PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

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Queensland Government

Teviot Village

Water and Wastewater Network Analysis

Prepared by Calibre Consulting
Prepared for Villa Green Pty Ltd

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EXECUTIVE SUMMARY

Calibre Consulting (Qld) Pty Ltd has been engaged by Villa Green Pty Ltd to prepare this *Water and Wastewater Network Analysis* report for the proposed Teviot Village Residential Development at Pub Lane, Greenbank.

The purpose of this report is to demonstrate that the development can be serviced generally in accordance with the Economic Development Queensland (EDQ) Greenbank Priority Development Area (PDA) Water Supply and Wastewater Servicing Strategies. Investigations undertaken demonstrate that water and wastewater infrastructure servicing options are available to service the ultimate study area yield of approximately 4,626 EP (1,652 lots). Consideration of trunk water and wastewater infrastructure staging in line with projected development growth was included as part of the investigation.

Water network investigations demonstrate that the Teviot Village Residential Development may be serviced via two connections to the existing DN300 water mains in Pub Lane. It is proposed that the Spring Mountain catchment is serviced via a DN300 connection to the existing DN300 water main in Pub Lane downstream of Spring Mountain reservoir. It is proposed that the Round Mountain HLZ will be serviced via a DN225 connection to the existing DN300 water main in Pub Lane downstream of Round Mountain reservoir. Due to pressure constraints, a local booster pump station will be required to service the proposed Round Mountain High Level Zone.

Wastewater network investigations demonstrate that the initial stages of the Teviot Village development may be serviced via a temporary Wastewater Treatment Plant (WWTP) to be located within the site. It is expected that the temporary WWTP will be designed, constructed, funded and operated by Logan Water and be in operation by September 2017.

Liaison with EDQ has indicated that a new WWTP at “Site B” will be in operation by 2021. Once commissioned, it is proposed that the on-site WWTP will be decommissioned and replaced with a Sewage Pump Station (SPS). Flows will be pumped south-east via a trunk network to the future North Maclean SPS. From here, flows will be conveyed to the “Site B” WWTP. The proposed strategies are consistent with the Logan City Council Approved “Logan South Wastewater Servicing Strategy” report prepared by Cardno, dated 27 May 2016.

Investigation of the water and wastewater service strategies demonstrate that the proposed Teviot Village Residential Development can be serviced generally in accordance with the EDQ Greenbank PDA Water and Wastewater Servicing Strategies. It is recommended that this *Water and Wastewater Network Analysis* report be approved and the service strategies presented within this report be incorporated into future design. It is considered that the preferred ultimate strategies may be refined once EDQ Greenbank PDA servicing strategies have been finalised.

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GLOSSARY

AD ..... Average Day

ADWF..... Average Dry Weather Flow

AHD…….. Australian Height Datum

C_2 …….. Coefficient for Dry Weather Flow

DN……. Diameter Nominal

du…….. Dwelling Units

DSS..... Desired Standards of Service

EDQ……..... Economic Development Queensland

EP..... Equivalent Persons

FF…….. Fire Flow

LCC…… Logan City Council

LWIA…….. Logan Water Infrastructure Alliance

MDMM..... Mean Day Max Month

NRW..... Non-Revenue Water

PD ..... Peak Day

PDA…… Priority Development Area

PDWF..... Peak Dry Weather Flow

PH ..... Peak Hour

PRV……. Pressure Reducing Valve

PWWF…….. Peak Wet Weather Flow

RIGS..... Reduced Inflow Gravity Sewer

RL…….. Relative Level

SEQ Code ..... South East Queensland Water Supply and Sewerage Design & Construction Code

SPS ..... Sewage Pump Station

SRWP…….. Southern Regional Water Pipeline

ULDA……. Urban Land Development Authority

WWTP…….. Wastewater Treatment Plant

1 INTRODUCTION

Calibre Consulting (Qld) Pty Ltd has been engaged by Villa Green Pty Ltd to prepare this *Water and Wastewater Network Analysis* report for the proposed Teviot Village Residential Development at Pub Lane, Greenbank. The proposed development is located within the Greenbank Priority Development Area (PDA) of the Logan City Council (LCC) local government area.

The proposed Teviot Village Residential Development layout is outlined in Appendix A. For clarity and consistency, the aforementioned development area will herein be referred to as the 'site' or 'Teviot Village'. The following investigation has allowed for a 10% contingency should this be required.

Water and wastewater servicing strategies for the Greenbank PDA have been developed by Economic Development Queensland (EDQ), previously known as the Urban Land Development Authority (ULDA). The purpose of this report is to demonstrate that the proposed Teviot Village development can be serviced in accordance with the servicing strategies developed by EDQ. It will also be demonstrated that the report is consistent with the LCC approved "Logan South Wastewater Servicing Strategy" report prepared by Cardno, dated 27 May 2016.

This document has been developed following consultation with Council, EDQ, Logan Water Infrastructure Alliance (LWIA) and other key stakeholders. An iterative process of infrastructure planning was undertaken with stakeholder input between February 2016 and December 2016. This report provides a summary of the outcomes and provides an overview of the supporting technical analyses.

This report (Issue B) has been revised in response to the EDQ information request (dated 28 April 2017). The water supply servicing strategy has been amended to reflect the updated LWIA Desired Standards of Service and to improve the network configuration through increasing available capacity within the Spring Mountain water supply zone. The wastewater service strategy has remained unchanged from what was previously endorsed.

2 SITE CHARACTERISTICS

2.1 LOCATION

The site is located at Pub Lane, Greenbank within the Logan City Council (LCC) local government area. The site has a total area of approximately 153 ha and has the real property description of Lot 9968 on SP163061. The site is bounded by a Queensland Railway Corridor to the east, Pub Lane to the south and rural properties to the north and west.

Figure 2-1 outlines the approximate location of the site.

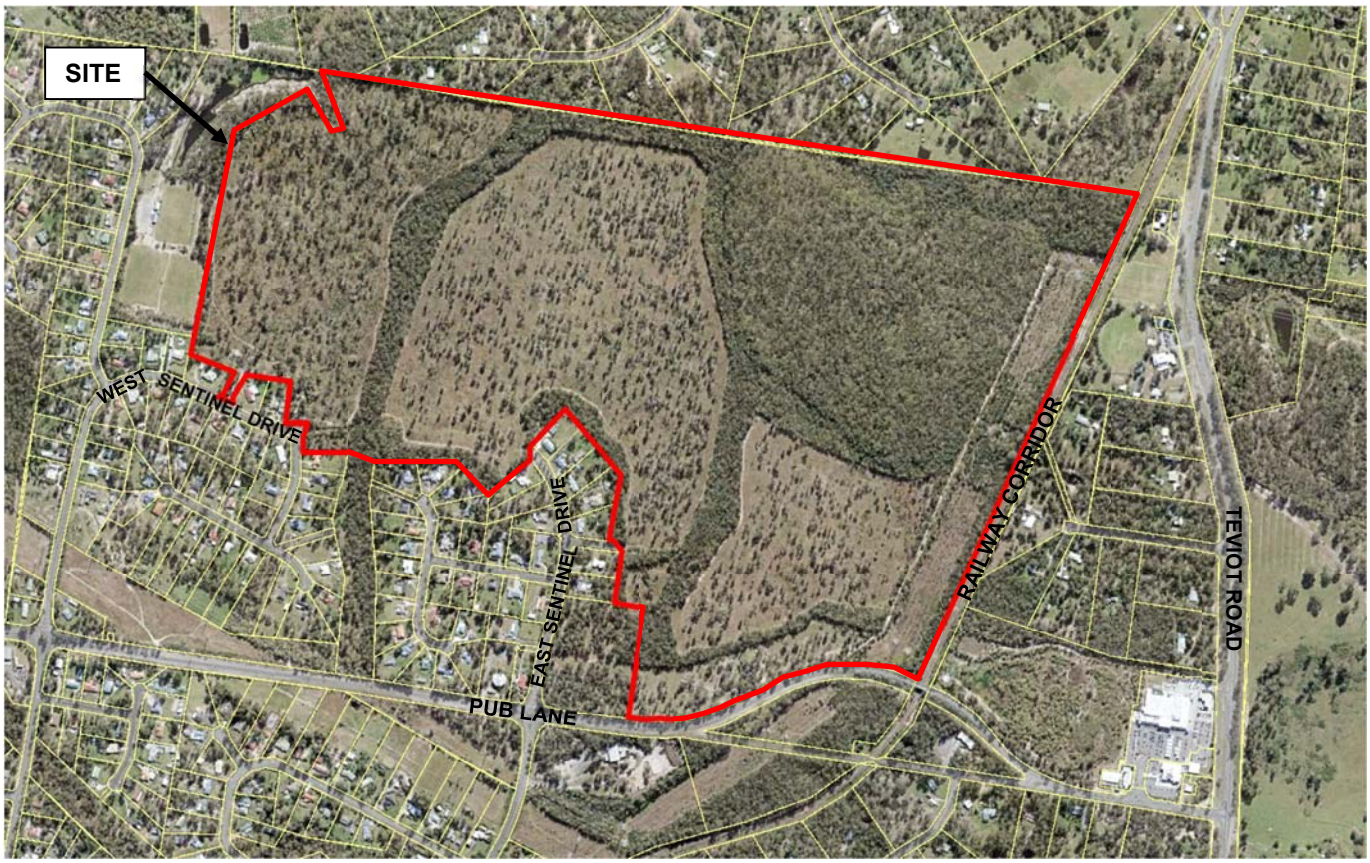


Figure 2-1: Site Location (Source: Google Earth)

The existing site is undeveloped with portions of the site already cleared. The natural surface elevations of the site range from approximately RL 75 mAHD at the southern boundary of the site adjacent to East Sentinel Drive to approximately RL 48 mAHD along the northern boundary of the site.

3 ASSUMPTIONS

This section provides an overview of the key assumptions made in developing the water and wastewater service strategies proposed to support the Teviot Village development.

3.1 INFORMATION SOURCES

The following information was provided by third parties in support of the water and wastewater assessment undertaken for the proposed development and is referenced within this report:

- Water Supply Boundary Conditions (LWIA, 11 November 2016).
- Teviot Downs Connection Points Figure 1 (LWIA, 15 June 2016).
- Logan South Wastewater Servicing Strategy (Cardno, 24 February 2016).
- Teviot Downs Estate Temporary STP Assessment & Costing (True Water DTR, October 2015).
- Greenbank PDA Water and Wastewater Servicing Figures 4, 5 and 7 (Cardno, July 2013).

For the purpose of this water and wastewater network analysis it has been assumed that the information provided above is the most accurate and appropriate at the time of reporting.

3.2 DESIRED STANDARD OF SERVICE

Issue A of this report was undertaken in accordance with the *South East Queensland Water Supply and Sewerage Design & Construction Code* (SEQ Code) for Logan Desired Standards of Service (DSS).

At the request of LWIA, assessment of the water supply infrastructure was undertaken in accordance with the updated LWIA DSS. The key criteria of the adopted DSS are as follows:

3.2.1 WATER

- Average Day Demand (AD): 165 L/EP/Day;
- Non-Revenue Water (NRW): 25 L/EP/Day
- Residential Fire Flow: 15 L/s for 2 hours;
- Commercial Fire Flow: 30 L/s for 4 hours;
- Minimum Service Pressure (Peak Hour Conditions): 22 m;
- Minimum Residual Pressure (Fire Flow Conditions): 12 m; and
- Target Maximum Service Pressure: 55 m.

3.2.2 WASTEWATER

- Average Dry Weather Flow (ADWF): 200 L/EP/Day;
- Peak Wet Weather Flow (PWWF): 5 x ADWF;
- Manning's 'n' value: 0.0128; and
- Maximum depth of flow in new pipes: 75% depth at PWWF.

3.3 GENERAL ASSUMPTIONS

3.3.1 WATER

For the purpose of this assessment it has been assumed that the Southern Regional Water Pipeline (SRWP) and greater South-East Queensland Water Grid have sufficient capacity to service the additional demands associated with the Greenbank PDA. It is anticipated that EDQ and LWIA will undertake future liaison with Seqwater to confirm sufficient capacity while balancing the supply allocations within the South-East Queensland Water Grid.

It is anticipated that trunk infrastructure external to the site within the Greenbank PDA, as outlined in Figure 5 within Appendix B, will be constructed after the proposed Teviot Village development. The proposed augmentations have not been accounted for within the assessment.

3.3.2 WASTEWATER

3.3.2.1 INTERIM HORIZON

Previous discussions with EDQ and the LWIA have indicated that a new temporary on-site Wastewater Treatment Plant (WWTP) will be operational to service the site by September 2017. It is expected that the temporary WWTP will be designed, constructed, funded and operated by Logan Water.

For the purpose of this assessment it has been assumed that the proposed land irrigation areas and buffer distances for the interim WWTP are in accordance with the relevant codes and standards.

3.3.2.2 ULTIMATE HORIZON

Previous discussions with EDQ and the LWIA have indicated that a new WWTP will be operational to service this region by 2021 (known as “Site B”). In the event that this new WWTP is deferred beyond 2021, it is anticipated that a second temporary WWTP may be required within the nearby development at Lot 434 on RP845844.

3.4 DEVELOPMENT PROJECTIONS

Ultimate development projections for the proposed Teviot Village development have been estimated in accordance with the RPS Proposed Overall Allotment Layout, *drawing 132965 – 03(G)* included within Appendix A. Equivalent Persons (EP) were estimated using the demand (by landuse) values prescribed within Table 4.2.5.7 of the Logan City Council Planning Scheme 2015. Table 3-1 outlines the equivalent water and wastewater demands calculated for the proposed Teviot Village development.

Table 3-1: Teviot Village Development Projections

Stage	Development Land Use	Quantity	Unit	Water Supply		Wastewater	
				EP/Unit	Total EP	EP/Unit	Total EP
Interim	Dwelling House	1,428	Dwelling	2.8	3,998.4	2.8	3,998.4
Ultimate	Dwelling House	1,502	Dwelling	2.8	4,205.6	2.8	4,205.6
Ultimate (Including 10% Contingency)	Dwelling House	1,652	Dwelling	2.8	4,625.6	2.8	4,625.6

As outlined in Table 3-1, it is anticipated that the proposed Teviot Village development will have water supply and wastewater equivalent populations of 4,206 EP. For modelling analyses, a 10% contingency has been applied. The adopted water supply and wastewater equivalent populations for design is 4,626 EP.

3.5 DEVELOPMENT HORIZONS

Water supply and wastewater servicing strategies have been developed across planning horizons. The timing of the horizons has been developed to align with the proposed commissioning of the proposed water booster pump station and the proposed “Site B” WWTP. It is anticipated that ultimate servicing strategies may be further refined as the regional servicing strategies are finalised.

4 WATER SUPPLY SERVICE STRATEGY

A water supply network assessment was undertaken to assess the infrastructure required to service the Teviot Village development. The proposed servicing strategy is generally in accordance with the EDQ Greenbank PDA Water Supply Servicing Strategy. Assessment was undertaken for the ultimate population projection of 4,626 EP (1,652 lots). All proposed water service strategies are conceptual only and remain subject to detailed engineering design, however the strategies are generally considered final.

4.1 METHODOLOGY

Water supply network modelling was undertaken with InfoWater Suite 12.3. The proposed water supply network was developed by Calibre Consulting. Network infrastructure was assessed against the LCC desired standards of service outlined within the SEQ Code.

The water supply network was developed in accordance with the boundary conditions provided by LWIA, included within Appendix C. Boundary conditions were provided for three potential connection locations as follows:

- Location 1: Existing DN150 water main in Cunningham Drive. Pressure managed catchment downstream of Spring Mountain Reservoir.
- Location 2: Existing DN300 water main in Pub Lane. Downstream of Spring Mountain Reservoir.
- Location 3: Existing DN300 water main in Pub Lane. Downstream of Round Mountain Reservoir.

Table 4-1 provides a summary of the hydraulic heads at the connection locations as provided by LWIA for the purpose of assessing the Teviot Village development.

