

**NAMAQUALAND REGIONAL WATER SUPPLY SCHEME  
(NRWSS)**

High priority infrastructure upgrade of:

**THE TWO WATER SUPPLY PIPELINES & ASSOCIATED INFRASTRUCTURE  
FROM OKIEP TO CONCORDIA AND CAROLUSBERG**

**DRAFT BASIS ASSESSMENT REPORT**



**06 August 2016**

## Table of Contents

Section A: Activity information.....	3
1) ACTIVITY DESCRIPTION.....	3
a) Describe the project associated with the listed activities applied for .....	3
b) Provide a detailed description of the listed activities associated with the project as applied for 6	
2) FEASIBLE AND REASONABLE ALTERNATIVES.....	7
a) Site alternatives (Refer to linear activities underneath) .....	7
b) Lay-out alternatives.....	13
c) Technology alternatives .....	13
d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives).....	13
e) No-go alternative .....	13
3) Physical size of the activity.....	14
a) Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):.....	14
b) Indicate the size of the alternative sites or servitudes (within which the above footprints will occur): .....	14
4) Site Access.....	14
5) LOCALITY MAP.....	15
6) LAYOUT/ROUTE PLAN .....	15
7) Sensitivity map .....	15
8) Site PHOTOGRAPHS.....	16
9) FACILITY ILLUSTRATION.....	16
10) ACTIVITY MOTIVATION.....	16
11) Applicable legislation, policies and/or guidelines .....	20
12) Waste, effluent, emission and noise management.....	20
a) Solid waste management.....	20
b) Liquid effluent .....	21
c) Emissions into the atmosphere.....	22
d) Waste permit.....	22
e) Generation of noise.....	22
13) WATER USE.....	22
14) ENERGY EFFICIENCY.....	23
Section B: SITE/area/PROPERTY description.....	24

1) GRADIENT OF THE SITE.....	25
2) location in landscape.....	26
3) Groundwater, Soil and Geological stability of the site.....	26
4) Groundcover.....	28
5) SURFACE WATER .....	29
6) Land use character of surrounding area .....	29
7) Cultural/Historical Features .....	31
8) SOCIO-ECONOMIC CHARACTER .....	33
a) Local Municipality.....	33
b) Socio-economic value of the activity.....	34
9) Biodiversity.....	35
a) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category).....	35
b) Indicate and describe the habitat condition on site .....	35
c) Complete the table to indicate: .....	36
d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats).....	36
Section C: public participation .....	39
1) ADVERTISEMENT and Notice.....	39
2) Determination of appropriate measures .....	39
3) Issues raised by interested and affected parties.....	39
4) Comments and response report .....	40
5) AUTHORITY PARTICIPATION.....	40
6) CONSULTATION WITH OTHER STAKEHOLDERS.....	40
Section D: Impact Assessment .....	41
1) Impacts that may result from the planning and design, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE phaseS AS WELL AS PROPOSED MANAGEMENT OF identified IMPACTS AND PROPOSED mitigation measures .....	41
2) Environmental impact statement .....	45
SECTION E. Recommendation of practitioner.....	48
Section F: Appendixes .....	51



**the denc**

Department:  
Environment & Nature Conservation  
NORTHERN CAPE PROVINCE  
REPUBLIC OF SOUTH AFRICA

Private Bag X6102, Kimberley, 8300, Metlife Towers, T-Floor, Tel: 053 807 7300, Fax: 053 807 7328

## NAMAQUALAND REGIONAL WATER SUPPLY SCHEME

HIGH PRIORITY INFRASTRUCTURE UPGRADE OF:

THE TWO WATER SUPPLY PIPELINES & ASSOCIATED INFRASTRUCTURE  
FROM OKIEP TO CONCORDIA AND CAROLUSBERG

Project applicant:	Sedibeng Water Board		
Business reg. no. /ID. no.:	Sedibeng Water		
Contact person:	Mr. Ian Hasenjager		
Postal address:	P. Bag X 05, Bothaville, 9660		
Telephone:	056 – 515 0282	Cell:	
E-mail:	<a href="mailto:ihasenjager@sedibengwater.co.za">ihasenjager@sedibengwater.co.za</a>	Fax:	056 – 515 0378

Prepared by:

Environmental Assessment Practitioner/Firm:	ENVIROAFRICA CC		
Business reg. no. /ID. no.:	CK 97 46008/23		
Contact person:	Peet Botes		
Postal address:	P. O. Box 5367, HELDERBERG, 7135 (Somerset West)		
Telephone:	021 – 851 1616	Cell:	
E-mail:	<a href="mailto:peet@enviroafrica.co.za">peet@enviroafrica.co.za</a>	Fax:	086 – 510 8904

	(For official use only)
<b>File Reference Number:</b>	
<b>Application Number:</b>	
<b>Date Received:</b>	

**Basic Assessment Report in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.**

**Kindly note that:**

- This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2014 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
- This report format is current as of **08 December 2014**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
- The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
- Where applicable **tick** the boxes that are applicable in the report.
- An incomplete report may be returned to the applicant for revision.
- The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.
- This report must be handed in at offices of the relevant competent authority as determined by each authority.
- No faxed or e-mailed reports will be accepted.
- The signature of the EAP on the report must be an original signature.
- The report must be compiled by an independent environmental assessment practitioner.
- Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
- A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
- Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.

## SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?	<b>YES</b>	NO
If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.		

### 1) ACTIVITY DESCRIPTION

a) Describe the project associated with the listed activities applied for

#### **HIGH PRIORITY INFRASTRUCTURE UPGRADE**

Both the towns of Concordia and Carolusberg are supplied with freshwater from the Namaqualand Regional Water Supply Scheme (NRWSS), managed by Sedibeng Water. The NRWSS entails pumping water from the Orange River Raw water Pumpstation (through a number of treatment plants) to first Eenriet Reservoir ( $\pm 14$ km north of Steinkopf) and then to the Okiep Reservoir (at Okiep) from where it is distributed to a number of towns, including Springbok, NababEEP, Concordia and Carolusberg.

The current pipelines have been in use well over its design period and needs to be replaced as a matter of urgency. Both the Concordia and Carolusberg pipelines are in poor shape of repair and do not have the long term capacity to service these towns. As part of the larger NRWSS upgrade (currently replacing the main supply pipeline Orange River Raw water Pumpstation to Okiep Reservoir and NababEEP) the Sedibeng Water Board considers the upgrade of the Concordia and Carolusberg bulk water supply lines as the next highest priority infrastructure upgrade.

Figure 1: Showing the Concordia pipeline route (following the existing pipeline route closely)



### **The proposed Concordia pipeline upgrade (Figure 1 above)**

The Concordia pipeline upgrade entails the **replacement** of the existing pipeline with a new and larger pipeline (**within the original footprint**). The new pipeline will be:

- Approximately 8.2 km in length;
- With a maximum diameter of 0.35 m;
- It will pass through the urban edge of Okiep and Concordia (land owned by Nama Khoi Municipality) as well as land owned by the O'okiep Copper Company and cross the Concordia commonage (owned by the Nama Khoi Municipality);
- It will cross a number of small seasonal streams / drainage lines within the same footprint as the original pipeline;
- It will cross natural veld (not listed in terms of NEMBA), within the existing servitude;
- It runs mostly parallel to the Okiep to Concordia tarred road, BUT is not located within the road reserve;
- The pipeline passes close to a type 2 CBA (as identified within the Namakwa Biodiversity Sector Plan) just outside of Okiep but will not impact on these CBA's;
- The new pipeline will be placed next to the old pipeline (so that the original pipeline can maintain water supply during construction);
- The new pipeline will be placed above ground within the rocky sections and below ground in sandy sections (in order to reduce construction cost as well as environmental impact);
- Placing the pipeline above ground will be more visual, but will result in a much reduced footprint and a very low physical disturbance;
- Once the new pipeline is in operation all off the above ground pipelines and infrastructure associated with the original pipeline will be removed. In order to reduce costs the below ground sections will not be removed, but physical rehabilitation of significant remaining footprints will be done. This should also reduce physical disturbance, which will reduce environmental impact;
- Please note that large sections of the original pipeline are expected to still be asbestos or asbestos cement pipelines, which will need special handling and disposal (and which will increase the upgrade costs significantly).

### **The proposed Carolusberg pipeline upgrade (Figure 2 below)**

At presently water is being pumped from the Okiep Reservoir over the mountains (the shortest route, Figure 2) to Carolusberg. Because the water has to be pumped from Okiep over the mountains the operational cost is ever increasing (rise in cost of electricity). The pipeline route is also difficult to access, making maintenance difficult and costly. Although this route option is retained as an alternative route option, it was calculated that both operational and maintenance costs can be reduced significantly (especially over the long term) if the supply pipeline is re-routed "around" the mountains (to the east). The proposed preferred option entails linking the new Carolusberg pipeline to the Concordia pipeline (tapping water from the Concordia pipeline) and routing it around the mountains to the south of Concordia up to Carolusberg. This will reduce pumping costs and thus operational costs significantly. The terrain is also much easier to access, with existing roads, which will in term reduce maintenance costs.

The proposed pipeline will tap into the Concordia line just south of Concordia and will then cross over a small kopje towards the main gravel road connecting Concordia and Carolusberg. The line will then follow the road (placed within the road reserve wherever possible) all the way (and under the N14) to the Carolusberg Reservoir. The proposed pipeline will be:

- Approximately 12.7 km in length;
- With a maximum diameter of 0.25 m;
- It will pass over the Concordia commonage (mostly within the existing road reserve) into the

urban edge of Carolusberg (land owned by Nama Khoi Municipality and the OCC Mining Company);

- It will cross a number of small seasonal drainage lines within the road reserve;
- It will cross natural veld (not listed in terms of NEMBA), within the road reserve;
- It is not expected to impact on any CBA or ESA (as identified within the Namakwa Biodiversity Sector Plan), but may pass within close proximity;
- The new pipeline will be placed above ground within the rocky sections and below ground in sandy sections (in order to reduce construction cost as well as environmental impact);
- Once the new pipeline is in operation all off the above ground pipelines and infrastructure associated with the original pipeline will be removed. In order to reduce costs the below ground sections will not be removed, but physical rehabilitation of significant remaining footprints will be done. This should also reduce physical disturbance, which will reduce environmental impact;
- Please note that sections of the original pipeline are expected to still be asbestos or asbestos cement pipelines, which will need special handling and disposal (and which will increase the upgrade costs significantly).

