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Our Ref: 502436/24.9/MB/fk

5 April 2024

The Municipal Manager
Mossel Bay Municipality
PO Box 2
MOSSEL BAY
6600

Attention: Mr Lindilizwi Mngxekeza

Dear Sir,

CONSTRUCTION OF INTERNAL CIVIL ENGINEERING SERVICES FOR MOSSEL BAY HOUSING PROJECTS: SINETHEMBA/SEWENDELAAN PHASE 1 LOCATED ON THE REMAINDER OF PTN. 249 OF THE FARM VYF-BRAKKE-FONTEIN No. 220 KWANONQABA, REGISTRATION DIVISION MOSSEL BAY RD

Below please find the Engineering Services Report for Sinethemba, based on the latest preliminary town planning layout as received from Zutari Town Planners, refer to enclosed Drawing no. 113048-0000-DRG-SINE/SEWE, revision 3, dated March 2024.

1. INTRODUCTION

1.1 Brief

The Mossel Bay Municipal area has seen a period of rapid growth in recent years which has had the effect that the demand for serviced subsidised erven has dramatically increased.

Mossel Bay Municipality, have submitted a housing subsidy application for 194 serviced housing erven in Mossel Bay as part of the Upgrading of Informal Settlements Programme (UISP) for the greater Mossel Bay Municipal area. The internal reticulation for the proposed residential development will be designed to conform to Municipal standards.

1.2 General

The proposed development is adjacent to Sijaji Street, Mzamomhle Street and Nofemela Street within the Kwanonqaba Township. The R102/Louis Fourie Road is towards the North and the N2 Highway towards the North West, when entering from the Mossel Bay CBD, refer to enclosed map: 502436- Upgrading of Informal Settlements. The climate is moderate, with most rainfall occurring mainly during autumn and the mean annual precipitation being in the order of 437mm. The temperature ranges from 18.4ºC to 26ºC.

The proposed number of developed erven contained is as follows:

Land – Use	No of Erven	Extent (±Ha)	% of Total
Residential Erven	194	1.63	60.15
Road Reserves	-	1.03	38.00
Servitudes	-	0.05	1.85
TOTAL	**194**	**2.71ha**	**100**

2. BULK WATER SUPPLY SYSTEM

2.1 General Description

The water services infrastructure consists of various raw water sources including the Wolwedans Dam, Klipheuwel Dam, Hartebees Kuil Dam and Ernst Robertson Dam as well as boreholes. Raw water pipelines convey the untreated water to a total of seven water purification plants situated throughout the municipal area. From the various water purification plants, as well as a desalination plant, the treated water is pumped via 30 pump stations into 55 reservoirs.

The total design capacity for the seven water purification plants, as well as the desalination plant, is 72.30 Mℓ per day. The average daily volume of water purified, during the 2015/2016 financial was 20.64 Mℓ per day. The water usage increased to 27.12 Mℓ per day during December 2015. This means that there is between 45.18 Mℓ and 51.66 Mℓ per day spare capacity available.

2.2. Proposed Water Demand for Housing Project

Our calculations are based on the “Guidelines for Human Settlement Planning and Design”.

Existing network capacity in the vicinity of the site is subject to the confirmation by Mossel Bay Municipality. GLS Consulting (GLS) were appointed by Mossel Bay Municipality to draw up the Water Master Plan for the Municipal area and to determine the effect of any form of developments in the Municipal area on the Water Master Plan. If required, this and other reports will be submitted to GLS in order to determine whether the existing water network system has sufficient capacity to accommodate the proposed housing development.

According to Table 8.14: Water Demand from ““Guidelines for Human Settlement Planning and Design”, the following calculation was done to determine the Annual Average Daily Demand (ADDD) for the various Land Uses: [2]

The proposed number of developed erven contained is as follows:

Description	Calculations	Annual Average Daily Demand (AADD)
Residential erven	194 erven x 600ℓ/erf/day	116 400 ℓ/day
Roads	-	0 ℓ/day
	TOTAL AADD	**116 400 ℓ/day**

This equates to 117 equivalent erven and from the design codes, we expect to design for a peak factor of 7.

Peak Domestic Demand = 116 400 ℓ/d x 7
= 814 800 ℓ/d
= 9.43 ℓ/s

Fireflow:

Such a development would fall into a low risk-group 1 category and as such, the following would apply:

- 900 ℓ/min
- 2 hour design fire flow

With the supply spread over a wide area, according to the GLS Water Master Plan the existing reservoirs have sufficient storage capacity and capacity for fire flow conditions to accommodate this particular development.

If required, GLS will be furnished with this and other reports in order to determine whether the existing water storage system has sufficient capacity to accommodate the proposed housing development. According to the Water Master Plan for the Municipal area, sufficient capacity exists at the Water Treatment Plants.

A water reticulation system exists within the adjacent neighbourhoods to which the proposed development will connect (see GLS Figure MBW 2.2b). A system of reservoirs, water pump stations and water mains deliver potable water to developed areas.

2.3 Proposed Services

No upgrades to the existing water reticulation system are envisaged in order to accommodate this development, but if required, this and other reports will be submitted to GLS in order to determine whether the existing water network system has sufficient capacity to accommodate the proposed housing development.

