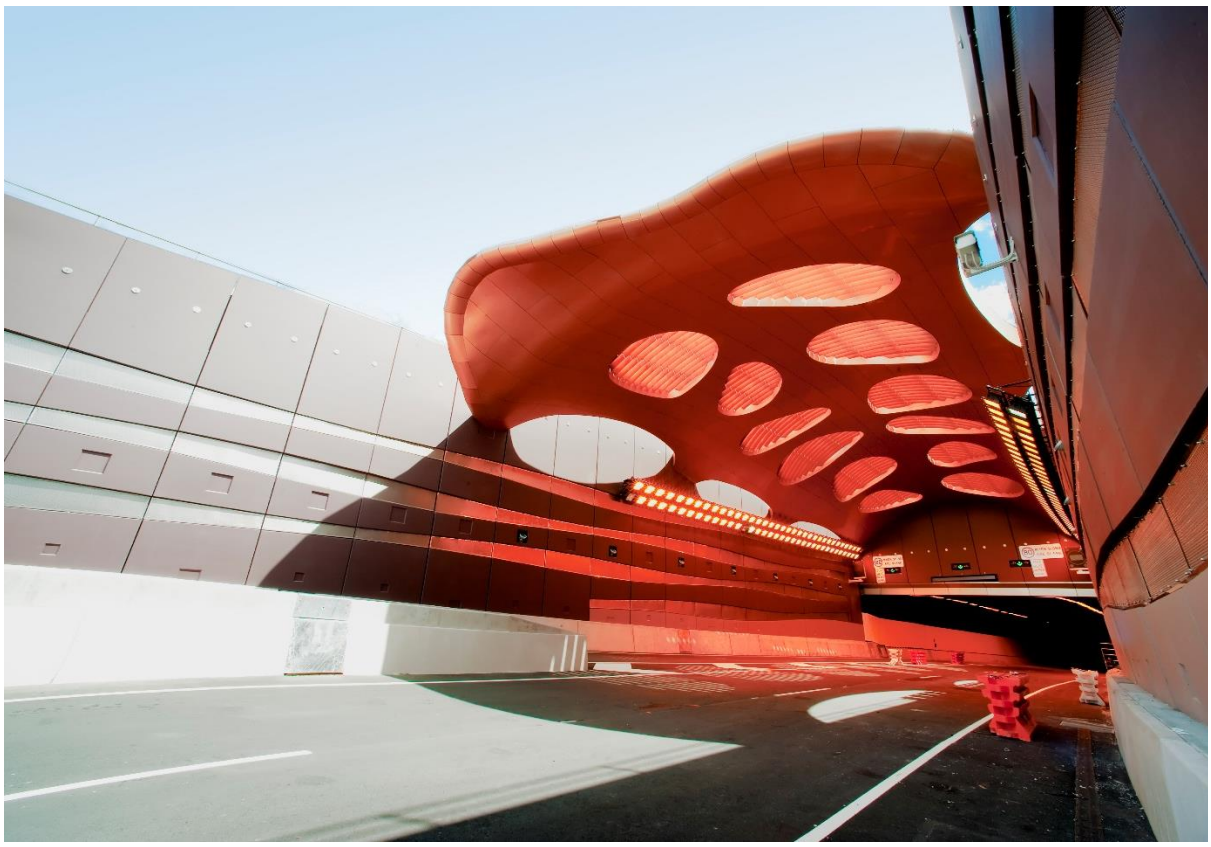
SASOL SOUTH AFRICA LIMITED

RE-INSTATEMENT AND DEVELOPMENT OF THE VBC08 WETLAND

HYDROLOGICAL IMPACT ASSESSMENT

29 JUNE 2021



RE-INSTATEMENT AND DEVELOPMENT OF THE VBC08 WETLAND

HYDROLOGICAL IMPACT ASSESSMENT

SASOL SOUTH AFRICA LIMITED

FINAL

PROJECT NO.: 41102282
DATE: JUNE 2021

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This Draft Hydrological Impact Assessment Report (Report) for the Proposed Re-Instatement and Development of the VBC08 Wetland in Secunda, Mpumalanga Province has been prepared by WSP Environmental Proprietary Limited (WSP) on behalf and at the request of Sasol South Africa Limited (Client), as part of the application process for an Environmental Authorisation.

Unless otherwise agreed by us in writing, we do not accept responsibility or legal liability to any person other than the Client for the contents of, or any omissions from, this Report. To prepare this Report, we have reviewed only the documents and information provided to us by the Client or any third parties directed to provide information and documents to us by the Client. We have not reviewed any other documents in relation to this Report, except where otherwise indicated in the Report.

PRODUCTION TEAM

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TABLE OF CONTENTS

TABLES

FIGURES

1 INTRODUCTION

WSP Environmental (Pty) Ltd (WSP) was appointed by Sasol South Africa Limited "Sasol" (Applicant), to undertake a Hydrological Assessment for the Water Use License Application (WULA). Sasol is proposing to reinstate and develop the existing wetland system VBC08, located adjacent to the Sasol Nitro Fertiliser Plant, Secunda in the Mpumalanga Province. The development includes the installation of up to eighteen wetland rehabilitation structures throughout the wetland system in order to facilitate nitrate removal and mitigate nutrient and salt load into the Groot Bossiespruit.

Sasol requires the necessary authorisation in terms of Section 21 of the National Water Act. (No.36 of 1998) (NWA), as amended, for water uses associated with the development. As part of the WULA, a Hydrological Impact Assessment is required by the Department of Water and Sanitation (DWS), and this report serves to fulfil this requirement.

2 LEGAL CONTEXT

The objective of the hydrological assessment is to limit any potential impacts on the surface water resources associated with Sasol. The NWA was used as the guidance document to meet this objective.