**Figure 2: Showing the existing Carolusberg pipeline (black) and the proposed new preferred route (blue)**





## b) Provide a detailed description of the listed activities associated with the project as applied for

Listed activity as described in GN 983, 984 and 985, EIA Regulations (2014)	Description of project activity
<b>GN 983 Listing notice 1</b>	
<b>Activity 9:</b> Development of infrastructure exceeding 1 000 m for the bulk transportation of water with an internal diameter of 0.36 m or larger (excluding where placed within a road reserve or urban areas).	Two pipelines is proposed: 1) <b>Concordia pipeline</b> will be approximately 9 km in length with a maximum internal width of 0.35 m. Sections of the pipeline will be within urban areas and a road reserve, but sections will be outside of the urban edge and not within a road reserve (following the original pipeline route closely). 2) <b>Carolusberg pipeline</b> will be approximately 14 km in length with a maximum internal width of 0.25 m. Sections of the pipeline will be within urban areas and a road reserve, but sections will outside of the urban edge and not within a road reserve.
<b>Activity 19:</b> Infilling, depositing or the dredging, excavation, removal or moving of more than 5 m <sup>3</sup> of material from a water course.	No major water courses or any wetlands will be impacted, but the: <ul style="list-style-type: none"> <li>• <b>Concordia pipeline</b> will cross a number of small seasonal drainage lines, within the original construction footprint; and the</li> <li>• <b>Carolusberg pipeline</b> (preferred option) will cross a number of small seasonal drainage lines within the road reserve.</li> </ul>
<b>Activity 45:</b> Expansion of the capacity of infrastructure for the bulk transportation of water by 10% or more.	This project entails the upgrading and expansion of infrastructure for the bulk transportation of water to both the towns of Concordia and Carolusberg.
<b>GN 984 Listing notice 2</b>	
N/a	
<b>GN 985 Listing notice 3</b>	
<b>Activity 4:</b> Development of a road wider than 4 metres with a road reserve less than 13.5m.	<b>Not considered to be applicable but:</b> It is likely that short sections of new "twee-spoor" roads may have to be established for maintenance purposes (some options for the new Carolusberg pipeline route). But no section should be longer than 1 km and no road will be wider than a "twee-spoor" track (<4m).
<b>Activity 12:</b> The clearance of 300 m <sup>2</sup> of indigenous vegetation within CBA's identified within bioregional plans.	<b>Only applicable to some of the alternatives:</b> The Namakwa Biodiversity Sector Plan identifies various CBA and ESA for the Namaqualand District. The Carolusberg alternative (A3 & A4) will impact on terrestrial CBA's as identified in this plan.
<b>Activity 14:</b> The development of infrastructure larger than 10 m <sup>2</sup> within a water course or within 32 m of a water course.	<b>Considered highly unlikely to be applicable but:</b> Both pipelines will cross small seasonal drainage lines and it is very likely that these pipelines are to be protected by concrete encasements. However, it is highly unlikely that such castings will larger 10 m <sup>2</sup> , and none of the sites are within a protected area, although a section of the pipeline (near Carolusberg) will be crossing small water courses within 10 km of from a national park (Goegab Nature Reserve).
<b>Activity 23:</b> The expansion of infrastructure larger than 10 m <sup>2</sup> within a water course or within 32 m of a water course.	<b>Not considered applicable</b> Existing infrastructure will not be expanded within any of the water courses.

**2) FEASIBLE AND REASONABLE ALTERNATIVES**

**“alternatives”**, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Describe alternatives that are considered in this application as required by Appendix 1 (3)(h), Regulation 2014. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the, competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

**PURPOSE AND NEED OF THE PROPOSED ACTIVITY**

The Concordia and Carolusberg pipelines supplies bulk water to these towns. Without these pipelines, there will not be water to sustain the communities of these two towns. The pipeline infrastructure is old and in urgent need of being replaced. The proposed activity is seen as a HIGH PRIORITY INFRASTRUCTURE upgrade by Sedibeng Water (responsible for the maintenance and upkeep of the Namaqualand Regional Water Supply Scheme).

**a) Site alternatives (Refer to linear activities underneath)**

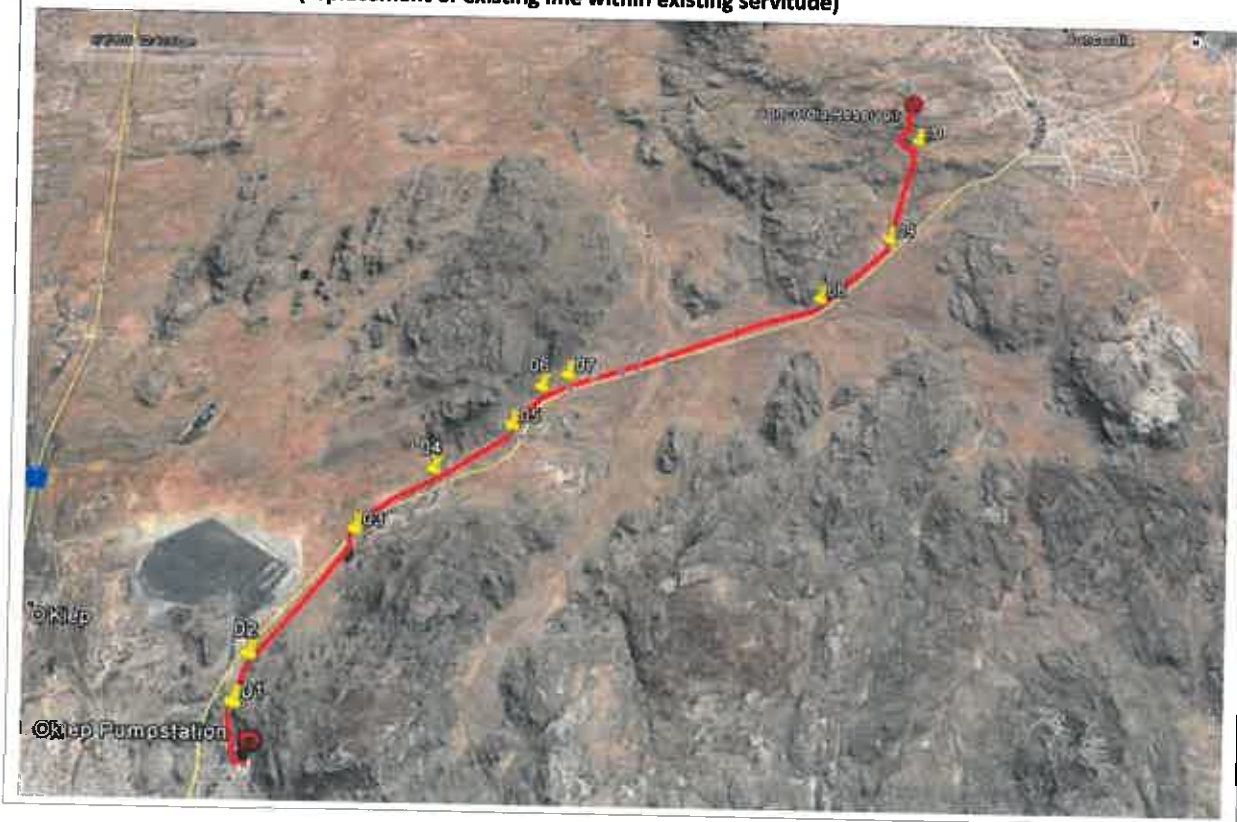
Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

**In the case of linear activities:**

**CONCORDIA PIPELINE (LINE 1)**

<b>CONCORDIA: Alternative A1 (preferred) (red line)</b>		
<p>The Concordia pipeline will be replaced within the same servitude or construction footprint, but next to the existing pipeline in order to maintain water supply during construction. The new pipe will be larger (more capacity). There is no reasonable or feasible alternatives (borehole water also not sufficient or of required quality). Total length approximately 8.2 km. Refer to the Figure 3 below.</p>		
Alternative:	Latitude (S):	Longitude (E):
• Starting point (Okiep Reservoir)	29°35'33.52"S	17°53'13.06"E
• Point 01 Okiep	29°35'23.68"S	17°53'6.05"E
• Point 02 Okiep	29°35'11.71"S	17°53'9.66"E
• Point 03 Road crossing	29°34'46.26"S	17°53'27.89"E
• Point 04 Entering CBA	29°34'30.71"SS	17°53'45.43"E
• Point 05 CBA area	29°34'19.75"S	17°54'4.86"E
• Point 06 Exiting CBA	29°34'8.95"S	17°54'11.89"E
• Point 07	29°34'5.03"S	17°54'18.68"E
• Point 08	29°33'40.67"S	17°55'29.20"
• Point 09	29°33'21.06"S	17°55'51.46"E
• Point 10 Rocky section	29°32'47.92"S	17°56'3.92"E
• End point (Concordia Reservoir)	29°32'33.77"S	17°56'4.98"E

**Figure 3: Concordia route (replacement of existing line within existing servitude)**



## CAROLUSBERG PIPELINE (LINE 2) ROUTE ALTERNATIVES

The existing pipeline has become very expensive to maintain (difficult terrain and access) and operate (ever increasing cost of electricity) and is not seen as a feasible long term solution as a result of operational and maintenance costs.

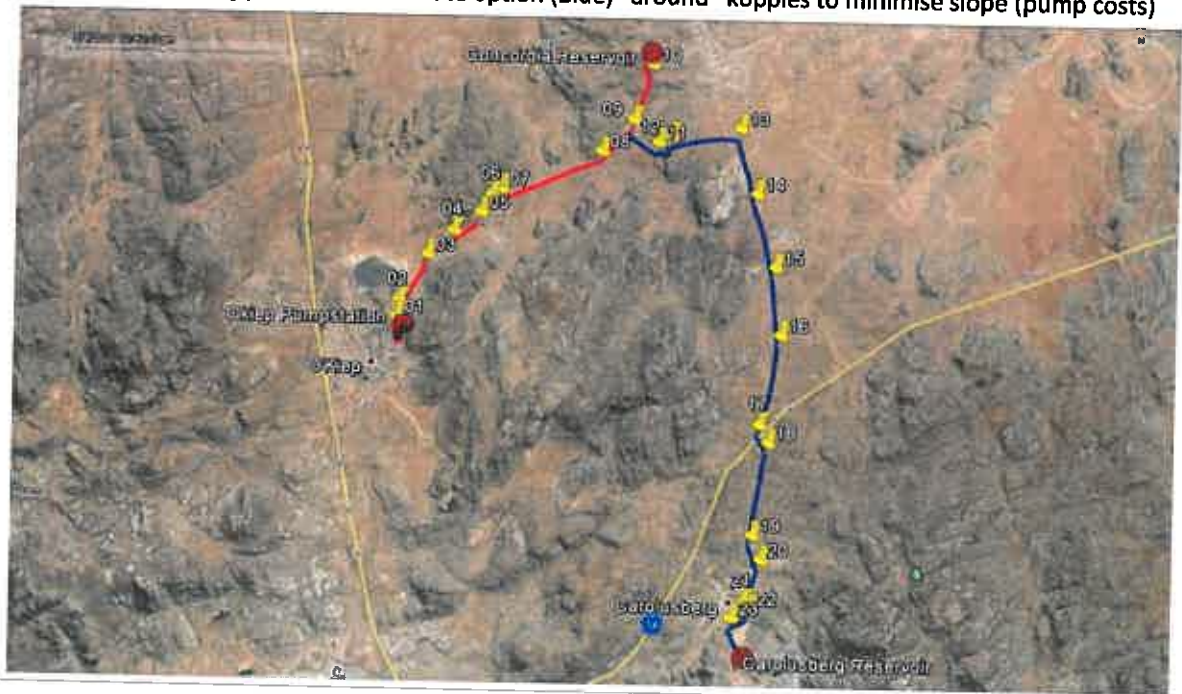
Four alternative route options were evaluated, (discussed below).

### CAROLUSBERG: Alternative A1 (preferred) (Blue line)

The preferred route alternative for the Carolusberg pipeline is described underneath. It taps-off the Concordia line just to the southwest of Carolusberg. It will cross over a small kopje to the north of the Marble mining operation (missing the areas on which mining rights have been registered). It will then follow the main gravel road between Concordia and Carolusberg up to the N14. The pipeline will cross underneath the N14 through an existing culvert. It will then again follow existing roads towards the Carolusberg Reservoir. Total length approximately 13 km. Refer to the blue line in Figure 4.

