

MEMORANDUM NO. 29				
SUBJECT	:	CONSOLIDATED RECORD OF AVAILABLE GEOTECHNICAL INFORMATION		
REVISION	:	B		
TO	:	S Kelefetswe (TCTA)		
FROM	:	P van Heerden / R Tluczek		
DATE	:	03 March 2022		

DOCUMENT CONTROL		
Rev No	Date of Issue	Description
A	07 Oct 21	Issued for comment (ref. letter 00/01/01/L586).
B	02 Mar 22	Geotechnical Report revision numbers updated.

1 OBJECTIVE OF THIS MEMORANDUM

The objective of this Memorandum is to outline what geotechnical information is available from the three (3) previous investigations, namely:

- The investigations carried out by the Mokolo Crocodile Consultants in 2012 (herein after referred to as the 2012 reports);
- The investigations carried out by SMEC in 2019 as part of the final EIA report (herein after referred to as the 2019 reports); and
- The investigations carried out by the GBN Joint Venture in 2019 and 2020 (herein after referred to as the 2020 reports).

2 GEOTECHNICAL INVESTIGATIONS UNDERTAKEN IN 2012

Data and reporting on previous geotechnical investigations carried out by Mokolo Crocodile Consultants in 2012 along the pipeline routes and associated structures for MCWAP-2 are included in the Status Report of 2017. The overall pipeline route and associated structures were divided into four stages and separate geotechnical reports were prepared for each of the stages as defined below:

- Stage 1: Tarantaalpan to Operational Reservoir (55,5 km);
- Stage 2: Vlieëpoort to Tarantaalpan (Transnet rail line) (42 km);
- Stage 3: Operational Reservoir to Steenbokpan (27.8 km); and
- Stage 4: Steenbokpan to Matimba Power Station (37,9 km).

The geotechnical reports for each of the above stages consist of the following three volumes:

- Volume 1: Geotechnical Data Report;
- Volume 2: Annexures supporting Volume 1; and
- Volume 3: Geotechnical Interpretive Report.

A full listing of the above reports is given in **Annexure A**.

Details of the geotechnical investigations carried out in each of the above-mentioned four stages are considered separately in **Section 3** below.

3 DETAILS OF THE 2012 GEOTECHNICAL INVESTIGATIONS – THE 2012 REPORTS

3.1 Stage 1 Investigations – Tarantaalpan to Operational Reservoir

The Stage 1 pipeline alignment is indicated in **Annexure A, Figure 1**. The extent of geotechnical investigations that were undertaken included test pits, boreholes, identification of potential spoil sites and borrow pit investigations. The locations of these investigations are indicated in **Annexure A, Figure 1**.

3.2 Centreline Investigations – Test Pits

Test pits were dug at 200 m nominal intervals along the complete Stage 1. The pipeline servitude is located next to the railway line reserve (western side) along the complete Stage 1.

From CH 0 m to CH 21 000 m the test pits were dug within the rail reserve on the western side of the railway line approximately 15 m to 25 m away from the pipeline centreline. Refer to **Detail Layout 1 in Figure 1** that reflects the typical test pit positions along this section.

From CH 21 000 m to CH 55 300 m the test pits were dug within the rail reserve on the eastern side of the rail way line approximately 50 m to 55 m away from the pipeline centreline. Refer to **Detail Layout 2 in Figure 1** that reflects the typical test pit positions along this section.

Some laboratory test results were still outstanding at the time when the geotechnical reports were issued for discussion.

3.2.1 Centreline Investigations - Boreholes

Boreholes were drilled at the Road R510, railway overpass, Road D2701 and Matlabas River crossings along the pipeline route. Boreholes were located within the rail reserve on the western side of the railway line approximately 15 m to 20 m away from the pipeline centreline. Refer to **Detail Layout 1** and **Detail Layout 3 in Figure 1** that reflect the typical borehole positions along Stage 1.

3.2.2 Borrow Pits

Eight (8) borrow pits were investigated. The location of the borrow pits and the available quantity and quality of borrow material are summarized in **Table 1** below.

Table 1: Summary of borrow pit locations and borrow material quantity and quality

BP No.	CH(m)	Estimated volume (m ³)		Suitable as pipe bedding ¹	
		Pipe Bedding	Road Gravel	Bedding	Selected fill blanket
28	700	-	-	No	No
33	10 300	200 000	>20 000	Yes	Yes
38	23 000	-	-	No	No
39	35 000	100 000	>10 000	No	Yes
41	15 400	>100 000	>25 000	Yes	Yes
42	40 500	>100 000	-	Yes	Yes
43	53 200	100 000	>5 000	Yes	Yes
44	47 300	>100 000	>5 000	Yes	Yes

¹ Suitability of the material as pipe bedding was based on the specification at the time of the investigation.

3.2.3 Potential Spoil Sites

Nine (9) potential spoil sites (D to L) were identified. Three of these sites (F, G and K) are located on the eastern side of the railway line and will require access across the railway line.