As per GLS, Figure MBW 2.1b, water reticulation as well as a potable water pumpstation exists within the proposed construction area. All existing services will either be rerouted or accommodated within the proposed development area.

3. BULK SEWAGE SYSTEM

3.1 Wastewater Treatment Works

From the point of origin, all waterborne sewage is conveyed through approximately 510 km gravity sewer pipelines to 73 sewer pump stations situated throughout the municipal area. From the pump stations the sewage is pumped through approximately 40 km of rising main pipelines to a total of seven wastewater treatment plants situated throughout the municipal area. The total design capacity for the seven wastewater treatment plants is 22.54 Mℓ per day. The current combined average daily inflow for the seven wastewater treatment plants is 10.72 Mℓ per day.

Wastewater generated from the proposed development will gravitate into the existing system and conveyed by means of gravity sewer lines as well as pumped through rising mains to the Hartenbos Regional Wastewater Treatment Works, where it will be treated.

According to the Sewer Master Plan for the Municipal area, sufficient capacity exists at the Sewage Treatment Plants.

3.2 Wastewater Reticulation System

A normal gravity wastewater reticulation system exists within the adjacent neighbourhoods to which the proposed development will drain (see GLS Figure MBS 2.1b). A system of gravity sewer mainlines, wastewater pump stations and rising mains delivers the accumulated wastewater to the Mossel Bay wastewater treatment works.

3.3 **Wastewater Flow Demand**

Our calculations are based on the "Guidelines for Human Settlement Planning and Design".

3.3.1 According to the guidelines, the expected average daily wastewater flow per dwelling for the three income groups is as follows:

Income group	**Low**	**Medium**	**High**
Litres per dwelling	500	750	1000
Average persons per dwelling	7	6	5

The proposed area in Phase 1 to be serviced is as follows:

AREA	**INCOME GROUP**	**NO OF ERVEN**
Sinethemba	Low	194 erven

Based on the above, the Average Dry Weather Flow (ADWF) for the residential erven would therefore be:

Q = 194 x 500
Q = 97000 ℓ/d
= 97 kℓ/d
ADWF = 0.097 Mℓ/d

3.3.2 The use of the land is solely for the residential purposes. There will be no other land uses taken into account.

3.3.3 The number of persons is:
194 x 7
= 1358 persons

This equates to a peak factor of 2.6.
This would lead to an expected Peak Dry Weather Flow (PDWF) as follows:
Q = (97000) x 2.6
= 252 200 ℓ/d
= 0.252 Mℓ/d
PDWF = 2.92 ℓ/s

If an infiltration rate of 15% is used for the ingress of stormwater into the system, the Peak Wet Weather Flow (PWWF) is calculated as follows:
Q = 252 200 x 1.15
= 290 030ℓ/d
= 0.29 Mℓ/d
PWWF = 3.36 ℓ/s

3.4 Proposed Services

No upgrades to the existing sewage reticulation system are envisaged in order to accommodate this development, but if required, this and other reports will be submitted to GLS in order to determine whether the existing sewage network system has sufficient capacity to accommodate the proposed housing development.

4. **STORMWATER**

No bulk stormwater systems are required as the stormwater will be dispersed via a number of stormwater outlets into the existing natural watercourse. Accumulated

stormwater will be dispersed by means of energy dissipating structures to minimize the effect of peak runoff downstream.

Currently, stormwater reticulation may exist within the proposed construction area. This is subjected to confirmation during the detailed design phase. All existing services will either be rerouted or accommodated with the future development area.

5. ACCESS ROADS

Access to the proposed development area will be provided from the North-West from Thembelihle Ave, North from Nofemela St or North from Sijaji St. No upgrades to the existing road infrastructure is required. The points/roads allocated where access will be available to the area will need to be upgraded, stabilized or filled with material to give proper movement of vehicles in and out of the site.

6. SOLID WASTE

Refuse removal will be dealt with once a week as applicable to all the current residential areas in the Mossel Bay Municipal area.

Solid waste is based on an estimated 3.5 kg/person/day.

Therefore: (194 units x 7 people per unit x 3.5 kg/day)
= 4753 kg/day
= 4.753 tons/day

Volume = 4.753 t/d x 0.75
= 3.57 m^3/d
= 107.10 m^3/month

Based on preliminary discussions with Mossel Bay Municipality the existing solid waste site will be able to accommodate the additional solid waste generated by the development. An existing solid waste processing and transfer site is located within, the development area will be accommodated within the final development layout.

7. FLOODLINES

This housing project is not affected by a floodline within the proposed development area.

8. EXTRAORDINARY DEVELOPMENT CONDITIONS AND LAND REHABILITATION

The general terrain and the underlying geology of these sites appear to be suitable for housing development. Some of the sites that are adjacent to natural drainage lines are quite steep and some terracing may be necessary. Most of these sites are presently occupied by informal structures and there is evidence of some disturbance to the natural ground level due to uncontrolled fill and/or rubbish dumping, but this is not considered severe and can probably be cleared off the sites. No other severely problematic soils are expected and conventional engineering is envisaged.