Table 4-1: LWIA Boundary Conditions for Teviot Village development

Horizon	DN150 water main in Cunningham Drive (Spring Mountain Head)	DN300 water main in Pub Lane (Spring Mountain Head)	DN300 water main in Pub Lane (Round Mountain Head)
2018	105 m	135 m	84 m
2021	105 m	130 m	82 m
2026	105 m	122 m	81 m

Issue A of this report was undertaken based on LWIA advice that the capacity from Spring Mountain Reservoir is constrained to a maximum of 2186 EP. Following further liaison with EDQ and LWIA, it is noted that the capacity from Spring Mountain Reservoir is now constrained to a maximum of 2,500 EP.

The network investigation was undertaken generally in accordance with the EDQ Greenbank PDA Water Supply Servicing Strategy. Assessment was undertaken for three planning horizons:

1. Interim Horizon (2018 planning horizon): For the purpose of this assessment, the interim horizon will be for up to 736 lots (2,061 EP).
2. Intermediate Horizon (2021 planning horizon): For the purpose of this assessment, the intermediate horizon will be for up to 1,428 lots (4,000 EP).
3. Ultimate Horizon (2026 planning horizon): Trunk infrastructure to service the site. For the purpose of this assessment, the ultimate horizon will be for up to 1,652 lots (4,626 EP).

4.2 WATER SUPPLY FLOW PROJECTION

The design water supply demands were calculated based on the population projections outlined in Table 3-1. Water demands were estimated in accordance with the two planning horizons as outlined in Section 4.1. The design water demands are outlined in Table 4-2.

Table 4-2: Teviot Village Water Supply Demand Projections

Planning Horizon	Demand (EP)	AD (L/s)	NRW (L/s)	MDMM (L/s)	PD (L/s)	PH (L/s)	FF (L/s)
Interim	2,061	4.53	0.60	5.71	7.29	12.80	15
Intermediate	4,000	8.80	1.16	11.09	14.14	24.84	15
Ultimate	4,626	10.17	1.34	12.82	16.36	28.73	15

Note: 1) 15 L/s fire flow triggered by residential land uses within the site.

The design water demands were estimated using an Average Day demand of 165 L/EP/day and a non-revenue water allowance of 25 L/EP/day. Peaking factors were not applied to the non-revenue water allowance. The ultimate Teviot Village demand of 4,626 EP has an estimated Peak Hour (PH) flow of 28.7 L/s and will require a minimum Fire Flow (FF) capacity of 15 L/s for 2 hours.

4.3 EXISTING WATER SUPPLY NETWORK INFRASTRUCTURE

Drawing No.16-002518-WS001 within Appendix E outlines the existing water supply infrastructure within the vicinity of the site. There are two existing trunk DN300 water mains to the south of the site in Pub Lane. The two DN300 water mains are supplied via different catchment reservoirs – Spring Mountain and Round Mountain. The Spring Mountain catchment is a high-level service zone while Round Mountain is a low-level service zone. There is also an existing DN150 water main and a DN80 water main within Cunningham Drive and West Sentinel Drive respectively. These mains are part of a pressure managed zone within the Spring Mountain catchment.

4.4 PROPOSED WATER SUPPLY SERVICE STRATEGY

Drawings No.16-002518-WS001 to WS006 within Appendix E outline the proposed water supply servicing strategies for the three proposed planning horizons. The proposed servicing strategies are generally in accordance with the EDQ Greenbank PDA Water Supply Servicing Strategy.

As outlined on *drawings No.16-002518-WS001 and WS002*, it is proposed that the initial stages of the Teviot Village development will be serviced via connection to the Spring Mountain catchment. It is proposed that a DN300 connection will be made to the existing DN300 water main in Pub Lane that is downstream of Spring Mountain reservoir. In order to defer construction of the booster pump station, it is proposed that Stages 1-3 of the site be serviced via a DN150 cross connection to the Spring Mountain catchment. The location of the cross connection is indicative only and subject to detailed design.

Due to maximum pressure constraints, it is proposed that a PRV will be located on the DN300 trunk water main near the site boundary. An internal reticulation network consisting of DN225, DN150 and DN100 water mains is proposed to connect to the DN300 trunk water main to service the initial stages of the development. To facilitate future development stages, it is also proposed that during Stage 1 works a new DN225 connection will be made to the existing DN300 water main in Pub Lane that is downstream of Round Mountain reservoir. The main will be closed during the interim horizon.

As outlined on *drawings No.16-002518-WS003 and WS004*, it is proposed that, during the intermediate horizon, the site will be serviced via two catchments – Spring Mountain catchment and Round Mountain High Level Zone (HLZ). Due to pressure constraints, it is proposed that a new booster pump station will be constructed to service the Round Mountain

HLZ. The booster pump station will be supplied via the DN225 water main proposed to be constructed during Stage 1 works.

In order to achieve the capacity constraints within the Spring Mountain catchment, it is proposed that the DN150 cross connection servicing Stages 1-3 of the development be normally closed following the interim horizon. It is proposed the eastern portion of the site is serviced via an internal reticulation network consisting of DN100 and DN150 water mains that are supplied via the booster pump station.

It is proposed that the western portion of the site is serviced via an internal reticulation network which connects to the Spring Mountain reticulation proposed in the interim horizon.

Drawings No.16-002518-WS005 and WS006 outline the proposed ultimate development servicing strategy. It is proposed that the balance of the development will be serviced via an internal reticulation network consisting of DN100 and DN150 water mains which connect to reticulation from previous development horizons. In accordance with the LWIA requirement outlined in Section 4.1, the Spring Mountain service catchment will not exceed a catchment demand of 2,500 EP.

For security of supply purposes, it is proposed that secondary connections, with normally closed boundary valves, will be made to the existing DN150 water main in Cunningham Drive, to the existing DN80 water main in West Sentinel Drive and between the proposed internal service catchments.

Infrastructure sizing has been developed to meet minimum pressure requirements under peak hour and fire flow demands. Provision has been made to align interim supply mains with the proposed road construction sequencing in order to minimise costs. Staging of the trunk water mains, booster pump configurations and alignments of reticulation water mains will be refined during future applications.

4.5 WATER SUPPLY NETWORK ASSESSMENT

A water supply network assessment has been undertaken in accordance with the development boundary conditions provided by LWIA and summarised in Table 4-1.

As outlined in Section 4.4, it is proposed that the ultimate development will be serviced via new DN300 and DN225 connections to the existing DN300 water mains in Pub Lane downstream of Spring Mountain reservoir and Round Mountain reservoir respectively. Due to pressure constraints, a new high level zone (Round Mountain HLZ) will be developed off the Round Mountain catchment via a new booster pump station. Table 4-3 outlines the lot and EP yields proposed under the ultimate horizon to be serviced via each catchment.

Table 4-3: Teviot Village Water Supply Ultimate Demand Projections

Catchment	Lots	Lots inc. 10% contingency	Total EP [1]
Spring Mountain Catchment	796	876	2,452.8
Round Mountain HLZ Catchment	706	776	2,172.8

Note: 1) Total EP in accordance with lot yield including 10% contingency.

As outlined in Table 4-3, the Spring Mountain catchment has been planned to not exceed the 2,500 EP threshold as specified by LWIA.

It is intended that the proposed booster pump station and PRV configurations and operation will be designed during detailed design. For the purpose of this assessment, pump stations and PRV's have been optimised to reduce maximum pressures while still maintaining required DSS.

Table 4-4 identifies the minimum network pressures modelled within the two service catchments under PH and FF conditions during the interim, intermediate and ultimate planning horizons.

Table 4-4: Internal Network Performance

Planning Horizon	Spring Mountain Catchment		Round Mountain HLZ Catchment	
	Minimum PH Pressure	Minimum FF Pressure	Minimum PH Pressure	Minimum FF Pressure
Interim Horizon	31.85	18.39	-	-
Intermediate Horizon	31.43	18.47	30.03	16.82
Ultimate Horizon	31.48	19.02	27.72	15.69

As outlined in Table 4-4, water network modelling indicates that the proposed water supply networks have sufficient capacity to service the proposed demands associated with the Teviot Village development area. Water network modelling indicated that the minimum pressure within the site during peak hour demand would be 27.72 m, above the SEQ Code minimum requirement of 22 m. Network modelling under fire flow conditions indicated that the minimum residual pressure would be 15.69 m, greater than the 12 m requirement.

4.6 WATER SUPPLY SERVICING SUMMARY

Based on the network modelling analyses, it is considered that the internal and external water supply networks can service the proposed Teviot Village development generally in accordance with the EDQ Greenbank PDA Water Supply Servicing Strategy.

5 WASTEWATER SERVICE STRATEGY

A wastewater network assessment was undertaken to assess the infrastructure required to service the Teviot Village development. The proposed servicing strategy is generally in accordance with the EDQ Greenbank PDA Wastewater Servicing Strategy and the "Logan South Wastewater Servicing Strategy" report prepared by Cardno. Assessment was undertaken for the ultimate population projection of 4,626 EP (1,652 lots). All proposed wastewater service strategies are conceptual only and remain subject to detailed engineering design, however the strategies are generally considered final.

5.1 METHODOLOGY

Wastewater network modelling was undertaken with the use of InfoSWMM Suite 14.5. The proposed wastewater network was developed by Calibre Consulting. Network infrastructure was assessed against the LCC desired standards of service outlined within the SEQ Code.

The network investigation was undertaken generally in accordance with the EDQ Greenbank PDA Wastewater Servicing Strategy. Assessment was undertaken for two planning horizons:

1. Interim Horizon (2021 planning horizon): Temporary on-site WWTP. For the purpose of this assessment, the interim horizon will be for up to 1,428 lots (4,000 EP).
2. Ultimate Horizon: Trunk infrastructure to service the site. For the purpose of this assessment, the ultimate horizon will be for up to 1,652 lots (4,626 EP).

The wastewater assessment has given provision to external sewerage loads from upstream catchments. The external sewerage loads were adopted in accordance with the EDQ advice included within Appendix D.

5.2 WASTEWATER LOAD PROJECTIONS

The design wastewater loads were calculated based on the population projections outlined in Table 3-1. Wastewater loads were estimated in accordance with the interim and ultimate planning horizons as outlined in Section 5.1. The design wastewater loads are outlined in Table 5-1.

Table 5-1: Teviot Village Wastewater Daily Flow Projection

Planning Horizon	Demand (EP)	ADWF (L/s)	C_2	PDWF (L/s)	PWWF (L/s)
Interim	4,000	9.26	1.97	18.22	46.30
Ultimate	4,626	10.71	1.94	20.75	53.54

The design wastewater loads were estimated using the Reduced Inflow Gravity Sewer (RIGS) ADWF load of 200 L/EP/d. An ultimate Peak Wet Weather Flow (PWWF) rate of 53.54 L/s is estimated to discharge from the Teviot Village development.

External wastewater loads were adopted in accordance with the EDQ advice included within Appendix D. Table 5-2 outlines the projected wastewater loads associated with the external developments.

Table 5-2: External Wastewater Daily Flow Projection

Catchment	Demand (EP)	ADWF (L/s)	C_2	PDWF (L/s)	PWWF (L/s)
External	1,260	2.92	2.22	6.48	14.58

As outlined in Table 5-2, it is projected that external catchments will convey a PWWF of 14.58 L/s to the infrastructure within the site. The development loads have been allocated to the nearest manhole from the markers shown in Appendix C.

5.3 EXISTING NETWORK

There is no existing wastewater infrastructure within the vicinity of the site. In accordance with the EDQ Greenbank PDA Wastewater Servicing Strategy, included within Appendix B, it is proposed that a new WWTP will be constructed approximately 9.5km to the east of the site adjacent the Logan River. Liaison with EDQ and the LWIA has indicated that the proposed WWTP at "Site B" will be operational by 2021.

5.4 PROPOSED WASTEWATER SERVICE STRATEGY

Drawings No.16-002518-WW001 to WW003 within Appendix E outline the proposed wastewater service strategies for the two proposed planning horizons. The proposed servicing strategies are generally in accordance with the EDQ Greenbank PDA Wastewater Servicing Strategy and the LCC endorsed "Logan South Wastewater Servicing Strategy" report prepared by Cardno, dated 27 May 2016.

As outlined on *Drawing No.16-002518-WW001*, it is proposed that the initial stages of the Teviot Village development will be serviced via an internal gravity network which conveys wastewater to a temporary WWTP to be located within the site. It is proposed that the WWTP will be located adjacent the green space network, at the northern boundary of the site. Once treated, effluent will be transported to an irrigation area located along the eastern boundary of the site. It is intended that the temporary WWTP will be designed, constructed, funded and operated by Logan Water and be in operation by September 2017. Indicative irrigation areas, as outlined on *Drawing No.16-002518-WW001*, have been adopted generally in accordance with the True Water DTR Pty Ltd temporary WWTP ERA 63 Approval. It is anticipated that the irrigation area will be approximately 5ha.

Approval for the temporary WWTP has been granted to service up to 4,000 EP (or 1,428 lots). It is anticipated the temporary WWTP may also service additional demands from the future nearby development at Lot 434 on RP845844 and the local shopping centre site. The additional flows may trigger a revised ERA63 application. It is proposed that flows from the external developments will be pumped to the WWTP via GB2 SPS located on Lot 434 on RP845844 and approximately 4.1km of OD315 rising main.

It is anticipated that the proposed "Site B" WWTP will be in operation by 2021. As outlined on *Drawing No.16-002518-WW002*, it is proposed that the on-site WWTP will be decommissioned and replaced with a SPS. It is proposed that operation of the OD315 rising main will be reversed to convey flows from the on-site SPS to the GB2 SPS. As outlined on *Drawing No.16-002518-WW003*, flows will then be conveyed south-east to the "Site B" WWTP via the future North Maclean SPS.

Should the "Site B" WWTP be deferred beyond 2021, it is considered that a second temporary WWTP will be provided by LWIA to at the nearby external site to allow development to proceed without delay.

Drawing No.16-002518-WW002, outlines the proposed infrastructure required to service the ultimate Teviot Village development. Conceptual longitudinal sections for proposed development trunk gravity mains are outlined in *drawings* 16-002518-*SK01 to SK05* within Appendix F.

Infrastructure sizing has been developed with sufficient capacity to convey ADWF and PWWF in accordance with the SEQ Code. Provision has been made to align interim wastewater mains with the proposed road construction sequencing in order to minimise costs.

5.5 WASTEWATER NETWORK ASSESSMENT

Assessment of the internal wastewater network was undertaken with the use of InfoSWMM software to ensure sufficient capacity is provided to service the proposed Teviot Village development. Onsite wastewater infrastructure has been conceptually designed in accordance with the SEQ Code and remains subject to detailed engineering design during individual development applications. The following outlines the concept design and assessment undertaken for the internal wastewater network infrastructure proposed for the development.

5.5.1 GRAVITY SEWER CONCEPTUAL DESIGN

As outlined in Section 5.4, it is proposed that the Teviot Village development will be serviced via a gathering network consisting of DN375, DN300, DN225 and DN150 gravity mains. Gravity mains have been sized to service the ultimate development area. Table 5-3 details the design specifications for the proposed internal gravity network.

Table 5-3: Internal Gravity Network Capacity Summary

Pipe Diameter (mm)	Minimum Grade (m)	Pipe Capacity @ 75% (L/s)	Pipe Full Capacity (L/s)
DN150	1:180	10.5	11.5
DN225	1:300	24.0	26.3
DN300	1:400	44.8	49.1
DN375	1:550	69.2	75.9

The internal sewer network has been planned with sufficient capacity to convey PWWF without exceeding 75% of pipe capacity. The internal reticulation network proposed to service the Teviot Village development is outlined on d*rawing No.16-002518-WW002* within Appendix E.

Conceptual longitudinal sections for proposed development trunk gravity mains are outlined in *drawings* 16-002518-*SK01 to SK05* within Appendix F.

5.5.2 PUMP STATION PLANNING

Drawing No.16-002518-WW002 within Appendix E outlines the proposed location of the sewage pump station proposed to service the Teviot Village development. Table 5-4 outlines the concept design components of the pump station.