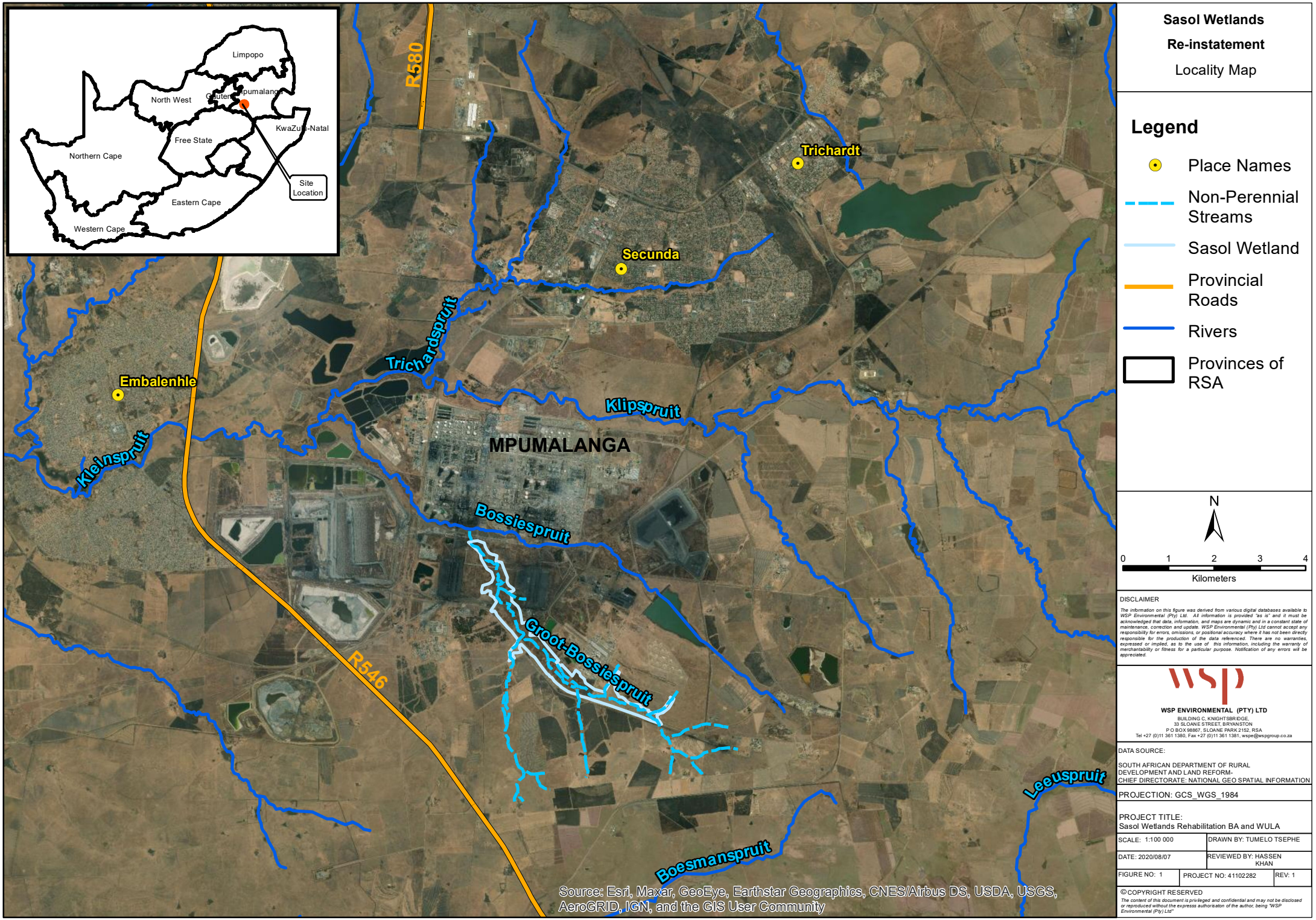
The preamble to the NWA recognises that the ultimate aim of water resource management is to achieve sustainable water use for the benefit of all users and that the quality of these resources are protected to ensure ongoing sustainability. The purpose of the NWA is stated, in **Section 2** as, inter alia:

- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Facilitating social and economic development;
- Protecting aquatic and associated ecosystems and their biological diversity;
- Reducing and preventing pollution and degradation of water resources; and
- Meeting international obligations.

The NWA presents strategies to facilitate sound management of water resources, provides for the protection of water resources, and regulates use of water by means of Catchment Management Agencies, Water User Associations, Advisory Committees and International Water Management.

3 SITE DESCRIPTION

Sasol Limited was established in the 1950s with the aim of synthesising alternative fuel from coal for South Africa. In the late seventies and early eighties, Sasol's primary industrial complex was constructed approximately 100 km east-south-east of Johannesburg. The Secunda Industrial Complex (SIC) is located in the Mpumalanga Province, 50 km north of Standerton, 32 km south-east of Leandra, 28 km west of Bethal, south-west of the town of Secunda, and to the east of the R546 and the township of Embalenhle, in the Govan Mbeki Local Municipality of the Gert Sibande District Municipality. The regional setting of the SIC can be seen in **Figure 3-1**.



Sasol Wetlands
Re-instatement
Locality Map

Legend

- Place Names
- Non-Perennial Streams
- Sasol Wetland
- Provincial Roads
- Rivers
- Provinces of RSA

N

0 1 2 3 4
Kilometers

DISCLAIMER

The information on this figure was derived from various digital databases available to WSP Environmental (Pty) Ltd. All information is provided "as is" and it must be acknowledged that data, information, and maps are dynamic and in a constant state of maintenance, correction and update. WSP Environmental (Pty) Ltd cannot accept any responsibility for errors, omissions, or positional accuracy where it has not been directly responsible for the production of the data referenced. There are no warranties, expressed or implied, as to the use of this information, including the warranty of merchantability or fitness for a particular purpose. Notification of any errors will be appreciated.

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DATA SOURCE:
SOUTH AFRICAN DEPARTMENT OF RURAL DEVELOPMENT AND LAND REFORM-
CHIEF DIRECTORATE: NATIONAL GEO SPATIAL INFORMATION

PROJECTION: GCS_WGS_1984

PROJECT TITLE:
Sasol Wetlands Rehabilitation BA and WULA

SCALE: 1:100 000	DRAWN BY: TUMELO TSEPHE
DATE: 2020/08/07	REVIEWED BY: HASSEN KHAN
FIGURE NO: 1	PROJECT NO: 41102282 REV: 1

4 PROJECT DESCRIPTION

Sasol is implementing an instream constructed/artificial wetland (passive system) which could augment the existing natural wetland system. The purpose is to reduce nutrient and salt load into the Groot Bossiespruit. The objectives of the system are to:

- Reduce downstream impacts of high nutrient and salt load on the Groot Bossiespruit after rain events, and
- Endeavour to attain the Upper Vaal Resource Water Quality Objectives (RWQO) or Water Use Licence (WUL) release standards at surface water monitoring locations in streams (RESM) 12.

