Water & Wastewater Planning Review

Weinam Creek Priority Development Area

PREPARED FOR REDLAND INVESTMENT CORPORATION

18-003165.WER01 | 7 April 2020

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DOCUMENT CONTROL

ISSUE	DATE	ISSUE DETAILS	AUTHOR	CHECKED	APPROVED
A	07.04.2020	Final	T. Chalmers	D. Collins	T. Chalmers

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1 Introduction

Calibre Professional Services Pty Ltd have been engaged by Redland Investment Corporation (RIC) to undertake a review of the water and wastewater network planning completed by Redland City Council (RCC) in support of the Weinam Creek Priority Development Area (PDA).

The PDA is located within Redland Bay, with Redland City Council (RCC) the local government and responsible distributor-retail water authority. The PDA is proposed to consist of mixed land use, with the majority being medium to high density residential living. Figure 1-1 illustrates the approximate extents of the proposed PDA.

Figure 1-1: Proposed PDA Master Plan Layout (Source: RCC Water Supply Master Plan, 2019)

A detailed PDA master plan layout is included in Appendix A.

1.1 Background

As part of the PDA servicing investigations, RCC have assessed existing and planned water and wastewater infrastructure associated with the PDA. The following information has been provided by RCC for review:

- Redland Water Network Model
  - EPA Net and Mike Urban format
- Water Supply Master Plan for Weinam Creek PDA (RCC, 2019)
- Sewerage Network Master Plan for Weinam Creek PDA (RCC, 2020)
- Redland Sewer Network Model
  - EPA SWMM and Mike Urban format
- Redland Sewer Pump Station & Network Data

1.2 Project Scope

The following scope of work has been undertaken by Calibre in support of the proposed Weinam Creek PDA:

- Review network information provided by RCC.
- Verify network model outputs and confirm infrastructure augmentations proposed by RCC.
- Prepare an opinion of cost for the proposed infrastructure augmentations.
- Document the infrastructure augmentation review and opinion of cost prepared by Calibre.

Each of the above items have been addressed within the following report.

2 Development Yield

For the purpose of water and wastewater planning, RCC adopted a development demand of 3,000 Equivalent Persons (EP) for the proposed PDA. Existing Local Government Infrastructure Plan (LGIP) demands were removed and replaced by the projected demand of 3,000 EP. Table 2-1 provides a comparison of the proposed development demands for the PDA.

Table 2-1: PDA Demand Projection

Zone	Approved Density	Redlands LGIP	Variance from LGIP
1	0	0	0
2	0	0	0
3	0	0	0
4	189	82	+107
5	124	54	+70
6	268	116	+152
7	562	243	+319
8	287	124	+163
9	562	281	+281
10	181	90	+90
11	0	0	0
12	393	196	+196
13	86	63	+23
14	367	269	+98
Total	3,018	1,518	+1,500

The approved demands are 18 EP higher than the demand adopted by RCC for modelling purposes. It is unlikely that an additional 18 EP will influence network modelling results and therefore the difference has been deemed negligible from a network analysis perspective.

3 Water Network Analysis

Modelling of water network conditions pre and post development has been completed by RCC. The supporting information provided by RCC (refer Section 1.1) has been reviewed by Calibre and documented in the following sections.

3.1 Methodology

Calibre have reviewed the Weinam PDA Water Supply Master Plan prepared by RCC and evaluated the impact that proposed PDA demands will have on network conditions. Infrastructure found to have sufficient capacity has not been reviewed as part of this analysis with the focus being verification of RCC proposed augmentations.

The following horizons were reviewed under Maximum Day & Fire Flow conditions:

- Baseline 2041 Horizon – Representation of LGIP network conditions (excludes additional PDA demands).
- 2041 Horizon + PDA – Representation of ultimate PDA development.

3.2 RCC Modelling Summary

The following provides a summary of the network analysis and findings documented by RCC:

- Weinam Creek PDA is supplied by the Heinemann Road tank set, with a total combined storage of approximately 60 ML and Bottom Water Level (BWL) of RL 77.3 m AHD. Assessment on the capacity of the water supply tanks was not undertaken, as the additional loading (3,000 EP) was considered a minor impact to the existing storage capacity.
- Most of the PDA is located within the Serpentine Creek District Metered Area (DMA), serviced by an existing PRV with a setting of approximately 60 m residual pressure, and ground level of RL 12.5 m AHD.
- The north-west area of the PDA is located within the Boundary Street DMA, with an existing fixed PRV setting of approximately 42 m residual pressure, and ground level of RL 9.7 m AHD.
- The PDA is directly serviced by a trunk system of DN200, DN225 and DN300 trunk mains downstream of each PRV.
- RCC's current LGIP only considers augmentations and demand projections up to 2036, which identified 6 pipe upgrades to service fire flow deficiencies, with no upgrades required to service standard flow. Of these 6 upgrades the only augmentations that would directly impact Weinam Creek PDA are as follows:
    - DN150 cross-connection between Auster Street and Moores Road.
    - DN150 cross-connection between Banana Street and the Weinam Creek boat ramp.
- For the post-development scenario, residential (15 L/s) and commercial (30 L/s) fire flow allocations were applied to the local pipe network servicing the PDA.
- Network modelling indicates that the Serpentine Creek DMA can achieve minimum pressures within Weinan Creek PDA however the additional demands create failures external to the PDA.
- Network modelling indicates the following:
    - Peak day network node failures within the DMA increase from 30 to 185 with inclusion of PDA under 2041 horizon.
    - Fire flow network node failures within the DMA increase from 41 to 90 with inclusion of PDA under 2041 horizon.
- Failures primarily generated by head loss through wider trunk network due to additional demand of Weinam PDA.
- A 5m increase in Serpentine Creek PRV can resolve pre-development failures under 2041 horizon, however this is not an acceptable long-term solution for aging network assets subject to additional growth.
- The proposed PDA generated network failures due to peak day and fire flow demands. Two servicing options were investigated as follows:
    - Option 1 – Split Serpentine Creek DMA with a new supply point from the DN750 along Cleveland Bay Road.
    - Option 2 – Split Serpentine Creek DMA with a new supply point from the DN600 along Giles Road.
- Both options resolve pressure deficiencies, however Option 2 was found to be favourable based on a lower RCC capital cost estimate of $3.6M versus $4.5M for Option 1.
- Summary of timing for network augmentations as follows:
    - All standard flow upgrades are required prior to ultimate development of PDA (3,000 EP)
    - All fire flow upgrades are required prior to the PDA reaching a demand of 600 EP.

