ERF 1486
VERMONT

CIVIL ENGINEERING SERVICES REPORT

MARCH 2024

REV 1

Liezl Stodart Pr Eng

COVER PAGE

Application details:

a) Municipality name: Overstrand Municipality

b) Particulars of the Site Development Plan: Erf 1486 Vermont – Site Plan - Revision 20, InterActive Town and Regional Planning, 14 March 2019

c) Erf numbers and farm names: Erf 1486, Vermont

d) Date of report: March 2024 (Revised September 2025)

e) Name and address of the Author: Douw Louwrens B.Eng, 16 Jacobus Geldenhuys St, Onrus, 7201

INDEX

ANNEXURES

1. INTRODUCTION

This civil engineering services report accompanies the land use planning application for the rezoning and subdivision of Erf 1486, Vermont. The site is located on the corner of the R43 and Lynx Road in Vermont. The location is shown in ***Figure 1***, Annexure B.

2. DEVELOPMENT PROPOSAL

The development proposal entails 6 single residential erven and 3 town housing erven ranging from 350 m² to 764 m² in extent. The development proposal is shown in Annexure A – ***Site Plan***.

3. AVAILABLE INFORMATION

The following information was available:

a) Existing cadastral information of the study area;

b) Aerial photographs of the study area obtained via Google Earth and Cape Farm Mapper;

c) Existing stormwater, water- and sewer services in the study area;

4. SITE DESCRIPTION

Erf 1486 is 15 068 m² in extent and consists of two catchment areas: The northern area drains in a southeastern direction towards a wetland situated on the property with a gradient of approximately 9.5%. The southern portion drains in a northeastern direction towards the wetland with a gradient of approximately 7.5%. The site lies between 67.0 m and 63.0 m above Mean Sea Level.

The portions of Erf 1486 concerned are currently vacant, except for a building on the northern border of the property which will be demolished.

5. GEOTECHNICAL INFORMATION

No geotechnical investigation was done for the site but the soil can be described as soils with limited pedological development, greyish and excessively drained soils.

The geology can be described as recent coastal sand and dunes with slight occurrence along the coast of shale of the Bokkeveld Group and sandstone of the Peninsula Formation, Table Mountain Group.

The erodibility of the soil can be described as high with a factor of 0.64.

Less than 15% of clay is expected on-site.

For the purpose of this report, the soil conditions are accepted to be as follows:

Soil Type : EA
Conductivity : 6.604 mm/hr
Suction Head : 169.926 mm

Source: https://gis.elsenburg.com/apps/cfm/

6. SERVICES

The extent of the existing services was obtained from the Overstrand Municipality and through a site investigation.

The design of services will be in accordance with the "The Neighbourhood Planning and Design Guide" (Red book), the TRH4 and the specific standards of the Local Authority.

6.1 WATER RETICULATION

The proposed internal water reticulation system will consist of an uPVC piped system and will be connected to the existing municipal system. Please refer to ***Figure 2,*** Annexure B.

6.1.1 Water demand

Table 1 indicates the design criteria which will apply to the envisaged water reticulation system:

Table 1: Water demand of proposed development

Land Use	Units	Demand	Total AADD* (l/day)
Single residential erven: > 650 m²	1	900 l / unit / day	900 l
Single residential erven: > 350 m²	5	700 l / unit / day	3 500 l
Town housing erven: > 200 m²	3	500 l / unit / day	1 500 l
		Total AADD*	**5 900 l**
		Peak flow (l/s) PF = 4,0	**0,27 l / s**
		Fire flow requirement	**15,0 l / s @ 7m**
AADD: Annual Average Daily Demand*			

6.1.2 Reticulation system

It is proposed that the development be accommodated within the existing Vermont reservoir zone. The connection to the existing system should be done to the existing 200 mm diameter pipe in Lynx Road, as shown in ***Figure 2,*** Annexure B.

The existing Vermont reservoir network and bulk supply system from the Preekstoel WTP to the Vermont reservoirs has sufficient capacity to accommodate the proposed development on Erf 1486. There is also sufficient reservoir storage capacity in the existing Vermont reservoirs to accommodate the proposed development.