3.3 Stage 2 Investigations – Vlieëpoort to Tarantaalpan (Transnet railway line)

The Stage 2 pipeline alignment is indicated in **Annexure A, Figure 2**. The extent of geotechnical investigations that were undertaken included test pits, boreholes, identification of potential spoil sites and borrow pit investigations. The locations of these investigations are indicated in **Annexure A, Figure 2**. EA appellant landowner properties and Arengo mining right application properties at the time of the investigations are also indicated.

3.3.1 Centreline Investigations – Test Pits

Test pits were dug at 200 m nominal intervals from CH 0 m to CH 8 500 m and from CH 16 500 m to CH 20 000 m. For the remainder of Stage 2 approximately every third test pit was excluded except between CH 20 000 m and CH 22 000 m where no test pits were excavated.

From CH 0 m to CH 5 500 m (low lift rising main) approximately 40% of the test pits are located some distance away from the pipeline alignment. As an example refer to **Detail Layout 1 in Figure 2** that reflect two test pit positions respectively 80 m and 100 m away from the pipeline alignment.

Some laboratory test results were still outstanding at the time when the geotechnical reports were issued for discussion.

3.3.2 Centreline Investigations - Boreholes

Two boreholes were drilled at both the Road D1649 Dwaalboom (CH 8 000) and Road R510 road crossings. The boreholes at the Road R510 crossing are located approximately 130 m away from the pipeline road crossing centreline. Refer to **Detail Layout 2 in Figure 2** that reflect the positions of the boreholes (BH47 and BH48) for the Road R510 crossing.

3.3.3 Borrow Pits

Four (4) borrow pits were investigated. The location of the borrow pits and the available quantity and quality of borrow material are summarized in Table 2 below.

Table 2: Summary of borrow pit locations and borrow material quantity and quality

BP No.	CH(m)	Estimated volume (m ³)		Suitable as pipe bedding ¹	
		Pipe Bedding	Road Gravel	Bedding	Selected fill blanket
SS1	0	8 000	0	Yes	Yes
BP25	16 000	>250 000	>30 000	Marginal	Marginal
BP30	27 000	>150 000	>20 000	Marginal	Yes
BP35	31 500	65 000	>20 000	No	No

¹ Suitability of the material as pipe bedding was based on the specification at the time of the investigation.

It was noted that the coordinates of BP25 were incorrectly tagged as BP28 in the EIA Report.

3.3.4 Potential Spoil Sites

Three (3) potential spoil sites (A, B and C) were identified.

3.3.5 Dolomitic Stability Investigation

Five (5) boreholes were drilled along the low lift pipeline alignment to investigate the risk of subsidence that may be associated with dolomitic rocks that occur along this section of the route. Two boreholes were drilled along the pipeline alignment between CH 36 000 m and CH 38 000 m to investigate whether dolomites are present in the area.

Apart from drilling the above boreholes, the dolomitic stability investigation along the pipeline route was not concluded.

3.4 Stage 3 Investigations – Operational Reservoir to Steenbokpan

The Stage 3 pipeline alignment is indicated in **Annexure A, Figure 3**. The extent of geotechnical investigations that were undertaken included test pits, identification of potential spoil sites and borrow pit investigations. No boreholes were drilled as part of the Stage 3 investigation. The locations where investigations were carried out is indicated in **Annexure A, Figure 3**.

3.4.1 Centreline Investigations – Test Pits

Test pits were dug along the pipeline alignment adopted previously and are remote from the current layout of the MCWAP-2 components. The results of these test pits are therefore not considered relevant.

3.4.2 Centreline Investigations - Boreholes

No boreholes were drilled as part of the Stage 3 investigation.

3.4.3 Borrow Pits

Five (5) borrow pits were investigated. The location of the borrow pits and the available quantity and quality of borrow material are summarized in Table 3 below.

Table 3: Summary of borrow pit locations and borrow material quantity and quality

BP No.	CH(m)	Estimated volume (m ³)		Suitable as pipe bedding ¹	
		Pipe Bedding	Road Gravel	Bedding	Selected fill blanket
48		100 000	45 000	Yes	Yes
49		100 000	5 000	Yes	Yes
50		100 000	8 000	Yes	Yes
52		100 000	12 000	Yes	Yes
53 ²		50 000	18 000	Yes	Yes
¹ Suitability of the material as pipe bedding was based on the specification at the time of the investigation.					
² Only partly investigated (not included in EIA report)					

The quality of material from all five borrow pits is suitable for use as pipe bedding and selected fill blanket. All five borrow pits are located remotely from the pipeline alignment.

3.4.4 Potential Spoil Sites

Four (4) potential spoil sites (M, N, O and P) were identified.

3.5 Stage 4 Investigations – Steenbokpan to Matimba

The Stage 4 pipeline alignment is indicated in **Annexure A, Figure 4**. The extent of geotechnical investigations that were undertaken included test pits, boreholes, identification of potential spoil sites and borrow pit investigations. The locations of these investigations are indicated in **Annexure A, Figure 4**.