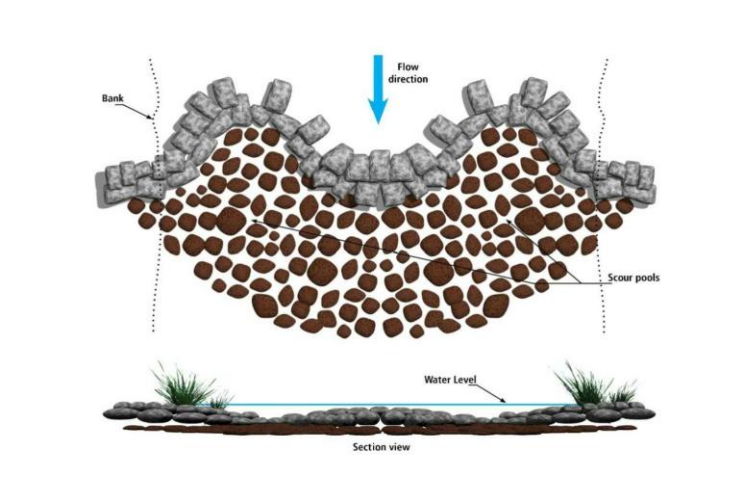
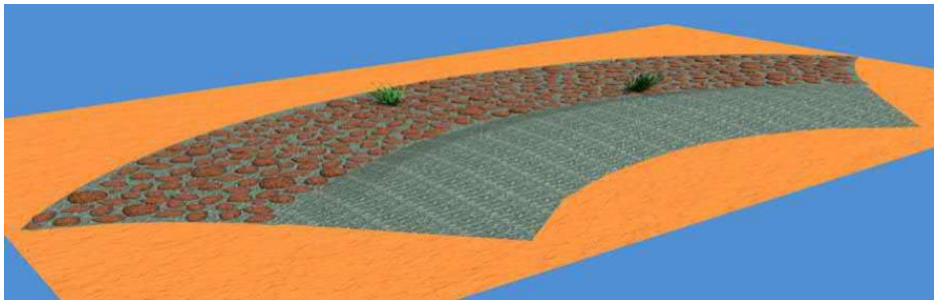
The proposed rehabilitation intervention measure are categorised as:

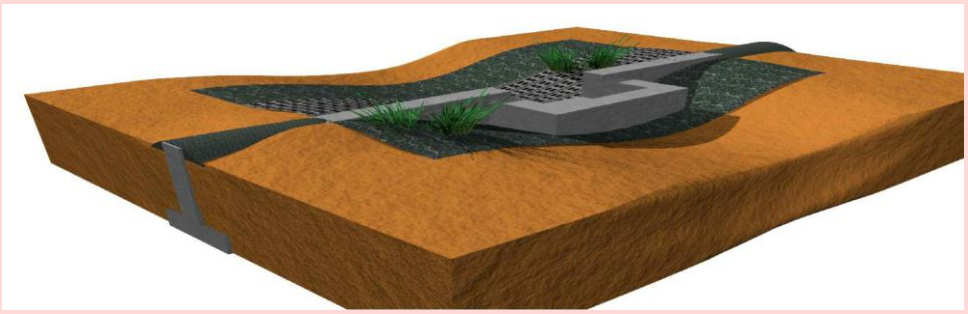
- Direct interventions: those that relate to specific instream measures that have specific functions given their respective locations; and
- Indirect interventions: those that relate to ancillary measures to improve the overall wetland conditions, contributing to the success of the rehabilitation effort.

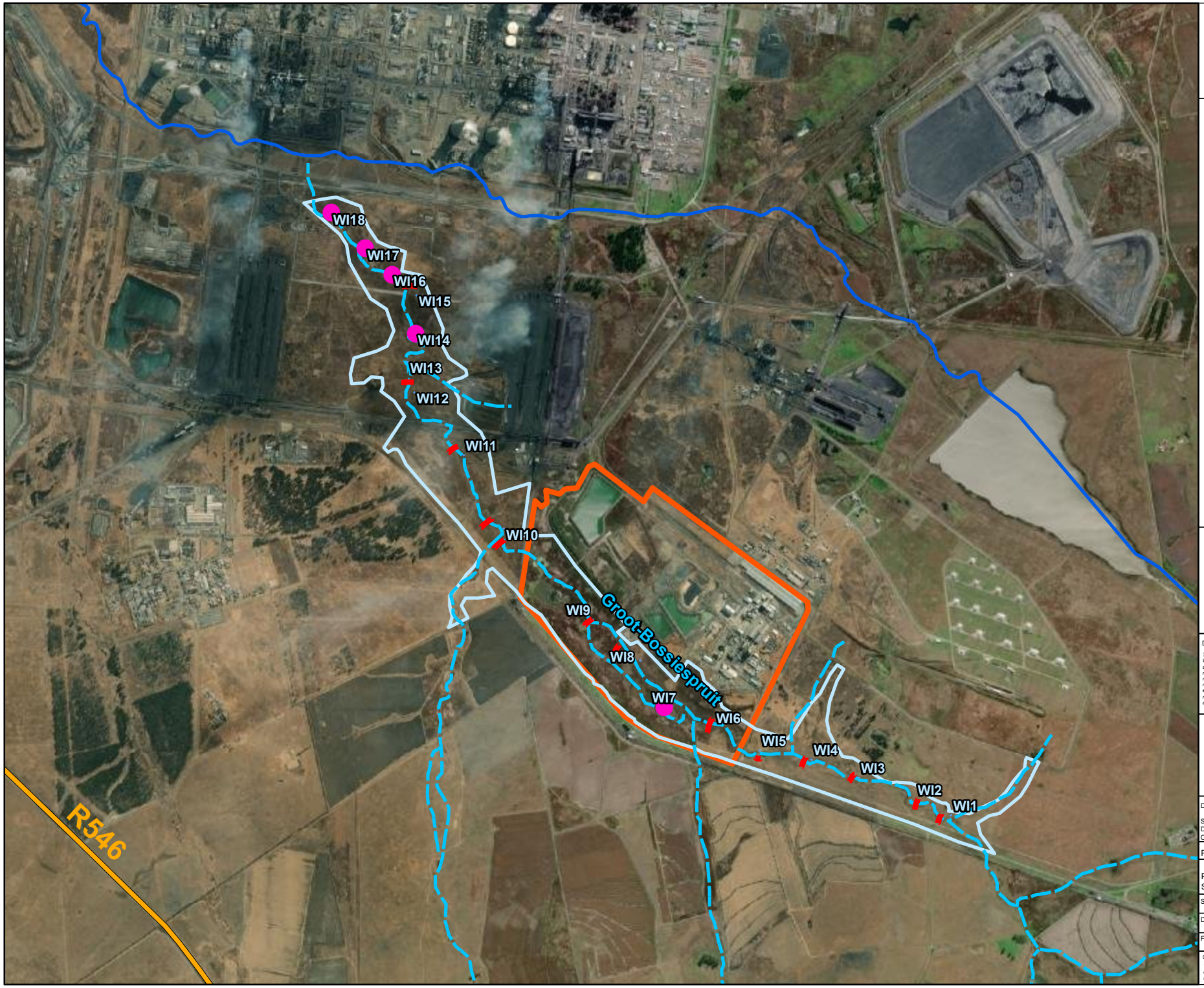
4.1 DIRECT MEASURES

Direct measures involve the addition of up to 18 wetland rehabilitation structures proposed throughout the wetland system, 13 of which are definite and 5 are future use if deemed required. The weir's main function is to raise the water table, yet allow sufficient water to move through the weir not to cut off the water source completely. The structure will also reduce water velocities in the system thereby reducing the potential for valley bottom erosion. The proposed designs for these interventions are shown in **Table 4-1** and the location of these are shown in **Figure 4-1**.