Shallow hard rock is expected within 1.5m in some areas in Kwanonqaba and the depth to the rock is likely to vary widely. Excavations into rock are classified as “Hard” in terms of SABS 1200D. The in situ soils are unsuitable for use as pipe bedding or blanket due to the presence of coarse soil or clumps of clay that does not meet grading or compactibility requirements. Pipe bedding and blanket materials will have to be imported from local quarries. The in situ soil may be suitable for use as backfilling over pipe blanket, but this will have to be confirmed. With respect to the construction of internal access roads, it is

likely that the in situ subgrade is poor on all sites and an imported selected subgrade layer is envisaged for roads. The installation of services will be particularly challenging on steep slopes.

These conditions have certain implications for the installation of services and thus the motivation is based on the necessity for:

a) Removing and disposal of the uncontrolled fill material from site;
b) Importing of backfill material for filling of disturbed ground areas;
c) Stormwater interventions on steep slopes to prevent erosion;
d) Creation of Housing Platforms on steep slopes;
e) Construction of Retaining Walls for housing platforms; and
f) Importation of selected layers for road construction.

Estimates regarding the additional cost over and above the housing subsidy amount can be submitted once detail designs have been completed and revised as soon as formal tenders received.

9. INTERNAL SERVICES

The proposed internal civil services are indicated on Drawing No's 502436-SINE-DRG-CC-0001. Below finds a brief description of the services to be provided for the area.

9.1. Sewage

1265m of 160mm dia PVC-u heavy duty sewer pipe

87 No. Manholes

110mm dia PVC-u light duty house connections with end cap for 194 erven.

9.2 Water

17m of 75mm dia PVC-u Class 12 water pipe

220m of 90mm dia PVC-u Class 12 water pipe

1050m of 110mm dia PVC-u Class 12 water pipe

14 No. Gate valves

4 No. Fire hydrants

20mm dia HDPE Class 12 water house connections for 194 erven

9.3 Roads

5300m², paving roads. Road widths vary from *3.5*m - 5.5m wide with Barrier/Mountable kerb and channels on the lower side of the roadway and concrete channels at intersections.

9.4 Stormwater

2010m of Barrier/Mountable kerb and channel

520m of 450mm dia concrete stormwater pipe

13 No. Stormwater Catchpits

2 No. Stormwater Manholes

2 No. Brick headwalls

10. STANDARD OF ENGINEERING SERVICES TO BE PROVIDED

Levels of services are as follows:

10.1 Sewer

- Pipe diameter: 160mm dia solid wall for main lines and 110mm solid wall for house connections. UPVC Class 34 or Ultracor Class 400 Heavy Duty (400 kPa).
- Precast concrete rings to be used for manholes.
- Erf connection ends 1m into the erf with a rodding eye.

10.2 Water

- Pipe diameter of 75 – 160 mm dia MPVC Class 9/12 pipes depending on residual pressure.
- Each erf will be serviced with a 20mm diameter connection and an Elster Kent/Honeywell plastic water meter in a plastic meter box or similar approved meter by the Technical Services Directorate.
- Provision is made for fire hydrants according to “Red Book” guidelines.
- All fire hydrants shall be 65mm dia (internal)
- All fire hydrant outlet shall be of bayonet coupling type.
- All valves shall be AVK type valves – left hand/closing or similar approved.

10.3 Roads and stormwater

- The road width will be 4.5m in 8 and 10m reserves and 5.5m in 13 and 16m reserves.
- All road surfaces will be either Cape seal or paved surface.
- Sub-base and base materials will be imported.
- Sub-surface drainage, where applicable, will be installed.
- The underground piped stormwater drainage system will be minimum 375mm diameter.
- Barrier kerbs will be installed around bellmouths. Bellmouth’s radius minimum 10m.
- All stormwater drains will be provided with a sand trap of at least 300mm.

10.4 Design Criteria and Standards

10.4.1 Design criteria

The following documents will serve as a base for the detail design criteria and standards:

- Guidelines for Human Settlement Planning and Design (“Red Book”); and
- City of Cape Town Management of Urban Stormwater Impacts Policy – Version 1.1, 2009.

10.4.2 Construction specifications

All materials and workmanship shall comply with the specifications as set out in the South African National Standards for Civil Engineering (SANS).

10.4.3 Roads

The road system forms an integral part of the local area plan.

10.4.3.1 *Design Criteria*

The design criterion for roads is as follows:

- Road reserve widths are 16m, 13m, 10m and 8m.
- Design life of the roads is 20 years.
- Sub-grade CBR – 15 to 20.
- Sub-base CBR – 45min. (processed crushed stone)
- Base course CBR – 80min. (processed crushed stone)
- Surfacing - minimum gravel wearing course on all roads.
  - alternatives Cape seal or paving
- Minimum road grade 0.45 %
- Minimum road crossfall 2 %

10.4.4 Stormwater

The storm water system forms an integral part of the road and urban planning layout. The system rests on three legs, the minor system, the major system and an emergency system. The minor storms are catered for in the pipe system while the major storms are routed through a linked system of roads and public open spaces using attenuation techniques. The emergency system recognizes failure of the minor and major system by storms greater than provided for in major system or in the event of malfunction of the minor system by providing continuous overland flow routes to minimize flooding of residential areas.