3.5.1 Centreline Investigations – Test Pits

Test pits dug between CH 0 m and CH 19 500 m along the Stage 4 pipeline alignment are not considered relevant to the current MCWAP-2 pipeline alignment. For the remainder of Stage 4, test pits were dug at 200 m nominal intervals (CH 19 500 m to CH 37 800 m).

The MCWAP-2 pipeline alignment between the Operational Reservoir and the Steenbokpan-Matimba tee-point plus 2 000 m from the Steenbokpan-Matimba tee-point towards Matimba was not investigated. This section of the MCWAP-2 pipeline alignment, approximately 20 400 m long, formed part of the recommended additional centreline investigations to be undertaken during the 2020 investigations.

Some laboratory test results were still outstanding at the time when the geotechnical reports were issued for discussion.

3.5.2 Boreholes

Boreholes were drilled at the Road D1675 crossing, railway crossing and conveyor crossing. All three of these crossings are located between the Medupi and Matimba Power Stations as reflected in Figure 4.

3.5.3 Borrow Pits

Eight (8) borrow pits were investigated. The location of the borrow pits and the available quantity and quality of borrow material are summarized in Table 4 below.

Table 4: Summary of borrow pit locations and borrow material quantity and quality

BP No.	CH(m)	Estimated volume (m ³)		Suitable as pipe bedding ¹	
		Pipe Bedding	Road Gravel	Bedding	Selected fill blanket
11	36 000	45 000	5 000	Marginal	Yes
12	29 500	>100 000	10 000	Marginal	Yes
13	22 000	80 000	12 000	Yes	Yes
14	25 200	>100 000	18 000	Marginal	Yes
15	0	100 000	15 000	Yes	Yes
46	7 500	90 000	0	Yes	Yes
51	32 200	90 000	12 000	Yes	Yes
59	14 000	100 000	10 000	Yes	Yes

¹ Suitability of the material as pipe bedding was based on the specification at the time of the investigation.

3.5.4 Potential Spoil Sites

Three (3) potential spoil sites (M, N and P) were identified. It should be noted that the same spoil site identification symbols were also used for Stage 3 spoil sites.

3.6 Structures

The project structures were defined by the following four sites:

- Abstraction Weir and Low-Lift Pumping Station;
- High-Lift Pumping Station, Balancing Reservoir and Sedimentation Works;
- Break Pressure Reservoir; and
- Operational Reservoir.

3.6.1 Abstraction Weir and Low-Lift Pumping Station

A geophysical survey was undertaken at the Abstraction Weir and Low-Lift Pumping Station site. The results of the geophysical surveys, supplemented by the findings of a Radon Emanation Survey, identified the position of a presumed fault. The geophysical survey was used to define the requirement for borehole drilling.

The following boreholes were drilled around the approximate position of the Abstraction Weir and Low-Lift Pumping Station:

- 3 Monitoring Boreholes (percussion);
- 6 Percussion boreholes; and
- 18 Rotary boreholes.

The results from these boreholes indicated very hard rock (banded ironstone) under the proposed weir position at a depth varying between 25 m and 40 m below ground, overlain by alluvium. At the Low-Lift Pumping Station, hard rock (banded ironstone) was encountered at approximately 30 m deep, overlain by alluvium and colluvium.

3.6.2 High-Lift Pumping Station, Balancing Reservoir and Sedimentation Works

As part of the initial investigation, the following geotechnical investigations were carried out at the High-Lift Pumping Station, Balancing Reservoir and Sedimentation Works:

- Geophysical investigation over a portion of the site;
- 15 test pits;
- 11 Boreholes;
- CBR tests; and
- Sieve and hydrometer analysis.

These investigations identified medium hard rock at depths varying between 1.5 m and 6 m. Discontinuity between the rock levels in a few boreholes was observed.

3.6.3 Break Pressure Reservoir

As part of the initial investigation, the following geotechnical investigations were carried out at the Break Pressure Reservoir:

- 9 test pits;
- 5 Boreholes;
- CBR tests; and
- Sieve and hydrometer analysis.

These investigations identified soft to medium hard rock (sandstone) at about 2.8 m deep.

3.6.4 Operational Reservoir

The initial investigation included 3 boreholes and 3 test pits adjacent to the site (along the pipe route). These indicated soft rock (sandstone) at approximately 2.6 m deep.

4 DETAILS OF THE 2019 GEOTECHNICAL INVESTIGATIONS – THE 2019 REPORTS

Additional geotechnical information was included in the Final EIA report. This information related to the investigation of alternative borrow pits. Six (6) borrow areas were investigated, namely borrow areas 14, 30, 35, 38, 39 and 50.

Due to the limited timeframe to assess the sites, only a prospecting exercise was undertaken.

A listing of the above report is given in **Annexure B**.

5 DETAILS OF THE 2020 GEOTECHNICAL INVESTIGATIONS – THE 2020 REPORTS

The objective of the 2020 geotechnical investigation was to:

- Review geotechnical investigations that had been completed previously (as detailed above); and
- Carry out a Gap Analysis and define the extent of supplementary investigations as detailed in Technical Memorandum no. 2A-M-111E-03 Additional Geotechnical Investigations (Rev A).