Table 4-1: Proposed designs for the interventions

Name	Design
W-Shaped Weir	
Low level berm	

Concrete weir structure	



Sasol Wetland Re-instatement

Wetland Intervention Map

Legend

- Future Use Wetland Interventions
- Definite Wetland Interventions
- Non-Perennial Streams
- Sasol Wetland (VBC08)
- Provincial Roads
- Rivers
- Site Boundary

N

0 300 600 900

Meters

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CHIEF DIRECTORATE: NATIONAL GEO SPATIAL INFORMATION

PROJECTION: GCS_WGS_1984

PROJECT TITLE:
Sasol Wetland Rehabilitation BA and WULA

SCALE: 1:30 000	DRAWN BY: TUMELO TSEPHE
DATE: 2020/06/04	REVIEWED BY: HASSEN KHAN

FIGURE NO: 3	PROJECT NO: 41102282	REV: 0

4.2 INDIRECT MEASURES

Indirect rehabilitation/rehabilitation measures in augmentation of the direct measures are key to the rehabilitation effort. **Table 4-2** indicates typical indirect rehabilitation measures.

Table 4-2: Indirect rehabilitation measures

Rehabilitation measure	Purpose of improvement/intervention	Description of improvement/intervention
Dam wall **Removal only at dams above fertiliser plant**	To allow a more regular/consistent flow through the wetland system	Breach dam wall and stockpile material for mixing with sediment. Mix sediment in a ratio of 1 to 5. Re-establish the natural vegetation
Earthworks	General earthworks are used to reshape uneven ground - this allows a more natural slope of the topography	Routine shaping and levelling
Removal of alien vegetation	To reinstate natural bio-diversity and functional vegetation communities	The current vegetation community of VBC08 is dominated by dense stands of weed species (Figure 29), some of which are considered invasive. The removal of these weed species is strongly recommended. It is understood that a burn regime cannot be introduced due to significant health and safety concerns. Instead, the weeds can be achieved via manual removal, or ideally could be addressed through very low-density grazing i.e. one or two cattle on a seasonal basis (in spring) to prevent new weed growth taking place and assist in breaking down old dense stands of weed material, thereby providing opportunity for wetland plant species to take hold.
Re-establishment of vegetation	To reinstate natural bio-diversity and functional vegetation communities	Conduct hydro-seeding with appropriate seeds mix over the Dongalock portions. Seed bed harvesting to be used in areas of shaping and levelling as well as in area where alien vegetation is removed

5 ENVIRONMENTAL SETTING

5.1 QUATERNARY CATCHMENT

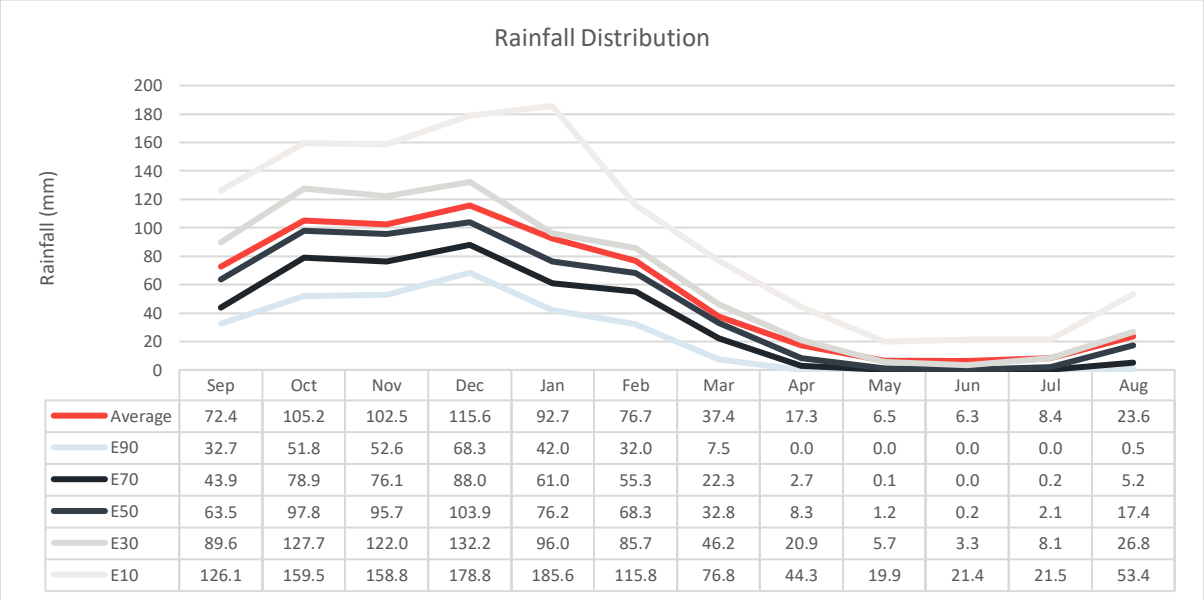
The SIC footprint falls within the boundary of C12D quaternary catchments within the Upper Vaal Water Management Area (WMA 14) and is located within the upper reaches of the Waterval River. The Mean Annual Precipitation (MAP), Mean Annual Evaporation (MAE) and Mean Annual Runoff (MAR) for quaternary catchment C12D can be seen in **Table 5-1** below.

Table 5-1: Quaternary Catchment Descriptions

Quaternary Catchment	Catchment Area (km^2)	Rainfall Zone	MAP (mm)	Evaporation Zone	MAE (mm)	MAR (mcm)
C12D	899	C1D	667	12A	1580	63.44

5.1.1 REGIONAL RAINFALL

The site falls within the C1D rainfall zone with an MAP of 667. The monthly rainfall distribution is represented in **Figure 5-1.** The 'E' values show the probability of non-exceedance, so highlight the likelihood that the specific rainfall event will not be exceeded.