Alternative:	Latitude (S):	Longitude (E):
• Starting point	29°33'22.87"S	17°55'50.22"E
• Point 11 (Start of rocky section)	29°33'34.98"S	17°56'9.09"E
• Point 12 (on top of rocky section)	29°33'31.59"S	17°56'17.75"E
• Point 13 (turning south towards Carolusberg)	29°33'26.10"S	17°57'6.31"E
• Point 14	29°34'6.16"S	17°57'18.37"E
• Point 15	29°34'50.87"S	17°57'32.33"E
• Point 16	29°35'32.11"S	17°57'36.76"E
• Point 17 (crossing underneath N14)	29°36'26.88"S	17°57'23.05"E
• Point 18	29°36'37.76"S	17°57'29.23"E
• Point 19	29°37'34.14"S	17°57'19.27"E
• Point 20	29°37'49.08"S	17°57'25.42"E
• Point 21	29°38'14.39"S	17°57'14.73"E
• Point 22	29°38'18.96"S	17°57'18.73"E </td
• Point 23	29°38'24.82"S	17°57'6.03"E
• End point (Carolusberg Reservoir)	29°38'41.20"S	17°57'16.18"E

Figure 4: Carolusberg preferred new route option (Blue) "around" koppies to minimise slope (pump costs)

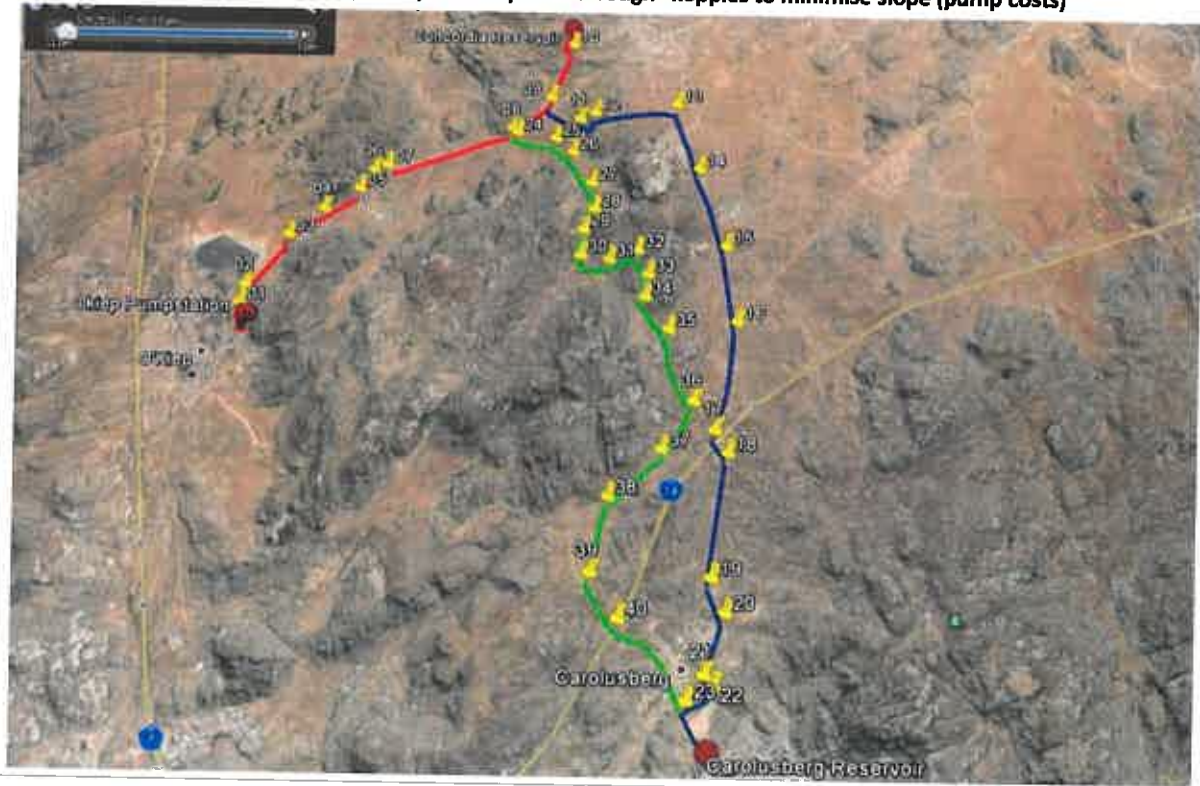


**CAROLUSBERG: Alternative A2 (Green line)**

The first alternative route for the Carolusberg pipeline is described underneath. This route (which was the preferred route from an engineer perspective) will follow the lay of the land (keeping to low lying sections) through natural veld (including CBA's) towards Carolusberg. From a biodiversity perspective the impact on undisturbed natural veld would most likely be the biggest of all the options considered. It is also likely to impact on a number of land users and is likely to cross an area with existing mining rights. Refer to the Green line in Figure 5.

Alternative:	Latitude (S):	Longitude (E):
• Starting point	29°33'40.67"S	17°55'29.20"E
• Point 24	29°33'43.33"S	17°55'32.43"E
• Point 25	29°33'46.79"S	17°55'54.78"E
• Point 26	29°33'55.41"S	17°56'5.44"E
• Point 27	29°34'14.04"S	17°56'16.66"E
• Point 28	29°34'30.52"S	17°56'18.48"E
• Point 29	29°34'42.21"S	17°56'12.73"E
• Point 30	29°34'56.92"S	17°56'11.59"E
• Point 31	29°34'59.73"S	17°56'27.22"E
• Point 32	29°34'54.40"S	17°56'42.91"E
• Point 33	29°35'7.92"S	17°56'48.74"E
• Point 34	29°35'19.89"S	17°56'46.89"E
• Point 35	29°35'36.58"S	17°56'59.78"E
• Point 36	29°36'12.85"S	17°57'12.36"E
• Point 37	29°36'35.98"S	17°56'55.72"E
• Point 38	29°36'58.32"S	17°56'28.41"E
• Point 39	29°37'32.33"S	17°56'19.99"E
• Point 40	29°37'51.44"S	17°56'33.23"E
• End point (Carolusberg Reservoir)	29°38'41.20"S	17°57'16.18"E

**Figure 5: Carolusberg alternative (Green) viable option "through" koppies to minimise slope (pump costs)**

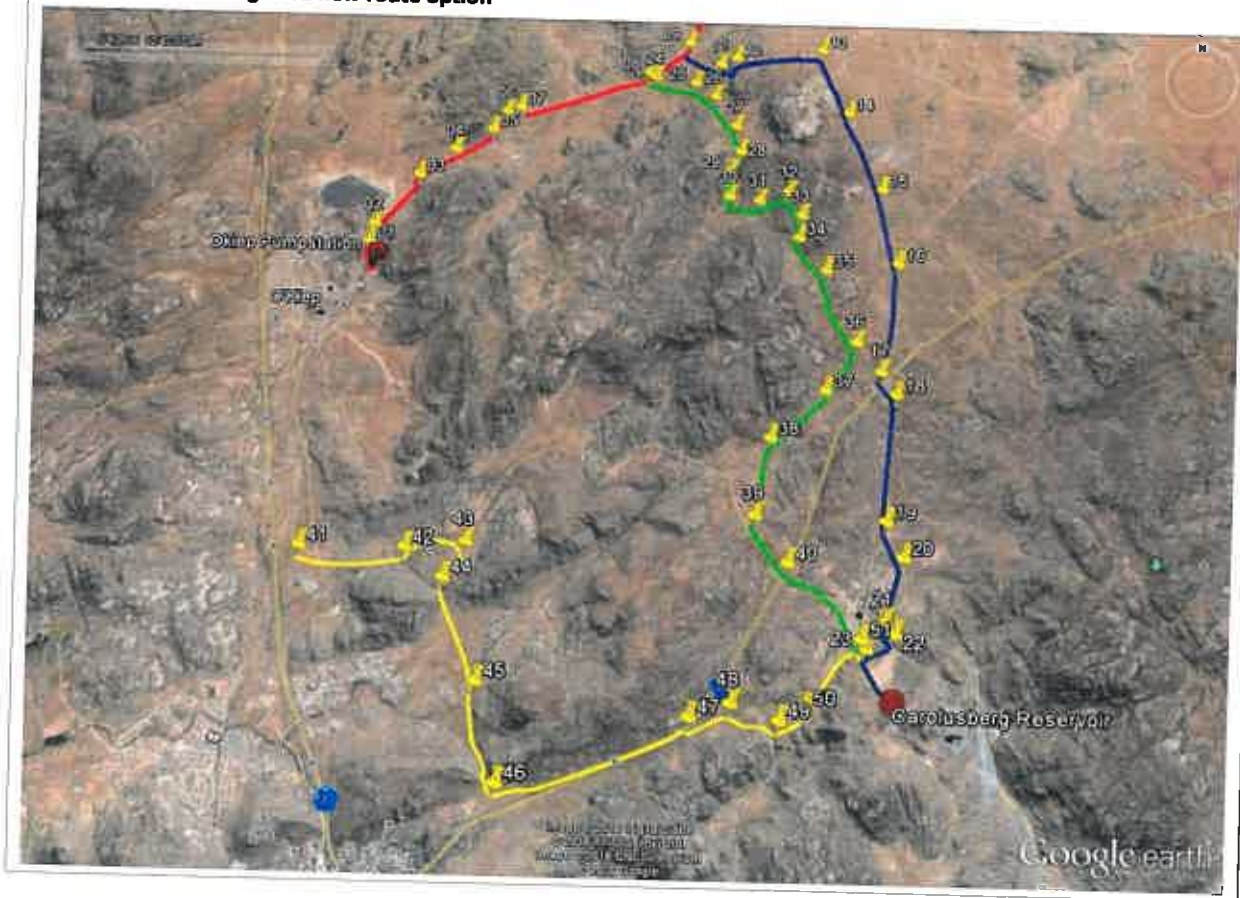


**CAROLUSBERG: Alternative A3 (Yellow Line)**

The second alternative route for the Carolusberg pipeline is described underneath. The proposed line will tap-off from the existing Springbok bulk water supply line, just north of the Springbok Industrial area. It will follow the existing tar road up to Point 43. It will then run through natural veld within a CBA (at the back of the Springbok industrial area) and through a narrow valley (Farm Melkboschkuil) up to the N14. It will then follow the N14 to Point 47 where it will jump south of the N14 and follow existing tracks towards Carolusberg and on to the Carolusberg Reservoir. Refer to the yellow line in Figure 6.

