ENNERDALE SOUTH EXT 6

STORMWATER MANAGEMENT PLAN FOR THE PROPOSED TOWNSHIP OF ENNERDALE SOUTH EXT 6 SITUATED ON PTN 37 OF THE FARM FONTEINE 313-IQ

01 June 2025

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SYNOPSIS :

STORMWATER MANAGEMENT PLAN FOR THE PROPOSED TOWNSHIP OF ENNERDALE SOUTH EXT 6 SITUATED ON PTN 37 OF THE FARM FONTEINE 313-IQ

KEY WORDS :

Stormwater Management

QUALITY VERIFICATION

SACAS ISO 9001:2015

This report has been prepared under the controls established by a certified ISO 9001:2008 quality management system developed by Ecosphere (Pty) Ltd.

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1 INTRODUCTION

This stormwater management report addresses the accommodation and management of stormwater runoff for the proposed township Ennerdale South Ext 6 situated on Portion 37 of the Farm Fonteine 313-IQ.

The report is submitted to the Department of Water and Sanitation (DWS) as well as the Johannesburg Roads Agency (JRA).

2 BACKGROUND

2.1 PROPERTY DESCRIPTION

The proposed township is situated in the jurisdiction area of the City of Johannesburg Metropolitan Municipality (CJMM), at the corner of Broad Road (R550) and the Golden Highway (R553). Please refer to the locality map depicted in **Figure 1**.

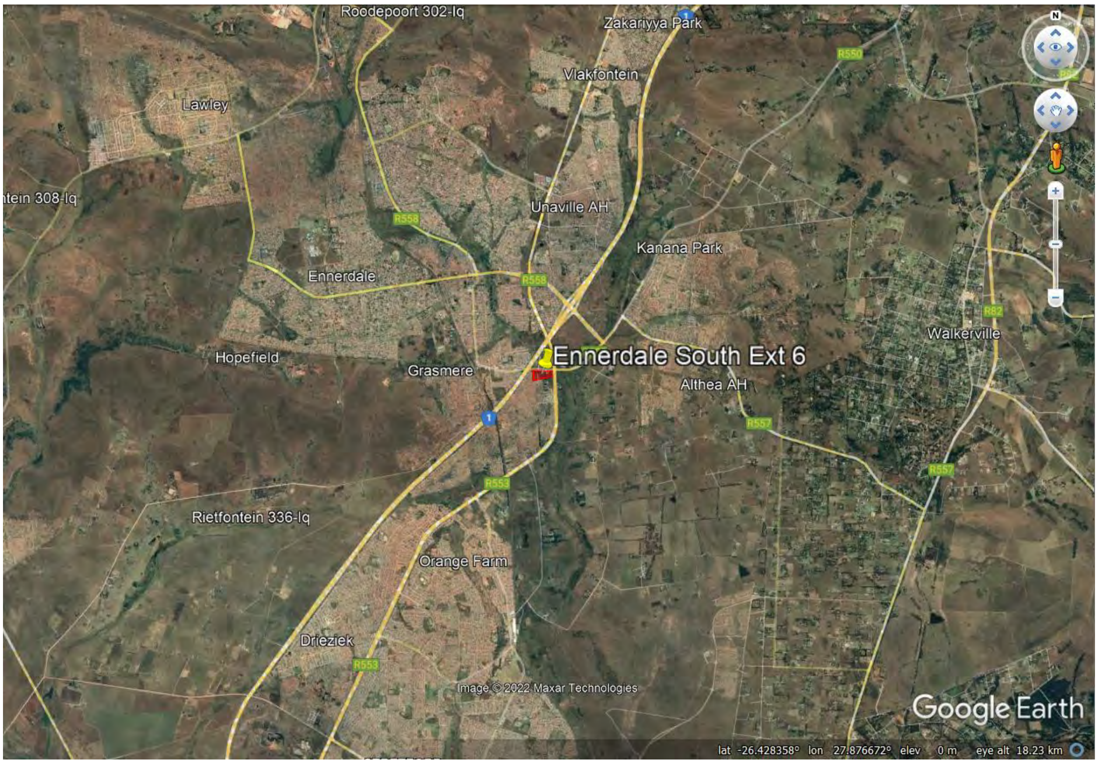


Figure 1 : Locality Plan

2.2 PROPERTY ZONING AND DEVELOPMENT CONTROL MEASURES

Ennerdale South Ext 6, with a total area of 5.6575 ha, consists of four erven as summarised in **Table 1**. Please refer to the proposed township layout and Site Development Plan (SDP) attached as Annexure A. The development control measures for the proposed township are summarised in **Table 2**.

Table 1 : Land Use Table

Zoning	Erf No.	No. of erven	Area (Ha)	% of Area
Business 3	1	1	2.1577	38.14
Special: for a Filling Station	2	1	0.4481	7.92
Social Open Space	3	1	1.7982	31.78
Special	4	1	0.8814	15.58
Public Road			0.3721	6.58
Total		4	5.6575	100

Table 2 : Development control measures

Zoning	Erf No.	FAR	Area (Ha)	Floor Area (m²)
Business 3	1	0.25	2.1577	5 394
Special: for a Filling Station	2	0.25	0.4481	1 120
Social Open Space	3		1.7982	
Special	4	0.10	0.8814	881
Public Road			0.3721	
Total			5.6575	7 396

3 NATURAL TOPOGRAPHY

The topography of the area forms part of a moderately developed area with a relatively steep slope downwards of approximately 2%, towards the eastern boundary of the township. The site and surrounding area drain towards a tributary of the Rietspruit River, located approximately 150 m east of the township. The tributary joins the river approximately 300 m from the township. The township was superimposed onto the 1:50 000 Topographical map (2627BD), and an extract is depicted in **Figure 2**.

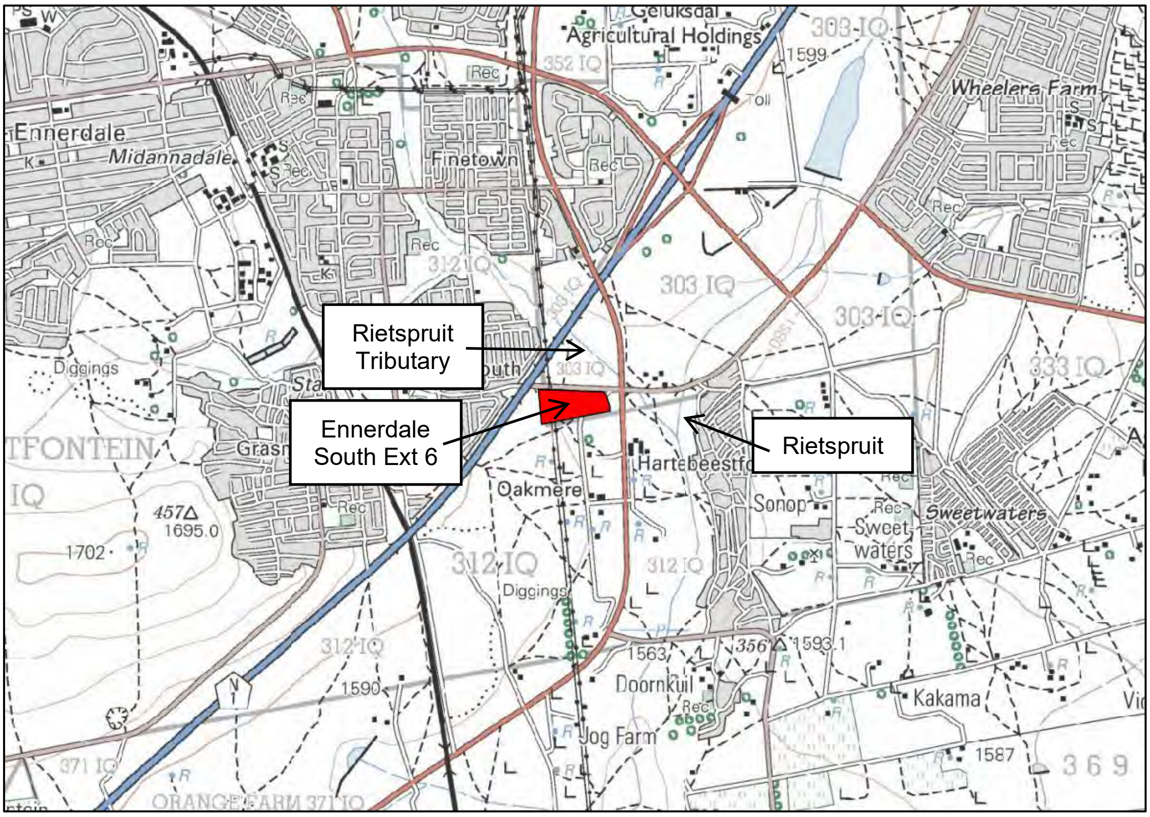


Figure 2 : Extract from 1:50 000 topographical map (2627BD - 2007)

4 ANNUAL RUNOFF VOLUME

The site is in the upper part of the northeastern portion of the C22H quaternary catchment, as depicted in **Figure 3**. The total area of the catchment is 454 km². According to the Water Resources of South Africa, 2012 study (WR2012), the Mean Annual Precipitation is 639 mm with a Mean Annual Runoff of 9.20 million cubic meters (mcm), which is equal to 20.3 mm per annum.

The annual stormwater runoff for the pre-development scenario (MAR_{pre}) of the proposed township was assumed to be per the average of the quaternary catchment C22H. The total area of the proposed township is 5.6575 ha, and therefore, the pre-development runoff of the proposed township is **1 146** m³ per annum.

The mean annual runoff for the post-development scenario (MAR_{post}) was determined based on an assumed imperviousness of 60%. Therefore, the remaining pervious area is 2.2630 ha, and the MAR for the pervious area is 459 m³ per annum. The MAR from the impervious area is equal to the total MAP, and therefore the MAR is 639 mm, or 21 691 m³ per annum. The MAR_{post} will therefore be **22 149 m³** per annum.

Figure 3 : Quaternary Catchments C22H

5 EXISTING STORMWATER INFRASTRUCTURE

No existing municipal stormwater infrastructure is in the vicinity of the proposed township. An existing culvert was, however, identified on the Golden Highway (P37-1). The culvert consists of 2x 1500x1200 mm rectangular portals as depicted in **Figure 4**. The location of the culvert is superimposed on the existing municipal stormwater layout depicted in **Figure 5**.