6.2 SEWERAGE RETICULATION

The proposed internal sewerage reticulation system will consist of a gravity uPVC piped system which will be connected to the existing reticulation system, as indicated in ***Figure 2,*** Annexure B.

6.2.1 Sewerage Demand

The expected sewerage flow of the development is indicated in ***Table 2***:

Table 2: Sewerage flow from proposed development

Land Use	Units	Flow	Total ADDWF* (l/day)
Single residential erven: > 650 m²	1	500 l / unit / day	500 l
Single residential erven: > 350 m²	5	450 l / unit / day	2 250 l
Town housing erven: > 200 m²	3	400 l / unit / day	1 200 l
		Total ADDWF*	**3 950 l**
		Peak flow (l/s) (PF = 2,5; 15% extraneous flows)	**0,13 l / s**
ADDWF: Average Daily Dry Weather Flow*			

6.2.2 Reticulation system

The development on Erf 1486 should be accommodated within the existing Onrus Main pumping station (PS) drainage area. The connection to the existing system should be done to the existing 110 mm diameter small bore pipe crossing Lynx Road to the southeast of the site, as shown in ***Figure 2,*** Annexure B.

Based on the findings of the GLS capacity analysis report and further discussions with GLS Consulting Engineers and Overstrand Municipal Officials, a section of the existing 110 mm diameter small bore sewer system from Erf 1486 to Malmok Crescent, and the small section of 110 mm diameter small bore sewer system in Malmok Crescent, should be upgraded to accommodate the proposed development as indicated in ***Figure 2***.

A section of the 110 mm diameter pipe should be upgraded to a 160 mm diameter pipe (± 255 m in length) which gravitates from the corner of Erf 2570 to Malmok Crescent. The southern portion of the pipe (± 100 m) falls within the Kolgans Street road reserve. The northern portion of the pipe (± 155 m) falls within the access servitude over Erven 1490 and 2570.

The cost to upgrade the 110 mm diameter pipe to a 160 mm diameter pipe is estimated at R 750 000 including P&G's, contingencies and VAT.

A short existing section of 110 mm diameter pipe along Malmok Crescent, approximately 20 m in length, should also be upgraded to a 200 mm diameter pipe. The pipe falls within the Malmok Crescent road reserve.

The cost to upgrade this section of 110 mm diameter pipe to a 200 mm diameter pipe is estimated at R 200 000 including P&G's, contingencies and VAT.

6.3 STORMWATER RETICULATION

The internal stormwater reticulation system will consist of adequately sized concrete stormwater pipes and/or channels where required to discharge stormwater runoff into the existing wetland area on site. Two 750mm x 300 mm rectangular culverts connect the wetland area with a wetland area on the eastern side of Lynx Road.

6.3.1 Calculations

Hydrological calculations were conducted with the PCSWMM computer program for the various Return Interval (RI) storm events. A 24-hour South Africa Type 1 SCS storm, peaking at 12 hours was used in the analysis.

6.3.2 Hydrology

Vermont is situated in the winter rainfall region of the Western Cape and no extreme rainfall intensities occur. A representative Mean Annual Precipitation (MAP) of 697 mm has been obtained from the accompanying software of the *Design Rainfall and Flood Estimation in South Africa* (*JC Smithers and RE Schiltze*) report.

A summary of the rainfall station- and related storm rainfall data is given in ***Table 3*** and ***Table 4*** respectively.

Table 3: Rainfall station data

Station name	SAWS No.	Latitude	Longitude	MAP (mm)	Altitude (m)	Distance from catchment centroid (km)	Length of records (years)
FISH'NS HAVEN	0006232_W	34˚ 22’	19˚ 08’	556	18	4,0	27
HERMANUS (MUN)	0006415_W	34˚ 25’	19˚ 14’	626	24	9,2	64
KLEINMOND (POL)	0006051AW	34˚ 20’	19˚ 02’	909	152	14,5	46