10.4.4.1 *Minimum design criteria for storm water system*

The data to be used for the design of the system is as follows:

- Minor system : 2-year return period conveyed in an underground pipe system. Preferably the overland flow shall not exceed 200m.
- Major system : 50-year return period. The difference between the 2 year and 50 year to be conveyed in the road prism with depth not exceeding 150mm within the road reserve width.
- The minimum gradients for pipelines are designed to give a minimum velocity of 0.7m per second with the pipe flowing full.
- The maximum velocity used is 3.5m per second.
- Major storm water overflows are to be provided to convey the excess storm water from the streets into designated public open spaces.
- Storm water flow velocities in roadways will be kept as low as possible and related to the surface finish to prevent scour and erosion.
- Roads are to be graded to ensure free and continuous flow to the main storm water system and to prevent local ponds at intersections.

10.4.4.2 *Pipelines*

- Storm water pipes are generally 50D, 75D or 100D as required by the loading and installation conditions.
- Pipes are generally laid on Class C bed.
- The minimum cover on pipes is 0.80m.

- The minimum pipe diameter is 375mm for longitudinal runs and catch pit connections.

10.4.6 Sewers

The sewer drainage system forms an integral part of the sewage system. The drainage for the site is in different directions due to the topography of the site.

10.4.6.1*Minimum design criteria*

- A conventional waterborne sewerage system is provided with single connections to individual erven. The main sewer line will be constructed within roads reserves or midblock sewers on the site topography depending.
- Design parameters : Average daily flow - 500ℓ / erf / day
  : Peak factor – Harmon formula
  : Extraneous flow – 15 %
  : Minimum velocity – 0.7m per second

- Minimum cover to pipes : 0.80m
- Minimum pipe size : 110mm diameter for house connections
  : 160mm diameter for sewer mains

  - Minimum gradients : 110mm diameter house connection 1:60
    : main lines at 80% capacity as follows:

Dwelling units	**Grade**
Less than 6	1:80
6 to 10	1:100
11 to 80	1:120
81 to 110	1:150
111 to 130	1:180

- House connection depth shall generally be 1.0m but at least be able to drain 80% of an erf.
- Maximum manhole spacing of 80m.

10.4.6.2 *Pipelines*

- Pipeline material for pipe sizes up to 160mm diameter :
  - uPVC Class 34 Ultracor Class 400 400 Heavy Duty (400 kPa) complying with SABS
- Pipes are generally laid on Class C bedding.

10.4.6.3 *Manholes*

- Dolomite aggregate and low alkali sulphate resistant cement to SABS 471 shall be used for all concrete, mortar or screed.
- Manhole cover to be central over main pipe on downstream side.
- Manhole covers and frames to be Concrete.

10.4.7 Water

The water reticulation network forms an integral part of the water distribution system.

10.4.7.1 *Minimum design criteria*

The design criteria generally as per the "Red Book" guidelines and specifically as follows:

- An average domestic consumption of 600ℓ per day per erf.
- Peak factors for the development will be calculated in accordance with Figure 9.9 of the "Red Book".
- Minimum pressures for the network are calculated for the fire flows of 30ℓ per second and peak demand at the point of lowest pressure under peak flow conditions.
- Valves to be placed such that a maximum of 4 valves need to be closed to isolate a section of pipeline.
- Valves to be spaced so that the length of main included in an isolated section does not exceed 600m.
- All valves to be installed at T-pieces where applicable and not within the road surface.
- Minimum cover to pipe to be 0.8m.

10.4.7.2 *Pipeline materials*

- Network – uPVC Class 9/12, dia 75 – 160mm complying to SABS 966
- Erf connections – HDPE Class 12, JASWIC