Table 5-4: Concept Sewage Pump Station Operational Requirements

Catchment (EP)	ADWF (L/s)	PWWF (L/s)	Operational Storage (m^3)	[1]Emergency Storage (kL)
5,886	13.63	68.13	5.80	196.20

Note: 1) Minimum emergency storage calculated for 4 hours ADWF in accordance with the SEQ Code.

The proposed pump station has been sized to cater for the ultimate Teviot Village development and external demands. It is anticipated that sufficient emergency storage will be provided within the wet well and upstream gravity network. Available network emergency storage will be confirmed during detailed design.

5.5.3 RISING MAIN ASSESSMENT

The rising main alignment is subject to detailed design by LWIA. *Drawing No.16-002518-WW002* within Appendix E outlines the proposed alignment of the rising main within the Teviot Village development site. For the purpose of this assessment, the rising main has been assumed to discharge the future GB2 SPS as identified in the "Logan South Wastewater Servicing Strategy" report. Table 5-5 outlines the proposed rising main performance during the ultimate horizon.

Table 5-5: Proposed Rising Main Operation

PWWF (L/s)	Diameter (mm)	Length (m)	Velocity (m/s)	Retention Time (hrs)
68.06	OD315 (ID 256.1)	4,100	1.32	4.31

The proposed rising main infrastructure has been planned to meet the preferred maximum velocity requirement of 1.5 m/s as outlined in the SEQ Code.

5.6 WASTEWATER SERVICING SUMMARY

Through wastewater network analysis it has been demonstrated that the proposed trunk wastewater network as outlined on *drawings No.16-002518-WW001 to WW003* within Appendix E and *drawings* 16-002518-*SK01 to SK05* within Appendix F is capable of servicing the Teviot Village residential development.

6 CONCLUSIONS

Calibre Consulting (Qld) Pty Ltd has been engaged by Villa Green Pty Ltd to prepare this *Water and Wastewater Network Analysis* report for the proposed Teviot Village Residential Development at Pub Lane, Greenbank. Water supply and wastewater servicing strategies were developed generally in accordance with the EDQ Greenbank PDA Water Supply and Wastewater Servicing Strategies.

Water network modelling was undertaken for three planning horizons. As outlined on *drawings No.16-002518-WS001 and WS002* within Appendix E, it is proposed that the initial stages of the Teviot Village development will be serviced via a DN300 connection to the existing DN300 water main in Pub Lane that is downstream of Spring Mountain reservoir. An internal reticulation network consisting of DN225, DN150 and DN100 water mains is proposed to connect to the DN300 trunk water main to service the initial stages of the development.

As outlined on *drawings No.16-002518-WS003 and WS004*, it is proposed that, during the intermediate horizon, the site will be serviced via two catchments – Spring Mountain catchment and Round Mountain High Level Zone (HLZ). Due to pressure constraints, it is proposed that a new booster pump station will be constructed to service the Round Mountain HLZ. The booster pump station will be supplied via a new DN225 water main which is to connect to the existing DN300 water main in Pub Lanem, downstream of Round Mountain reservoir. It is proposed that the DN150 cross connection servicing Stages 1-3 of the development be normally closed following the interim horizon.

As outlined on d*rawings No.16-002518-WS005 and WS006* within Appendix E, it is proposed that the balance of the site will be serviced an internal reticulation network connecting to water mains from initial development stages.

Water supply network modelling with the use of InfoWater was undertaken in accordance with the boundary conditions provided by LWIA. Network analyses confirmed that the proposed water supply networks can service the proposed Teviot Village development in accordance with the EDQ Greenbank PDA Water Supply Servicing Strategy.

As outlined on *Drawing No.16-002518-WW001*, it is proposed that the initial stages of the Teviot Village development will be serviced via an internal gravity network which conveys wastewater to a temporary WWTP to be located within the site. The temporary WWTP will be designed, constructed, funded and operated by Logan Water and be in operation by September 2017. Approval for the temporary WWTP has been granted to service up to 1,428 lots from the site (or 4,000 EP). The temporary WWTP may also service additional demands from the future nearby developments, subject to a revised ERA63 approval. Flows from the external development will be pumped to the WWTP via a SPS and rising main.

Liaison with EDQ and LWIA has indicated that a new WWTP at “Site B” will be in operation by 2021. As outlined on *Drawing No.16-002518-WW002*, it is proposed that the on-site WWTP will be decommissioned and replaced with a SPS. Flows will be pumped south-east via trunk infrastructure to the “Site B” WWTP. It is proposed that the rising main used to convey flows from the external site to the temporary WWTP will be utilised in the ultimate case to reverse flows to the GB2 SPS.

Should the “Site B” WWTP be deferred beyond 2021, it is considered that a second temporary WWTP will be provided by LWIA at the nearby external site to allow both developments to proceed without delay.

The internal gravity reticulation network is proposed to consist of DN150, DN225, DN300 and DN375 gravity mains. Network modelling with the use of InfoSWMM has confirmed that the proposed network is sufficiently sized to service the proposed Teviot Village development in accordance with the EDQ Greenbank PDA Wastewater Servicing Strategy. The proposed strategies are consistent with the Logan City Council Approved “Logan South Wastewater Servicing Strategy” report prepared by Cardno, dated 27 May 2016.

Internal water supply and wastewater infrastructure was conceptually designed in accordance with the SEQ Code requirements. Through water and wastewater network analyses it was determined that the proposed Teviot Village Residential Development can be serviced in accordance with the EDQ Greenbank PDA Water Supply and Wastewater Servicing Strategies.

7 RECOMMENDATIONS

Calibre Consulting recommends that this *Water and Wastewater Network Analysis* report for the Teviot Village Residential Development be approved on the basis that the site provides suitable water and wastewater network infrastructure.

Calibre Consulting recommends the following be undertaken in support of the proposed development:

- Adopt the water supply service strategies as outlined on d*rawings No.16-002518-WS001 to WS006* within Appendix E.
- Adopt the wastewater service strategy as outlined on d*rawings No.16-002518-WW001 to WW003* within Appendix E.
- Undertake detailed design in accordance with the proposed water and wastewater strategies.
- Review the ultimate water supply and wastewater servicing strategies following finalisation of the EDQ Greenbank PDA Water Supply and Wastewater Servicing Strategies.

8 REFERENCES

- Cardno (24 February 2016), *Logan South Wastewater Servicing Strategy.*
- Logan City Council (2015), *Logan Planning Scheme SC6.2.5 Planning Scheme Policy.*
- SEQ Water (2013), SEQ Code – *South East Queensland Water Supply and Wastewater Design & Construction Code.*
- True Water DTR (October 2015), *Teviot Downs Estate Temporary STP Assessment & Costing.*

APPENDICES

APPENDIX A	DEVELOPMENT LAYOUT
APPENDIX B	GREENBANK PDA SERVICE STRATEGIES
APPENDIX C	LWIA WATER SUPPLY CORRESPONDENCE
APPENDIX D	LWIA WASTEWATER CORRESPONDENCE
APPENDIX E	CALIBRE CONSULTING SERVICE STRATEGIES
APPENDIX F	CALIBRE CONSULTING CONCEPTUAL LONG-SECTIONS

APPENDIX A DEVELOPMENT LAYOUT

Yield Breakdown

Residential Allotments	Typical Allotment Size		Overall	
	Dimensions	Area	Lots	%
28m Deep Allotments				
Villa Allotment	10.5 x 28m	294m²	53	4%
Premium Villa Allotment	12.5 x 28m	350m²	258	17%
Courtyard Allotment	14 x 28m	392m²	208	14%
Premium Courtyard Allotment	16 x 28m	448m²	63	4%
Sub Total 28m Deep Allotments			**582**	**39%**
30m Deep Allotments				
Villa Allotment	10.5 x 30m	315m²	51	3%
Premium Villa Allotment	12.5 x 30m	375m²	338	23%
Courtyard Allotment	14 x 30m	420m²	291	19%
Premium Courtyard Allotment	16 x 30m	480m²	85	6%
Traditional Allotment	20 x 30m	600m²	3	0%
Sub Total 30m Deep Allotments			**768**	**51%**
32m Deep Allotments				
Villa Allotment	10.5 x 32m	336m²	13	1%
Premium Villa Allotment	12.5 x 32m	400m²	40	3%
Courtyard Allotment	14 x 32m	448m²	61	4%
Traditional Allotment	20 x 32m	640m²	1	0%
Premium Traditional Allotment	22 x 32m	704m²	5	0%
Sub Total 32m Deep Allotments			**120**	**8%**
Lifestyle Allotments				
Lifestyle Allotment	n/a	800 - 1999m²	7	0%
Premium Lifestyle Allotment	n/a	2000m² +	25	2%
Sub Total Lifestyle Allotments			**32**	**2%**
Total Residential Allotments			**1502**	**100%**
Super Lots				
Service Allotments			**3**	

Land Budget

Land Use	Overall	
	Area	%
Area of Subject Site	**149.9708 ha**	**100.0%**
Saleable Area		
Residential Allotments	68.7406 ha	45.8%
Balance Allotments (Future Mixed Density)	—	0.0%
Service Allotments	0.2075 ha	0.1%
Total Area of Allotments	**68.9481 ha**	**46.0%**
Road		
Local Roads	24.8650 ha	16.6%
Collector Roads	4.1764 ha	2.8%
Trunk Collector Roads	2.7437 ha	1.8%
Total Area of New Road	**31.7851 ha**	**21.2%**
Open Space		
District Sports Park	2.8256 ha	1.9%
Linear Open Space (Active)	13.8040 ha	9.2%
Linear Open Space (Conservation)	19.6080 ha	13.1%
Neighbourhood Recreation Park	1.6102 ha	1.1%
Pedestrian Linkage / Landscape Treatment	0.8233 ha	0.5%
Existing Easement	10.5665 ha	7.0%
Total Open Space	**49.2376 ha**	**32.8%**

Legend

General
- Site Boundary
- Stage Boundary
- Indicative External Footpath
- Management Lot Area
- Bus Stop

Constraints
- 10m Protected Vegetation / Building Exclusion Zone Buffer in Allotment
- Retained Remnant Endangered Regional Ecosystem
- 33m Buffer to Remnant Endangered Regional Ecosystem
- 33m Bushfire Setback
- Drainage Centerline
- BMD Q100
- 50m Buffer to Sewer Pump Station

Scale 1 : 2500 @ A1

0 20 40 60 80 100 120 140

REVISION
A: 28/02/2017 - Council feedback amendments

Note:
All Lot Numbers, Dimensions and Areas are approximate only, and are subject to survey and Council approval.

Dimensions have been rounded to the nearest 0.1 metres.

Areas have been rounded down to the nearest 5m².

The boundaries shown on this plan should not be used for final detailed engineers design.

Source Information:
Site boundaries: Land Partners.
Adjoining information: DCDB.
Contours: Land Partners
Flood: BMD

CLIENT
VILLA GREEN PTY LTD

PROJECT
TEVIOT VILLAGE

Plan of Subdivision
Ultimate
Allotment Layout
Combined Applications

Date.	28 February 2017
Comp By.	WNW
Checked By.	PHE
DWG Name.	132965 ROL
Job Ref.	132965
Local Authority.	Economic Development Queensland
Locality.	Teviot Downs
Scale	1 : 2500
Sheet	A1
Plan Ref	132965 – 26
Rev	A

RPS
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Yield Breakdown

Residential Allotments	Typical Allotment Size		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8	Stage 9	Stage 10	Stage 11	Stage 12	Stage 13	Stage 14	Stage 15	Stage 16	Stage 17	Stage 18	Stage 19	Stage 20	Stage 21	Stage 22	Stage 23	Stage 24	Stage 25	Stage 26	Stage 27	Overall	
	Dimensions	Area	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	Lots	%
28m Deep Allotments																															
Villa Allotment	10.5 x 28m	294m²	2	—	5	5	3	2	1	1	—	2	5	1	—	—	—	—	2	3	4	3	2	4	1	3	1	1	2	**53**	**4%**
Premium Villa Allotment	12.5 x 28m	350m²	7	3	7	7	13	14	5	8	10	8	17	9	9	11	—	8	9	16	10	10	3	9	8	15	13	4	25	**258**	**17%**
Courtyard Allotment	14 x 28m	392m²	14	2	13	6	9	14	3	9	10	8	12	7	2	4	—	2	3	3	11	4	7	9	8	13	10	3	22	**208**	**14%**
Premium Courtyard Allotment	16 x 28m	448m²	—	—	10	1	6	4	4	1	4	3	1	4	4	—	—	1	—	—	—	—	4	—	2	—	3	2	9	**63**	**4%**
Sub Total 28m Deep Allotments			**23**	**5**	**35**	**19**	**31**	**34**	**13**	**19**	**24**	**21**	**35**	**21**	**15**	**15**	**—**	**11**	**14**	**22**	**25**	**17**	**16**	**22**	**19**	**31**	**27**	**10**	**58**	**582**	**39%**
30m Deep Allotments																															
Villa Allotment	10.5 x 30m	315m²	—	5	2	4	3	4	—	2	5	—	4	—	—	1	—	1	4	4	4	2	3	—	3	—	—	—	—	**51**	**3%**
Premium Villa Allotment	12.5 x 30m	375m²	8	7	14	6	9	12	12	6	11	16	21	12	17	11	29	5	24	31	6	16	13	9	17	9	9	7	1	**338**	**23%**
Courtyard Allotment	14 x 30m	420m²	13	10	10	11	10	7	10	1	13	11	13	20	9	12	18	9	11	20	3	17	12	8	7	13	13	9	1	**291**	**19%**
Premium Courtyard Allotment	16 x 30m	480m²	7	3	5	2	7	4	5	2	3	6	2	4	4	3	1	6	5	—	2	6	2	—	1	2	2	1	—	**85**	**6%**
Traditional Allotment	20 x 30m	600m²	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	**3**	**0%**
Sub Total 30m Deep Allotments			**31**	**25**	**31**	**23**	**29**	**27**	**27**	**11**	**32**	**33**	**40**	**36**	**30**	**27**	**48**	**21**	**44**	**55**	**15**	**41**	**30**	**17**	**28**	**24**	**24**	**17**	**2**	**768**	**51%**
32m Deep Allotments																															
Villa Allotment	10.5 x 32m	336m²	1	4	—	—	—	—	2	4	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	**13**	**1%**
Premium Villa Allotment	12.5 x 32m	400m²	8	10	—	—	—	—	6	6	—	—	—	—	—	—	2	4	4	—	—	—	—	—	—	—	—	—	—	**40**	**3%**
Courtyard Allotment	14 x 32m	448m²	8	10	—	2	—	—	14	3	—	—	—	—	—	—	2	11	5	—	—	—	—	—	—	—	1	5	—	**61**	**4%**
Traditional Allotment	20 x 32m	640m²	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	**1**	**0%**
Premium Traditional Allotment	22 x 32m	704m²	—	—	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	**5**	**0%**
Sub Total 32m Deep Allotments			**17**	**24**	**—**	**3**	**—**	**—**	**22**	**13**	**—**	**—**	**—**	**—**	**5**	**—**	**4**	**17**	**9**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**1**	**5**	**—**	**120**	**8%**
Lifestyle Allotments																															
Lifestyle Allotment	n/a	800 - 1999m²	1	—	—	1	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	**7**	**0%**
Premium Lifestyle Allotment	n/a	2000m² +	1	—	—	5	—	—	6	8	—	—	—	—	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	**25**	**2%**
Sub Total Lifestyle Allotments			**2**	**—**	**—**	**6**	**—**	**—**	**6**	**8**	**—**	**—**	**—**	**—**	**10**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**32**	**2%**
Total Residential Allotments			**73**	**54**	**66**	**51**	**60**	**61**	**68**	**51**	**56**	**54**	**75**	**57**	**60**	**42**	**52**	**49**	**67**	**77**	**40**	**58**	**46**	**39**	**47**	**55**	**52**	**32**	**60**	**1502**	**100%**
Super Lots																															
Service Allotments			—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	1	—	—	—	—	—	—	—	—	1	—	**3**	