Table 4: Storm rainfall data

	Rainfall Depth (mm)					
Rainfall return period	**1:2 year**	**1:5 year**	**1:10 year**	**1:20 year**	**1:50 year**	**1:100 year**
FISH'NS HAVEN	50,1	70,6	86,4	103,4	128,6	150,1
HERMANUS (MUN)	48,2	67,8	83,0	99,3	123,6	144,3
KLEINMOND (POL)	44,9	61,5	73,9	86,8	105,2	120,4
Accepted:	47,7	66,7	81,1	96,5	119,1	138,3

6.3.3 Peak flow runoff

Table 5 summarizes the site characteristics in terms of the pre- and post-development scenarios. Based on the Site Plan and measurements from aerial photographs, the site will be approximately 27,8% impervious post-development versus 3,8% impervious before development.

Table 5: Site Characteristics

Scenario	Site area (m^2)	Impervious area (m^2)	Impervious %
Pre-development	15 068	580	3,8
Post-development	15 068	4 186	27,8

The development area was modelled with the PCSWMM program to determine peak flow runoff volumes for the pre- and post-development scenarios for each of the Return Interval (RI) storm events. The stormwater run-off from the catchment area during the various recurrence interval storm events is indicated in ***Table 6***.

Table 6: Pre- and post-development stormwater runoff

Recurrence Interval storm event	Peak flow runoff (m^3/s)	
	Pre-development	Post-development
1:2	0,01	0,02
1:5	0,04	0,05
1:10	0,07	0,08
1:20	0,11	0,12
1:50	0,17	0,17
1:100	0,24	0,22

The development of the site will only contribute to a small increase in the total peak runoff from the area for smaller storm events. The development layout and existing wetland area will provide adequate detention for larger storm events and no additional stormwater quantity- (attenuation) or quality control measures are proposed.

6.4 ROADS

Vehicular entry to the development will be off Lynx Road approximately 105 and 180 metres (center to center) from the R43 for respectively the northern and southern portions.

It is proposed that the carriageway crossings and internal roads be constructed according to the following specifications (to be confirmed after a geotechnical investigation):

For asphalt surfacing:

Surface	Asphalt	30mm
Base	G4	125mm
Subbase	G5	150mm
Subgrade	To be confirmed after testing	150mm

For interlocking paving:

Surface	Interlocking paving with 20mm sand	80mm
Base	G4	125mm
Subbase	G7	150mm
Subgrade	To be confirmed after testing	150mm

6.5 SOLID WASTE

Centralised refuse collection areas should be created adjacent to the accesses off Lynx Road for collection by the municipal refuse removal service.

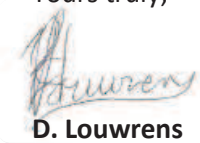
7. CONCLUSIONS

From the above, the following can be concluded:

- The proposed internal water reticulation system will consist of a uPVC water reticulation system to be connected to the existing 200 mm Ø pipe in Lynx Road;
- The existing Vermont reservoir network and bulk supply system from the Preekstoel WTP to the Vermont reservoirs have sufficient capacity to accommodate the proposed development on Erf 1486;
- There is sufficient reservoir storage capacity in the existing Vermont reservoirs to accommodate the proposed development;
- The proposed internal sewerage reticulation system will consist of a gravity uPVC piped system to be connected to the existing 110 mm diameter pipe crossing Lynx Road to the southeast of the site;
- A 255 m section of the existing 110 mm diameter small bore sewer system from Erf 1486 to Malmok Crescent should be upgraded to a 160 mm diameter pipe to accommodate the proposed development;
- A short existing section of 110 mm diameter sewer pipe along Malmok Crescent, approximately 20 m in length, should be upgraded to a 200 mm diameter pipe to accommodate the proposed development;
- The development of the site will only contribute to a small increase in the total peak runoff from the area for smaller storm events. The proposed layout of the site and existing wetland area will provide adequate detention for larger storm events and no additional stormwater quantity- (attenuation) or quality control measures are proposed.;
- Vehicular entry to the development will be off Lynx Road approximately 105 and 180 metres from the R43 for respectively the northern and southern portions;
- Centralised refuse collection areas should be created adjacent to the accesses off Lynx Road for collection by the municipal refuse removal service.

We trust that you will find this civil engineering services report in order. Please contact the undersigned should there be any queries.