Figure 4 : Existing culvert on the Golden Highway (P37-1)

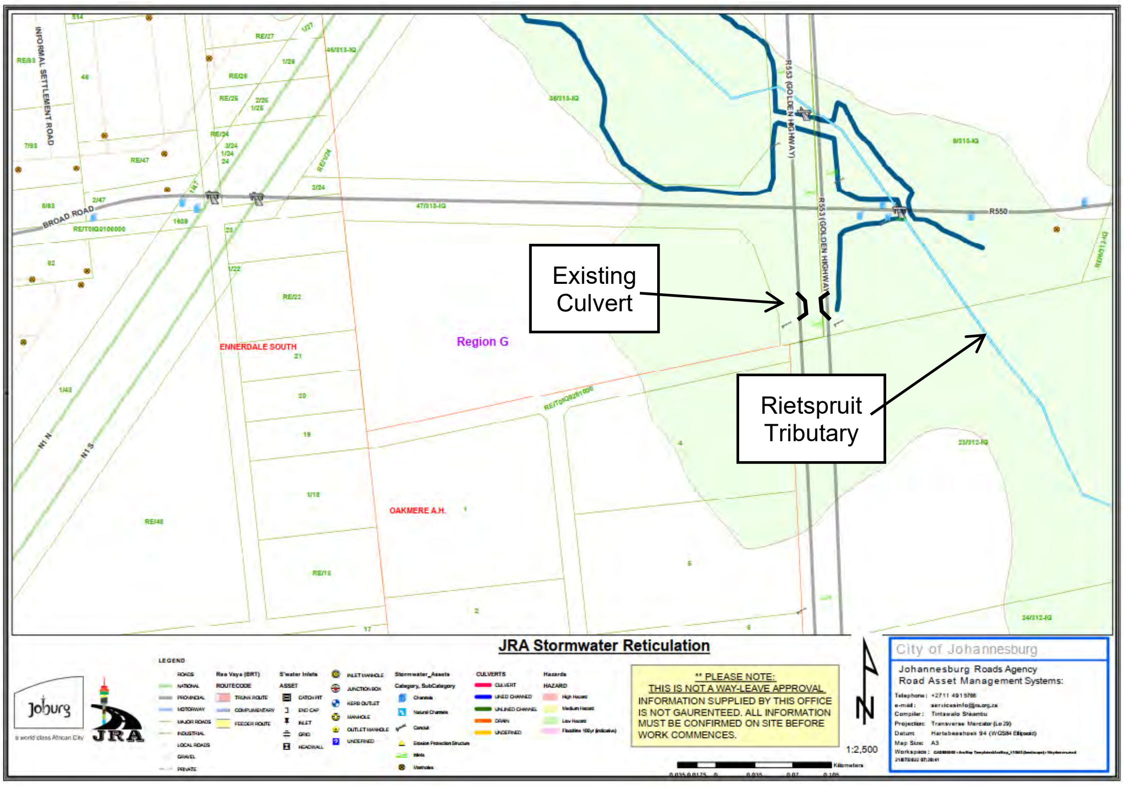


Figure 5 : Existing municipal stormwater infrastructure

6 DESIGN RAINFALL

The design rainfall for the site was determined using the computer software, Design Rainfall Estimation in South Africa, which implements the procedures to estimate design rainfall in South Africa per Smithers and Schulze. The design rainfall results are depicted in **Figure 6**, from which the Depth-Duration-Frequency (DDF) curves were generated as depicted in **Figure 7**. The Mean Annual Precipitation (MAP) was calculated at the site as 677mm.

Gridded values of all points within the specified block

Latitude (°)	Latitude (')	Longitude (°)	Longitude (')	MAP (mm)	Altitude (m)	Duration (m/h/d)	Return Period (years) 2	2L	2U	5	5L	5U	10
26	25	27	52	677	1590	5 m	8.6	6.9	10.3	11.5	9.2	13.8	13.4
						10 m	12.5	9.9	15.2	16.7	13.2	20.2	19.5
						15 m	15.6	12.2	19.0	20.8	16.3	25.3	24.3
						30 m	19.8	15.8	23.9	26.4	21.0	31.9	30.9
						45 m	22.8	18.3	27.4	30.4	24.4	36.5	35.6
						1 h	25.2	20.4	30.1	33.6	27.2	40.2	39.3
						1.5 h	29.1	23.7	34.5	38.7	31.6	46.0	45.2
						2 h	32.1	26.3	37.9	42.8	35.1	50.6	50.0
						4 h	37.8	31.9	43.7	50.4	42.5	58.3	58.8
						6 h	41.6	35.6	47.5	55.4	47.4	63.4	64.7
						8 h	44.5	38.5	50.4	59.3	51.3	67.2	69.3
						10 h	46.9	41.0	52.8	62.5	54.6	70.4	73.0
						12 h	48.9	43.1	54.8	65.2	57.4	73.1	76.2
						16 h	52.4	46.6	58.1	69.8	62.1	77.5	81.5
						20 h	55.2	49.5	60.8	73.6	66.0	81.2	85.9
						24 h	57.6	52.1	63.2	76.8	69.4	84.3	89.7
						1 d	49.9	45.1	54.7	66.5	60.1	73.0	77.7

Figure 6 : Design rainfall results (26° 25' S 27° 52' E)

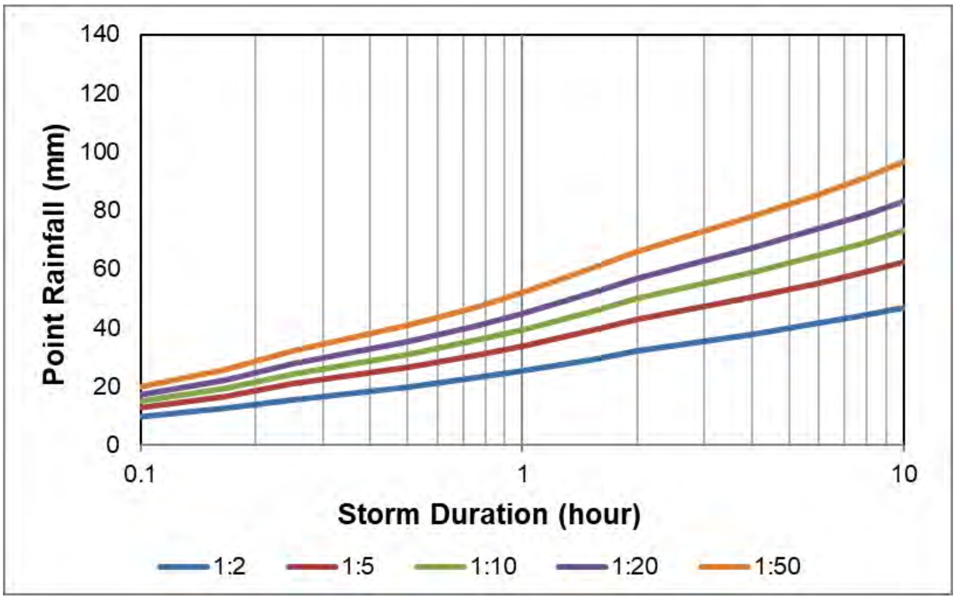


Figure 7 : Depth-Duration-Frequency (DDF) curves

7 ELEVATION DATA

The LiDAR survey data provided by the CJMM was used as a basis for generating the Digital Terrain Model (DTM). The LiDAR survey was conducted by AAM Geospatial (Cape Town), Job No: 11826A, and Project Name: CoJ_2015. The average density of the ground survey points in the study area is approximately 8.6 points per 100m². No further survey information was available.

8 GEOLOGY

A geotechnical investigation was conducted by Andon van der Merwe Consulting Engineering Geologist during October of 2021 with Report No. A21/1791. The relevant findings from the report are summarised in this Chapter.

Ten test pits were excavated, positioned as depicted in **Figure 8**. The subsoils that were encountered are summarised as follows:

"*The site for the proposed new commercial development is blanketed by two prominent soil zones, Soil Zone "A and "B", and are based on the test pit investigation and visual observations of the site conditions.*

*Soil Zone **"A"** covers roughly 70% of the site along the central and eastern parts of the property and is characterized by potentially expansive transported soils overlying residual andesite soils to considerable depths. This zone contains a thin to moderate horizon (0,2m to 0,7m thick) of loose to medium dense sandy colluvium overlying a prominent horizon (1,4m to 1,7m thick) of potentially expansive clayey alluvium. The clayey alluvium is underlain in most places by a thin to moderate horizon (0,1m to 0,6m thick) of gravelly alluvium with an overall dense consistency. The active alluvial clay extends to a depth exceeding 3,0m in TP/03 at the south-eastern corner of the property. The alluvium is underlain by a prominent horizon of silty and clayey reworked residual andesite to depths generally exceeding 3,0m below surface. A generalized description of the typical soil profile that may be encountered across this soil zone is as follows:*

0,0 – 0,4: Moist, dark brown, dense, slightly voided, clayey SAND containing roots; colluvium.

0,4 – 1,9: Very moist, dark grey blotched yellow, stiff becoming firm from 1,5m, slightly voided, silty CLAY; alluvium.

1,9 – 2,0: Abundant coarse medium and fine, sub-rounded and sub-angular QUARTZ GRAVELS and COBBLES clast supported in a matrix as above; alluvium. Overall consistency is dense.

2,0 – 3,0: Moist, yellow blotched grey and orange, soft, intact, sandy silty CLAY; reworked residual andesite. Note: The residual andesite tends to be completely weathered, very soft rock andesite from 3,0m depth in TP/01.

*Soil Zone **"B"** covers +-30% of the site along the western part of the property and is blanketed by a moderate horizon (0,6m to 0,9m thick) of generally medium dense becoming dense sandy colluvium overlying a moderate horizon (0,6m to 0,7m) of medium dense to dense gravelly ferruginised colluvium over stiff sandy silty clay ferruginised reworked residual andesite to a depth exceeding 2,2m below surface. A generalized description of the typical soil profile that may be encountered across this soil zone is as follows:*

0,0 – 0,6: Slightly moist, dark brown becoming orange brown, medium dense becoming dense, slightly voided, silty SAND containing roots; colluvium.

0,6 – 1,3: Abundant coarse medium and fine, sub-rounded FERRICRETE GRAVELS clast supported in a matrix as above and containing roots; ferruginised colluvium. Overall consistency is medium dense.

1,3 – 2,2: Moist, grey blotched red and yellow, stiff, intact, sandy silty CLAY containing scattered FERRICRETE CONCRETIONS and roots; ferruginised reworked residual andesite.

Refusal of the backactor was not encountered in any of the test pits over the property to an excavation depth of between 2,2m and 3,0m below the surface.

Ground water seepage was encountered in 60% of the test pits at a depth of between 2,2m and 3,0m below surface towards the eastern part of the site, i.e., Zone "A". The presence of ferricreterich soils from surficial depths of between 0,4m to 0,9m below the surface is indicative of a possible seasonal perched water table during the wet season."

