as specified:-				
b)	OD280mm dia (PE) - beneath rail line	m	40	1500.00	\$ 60,000.00
<b>TOTAL FOR SCHEDULE 4.0: Sewerage Reticulation</b>					<b>\$ 800,750.00</b>

# Preliminary Estimate of Costs - Option C



PROJECT NO.: 18-0042  
PROJECT NAME: Pebble Creek  
CLIENT: Orchard Property Group  
DATE: 7 September 2018

## SUMMARY OF CONSTRUCTION COSTS:

SCHEDULE 1.0: GENERAL	\$	234,175.00
SCHEDULE 2.0: SEWERAGE RETICULATION	\$	845,500.00
<b>Sub Total</b>	<b>\$</b>	<b>1,079,675.00</b>
G.S.T.	\$	107,967.50
<b>TOTAL (G.S.T. inclusive)</b>	<b>\$</b>	<b>1,187,642.50</b>



ITEM CODE	ITEM DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
<b>SCHEDULE 1.0: GENERAL</b>					
<b>1</b>					
a)	Establishment including all preliminary items and all incidental works required to complete the works including insurances, site information signs, demobilisation and compliance with WHS requirements upon completion of works, etc.	Item	1	42,275.00	\$ 42,275.00
b)	Preparation of as-constructed drawings and asset registers for all works (sewerage) in electronic and hard copy form in accordance with the relevant Authority standards and requirements. The Contractor shall familiarise themselves with the relevant Authority's requirements in this regard.	Item	1	7,500.00	\$ 7,500.00
<b>2</b>	Provision for traffic as required including supply, certification and implementation of traffic management plans (TMPs) and traffic permits where applicable.	Item	1	2,500.00	\$ 2,500.00
<b>3</b>	Clearing and grubbing of site including engagement of and certification from a suitably qualified fauna catcher/spotter and arborist (where required), felling of trees, mulching of timber, lawful disposal of grubbed material, demolition and removal of structures, septic tanks, disposal or selective respreading of mulch material as directed by the Superintendent, etc.	Item	1	25,000.00	\$ 25,000.00
<b>4</b>	Strip, stockpile and respread topsoil (100mm thickness unless noted otherwise).	m <sup>3</sup>	1,450	12.00	\$ 17,400.00
<b>5</b>	Grass seeding/Hydromulching to Authority specifications to disturbed areas including footpaths, allotments, batters and drains.	m <sup>2</sup>	14,500	1.00	\$ 14,500.00
<b>6</b>	Alterations and maintaining existing services affected by the works (if ordered).	PC Item	1	50,000.00	\$ 50,000.00
<b>7</b>	Mountain Ridge Road Reinstatement Works	Item	1	75,000.00	\$ 75,000.00
<b>TOTAL FOR SCHEDULE 1.0: General</b>					<b>\$ 234,175.00</b>

ITEM CODE	ITEM DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
<b>SCHEDULE 2.0: SEWERAGE RETICULATION</b>					
<b>1</b>	uPVC sewer rising main pipes including excavation (irrespective of the nature of the material), disposal of spoil, subgrade preparation, dewatering, bedding, supply, lay jointing complete including all bends, backfilling, and compaction:-				
a)	225mm dia				
i.	0 - 1.50m deep	m	1200	225.00	\$ 270,000.00
ii.	1.501 - 3.0m deep	m	250	300.00	\$ 75,000.00
iii	Extra over for bridge crossing	m	60	250.00	\$ 15,000.00
<b>2</b>	Sewer rising main appertenances				
a)	Scour Valve	No	2	12,000.00	\$ 24,000.00
b)	Air Valve - Smart Valve or similar	No	2	6,000.00	\$ 12,000.00
c)	Odour Control - Vent Pole	No	2	7,500.00	\$ 15,000.00
<b>3</b>	QA Testing of sewerage reticulation to Authority requirements (including CCTV, pressure testing, ovality, etc.).	Item	1	14500.00	\$ 14,500.00
<b>4</b>	Tunnel boring/direction drilling sewer pipe as detailed on design plans or as specified:-				
a)	OD280mm dia (PE) - through high point	m	310	1200.00	\$ 372,000.00
b)	OD280mm dia (PE) - beneath rail line	m	40	1200.00	\$ 48,000.00
<b>TOTAL FOR SCHEDULE 4.0: Sewerage Reticulation</b>					<b>\$ 845,500.00</b>