Three investigation reports were produced:

- A Geotechnical Factual Report;
- A Dolomitic Stability Assessment; and
- A Geotechnical Interpretive Report.

Each of the above is dealt with in detail below.

5.1 Geotechnical Factual Report

This report presents all the findings from the 2020 geotechnical investigation, which included:

- Test pitting along the pipeline, at borrow areas; road, rail and conveyor crossings;
- Dynamic Cone Penetrometer (DCP) tests;
- Geophysical surveys, including Seismic, electric resistivity and gravity;
- Borehole drilling, including rotary core and percussion;
- Cone Penetrometer testing (CPTu) with porewater pressure measurements; and
- Laboratory testing.

5.2 Dolomitic Stability Report

The scope of work for the 2020 study included percussion drilling, geophysical gravity surveys (processed to residual values), limited test pitting with limited laboratory testing. The scope of work included:

- Twenty-three (23) test pits;
- Three gravity surveys including one over the “bat cave”; and
- Thirty-seven (37) rotary percussion boreholes.

Two areas of the proposed alignment are underlain by dolomite rock and are referred to as follows:

- Site A – low lift rising main: This section stretches from the abstraction weir position for approximately 4km and terminates just before the balancing reservoir structure; and
- Site B – high lift rising main and gravity main: This section is located within the break pressure tank area covering approximately 4.5 km of the pipeline.

The report presents the findings of the dolomite stability investigation and should be read in conjunction with the factual report.

The dolomite area designation for the majority of both Sites A and B is characterised by a D3 designation. Dolomite with a designation D4 has been identified over a 475m section on the southern end of the low lift rising main. It is understood from the geohydrological report that ground water abstraction at Site A may be exceeding recharge – which would exacerbate the likelihood of sinkhole formation.

5.3 Geotechnical Interpretive Report

a) Centreline Investigations – Test Pits

A total of 152 test pits were excavated at intervals of approximately 200 m along the pipeline route. These test pits were either conducted in areas where the alignment had been altered or where access had previously not been granted.

b) Dynamic Cone Penetrometer (DCP)

The DCP testing was carried out at each test pit to a depth of 2 m. Initially a DCP was carried out from 0 m to 1 m from ground level. After the trial pit was excavated to 1 m depth, the second DCP was carried out from 1 m to 2 m depth.

c) Dolomitic Study

The investigation included percussion drilling and a gravity geophysics surveys. Percussion drilling included a total of thirty-seven (37) percussion boreholes; twenty (20) along the low lift rising main pipeline alignment and seventeen (17) along a section of pipeline in the vicinity of the break pressure tank. The gravity survey was carried out along 4.12 km of the low lift rising main pipeline from the weir to the balancing reservoir, along a 2.0 km section in the vicinity of the Break Pressure Tank and in the vicinity of the “bat cave”. A separate dolomite report was submitted.

d) Laboratory Testing

Representative samples from test pits were retrieved for laboratory testing which included:

- Grading;
- Atterberg Limits;
- Moisture content;
- Mod AASHTO & CBR;
- Compactability factor;
- pH;
- Electrical conductivity (EC);
- Chemistry test (total sulphate, acid soluble sulphate, water soluble sulphate and chloride), and
- Fertility tests.

5.3.2 Low Lift Rising Main

The field investigation along the low lift pipeline section included the following components:

- A total of 18 Test pits;
- A total of 36 DCP tests carried out 0-1 m and from 1-2 m at each test pit position;
- A gravity survey for approximately 4 km;
- Bat cave gravity survey alongside the pipeline route; and
- A total of 21 percussion boreholes.

Both the approved pipeline alignment and an alternative alignment were investigated.

5.3.3 High Lift Rising Main

Test pits had been excavated along the bulk of the high lift rising main during the 2012 investigations. However, there remained a 3 km section that still had to be investigated. A total of nineteen (19) test pits were planned along the high lift rising main, however due to access constraints only fourteen (14) test pits were excavated. The investigation along the 3 km section of pipeline between the balancing dam and the break pressure tank included:

- A total of 14 Test pits; and
- A total of 28 DCP tests carried out 0-1 m and from 1-2 m at each test pit position.

5.3.4 Gravity Main Pipeline

A new 21 km section of pipeline, north of the operational reservoir was investigated. The field investigation along this section of gravity main pipeline included the following components:

- A total of 99 Test pits; and
- A total of 198 DCP tests carried out 0-1 m and from 1-2 m at each test pit position.

5.3.5 New Northern Alignment

A 4 km alternative pipeline alignment was investigated between Medupi and Matimba Power Stations. The field investigation along this section of the pipeline included the following components:

- A total of 20 Test pits; and
- A total of 32 DCP tests carried out from 0-1 m and from 1-2 m at each test pit position. Some DCP tests from 1.0 to 2.0 m were not carried out due to refusal in the first 1.0 m.