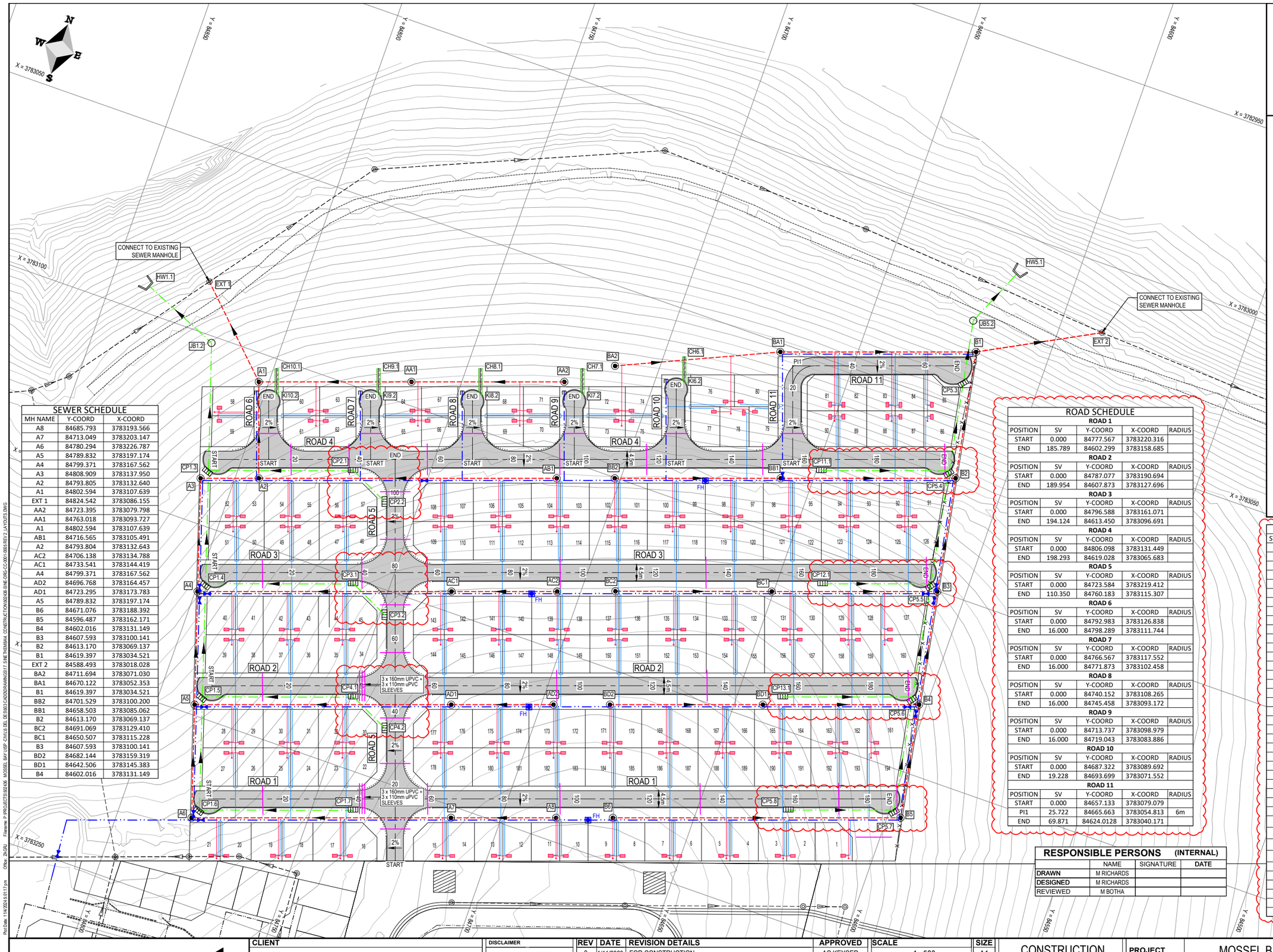
We trust that we have provided sufficient information for your purposes and look forward to hearing from you shortly. Please do not hesitate to contact us if you should require any further information.

Yours faithfully

M BOTHA Pr Tech Eng
Technical Specialist
pp Zutari

AC Keyser Pr Tech Eng
Office Manager
pp Zutari

Enc: *Drawing No. 113048-0000-DRG-SINE/SEWE*
Map : 502436 – upgrading of informal settlements
GLS Figure MBS 2.1b
GLS Figure MBW 2.2b



GENERAL NOTES:

1. ALL WORK TO BE DONE IN ACCORDANCE WITH SANS 1200.
2. ALL EXISTING SERVICES TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION.
3. ALL BELLMOUTH RADI TO BE 8m UNLESS OTHERWISE SHOWN.
4. FOR SEWER LAYOUT SEE DRG No. 0002.
5. FOR WATER LAYOUT SEE DRG No. 0003.
6. FOR ROADS AND STORMWATER LAYOUT SEE DRG No. 0004.
7. FOR PLATFORM AND RETAINING WALL LAYOUT SEE DRG No. 0005.

LEGEND:

PROPOSED SERVICES:

- SEWER PIPELINE
- SEWER MANHOLE
- SEWER HOUSE CONNECTION
- PRECAST TOILET STRUCTURE
- WATER PIPELINE
- WATER HOUSE CONNECTION
- FIRE HYDRANT
- VALVE
- STORMWATER PIPELINE
- STORMWATER CATCHPIT
- STORMWATER JUNCTION BOX
- STORMWATER HEADWALL
- STORMWATER KERB INLET AND CHANNEL
- MOUNTABLE KERB (MK10)
- COMBINATION KERB (CK5)
- BARRIER KERB AND CHANNEL (BK2+C1)
- ASHPHALT ROAD SURFACE
- HOUSE PLATFORM
- DUCTS

EXISTING SERVICES:

- SEWER PIPELINE
- SEWER MANHOLE
- WATER PIPELINE
- FIRE HYDRANT
- VALVE
- STORMWATER PIPELINE
- STORMWATER CATCHPIT
- INFORMAL GRAVEL ROADS
- FENCE

SEWER SCHEDULE

MH NAME	Y-COORD	X-COORD
A8	84685.793	3783193.566
A7	84713.049	3783203.147
A6	84780.294	3783226.787
A5	84789.832	3783197.174
A4	84799.371	3783167.562
A3	84808.909	3783137.950
A2	84793.805	3783132.640
A1	84802.594	3783107.639
EXT 1	84824.542	3783086.155
AA2	84723.395	3783079.798
AA1	84763.018	3783093.727
A1	84802.594	3783107.639
AB1	84716.565	3783105.491
A2	84793.804	3783132.643
AC2	84706.138	3783134.788
AC1	84733.541	3783144.419
A4	84799.371	3783167.562
AD2	84696.768	3783164.457
AD1	84723.295	3783173.783
A5	84789.832	3783197.174
B6	84671.076	3783188.392
B5	84596.487	3783162.171
B4	84602.016	3783131.149
B3	84607.593	3783100.141
B2	84613.170	3783069.137
B1	84619.397	3783034.521
EXT 2	84588.493	3783018.028
BA2	84711.694	3783071.030
BA1	84670.122	3783052.353
B1	84619.397	3783034.521
BB2	84701.529	3783100.200
BB1	84658.503	3783085.062
B2	84613.170	3783069.137
BC2	84691.069	3783129.410
BC1	84650.507	3783115.228
B3	84607.593	3783100.141
BD2	84682.144	3783159.319
BD1	84642.506	3783145.383
B4	84602.016	3783131.149