Alternative:	Latitude (S):	Longitude (E):
• Point 41 (Connecting point)	29°37'47.05"S	17°52'54.57"E
• Point 42	29°37'47.67"S	17°53'43.06"E
• Point 43	29°37'45.29"S	17°54'10.43"E
• Point 44	29°37'59.67"S	17°54'1.35"E
• Point 45	29°38'39.07"S	17°54'19.49"E
• Point 46	29°39'15.16"S	17°54'31.07"E
• Point 47	29°38'50.88"S	17°55'49.89"E
• Point 48	29°38'45.75"S	17°56'7.25"E
• Point 49	29°38'51.43"S	17°56'27.77"E
• Point 50	29°38'46.84"S	17°56'38.57"E
• Point 51	29°38'21.20"S	17°57'4.19"E
• End point (Carolusberg Reservoir)	29°38'41.20"S	17°57'16.18"E

**Figure 6: Carolusberg third new route option**

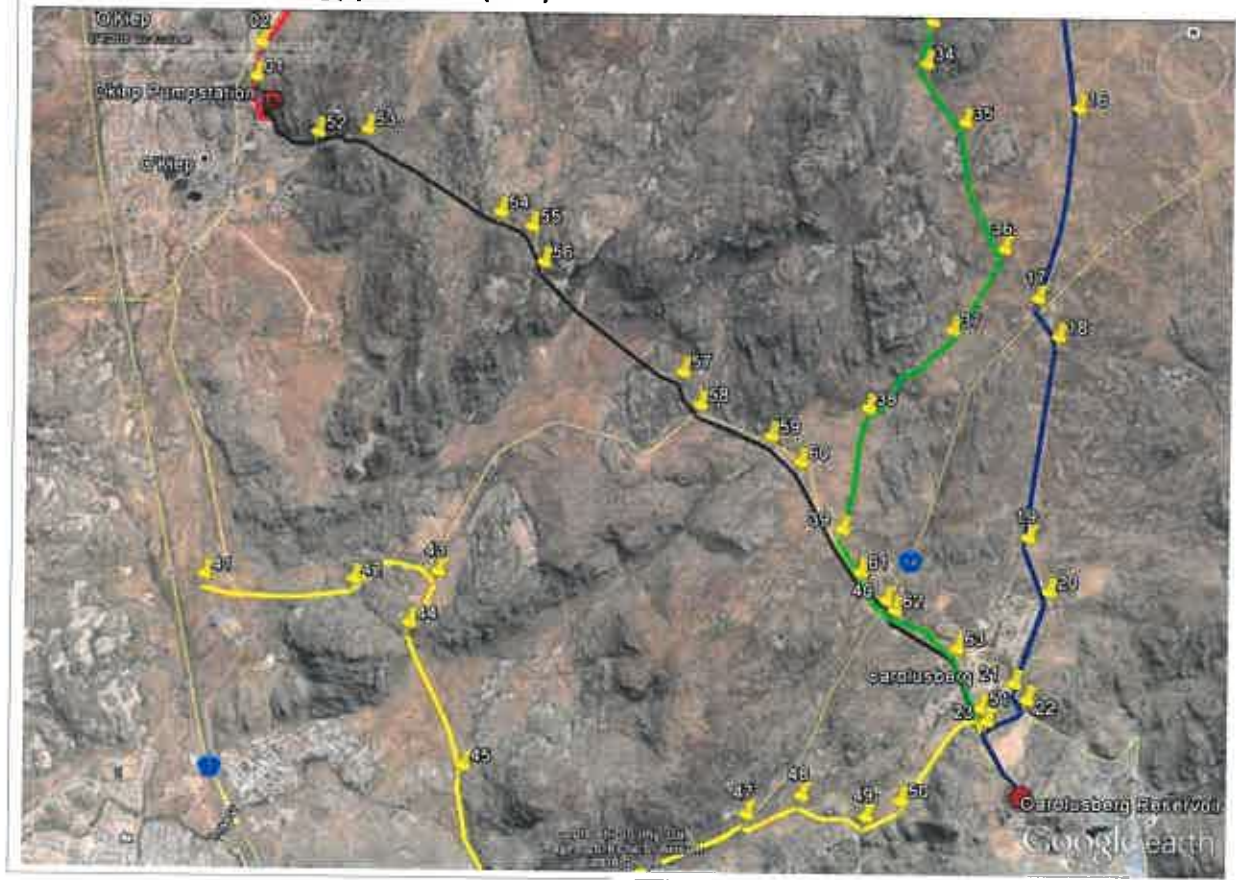


**CAROLUSBERG: Alternative A4 (Black line)**

As a last resort the existing pipeline route can also be considered as an alternative. However, as mentioned before, the energy needed to pump the water along this route (over the mountains as to around the mountains) is much more than for any of the other route options. Coupled with maintenance cost (difficult access) this option has been calculated as the most expensive long term option of the 4 routes evaluated. It will make poor financial sense to maintain this route option. Refer to the black line in the Figure underneath.

Alternative:	Latitude (S):	Longitude (E):
• Starting point (Okiep Reservoir)	29°35'33.52"S	17°53'13.06"E
• Point 52	29°35'40.62"S	17°53'27.83"E
• Point 53	29°35'40.58"S	17°53'44.79"E
• Point 54	29°36'4.63"S	17°54'29.15"E
• Point 55	29°36'8.78"S	17°54'39.34"E
• Point 56	29°36'18.77"S	17°54'43.43"E
• Point 57	29°36'48.84"S	17°55'28.46"E
• Point 58	29°36'57.91"S	17°55'34.19"E
• Point 59	29°37'6.47"S	17°55'57.28"E
• Point 60	29°37'13.67"S	17°56'6.63"E
• Point 61	29°37'44.08"S	17°56'25.76"E
• Point 62	29°37'54.61"S	17°56'36.54"E
• Point 63	29°38'4.99"S	17°56'56.64"E
• End point (Carolusberg Reservoir)	29°38'41.20"S	17°57'16.18"E

**Figure 7: Carolusberg existing pipeline route (Black)**



For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A of this form.

**b) Lay-out alternatives**

Please refer to layout alternatives discussed above.

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

**c) Technology alternatives**

There are no viable technology alternatives.

Alternative 1 (preferred alternative)		
Alternative 2		
Alternative 3		

**d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)**

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 2		
Alternative 3		

**e) No-go alternative**

It is very important to note that the "No-Go Alternative" will not result in a status quo or no impact. It will only mean that the capacity of the two pipelines cannot be expanded. The existing infrastructure will remain under pressure (struggling to meet current demands) and is likely to prohibit/restrict future development in these two areas (service restrictions). The maintenance and operational costs of the Carolusberg line will continue to rise (more expensive water).

The no-go alternative will also NOT mean that many of the impacts associated with the expansion WILL NOT occur. In fact it is very likely that both these pipelines will have to be replaced in any case, as part of maintenance as a result of the many failures. This will mean that the pipeline will be replaced as emergency repairs or in sections over a time, without any environmental control, which might result in a much higher overall environmental impact over which there will be very little control.



Paragraphs 3 – 13 below should be completed for each alternative.

### 3) PHYSICAL SIZE OF THE ACTIVITY

a) Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:	Size of the activity:
Alternative A1 (preferred activity alternative)	m <sup>2</sup>
Alternative A2 (if any)	m <sup>2</sup>
Alternative A3 (if any)	m <sup>2</sup>

or, for linear activities:

CONCORDIA ALTERNATIVE:	Length of the activity:
Alternative A1 (preferred activity alternative)	± 8 200 m
<b>CAROLUSBERG ALTERNATIVES</b>	
Alternative A1 (preferred activity alternative)	± 12 700 m
Alternative A2 (if any)	± 12 400 m
Alternative A3 (if any)	± 10 800 m
Alternative A4 (if any)	± 9 300 m

b) Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

CONCORDIA ALTERNATIVE:	Length of the activity:
Alternative A1 (preferred activity alternative)	± 8 200 x 10 m <sup>2</sup>
<b>CAROLUSBERG ALTERNATIVES</b>	
Alternative A1 (preferred activity alternative)	± 12 700 x 10 m <sup>2</sup>
Alternative A2 (if any)	± 12 400 x 10 m <sup>2</sup>
Alternative A3 (if any)	± 10 800 x 10 m <sup>2</sup>
Alternative A4 (if any)	± 9 300 x 10 m <sup>2</sup>

### 4) SITE ACCESS

Does ready access to the site exist?	YES	NO
If NO, what is the distance over which a new access road will be built	m	
For both preferred routes access exists. For the Carolusberg Alternative A2, approximately >1 km will have to be established (not existing).		

Describe the type of access road planned:

In all instances a two spoor maintenance road (<4 m) is all that is required where existing roads is not yet established.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

## 5) LOCALITY MAP

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.). The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;
- closest town(s);
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection).

## 6) LAYOUT/ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and
- a north arrow.

## 7) SENSITIVITY MAP

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;
- the 1:100 year flood line (where available or where it is required by DWS);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or infested with alien species); and
- critical biodiversity areas.

The sensitivity map must also cover areas within 100m of the site and must be attached in Appendix A.

## 8) SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

## 9) FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of at least 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

## 10) ACTIVITY MOTIVATION

Motivate and explain the need and desirability of the activity (including demand for the activity):

• Is the activity permitted in terms of the property's existing land use rights?	YES	NO	Please explain
It is important existing infrastructure being upgraded as a result of age and population growth.			
• Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	YES	NO	Please explain
It is important existing infrastructure being upgraded as a result of age and population growth.			
(b) Urban edge / Edge of Built environment for the area	YES	NO	Please explain
It is important existing infrastructure being upgraded as a result of age and population growth.			
(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	YES	NO	Please explain
It is important existing infrastructure being upgraded as a result of age and population growth.			
(d) Approved Structure Plan of the Municipality	YES	NO	Please explain
It is important existing infrastructure being upgraded as a result of age and population growth.			
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	YES	NO	Please explain
It is important existing infrastructure being upgraded as a result of age and population growth. But is important to note that the preferred options are associated with the least additional			

environmental impact.			
(f) Any other Plans (e.g. Guide Plan)	YES	NO	Please explain
It is important existing infrastructure being upgraded as a result of age and population growth.			
<ul style="list-style-type: none"> <li>Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?</li> </ul>	YES	NO	Please explain
It is important existing infrastructure being upgraded as a result of age and population growth.			
<ul style="list-style-type: none"> <li>Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)</li> </ul>	YES	NO	Please explain
It is important existing infrastructure being upgraded as a result of age and population growth. This is the infrastructure supplying bulk water to the towns of Concordia and Carolusberg.			
<ul style="list-style-type: none"> <li>Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)</li> </ul>	YES	NO	Please explain
The whole of the NRWSS bulk water supply line is being upgraded at present. The Concordia and Carolusberg pipeline upgrades is part of the planned overall upgrades.			
<ul style="list-style-type: none"> <li>Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)</li> </ul>	YES	NO	Please explain
It is important existing SERVICE providing infrastructure being upgraded as a result of age and population growth.			
<ul style="list-style-type: none"> <li>Is this project part of a national programme to address an issue of national concern or importance?</li> </ul>	YES	NO	Please explain
Providing adequate services to all the people of South Africa is of national importance.			

<ul style="list-style-type: none"> <li>Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)</li> </ul>	YES	NO	Please explain
It is important existing infrastructure being upgraded as a result of age and population growth. Where the pipeline will be moved (Carolusberg) it will not interfere with existing land use or rights (various alternatives was tested with the local community that might be impacted – which led to further layout options being evaluated).			
<ul style="list-style-type: none"> <li>Is the development the best practicable environmental option for this land/site?</li> </ul>	YES	NO	Please explain
All efforts are made to ensure placement that will not interfere with existing land use or rights.			
<ul style="list-style-type: none"> <li>Will the benefits of the proposed land use/development outweigh the negative impacts of it?</li> </ul>	YES	NO	Please explain
The proposed activity is the upgrade of existing bulk SERVICE PROVIDING infrastructure, to the benefit of the local communities.			
<ul style="list-style-type: none"> <li>Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?</li> </ul>	YES	NO	Please explain
The proposed activity is the upgrade of existing SERVICE PROVIDING infrastructure (Bulk water supply).			
<ul style="list-style-type: none"> <li>Will any person's rights be negatively affected by the proposed activity/ies?</li> </ul>	YES	NO	Please explain
It will not interfere with existing land use or rights. Temporary inconveniences (e.g. access to properties) might be experienced, but will be easy to manage.			
<ul style="list-style-type: none"> <li>Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?</li> </ul>	YES	NO	Please explain
It will not interfere with existing land use or rights			
<ul style="list-style-type: none"> <li>Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?</li> </ul>	YES	NO	Please explain
Upgrades in essential bulk water supply.			
<ul style="list-style-type: none"> <li>What will the benefits be to society in general and to the local communities?</li> </ul>	Please explain		
The proposed activity is the upgrade of existing SERVICE PROVIDING infrastructure (Bulk water supply).			
<ul style="list-style-type: none"> <li>Any other need and desirability considerations related to the proposed activity?</li> </ul>	Please explain		
<ul style="list-style-type: none"> <li>How does the project fit into the National Development Plan for 2030?</li> </ul>	Please explain		
Upgrades in essential bulk water supply.			