5.3.6 Geotechnical Investigation for Crossings

The proposed pipeline alignment will have a total of ten (10) crossings. These occur at river, road, rail and conveyer crossings. Some of the crossings were investigated during the 2012 investigations. The location of the crossings along the proposed alignment occur at the following locations:

- One (1) River Crossing:
 - a) Matlabas River Crossing.
- Two (2) Conveyer Belt Crossings:
 - a) Conveyer Belt at Naauw Ontkoman; and
 - b) Conveyer Belt at Hangklip.
- One (1) Rail Crossings:
 - a) Rail Crossing at Hangklip.
- Four (4) Road Crossings:
 - a) Road Crossing Groenrivier;
 - b) Road Crossing Hookraal;
 - c) R510 Road Crossing; and
 - d) D1649 Road Crossing.
- Two (2) Road over Rail Crossings:

- a) Road over Rail Crossing Haarlem; and
- b) Road over rail Ruigtevley.

The field investigation at each crossing position included excavating two test pits on either side of the crossings using either a TLB or 30 ton excavator to refusal of the machine.

5.4 Geotechnical Evaluation Structures

The proposed pipeline will include structures that will be located along the route which will consist of the following:

- Vlieëpoort abstraction weir, abstraction works and low lift pump station;
- Balancing reservoir, high lift pump station and sedimentation works; and
- Break pressure reservoir, break pressure tank.

5.4.1 Weir, Abstraction Works and Low Lift Pump Station

The weir is located at chainage 0 km at the southern end of the pipeline marking the beginning of the proposed low lift pipeline. The abstraction weir is characterised by three sections including the weir structure, the abstraction works as well as the low lift pump station. The following investigations were carried out within this area:

- Five (5) boreholes, including four (4) rotary core boreholes and one (1) percussion borehole,
- Twelve (12) CPTu tests;
- Four (4) test pits, two on each bank of the river;
- Four (4) DCP tests, two on each bank of the river; and
- Three (3) electrical resistivity lines amounting to a total of 780 m.



5.4.2 Balancing Reservoir

The reservoir area is characterised by three modules which include the balancing reservoir, high lift pump station and sedimentation works. The following investigations were carried out within this area:

- Four (4) rotary core boreholes in the northern section; and
- Six (6) seismic lines amounting to a total of 5400 m.

5.4.3 Borrow Pits

After carrying out the field reconnaissance, twelve (12) potential borrow pits were identified; i.e. borrow pit A to L. Of these; two (2) were cancelled due to environmental constraints (A and C), and one (1) was cancelled due to access constraints (K).

Reviewed	
	
R Tluczek	P van Heerden
Engineering	Chief Design Engineer

ANNEXURE A

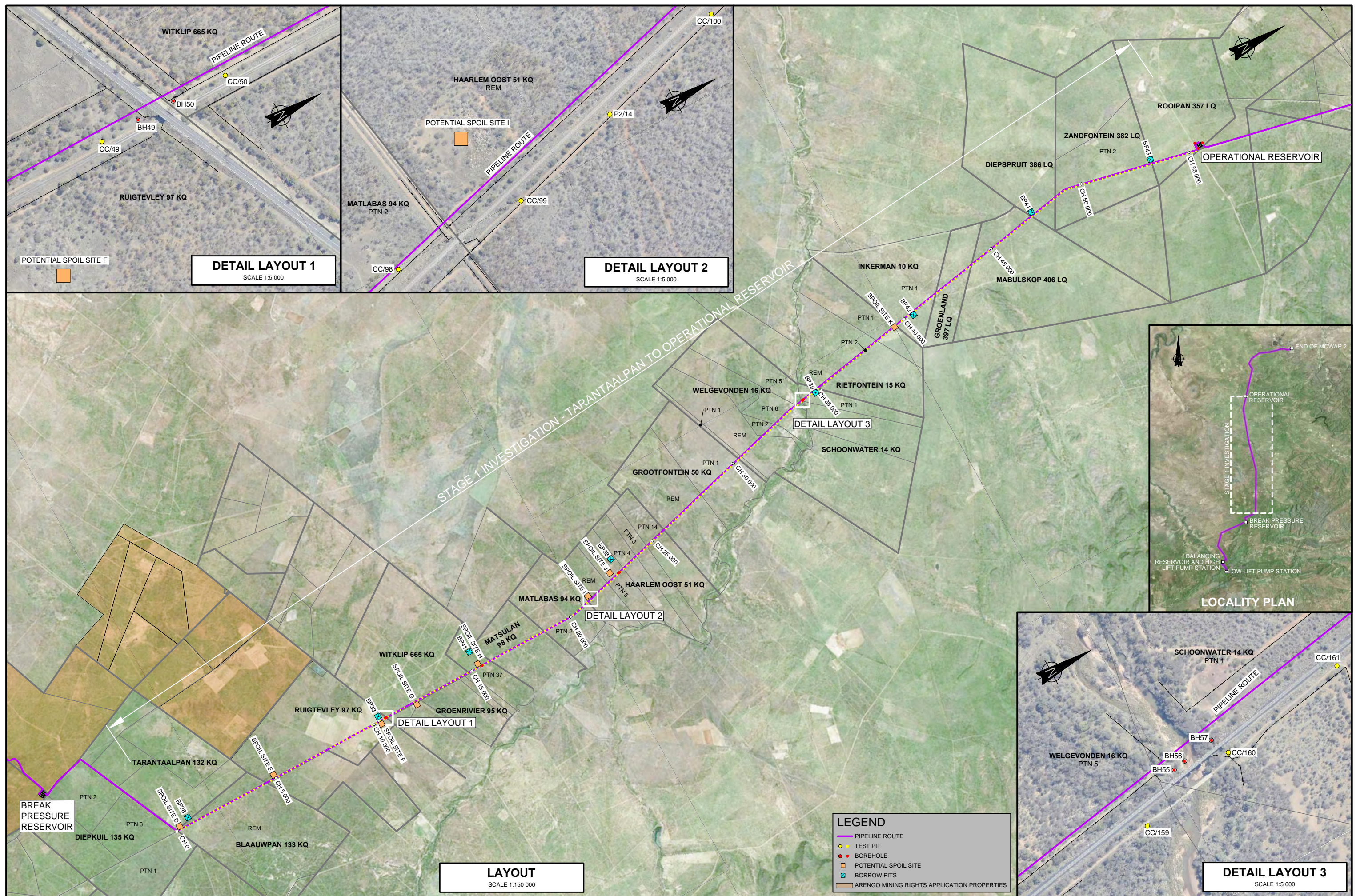
The following figures are attached herewith:

Figure 1: Extent of previous geotechnical work: Stage 1 Investigation – Tarantaalpan to Operational Reservoir

Figure 2: Extent of previous geotechnical work: Stage 2 Investigation – Vlieëpoort weir to Tarantaalpan

Figure 3: Extent of previous geotechnical work: Stage 3 Investigation – Operational reservoir to Steenbokpan

Figure 4: Extent of previous geotechnical work: Stage 4 Investigation – Steenbokpan to Matimba



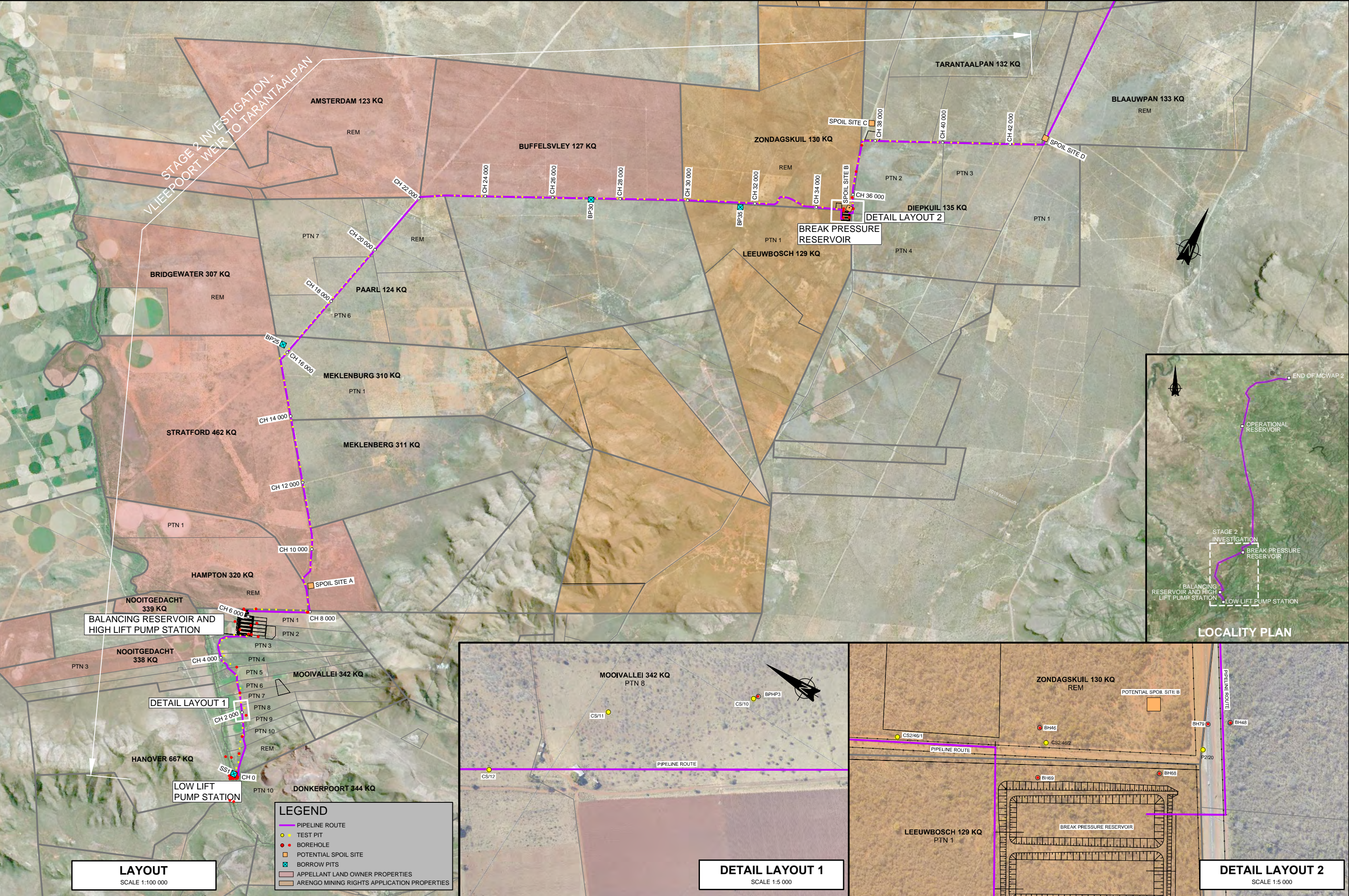


FIGURE 2: EXTENT OF PREVIOUS GEOTECHNICAL WORK - STAGE 2 INVESTIGATION - VLIEPOORT WEIR TO TARANTAALPAN

Revision A

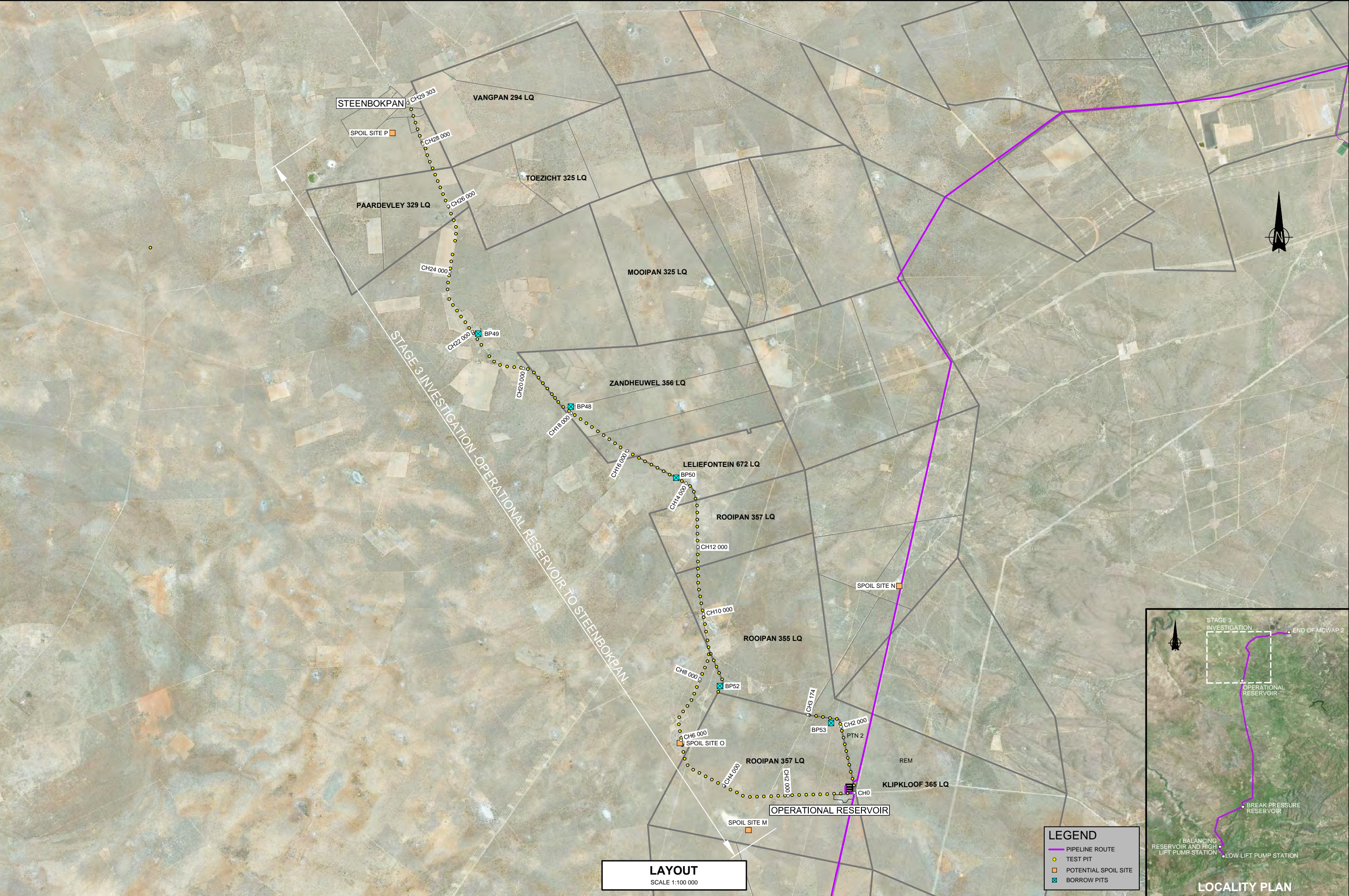


FIGURE 3: EXTENT OF PREVIOUS GEOTECHNICAL WORK - STAGE 3 INVESTIGATION - OPERATIONAL RESERVOIR TO STEENBOKPAN

Revision A



FIGURE 4: EXTENT OF PREVIOUS GEOTECHNICAL WORK - STAGE 4 INVESTIGATION - STEENBOKPAN TO MATIMBA

Revision A

ANNEXURE B

LIST OF 2012 GEOTECHNICAL INVESTIGATIONS – PHASE 2

LIST OF 2012 GEOTECHNICAL INVESTIGATIONS – PHASE 2

Report Description	Status
Stage 1 2A-R-111E-43 Geotech Report 2-1 Vol 1 Rev A (TCTA) 2A-R-111E-43 Phase 2 Stage 1 Vol 2-1 Annexure A Rev A (TCTA) 2A-R-111E-43 Phase 2 Stage 1 Vol 2-2 Annexure B & C Rev A (TCTA) 2A-R-111E-43 Phase 2 Stage 1 Vol 2-3 Annexure D & E Rev A (TCTA) 2A-R-111E-43 Phase 2 Stage 1 Vol 3 Interp Rep Rev A (TCTA)	All 1 st Issue for discussion