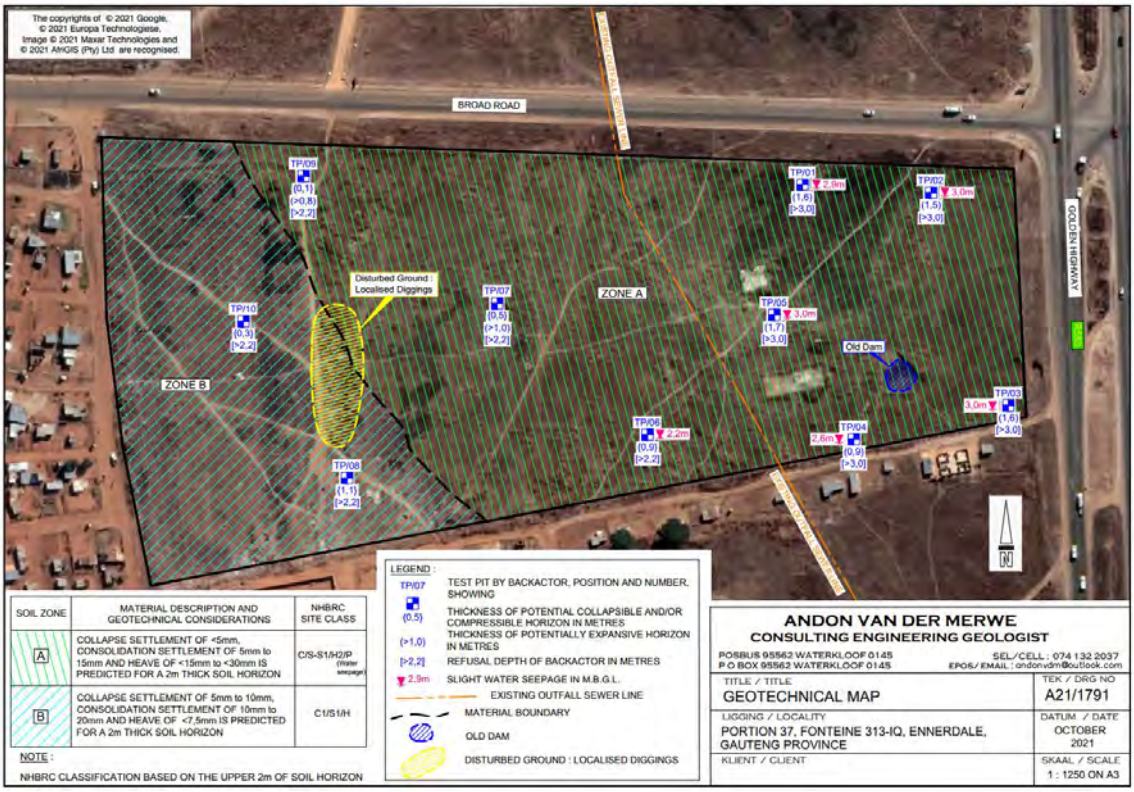


Figure 8 : Test pits on Portion 37 (Copied from Report No. A21/1791)

Andon van der Merwe Consulting Engineering Geologist took soil samples from TP2, at 0.0-1.0m and 2.0-3.0m depths, from TP3, at 1.5 and 2.1-3.0m depth, from TP 6, at 0.9-1.2m depth, and from TP 8, at 1.3-2.2m depths respectively. Sieve analyses were conducted by Geoplan's soil laboratory, and the results of the sand, silt, and clay compositions are summarised in Table 3. From these results, the soil classification was determined for this investigation, according to the soil texture triangle, as being mostly *clay* and clay-*loam*, respectively, summarised in **Table 3**.

Table 3 : Soil texture triangle classification for Portion 37

Description	TP2		TP3		TP6	TP8
Depth (m)	0.0-1.0	2.0-3.0	1.5	2.1-3.1	0.9-1.2	1.3-2.2
Sand	40%	29%	28%	25%	36%	35%
Silt	35%	30%	32%	29%	26%	25%
Clay	25%	40%	40%	45%	38%	39%
Classification	Loam	Clay	Clay	Clay	Clay-loam	Clay-loam

9 PRE-DEVELOPMENT STORMWATER PEAK DISCHARGE

The pre-development peak discharge was estimated using the Rational method as well as from hydrological modelling conducted in EPA SWMM. The input data, assumptions, and results are described in this Chapter.

9.1 CATCHMENT FOR THE PRE-DEVELOPMENT PEAK DISCHARGE CALCULATIONS

The catchment area considered for the pre-development scenario is 2.5716 ha. Currently, runoff of higher-lying regions drains onto the site, but it could be easily redirected into the existing road reserve of Broad Road, as depicted in **Figure 9**, with a street view of the road also depicted in **Figure 10**. The existing gravel road along the western boundary of the site is currently marginally diverting the runoff towards Broad Road. General maintenance and proper spreading of the runoff is required, as the outlet of the side drain is blocked, as depicted Figure 10.

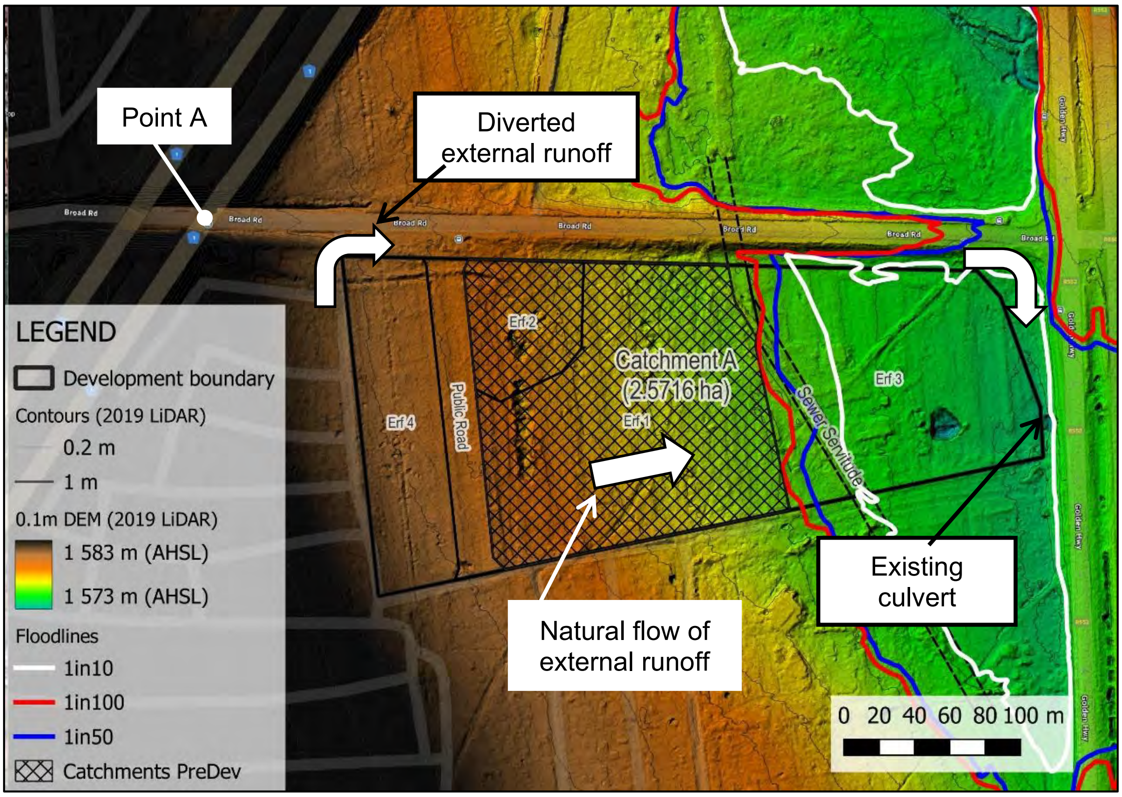


Figure 9 : Division of catchment 1 into catchment 2 and 3

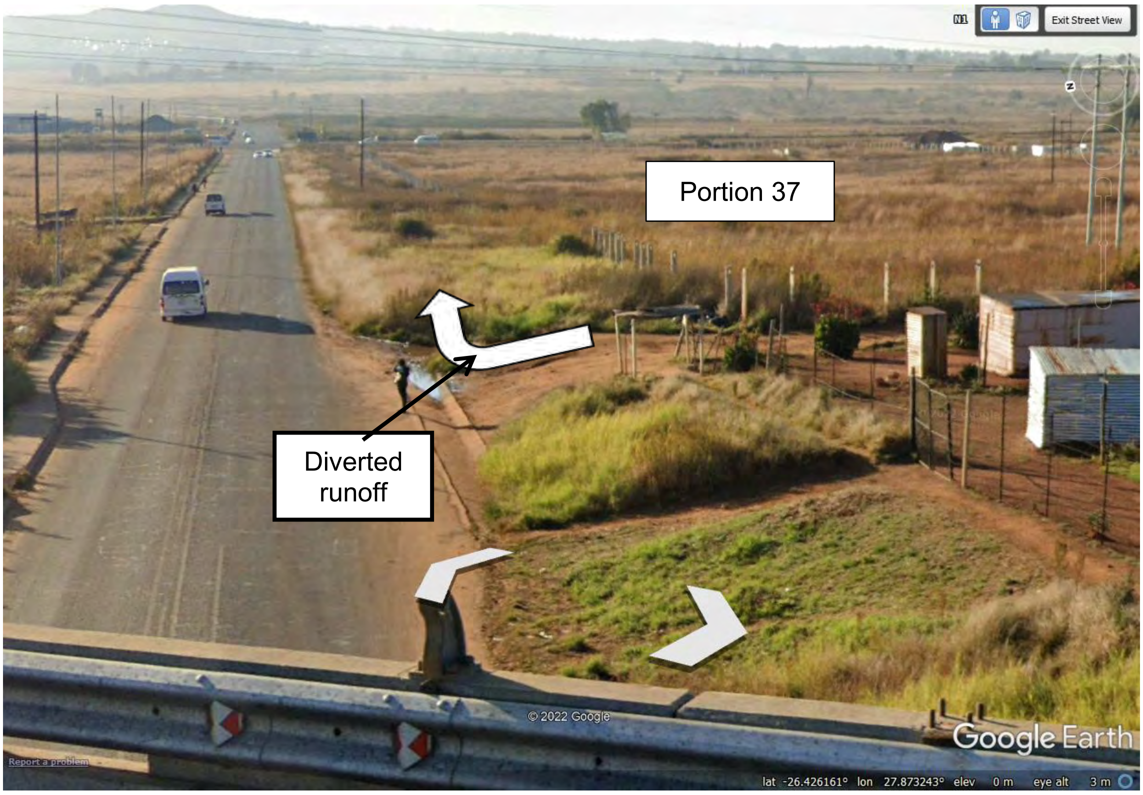


Figure 10 : Street view from point A

9.2 TIME OF CONCENTRATION

The time of concentration for the pre-development condition was determined assuming a combination of overland and defined watercourse flow conditions.

