ERF 1486
VERMONT

CIVIL ENGINEERING SERVICES REPORT

JANUARY 2024

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 18, InterActive Town and Regional Planning, 14 March 2019

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

d) Date of report: January 2024

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

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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 4 town housing erven ranging from 281 m² to 703 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: <= 1 000 m²	6	800 l / unit / day	4 800 l
Town housing erven: 250 m² - 500 m²	4	600 l / unit / day	2 400 l
		Total AADD*	**7 200 l**
		Peak flow (l/s) PF = 4,0	**0,33 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.

It is expected that 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. It is furthermore expected that there is sufficient reservoir storage capacity in the existing Vermont reservoirs to accommodate the proposed development. This should however be confirmed by the GLS capacity analysis report.

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 was taken as 70% of the water demand of the development. ***Table 2*** indicates the design criteria applicable to the sewerage reticulation system for the new development proposal:

Table 2: Sewerage flow from proposed development

Land Use	Units	Flow	Total ADDWF* (l/day)
Single residential erven: <= 1 000 m²	6	560 l / unit / day	3 360 l
Town housing erven: 250 m² - 500 m²	4	420 l / unit / day	1 680 l
		Total ADDWF*	**5 040 l**
		Peak flow (l/s) (PF = 2,5; 15% extraneous flows)	**0,17 l / s**
ADDWF: Average Daily Dry Weather Flow*			

6.2.2 Reticulation system

It is proposed that 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 pipe crossing Lynx Road to the southeast of the site, as shown in ***Figure 2,*** Annexure B.

It is expected that the existing Onrus Main PS drainage area has sufficient capacity to accommodate the proposed development on Erf 1486. This should however be confirmed by the GLS capacity analysis report being conducted and whether any upgrades will be required.

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 (m²)	Impervious area (m²)	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 (m³/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:

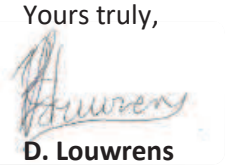
- The proposed internal water reticulation system will consist of a uPVC water reticulation system to be connected to the existing 200 mm Ø pipe in Lynx Road;
- It is expected that the existing Vermont reservoir network and bulk supply system from the Preekstoel WTP to the Vermont reservoirs have sufficient capacity to accommodate the proposed development on Erf 1486 (to be confirmed by the GLS Consulting Engineers capacity analysis report);
- It is expected that there will be sufficient reservoir storage capacity in the existing Vermont reservoirs to accommodate the proposed development. (to be confirmed by the GLS Consulting Engineers capacity analysis report);
- 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;
- It is expected that the existing Onrus Main PS sewerage drainage area has sufficient capacity to accommodate the proposed development on Erf 1486. (to be confirmed by the GLS Consulting Engineers capacity analysis report);
- 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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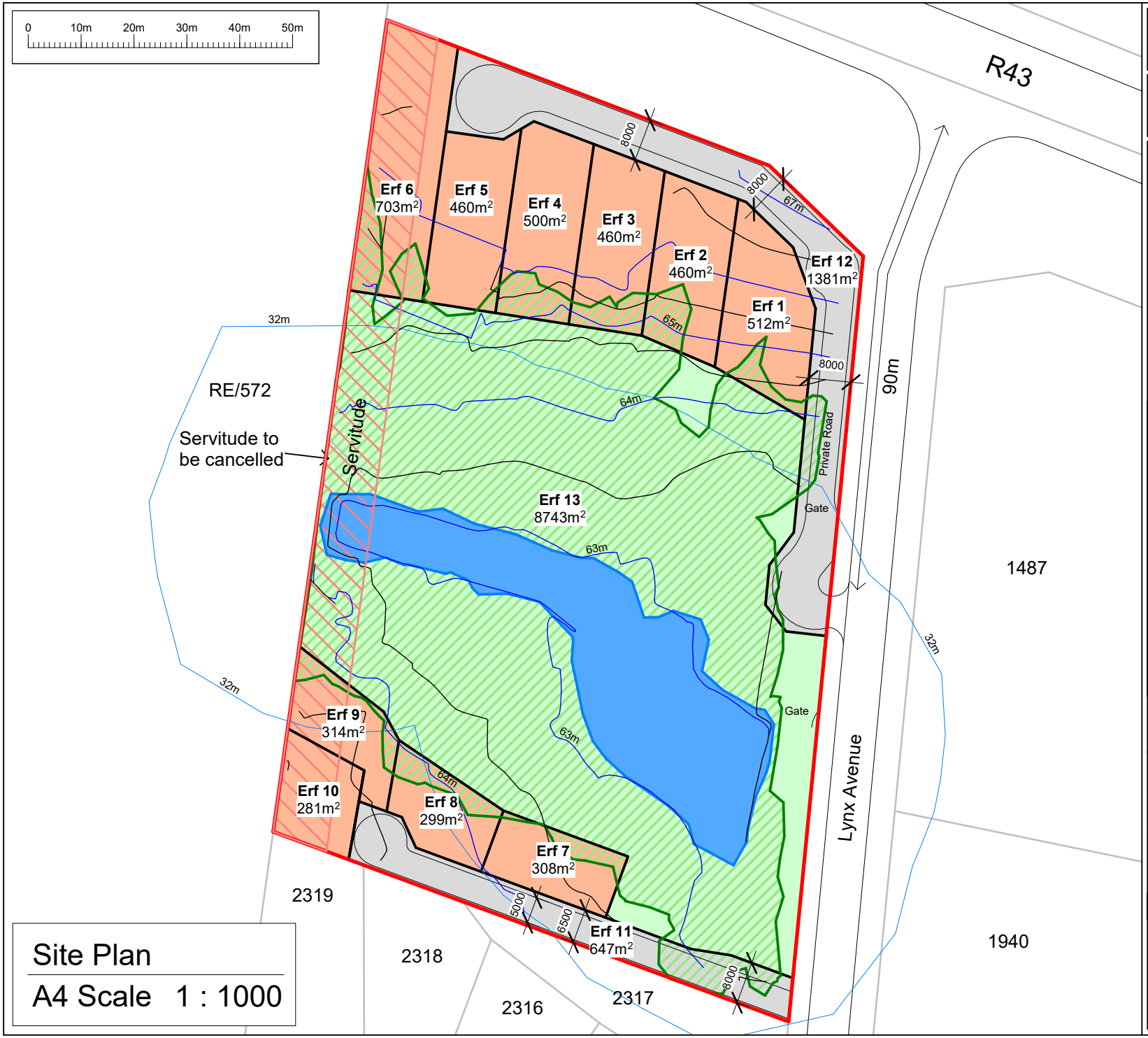
ANNEXURE A: Site Plan



Site Plan

A4 Scale 1 : 1000

PROJECT

Erf 1486 Vermont

TITLE

Site Plan

Erf	Zoning	Land Use	% Seasonal Wetland	Area
1	GR1	Single Residential	11%	512m²
2	GR1	Single Residential	18%	460m²
3	GR1	Single Residential	17%	460m²
4	GR1	Single Residential	19%	500m²
5	GR1	Single Residential	3%	460m²
6	GR1	Single Residential	19%	703m²
7	GR1	Town Housing	19%	308m²
8	GR1	Town Housing	30%	229m²
9	GR1	Town Housing	20%	314m²
10	GR1	Town Housing	N/A	281m²
11	OS3	Private Road	N/A	647m²
12	OS3	Private Road	N/A	1381m²
13	OS3	Private Open Space	N/A	8743m²
Total				**15068m²**

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 18

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 bulk water and sewer services capacity analysis report (To be completed)