- **Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.**

The general objectives of Integrated Environmental Management have been taken into account through the following:

- The actual and potential impacts of the activity on the environment, socio-economic conditions and cultural heritage have been identified, predicted and evaluated, as well as the risks and consequences and alternatives and options for mitigation of activities, with a view to minimizing negative impact, maximizing benefits and promoting compliance with the principles of environmental management – please refer to Section D.
- The effects of the activity on the environment have been considered before actions taken in connection with them – Refer to the Biodiversity Assessment (Appendix D1).
- Adequate and appropriate opportunity for public participation is ensured through the public participation process -Please refer to Appendix E.
- The environmental attributes have been considered in the management and decision-making of the activity – an EMP has been included (Appendix G) with the proposed activity and must adhere to the requirements of all applicable state Authorities.

- **Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.**

The principles of environmental management as set out in section 2 of NEMA have been taken into account. The principles pertinent to this activity include:

- People and their needs have been placed at the forefront while serving their physical, psychological, developmental, cultural and social interests – the proposed activity is not expected to have any adverse effect on people. Temporary job creation is expected during the construction phase of the project.
- Development must be socially, environmentally and economically sustainable. Where disturbance of ecosystems, loss of biodiversity, pollution and degradation, and landscapes and sites that constitute the nation's cultural heritage cannot be avoided, are minimised and remedied. - Through good engineering and environmental advice and the implementation of a responsible EMP, environmental impact will be minimised. (Appendix G).
- Where waste cannot be avoided, it is minimised and remedied through the implementation and adherence of EMP.
- The use of non-renewable natural resources is responsible and equitable – no exploitation of non-renewable natural resources occurs with the proposed activity.
- The negative impacts on the environment and on people's environmental rights have been anticipated and prevented, and where they cannot be prevented, are minimised and remedied (Appendix F).
- The interests, needs and values of all interested and affected parties will be taken into account in any decisions through the Public Participation Process (Appendix E).
- The social, economic and environmental impacts of the activity have been considered, assessed and evaluated, including the disadvantages and benefits (Appendix F).
- The effects of decisions on all aspects of the environment and all people in the environment have been taken into account, by pursuing what is considered the best practicable environmental option.

## 11) APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
National Heritage Resources Act, Act 25 of 1999 (NHRA)	The new route of the Carolusberg pipeline.	SAHRA	In progress
National Environmental Management Act (NEMA) and the Environmental Impact Assessment (EIA) Regulations 2014	Refer to Section A, Paragraph 1(b) for detail of applicable listed activities.	DENC	This Application
National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA)	National list of ecosystems that are threatened and in need of protection Alien and invasive species regulations 2014	DENC	Threatened ecosystems not applicable. Alien invasive species to be managed in accordance to regulations.
Occupational Health & Safety Act, Act 85 of 1993 (OHSA)	Asbestos Regulations, 2001 (GN R.155 of 10 February 2002)	Department of Labour	To be addressed as needed.
National Water Act, Act 36 of 1998	Temporary impact on seasonal drainage lines.	Dept. of Water and Sanitation.	In progress
National Forest Act, Act 84 of 1998	List of protected tree species	DAFF	To be submitted if needed.
Northern Cape Nature Conservation Act 9 of 2009 (NCNCA)	List of Protected species. List of alien species.	DENC	To be submitted if needed.
Integrated Environmental Management Information Series.	Criteria to be used for evaluating environmental impacts of the proposed activity during the NEMA EIA application process.	DENC	This application

## 12) WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

### a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	<b>YES</b>	NO
If YES, what estimated quantity will be produced per month?	Unknown m <sup>3</sup>	

How will the construction solid waste be disposed of (describe)?

Please note that only small amounts of waste are expected. Normal construction (e.g. concrete and wrapping) and general waste will be disposed of at Municipal approved Waste disposal sites (with Municipal approval).

It is likely that some of the original pipes (being replaced) are still off asbestos or asbestos cement compounds. These will be disposed of in accordance with the Asbestos regulations (2001) (In terms of the Occupational Health & Safety Act, 1993).

Where will the construction solid waste be disposed of (describe)?

Refer above

Will the activity produce solid waste during its operational phase?	YES	<b>NO</b>
If YES, what estimated quantity will be produced per month?	m <sup>3</sup>	
How will the solid waste be disposed of (describe)?		
If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.		
Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?		
<i>If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.</i>		

Can any part of the solid waste be classified as hazardous in terms of the NEM:WA?	YES	<b>NO</b>
If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.		
NB: Please note that in terms of the Waste Classification and Management Regulations (GN R.634 of 23 August 2013), Asbestos waste does not require classification or assessment and thus does not require a Waste Management Licence		

Is the activity that is being applied for a solid waste handling or treatment facility?	YES	<b>NO</b>
If YES, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.		

**b) Liquid effluent**

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	YES	<b>NO</b>
If YES, what estimated quantity will be produced per month?	m <sup>3</sup>	
Will the activity produce any effluent that will be treated and/or disposed of on site?	YES	<b>NO</b>
<i>If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.</i>		



Will the activity produce effluent that will be treated and/or disposed of at another facility?		YES	NO
If YES, provide the particulars of the facility:			
Facility name:			
Contact person:			
Postal address:			
Postal code:			
Telephone:		Cell:	
E-mail:		Fax:	

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:  
 N/a (This application is for a bulk water distribution system alone).

**c) Emissions into the atmosphere**

Will the activity release emissions into the atmosphere other than exhaust emissions and dust associated with construction phase activities?	YES	NO
If YES, is it controlled by any legislation of any sphere of government?	YES	NO
If YES, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.		
If NO, describe the emissions in terms of type and concentration:		

**d) Waste permit**

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA?	YES	NO
--	-----	----

If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

**e) Generation of noise**

Will the activity generate noise?	YES	NO
If YES, is it controlled by any legislation of any sphere of government?	YES	NO
Describe the noise in terms of type and level:		
Normal construction related noise, which will be kept within reasonable construction hours.		

**13) WATER USE**

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

Municipal	Water board	Groundwater	River, stream, dam or lake	Other	The activity will not use water
-----------	-------------	-------------	----------------------------	-------	---------------------------------

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:	litres	
Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?	YES	NO
If YES, please provide proof that the application has been submitted to the Department of Water Affairs.		

#### 14) ENERGY EFFICIENCY

Describe the design measures, if any, which have been taken to ensure that the activity is energy efficient:

Concordia pipeline: The pipeline is located back within the existing pipeline servitude, but will be larger, which will reduce resistance within the line and thus energy costs.

Carolusberg pipeline route: The whole of the Carolusberg pipeline is re-routed specifically to reduce the cost of energy to pump the water "over" the koppies between Okiep and Carolusberg. The new proposed route will run "around" these koppies, which will reduce energy costs significantly as well as maintenance (easier access).

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

At present no viable alternative energy sources are available in support of the proposed upgrades.

## SECTION B: SITE/AREA/PROPERTY DESCRIPTION

### Important notes:

- For linear activities (pipelines, etc.) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A):

- Paragraphs 1 - 6 below must be completed for each alternative.

Has a specialist been consulted to assist with the completion of this section?	YES	NO
If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.		

<b>Property description/physical address:</b>	<b>Province</b>	Northern Cape Province
	<b>District Municipality</b>	Namakwa District Municipality
	<b>Local Municipality</b>	Nama Khoi Local Municipality
	<b>Ward Number(s)</b>	Ward 1 (Concordia) Ward 4 (Carolusburg) Ward 6 (Okiep)
	<b>Farm name and Number</b>	Remainder of Farm Concordia No 21, Springbok Portion 1 of Farm Melkboschkuil No 132, Springbok Portion 23 of Farm Melkboschkuil No 132, Springbok Remainder of Farm Brakfontein No 133, Springbok Portion 9 of Farm Brakfontein No 133, Springbok Remainder of Farm Die Plaas No 635, Springbok
	<b>SG Code</b>	C053 0000 00000021 00000 (Concordia commonage) C053 0000 00000132 00001 C053 0000 00000132 00023 (Carolusberg) C053 0000 00000133 00000 C053 0000 00000133 00009 (Okiep) C053 0000 00000635 00000
Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.		
<b>Current land-use zoning as per local municipality IDP/records:</b>	Agriculture	
In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.		
Is a change of land-use or a consent use application required?		
		YES
		NO

## 1) GRADIENT OF THE SITE

Indicate the general gradient of the site.

### Concordia: Alternative A1:

Flat	1:50 – 1:20	1:20 – 1:15 Average	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
------	-------------	------------------------	-------------	--------------	-------------	---------------------

Concordia Pipeline (A1): The route has a total length of approximately 8.2 km with an average slope of 4.8% and a maximum slope of 18.2% as it rises towards the Concordia Reservoir.

### Carolusberg: Alternative A1 (Preferred)

Flat	1:50 – 1:20 Average	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
------	------------------------	-------------	-------------	--------------	-------------	---------------------

Carolusberg Pipeline (A1): The preferred route will have total length of approximately 12.7 km with an average slope of 2.3% (one steep section at the start with a maximum slope of 22.7%).

### Carolusberg: Alternative A2 (if any):

Flat	1:50 – 1:20 Average	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
------	------------------------	-------------	-------------	--------------	-------------	---------------------

Carolusberg Pipeline (A2): The first alternative route will have total length of approximately 12.4 km with an average slope of 4.2% and a maximum slope of 19.3%.

### Carolusberg: Alternative A3 (if any):

Flat	1:50 – 1:20 Average	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
------	------------------------	-------------	-------------	--------------	-------------	---------------------

Carolusberg Pipeline (A3): The second alternative route will have total length of approximately 10.8 km with an average slope of 4.7% and a maximum slope of 13.2%.

### Carolusberg: Alternative A4 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10 Average	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
------	-------------	-------------	------------------------	--------------	-------------	---------------------

Carolusberg Pipeline (A4): The existing route has total length of approximately 9.4 km with an average slope of 6.3% and a maximum slope of 32.5%.