Both options are included within Appendix B, with Option 2 the preferred servicing strategy. On the basis that Option 2 is the preferred strategy, Option 1 will not be discussed any further within this report.

3.3 Augmentation Review

As described in Section 3.1, Calibre has reviewed the network augmentations proposed by RCC and tested if these are directly triggered by the proposed PDA. Table 3-1 provides a summary of the proposed Option 2 augmentations and Calibre's review comments.

Table 3-1: Water Augmentation Summary

Item	RCC Proposed Augmentation	Trigger	Calibre Comments
1	1,135m of DN375 Water Main	PDA Maximum Day Demands	Agreed, critical connection to trunk main required to achieve minimum pressure requirements. Existing network is undersized to cater for PDA demands. Note, 260m of DN150 augmentations triggered by Maximum Day Demands are in addition to Fire Flow augmentations below.
2	830m of DN300 Water Main		
3	420m of DN250 Water Main		
4	640m of DN200 Water Main		
5	260m of DN150 Water Main		
6	PRV / Meter Assembly		Agreed, new PRV and boundary to configuration required for new connection to DN600 trunk main on Giles Road.
7	200m of DN200 Water Main	PDA Fire Flows	Reticulation augmentations are reasonable considering fire flows have increased from 15 L/s to 30 L/s.
8	1,250m of DN150 Water Main		

As described in Table 3-1, most augmentations identified by RCC are directly triggered by the proposed PDA. The augmentation identified within the RCC PIP are illustrated in Figure 3-1. It is assumed that these augmentations will be included in the

Figure 3-1: Proposed PIP Augmentation (Source: RCC Water Master Plan)

The network modelling outcomes and proposed augmentations are consistent with those identified in the RCC Water Master Plan 2016. The augmentations triggered by the PDA have been included in the opinion of cost provided in Section 5.

4 Wastewater Network Analysis

Modelling of wastewater network conditions pre and post development has been completed by RCC. The supporting information provided by RCC (refer Section 1.1) has been reviewed by Calibre and documented in the following sections.

4.1 Methodology

Calibre have reviewed the Weinam PDA Sewerage Network Master Plan prepared by RCC and evaluated the impact that proposed PDA demands will have on network conditions. In addition to review of the master plan report, Calibre have reviewed the GIS network information provided by RCC and calculated the impact that proposed PDA demands will have on network conditions. Infrastructure found to have sufficient capacity has not been reviewed as part of this analysis with the focus being verification of RCC proposed augmentations.

The following horizons were assessed under Peak Wet Weather Flow (PWWF) conditions:

- Baseline 2041 Horizon – Representation of LGIP network conditions (excludes additional PDA demands).
- 2041 Horizon + PDA – Representation of ultimate PDA development.

4.2 RCC Network Modelling Summary

The following provides a summary of the network analysis and findings documented by RCC:

- The Weinam Creek PDA is split across two existing Sewage Pumping Station (SPS) catchments.
- SPS 90 is located north of Weinam Creek, while SPS 132 is located to the south.
- SPS 132 and its associated catchment infrastructure has enough capacity to service proposed PDA catchment demands.
- SPS 90 and its associated catchment infrastructure experience failures and require several upgrades to service the PDA catchment demands. These augmentations include:
    - Upgrade to SPS 90 rising main required (Approx. 800m of DN150 upgraded to DN225).
    - Pumps oversized following rising main upgrade and need to be downgraded to operate efficiently.
    - SPS 90 to be refurbished with internal pipework replaced and Polyethylene liner installed.
    - Emergency storage fails with additional 41 kL offline storage vessel required.
    - Approximately 392m of gravity network fails upstream of SPS 90 and required upgrade.
- No upgrades required to SPS 90 switchboard and controls following pump replacement

The existing infrastructure and augmentations proposed by RCC are illustrated on Drawing No. 18-003165-SK01 within Appendix C.

4.3 SPS 90 Performance Review

Table 4-1 summarises the performance of existing SPS 90 catchment infrastructure under each scenario.