Land Budget

Land Use	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8	Stage 9	Stage 10	Stage 11	Stage 12	Stage 13	Stage 14	Stage 15	Stage 16	Stage 17	Stage 18	Stage 19	Stage 20	Stage 21	Stage 22	Stage 23	Stage 24	Stage 25	Stage 26	Stage 27	No Stage	Overall	
	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	%
Area of Subject Site	**5.4902 ha**	**4.4024 ha**	**4.0129 ha**	**6.9458 ha**	**4.4666 ha**	**3.6972 ha**	**6.9330 ha**	**5.9512 ha**	**3.0552 ha**	**6.8379 ha**	**5.9157 ha**	**7.2230 ha**	**7.1035 ha**	**3.2853 ha**	**6.1451 ha**	**3.4219 ha**	**7.3960 ha**	**4.1292 ha**	**4.0175 ha**	**5.8074 ha**	**4.0580 ha**	**2.1403 ha**	**5.7356 ha**	**5.3970 ha**	**3.9260 ha**	**4.5144 ha**	**7.3602 ha**	**10.6023 ha**	**149.9708 ha**	**100.0%**
Saleable Area																														
Residential Allotments	3.5372 ha	2.3453 ha	2.9012 ha	3.3109 ha	2.4580 ha	2.4337 ha	4.2525 ha	3.9542 ha	2.2565 ha	2.3653 ha	2.9222 ha	2.3498 ha	4.1484 ha	1.7516 ha	2.1182 ha	2.1731 ha	2.8184 ha	2.9802 ha	1.6329 ha	2.5544 ha	1.8774 ha	1.5467 ha	1.8977 ha	2.2864 ha	2.1244 ha	1.3698 ha	2.3742 ha	—	**68.7406 ha**	45.8%
Balance Allotments (Future Mixed Density)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	**—**	0.0%
Service Allotments	—	—	—	—	—	—	—	—	—	—	—	0.0400 ha	—	—	—	—	0.0400 ha	—	—	—	—	—	—	—	—	0.1275 ha	—	—	**0.2075 ha**	0.1%
Total Area of Allotments	**3.5372 ha**	**2.3453 ha**	**2.9012 ha**	**3.3109 ha**	**2.4580 ha**	**2.4337 ha**	**4.2525 ha**	**3.9542 ha**	**2.2565 ha**	**2.3653 ha**	**2.9222 ha**	**2.3898 ha**	**4.1484 ha**	**1.7516 ha**	**2.1182 ha**	**2.1731 ha**	**2.8584 ha**	**2.9802 ha**	**1.6329 ha**	**2.5544 ha**	**1.8774 ha**	**1.5467 ha**	**1.8977 ha**	**2.2864 ha**	**2.1244 ha**	**1.4973 ha**	**2.3742 ha**	**—**	**68.9481 ha**	**46.0%**
Road																														
Local Roads	1.2882 ha	0.6309 ha	1.1117 ha	0.8653 ha	0.7913 ha	0.5844 ha	1.4323 ha	1.1828 ha	0.7627 ha	1.2389 ha	0.9507 ha	1.0888 ha	1.0948 ha	0.8752 ha	1.0937 ha	1.0999 ha	1.0976 ha	0.9808 ha	0.5709 ha	1.0457 ha	0.2815 ha	0.5936 ha	0.6995 ha	0.7111 ha	0.8908 ha	0.7196 ha	1.1823 ha	—	**24.8650 ha**	16.6%
Collector Roads	0.3356 ha	—	—	0.5959 ha	0.2360 ha	0.6791 ha	0.4180 ha	—	—	—	0.3386 ha	0.3230 ha	0.4983 ha	—	—	—	—	—	—	—	0.7519 ha	—	—	—	—	—	—	—	**4.1764 ha**	2.8%
Trunk Collector Roads	0.3292 ha	0.5968 ha	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.5914 ha	—	—	0.6388 ha	0.1907 ha	—	—	0.3968 ha	—	—	—	—	**2.7437 ha**	1.8%
Total Area of New Road	**1.9530 ha**	**1.2277 ha**	**1.1117 ha**	**1.4612 ha**	**1.0273 ha**	**1.2635 ha**	**1.8503 ha**	**1.1828 ha**	**0.7627 ha**	**1.2389 ha**	**1.2893 ha**	**1.4118 ha**	**1.5931 ha**	**0.8752 ha**	**1.0937 ha**	**1.0999 ha**	**1.6890 ha**	**0.9808 ha**	**0.5709 ha**	**1.6845 ha**	**1.2241 ha**	**0.5936 ha**	**0.6995 ha**	**1.1079 ha**	**0.8908 ha**	**0.7196 ha**	**1.1823 ha**	**—**	**31.7851 ha**	**21.2%**
Open Space																														
District Sports Park	—	—	—	—	—	—	—	—	—	—	—	2.8256 ha	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	**2.8256 ha**	1.9%
Linear Open Space (Active)	—	0.1987 ha	—	0.7699 ha	0.4595 ha	—	—	0.4300 ha	—	1.1217 ha	0.6297 ha	0.2483 ha	0.6149 ha	0.2847 ha	2.1676 ha	—	1.0479 ha	—	1.1129 ha	0.6383 ha	0.1200 ha	—	0.5359 ha	0.5045 ha	0.3137 ha	1.2956 ha	1.3102 ha	—	**13.8040 ha**	9.2%
Linear Open Space (Conservation)	—	0.3307 ha	—	1.3420 ha	0.5218 ha	—	—	0.3072 ha	—	2.1120 ha	1.0165 ha	0.3475 ha	0.7471 ha	0.3378 ha	0.7656 ha	—	1.8007 ha	—	0.6398 ha	0.9302 ha	0.2137 ha	—	2.6025 ha	1.4982 ha	0.5971 ha	1.0019 ha	2.4599 ha	0.0358 ha	**19.6080 ha**	13.1%
Neighbourhood Recreation Park	—	0.3000 ha	—	—	—	—	0.7918 ha	—	—	—	—	—	—	—	—	—	—	—	—	—	0.5184 ha	—	—	—	—	—	—	—	—	**1.6102 ha**	1.1%
Pedestrian Linkage / Landscape Treatment	—	—	—	0.0618 ha	—	—	0.0384 ha	0.0770 ha	0.0360 ha	—	0.0580 ha	—	—	0.0360 ha	—	0.1489 ha	—	0.1682 ha	0.0610 ha	—	0.1044 ha	—	—	—	—	—	0.0336 ha	—	**0.8233 ha**	0.5%
Existing Easement	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10.5665 ha	**10.5665 ha**	7.0%
Total Open Space	**—**	**0.8294 ha**	**—**	**2.1737 ha**	**0.9813 ha**	**—**	**0.8302 ha**	**0.8142 ha**	**0.0360 ha**	**3.2337 ha**	**1.7042 ha**	**3.4214 ha**	**1.3620 ha**	**0.6585 ha**	**2.9332 ha**	**0.1489 ha**	**2.8486 ha**	**0.1682 ha**	**1.8137 ha**	**1.5685 ha**	**0.9565 ha**	**—**	**3.1384 ha**	**2.0027 ha**	**0.9108 ha**	**2.2975 ha**	**3.8037 ha**	**10.6023 ha**	**49.2376 ha**	**32.8%**

REVISION
A: 28/02/2017 - Council feedback amendments

PROJECT: TEVIOT VILLAGE

Job Ref.	132965	Date.	28 February 2017
Comp By.	WNW	DWG Name.	132965 ROL
Chk'd By.	PHE	Locality.	Teviot Downs
Local Authority.	Economic Development Queensland		

CLIENT: VILLA GREEN PTY LTD

Plan of Subdivision
Ultimate Staged Development Statistics
Combined Applications

RPS Australia East Pty Ltd
ACN 140 292 762
ABN 44 140 292 762

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Brisbane Design Studio
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Fortitude Valley QLD 4006

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W rpsgroup.com.au

Scale	Sheet	Plan Ref	Rev
N / A	A1	132965 – 27	A

APPENDIX B GREENBANK PDA SERVICE STRATEGIES

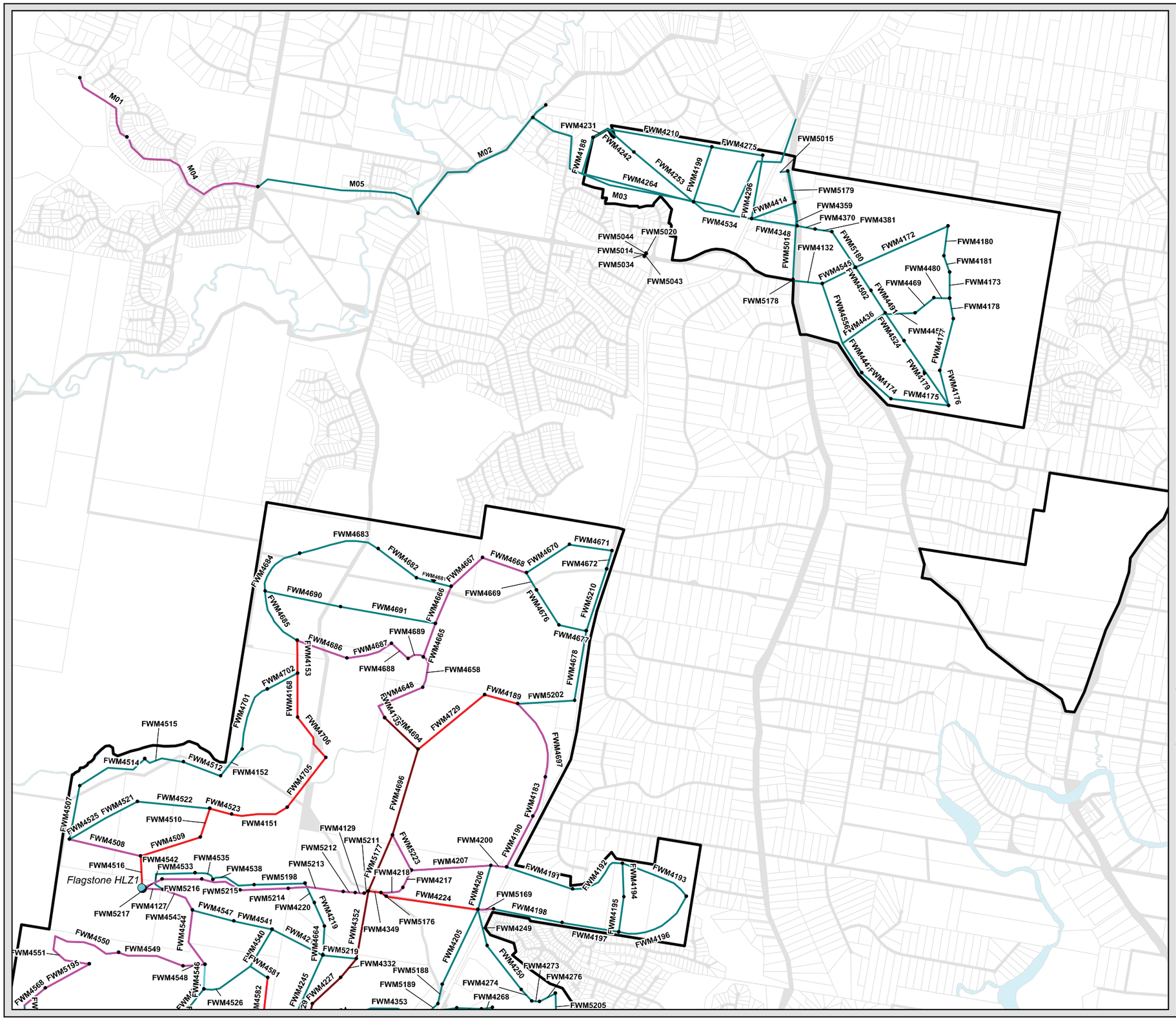


Figure 5
Water Supply Map North

LEGEND

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W E
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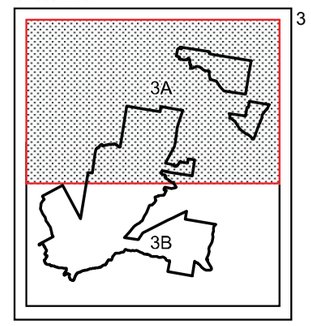
Reservoir

Node
(Infrastructure start / end point)

Water Supply Mains
(Diam)

- 250mm
- 300mm
- 375mm
- 450mm
- 475mm
- 600mm

Sheet Index



350 0 350 700 1050
Metres
Scale: 1:35,000

Cardno
Shaping the Future
Cardno (QLD) Pty Ltd | ABN 57 051 074 992
Level 11, North Tower, 515 St Pauls Terrace
Locked Bag 4006, Fortitude Valley QLD 4006
Tel: 07 3369 9822 Fax: 07 3369 9722

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SHEET	A3
Project No:	7902-70.011
Date:	17/07/2013
Revision Number:	
Designed by:	
Client Name:	EDQ

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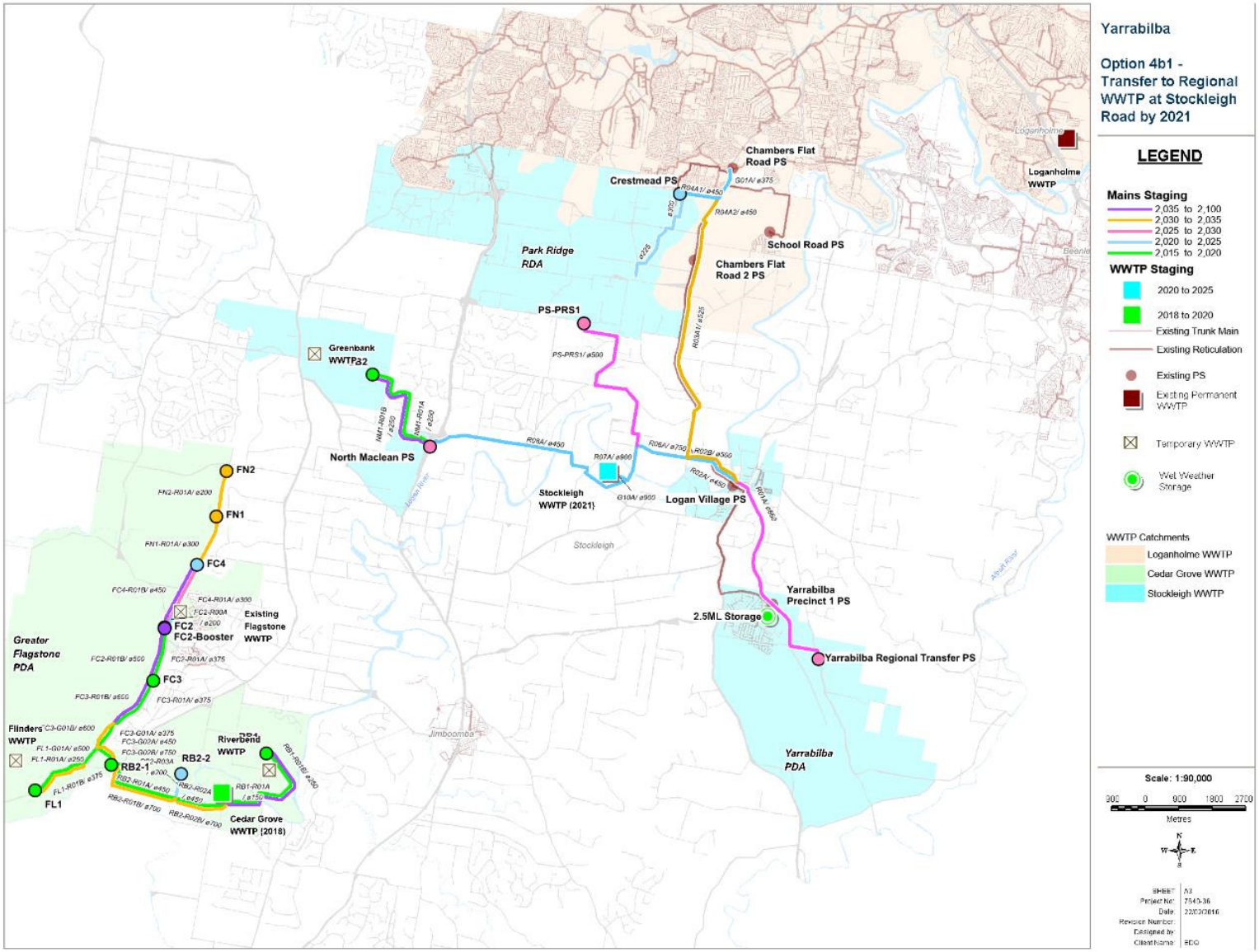