	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Average	72.4	105.2	102.5	115.6	92.7	76.7	37.4	17.3	6.5	6.3	8.4	23.6
E90	32.7	51.8	52.6	68.3	42.0	32.0	7.5	0.0	0.0	0.0	0.0	0.5
E70	43.9	78.9	76.1	88.0	61.0	55.3	22.3	2.7	0.1	0.0	0.2	5.2
E50	63.5	97.8	95.7	103.9	76.2	68.3	32.8	8.3	1.2	0.2	2.1	17.4
E30	89.6	127.7	122.0	132.2	96.0	85.7	46.2	20.9	5.7	3.3	8.1	26.8
E10	126.1	159.5	158.8	178.8	185.6	115.8	76.8	44.3	19.9	21.4	21.5	53.4

Figure 5-1: Monthly Rainfall Distribution for Quaternary C12D (WR2012)

5.1.2 EVAPORATION

Evaporation data for the site was extracted from the WR2012 (WRC, 2015) database. The site falls within evaporation zone 12A. The MAE is clearly considerably higher than the MAP, making this a dry area. The monthly evaporation distribution is presented in **Figure 5-2**.

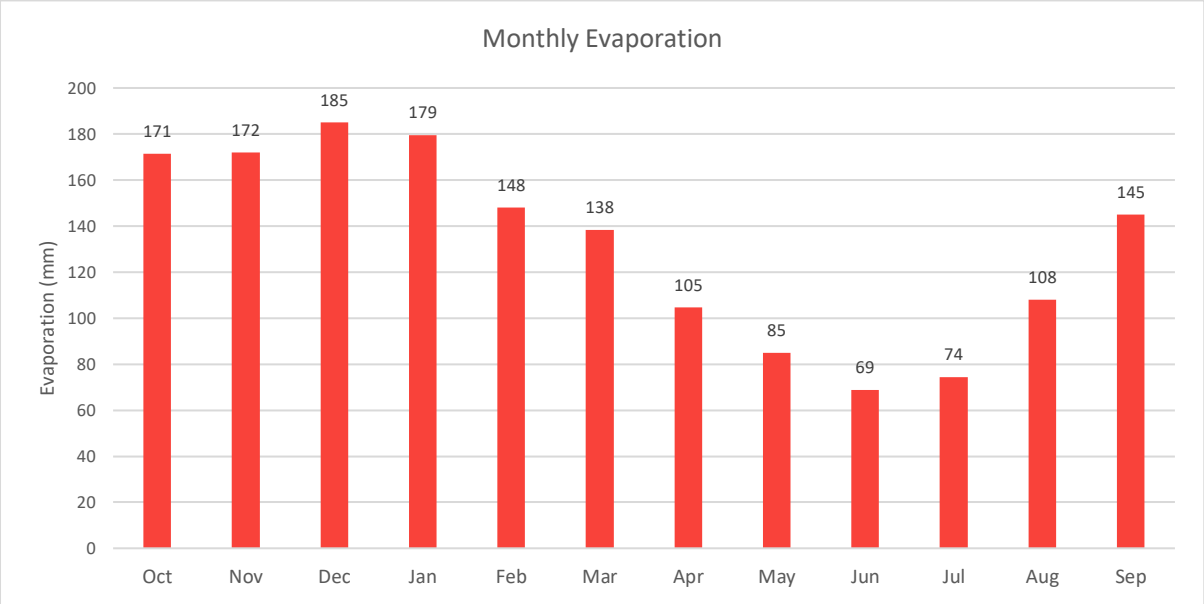
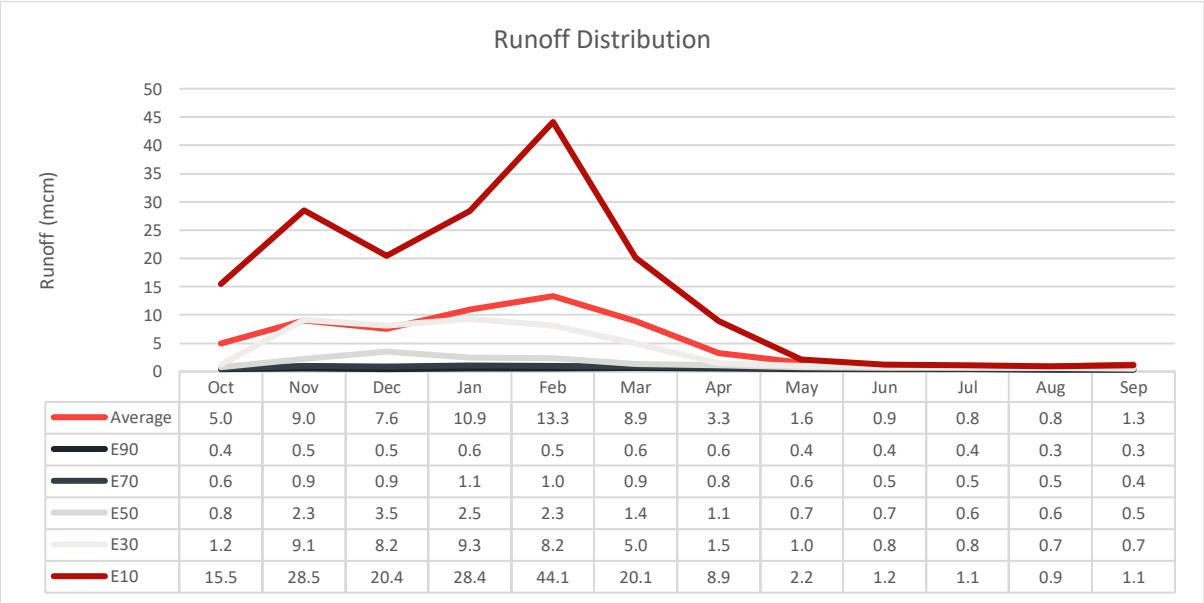


Figure 5-2: Monthly S-Pan Evaporation for Quaternary C12D (WR2012)

5.1.3 NATURALISED RUNOFF

WR2012 (WRC, 2015) simulates average runoff of this quaternary at 63.4 mcm per annum. The monthly runoff is presented in **Figure 5-3**. The 'E' values show the probability of non-exceedance.