Table 4-1: Existing SPS 90 Performance Summary

Performance Criteria	Existing	2017 Horizon + PDA	2041 Horizon + PDA
Total Pump Capacity (PWWF)	44.00	48.50	53.20
Calculated Pump Duty (DN150 Rising Main)[1]	44 L/s @ 40.7 m	48.5 L/s @ 49.4 m	53.2 L/s @ 59.3 m
DN150 Rising Main Velocity @ PWWF[2]	2.49	2.74	3.01
Rising Main Velocity Acceptable	Yes (<3.0 m/s)	Yes (<3.0 m/s)	No (>3.0 m/s)
Existing Pump Capacity Sufficient	Yes	No (-4.5 L/s)	No (-9.2 L/s)
Available Emergency Storage		Approx. 112 kL	
Required Emergency Storage	74.7 kL	139.7 kL	153 kL
Sufficient Emergency Storage	Yes (+37.3 kL)	No (-27.7 kL)	No (-41 kL)

Notes: 1) Assumes total fitting loss (k = 20) and Colebrook-White friction factor of k = 0.150.
2) Nominal diameter adopted for velocity and pump duty calculations.

Review of the existing SPS 90 catchment infrastructure indicates that the upgrades required are generally consistent with those identified by RCC through their network modelling.

Table 4-2 provide a summary of SPS 90 network performance following the proposed augmentations.

Table 4-2: Augmented SPS 90 Performance Summary

Performance Criteria	Baseline 2041 Horizon[1]	2041 Horizon + PDA
Total Pump Capacity (PWWF)	48.50	53.20
Calculated Pump Duty (DN2225 Rising Main)[1]	48.5 L/s @ 6.7 m	53.2 L/s @ 8.1 m
Calculated Pump Duty (DN200 Rising Main)[1]	48.5 L/s @ 8.4m	53.2 L/s @ 11.3 m
DN225 Rising Main Velocity @ PWWF[2]	1.22 m/s	1.34 m/s
DN200 Rising Main Velocity @ PWWF[2]	1.29 m/s	1.69 m/s
Rising Main Velocity Acceptable	Yes (<3.0 m/s)	Yes (<3.0 m/s)

Notes: 1) Assumes total fitting loss (k = 20) and Colebrook-White friction factor of k = 0.150.
2) Nominal diameter adopted for velocity and pump duty calculations.

Assessment of the rising main augmentation proposed by RCC indicates that there is potential to upgrade the rising main to a DN200 main instead of DN225. Alternatively, a DN150 rising main in parallel could be utilised if the existing alignment has sufficient space for a dual rising main. Both options achieves suitable operating conditions and remain in accordance with the SEQ Code approved products list.

With alignment constraint unknown at the time of reporting, replacement of the existing DN150 rising main with a DN200 has been adopted as the preferred strategy. This also supports a conservative cost estimate as detailed in Section 5.

4.4 Gravity Network Assessment

Assessment of the gravity sewer upstream of SPS 90 was undertaken to verify the augmentations proposed by RCC. Table 4-3 provides a summary of calculated capacity in the gravity network upstream of SPS 90.

Table 4-3: SPS 90 Upstream Gravity Network Capacity Review

Pipe ID	Diameter	Length	Grade[1]	Capacity[2]	Baseline 2041 PWWF[3]	2041 + PDA PWWF	Upgrade Required
14170	DN225	3.5 m	1 : 22	97.5 L/s	40.49 L/s	59.78 L/s	No
14716	DN150	26.2 m	1 : 238	10.02 L/s	12.03 L/s	21.05 L/s	Yes
14715	DN150	39.6 m	1 : 180	11.53 L/s	10.92 L/s	21.05 L/s	Yes
14712	DN150	65.9 m	1 : 199	10.95 L/s	10.54 L/s	20.09 L/s	Yes
14711	DN150	15.1 m	1 : 189	11.26 L/s	9.94 L/s	19.13 L/s	Yes
14698	DN150	34.2 m	1 : 263	9.54 L/s	9.94 L/s	19.13 L/s	Yes
14697	DN150	56.8 m	1 : 405	7.57 L/s	9.74 L/s	18.93 L/s	Yes
14695	DN150	85.2 m	1 : 147	12.58 L/s	9.48 L/s	18.67 L/s	Yes
14677	DN150	69.5 m	1 : 162	11.99 L/s	9.32 L/s	18.51 L/s	Yes

Notes: 1) Grade calculated with GIS information provided by RCC and rounded to nearest whole number.
2) Capacity calculated at 100% depth flow within existing pipe.
3) Baseline PWWF estimated in accordance with demand allocation GIS information provided by RCC.

The existing DN150 pipes require augmentation to service the PDA demands under the 2041 horizon. Calculations indicate that capacity within Pipes 14698 and 14697 is insufficient under the Baseline 2041 horizon and will likely require upgrades regardless of the PDA development.

Table 4-4 provides a summary of the augmentations required to service the baseline 2041 horizon and PDA demands.