Figure 1-1: Preferred Strategy (Option 4B1)

APPENDIX C LWIA WATER SUPPLY CORRESPONDENCE

From: Marco Bonotto [mailto:Marco.Bonotto@dilgp.qld.gov.au]
Sent: Friday, 11 November 2016 3:18 PM
To: Mal McCann <Mal.McCann@calibreconsulting.co>
Subject: Teviot Boundary Conditions

Hi Mal,

Following our meeting last week, please find below the advice from LWIA about the water boundary conditions:

Based on currently available information and model results the following boundary conditions are available at peak hour and indicate the hydraulic head near the approximate connecting points (see attached Exact connecting points TBC)

Year	150mm on Cunningham Pressure Managed (m)	300mm on Pub Lane SM head (m)	300mm on Pub Lane RM head (m)
2018	105	135	84
2021	105	130	82
2026	105	122	82

And were made with the following previous EP estimates:

Development Category	2018	2021	2026
Teviot Downs (SM)	165 EP	800 EP	2186 EP
Teviot Downs (RM)	0 EP	431 EP	1093 EP

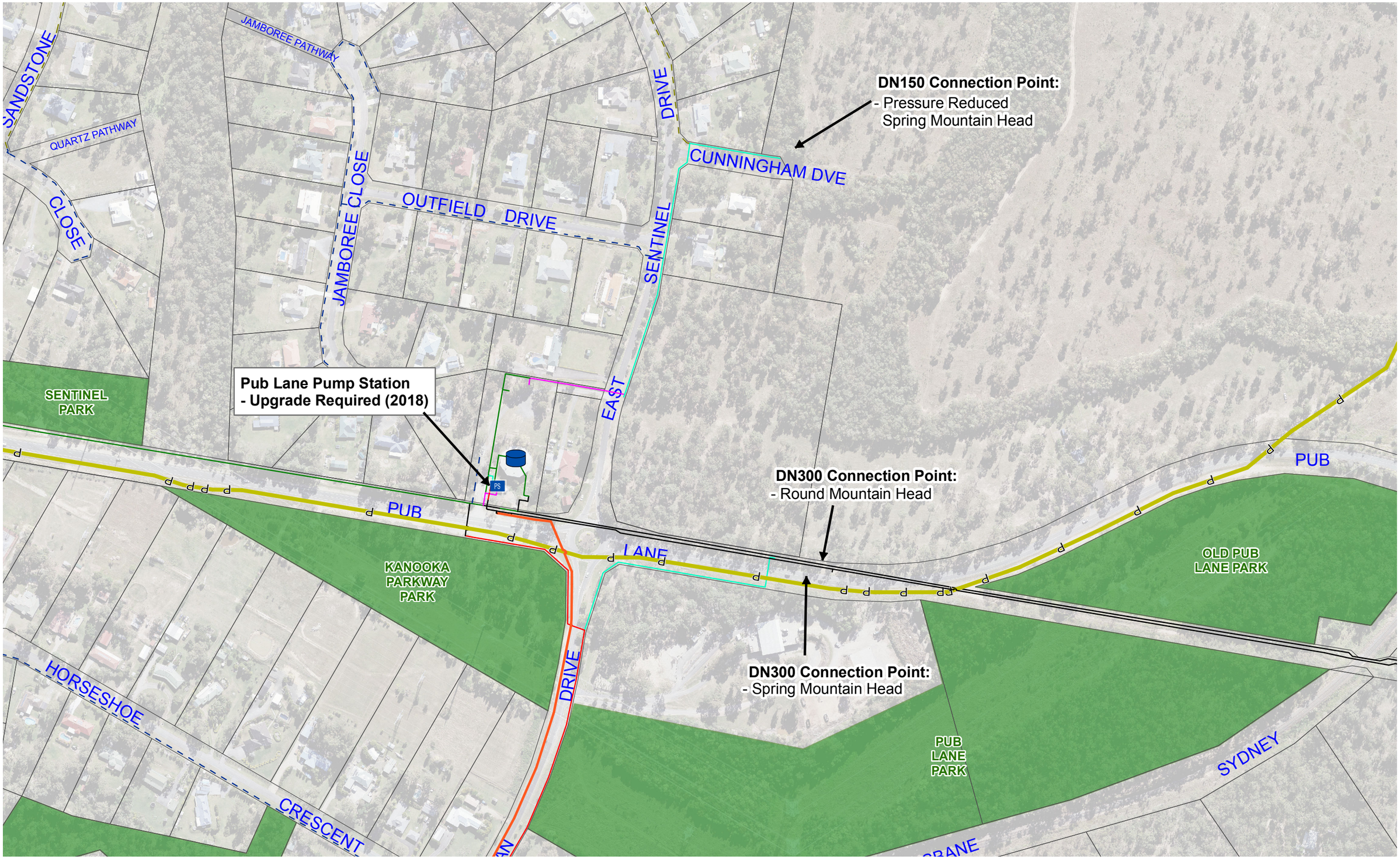
The capacity from Spring Mountain (SM) is constrained to a maximum of 2186EP. Additional capacity is available from Round Mountain (RM).

Please let me know if you need any clarifications.

Cheers

Marco Bonotto
Principal Engineer - Technical Services
Economic Development Queensland
Department of Infrastructure, Local Government and Planning
Level 14, 1 William Street QLD 4000
p. 07 3452 7696 | **e.** marco.bonotto@dilgp.qld.gov.au

Customers first | Ideas into action | Unleash potential | Be courageous | Empower people



Project Manager: JT	LoganWIA References	LOGAN WATER INFRASTRUCTURE ALLIANCE — Proudly LOGAN CITY COUNCIL	**Legend**	Project:
Designed By:	Project No:		PS Water Pump Station; Water Reservoir Ground	Project Description: Teviot Downs Connection Points
Drawn By: BR	Sheet Size: A3		**Water Supply Pipes**: Water Line 50mm; Water Line 80mm; Water Line 100mm; Water Line 150mm; Water Line 200mm; Water Line 225mm; Water Line 250mm; Water Line 300mm; Water Line 375mm; Water Line 1000mm (SRWP)	LoganWIA Figure No:
Date: 15/06/2016	Datum: GDA94 Zone 56			Figure No: 1 — Rev:

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30 0 30 60 90 120 Meters

Scale: 1:3,227

N W E S

APPENDIX D LWIA WASTEWATER CORRESPONDENCE

From: Marco Bonotto [mailto:Marco.Bonotto@dilgp.qld.gov.au]
Sent: Thursday, 24 November 2016 8:58 AM
To: Nicole Jackson <Nicole.Jackson@calibreconsulting.co>
Cc: Mal McCann <Mal.McCann@calibreconsulting.co>
Subject: RE: Additional Sewage Loading - Teviot Village

Hi Nicole,

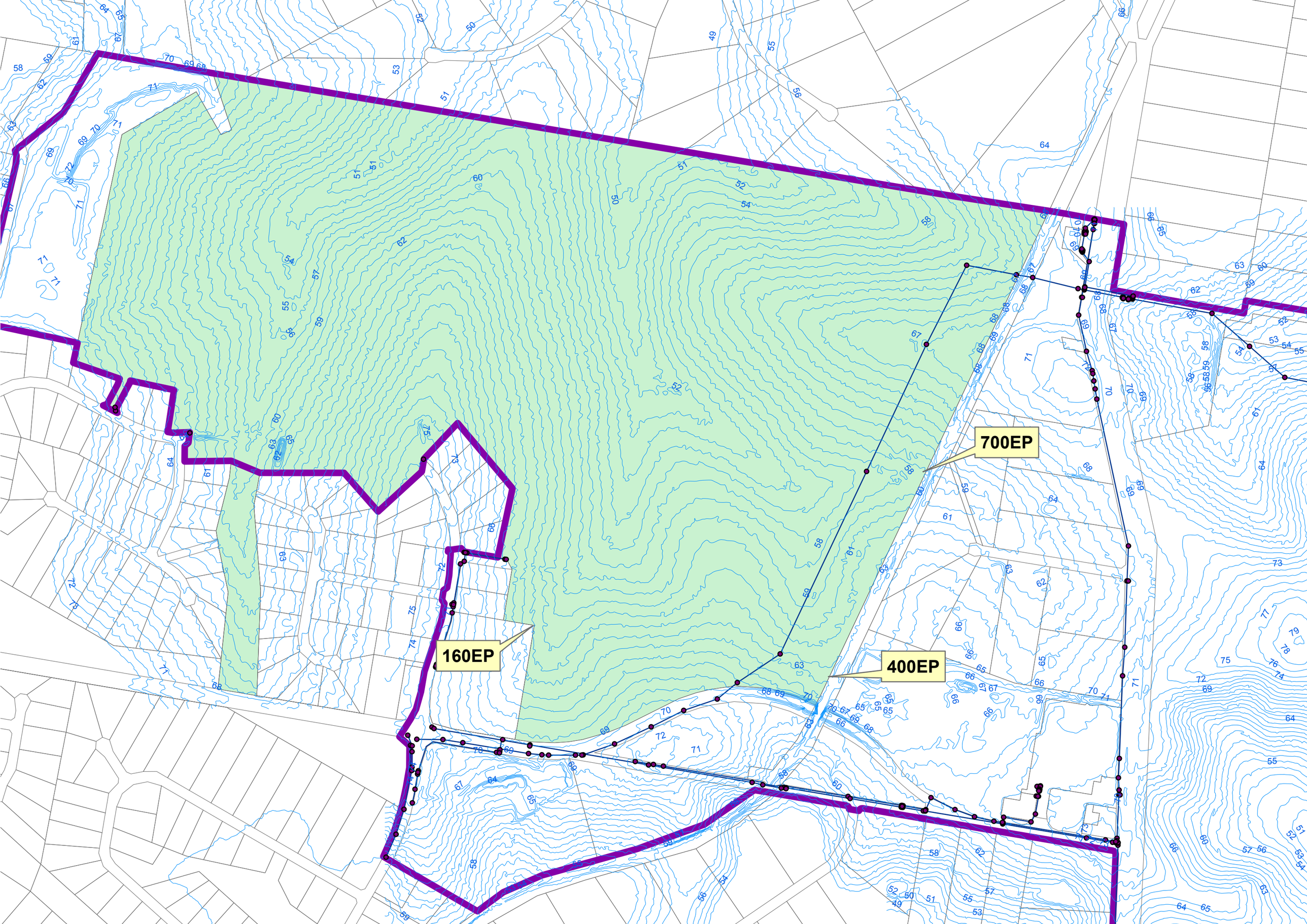
Please find attached a map showing the expected external sewerage loads from the upstream catchments that shall be taken in consideration in the Teviot sewerage network.
I note that I have not included the existing sporting centre property on the west side of the development as this should be taken in consideration as part of the overall sport field master plan.

Let me know if you need any clarifications.

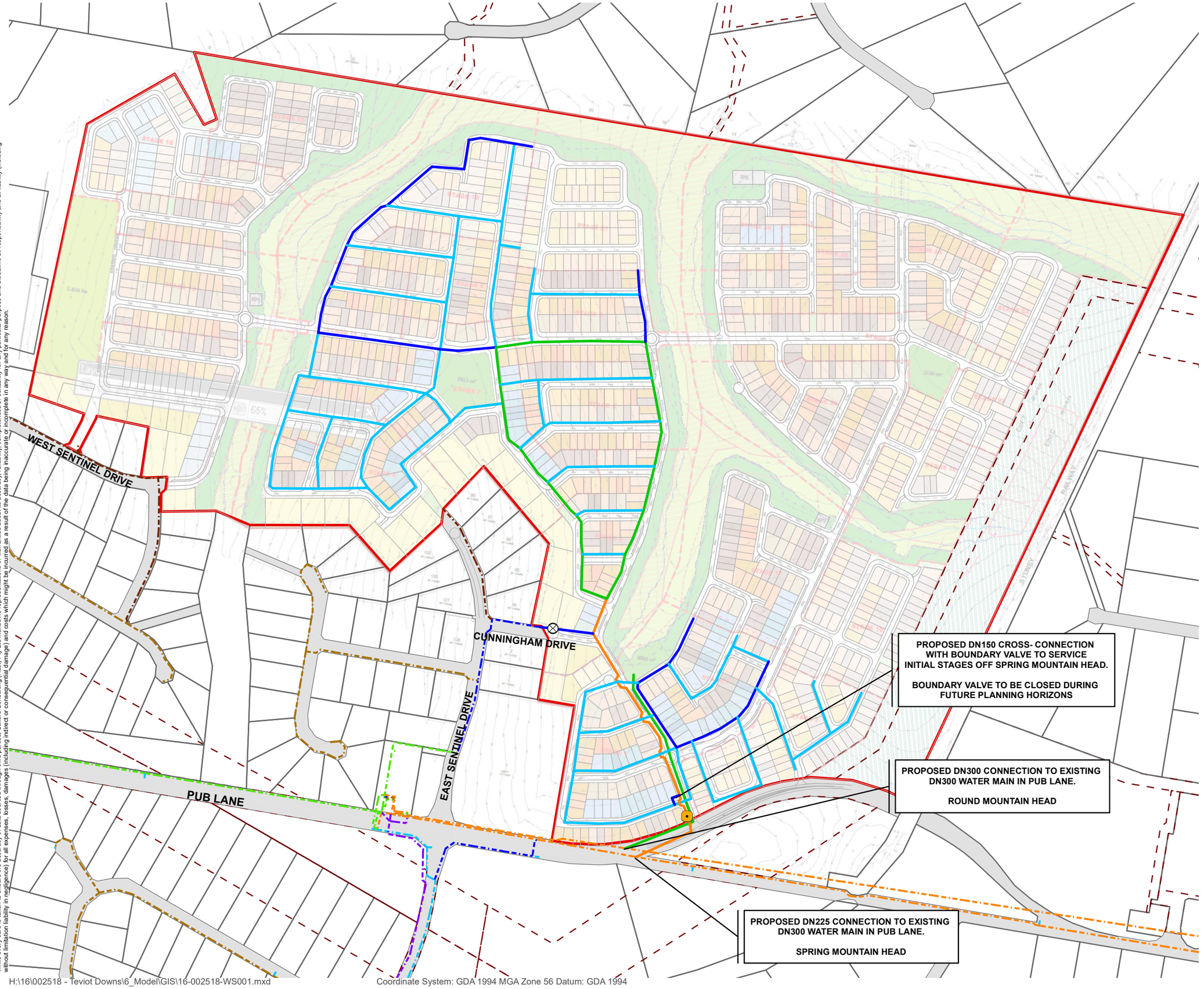
Cheers

Marco Bonotto
Principal Engineer - Technical Services
Economic Development Queensland
Department of Infrastructure, Local Government and Planning
Level 14, 1 William Street, Brisbane QLD 4000
p. 07 3452 7696 | **e.** marco.bonotto@dilgp.qld.gov.au

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700EP
160EP
400EP

APPENDIX E CALIBRE CONSULTING SERVICE STRATEGIES



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H:\16\002518 - Teviot Downs\6_Model\GIS\16-002518-WS001.mxd

Coordinate System: GDA 1994 MGA Zone 56 Datum: GDA 1994

calibre CONSULTING

LEGEND

WATER SUPPLY INFRASTRUCTURE

- PROPOSED CLOSED BOUNDARY VALVE
- PROPOSED PRESSURE REDUCING VALVE
- PROPOSED DN100 WATER MAIN
- PROPOSED DN150 WATER MAIN
- PROPOSED DN225 WATER MAIN
- PROPOSED DN300 WATER MAIN
- EXISTING DN50 WATER MAIN
- EXISTING DN80 WATER MAIN
- EXISTING DN100 WATER MAIN
- EXISTING DN150 WATER MAIN
- EXISTING DN200 WATER MAIN
- EXISTING DN225 WATER MAIN
- EXISTING DN300 WATER MAIN
- EXISTING DN375 WATER MAIN

CADASTRE

- ROAD
- LAND PARCEL
- EASEMENT
- SITE BOUNDARY

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH REPORT 16-002518.01.