## 2) LOCATION IN LANDSCAPE

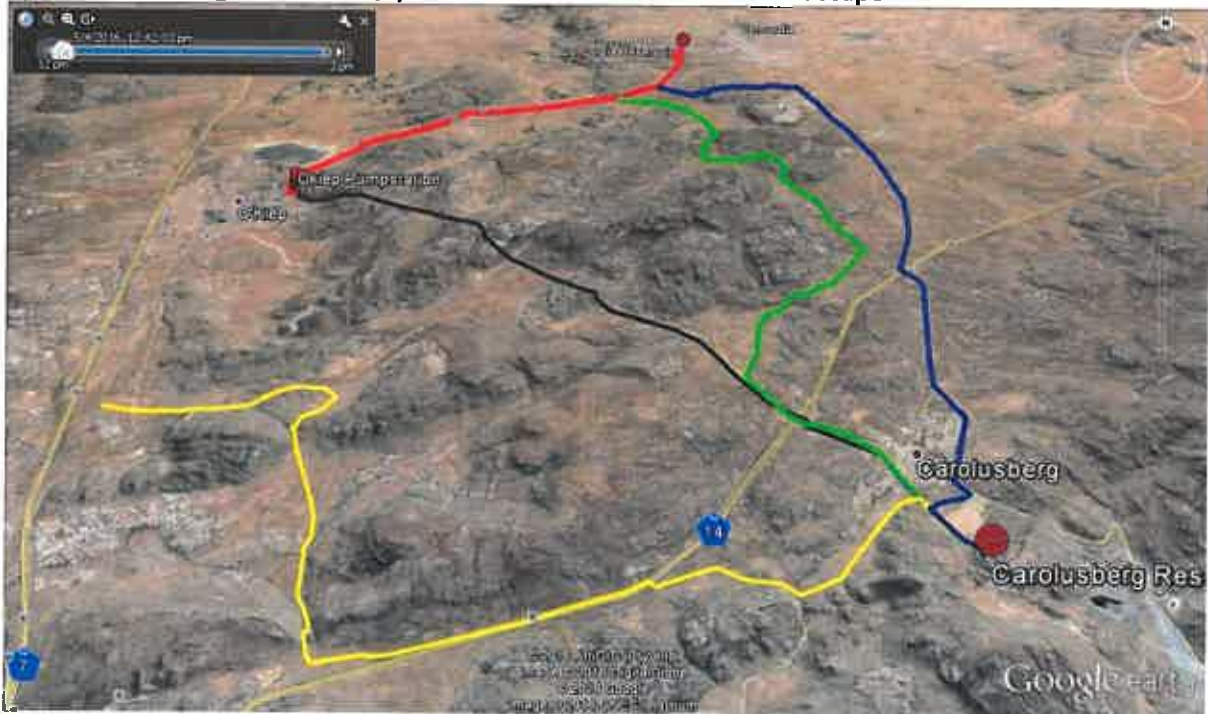
Indicate the landform(s) that best describes the site:

2.1 Ridgeline		2.4 Closed valley		2.7 Undulating plain / low hills	X
2.2 Plateau		2.5 Open valley		2.8 Dune	
2.3 Side slope of hill/mountain		2.6 Plain		2.9 Seafront	
2.10 At sea					

Figure 8 (below) shows all of the route alternatives in perspective to the landscape. The towns of Okiep, Concordia and Carolusberg are located just to the northeast of Springbok and all within the same granite koppies dominated landscape. To reach Concordia and Carolusberg from the existing Okiep reservoir, any pipeline route will have to cross “over, cross “through” or cross “around” the granite koppies within which these towns are located.

- The Concordia pipeline will follow the existing route, which is still the most viable from an engineering perspective.
- It is proposed that the Carolusberg pipeline route is relocated “around” (Alternative A1) or “through” (Alternative A2) these koppies in order to reduce operating and maintenance costs.

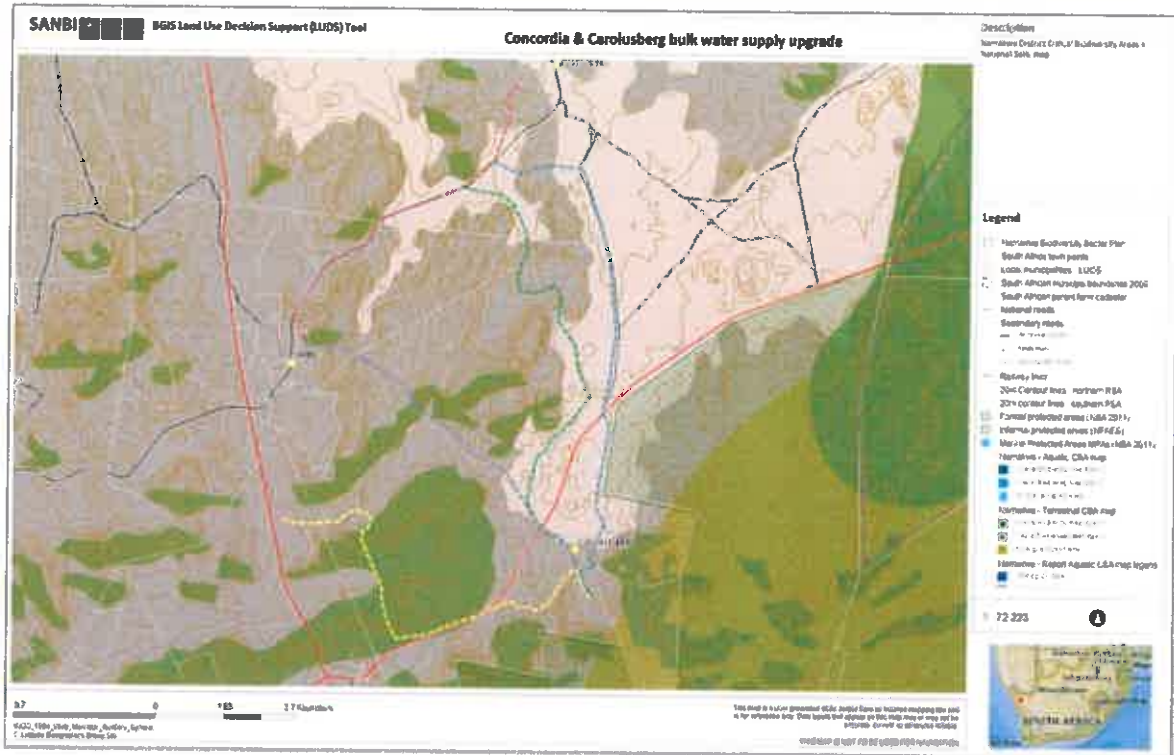
**Figure 8:** Showing the various pipeline routes in relation to the landscape



## 3) GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Please note that soil conditions are very similar over the whole of the site. It varies from sandy soils in the lower lying areas associated with Namaqualand Blomveld vegetation and rocky koppies associated with the Namaqualand Klipkoppe Shrubland (Refer to Figure 9).

Figure 9: National soil classes in relation to the existing and or proposed pipeline routes (CBA areas also indicated)



Is the site(s) located on any of the following?

<b>CONCORDIA pipeline upgrade</b>	<b>Alternative A1:</b>	
Shallow water table (less than 1.5m deep)	YES	NO
Dolomite, sinkhole or doline areas	YES	NO
Seasonally wet soils (often close to water bodies)	YES	NO
Unstable rocky slopes or steep slopes with loose soil	YES	NO
Dispersive soils (soils that dissolve in water)	YES	NO
Soils with high clay content (clay fraction more than 40%)	YES	NO
Any other unstable soil or geological feature	YES	NO
An area sensitive to erosion	YES	NO

<b>CAROLUSBERG alternatives</b>	<b>Alternative A1</b>		<b>Alternative A2</b>		<b>Alternative A3</b>		<b>Alternative A4</b>	
Shallow water table (less than 1.5m deep)	YES	NO	YES	NO	YES	NO	YES	NO
Dolomite, sinkhole or doline areas	YES	NO	YES	NO	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)	YES	NO	YES	NO	YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil	YES	NO	YES	NO	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)	YES	NO	YES	NO	YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)	YES	NO	YES	NO	YES	NO	YES	NO
Any other unstable soil or geological feature	YES	NO	YES	NO	YES	NO	YES	NO
An area sensitive to erosion	YES	NO	YES	NO	YES	NO	YES	NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

#### 4) GROUNDCOVER

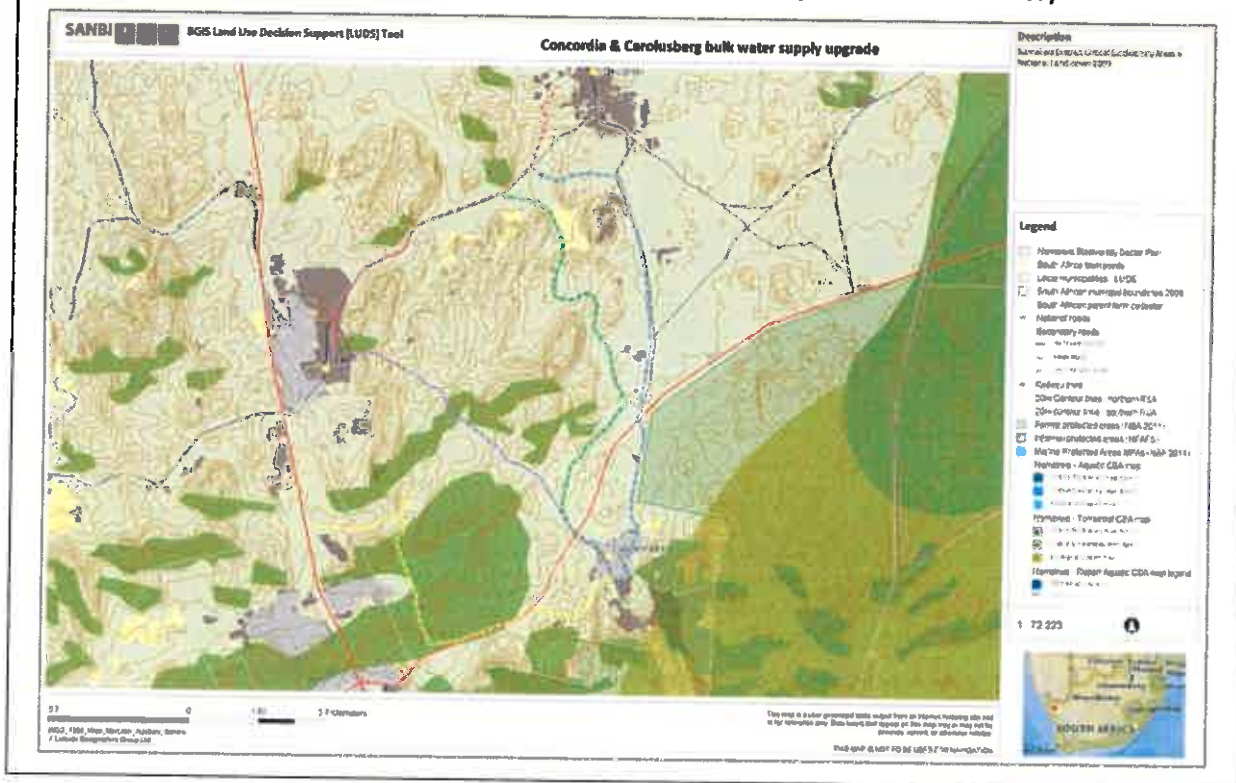
Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition <sup>E</sup>	Natural veld with scattered aliens <sup>E</sup>	Natural veld with heavy alien infestation <sup>E</sup>	Veld dominated by alien species <sup>E</sup>	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an "E" is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

Figure 10 (Below) shows that most of the areas involved are still remaining natural veld (light green on map). Small areas of agricultural land (Yellow) may be impacted and a number of mining areas (dark brown) may also be impacted. Please note that with regards to the mining areas, all efforts are made to ensure that the proposed pipelines do not impact on mining operations (current and future).