Table 4-4: SPS 90 Upstream Gravity Network Augmentations

Pipe ID	Existing Diameter	Proposed Duplication	Length	Grade[1]	2041 + PDA PWWF	Augmented Capacity[2]	Augmentation Trigger
14716	DN150	DN225	26.2 m	1 : 238	21.05 L/s	36.98 L/s	2041 + PDA
14715	DN150	DN225	39.6 m	1 : 180	21.05 L/s	42.53 L/s	2041 + PDA
14712	DN150	DN200	65.9 m	1 : 199	20.09 L/s	32.48 L/s	2041 + PDA
14711	DN150	DN200	15.1 m	1 : 189	19.13 L/s	33.35 L/s	2041 + PDA
14698	DN150	DN200	34.2 m	1 : 263	19.13 L/s	28.27 L/s	Baseline 2041
14697	DN150	DN200	56.8 m	1 : 405	18.93 L/s	22.66 L/s	2041 + PDA
14695	DN150	DN150	85.2 m	1 : 147	18.67 L/s	24.21 L/s	Baseline 2041
14677	DN150	DN150	69.5 m	1 : 162	18.51 L/s	23.07 L/s	2041 + PDA

Notes: 1) Grade maintained in accordance with existing pipe grade, assumes direct replacement.
2) Combined capacity calculated at 75% depth flow within existing & proposed pipes (duplicated system).

The augmented capacity has been calculated as a combined network capacity under the assumption that pipe will be duplicated, laid on the same grade and existing sewers kept in service.

A total of 392m of gravity sewer requires augmentation to service the PDA. Of the total 392m, approximately 119m of augmentation is triggered under the Baseline 2041 horizon.

4.5 Augmentation Review

As described in Section 4.1, Calibre has reviewed the network augmentations proposed by RCC and tested if these are directly triggered by the proposed PDA. Table 4-5 provides a summary of the proposed augmentations and Calibre's review comments.

Table 4-5: Wastewater Augmentation Summary

Item	RCC Proposed Augmentation	Calibre Comments
1	Upgrade SPS 90 DN150 Rising Main to DN225.	Upgrade of existing DN150 rising main required to service PDA. Calculation indicate a DN200 pressure main can achieve suitable velocities and pump duties under 2041 + PDA horizon.
2	Downgrade SPS 90 pumps following rising main upgrade.	Agreed, increased rising main results in pumps operating at undesirable duties.
3	Refurbish SPS 90 internal pipework and install wet well liner.	Pump augmentation will likely require new pedestals which should be upgraded to suit SEQ Code requirements. Other wet well augmentations including refurbishment of wet well pipework and installation of PE liner don't appear to be directly linked to PDA. Pump augmentation and SPS shutdown does provide an opportunity to carry out the proposed refurbishment and is sensible from a maintenance perspective.
4	Provide additional 41 kL offline emergency storage.	Demands associated with PDA trigger requirement for additional emergency storage at SPS 90.
5	Upgrade gravity sewer upstream of SPS 90	Approximately 392m of DN150 gravity sewer upstream of SPS 90 requires augmentation. Of this total 392m, calculation show that approximately 119m of augmentations are triggered under Baseline 2041 horizon.

As described in Table 4-5, most augmentations identified by RCC are directly triggered by the proposed PDA. The revised augmentations proposed by Calibre are illustrated in Drawing No. 18-003165-SK02 within Appendix C. The augmentations triggered by the PDA have been included in the opinion of cost detailed in Section 5.

5 Opinion of Cost

An opinion of cost has been prepared for the infrastructure augmentations triggered by the proposed PDA. Table 5-1 provides a summary of each infrastructure augmentation and the associated cost estimate.

Table 5-1: Augmentation Opinion Cost Estimate

Item	Description	Quantity	Opinion of Cost Estimate
1	Proposed DN375 water main	1,135m	$1,390,000
2	Proposed DN300 water main	830m	$690,000
3	Proposed DN250 water main	420m	$260,000
4	Proposed DN200 water main	840m	$390,000
5	Proposed DN150 water main	1,510m	$530,000
6	Proposed PRV & Meter Assembly	1 Unit	$200,000
7	Proposed DN200 rising main (replace existing)	800m	$510,000
8	Proposed DN225 sewer duplication (existing DN150)	65.8m	$150,000
9	Proposed DN200 sewer duplication (existing DN150)	172m	$350,000
10	Proposed DN150 sewer duplication (existing DN150)	154.7m	$270,000
11	Additional offline emergency storage	1 Unit	$200,000
12	SPS pump replacement	2 Pumps	$40,000
		Total Estimated Cost	**$4,980,000**

Notes:
1) Rates adopted based on recent tender rates, including multiplier for brownfield development.
2) Rates assume good ground conditions with standard open trench construction methods
3) Gravity sewer rates include allowance for maintenance hole replacement / augmentation.
4) Total item cost estimates include 20% On Cost & 10% contingency.
5) Total item cost estimates rounded to the nearest $10,000.

A total value of approximately $4.98 million has been estimated for the water and wastewater augmentations required to service the proposed Weinam Creek PDA. It should be noted that the $4.98 million is the total value of infrastructure and does not separate augmentations which may have been triggered without the PDA (i.e. 119m of DN150 gravity sewer augmentation).

A detailed breakdown of rates, contingencies and on-costs are included in Appendix D. It is recommended that these costs are refined once further design has been completed for the proposed augmentations.