The empirical formula developed by the US Soil Conservation Service, expressed in terms of **Equation 1**, was used for the defined watercourse flow conditions.

$$T_c = \left(\frac{0.87 \cdot L^2}{1000 \cdot S_{av}}\right)^{0.385} \qquad \text{Equation 1}$$

Where:

T_c = Time of concentration (hours),

L = Hydraulic length of catchment, measured along flow path from the catchment boundary to the point where the flood needs to be determined (km), and

S_{av} = Average slope (m/m).

The Kerby formula was used to determine the time of concentration for the overland flow condition, expressed in terms of **Equation 2** with an assumed roughness coefficient of 0.15. Overland flow conditions were assumed to apply to the first 150 m of the hydraulic length.

$$T_c = 0.604 \cdot \left(\frac{r \cdot L}{\sqrt{S_{av}}}\right)^{0.467} \qquad \text{Equation 2}$$

Where:

T_c = Time of concentration (hours),

L = 0.15 (km),

r = 0.15, and

S_{av} = Average slope (m/m).

The hydraulic length of catchment A, as well as the elevations at 10% and 85% along the flow path, was determined using the DTM described in Section 7. The details, as well as the resulting time of concentration of 0.255 hours, are summarised in **Table 4**.

Table 4 : Pre-development time of concentration for catchment A

Description	Results
Longest water course	156 m
Average slope (10-85 method)	2.225 %
Time of concentration (Defined watercourse)	0.006 hour
Time of concentration (Overland flow)	0.249 hour
Total time of concentration	0.255 hour

9.3 RUNOFF COEFFICIENT

Catchment A consists of 100% rural area. The runoff coefficients associated with each component and classification of a rural area were adopted from the Drainage Manual. The permeability of the site was assumed to be *semi*-permeable because the site comprises mostly *clay* and clay-*loam* material, as summarised in Table 3. The combined runoff coefficient for catchment A was 0.400, as summarised in **Table 5**.

Table 5 : Rural runoff coefficients (Drainage Manual, 2016)

Component	Classification	C-value 600-900mm MAP	Made-up of (%)	Combined coefficient
Surface slope (Cs)	Vleis and pans (<3%)	0.03	100	0.030
	Flat areas (3 to 10%)	0.08	0	0
	Hilly areas (10 to 30%)	0.16	0	0
	Steep areas (>30%)	0.26	0	0
Permeability (Cp)	Very permeable	0.04	100	0
	Permeable	0.08	0	0
	Semi-permeable	0.16	0	0.160
	Impermeable	0.26	0	0
Vegetation (Cv)	Thick bush and plantation	0.04	0	0
	Light bush and plantation	0.11	0	0
	Grasslands	0.21	100	0.210
	No vegetation	0.28	0	0
Total				0.400

An adjustment factor for the initial saturation was applied to the combined runoff coefficient. The average between *steep and permeable* and *flat and permeable* catchments, as summarised in **Table 6** were adopted.

Table 6 : Adjustment factor for initial saturation (Drainage Manual, 2016)

Return period (years)	1:2	1:5	1:10	1:20	1:50
Factor for steep and impermeable catchments	0.75	0.80	0.85	0.90	0.95
Factor for flat and permeable catchments	0.50	0.55	0.60	0.67	0.83
Average factor adopted for Portion 37	0.63	0.68	0.73	0.79	0.89

9.4 Peak discharge estimate from the Rational method

The preceding information, namely the design rainfall described in Chapter 6, the catchment area described in section 9.1, the time of concentration described in Section 9.2, and the runoff coefficient described in Section 9.3 was utilized in the formula of the Rational method expressed in **Equation 3**. The results are summarised in **Table 7**, which indicates, for example, a peak discharge of 0.254 m^3/s for a 1:25 year storm event.

$$Q_T = \frac{C_T \cdot I_T \cdot A}{3.6} \qquad \text{Equation 3}$$

Where:

Q_T = Peak discharge for storm event with recurrence interval T (m³/s),

I_T = Average rainfall intensity (mm/hour),

A = Catchment area (km²).

Table 7 : Pre-development stormwater peak discharge results for catchment A according to the Rational method

Description	**Recurrence Interval (year)**					
	1:2	**1:5**	**1:10**	**1:20**	**1:25 #**	**1:50**
Catchment Area (ha)	2.5716					
Runoff coefficient	0.472					
Factor for initial saturation	0.63	0.68	0.73	0.79	0.80	0.89
Adjusted coefficient	0.250	0.270	0.290	0.314	0.356	0.400
Time of concentration (hour)	0.255					
Point rainfall (mm)	15	21	24	27	28	32
Average intensity (mm/hour)	60	81	94	107	110	125
Peak runoff (m³/s)	0.108	0.156	0.195	0.241	0.254	0.317

Determined by linear interpolation

9.5 HYDROLOGICAL MODELLING

A single event-based simulation model was conducted using EPA SWMM version 5.2. The parameter input values are described separately in the sections below.

9.5.1 SOIL INFILTRATION PARAMETERS

The input values used in the simulation for the pervious areas, which were inferred from the geotechnical investigation as being *Clay-Loam* described in Chapter 8, are summarized in **Table 8**.

Table 8 : EPA SWMM general sub-catchment characteristics

Description	Input value
Infiltration method	Modified Green Ampt
Soil classification	Clay-loam
Suction head	210.06 mm
Conductivity	1.02 mm/h
Initial deficit	0.154 m/m
Impervious Manning Roughness	0.020
Impervious Depression Storage	2.0 mm
Pervious Manning Roughness	0.130
Pervious Depression Storage	5.0 mm

9.5.2 SYNTHETIC DESIGN STORM

A synthetic design storm was created using the Chicago Design Storm method. Using the *Smithers and Schulze* design rainfall results depicted in Figure 6, the site-specific regression coefficients were calculated, summarised in **Table 9**.

Table 9 : Chicago design storm regression coefficients

Coeff.	Recurrence Interval (Year)					
	1in2	1in5	1in10	1in20	1in25	1in50
a	741.6	1024.6	1202.2	1348.1	1380.7	1543.3
b	5.948	6.301	6.333	6.163	6.148	6.078
c	0.765	0.773	0.774	0.770	0.770	0.768

Assuming a storm advancement coefficient of 0.38 and a total storm duration of 4.0 hours, the cumulative rainfall curves were calculated at 5-minute intervals as depicted in **Figure 11**.

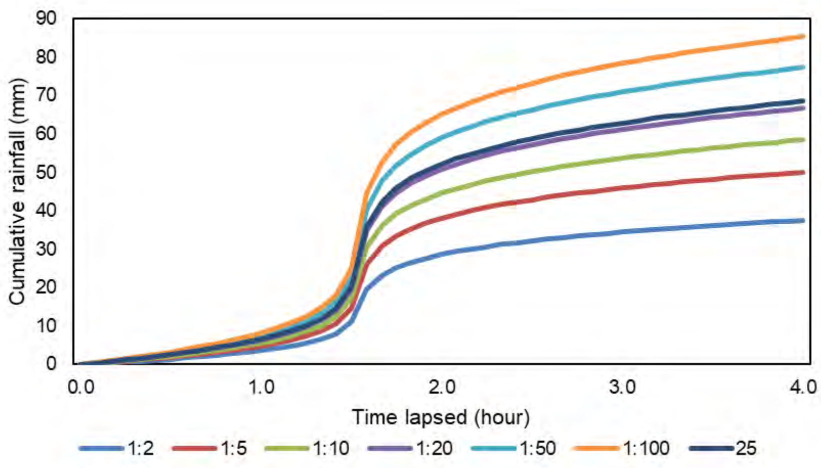


Figure 11 : Synthetic rainfall mass curve per Chicago design storm

9.5.3 SIMULATION RESULTS

The results following the hydrological simulations are summarized in **Table 10**. Although the results are marginally higher, they correspond well to the results calculated from the Rational method. A more thorough comparison is made in the next chapter.

Table 10 : Hydrological simulation peak discharge for pre-development

Description	Recurrence Interval (Year)					
	1in2	1in5	1in10	1in20	1in25	1in50
Peak discharge (m³/s)	0.092	0.182	0.254	0.332	0.350	0.440

10 POST-DEVELOPMENT STORMWATER PEAK DISCHARGE

The modelling of the post-development scenario was conducted similarly to the pre-development scenario, for which details are provided in the sections below.

10.1 STORMWATER MODEL

The development was divided into 18 sub-catchments. The imperviousness of the sub-catchments is depicted in **Figure 12**.

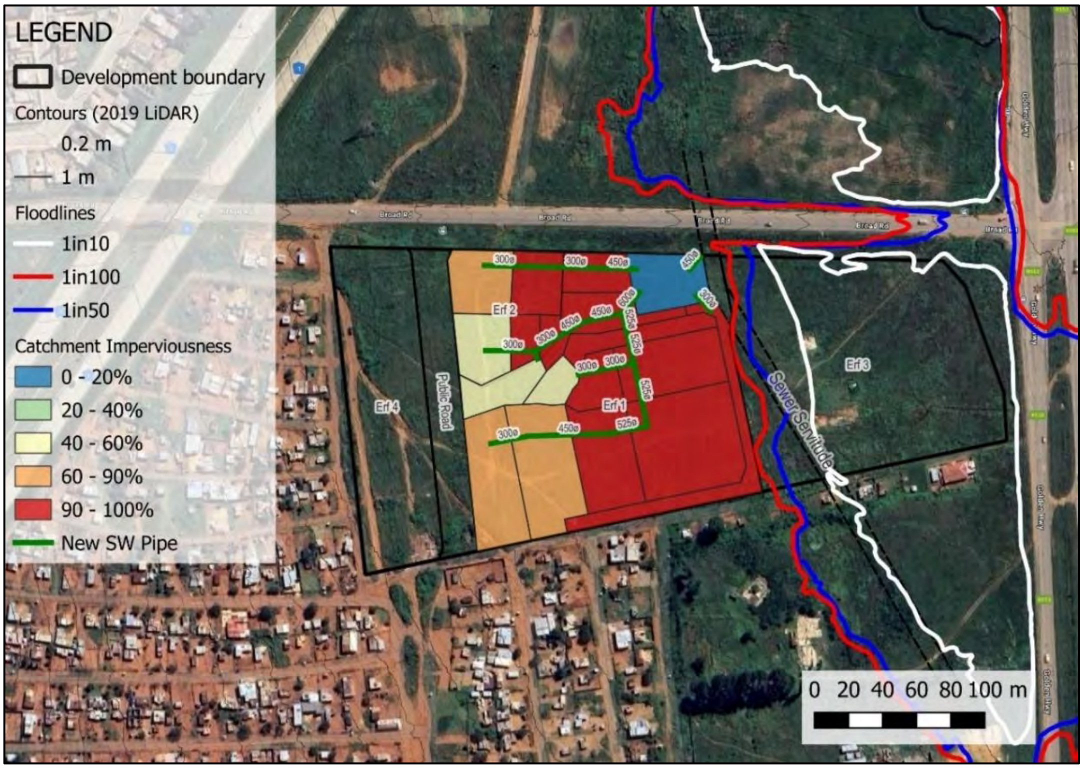


Figure 12 : Post-development sub-catchment imperviousness

10.2 Proposed stormwater network

The stormwater network of the proposed development will consist of pipe sizes ranging from 300ø to 600ø. Sizes equal to or larger than 300ø consist of concrete pipes of class 100D. Please refer to the proposed stormwater layout attached as **Annexure B**.