ROAD SCHEDULE

ROAD 1

POSITION	SV	Y-COORD	X-COORD	RADIUS
START	0.000	84777.567	3783220.316	
END	185.789	84602.299	3783158.685	

ROAD 2

POSITION	SV	Y-COORD	X-COORD	RADIUS
START	0.000	84787.077	3783190.694	
END	189.954	84607.873	3783127.696	

ROAD 3

POSITION	SV	Y-COORD	X-COORD	RADIUS
START	0.000	84796.588	3783161.071	
END	194.124	84613.450	3783096.691	

ROAD 4

POSITION	SV	Y-COORD	X-COORD	RADIUS
START	0.000	84806.098	3783131.449	
END	198.293	84619.028	3783065.683	

ROAD 5

POSITION	SV	Y-COORD	X-COORD	RADIUS
START	0.000	84723.584	3783219.412	
END	110.350	84760.183	3783115.307	

ROAD 6

POSITION	SV	Y-COORD	X-COORD	RADIUS
START	0.000	84792.983	3783126.838	
END	16.000	84798.289	3783111.744	

ROAD 7

POSITION	SV	Y-COORD	X-COORD	RADIUS
START	0.000	84766.567	3783117.552	
END	16.000	84771.873	3783102.458	

ROAD 8

POSITION	SV	Y-COORD	X-COORD	RADIUS
START	0.000	84740.152	3783108.265	
END	16.000	84745.458	3783093.172	

ROAD 9

POSITION	SV	Y-COORD	X-COORD	RADIUS
START	0.000	84713.737	3783098.979	
END	16.000	84719.043	3783083.886	

ROAD 10

POSITION	SV	Y-COORD	X-COORD	RADIUS
START	0.000	84687.322	3783089.692	
END	19.228	84693.699	3783071.552	

ROAD 11

POSITION	SV	Y-COORD	X-COORD	RADIUS
START	0.000	84657.133	3783079.079	
PI1	25.722	84665.663	3783054.813	6m
END	69.871	84624.0128	3783040.171	

STORMWATER SCHEDULE

STRUCTURE	Y-COORD	X-COORD	DESCRIPTION
CP1.7	84739.195	3783209.936	CATCHPIT
CP1.6	84779.134	3783224.311	CATCHPIT
CP1.5	84788.692	3783194.748	CATCHPIT
CP1.4	84797.925	3783165.249	CATCHPIT
CP1.3	84807.766	3783135.518	CATCHPIT
JB1.2	84818.404	3783101.853	JUNCTION BOX
HW1.1	84839.590	3783092.860	HEADWALL
CP2.2	84759.115	3783127.208	CATCHPIT
CP2.1	84771.112	3783124.069	CATCHPIT
CP1.3	84807.766	3783135.518	CATCHPIT
CP3.2	84748.801	3783156.549	CATCHPIT
CP3.1	84759.809	3783151.252	CATCHPIT
CP1.4	84797.925	3783165.249	CATCHPIT
CP4.2	84738.486	3783185.888	CATCHPIT
CP4.1	84749.495	3783180.591	CATCHPIT
CP1.5	84788.692	3783194.748	CATCHPIT
CP5.8	84626.365	3783170.262	CATCHPIT
CP5.7	84598.730	3783161.251	CATCHPIT
CP5.6	84604.260	3783130.508	CATCHPIT
CP5.5	84609.850	3783099.429	CATCHPIT
CP5.4	84615.420	3783068.464	CATCHPIT
CP5.3	84619.862	3783043.771	CATCHPIT
JB5.2	84622.943	3783026.644	JUNCTION BOX
HW5.1	84615.995	3783010.723	HEADWALL
KI6.2	84692.358	3783068.727	KERB INLET
CH6.1	84694.613	3783062.313	BOT OF CHANNEL
KI7.2	84717.704	3783081.057	KERB INLET
CH7.1	84719.957	3783074.647	BOT OF CHANNEL
KI8.2	84744.118	3783090.347	KERB INLET
CH8.1	84746.373	3783083.933	BOT OF CHANNEL
KI9.2	84770.533	3783099.633	KERB INLET
CH9.1	84772.788	3783093.219	BOT OF CHANNEL
KI10.2	84796.948	3783108.919	KERB INLET
CH10.1	84799.203	3783102.505	BOT OF CHANNEL
CP11.1	84648.726	3783079.237	CATCHPIT
CP5.4	84615.420	3783068.464	CATCHPIT
CP12.1	84638.096	3783108.468	CATCHPIT
CP5.5	84609.850	3783099.429	CATCHPIT
CP13.1	84638.109	3783141.438	CATCHPIT
CP5.6	84604.260	3783130.508	CATCHPIT

RESPONSIBLE PERSONS (INTERNAL)

	NAME	SIGNATURE	DATE
DRAWN	M RICHARDS		
DESIGNED	M RICHARDS		
REVIEWED	M BOTHA		

ZUTARI
IMPACT. ENGINEERED.