6 Conclusions

The following conclusions can be drawn from Calibre's review of the water and wastewater network investigations completed by Redland City Council:

- The Weinam Creek PDA results in an additional 1,518 EP over RCC PIP demand projections.
- To service additional PDA demands, augmentations to the local water and wastewater networks are required.
- Two water network augmentation strategies were investigated as follows:
    - Option 1 – Split Serpentine Creek DMA with a new supply point from the DN750 along Cleveland Bay Road.
    - Option 2 – Split Serpentine Creek DMA with a new supply point from the DN600 along Giles Road.
- Both options resolve pressure deficiencies, however Option 2 was found to be favourable based on a lower RCC capital cost estimate of $3.6M versus $4.5M for Option 1.
- Water network augmentations include a combination of PIP augmentation and new network augmentations triggered directly by the PDA. Water network augmentations required to service Weinam Creek PDA include the following:
    - 1,135m of DN375 Water Main
    - 830m of DN300 Water Main
    - 420m of DN250 Water Main
    - 840m of DN200 Water Main
    - 1,510 of DN150 Water Main
    - PRV / Meter Assembly
- Weinam Creek PDA is split across two existing Sewage Pumping Station (SPS) catchments.
    - SPS 90 located north of Weinam Creek and SPS 132 located south of Weinam Creek.
- SPS 90 is located north of Weinam Creek, while SPS 132 is located to the south.
- SPS 132 and its associated catchment infrastructure has enough capacity to service proposed PDA catchment demands.
- SPS 90 and its associated catchment infrastructure experience failures and require several upgrades to service the PDA catchment demands. These augmentations include:
    - Upgrade to SPS 90 rising main required (Approx. 800m of DN150 upgraded to DN200).
    - Pumps oversized following rising main upgrade and need to be downgraded to operate efficiently.
    - Emergency storage fails with additional 41 kL offline storage vessel required.
    - Approximately 392m of DN150 gravity sewer upstream of SPS 90 requires augmentation. Of this total 392m, calculation show that approximately 119m of augmentations are triggered under Baseline 2041 horizon.
- The proposed water and wastewater network augmentations triggered by the Weinam Creek PDA have a total estimated capital cost of $4.98 million.
    - Water network augmentations estimate value = $3,460,000
    - Wastewater network augmentations estimated value = $1,520,000
- The total opinion of cost value ($4.98 million) does not separate augmentations that may be triggered regardless of the PDA and is a representation of the total value of infrastructure augmentations regardless of their trigger.

7 Recommendations

Calibre make the following recommendations based on the findings within this report:

- Verify population triggers for network augmentations and define these within PDA Development Approval conditions.
- Undertake conceptual design for the preferred servicing strategies to confirm opportunities and constraints.
- Update opinion of cost estimates based on conceptual designs and review feasibility of preferred strategies.
- Undertake detailed engineering design and construction of augmentations prior to population triggers defined in DA conditions.