10.3 Attenuation facility

An attenuation facility for the proposed development will be incorporated in the northeastern corner of the development, consisting of an earth berm along the northern and eastern boundaries. An outlet structure will be constructed to ensure that the pre-development peak discharge is not exceeded, which will discharge into the earth channel along Broad Road.

The attenuation pond has been developed following the guidelines outlined in the JRA Road and Stormwater Manual (Volume 1: Code of Procedure). The invert level of the pond is set at 1576.0 m. The outlet structure will include a rectangular orifice measuring 300 mm in length and 200 mm in height, a screen chamber, an overflow weir positioned at 1577.3 m, and an emergency overflow at 1577.5 m. The volume-discharge curve for the conceptually designed attenuation pond is illustrated in the accompanying **Figure 13**.

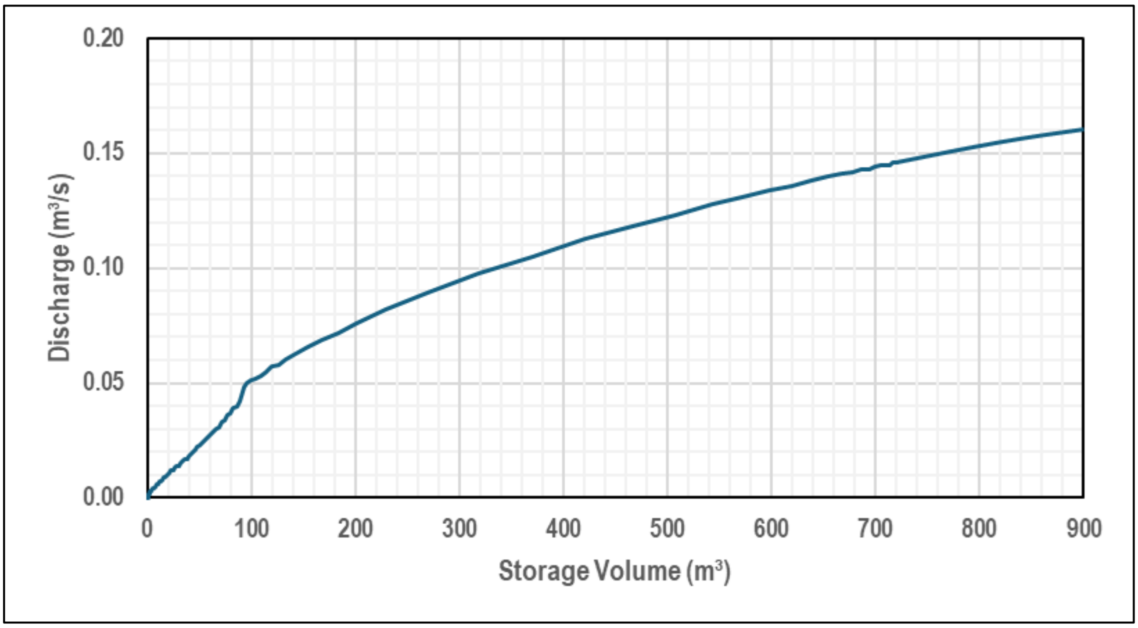


Figure 13 : Volume-discharge curve of the attenuation facility

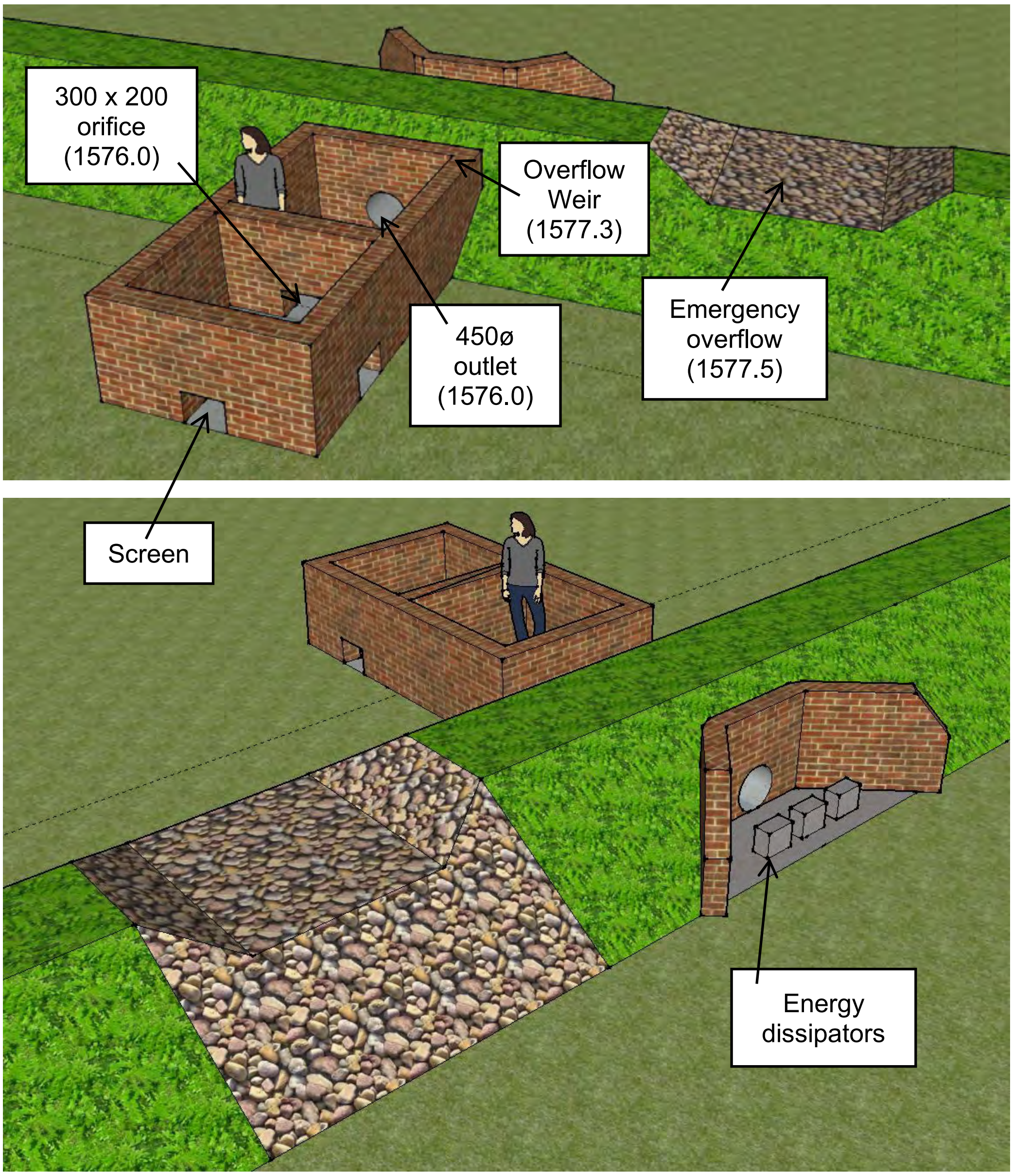


Figure 14 : 3D view of outlet structure

The required storage for the 1:25-year storm event is depicted in **Figure 15** which indicates a maximum of 770 m³ storage volume required. This equates to an attenuation rate of 300 m³/ha, considering the total area of the proposed development of 2.5716 ha as provided in Section 2.2.

The attenuation rate is less than the guideline provided by the JRA road and stormwater manual (volume 1: code of procedure), of 350 m³/ha, but from the simulation results, it is evident that this volume is adequate to ensure that the pre-development peak discharge is not exceeded.

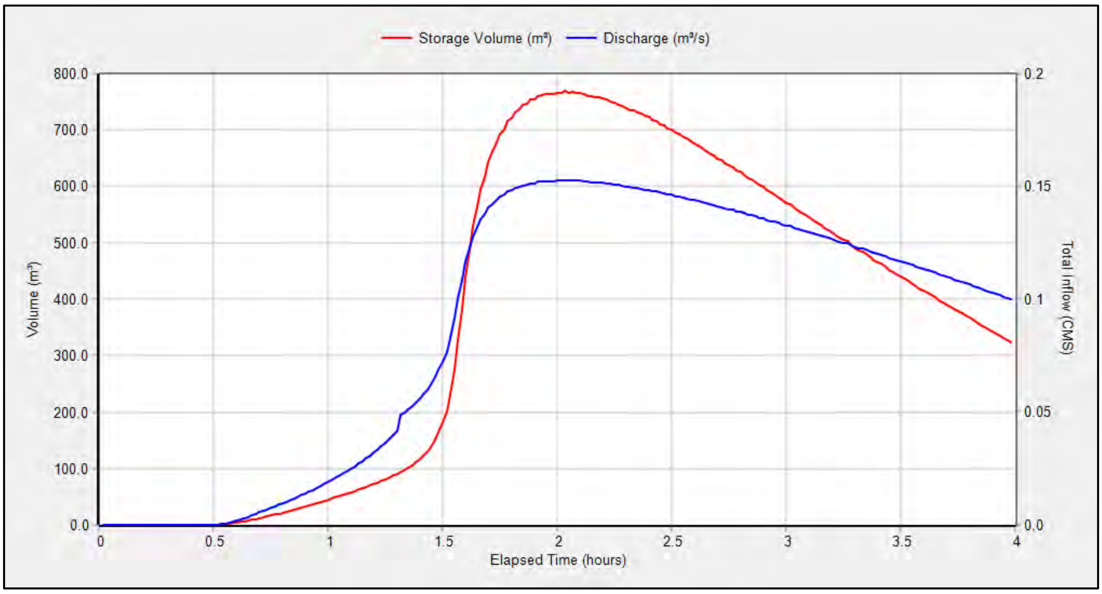


Figure 15 : Maximum attenuated volume during the 1:25-year storm event

10.4 SIMULATION RESULTS

The peak discharge for the post-development scenario from the hydrological modelling is presented in **Table 11**.