Yours truly,



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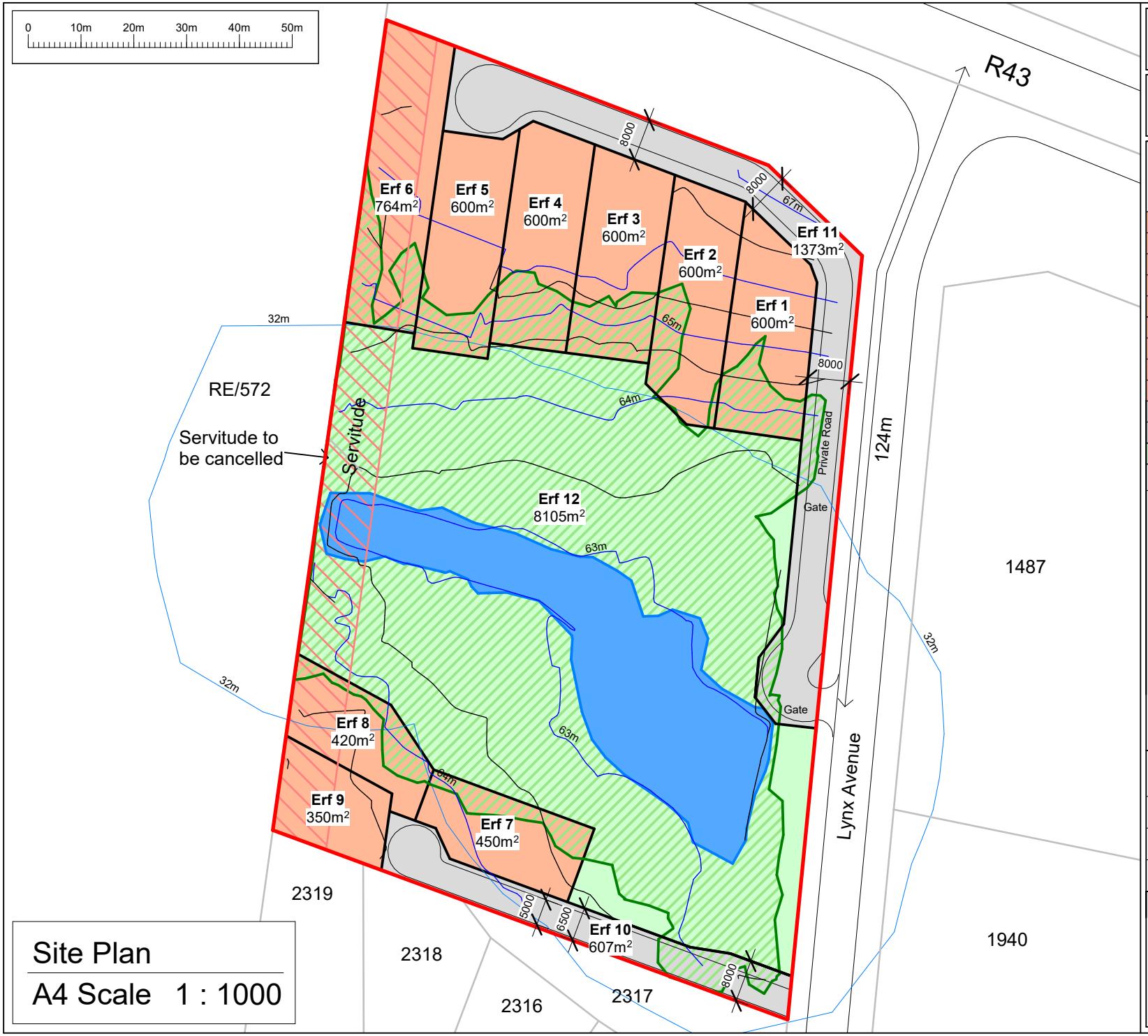
ANNEXURE A: Site Plan