WEINAM CREEK PRIORITY DEVELOPMENT AREA

Appendix A Proposed Development Layout

REDLAND INVESTMENT CORPORATION

weinam creek

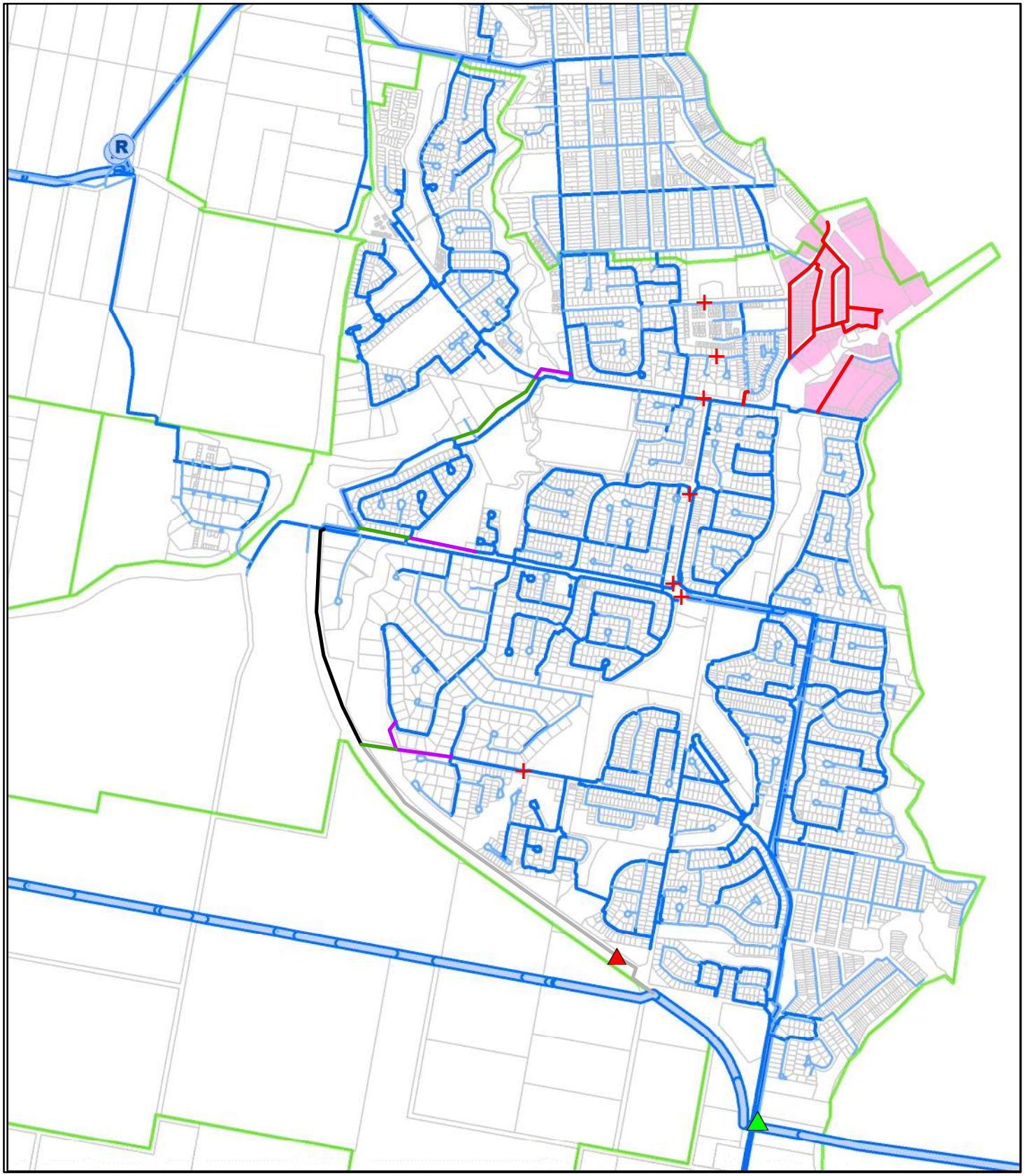
master plan - OPTION ONE

Ref. No. 133693 Date October 2018 Scale 1 : 1500@A1

WEINAM CREEK PRIORITY DEVELOPMENT AREA

Appendix B Water Network Augmentation

REDLAND INVESTMENT CORPORATION



Legend

Water Mains - Operating Diameter

- 20 - 100 mm
- 101 - 250 mm
- 251 - 500 mm
- 501 - 900 mm

Proposed Option 1 (mm)

- 200
- 225
- 300
- 375

Proposed FF (mm)

- 150

- Proposed Closed Valves
- Proposed Option 1 PRV
- Serpentine Creek PRV
- Distribution Maintenance Areas
- Current Land
- Weinam Creek PDA

Issue	Date	By	Chkd	Appd
D1	5/11/2019	JM	MI	MI

Redland City Council
Redland Water
PO Box 21
Cleveland QLD 4163

Job Title	**Weinam Creek PDA**
Drawing Title	**Option 1 Pipe Upgrades**
Scale at A3	**1:406,300**
Drawing Status	**Draft V1**
Coordinate System	**GDA 1994 MGA Zone 56**
Date of Print	**5/11/2019**
Drawing No	**001**

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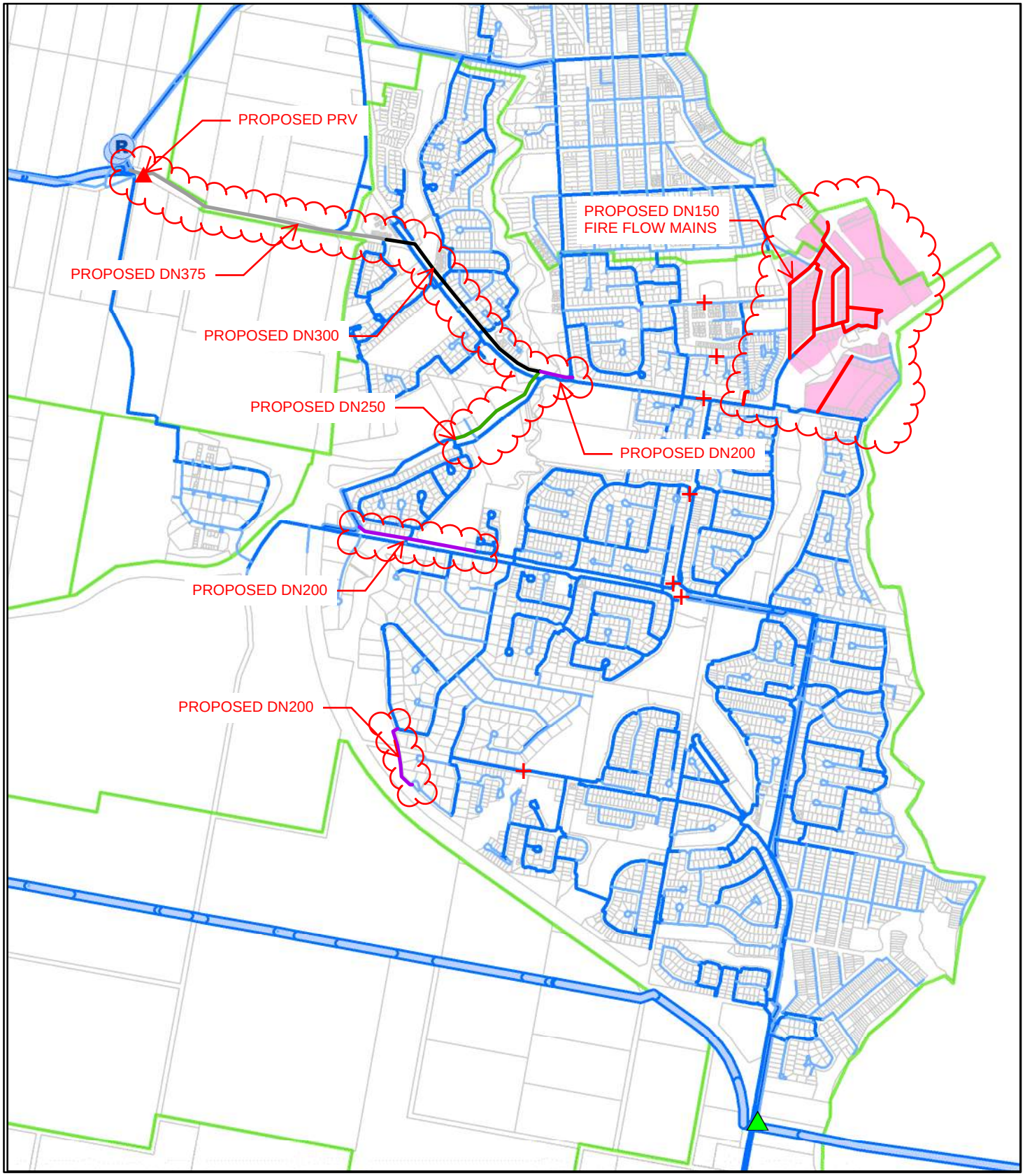