# Preliminary Estimate of Costs - Option A1



PROJECT NO.: 18-0042  
PROJECT NAME: Pebble Creek  
CLIENT: Orchard Property Group  
DATE: 7 September 2018

## SUMMARY OF CONSTRUCTION COSTS:

SCHEDULE 1.0: GENERAL	\$	230,510.00
SCHEDULE 2.0: SEWERAGE RETICULATION	\$	1,351,000.00
<b>Sub Total</b>	<b>\$</b>	<b>1,581,510.00</b>
G.S.T.	\$	158,151.00
<b>TOTAL (G.S.T. inclusive)</b>	<b>\$</b>	<b>1,739,661.00</b>



ITEM CODE	ITEM DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
<b>SCHEDULE 1.0: GENERAL</b>					
<b>1</b>					
a)	Establishment including all preliminary items and all incidental works required to complete the works including insurances, site information signs, demobilisation and compliance with WHS requirements upon completion of works, etc.	Item	1	67,550.00	\$ 67,550.00
b)	Preparation of as-constructed drawings and asset registers for all works (sewerage) in electronic and hard copy form in accordance with the relevant Authority standards and requirements. The Contractor shall familiarise themselves with the relevant Authority's requirements in this regard.	Item	1	7,500.00	\$ 7,500.00
<b>2</b>	Provision for traffic as required including supply, certification and implementation of traffic management plans (TMPs) and traffic permits where applicable.	Item	1	2,500.00	\$ 2,500.00
<b>3</b>	Clearing and grubbing of site including engagement of and certification from a suitably qualified fauna catcher/spotter and arborist (where required), felling of trees, mulching of timber, lawful disposal of grubbed material, demolition and removal of structures, septic tanks, disposal or selective respreading of mulch material as directed by the Superintendent, etc.	Item	1	25,000.00	\$ 25,000.00
<b>4</b>	Strip, stockpile and respread topsoil (100mm thickness unless noted otherwise).	m <sup>3</sup>	2,180	12.00	\$ 26,160.00
<b>5</b>	Grass seeding/Hydromulching to Authority specifications to disturbed areas including footpaths, allotments, batters and drains.	m <sup>2</sup>	21,800	1.00	\$ 21,800.00
<b>6</b>	Alterations and maintaining existing services affected by the works (if ordered).	PC Item	1	50,000.00	\$ 50,000.00
<b>7</b>	Various road reinstatements to Southern existing areas	Item	1	30,000.00	\$ 30,000.00
<b>TOTAL FOR SCHEDULE 1.0: General</b>					<b>\$ 230,510.00</b>

ITEM CODE	ITEM DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
<b>SCHEDULE 2.0: SEWERAGE RETICULATION</b>					
<b>1</b>	uPVC sewer rising main pipes including excavation (irrespective of the nature of the material), disposal of spoil, subgrade preparation, dewatering, bedding, supply, lay jointing complete including all bends, backfilling, and compaction:-				
a)	225mm dia				
i.	0 - 1.50m deep	m	1400	225.00	\$ 315,000.00
ii.	1.501 - 3.0m deep	m	430	300.00	\$ 129,000.00
iii.	Extra over for construction through existing areas external to the site	m	780	100.00	\$ 78,000.00
b)	300mm dia				
i.	0 - 1.50m deep	m	800	320.00	\$ 256,000.00
ii.	1.501 - 3.0m deep	m	175	400.00	\$ 70,000.00
iii.	Extra over for construction through existing areas external to the site	m	500	100.00	\$ 50,000.00
<b>2</b>	Sewer rising main appertenances				
a)	Scour Valve	No	1	12,000.00	\$ 12,000.00
b)	Air Valve - Smart Valve or similar	No	2	6,000.00	\$ 12,000.00
c)	Odour Control - Vent Pole	No	2	7,500.00	\$ 15,000.00
d)	Odour Control - Carbon Treatment	No		15,000.00	\$ -
<b>3</b>	QA Testing of sewerage reticulation to Authority requirements (including CCTV, pressure testing, ovality, etc.).	Item	1	14000.00	\$ 14,000.00
<b>4</b>	Upgrade of existing Pump Station	Item	1	400000.00	\$ 400,000.00
<b>TOTAL FOR SCHEDULE 4.0: Sewerage Reticulation</b>					<b>\$ 1,351,000.00</b>