	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average	5.0	9.0	7.6	10.9	13.3	8.9	3.3	1.6	0.9	0.8	0.8	1.3
E90	0.4	0.5	0.5	0.6	0.5	0.6	0.6	0.4	0.4	0.4	0.3	0.3
E70	0.6	0.9	0.9	1.1	1.0	0.9	0.8	0.6	0.5	0.5	0.5	0.4
E50	0.8	2.3	3.5	2.5	2.3	1.4	1.1	0.7	0.7	0.6	0.6	0.5
E30	1.2	9.1	8.2	9.3	8.2	5.0	1.5	1.0	0.8	0.8	0.7	0.7
E10	15.5	28.5	20.4	28.4	44.1	20.1	8.9	2.2	1.2	1.1	0.9	1.1

Figure 5-3: Simulated runoff for Quaternary C12D (WR2012)

5.2 DRAINAGE

The Vaal River originates on the Eastern Escarpment, north-east of Ermelo, and flows west, through the Mpumalanga Highveld, where it is dammed by the Grootdraai Dam near Standerton, from where water supply for industrial use at the SIC is obtained. Downstream from the Grootdraai Dam, the Vaal River is joined by the Klip River and the Waterval River, and further downstream, at the confluence of the Vaal River with the Wilge River,

the Vaal Dam has been constructed. Downstream of the Vaal Dam a number of tributaries draining the Gauteng, Northwest and Free State Provinces (including the Suikerbosrant River, the Klip Spruit, the Riet Spruit, the Taaibos Spruit, the Mooi River, the Renoster Spruit, the Skoon Spruit, and the Vals River) join the Vaal River, which flows further to the north-west, west, and south-west, until it is dammed by the Bloemhof Dam at its confluence with the Vet River. Downstream from the Bloemhof Dam, it continues in a slightly more south-westerly direction, and is joined by the Harts River and the Riet River, before its confluence with the Orange River at Douglas, some 700 km from its origin. Drainage in Quaternary catchment C12D is as follows:

- The Waterval River originates just south of the town of Leandra, some 30 km to the north-west of the SIC. Following its confluence with the Rol Spruit, it is joined by the Groot Spruit, which originates to the north of the town of Evander. The main tributary of the Groot Spruit is the Klein Spruit, which drains the area where the SIC is located.
- The Klein Spruit is formed by the confluence of the Trichardt Spruit and the Bossie Spruit.
- The Trichardt Spruit flows from the north, draining the town of Secunda, and is joined from the east by the Klip Spruit, which roughly follows the northern boundary of the SIC Primary Area.
- The Bossie Spruit roughly forms the southern boundary of the Primary Area, and has two tributaries, namely the Groot-Bossie Spruit, which drains the south-east, and flows past Sasol Nitro Fertilisers (SNF) and Sasol nitro Explosives (SNE), and the Brand Spruit, which joins the Bossie Spruit from the south, and which forms the eastern boundary of the Outside Ash area.

6 FLOOD LINE ASSESSMENT

Flood lines were determined for the 1 in 50-year and the 1 in 100-year peak floods in the Sasol Secunda Industrial Complex (SSIC) in 2018 by SRK Consulting (South Africa) (Pty) Ltd (SRK). SRK determined detailed flood lines for the river system draining the eastern river catchments through the Sasol Secunda operational area to the western side into the Trichardspruit which confluences with the Waterval River which is approximately ±10 km to the west of the SSIC.

The flood lines are shown on drawing **Figure 6-1**. From the flood line study, the following was observed:

- The existing developments between RS TRS3T5106 and TRS3T4860 are situated within the flood lines;
- The existing developments between RS KLP3913 and KLP3746 are situated within the flood lines; and
- The existing developments between RS TRS2T1227 and TRS2T573 are situated within the flood lines.

These areas are difficult to see in the map therefore these areas have been highlighted with a RED ring in **Figure 6-1**.

The following is recommends were made:

- The flood line information to be used to ensure that no new development/expansions and/or activities within the area of interest (SSIC) is situated within the 1:100 year flood line; and
- The flood lines be revised should further watercourse/control structures be modified in the future.

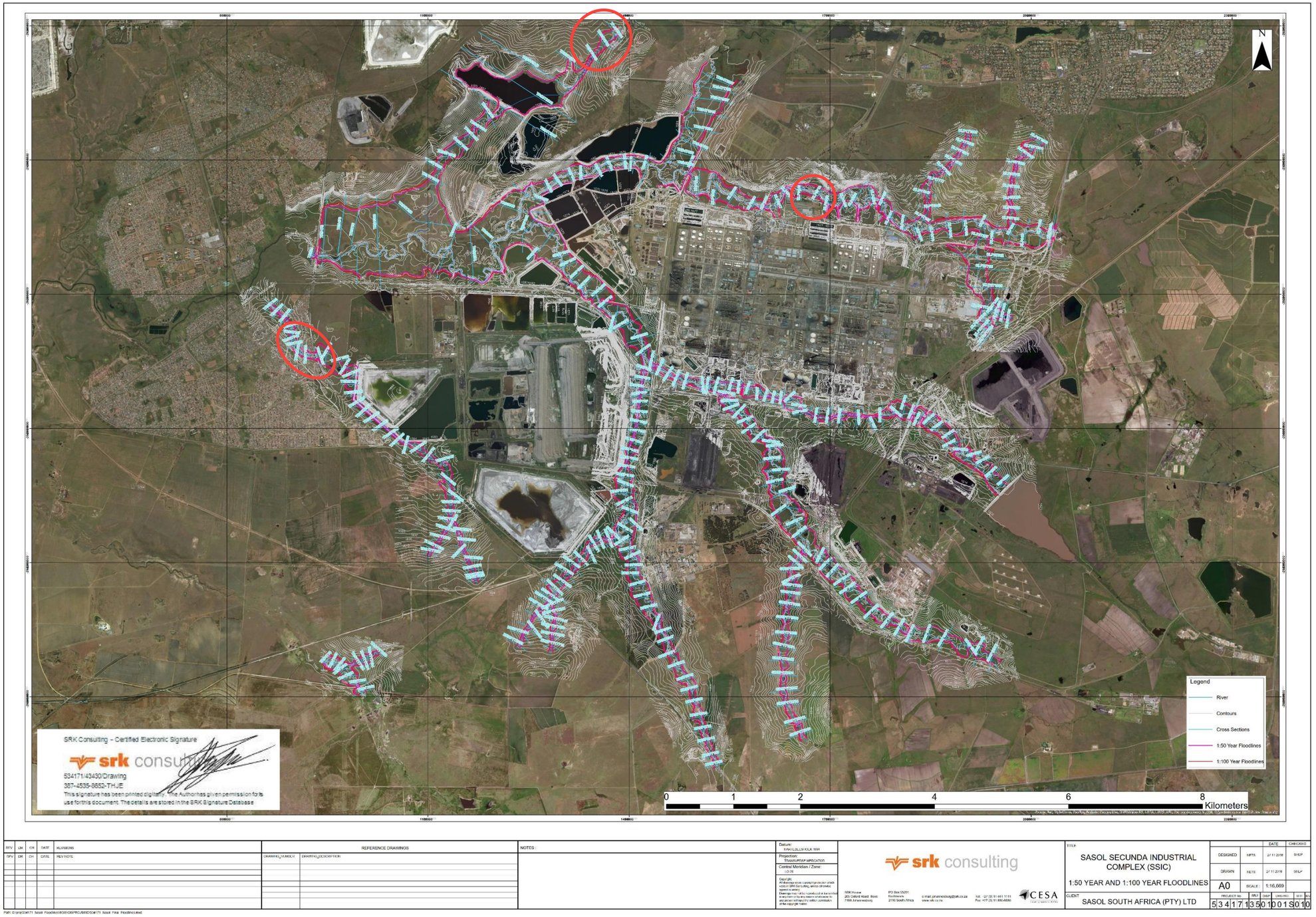


Figure 6-1: SIC 1:100-year Floodlines (SRK, 2013)

7 SURFACE WATER QUALITY MONITORING

Surface water quality monitoring is conducted by the analysis of samples taken in surface water resources (streams), discharges into streams, and in facilities used for the containment of contaminated water.