Legend

Water Mains - Operating Diameter

- 20 - 100 mm
- 101 - 250 mm
- 251 - 500 mm
- 501 - 900 mm

Proposed Option 2 (mm)

- 200
- 250
- 300
- 375

Proposed FF (mm)

- 150

- Proposed Closed Valves
- Proposed Option 2 PRV
- Serpentine Creek PRV
- Distribution Maintenance Areas
- Current Land
- Weinam Creek PDA

Issue	Date	By	Chkd	Appd
D1	5/11/2019	JM	MI	MI

Redland CITY COUNCIL
Redland Water
PO Box 21
Cleveland QLD 4163

Job Title	**Weinam Creek PDA**
Drawing Title	**Option 2 Pipe Upgrades**
Scale at A3	**1:406,300**
Drawing Status	**Draft V1**
Coordinate System	**GDA 1994 MGA Zone 56**
Date of Print	**5/11/2019**
Drawing No	**001**

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WEINAM CREEK PRIORITY DEVELOPMENT AREA

Appendix C Sewer Network Augmentation

REDLAND INVESTMENT CORPORATION

LEGEND

- PDA SITE BOUNDARY
- CADASTRE
- LOT BOUNDARY
- EXISTING DN100 SEWER GRAVITY MAIN
- EXISTING DN150 SEWER GRAVITY MAIN
- EXISTING DN225 SEWER GRAVITY MAIN
- EXISTING DN300 SEWER GRAVITY MAIN
- EXISTING SEWER RISING MAIN
- PROPOSED DN150 SEWER GRAVITY MAIN
- PROPOSED DN200 SEWER GRAVITY MAIN
- PROPOSED DN225 SEWER GRAVITY MAIN
- PROPOSED DN225 SEWER RISING MAIN
- EXISTING SEWER PUMP STATION
- PROPOSED DEVELOP AREA

NOTES:

1. THIS PLAN IS CONCEPT ONLY AND SUBJECT DETAILED ANALYSIS.
2. INFRASTRUCTURE SIZE, LOCATION AND ALIGNMENT ARE INDICATIVE ONLY SUBJECT TO SURVEY.
3. EXISTING INFRASTRUCTURE CAPACITY SUBJECT TO FURTHER INVESTIGATION.
4. PROPOSED STRATEGY IS SUBJECT TO FUTURE PLANNING AND DETAILED DESIGN.

FILE: 18-003165-SK01-SK02.dwg DATE: 24-02-2020 USER: JOSE MOLINA
XREFS: X_18-003165-TITLE X_18-003165-EX-CADASTRE X_18-003165-PUMP-STATION X_18-003165-CATCHMENTS X_18-003165-MAINTENANCE HOLE X_18-003165-EX-SBM X_18-003165-AERIAL IMAGE X_18-003165-EX-SGM X_18-003165-DESIGN

REVISION	DATE	ISSUE DETAILS	DRAWN	DESIGN
A	25.02.20	ORIGINAL ISSUE	JM	TC
B	07.04.20	RE-ISSUE FOR APPROVAL	JM	TC
C				
D				
E				
F				
G				
H				

DRAWN CHECK

DESIGN CHECK

STATUS

NOT FOR CONSTRUCTION

SCALE

0 200 400 600 800 1000 1200 1400 1600

SCALE 1:20000 (A1) SCALE 1:40000 (A3)

CLIENT

REDLAND INVESTMENT CORPORATION

calibre

 calibregroup.com

PROJECT

WEINAM CREEK PDA WATER & WASTEWATER SERVICING REVIEW

DISCLAIMER

ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE.

DRAWING TITLE

RCC PROPOSED NETWORK AUGMENTATIONS

PROJECT No.	DRAWING No.	REVISION
18-003165	SK01	B

LEGEND

- PDA SITE BOUNDARY
- CADASTRE
- LOT BOUNDARY
- EXISTING DN100 SEWER GRAVITY MAIN
- EXISTING DN150 SEWER GRAVITY MAIN
- EXISTING DN225 SEWER GRAVITY MAIN
- EXISTING DN300 SEWER GRAVITY MAIN
- EXISTING SEWER RISING MAIN
- PROPOSED DN150 SEWER GRAVITY MAIN
- PROPOSED DN200 SEWER GRAVITY MAIN
- PROPOSED DN225 SEWER GRAVITY MAIN
- PROPOSED DN200 SEWER RISING MAIN
- EXISTING SEWER PUMP STATION
- PROPOSED DEVELOP AREA

NOTES:

1. THIS PLAN IS CONCEPT ONLY AND SUBJECT DETAILED ANALYSIS.
2. INFRASTRUCTURE SIZE, LOCATION AND ALIGNMENT ARE INDICATIVE ONLY SUBJECT TO SURVEY.
3. EXISTING INFRASTRUCTURE CAPACITY SUBJECT TO FURTHER INVESTIGATION.
4. PROPOSED STRATEGY IS SUBJECT TO FUTURE PLANNING AND DETAILED DESIGN.