Site Plan

A4 Scale 1 : 1000

PROJECT

Erf 1486 Vermont

TITLE

Site Plan

Erf	Zoning	Land Use	% Seasonal Wetland on Residential Erven	Area
1	GR1	Single Residential	30%	600m²
2	GR1	Single Residential	19%	600m²
3	GR1	Single Residential	30%	600m²
4	GR1	Single Residential	30%	600m²
5	GR1	Single Residential	22%	600m²
6	GR1	Single Residential	26%	764m²
7	GR1	Town Housing	30%	450m²
8	GR1	Town Housing	29%	420m²
9	GR1	Town Housing	0%	350m²
10	OS3	Private Road	N/A	607m²
11	OS3	Private Road	N/A	1516m²
12	OS3	Private Open Space	N/A	7964m²
Total			**15%**	**15069m²**

Application Area

Permanent Wetland (depression)

Seasonal / Temporary Wetland

Servitude (to be cancelled)

N

CLIENT

DRAWN BY	CHECKED BY	DATE
JM	AW	14/03/19

DRAWING NUMBER

Rev 20

A4 SCALE

INDEMNITY

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ANNEXURE B: DRAWINGS

Figure 1: Erf 1486, Vermont - Locality Plan

Figure 2: Water, sewer and stormwater reticulation

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ERF 1486
VERMONT
LOCALITY PLAN

FIGURE 1

SCALE
1:10 000 (A4)

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ERF 1486
VERMONT
WATER, SEWER AND STORMWATER RETICULATION

FIGURE 2

SCALE
1:5 000 (A4)

ANNEXURE C: GLS water and sewer services capacity analysis report

Infrastructure planning

19 February 2024

The Director: Civil Engineering Services
Overstrand Municipality
P. O. Box 20
HERMANUS
7200

Attention: Mr Dennis Hendriks

Dear Sir,

DEVELOPMENT OF ERF 1486, VERMONT: CAPACITY ANALYSIS OF THE BULK WATER AND SEWER SERVICES

The request by Mr André Wiehahn of ITRP Town and Regional Planning regarding comments on the bulk water and sewer supply to the proposed development (residential development on Erf 1468, Vermont), refers.

This document should inter alia be read in conjunction with the Water Master Plan (performed for the Overstrand Municipality) dated June 2021 and the Sewer Master Plan, dated June 2021.

Future development area GH8.6, which included the proposed development area on Erf 1468, was conceptionally taken into consideration for the June 2021 master plans for the water and sewer networks.

1. WATER DISTRIBUTION SYSTEM

1.1 *Distribution zone*

It is proposed that the development is accommodated within the existing Vermont reservoir water distribution zone. The connection to the existing reticulation system should be made to the existing 200 mm Ø pipe in Lynx Avenue east of Erf 1468, as shown in Figure 1 attached.

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Directors: Marius de la Rey, Garreth Young

1.2 *Water demand*

The original water analysis for the master plan was performed with a total annual average daily demand (AADD) for development on Erf 1468 (future area GH8.6 in the June 2021 master plan) of 22,6 kL/d.

For this re-analysis, the AADD and fire flows for the proposed development were calculated as follows:

- 9 Single Residential units @ 0,6 kL/d/unit [(1)] = 5,4 kL/d
- Fire flow criteria (Low risk) = 15 L/s @ 7 m

[(1)] As per Table J.2 from Section J - Water Supply of "The Neighbourhood Planning and Design Guide" (so called "Red book").

1.3 *Present situation*

1.3.1 *Network conveyance*

The existing Vermont reservoir network has sufficient capacity to accommodate the proposed development on Erf 1468.

The connection to the existing system can be done at the 200 Ø mm diameter pipeline in Lynx Avenue (East of the proposed development), as shown on Figure 1 attached.

1.3.2 *Bulk supply system*

The existing bulk supply system from the Preekstoel Water Treatment Plant (WTP) to the Vermont reservoirs has sufficient capacity to accommodate the proposed development.

1.3.3 *Reservoir capacity*

There is sufficient reservoir storage capacity in the existing Vermont reservoirs to accommodate the proposed development.

2. SEWER NETWORK

2.1 *Drainage area*

The development on Erf 1486 should be accommodated within the existing Onrus Main pumping station (PS) drainage area.