CLIENT

MOSSEL BAY MUNICIPALITY

DISCLAIMER

IF CONSTRUCTION DRAWINGS ARE ISSUED UNSIGNED, THE MASTER WITH THE ORIGINAL SIGNATURE OF APPROVAL WILL BE HELD AT THE ZUTARI OFFICE OF THE APPROVER

REV	DATE	REVISION DETAILS	APPROVED
0	1/11/2023	FOR CONSTRUCTION	AC KEYSER
1	3/4/2024	LAYOUT AND SERVICES REVISED	AC KEYSER
2	11/4/2024	ROADS AND STORMWATER REVISED, DUCTS ADDED	AC KEYSER

SCALE: 1 : 500
SIZE: A1
DRAWN: M RICHARDS
DESIGNED: M RICHARDS
REVIEWED: M BOTHA

CONSTRUCTION

APPROVED
DATE
AC KEYSER ECSA -200670188

PROJECT: MOSSEL BAY UISP: SINETHEMBA (PHASE 1)

TITLE: GENERAL SERVICES LAYOUT

DRAWING No. | PROJECT No. 502436 | WBS SINE | TYPE DRG | DISC CC | NUMBER 0001 | REV 2

LAYOUT PLAN
FOR SINETHEMBA/SEWENDELAAN PHASE 1 LOCATED ON THE REMAINDER OF PTN. 249 OF THE FARM VYF-BRAKKE-FONTEIN No. 220 KWANONQABA, REGISTRATION DIVISION MOSSEL BAY RD

Key:

- Township boundary (Phase 1)
- Stormwater servitudes
- Surface contours

LAND USE TABLE

Notation	Use Zone	Land Use	Erf nos	Number of erven	Area (ha)
	Single Residential Zone II	Residential	1-194	194	1.6230ha
	Open Space Zone I	Public Open Space	195-202	8	0.0480ha
	Transport Zone II	Public Street	203	1	1.0259ha
TOTAL:				**203**	**2.6971ha**

FLOODLINE DETERMINATION:

I/we hereby certify that in accordance with the Water Act, 1998, the area is not affected by the floods with an expected recurrence interval of 1:100 years.

Date: _____ Signed: _____ (Pr Eng) Registr No. _____

N W E S

SCALE: 1:1000

ZUTARI IMPACT. ENGINEERED.

CLIENT: Mossel Bay Municipality

DISCLAIMER: IF CONSTRUCTION DRAWINGS ARE ISSUED UNSIGNED, THE MASTER WITH THE ORIGINAL SIGNATURE OF APPROVAL WILL BE HELD AT THE ZUTARI OFFICE OF THE APPROVER

REV	DATE	REVISION DETAILS	APPROVED
0	27/03/2023	First draft (with 100m² residential erven)	R Schroder
1	4/04/2023	second draft (with 80m² residenital erven)	R Shroder
2	08/12/2023	Final draft	R Schroder
3	08/02/2024	Phase 1 Review	R Schroder
4	20/03/2024	Final calculated draft	R Schroder

SCALE	1:1000
SIZE	A3
DRAWN	WG Davel
DESIGNED	WG Davel
REVIEWED	R Schroder

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED
DATE March. 2024
R Schroder

PROJECT	MOSSEL BAY UISP Amended
TITLE	SINETHEMBA / SEWENDELAAN LAYOUT PLAN - PHASE 1

DRAWING No. PROJECT No. 113408 – WBS 0000 – TYPE DRG – DISC – NUMBER SIN / SEWE – REV 3

ZUTARI
IMPACT. ENGINEERED.

MOSSEL BAY MUNICIPALITY

PROJECT: 502436
UPGRADING OF INFORMAL SETTLEMENTS (UISP)

Date: May 2022
Project Leader: M Botha
Map by: M Richards
Projection: Hartebeesthoek94 Lo23 (E-N)

REVISION	DESCRIPTION	APPROVER
A	AREAS UPDATED	AC KEYSER

LEGEND:

- PENDING APPROVAL FROM TOWN PLANNERS
- TOWN PLANNING APPROVED LAYOUTS

LEGEND

Pipe diameters

- Existing <= 110
- Existing > 110 <= 160
- Existing > 160 <= 225
- Existing > 225 <= 315
- Existing > 315 <= 400
- Existing > 400
- Existing rising main
- Existing manholes
- Existing pumping station
- Existing Wastewater Treatment Plant (WWTP)
- Railway line
- River
- Coastline