Figure 10: SANBI BGIS National land cover layer (2009) for the proposed site (CBA areas also indicated)



**BIODIVERSITY ASSESSMENT APPENDIX D1****LAND USE & COVER:**

Land use in the majority of the NDM is defined by livestock grazing and mining – the two major economic drivers in the region. Some agriculture in the form of wheat and grape cultivation occurs in areas under irrigation and dryland rooibos tea production occurs on the Bokkeveld Escarpment. Another significant economic factor for the NDM's economy is "flower" tourism that is based on Namaqualand's fantastic annual wildflower displays that cover regions in a kaleidoscope of colour each spring. This is a distinctly seasonal aspect of the economy, lasting only eight to ten weeks, and being highly dependent on the timing and duration of the previous winter rains. However, there are indications that in recent years the regional ecotourism industry is diversifying (e.g. 4x4 and nature tourism) with greater numbers of tourists arriving throughout the year (Namakwa District Sector Plan, 2008). The surrounding areas show the same largely natural veld extending in almost all directions (refer to the national Land cover map, Figure 10 above).

**5) SURFACE WATER**

Indicate the surface water present on and or adjacent to the site and alternative sites?

Perennial River	YES	NO	UNSURE
Non-Perennial River	YES	NO	UNSURE
Permanent Wetland	YES	NO	UNSURE
Seasonal Wetland	YES	NO	UNSURE
Artificial Wetland	YES	NO	UNSURE
Estuarine / Lagoonal wetland	YES	NO	UNSURE

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

The Concordia will cross a number of small seasonal streams / drainage lines within the same footprint as the original pipeline (existing lawful use).

The proposed Carolusberg pipeline alternatives will also cross a number of small seasonal streams / drainage lines along the various routes.

Please note that the above are at worst small seasonal flowing drainage lines draining higher lying areas.

**6) LAND USE CHARACTER OF SURROUNDING AREA**

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

Natural area	Dam or reservoir	Polo fields
Low density residential	Hospital/medical centre	Filling station <sup>H</sup>
Medium density residential	School	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential <sup>A</sup>	Church	Agriculture
Retail commercial & warehousing	Old age home	River, stream or wetland
Light industrial	Sewage treatment plant <sup>A</sup>	Nature conservation area
Medium industrial <sup>AN</sup>	Train station or shunting yard <sup>N</sup>	Mountain, koppie or ridge
Heavy industrial <sup>AN</sup>	Railway line <sup>N</sup>	Museum
Power station	Major road (4 lanes or more) <sup>N</sup>	Historical building
Office/consulting room	Airport <sup>N</sup>	Protected Area



Military or police base/station/compound	Harbour	Graveyard
Spoil heap or slimes dam <sup>A</sup>	Sport facilities	Archaeological site
Quarry, sand or borrow pit	Golf course	Other land uses (describe)

Natural areas: No additional impact unless for temporary access (if at all necessary).  
 Low density residential: By-pass residential areas.  
 Spoil heap or slimes dam: By-pass spoil heap and slimes dam near Okiep (but within the same footprint as the original pipeline).  
 Dam or reservoir: The Carolusberg A4 alternative will by-pass a dam near Springbok, but should not result in additional impact.  
 Agriculture: The Carolusberg A2 alternative cross or by-pass agricultural land which might result in temporary disturbances.  
 River stream or wetland: No additional impact.  
 Nature conservation areas: It by-pass the Goegab Nature Reserve as well as proposed CBA (Critical biodiversity areas), but should have no impact on these features.  
 Mountain koppie or ridge: No additional impact, apart from temporary access (if at all necessary) is expected.

If any of the boxes marked with an "N" are ticked, how this impact will / be impacted upon by the proposed activity? Specify and explain:

N/a

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

N/a

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

N/a

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan) (Refer to Figure 10)	YES	NO
Core area of a protected area?	YES	NO
Buffer area of a protected area?	YES	NO
Planned expansion area of an existing protected area?	YES	NO
Existing offset area associated with a previous Environmental Authorisation?	YES	NO
Buffer area of the SKA?	YES	NO

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A.

## 7) CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:	YES	NO
	Uncertain	
Please refer to the specialist report attached as Appendix D2 and summary underneath.		

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:

Underneath a short summary of heritage features encountered per pipeline (with recommendations). Refer to Appendix D2 for a full copy of this the Archaeological report.

### Concordia replacement pipeline

No significant cultural or heritage features encountered.

### Carolusberg Alternative A1 (Preferred line)

The following features were encountered, none of which were directly on the line (Figure 11, underneath). Although only one is considered significant (Site 340), all can be easily avoided (to be marked and protected during construction).

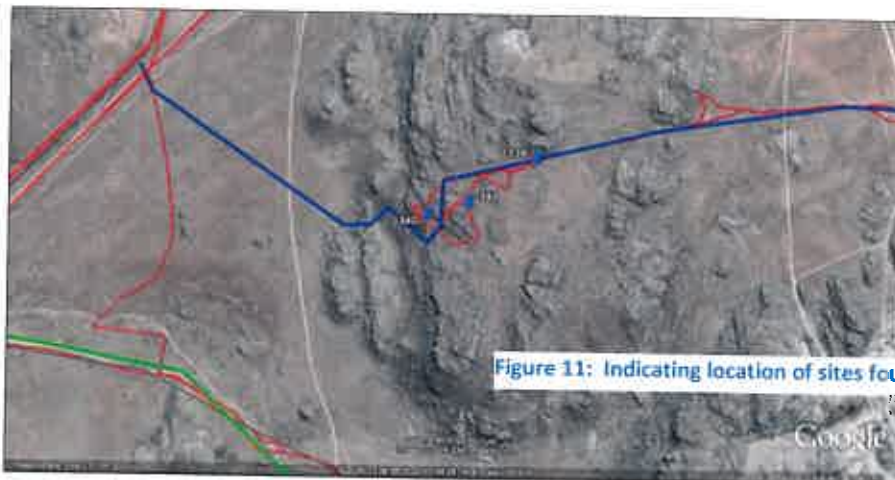


Figure 11: Indicating location of sites found along line A1

Site 339 – stone wall/sheep kraal enclosure: not significant, but to be avoided.

Site 340 Graves: high significance (grade IIIa), avoid.

Site 341 – stone farm boundary line: significant, avoid.

### Carolusberg Alternative A2

Nine (9) of features of archaeological of interest was encountered, of which 2 was of high significance (Site 342 & 661), two was of medium significance (Site 344 & 345) and one of low significance (Site 343). The other sites regarded as not significant (Refer to Figure 12).

Site 640 - ruined/abandoned farm house – not significant

Site 641 - farm related infrastructure – concrete pit, drinking trough – not significant

Site 654 – stone tool: not significant

Site 655 – stone tools: not significant

Site 661 – Possible Khoi herder sheep/goat kraal: High significance. Pipeline must avoid

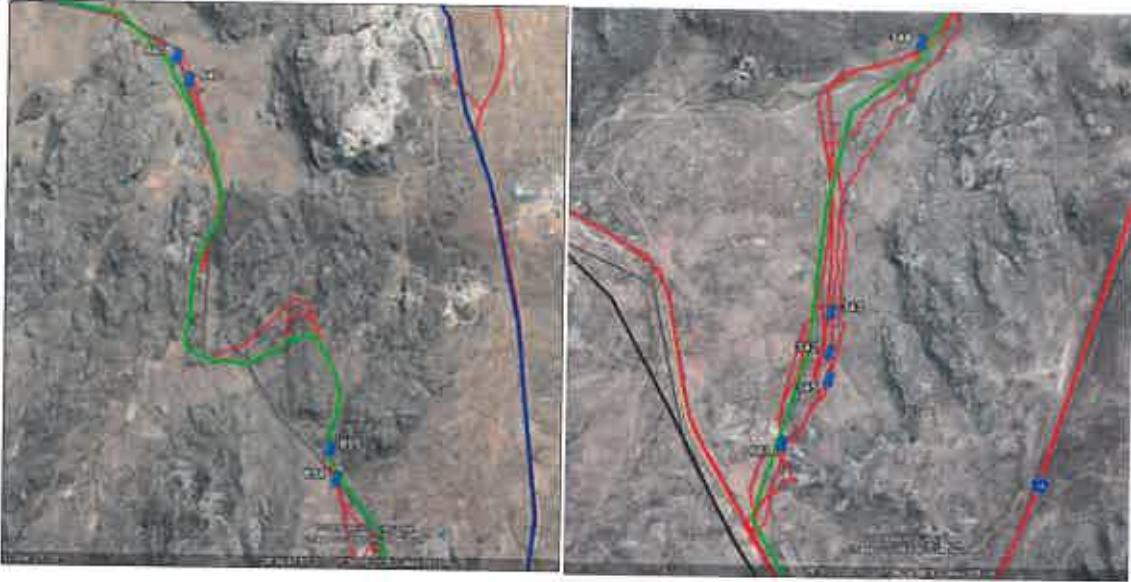
Site 342 – Grave: High significance

Site 343 – stone implement: Low significance

Site 344 – Stone built kraal: Medium significance: Pipeline must avoid

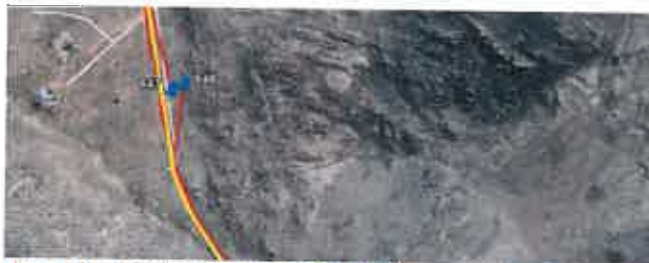
**Site 345** – threshing floor: Medium significance

**Figure 12: Significant sites encountered along the A2 alternative route**



**Carolusberg Alternative A4 (existing line)**

None.



**Figure 13: Carolusberg alternative A4 sites encountered**



**Carolusberg Alternative A4**

Along the A4 alternative two sites of high significance and one of low significance were encountered (Refer to Figure 13).

**Site 646:** Grave/grave marker/stone cairns marking old prospecting site: High significance Pipeline must avoid

**Site 647:** Ruins and rubble of farm house: Low significance

**Site 648:** x 2 possible graves: High significance Pipeline must avoid

Will any building or structure older than 60 years be affected in any way?	YES	<b>NO</b>
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES	NO
If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.		

## 8) SOCIO-ECONOMIC CHARACTER

### a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

#### Level of unemployment:

According to the Nama Khoi Municipal IDP (2012-2017), the Nama Khoi LM is largely populated by potentially economically active and young people. This implies that there is a lot of human capital available for any kind of work, but also that there is space for training and developing young and economically active people in highly qualified occupations in the relevant fields needed. This could increase the employment level of the area.

The various employment indicators are as follows:

- Unemployment rate which indicates the number of people unemployed as a percentage of the economically active population.
- Labour participation rate (LPR) – which indicates the labour force (economically active population) as a percentage of the population in the age cohort of 15 to 64 years.
- The number of persons each economically active person has to support is measured by the labour dependency ratio.

The following table indicates the employment indicators for the Northern Cape Province, the Namakwa DM, and the Nama Khoi LM.

2009	NC	NDM	NKLM
Unemployment Rate	27.6%	19.3%	16.5%
Labour Participation Rate	53.3%	56.8%	56.3%
Labour Dependency Ratio	2.9	2.6	2.5

According to the IDP, the unemployment rate has decreased from 2001 to 2009 with labour participation also showing a decrease. The Nama Khoi LM is performing better than the Namakwa DM and the Northern Cape Province.

#### Economic profile of local municipality:

According to the Nama Khoi Municipal IDP (2012-2017) The Nama Khoi LM covers a geographical area of 14,921 km<sup>2</sup>, which is approximately 12% of Namakwa's total. The Municipality has a population density of 3.9 people per km<sup>2</sup> and a household density of 1.1 households per km<sup>2</sup>. The most significant portion of Namakwa's population (43%) re-sides in this Municipality.