# Preliminary Estimate of Costs - Option E



PROJECT NO.: 18-0042  
PROJECT NAME: Pebble Creek  
CLIENT: Orchard Property Group  
DATE: 13 September 2018

## SUMMARY OF CONSTRUCTION COSTS:

SCHEDULE 1.0: GENERAL	\$	209,525.00
SCHEDULE 2.0: SEWERAGE RETICULATION	\$	522,500.00
<b>Sub Total</b>	<b>\$</b>	<b>732,025.00</b>
G.S.T.	\$	73,202.50
<b>TOTAL (G.S.T. inclusive)</b>	<b>\$</b>	<b>805,227.50</b>



ITEM CODE	ITEM DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
<b>SCHEDULE 1.0: GENERAL</b>					
<b>1</b>					
a)	Establishment including all preliminary items and all incidental works required to complete the works including insurances, site information signs, demobilisation and compliance with WHS requirements upon completion of works, etc.	Item	1	26,125.00	\$ 26,125.00
b)	Preparation of as-constructed drawings and asset registers for all works (sewerage) in electronic and hard copy form in accordance with the relevant Authority standards and requirements. The Contractor shall familiarise themselves with the relevant Authority's requirements in this regard.	Item	1	7,500.00	\$ 7,500.00
<b>2</b>	Provision for traffic as required including supply, certification and implementation of traffic management plans (TMPs) and traffic permits where applicable.	Item	1	2,500.00	\$ 2,500.00
<b>3</b>	Clearing and grubbing of site including engagement of and certification from a suitably qualified fauna catcher/spotter and arborist (where required), felling of trees, mulching of timber, lawful disposal of grubbed material, demolition and removal of structures, septic tanks, disposal or selective respreading of mulch material as directed by the Superintendent, etc.	Item	1	40,000.00	\$ 40,000.00
<b>4</b>	Strip, stockpile and respread topsoil (100mm thickness unless noted otherwise).	m <sup>3</sup>	1,700	12.00	\$ 20,400.00
<b>5</b>	Earthworks - cut to fill within existing gullies to facilitate suitable rising main vertical alignment	m <sup>3</sup>	12,000	8.00	\$ 96,000.00
<b>6</b>	Grass seeding/Hydromulching to Authority specifications to disturbed areas including footpaths, allotments, batters and drains.	m <sup>2</sup>	17,000	1.00	\$ 17,000.00
<b>7</b>	Alterations and maintaining existing services affected by the works (if ordered).	PC Item	1		\$ -
<b>TOTAL FOR SCHEDULE 1.0: General</b>					<b>\$ 209,525.00</b>

ITEM CODE	ITEM DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
<b>SCHEDULE 2.0: SEWERAGE RETICULATION</b>					
<b>1</b>	uPVC sewer rising main pipes including excavation (irrespective of the nature of the material), disposal of spoil, subgrade preparation, dewatering, bedding, supply, lay jointing complete including all bends, backfilling, and compaction:-				
a)	225mm dia				
i.	0 - 1.50m deep	m	1200	225.00	\$ 270,000.00
ii.	1.501 - 3.0m deep	m	500	300.00	\$ 150,000.00
<b>2</b>	Sewer rising main appertenances				
a)	Scour Valve	No	1	12,000.00	\$ 12,000.00
b)	Air Valve - Smart Valve or similar	No	1	6,000.00	\$ 6,000.00
c)	Odour Control - Vent Pole	No	1	7,500.00	\$ 7,500.00
<b>3</b>	QA Testing of sewerage reticulation to Authority requirements (including CCTV, pressure testing, ovality, etc.).	Item	1	17000.00	\$ 17,000.00
<b>4</b>	Tunnel boring/direction drilling sewer pipe as detailed on design plans or as specified:-				
a)	OD280mm dia (PE) - beneath rail line	m	40	1500.00	\$ 60,000.00
<b>TOTAL FOR SCHEDULE 4.0: Sewerage Reticulation</b>					<b>\$ 522,500.00</b>