BRANDWAG WWTP
BRANDWACHT
Brandwacht PS1
Sonskyn Valley PS
Hartenbos Landgoed Main Outfall PS2
Oudtshoorn Rd PS
Oewerstroom PS
HARTENBOS RIVER
Hartenbos Landgoed Main Outfall PS
Hartenbos Landgoed PS1
Loerierand PS
Kabeljou Rd PS
Dummy PS
HARTENBOS HEUWELS
Cemetry PS
Terrein B PS
Stellenbosch Rd PS
Mosselrivier PS
Dummy PS
Hartenzich PS
Seemeeu Park PS
Dummy PS
Post Kantoor Rd PS
Eric Warner PS
HARTENBOS
Vlei Rd PS
Bay Dunes PS
Num Num PS
Alwynfleur PS
Islandview PS
Courtenay Park PS
Voorbaai PS
DIAZ
Dummy PS
AALWYNDAL
Vakansieplaas PS
Diaz Hotel PS
SEAL ISLAND
INDIAN OCEAN
N2
ALMEIDA
KWANONQABA
Beach Street PS
MB CENTRAL
DIE PUNT
Fynbos Paradise PS
PINNACLE POINT WWTP
HEIDERAND
DANABAAI
Pinnacle Point Main Outfall PS
Pinnacle Point PS4
Pinnacle Point PS8
Pinnacle Point PS6
Pinnacle Point PS3
Pinnacle Point PS2
Pinnacle Point PS1
Cecil Shepherd Rd PS
Suction Tank
Suction Tanks
Dana Bay PS1
Dana Bay Main Outfal PS
Pinnacle Point PS7
Pinnacle Point PS5
Nautilus PS6
Nautilus PS7

0 200 400 800 1600 m

Scale 1:40000

April 2017

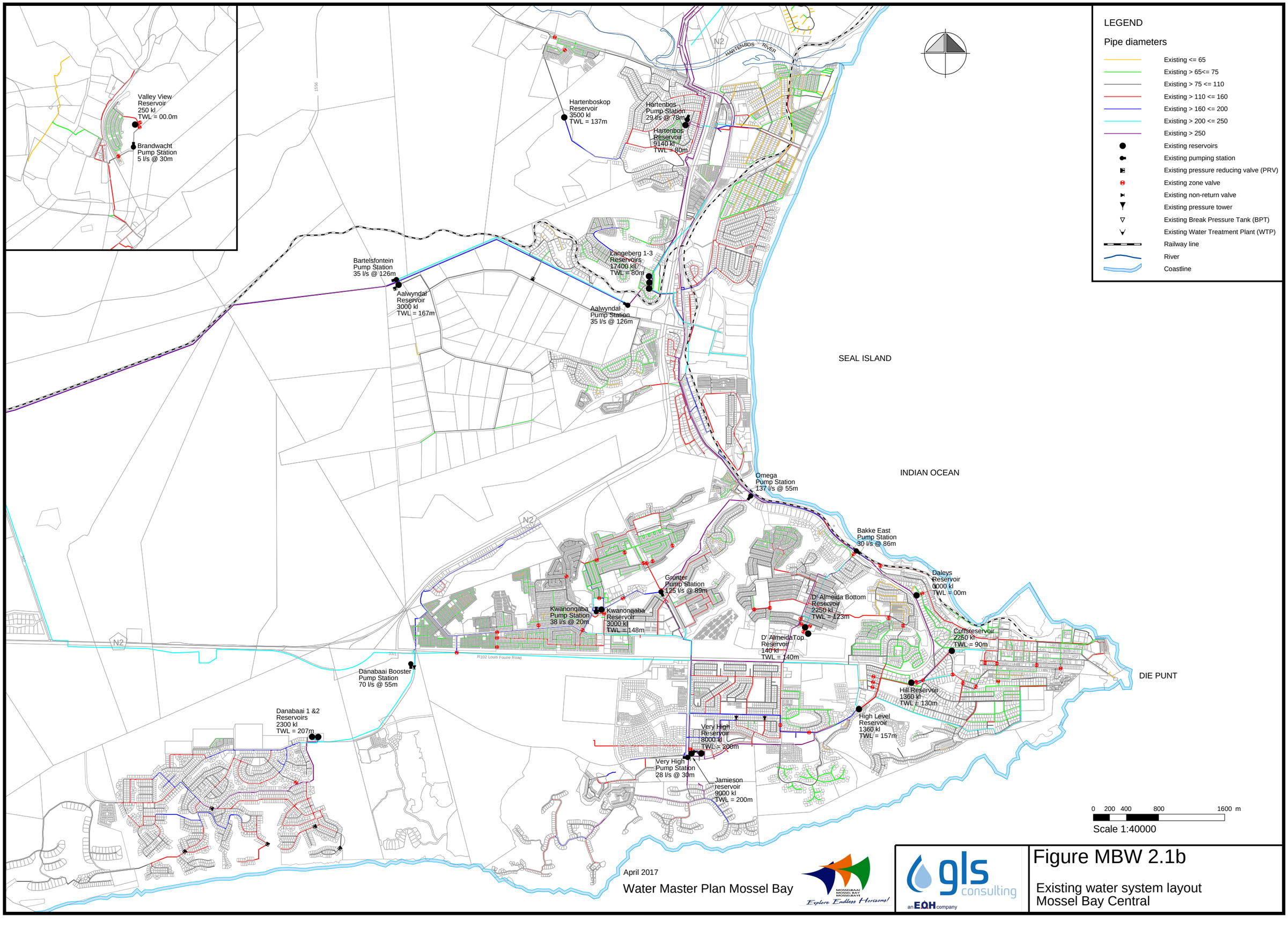
Sewer Master Plan Mossel Bay

Explore Endless Horizons!

gls consulting an EQH company

Figure MBS 2.1b

Existing sewer system layout
Mossel Bay Central



April 2017

Water Master Plan Mossel Bay

MOSSELBAAI MOSSEL BAY MOSSELBAYI
Explore Endless Horizons!

gls consulting
an EOH company

Figure MBW 2.1b

Existing water system layout
Mossel Bay Central