With regard to the sampling of surface water resources (streams), a network of 24 sampling points ("RESM" or "Receiving Environment Surface Monitoring") has been established around the SIC in order to measure potential impacts from the various activities on the relevant surface water resources. The water quality analysis will focus on the Bossie Spruit and Groot-Bossie Spruit, namely RESM 10, 12, 14 and 15. The coordinates and description of the points where samples are taken are summarised in **Table 7-1** and illustrated in **Figure 7-1**. These points are all upstream of RESM-1, which is considered to be the downstream point of the complex

Table 7-1: Surface Water Quality Monitoring Points

Station	Latitude	Longitude	Water Resource	Sampling Frequency
RESM 10	26°33'52.3"S	29°09'11.5"E	Bossie Spruit	Weekly
RESM 15	26°35'51.2"S	29°10'55.5"E	Groot-Bossie Spruit	Weekly
RESM 14	26°35'00.9"S	29°09'59.3"E	Groot-Bossie Spruit	Weekly
RESM 12	26°33'58.8"S	29°09'18.4"E	Groot-Bossie Spruit	Weekly

Various water quality guidelines/limits were assessed in order to determine the most important receptors and/or potential surface water users in the area. In order to achieve this, a Most Sensitive User (MSU) analysis was carried out, and the following were determined to be of most relevance:

- GN665 General Authorisation Limits – 2013 (referred to as GA in **Table 7-2**) (GN665, 2013)
- SANS 241: National Standard for Drinking Water Quality – 2015 (referred to as SANS 241 in **Table 7-2**) (SANS 241, 2015)
- South African Water Quality Guidelines: Volume 4 - Irrigation Watering - 1996 (referred to as Irrigation in **Table 7-2**) (SAWQG Irrigation, 1996)
- South African Water Quality Guidelines: Volume 5 - Livestock Watering – 1996 (referred to as Livestock in **Table 7-2**) (SAWQG Livestock, 1996)
- Classes and resource quality objectives of Water Resources for Catchments of the Upper Vaal – 2016 (referred to as RQO in **Table 7-2**)
- Water Use Licence specifications for in-stream water quality objectives and resource quality objectives – Appendix V condition 3.7.6 for RESM 12 (referred to as WUL (RESM12)) (WUL, 2008) in **Table 7-2**)

Table 9-2 provides the MSU analysis against which the water quality results have been compared. The average water quality results for the period January 2019-June 2020 which was obtained from Sasol is shown in **Table 7-3**. Values that were below detectable limits where treated as a zero reading when calculating the averages. All values exceeding the MSU was highlighted in orange.

Table 7-2: MSU Water Quality Guideline Requirements

Determinant	Units	GA	SANS 241	Livestock	Irrigation	RQO	WUL (RESM 12)	MSU
Aluminium	mg/l	NS	0.3	5	5	0.15	NS	0.15
Ammonia	mg/l	6	1	NS	NS	NS	NS	1
Arsenic	mg/l	0.02	0.01	NS	NS	0.13	NS	0.01
Cadmium	mg/l	0.005	0.005	NS	0.01	0.005	NS	0.005
Calcium	mg/l	NS	150	1000	NS	NS	NS	150
Chloride	mg/l	0.25	NS	NS	NS	0.005	NS	0.005
Chromium	mg/l	0.05	NS	1	0.1	0.2	NS	0.05
Conductivity (EC)	µS/cm	150	150	NS	NS	111	250	111
Copper	mg/l	0.01	1	0.5	0.2	0.008	NS	0.008
Fluoride	mg/l	1	1	2	2	3	NS	1
Iron	mg/l	0.3	0.2	10	5	NS	NS	0.2
Lead	mg/l	0.01	0.02	0.1	0.2	0.013	NS	0.01
Magnesium	mg/l	NS	70	500	NS	NS	NS	70
Manganese	mg/l	0.1	0.1	10	0.02	1.3	NS	0.02
Mercury	mg/l	0.005	0.001	10	0.02	1.3	NS	0.001
Nickel	mg/l	0.15	1	0.2	NS	NS	NS	0.15
Nitrate + Nitrite as Nitrogen	mg/l	15	10	100	NS	4	NS	4
pH	pH Units	5.5-9.5	5.5-9.5	NS	6.5-8.4	NS	NS	6.5-8.4
Phosphate	mg/l	10	NS	NS	NS	0.125	NS	0.125
Potassium	mg/l	NS	50	NS	NS	NS	NS	50
Selenium	mg/l	0.02	0.02	0.05	NS	0.03	NS	0.02
Sodium	mg/l	NS	200	2000	70	NS	NS	70
Sulfate	mg/l	NS	400	1000	NS	NS	NS	400
Suspended solids	mg/l	25	NS	NS	NS	NS	NS	25
Total dissolved solids	mg/l	NS	1000	1000	40	NS	1625	40
Vanadium	mg/l	NS	0.2	1	0.1	NS	NS	0.1
Zinc	mg/l	0.1	5	20	1	0.036		0.036