Stage 2 2A-R-111E-53 Geotech Report 2-2 Vol 1 Rev A (TCTA) 2A-R-111E-53 Phase 2 Stage 2 Vol 2-1 Annexure A Rev A (TCTA) 2A-R-111E-53 Phase 2 Stage 2 Vol 2-2 Annexure B Rev A (TCTA) 2A-R-111E-53 Phase 2 Stage 2 Vol 2-3 Annexure C Rev A (TCTA) 2A-R-111E-53 Phase 2 Stage 2 Vol 2-4 Annexure D & E Rev A (TCTA) 2A-R-111E-53 Phase 2 Stage 2 Vol 3 Interp Rep Rev A (TCTA)	All 1 st Issue for discussion
Stage 3 2A-R-111E-54 Geotech Report 2-3 Vol 1 Rev A (TCTA) 2A-R-111E-54 Phase 2 Stage 3 Vol 2-1 Annexure A Rev A (TCTA) 2A-R-111E-54 Phase 2 Stage 3 Vol 2-2 Annexure B Rev A (TCTA) 2A-R-111E-54 Phase 2 Stage 3 Vol 2-3 Annexures C & D Rev A (TCTA) 2A-R-111E-54 Phase 2 Stage 3 Vol 3 Rev A (TCTA)	All 1 st Issue for discussion
Stage 4 2A-R-111E-55 Geotech Report 2-4 Vol 1 Rev A (TCTA) 2A-R-111E-55 Phase 2 Stage 4 Vol 2-1 Annexure A to C Rev A (TCTA) 2A-R-111E-55 Phase 2 Stage 4 Vol 2-2 Annexure D Rev A (TCTA) 2A-R-111E-55 Phase 2 Stage 4 Vol 2-3 Annexure E & F Rev A (TCTA) 2A-R-111E-55 Phase 2 Stage 4 Vol 2-4 Annexure G & H Rev A (TCTA) 2A-R-111E-55 Phase 2 Stage 4 Vol 3 Interp Rev A (TCTA)	All 1 st Issue for discussion