2. THIS DRAWING IS CONCEPTUAL AND SUBJECT TO DETAILED DESIGN.

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N

PROJECT:

TEVIOT VILLAGE

CLIENT:

VILLA GREEN PTY LTD

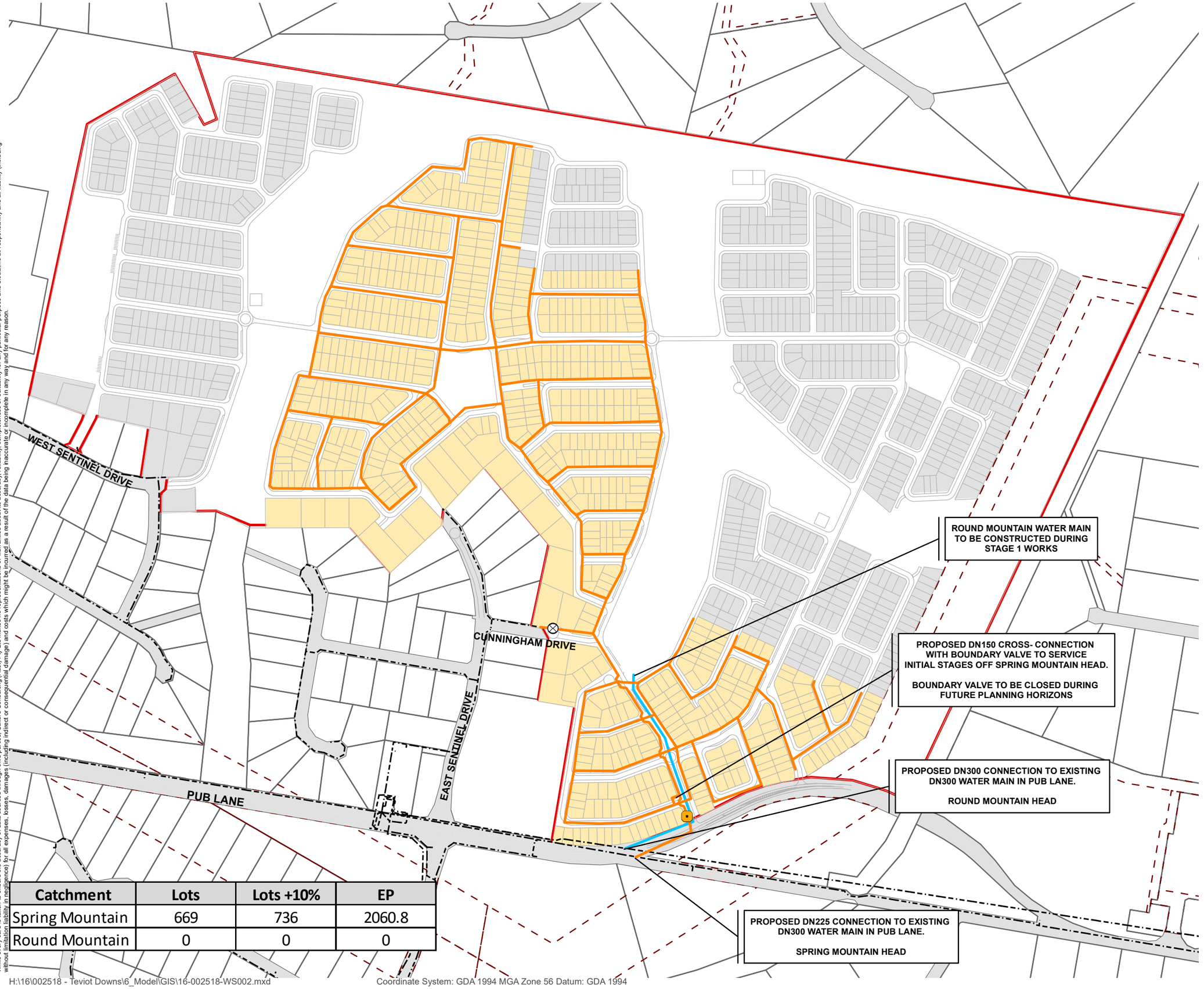
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PROPOSED WATER SUPPLY SERVICE STRATEGY INTERIM HORIZON

DRAWING NO: **16-002518-WS001**

ISSUE: **C**

ISS	BY	CHK	DATE	DETAILS
A	MAH	NJ	25.11.16	ORIGINAL
B	MAH	NJ	07.12.16	MINOR AMENDMENTS
C	MAH	NJ	12.05.17	STRATEGY AMENDED



Catchment	Lots	Lots +10%	EP
Spring Mountain	669	736	2060.8
Round Mountain	0	0	0

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Coordinate System: GDA 1994 MGA Zone 56 Datum: GDA 1994

calibre CONSULTING

LEGEND

WATER SUPPLY INFRASTRUCTURE

- PROPOSED CLOSED BOUNDARY VALVE
- PROPOSED PRESSURE REDUCING VALVE
- SPRING MOUNTAIN WATER MAIN
- ROUND MOUNTAIN WATER MAIN
- EXISTING WATER MAIN

SERVICE CATCHMENTS

- SPRING MOUNTAIN SERVICE CATCHMENT
- FUTURE STAGES

CADASTRE

- ROAD
- LAND PARCEL
- EASEMENT
- SITE BOUNDARY

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH REPORT 16-002518.01.

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1:6,000 (A3)

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PROJECT:

TEVIOT VILLAGE

CLIENT:

VILLA GREEN PTY LTD

DRAWING TITLE:

PROPOSED WATER SUPPLY SERVICE CATCHMENTS INTERIM HORIZON

DRAWING NO: **16-002518-WS002**

ISSUE: **C**

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A	MAH	NJ	25.11.16	ORIGINAL
B	MAH	NJ	07.12.16	MINOR AMENDMENTS
C	MAH	NJ	12.05.17	STRATEGY AMENDED

WEST SENTINEL DRIVE

CUNNINGHAM DRIVE

EAST SENTINEL DRIVE

PUB LANE

PROPOSED DN300 CONNECTION TO EXISTING DN300 WATER MAIN IN PUB LANE.

ROUND MOUNTAIN HEAD

PROPOSED DN225 CONNECTION TO EXISTING DN300 WATER MAIN IN PUB LANE.

SPRING MOUNTAIN HEAD

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Coordinate System: GDA 1994 MGA Zone 56 Datum: GDA 1994

calibre CONSULTING

LEGEND

WATER SUPPLY INFRASTRUCTURE

- PROPOSED ROUND MOUNTAIN HLZ BOOSTER PUMP STATION
- PROPOSED CLOSED BOUNDARY VALVE
- PROPOSED PRESSURE REDUCING VALVE
- PROPOSED DN100 WATER MAIN
- PROPOSED DN150 WATER MAIN
- PROPOSED DN225 WATER MAIN
- PROPOSED DN300 WATER MAIN
- EXISTING DN50 WATER MAIN
- EXISTING DN80 WATER MAIN
- EXISTING DN100 WATER MAIN
- EXISTING DN150 WATER MAIN
- EXISTING DN200 WATER MAIN
- EXISTING DN225 WATER MAIN
- EXISTING DN300 WATER MAIN
- EXISTING DN375 WATER MAIN

CADASTRE

- ROAD
- LAND PARCEL
- EASEMENT
- SITE BOUNDARY

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH REPORT 16-002518.01.

2. THIS DRAWING IS CONCEPTUAL AND SUBJECT TO DETAILED DESIGN.

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PROJECT:

TEVIOT VILLAGE

CLIENT:

VILLA GREEN PTY LTD

DRAWING TITLE:

PROPOSED WATER SUPPLY SERVICE STRATEGY INTERMEDIATE HORIZON

DRAWING NO: **16-002518-WS003**

ISSUE: **C**

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B	MAH	NJ	07.12.16	MINOR AMENDMENTS
C	MAH	NJ	12.05.17	STRATEGY AMENDED

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WEST SENTINEL DRIVE

CUNNINGHAM DRIVE

EAST SENTINEL DRIVE

PUB LANE

BOUNDARY VALVE TO BE CLOSED FOLLOWING INTERIM HORIZON.

PROPOSED DN300 CONNECTION TO EXISTING DN300 WATER MAIN IN PUB LANE.

ROUND MOUNTAIN HEAD

PROPOSED DN225 CONNECTION TO EXISTING DN300 WATER MAIN IN PUB LANE.

SPRING MOUNTAIN HEAD

Catchment	Lots	Lots +10%	EP
Spring Mountain	736	810	2268
Round Mountain	562	618	1730.4

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Coordinate System: GDA 1994 MGA Zone 56 Datum: GDA 1994

calibre CONSULTING

LEGEND

WATER SUPPLY INFRASTRUCTURE

- PROPOSED ROUND MOUNTAIN HLZ BOOSTER PUMP STATION
- PROPOSED CLOSED BOUNDARY VALVE
- PROPOSED PRESSURE REDUCING VALVE
- ROUND MOUNTAIN HLZ WATER MAIN
- ROUND MOUNTAIN WATER MAIN
- SPRING MOUNTAIN WATER MAIN
- EXISTING WATER MAIN

SERVICE CATCHMENTS

- ROUND MOUNTAIN HLZ SERVICE CATCHMENT
- SPRING MOUNTAIN SERVICE CATCHMENT
- FUTURE STAGES

CADASTRE

- ROAD
- LAND PARCEL
- EASEMENT
- SITE BOUNDARY

NOTES:

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PROJECT:

TEVIOT VILLAGE

CLIENT:

VILLA GREEN PTY LTD

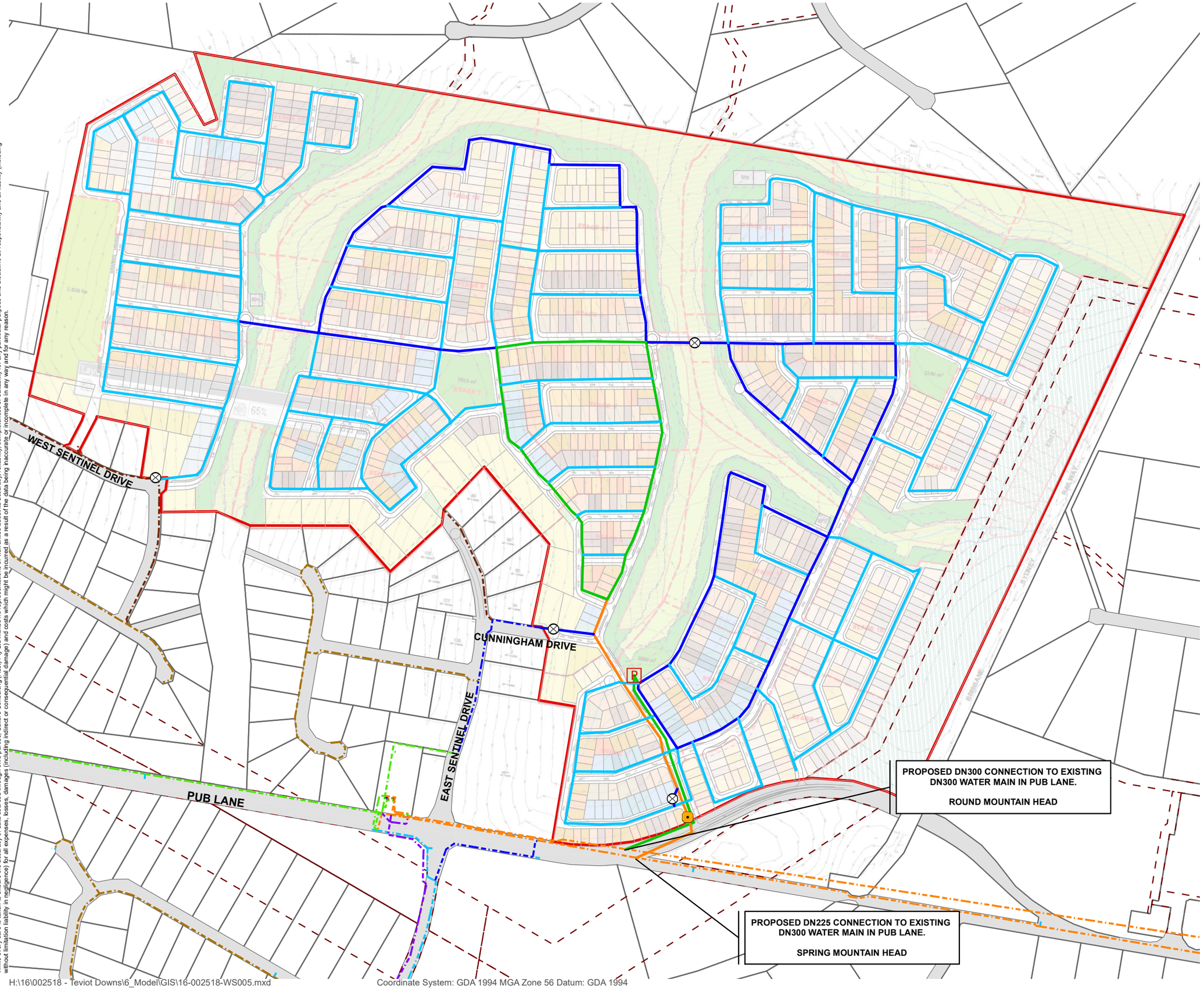
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PROPOSED WATER SUPPLY SERVICE CATCHMENTS INTERMEDIATE HORIZON

DRAWING NO: **16-002518-WS004**

ISSUE: **A**

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A	MAH	NJ	12.05.17	ORIGINAL



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Coordinate System: GDA 1994 MGA Zone 56 Datum: GDA 1994

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LEGEND

WATER SUPPLY INFRASTRUCTURE

- PROPOSED ROUND MOUNTAIN HLZ BOOSTER PUMP STATION
- PROPOSED CLOSED BOUNDARY VALVE
- PROPOSED PRESSURE REDUCING VALVE
- PROPOSED DN100 WATER MAIN
- PROPOSED DN150 WATER MAIN
- PROPOSED DN225 WATER MAIN
- PROPOSED DN300 WATER MAIN
- EXISTING DN50 WATER MAIN
- EXISTING DN80 WATER MAIN
- EXISTING DN100 WATER MAIN
- EXISTING DN150 WATER MAIN
- EXISTING DN200 WATER MAIN
- EXISTING DN225 WATER MAIN
- EXISTING DN300 WATER MAIN
- EXISTING DN375 WATER MAIN

CADASTRE

- ROAD
- LAND PARCEL
- EASEMENT
- SITE BOUNDARY

NOTES:

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PROJECT:

TEVIOT VILLAGE

CLIENT:

VILLA GREEN PTY LTD

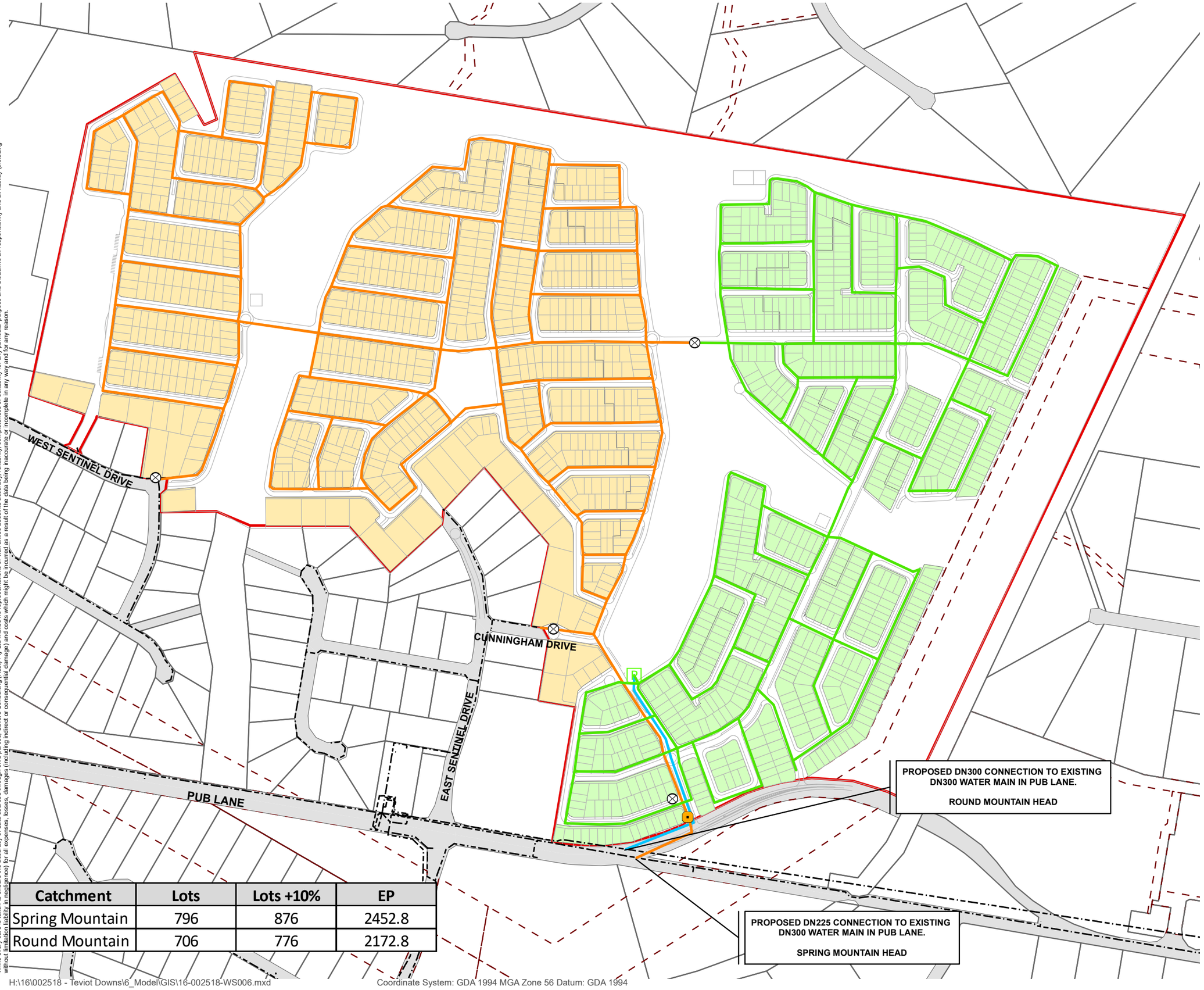
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PROPOSED WATER SUPPLY SERVICE STRATEGY ULTIMATE HORIZON

DRAWING NO: **16-002518-WS005**

ISSUE: **A**

ISS	BY	CHK	DATE	DETAILS
A	MAH	NJ	12.05.17	ORIGINAL



Catchment	Lots	Lots +10%	EP
Spring Mountain	796	876	2452.8
Round Mountain	706	776	2172.8

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Coordinate System: GDA 1994 MGA Zone 56 Datum: GDA 1994

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LEGEND

WATER SUPPLY INFRASTRUCTURE

- PROPOSED ROUND MOUNTAIN HLZ BOOSTER PUMP STATION
- PROPOSED CLOSED BOUNDARY VALVE
- PROPOSED PRESSURE REDUCING VALVE
- ROUND MOUNTAIN HLZ WATER MAIN
- ROUND MOUNTAIN WATER MAIN
- SPRING MOUNTAIN WATER MAIN
- EXISTING WATER MAIN

SERVICE CATCHMENTS

- ROUND MOUNTAIN HLZ SERVICE CATCHMENT
- SPRING MOUNTAIN SERVICE CATCHMENT

CADASTRE

- ROAD
- LAND PARCEL
- EASEMENT
- SITE BOUNDARY

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH REPORT 16-002518.01.

2. THIS DRAWING IS CONCEPTUAL AND SUBJECT TO DETAILED DESIGN.

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1:6,000 (A3)

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PROJECT:

TEVIOT VILLAGE

CLIENT:

VILLA GREEN PTY LTD

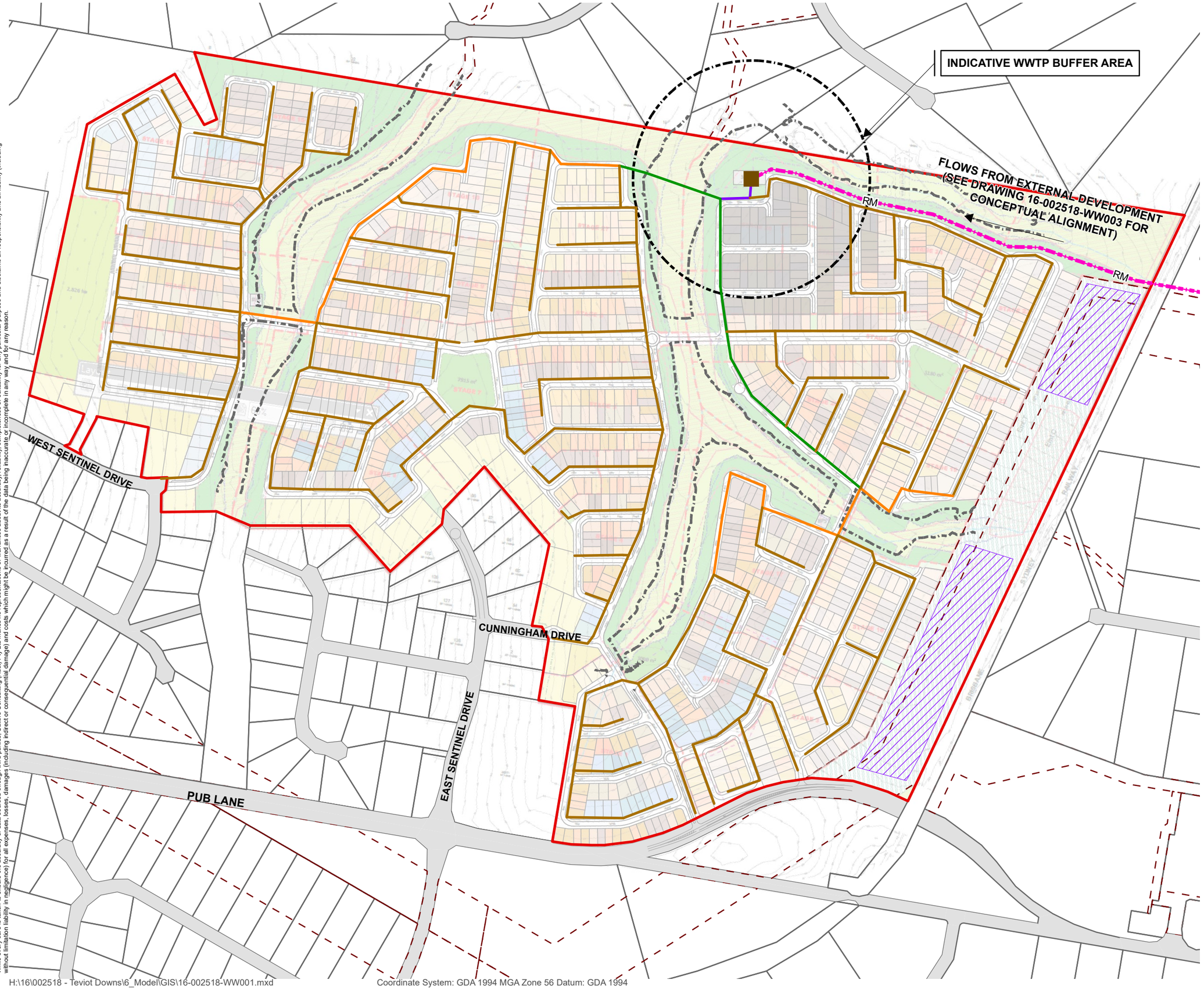
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PROPOSED WATER SUPPLY SERVICE CATCHMENTS ULTIMATE HORIZON

DRAWING NO: **16-002518-WS006**

ISSUE: **A**

ISS	BY	CHK	DATE	DETAILS
A	MAH	NJ	12.05.17	ORIGINAL



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Coordinate System: GDA 1994 MGA Zone 56 Datum: GDA 1994

calibre CONSULTING

LEGEND

WASTEWATER INFRASTRUCTURE

- PROPOSED TEMPORARY WWTP
- RM PROPOSED OD315 RISING MAIN
- PROPOSED DN150 GRAVITY MAIN
- PROPOSED DN225 GRAVITY MAIN
- PROPOSED DN300 GRAVITY MAIN
- PROPOSED DN375 GRAVITY MAIN
- INDICATIVE WWTP BUFFER AREA
- INDICATIVE IRRIGATION AREA

CADASTRE

- ROAD
- LAND PARCEL
- EASEMENT
- LOTS NOT WITHIN INTERIM HORIZON
- SITE BOUNDARY
- DEVELOPED Q100

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH REPORT 16-002518.01.
2. THIS DRAWING IS CONCEPTUAL AND SUBJECT TO DETAILED DESIGN.
3. PROPOSED WWTP TO BE LOCATED OUTSIDE Q100 FLOOD EXTENTS.
4. IRRIGATION AREA ADOPTED GENERALLY IN ACCORDANCE WITH THE TRUE WATER DTR PTY LTD TEMPORARY WWTP ERA 63 APPROVAL.
5. TEMPORARY WWTP TO BE DELIVERED BY LWIA BY SEPTEMBER 2017.

0 50 100 200 m

1:6,000 (A3)

N

PROJECT:

TEVIOT VILLAGE

CLIENT:

VILLA GREEN PTY LTD

DRAWING TITLE:

PROPOSED INTERIM WASTEWATER SERVICE STRATEGY

DRAWING NO: **16-002518-WW001**

ISSUE: **B**

ISS	BY	CHK	DATE	DETAILS
A	MAH	NJ	25.11.16	ORIGINAL
B	MAH	NJ	07.12.16	MINOR AMENDMENTS

RISING MAIN FROM INTERIM SCENARIO TO BE REVERSED TO CONVEY FLOWS TO THE NORTH MACLEAN SPS.

TO NORTH MACLEAN SPS (SEE DRAWING 16-002518-WW003 FOR CONCEPTUAL ALIGNMENT)

RM

RM

WEST SENTINEL DRIVE

CONNECTION TO SPORTS FIELD AS DIRECTED BY EDQ

CUNNINGHAM DRIVE

EAST SENTINEL DRIVE

PUB LANE

CONNECTION TO FUTURE RESIDENTIAL AS DIRECTED BY EDQ (700 EP)

CONNECTION TO SHOPPING CENTRE AS DIRECTED BY EDQ (400 EP)

CONNECTION TO FUTURE SCHOOL AS DIRECTED BY EDQ (160 EP)

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H:\16\002518 - Teviot Downs\6_Model\GIS\16-002518-WW002.mxd

Coordinate System: GDA 1994 MGA Zone 56 Datum: GDA 1994

calibre CONSULTING

LEGEND

WASTEWATER INFRASTRUCTURE

- PROPOSED SPS
- RM PROPOSED OD315 RISING MAIN
- PROPOSED DN150 GRAVITY MAIN
- PROPOSED DN225 GRAVITY MAIN
- PROPOSED DN300 GRAVITY MAIN
- PROPOSED DN375 GRAVITY MAIN

CADASTRE

- ROAD
- LAND PARCEL
- EASEMENT
- SITE BOUNDARY
- DEVELOPED Q100

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH REPORT 16-002518.01.

2. THIS DRAWING IS CONCEPTUAL AND SUBJECT TO DETAILED DESIGN.

3. PROPOSED SPS TO BE LOCATED OUTSIDE Q100 FLOOD EXTENTS.

0 50 100 200 m

1:6,000 (A3)

N

PROJECT:

TEVIOT VILLAGE

CLIENT:

VILLA GREEN PTY LTD

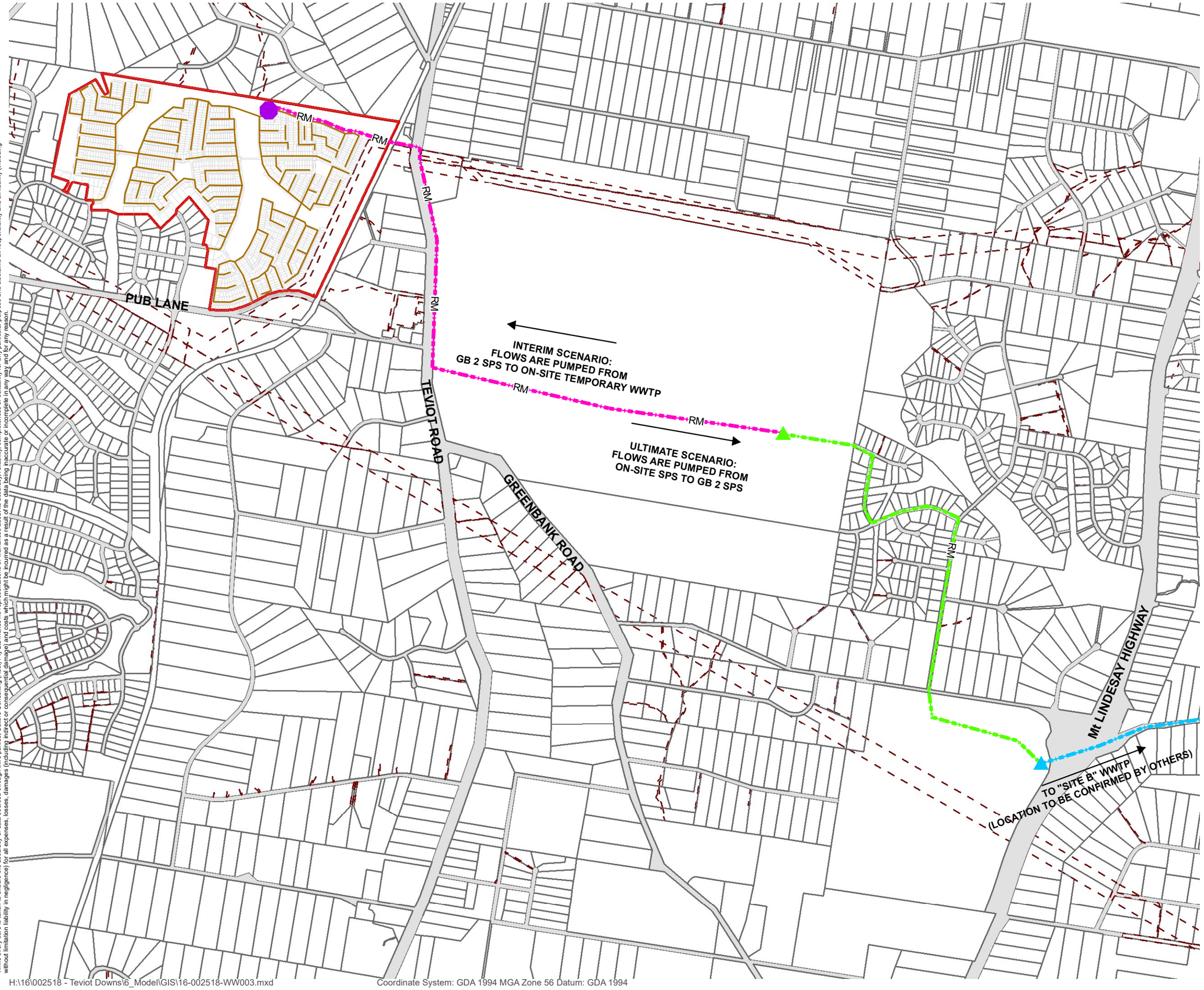
DRAWING TITLE:

PROPOSED ULTIMATE WASTEWATER SERVICE STRATEGY

DRAWING NO: **16-002518-WW002**

ISSUE: **B**

ISS	BY	CHK	DATE	DETAILS
A	MAH	NJ	25.11.16	ORIGINAL
B	MAH	NJ	07.12.16	MINOR AMENDMENTS



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Coordinate System: GDA 1994 MGA Zone 56 Datum: GDA 1994

calibre CONSULTING

LEGEND

WASTEWATER INFRASTRUCTURE

- PROPOSED TEMPORARY WWTP / ULTIMATE SPS
- FUTURE GB2 SPS
- FUTURE NORTH MACLEAN SPS
- RM FUTURE NORTH MACLEAN RM
- RM FUTURE GB2 RM
- RM PROPOSED OD315 RISING MAIN
- PROPOSED GRAVITY MAIN

CADASTRE

- ROAD
- LAND PARCEL
- EASEMENT
- SITE BOUNDARY

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH REPORT 16-002518.01.
2. THIS DRAWING IS CONCEPTUAL AND SUBJECT TO DETAILED DESIGN.
3. EXTERNAL RISING MAIN ALIGNMENTS AND SPS LOCATIONS TO BE CONFIRMED BY LWIA.