The proposed connection point to the sewer system is to the existing 110 Ø small bore sewer pipe in Lynx Road, as shown on Figure 2 attached.

The development is inside the sewer priority area.

2.2 *Sewer flow*

In the original sewer master plan, the peak day dry weather flow (PDDWF) for development on Erf 1468 (future area GH8.6 in the June 2021 sewer master plan) was calculated at 17,3 kL/d.

For this re-analysis, the PDDWF for the proposed development was calculated as 3,8 kL/d.

2.3 *Present situation*

2.3.1 *Gravity sewers*

The existing 110 mm diameter small bore sewer system from Erf 1486 to Malmok Street, and the small section of 110 mm diameter small bore sewer system (that has not yet been upgraded to a 200 mm) in Malmok Street (as shown on Figure 2 attached), have sufficient hydraulic spare capacity to accommodate the peak sewage flow from the proposed development.

Accommodation of the development on Erf 1486 on the existing small bore system is however not supported due to operational problems that are experienced with smaller diameter sewer systems, specifically frequent sewer blockages.

In the sewer master plan upgrading of the existing system in Malmok Street is proposed to accommodate potential future development areas within the upstream drainage area.

It is therefore proposed that the existing 110 mm diameter small bore sewer system from the proposed development to the existing 200 mm diameter outfall sewer in Malmok Street is upgraded to 160 mm diameter and 200 mm diameter outfall sewers (as indicated on Figure 2), to accommodate the proposed development in the existing sewer system:

The existing Onrus Main PS drainage area in Vermont has sufficient capacity to accommodate the proposed development within the existing sewer system, except for a small section of a 110 mm Ø outfall sewer in Malmok Crescent that has not yet been upgraded to a 200 mm diameter pipe.

(The old 110 mm outfall sewer in Malmok Crescent before and after this section of pipe has recently been upgraded to a Ø of 200 mm, as proposed in the June 2021 Sewer Master Plan.)

Network upgrade:

• Item 1	: 570 m x 160 mm Ø new outfall sewer (replace existing 110 mm Ø small bore system)	R 1 470 000 *
• OHS11.12	: 20 m x 200 mm Ø new outfall sewer (replace existing 110 mm Ø small bore system)	R 186 000 *
	Total	R 1 656 000 *

(* Including P & G, Contingencies and Fees, but excluding VAT - Year 2023/24 Rand Value. This is a rough estimate, which does not include major unforeseen costs).

Take note that the route of the proposed pipeline is schematically shown on Figure 2 and will have to be finalised after a detail pipeline route investigation has been performed.

2.3.2 *Pumping Stations*

The proposed development gravitates to the Onrus Main PS from where sewage is pumped to the Hermanus Wastewater Treatment Plant (WWTP). The pump station has sufficient spare capacity to accommodate the proposed development.

2.4 *Minimum items required*

The minimum requirements to accommodate the proposed development in the existing sewer system are link services item 1 to connect the development to the existing Onrus Main PS drainage area and master plan item OHS11.12 to reinforce the existing Onrus Main PS sewer reticulation system.

GLS

3. CONCLUSION

The developer of Erf 1486 in Vermont may be liable for the payment of a Development Contribution (as calculated by the Overstrand Municipality) for bulk water and sewer infrastructure as per Council Policy.

There is sufficient capacity in the existing water reticulation system to accommodate the proposed development and no network upgrades will be required.

There is sufficient hydraulic spare capacity in the existing small bore sewer reticulation system downstream of the proposed development to accommodate the proposed development. Accommodation of the development on Erf 1486 on the existing small bore system is however not supported due to operational problems that are experienced with smaller diameter sewer systems, specifically frequent sewer blockages.

The minimum requirements to accommodate the proposed development in the existing sewer system are therefore link services item 1 and master plan item OHS11.12 to reinforce the existing Onrus Main PS sewer reticulation system.

We trust that you find this of value.