ANNEXURE C

LIST OF 2020 GEOTECHNICAL INVESTIGATIONS – PHASE 2

LIST OF 2020 GEOTECHNICAL INVESTIGATIONS – PHASE 2

Report Description	Status
Geotechnical Factual Report 2A-R-111E-15 Geotechnical Investigation Factual Report (Rev B)	Final
Dolomite Stability Assessment 2A-R-111E-22 Dolomite Stability Assessment Rev B Annexure A – Geohydrology Annexure B – Drawings <ol style="list-style-type: none"> 1) Drawing 2A-G3-050 LLRM Approved Alignment 2) Drawing 2A-G3-052 Break Pressure Reservoir & pipelines Annexure C - Crossings Testpit Profiles Annexure C - Low Lift Pipeline Testpit Profiles Annexure D1 – Gravity – Bat Cave Annexure D2 – Gravity Annexure D3 – Gravity Annexure E - Percussion Boreholes	Final
Geotechnical Interpretive Report 2A-R-111E-29 Geotechnical Interpretive Report (Rev B)	Final

ANNEXURE D

2019 GEOTECHNICAL INFORMATION

2019 GEOTECHNICAL INFORMATION

Report Description	Status
Final EIA Report (May 2019) Appendix F2 Geotechnical Investigations of Alternative Borrow Pits Memorandum 1: Borrow Pit 14 Memorandum 1: Borrow Pit 30 Memorandum 1: Borrow Pit 35 Memorandum 1: Borrow Pit 38 Memorandum 1: Borrow Pit 39 Memorandum 1: Borrow Pit 50	Memorandum from SMEC to Nema Consulting