0 165 330 660 m

1:20,000 (A3)

N

PROJECT:

TEVIOT VILLAGE

CLIENT:

VILLA GREEN PTY LTD

DRAWING TITLE:

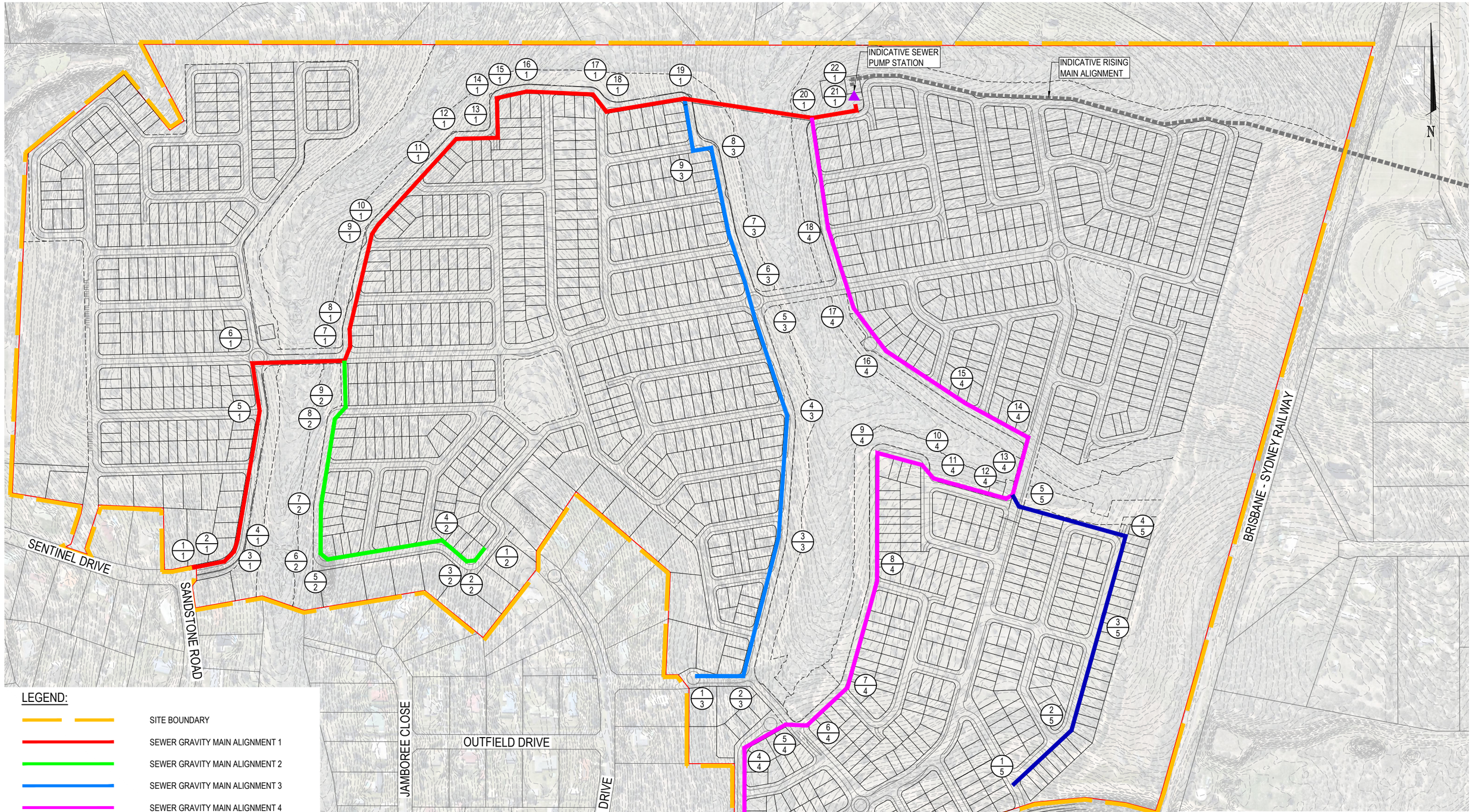
PROPOSED REGIONAL WASTEWATER SERVICE STRATEGY

DRAWING NO: **16-002518-WW003**

ISSUE: **A**

ISS	BY	CHK	DATE	DETAILS
A	MAH	NJ	07.12.16	ORIGINAL

APPENDIX F CALIBRE CONSULTING CONCEPTUAL LONG-SECTIONS



LEGEND:

- SITE BOUNDARY
- SEWER GRAVITY MAIN ALIGNMENT 1
- SEWER GRAVITY MAIN ALIGNMENT 2
- SEWER GRAVITY MAIN ALIGNMENT 3
- SEWER GRAVITY MAIN ALIGNMENT 4
- SEWER GRAVITY MAIN ALIGNMENT 5
- SEWER RISING MAINS (NOT DESIGNED)
- INDICATIVE PUMP STATION LOCATION
- CADASTRE
- EXISTING CONTOURS

NOTES:

1. WASTEWATER SERVICING STRATEGIES PROPOSED ARE CONCEPTUAL AND REMAIN SUBJECT TO DETAILED ENGINEERING DESIGN.
2. PROPOSED INFRASTRUCTURE ALIGNMENTS, DIAMETERS AND MATERIALS ARE SUBJECT TO DEVELOPMENT DENSITIES AND WILL BE CONFIRMED DURING DETAILED DESIGN.
3. DESIGN INFORMATION SHOWN ON PLAN IS INDICATIVE ONLY AND HAS BEEN GENERATED FROM DCDB, LIDAR CONTOURS, COUNCIL AND DIAL BEFORE YOU DIG RECORDS. FINAL DESIGN TO BE CONFIRMED AND WILL BE SUBJECT TO DETAILED SURVEY AND POT-HOLING.

REVISION	DATE	ISSUE DETAILS	DRAWN	DESIGN
A	28.11.16	ORIGINAL ISSUE	SL	MH
B	07.12.16	UPDATED LAYOUT	SL	MH
C	15.12.16	MINOR AMENDMENTS	SL	MH
D				
E				
F				
G				
H				

DRAWN

DESIGN

STATUS
PRELIMINARY
NOT FOR CONSTRUCTION

SCALE
1:2500 1:5000
50 0 50 100
A1 A3

CLIENT
VILLA GREEN

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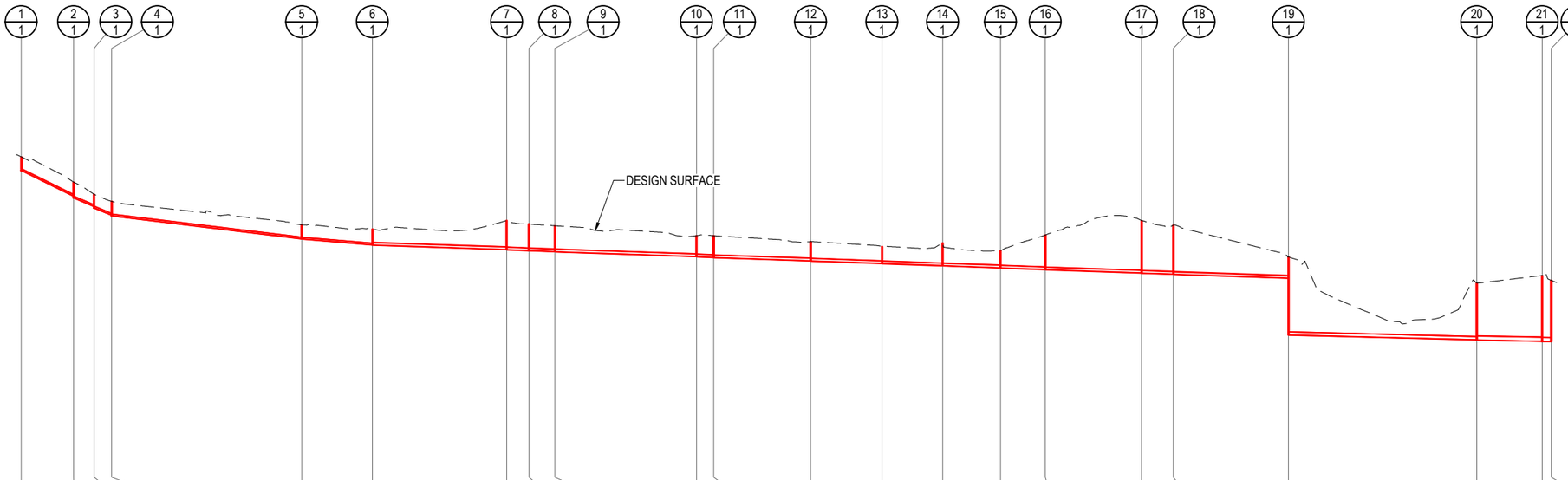
PROJECT
TEVIOT VILLAGE

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

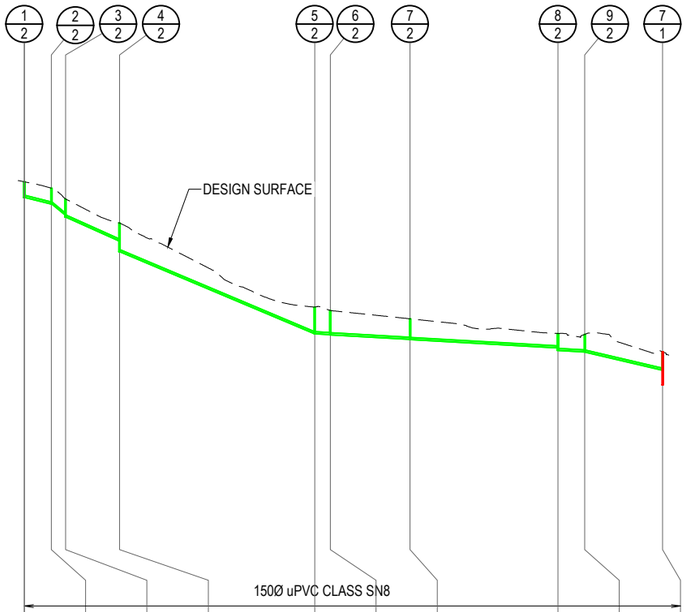
DRAWING TITLE
CONCEPT SEWER GRAVITY MAINS LAYOUT PLAN

PROJECT No.	DRAWING No.	REVISION
16-002518	SK01	C

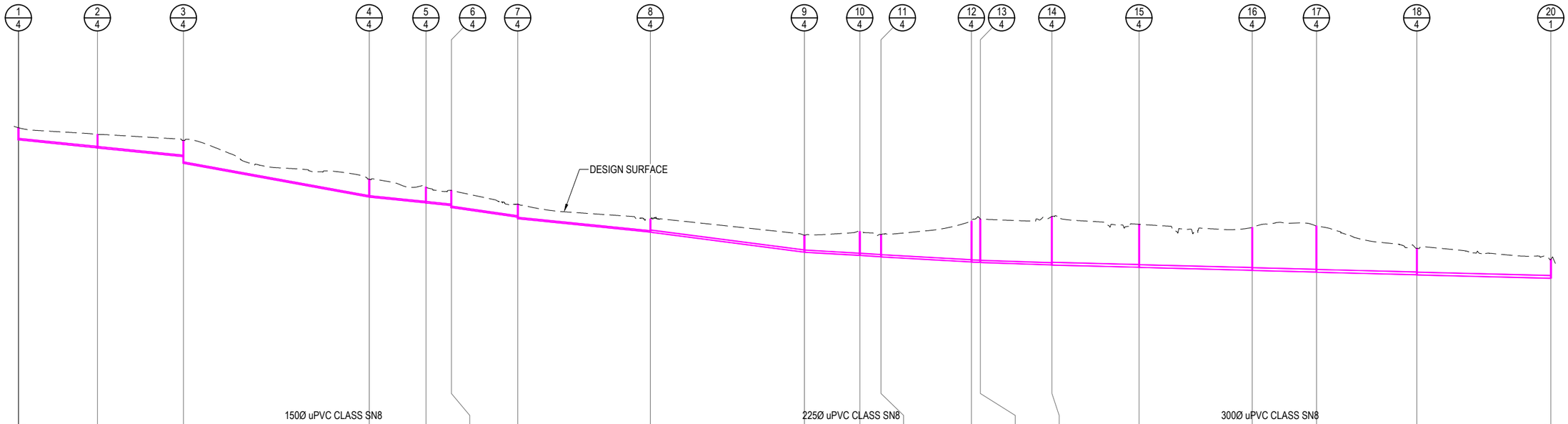
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DESIGN SURFACE

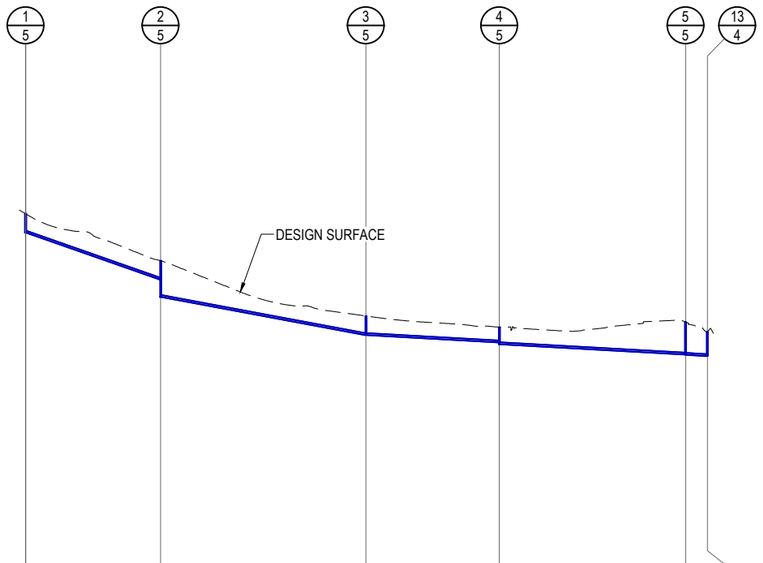
| | | |


1/2
2/2
3/2
4/2
5/2
6/2
7/2
8/2
9/2
7/1
DESIGN SURFACE

| | | |


1 4
2 4
3 4
4 4
5 4
6 4
7 4
8 4
9 4
10 4
11 4
12 4
13 4
14 4
15 4
16 4
17 4
18 4
20 1
DESIGN SURFACE

| | | |


1/5
2/5
3/5
4/5
5/5
13/4
DESIGN SURFACE

| | | |