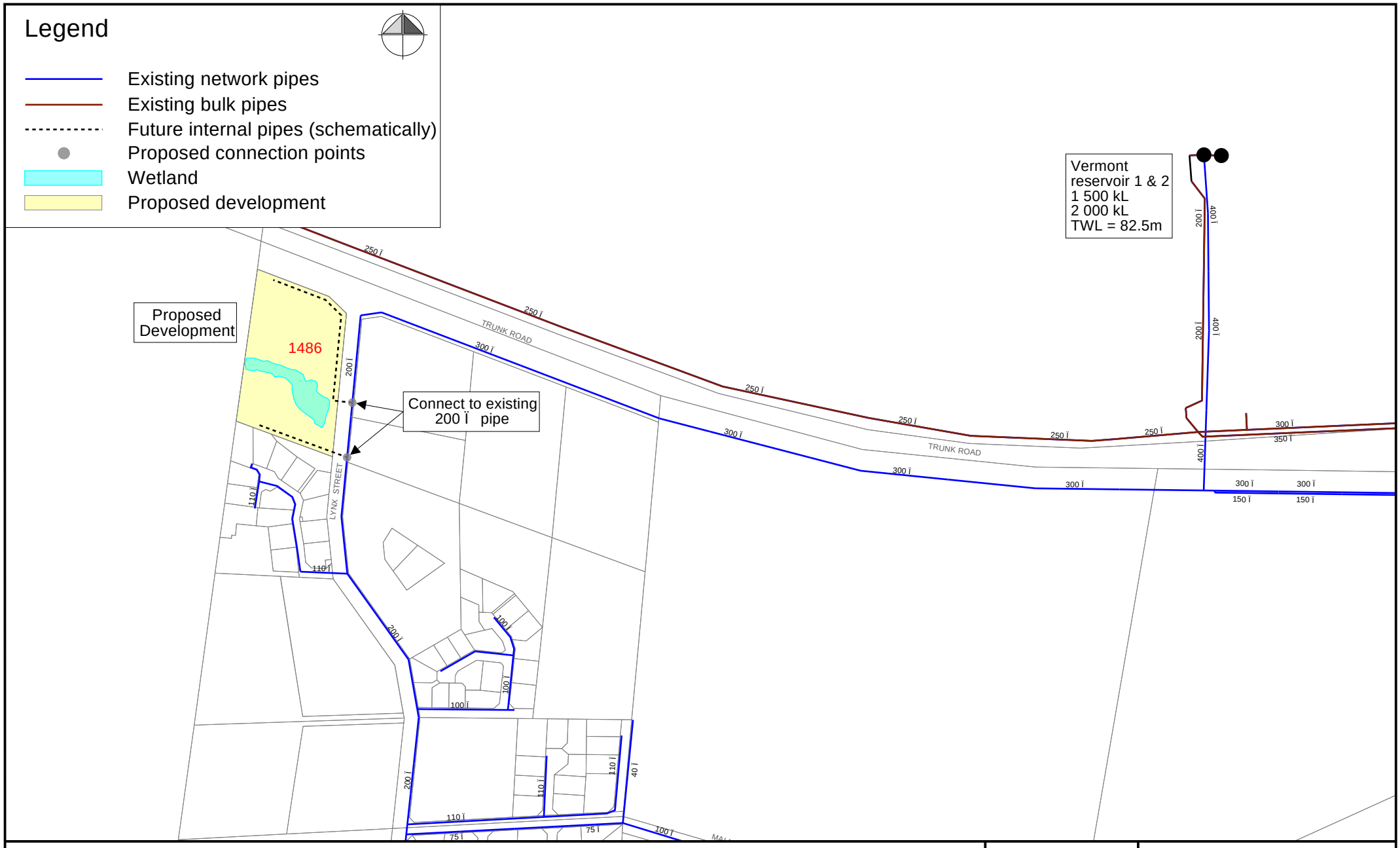
Yours sincerely,

GLS CONSULTING (PTY) LTD
REG. NO.: 2007/003039/07

Per: PC DU PLESSIS

cc. ITRP Town and Regional Planning
46 Selkirk St
Hermanus Heights
HERMANUS
7200

Attention: Mr André Wiehahn



February 2024

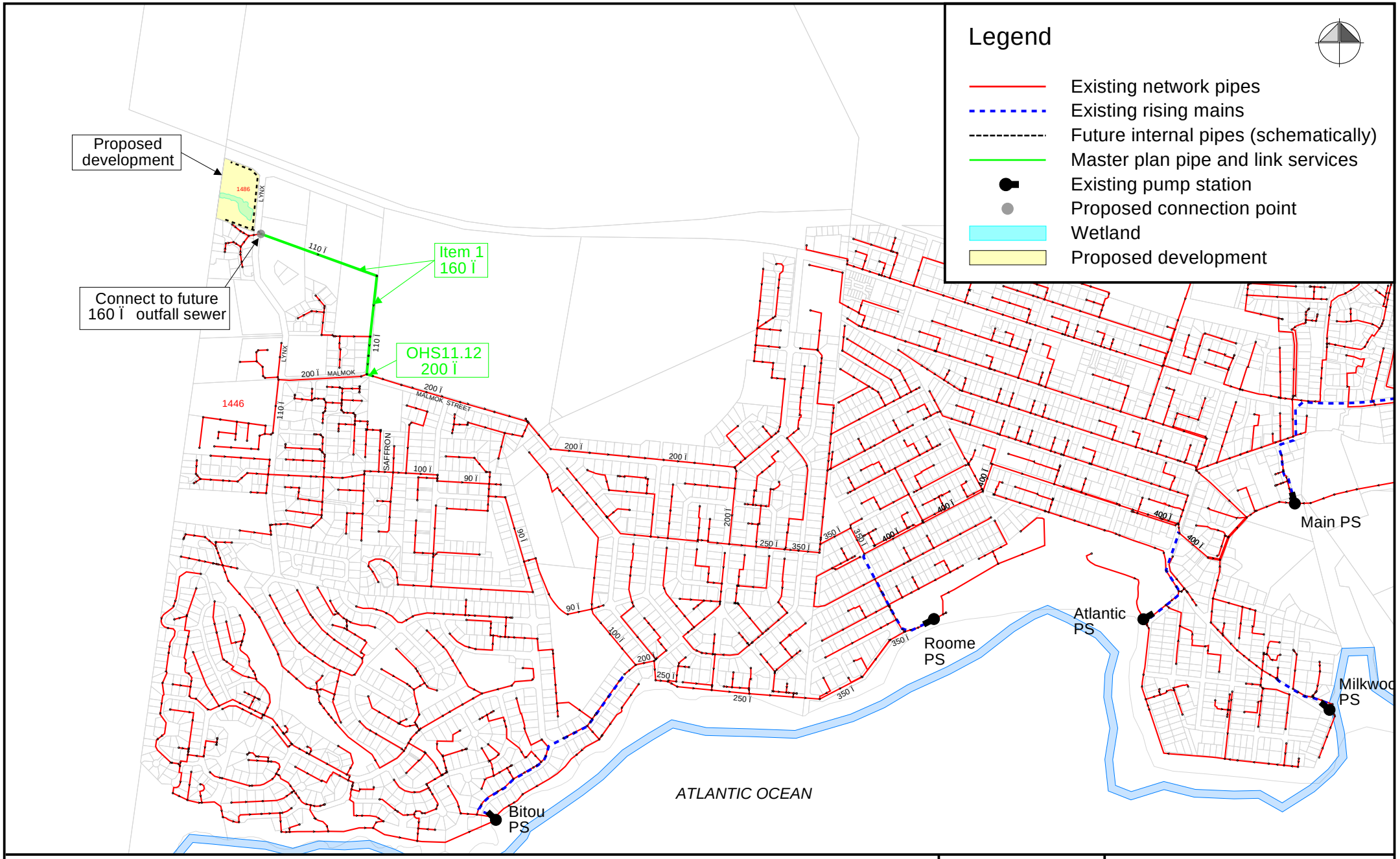
Development of Erf 1486 - Vermont

0 75 150 300 m

Scale 1:5000

Figure 1

Proposed Development
Vermont - Erf 1486
Existing Water System



February 2023

Development of Erf 1486 - Vermont

0 150 300 600 m

Scale 1:12500

Figure 2

Proposed Development
Vermont - Erf 1486
Existing Sewer System