Table 11 : Hydrological simulation peak discharge for pre-development

Description	Recurrence Interval (Year)					
	1in2	1in5	1in10	1in20	1in25	1in50
Peak discharge (m^3/s)	0.106	0.127	0.139	0.151	0.153	0.163

To evaluate the effectiveness of the proposed mitigation, the results for the post-development scenario were compared to the peak discharge from the pre-development scenario, as depicted in **Figure 16**. This indicates that the proposed attenuation facility is sufficient to ensure that the pre-development peak discharge is not exceeded during the 1:5 to 1:25 year storm events.

It is noted that higher reductions in the peak discharge were observed for higher return periods. This overachievement could be optimized during the detailed design stage by the addition of secondary orifices to increase the flow at predetermined stages. For this investigation, however, the achievements were deemed acceptable.

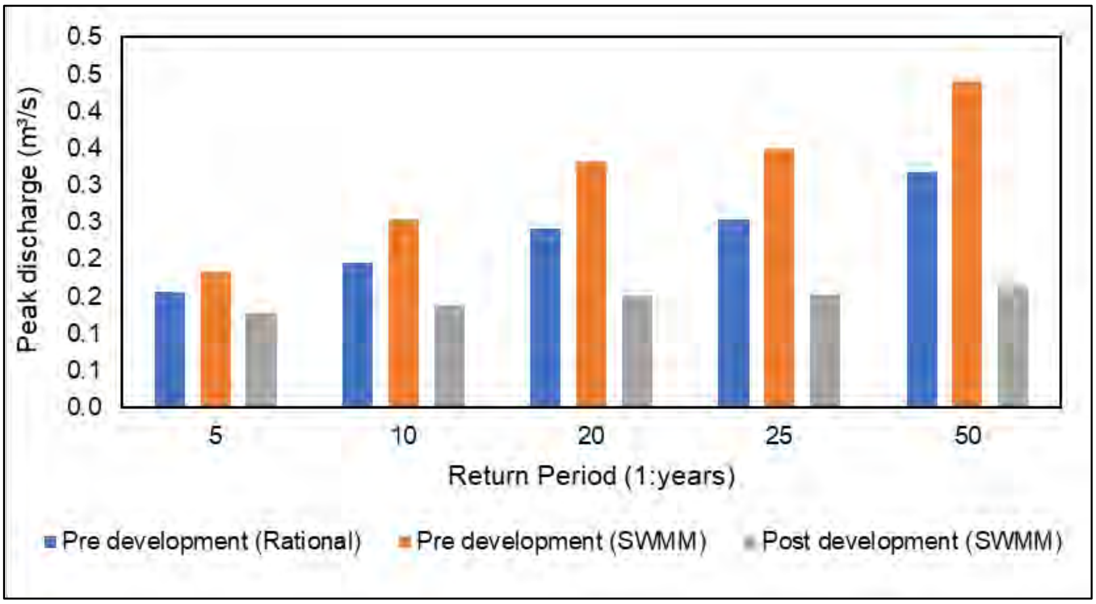


Figure 16 : Pre- and post-development peak discharge comparison

11 FINANCIAL IMPLICATIONS

No external services are required to accommodate the proposed township because it will discharge directly into the Broad Road reserve. Additionally, sufficient attenuation is provided to ensure that the pre-development peak discharge is not exceeded. Therefore, only an estimated cost for the internal stormwater services is provided, which is **R 1 181 187** (Excl. VAT) as summarised in **Table 12**.

Table 12 : Construction cost estimate for the stormwater infrastructure

ITEM	DESCRIPTION	UNIT	QNT	RATE	AMOUNT
1	300ø 100D Concrete pipe	m	180	1 200	216 000
2	450ø 100D Concrete pipe	m	110	1 650	181 500
3	525ø 100D Concrete pipe	m	90	1 900	171 000
4	600ø 100D Concrete pipe	m	15	2 100	31 500
6	Attenuation pond	m^3	770	235	180 950
Sub-total					780 950
Add P&G's at 25%, Contingencies at 10%, Pro Fees at 10%					400 237
Total (Excl. VAT)					1 181 187

12 Legal Implications

12.1 Servitudes

No servitudes are required to accommodate the proposed township.

12.2 Operations and maintenance

No external stormwater infrastructure is required to accommodate the proposed township, and the internal stormwater network will not be handed over to the JRA on completion of the construction works. The responsibility of the operations and maintenance will be for the developer until taken over by the future property owners.

13 Flood Lines

The proposed development is certified to be not affected by the 1:100-year flood lines as per the provision of Section 144 of the National Water Act, 1998 (Act 36 of 198).

14 Conclusion

From the report it is evident that the proposed township can be supported from a stormwater management perspective:

- The stormwater runoff from the township will be safely channeled to the proposed attenuation pond.
- The proposed attenuation is adequate to ensure that the pre-development runoff for the 1:5 to 1:25 year storm events is not exceeded.
- Attenuation storage will be provided at a rate of 300 m^3/ha.
- The deviation from the recommended rate of 350 m^3/ha is substantiated through detailed calculations and a stormwater simulation model.
- Stormwater inlets will be constructed at strategic positions to catch runoff from the site and conveyed in an underground stormwater drainage system consisting of interlocking joint concrete pipes.

ANNEXURE A

(Proposed Township Layout)

FLOOD LINE CERTIFICATION

It is hereby certified that the proposed township as shown is AFFECTED / NOT AFFECTED by a 1:100 year flood line, as per the provisions of Section 144 of the National Water Act, 1998 (Act 36 of 1998).

(Pr Eng) (Reg No ....)

Geotechnical Legend

TP/07 Test pit position

SOIL ZONE	MATERIAL DESCRIPTION AND GEOTECHNICAL CONSIDERATIONS	NHBRC SITE CLASS
	COLLAPSE SETTLEMENT OF <5mm, CONSOLIDATION SETTLEMENT OF 5mm to 15mm AND HEAVE OF <15mm to <30mm IS PREDICTED FOR A 2m THICK SOIL HORIZON	C/S-S1/H2/P (Water seepage)
	COLLAPSE SETTLEMENT OF 5mm to 10mm, CONSOLIDATION SETTLEMENT OF 10mm to 20mm AND HEAVE OF <7,5mm IS PREDICTED FOR A 2m THICK SOIL HORIZON	C1/S1/H

NOTE :
NHBRC CLASSIFICATION BASED ON THE UPPER 2m OF SOIL HORIZON

SCALE 1:1000 (A1)
0 12 24 36 48 60 120
Metres

LAYOUT PLAN

PROPOSED TOWNSHIP
ENNERDALE SOUTH EXTENSION 6

SITUATED ON
PORTION 37 OF THE FARM
FONTEINE 313-IQ

Province : Gauteng

LOCALITY PLAN

ZONING SCHEDULE

LAND USE TABLE

PROPOSED ZONING	ERF No.	No. OF ERVEN	AREA (Ha)	% OF AREA
Business 3	1	1	2,1577	38,14
Special: for Filling Station	2	1	0,4481	7,92
Social Open Space	3	1	1,7982	31,78
Special	4	1	0,8814	15,58
Roads, Railway & Air: Public Road			0,3721	6,58
TOTAL		4	5,6575	100

LOCAL AUTHORITY
CITY OF JOHANNESBURG

CONTOURS
Contour Interval: 1,0m
Datum (AHSL): Sea Level
Surveyed by: -
Date of Survey: -

GENERAL INFORMATION
Maximum Street Gradient:
Minimum Street Gradient:
Maximum Street Length:

CLIENT
OAKMERS CC

SERVITUDE NOTES

1. Power line servitude with underground electric cables vide diagram S.G. No. A3432/1937 and Deed of Servitude No. K330/1938s.
2. Power line servitude with underground electric cables vide diagram S.G. No. A2339/1942 and Deed of Servitude No. K715/1943s.

NOTES

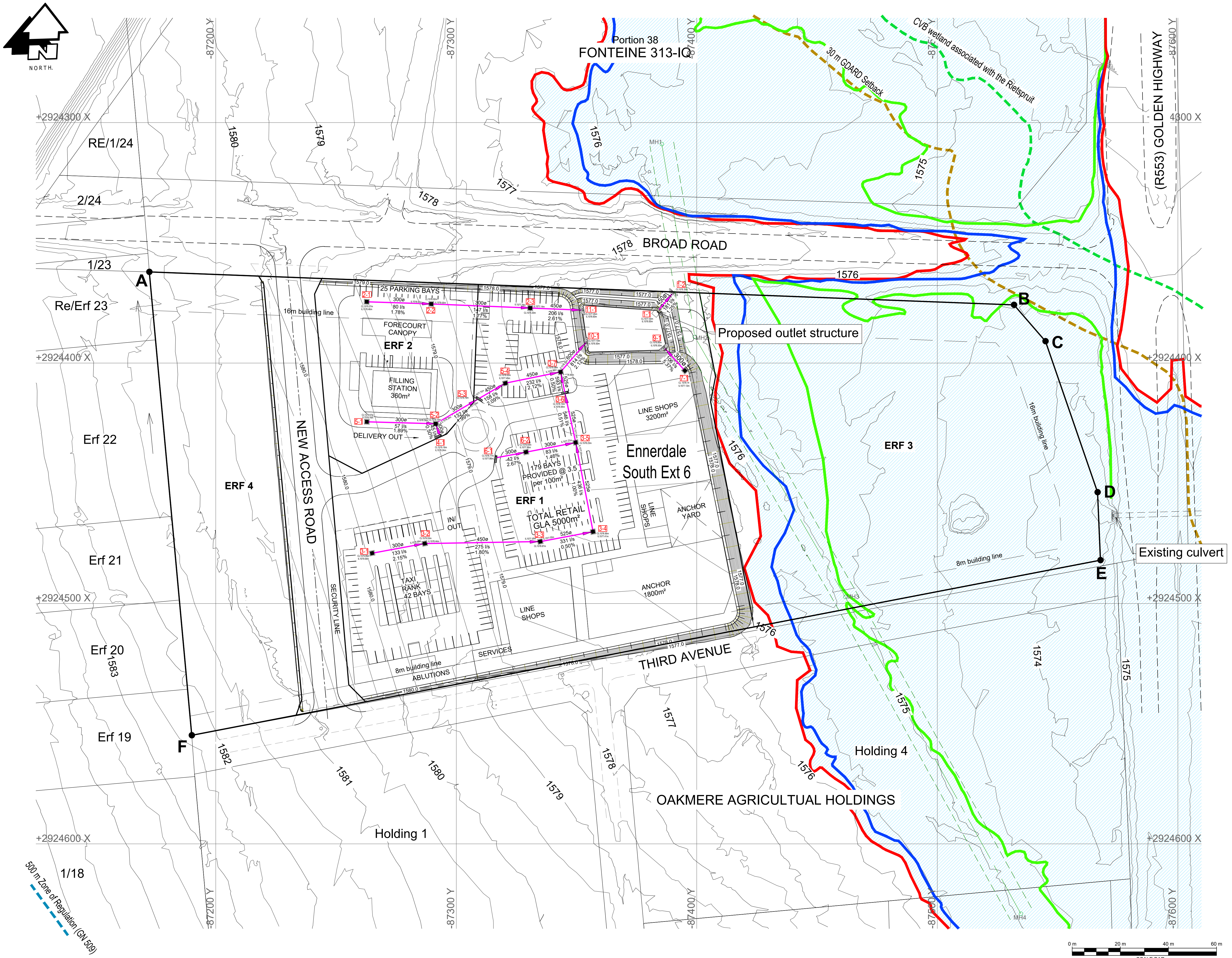
1. The figure A;B;C;D;E;F;A represents the proposed ENNERDALE SOUTH EXTENSION 6 township, in extent 5,6575 hectares.
2. Survey system: WG27
3. Measurements are given in metres.
4. All areas and distances are approximately pending final survey.
5. Erf 3 will be notarially tied with Erf 2.