FILE: 18-003165-SK01-SK02.dwg DATE: 24-02-2020 USER: JOSE MOLINA
XREFS: X_18-003165-TITLE X_18-003165-EX-CADASTRE X_18-003165-PUMP-STATION X_18-003165-CATCHMENTS X_18-003165-MAINTENANCE HOLE X_18-003165-EX-SBM X_18-003165-AERIAL IMAGE X_18-003165-EX-SGM X_18-003165-DESIGN

REVISION	DATE	ISSUE DETAILS	DRAWN	DESIGN
A	25.02.20	ORIGINAL ISSUE	JM	TC
B	07.04.20	RE-ISSUE FOR APPROVAL	JM	TC
C				
D				
E				
F				
G				
H				

DRAWN CHECK

DESIGN CHECK

STATUS

NOT FOR CONSTRUCTION

SCALE

0 200 400 600 800 1000 1200 1400 1600

SCALE 1:20000 (A1) SCALE 1:40000 (A3)

CLIENT

REDLAND INVESTMENT CORPORATION

calibre

 calibregroup.com

PROJECT

WEINAM CREEK PDA WATER & WASTEWATER SERVICING REVIEW

DISCLAIMER

ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE.

DRAWING TITLE

CALIBRE PROPOSED NETWORK AUGMENTATIONS

PROJECT No.	DRAWING No.	REVISION
18-003165	SK02	B

WEINAM CREEK PRIORITY DEVELOPMENT AREA

Appendix D Cost Estimate Table

REDLAND INVESTMENT CORPORATION

Project Weinam Creek W&WW Review
Date 7th April 2020

Description	Quantity	Diameter	Base Unit Rate	Site Condition Multiplier	Adjusted Unit Rate	Base Cost	On Cost	Contingency	Total Estimated Cost	Rounded Total
Proposed DN375 water main	1,135	DN375	$ 620	1.5	$ 930	$ 1,055,550	$ 211,110	$ 126,666	$ 1,393,326	$ 1,390,000
Proposed DN300 water main	830	DN300	$ 421	1.5	$ 632	$ 524,145	$ 104,829	$ 62,897	$ 691,871	$ 690,000
Proposed DN250 water main	420	DN250	$ 317	1.5	$ 476	$ 199,710	$ 39,942	$ 23,965	$ 263,617	$ 260,000
Proposed DN200 water main	840	DN200	$ 235	1.5	$ 353	$ 296,100	$ 59,220	$ 35,532	$ 390,852	$ 390,000
Proposed DN150 water main	1,510	DN150	$ 177	1.5	$ 266	$ 400,905	$ 80,181	$ 48,109	$ 529,195	$ 530,000
Proposed PRV & Meter Assembly	1 Unit	-	$ 100,000	1.5	$ 150,000	$ 150,000	$ 30,000	$ 18,000	$ 198,000	$ 200,000
Proposed DN200 rising main (replace existing)	800	DN200	$ 320	1.5	$ 480	$ 384,000	$ 76,800	$ 46,080	$ 506,880	$ 510,000
Proposed DN225 sewer duplication (existing DN150)	65.8	DN225	$ 294	6	$ 1,764	$ 116,071	$ 23,214	$ 13,929	$ 153,214	$ 150,000
Proposed DN200 sewer duplication (existing DN150)	172	DN200	$ 254	6	$ 1,524	$ 262,128	$ 52,426	$ 31,455	$ 346,009	$ 350,000
Proposed DN150 sewer duplication (existing DN150)	154.7	DN150	$ 223	6	$ 1,338	$ 206,989	$ 41,398	$ 24,839	$ 273,225	$ 270,000
Additional offline emergency storage	1 Unit	-	$ 100,000	1.5	$ 150,000	$ 150,000	$ 30,000	$ 18,000	$ 198,000	$ 200,000
SPS pump replacement	2 Pumps	-	$ 10,000	1.5	$ 15,000	$ 30,000	$ 6,000	$ 3,600	$ 39,600	$ 40,000
					Total	$ 3,775,598	$ 755,120	$ 453,072	$ 4,983,789	$ 4,980,000

Site Condition Multipliers	
Development Type	
Greenfield	1
Brownfield	1.5
Dense Urban	2.2
Depth	
0-3m	1
3-5m	1.4
> 5m	2
Soil	
Good Soil	1
ASS	1.5
Rock	2
Length	
< 100 m	3
100 - 200 m	2
> 200 m	1
Other	
Environmental	3.0
Dense Urban	4.0
Trenchless	10

Notes:
1) Base rates adopted in accordance with recent tender rates.
2) Rates assume good ground conditions with standard open trench construction methods
3) Gravity sewer rates include allowance for maintenance hole replacement / augmentation.
4) Total item cost estimates include 20% On Cost & 10% contingency.
5) Total item cost estimates rounded to the nearest $10,000.