Table 7-3: Water Quality Analysis

Average	Units	MSU	RESM10	RESM12	RESM14	RESM15
Aluminium	mg/l	0.15	0.44	0.19	0.28	0.13
Ammonia	mg/l	1	0.33	0.42	0.62	0.20
Arsenic	mg/l	0.01	0.01	0.02	0.01	0.01
Cadmium	mg/l	0.005	0.00	0.00	0.03	0.01
Calcium	mg/l	150	44.87	111.66	241.77	55.55
Chloride	mg/l	0.005	32.36	57.35	84.48	39.46
Chromium	mg/l	0.05	0.01	0.01	0.00	0.00
Conductivity (EC)	µS/cm	111	611.28	1448.27	3127.51	838.64
Copper	mg/l	0.008	0.02	0.01	0.01	0.01
Fluoride	mg/l	1	0.47	0.59	0.44	0.43
Iron	mg/l	0.2	0.41	1.21	0.29	0.19
Lead	mg/l	0.01	0.00	0.00	0.00	0.01
Magnesium	mg/l	70	28.95	75.96	182.50	49.42
Manganese	mg/l	0.02	0.05	0.04	0.03	0.14
Mercury	mg/l	0.001	0.00	0.01	0.00	0.02
Nickel	mg/l	0.15	0.01	0.00	0.01	0.01
Nitrate + Nitrite as Nitrogen	mg/l	4	8.10	68.80	285.22	2.46
pH	pH Units	6.5-8.4	7.89	7.74	7.87	7.60
Phosphate	mg/l	0.125	0.40	2.06	5.68	1.12
Potassium	mg/l	50	6.33	7.80	9.26	6.69
Selenium	mg/l	0.02	0.03	0.04	0.05	0.05
Sodium	mg/l	70	33.63	63.00	111.86	39.05
Sulfate	mg/l	400	131.45	225.23	277.79	160.17
Suspended solids	mg/l	25	23.42	0.00	0.00	0.00
Total dissolved solids	mg/l	40	390.78	921.34	2032.90	545.08
Vanadium	mg/l	0.1	0.03	0.06	0.09	0.05
Zinc	mg/l	0.036	0.15	0.04	0.02	0.01

Sasol Wetlands Rehabilitation

Water Quality Map

Legend

- Sasol Monitoring Points
- Provincial Roads
- Rivers
- Site Boundary

N

0 300 600 900

Meters

DISCLAIMER

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PROJECT TITLE:
Sasol Wetland Rehabilitation BA and WULA

SCALE: 1:40 000	DRAWN BY: TUMELO TSEPHE
DATE: 2020/06/04	REVIEWED BY: HASSEN KHAN

FIGURE NO: 4	PROJECT NO: 41102282	REV: 0

8 HYDROLOGICAL IMPACT ASSESSMENT

The objective of this section of the report is to assess the risk posed by the activity-related processes on the hydrological environment. The analyses and characterisation involves the appraisal of Source-Pathway-Receptor mechanisms associated with potential source areas in relation to regional surface water and evaluates the subsequent risks/impacts identified. In the event that no linkages exist, then no significant risk is considered to exist. The analyses and characterisation assessment incorporated the following steps:

- Identification of potential source areas;
- Assessment of exposure pathways;
- Risk assessment; and
- Matters requiring attention / problem statement.

8.1 METHODOLOGY

To establish the potential environmental significance to surface water resources posed by the activity, an Environmental Risk Assessment was undertaken. This was conducted in accordance with the approach outlined in the Operational Guideline: Integrated Water and Waste Management Plan (DWS, 2010) (**Tables 8-1 to 8-4**).

Table 8-1: Probability of Occurrence Rating

Probability (P) of Occurrence	Rating	Description
None	0	-
Improbable	1	Where the likelihood of the impact is very low
Low Probability	2	Where there is a low possibility of the impact to occur
Medium Probability	3	Where there is a distinct possibility of the impact to occur
High Probability	4	Where it is very likely that the impact will occur
Definite/Don't Know	5	Where the impact will occur regardless of any management measures

Table 8-2: Magnitude of Occurrence Rating

Magnitude (M) of Occurrence	Rating	Description
Minor	2	Describes the intensity of the impact in relation to natural, cultural and social functions and processes
Low	4	
Moderate	6	
High	8	
Very High / Don't know	10	

Table 8-3: Duration of Impact Rating

Duration (D) of Impact	Rating	Description
Immediate	1	-
Short Term	2	0 – 5 years
Medium Term	3	6 – 15 years

Long Term	4	The impact will cease after the operational life of the activity
Permanent	5	Where mitigation measures by natural processes or human intervention will not occur

Table 8-4: Scale of Impact Rating

Scale (S) of Impact	Rating	Description
None	0	Describes the extent of the impact
Site	1	
Local	2	
Regional	3	
National	4	
International	5	

Significance Level of the Risk – Determined through a synthesis of the probability of occurrence and consequence of occurrence. The **Significance Points (SP)** is defined as follows:

SP = (M + D + S) x P

Where:	SP>60:	High	Environmental Significance
	30<SP<60:	Moderate	Environmental Significance
	SP<30:	Low	Environmental Significance

The HIA will provide a basis to identify the risks and make informed decisions on the way forward in order to ensure that these risks do not result in unacceptable social, environmental or reputational risks.

8.2 IMPACT ASSESSMENT

The risk level was determined based on an understanding of the nature of the impact, potential mitigatory measures that can be implemented and changes in risk profile as a result of implementation of these mitigatory measures. These impacts were assessed using the Environmental Significance table during operational phase of the development (**Table 8-5**).

Table 8-5: Impact Assessment

Phase	Facility/Activity/Source	Description	Required Action	Summarised Exposure Pathways	Environmental Risk Assessment (Post Action)				
					Probability	Magnitude	Duration	Scale	Significant Points
Construction	— Removal of vegetation	— The removal vegetation and excavation can result in an increase in erosion down the Groot-Bossie Spruit	— Construction should commence during the dry season — Progressive rehabilitation of disturbed land should be carried out to minimize the amount of time that bare soils are exposed to the erosive effects of rain and subsequent runoff	Surface water resource	4	2	1	1	16
	— Diversion of the stream	— During construction, the watercourse will be diverted around the activity	— Construction should commence during the dry season	Surface water resource	4	4	1	1	24
	— Movement of heavy machinery	— The spillage of oils, fuel and chemicals from heavy machinery and trucks can result in hydrocarbon pollution of the surrounding water resources	— Drip trays should be placed under all standing machinery — Oil recovered from any vehicle or machinery on site should be collected, stored and disposed of by accredited vendors for recycling	Surface water resource	3	4	1	1	18
	— Excavation	— Excavation will expose soil to environmental factors which may result in an increase in erosion — Exposed soils may contain contaminants which may seep into a water resource	— Construction should commence during the dry season — Storage of excavated soils should be done on a lined and bunded area.	Surface water resource	4	4	1	1	24
	— Movement of people	— Workers will be on site during construction which may lead to an increase in pollution such as litter and waste	— Waste bins and toilets must be provided to workers	Surface water resource	3	4	1	1	18
Operation	— Operation of the wetland rehabilitation structures	— The objective of the wetland rehabilitation structures is to reduce the velocity within the Groot-Bossie Spruit to assist with the re-instatement of the wetlands and reduce the erosion occurring.	— Structures must be adequately designed to allow for the objectives to be achieved whilst allowing maintenance flow of the Groot-Bossie Spruit to pass through	Surface water resource	3	2	2	1	15

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