LAYOUT PLAN No. : -
DRAWING No. : S2205-4
Date : March 2025
Copyright : Synchronicity DP

PLOT DATE: 05/03/2025 6:15 pm
C:\Users\salom\Downloads\S2205-4.dwg

ANNEXURE B

(Stormwater infrastructure construction drawings)



NOTES

GENERAL:1) ALL DIMENSIONS AND LEVELS ARE TO BE VERIFIED ON SITE PRIOR TO ORDERING OR FABRICATION OF MATERIAL. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER2) DRAWINGS ARE NOT TO BE SCALED3) IF IN DOUBT, CONSULT THE ENGINEER4) ALL CONSTRUCTION ACTIVITIES MUST COMPLY TO THE OHS ACT REGULATIONS

LEGENDS

- Proposed stormwater
- Existing stormwater
- Headwall
- Grid Inlet
- Manhole
- Junction Box
- Kerb Inlet
- CVB wetland associated with the Rietspruit
- 30 m GDARD Setback
- 500 m Zone of Regulation (GN 509)

FLOODLINES BEFORE MITIGATIONS

- 1:100 Year Floodline
- 1:50 Year Floodline
- 1:10 Year Floodline

REVISIONS

No.	Date	By	Description
00	AUG 2022	JM	ISSSUED WITH STORMWATER MANAGEMENT PLAN
00a	AUG 2023	RM	RETAINING WALL ANNOTATION AMENDED
00b	MAY 2025	CS	TOWNSHIP LAYOUT UPDATED WITH LATEST SDP

DRAWING STATUS

FOR INFORMATION

CLIENT

Z and Z Foods CC
t/a Casa Mia Biscuits
PO Box 576
Lenasia
1820

CLIENT APPROVAL

Project leader:
Signature :
Date:

CLIENT DRAWING NUMBER:

ilifa 40 YEARS
AFRICA ENGINEERS

KRUGERSDORP OFFICE
20 Ontdekkers Road
PO Box 8013
Westgate 1734

PRETORIA	012- 941 1616
KRUGERSDORP	011- 955 5334
SECUNDA	017- 634 8895
NEWCASTLE	034- 312 6464
HARRISMITH	058- 622 1297
RICHARDSBAY	035- 753 1083

SHEQ National cert

Designed :	*Ilifa Africa Engineers*
Drawn :	*J.v.S. MOUTON Pr.Tech.Eng (2013 701 86)*
Checked :	*A.B. KRIEL Pr.Eng (20010142)*

Drawing Approved: 29 May 2025 Date: *A.B. KRIEL Pr.Eng (20010142)*

PROJECT TITLE

Porposed township Ennerdale Extension South 6 situated on Portion 37 of the farm Fonteine 313 IQ

DRAWING TITLE

STORMWATER GENERAL LAYOUT

DATE:	SCALE:	
AUG 2022	AS SHOWN	A3

PLAN No.

CONSULTING ENG. DRAWING NO: K21-014-01-200

Rev 00b

ANNEXURE C

(Stormwater Network Analysis Results – 1:25 year storm event)

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.4)
------------------------------------------------------------

12dModel 1D Dynamic Drainage Analysis 15.0C1r (Macro Version 256)
Storm No: 1      Duration: 240 mins     ARI: 25 year  (minor)
ID: 26N26L1-112-1
WARNING 02: maximum depth increased for Node 11-1

****************
Analysis Options
****************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 01/01/2008 00:00:00
Ending Date .............. 01/01/2008 04:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:01:00
Dry Time Step ............ 00:01:00
Routing Time Step ........ 2.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 1
Head Tolerance ........... 0.001524 m
```

```
**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......         0.178        68.504
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.007         2.850
Surface Runoff ...........         0.161        62.157
Final Storage ............         0.009         3.571
Continuity Error (%) .....        -0.109


**************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.161         1.610
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.127         1.268
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.034         0.342
Continuity Error (%) .....        -0.031


*************************
Highest Continuity Errors
*************************
Node 12-1 (42.48%)


***************************
Time-Step Critical Elements
***************************
```

```
Link 1-1_to_1-2 (46.60%)
Link 3-6_to_3-7 (34.75%)
Link 8-1_to_8-2 (15.05%)


*********************************
Highest Flow Instability Indexes
*********************************
Link 9-1_to_8-1 (2)
Link 10-1_to_8-1 (2)
Link 11-1_to_8-1 (2)
Link 3-7_to_10-1 (2)
Link 8-1_to_12-1 (1)


*********************************
Most Frequent Nonconverging Nodes
*********************************
Node 3-7 (0.05%)
Node 1-2 (0.05%)


*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     0.12 sec
Average Time Step           :     0.55 sec
Maximum Time Step           :     2.00 sec
% of Time in Steady State   :     0.00
Average Iterations per Step :     2.02
% of Steps Not Converging   :     0.05
Time Step Frequencies       :
    2.000 -  1.516 sec      :     3.04 %
    1.516 -  1.149 sec      :     0.28 %
    1.149 -  0.871 sec      :     0.43 %
    0.871 -  0.660 sec      :     0.71 %
    0.660 -  0.500 sec      :    95.54 %
```

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
2-1(1)	68.50	0.00	0.00	3.58	52.58	8.99	61.57	0.08	0.07	0.899
2-2(1)	68.50	0.00	0.00	0.00	65.66	0.00	65.66	0.07	0.05	0.958
2-3(1)	68.50	0.00	0.00	0.00	65.71	0.00	65.71	0.06	0.05	0.959
3-1(1)	68.50	0.00	0.00	3.59	52.45	8.96	61.42	0.14	0.11	0.897
3-2(1)	68.50	0.00	0.00	3.59	52.42	8.96	61.37	0.16	0.13	0.896
3-3(1)	68.50	0.00	0.00	0.00	65.45	0.00	65.45	0.14	0.10	0.955
3-4(1)	68.50	0.00	0.00	0.00	65.22	0.00	65.22	0.24	0.17	0.952
3-5(1)	68.50	0.00	0.00	0.00	65.45	0.00	65.45	0.13	0.10	0.955
3-6(1)	68.50	0.00	0.00	0.00	65.69	0.00	65.69	0.06	0.05	0.959
4-1(1)	68.50	0.00	0.00	8.98	33.01	22.25	55.26	0.05	0.04	0.807
5-1(1)	68.50	0.00	0.00	8.98	32.98	22.19	55.17	0.07	0.05	0.805
5-2(1)	68.50	0.00	0.00	0.00	65.86	0.00	65.86	0.03	0.03	0.961
5-3(1)	68.50	0.00	0.00	0.00	65.91	0.00	65.91	0.03	0.02	0.962
5-4(1)	68.50	0.00	0.00	0.00	65.63	0.00	65.63	0.08	0.06	0.958
6-1(1)	68.50	0.00	0.00	7.17	39.63	17.94	57.57	0.03	0.03	0.840
6-2(1)	68.50	0.00	0.00	0.00	65.73	0.00	65.73	0.06	0.04	0.960
7-1(1)	68.50	0.00	0.00	0.00	65.51	0.00	65.51	0.11	0.08	0.956
8-1(1)	68.50	0.00	0.00	18.02	0.00	43.32	43.32	0.07	0.03	0.632

****
Node Depth Summary
****

Average Maximum Maximum Time of Max   Reported

Node	Type	Depth Meters	Depth Meters	HGL Meters	Occurrence days hr:min	Max Depth Meters
1-1	JUNCTION	0.15	0.20	1576.20	0 02:02	0.20
2-1	JUNCTION	0.04	0.14	1578.60	0 01:35	0.14
2-2	JUNCTION	0.05	0.20	1578.20	0 01:35	0.20
2-3	JUNCTION	0.05	0.18	1577.31	0 01:35	0.18
3-2	JUNCTION	0.06	0.24	1578.68	0 01:35	0.24
3-7	JUNCTION	0.13	0.41	1577.24	0 01:35	0.41
4-1	JUNCTION	0.51	0.68	1578.44	0 01:35	0.68
5-1	JUNCTION	0.03	0.12	1578.88	0 01:35	0.12
5-2	JUNCTION	0.05	0.19	1578.43	0 01:35	0.19
5-3	JUNCTION	0.04	0.17	1577.87	0 01:35	0.17
5-4	JUNCTION	0.05	0.20	1577.65	0 01:35	0.20
6-1	JUNCTION	0.02	0.08	1577.94	0 01:35	0.08
7-1	JUNCTION	0.03	0.12	1577.25	0 01:34	0.12
8-2	JUNCTION	0.64	1.12	1577.12	0 02:02	1.12
9-1	JUNCTION	0.27	0.67	1577.17	0 02:01	0.66
10-1	JUNCTION	0.28	0.80	1577.30	0 01:44	0.79
11-1	JUNCTION	0.21	0.62	1577.22	0 01:54	0.61
12-1	JUNCTION	0.64	1.12	1577.12	0 02:02	1.12
1-2	OUTFALL	0.15	0.20	1576.10	0 02:02	0.20
3-1	STORAGE	0.04	0.18	1579.22	0 01:35	0.18
3-3	STORAGE	0.10	0.76	1578.27	0 01:35	0.73
3-4	STORAGE	0.10	0.78	1578.19	0 01:35	0.75
3-5	STORAGE	0.14	0.82	1577.86	0 01:35	0.80
8-1	STORAGE	0.64	1.12	1577.12	0 02:02	1.12
3-6	STORAGE	0.15	0.60	1577.54	0 01:35	0.60
6-2	STORAGE	0.04	0.36	1577.93	0 01:35	0.36

****

Node Inflow Summary

****

Maximum Maximum Lateral Total Flow

Node	Type	Lateral Inflow CMS	Total Inflow CMS	Time of Max Occurrence days hr:min	Inflow Volume 10^6 ltr	Inflow Volume 10^6 ltr	Balance Error Percent
1-1	JUNCTION	0.000	0.153	0 02:02	0	1.27	0.092
2-1	JUNCTION	0.067	0.067	0 01:35	0.0835	0.0835	0.039
2-2	JUNCTION	0.055	0.122	0 01:35	0.0716	0.155	0.120
2-3	JUNCTION	0.046	0.166	0 01:35	0.0593	0.214	-0.006
3-2	JUNCTION	0.125	0.234	0 01:35	0.161	0.3	0.088
3-7	JUNCTION	0.000	0.871	0 01:35	0	1.24	-0.271
4-1	JUNCTION	0.041	0.041	0 01:35	0.0506	0.0506	1.275
5-1	JUNCTION	0.053	0.053	0 01:35	0.0671	0.0671	0.043
5-2	JUNCTION	0.025	0.119	0 01:35	0.0326	0.15	0.075
5-3	JUNCTION	0.021	0.139	0 01:35	0.027	0.176	0.022
5-4	JUNCTION	0.059	0.197	0 01:35	0.0772	0.254	0.161
6-1	JUNCTION	0.026	0.026	0 01:35	0.0309	0.0309	0.045
7-1	JUNCTION	0.084	0.084	0 01:35	0.112	0.112	0.013
8-2	JUNCTION	0.000	0.153	0 02:02	0	1.27	0.296
9-1	JUNCTION	0.000	0.135	0 01:45	0	0.246	0.187
10-1	JUNCTION	0.000	0.871	0 01:35	0	1.4	0.079
11-1	JUNCTION	0.000	0.312	0 01:43	0	0.476	0.145
12-1	JUNCTION	0.000	0.005	0 01:34	0	0.00359	73.846
1-2	OUTFALL	0.000	0.153	0 02:02	0	1.27	0.000
3-1	STORAGE	0.109	0.109	0 01:35	0.139	0.139	0.045
3-3	STORAGE	0.100	0.330	0 01:35	0.136	0.436	-0.050
3-4	STORAGE	0.170	0.479	0 01:35	0.239	0.676	0.063
3-5	STORAGE	0.099	0.632	0 01:35	0.134	0.895	0.056
8-1	STORAGE	0.035	1.146	0 01:35	0.0683	2.17	0.607
3-6	STORAGE	0.049	0.678	0 01:35	0.0642	0.959	-0.019
6-2	STORAGE	0.042	0.069	0 01:35	0.0551	0.086	0.133

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
8-2	JUNCTION	0.89	0.117	0.385

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
3-1	0.000	1.7	0.0	0.0	0.000	6.6	0 01:35	0.109
3-3	0.000	0.3	0.0	0.0	0.001	2.1	0 01:35	0.319
3-4	0.000	0.3	0.0	0.0	0.001	2.0	0 01:35	0.479
3-5	0.000	0.4	0.0	0.0	0.001	2.2	0 01:35	0.634
8-1	0.412	23.2	0.0	0.0	0.769	43.2	0 02:02	0.586
3-6	0.000	11.9	0.0	0.0	0.001	49.1	0 01:35	0.679
6-2	0.000	4.2	0.0	0.0	0.000	37.2	0 01:35	0.066

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
1-2	95.30	0.102	0.153	1.268
System	95.30	0.102	0.153	1.268

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days	Time of Max Occurrence hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
1-1_to_1-2	CONDUIT	0.153	0	02:02	2.24	0.41	0.44
2-1_to_2-2	CONDUIT	0.067	0	01:35	1.61	0.44	0.57
2-2_to_2-3	CONDUIT	0.121	0	01:35	2.40	0.79	0.67
2-3_to_11-1	CONDUIT	0.166	0	01:35	3.59	0.30	0.62
3-1_to_3-2	CONDUIT	0.109	0	01:35	2.53	0.65	0.59
3-2_to_3-3	CONDUIT	0.230	0	01:35	2.15	0.51	0.77
3-3_to_3-4	CONDUIT	0.319	0	01:35	1.62	0.89	1.00
3-4_to_3-5	CONDUIT	0.479	0	01:35	2.21	0.95	1.00
3-5_to_3-6	CONDUIT	0.634	0	01:35	2.93	1.75	1.00
3-6_to_3-7	CONDUIT	0.679	0	01:35	3.15	1.89	0.98
3-7_to_10-1	CONDUIT	0.871	0	01:35	4.87	0.82	0.79
4-1_to_5-2	CONDUIT	0.041	0	01:35	0.89	0.50	0.62
5-1_to_5-2	CONDUIT	0.053	0	01:35	1.42	0.34	0.52
5-2_to_5-3	CONDUIT	0.118	0	01:35	2.50	0.73	0.64
5-3_to_5-4	CONDUIT	0.139	0	01:35	2.32	0.29	0.40
5-4_to_3-7	CONDUIT	0.197	0	01:35	2.59	0.40	0.51
6-1_to_6-2	CONDUIT	0.026	0	01:35	1.05	0.14	0.63
6-2_to_3-5	CONDUIT	0.066	0	01:35	1.49	0.48	1.00

7-1_to_9-1	CONDUIT	0.085	0	01:35	3.79	0.32	0.65
8-1_to_8-2	CONDUIT	0.153	0	02:02	0.43	0.71	1.00
9-1_to_8-1	CONDUIT	0.154	0	01:42	0.40	0.03	0.83
10-1_to_8-1	CONDUIT	0.871	0	01:35	2.71	0.18	0.90
11-1_to_8-1	CONDUIT	0.351	0	01:42	0.73	0.07	0.81
8-1_to_12-1	CONDUIT	0.005	0	01:34	0.11	0.02	1.00
8-2_to_1-1	ORIFICE	0.153	0	02:02			1.00
12-1_to_1-1	WEIR	0.000	0	00:00			0.00

****
Flow Classification Summary
****

	Adjusted	---------- Fraction of Time in Flow Class ----------								
	/Actual		Up	Down	Sub	Sup	Up	Down	Norm	Inlet
Conduit	Length	Dry	Dry	Dry	Crit	Crit	Crit	Crit	Ltd	Ctrl
1-1_to_1-2	1.11	0.12	0.00	0.00	0.01	0.87	0.00	0.00	0.32	0.00
2-1_to_2-2	1.00	0.10	0.00	0.00	0.01	0.89	0.00	0.00	0.88	0.00
2-2_to_2-3	1.00	0.10	0.00	0.00	0.00	0.00	0.00	0.90	0.00	0.00
2-3_to_11-1	1.00	0.10	0.00	0.00	0.48	0.42	0.00	0.00	0.52	0.00
3-1_to_3-2	1.00	0.10	0.00	0.00	0.00	0.00	0.00	0.90	0.00	0.00
3-2_to_3-3	1.00	0.10	0.00	0.00	0.01	0.05	0.00	0.84	0.05	0.00
3-3_to_3-4	1.00	0.10	0.00	0.00	0.05	0.86	0.00	0.00	0.39	0.00
3-4_to_3-5	1.00	0.10	0.00	0.00	0.05	0.85	0.00	0.00	0.81	0.00
3-5_to_3-6	1.00	0.10	0.00	0.00	0.13	0.77	0.00	0.00	0.00	0.00
3-6_to_3-7	1.02	0.10	0.00	0.00	0.09	0.02	0.00	0.79	0.00	0.00
3-7_to_10-1	1.00	0.10	0.00	0.00	0.47	0.43	0.00	0.00	0.34	0.00
4-1_to_5-2	1.48	0.10	0.04	0.00	0.82	0.00	0.04	0.00	0.30	0.00
5-1_to_5-2	1.00	0.10	0.00	0.00	0.00	0.90	0.00	0.00	0.88	0.00
5-2_to_5-3	1.00	0.10	0.00	0.00	0.00	0.00	0.00	0.90	0.00	0.00
5-3_to_5-4	1.00	0.10	0.00	0.00	0.01	0.89	0.00	0.00	0.88	0.00
5-4_to_3-7	1.00	0.10	0.00	0.00	0.07	0.11	0.00	0.72	0.17	0.00
6-1_to_6-2	1.00	0.10	0.00	0.00	0.40	0.50	0.00	0.00	0.90	0.00
6-2_to_3-5	1.00	0.10	0.00	0.00	0.04	0.02	0.00	0.84	0.03	0.00

7-1_to_9-1	1.00	0.10	0.00	0.00	0.59	0.31	0.00	0.00	0.60	0.00
8-1_to_8-2	1.00	0.11	0.00	0.00	0.88	0.01	0.00	0.00	0.00	0.00
9-1_to_8-1	1.23	0.10	0.00	0.00	0.88	0.02	0.00	0.00	0.29	0.00
10-1_to_8-1	1.16	0.11	0.00	0.00	0.61	0.29	0.00	0.00	0.28	0.00
11-1_to_8-1	1.06	0.10	0.00	0.00	0.85	0.04	0.00	0.00	0.37	0.00
8-1_to_12-1	1.00	0.11	0.00	0.00	0.89	0.00	0.00	0.00	0.00	0.00

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Conduit Surcharge Summary
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	--------- Hours Full --------			Hours Above Full Normal Flow	Hours Capacity Limited
Conduit	Both Ends	Upstream	Dnstream		
2-3_to_11-1	0.01	0.01	0.53	0.01	0.01
3-2_to_3-3	0.01	0.01	0.05	0.01	0.01
3-3_to_3-4	0.05	0.05	0.06	0.01	0.01
3-4_to_3-5	0.06	0.06	0.11	0.01	0.01
3-5_to_3-6	0.09	0.11	0.09	0.14	0.09
3-6_to_3-7	0.01	0.09	0.01	0.16	0.01
3-7_to_10-1	0.01	0.01	0.33	0.01	0.01
6-1_to_6-2	0.01	0.01	0.02	0.01	0.01
6-2_to_3-5	0.02	0.02	0.11	0.01	0.01
7-1_to_9-1	0.01	0.01	1.60	0.01	0.01
8-1_to_8-2	0.89	0.89	0.89	0.01	0.01
9-1_to_8-1	0.01	0.01	0.89	0.01	0.01
10-1_to_8-1	0.01	0.01	0.89	0.01	0.01
11-1_to_8-1	0.01	0.01	0.89	0.01	0.01
8-1_to_12-1	0.89	0.89	0.89	0.01	0.01

Analysis begun on: Sun Jun 1 20:09:59 2025
Analysis ended on: Sun Jun 1 20:09:59 2025
Total elapsed time: < 1 sec