Approximately 3.1% of the population is receiving some form of government grant. This results in a social dependency on the government which in return places strain on the government budget for other services.

The majority of the Nama Khoi LM's population (62.4%) travel to school or to work by foot. Around 26.2% of the Nama Khoi population make use of public transport (i.e. the bus, train, taxi, or lifts with other people); while 0.8% make use of bicycles and 10.6% use their own private transport. Donkeys and horses as well as donkey/horse carts are also widely used in the area.

#### Level of education:

Education Levels (2007), according to the Nama Khoi Municipal IDP (2012-2017)

The following Table indicates the adult education levels (individuals aged 20 years and older) of

citizens residing in the Northern Cape Province, the Namakwa DM, and the Nama Khoi LM.

LEVELS (DM & LM) 2007	NC	NDM	NKLM
No Schooling	12.2%	5.8%	1.7%
Some Primary	20.4%	19.4%	17.4%
Complete Primary (Grade 7)	7.4%	10.1%	11.1%
Some Secondary	33.8%	41.4%	42.7%
Complete Secondary (Grade 12)	16.7%	15.3%	17.5%
Some Secondary with Certificate/Diploma	3.2%	2.1%	2.5%
Complete Secondary with Certificate/Diploma	3.6%	3.6%	4.9%
Tertiary Education	2.7%	2.4%	2.2%

Around 2% of the Nama Khoi LM's adult population has no schooling, which is lower than the overall of the Namakwa DM's 5.8%. Only 9.6% of the Nama Khoi's adult population has a certificate/ diploma or tertiary education.

The majority of the Nama Khoi LM's population is employed in the following occupations:

- Elementary occupations (21.4%)
- Craft and related trades workers (11.9%)
- Service workers, shop and market sales workers (11.4%)

This indicates that there are limited professional skills in the area.

#### b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	R 50 Million	
What is the expected yearly income that will be generated by or as a result of the activity?	R 6.7 Million	
Will the activity contribute to service infrastructure?	YES	NO
Is the activity a public amenity?	YES	NO
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	50	
What is the expected value of the employment opportunities during the development and construction phase?	R 2.0 Million	
What percentage of this will accrue to previously disadvantaged individuals?	% 100	
How many permanent new employment opportunities will be created during the operational phase of the activity?		
What is the expected current value of the employment opportunities during the first 10 years?	R 2.0 Million	
What percentage of this will accrue to previously disadvantaged individuals?	% 100	

**9) BIODIVERSITY**

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult <http://bgis.sanbi.org> or [BGIShelp@sanbi.org](mailto:BGIShelp@sanbi.org). Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

- a) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)

Systematic Biodiversity Planning Category				If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan
Critical Biodiversity Area (CBA)	Ecological Support Area (ESA)	Other Natural Area (ONA)	No Natural Area Remaining (NNR)	CBA 2 Terrestrial: Areas with intermediate irreplaceability or some flexibility in terms of area required to meet biodiversity targets.
				ONA – Remaining natural veld
				NNR – Agricultural or mining areas

- b) Indicate and describe the habitat condition on site

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	± 95-97%	Remaining natural veld in good to excellent condition. Most of these areas are subjected to grazing, but veld still in good condition. Along roads and near towns the vegetation is slightly more impacted.
Near Natural (includes areas with low to moderate level of alien invasive plants)	%	
Degraded (includes areas heavily invaded by alien plants)	%	
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	3-5%	As a result of agriculture, past agriculture mining and urban development.

## c) Complete the table to indicate:

- (i) the type of vegetation, including its ecosystem status, present on the site; and  
(ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		Aquatic Ecosystems						
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Critical	Wetland (including rivers, depressions, channelled and unchannelled wetlands, flats, seeps pans, and artificial wetlands)			Estuary		Coastline	
	Endangered							
	Vulnerable							
	Least Threatened	YES	NO	UNSURE	YES	NO	YES	NO

d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

**BIODIVERSITY ASSESSMENT (Refer to Appendix D1)**

The following information was taken from the Biodiversity Assessment done by PB Consult.

**Vegetation**

Between 95 – 97% of the areas that will be impacted by the preferred pipeline routes is still mostly natural veld of the Succulent Karoo Biome. The Succulent Karoo has little agricultural potential due to the lack of water. The scarcity of grasses limits grazing, and the low carrying capacity requires extensive supplementary feeds. Much soil has been lost from the biome, through sheet erosion, as a consequence of nearly 200 years of grazing. Tourism is a major industry with the spring mass flower displays one of the main attractions. Mining is important, especially in the north (Mucina et al, 2006).

The vegetation types encountered were either Namaqualand Klipkoppe Shrubland associated with the huge granite and gneiss domes and disintegrating boulder koppies with Namaqualand Blommeveld in the valleys and flat areas between the granitic rocky hills of the Namaqualand Escarpment. Although poorly conserved, the vegetation types itself are not considered under threat (with more than 94% still remaining according to the 2004 National Spatial Biodiversity Assessment). In some areas the vegetation has been subjected to intensive farming (ploughed) and it is also subject to constant grazing by goats and sheep. On the other hand the biome has a high number of rare and Red Data Book plant species and the high species richness and unique global status of the biome require urgent conservation attention.

Thus, even though the vegetation types as such are not under threat, they are both in urgent need of further conservation and important in terms of species richness and uniqueness (the area surrounding Springbok specifically mentioned as a an area of special concern). It is thus important to minimise impacts on natural vegetation in good condition and especially to minimise impacts within critical biodiversity areas (CBA's) and ecological support areas (ESA's) networks as proposed within the Namakwa Municipal Biodiversity Sector Plan (2008), which are the proposed conservation network for achieving national conservation targets within the Namaqualand District (refer to Figure 14 underneath).

The preferred Concordia pipeline will be located within the original construction footprint, and as such will minimise impact on natural vegetation. The preferred Carolusberg (A1) option, will be placed within the road reserve, which, although still natural veld in most instances, will reduce impact as a result of its placement near to existing road infrastructure (existing access). It is also proposed to place the pipeline aboveground when going over the klipkoppe, which will further reduce the construction footprint and thus impact significantly.

#### **CBA and ESA priority network**

According to the Namakwa Municipal Biodiversity Sector Plan (2008) the preferred routes will not impact on any CBA area (Figure 14, underneath).

#### **Threatened and Protected plant species**

South Africa has become the first country to fully assess the status of its entire flora. Major threats to the South African flora are identified in terms of the number of plant taxa Red-Listed as threatened with extinction as a result of threats like, habitat loss, invasive alien plant infestation, habitat degradation, unsustainable harvesting, demographic factors, pollution, loss of pollinators or dispersers, climate change and natural disasters. South Africa uses an amended IUCN system of categories in order to also highlight species that may be of low risk of extinction but are still of conservation concern (SANBI, 2015).

**Red-listed plant species:** Two red-listed plant species was observed, namely the Kokerboom (*Aloidendron dichotomum*) and a small perennial herb, which is likely to be the listed *Moraea fenestralis*. However, both of these species are associated with the klipkoppe, which means that the above ground construction method to be used in the Klipkoppe area will minimise impact. Both preferred routes also minimise the impact on klipkoppe as a result of their placement.

In the Northern In the Northern Cape, species of conservation concern are also protected in terms of national and provincial legislation, namely:

**Species protected in terms of NEM: BA (National Environmental Management: Biodiversity Act, Act 10 of 2004):** No species protected in terms of NEM: BA were encountered.

**Species protected in terms of NFA (National Forests Act, Act 84 of 1998):** No species protected in terms of the NFA encountered.

**Species protected in terms of the NCNCA (Northern Cape Nature Conservation Act, Act 9 of 2009):** Thirty (30) plant species protected in terms of the NCNCA were encountered (Refer to Table 10 within the Biodiversity Assessment – Appendix D1). Most of these species are locally common, but at least 6 species are recommended for search & rescue wherever they will be impacted.

The proposed preferred options, the construction method (above ground placement in rocky areas) and search and rescue should minimise any potential long term or significant impact on plant species encountered.

#### **Aquatic ecosystems**

None of the proposed route options will cross any significant river system. However, both

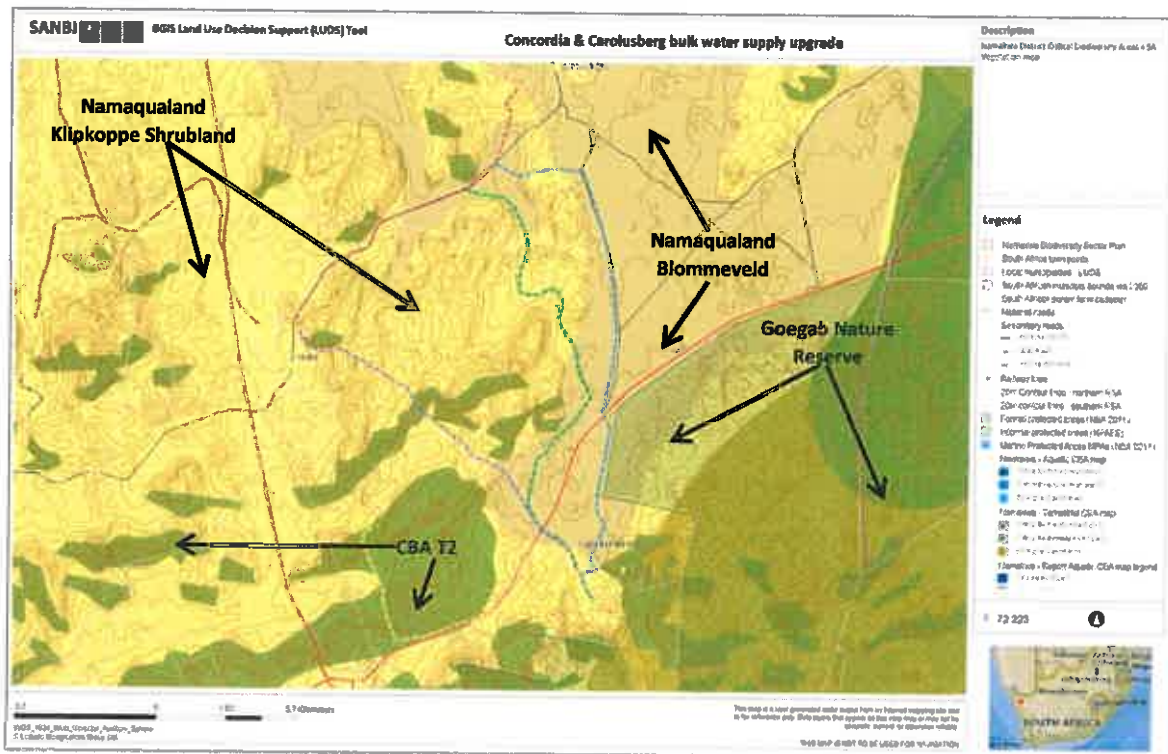


preferred routes will cross a number of small seasonal drainage lines (most of these very poorly defined). The Concordia line will cross these systems in the same footprint as the original pipeline, while the Carolusberg pipeline will cross them within the disturbed road reserve. The impact will be temporary (pipeline placed underneath these features) and with good environmental control all potential permanent impacts can be mitigated.

However, all water courses must be regarded as significant environmental aspects and care must be taken when working in or near such features. Emphasis must be on:

- minimising construction footprint (direct impact);
- rehabilitation of the river corridor and erosion control measures; and
- re-instating its functioning.

Figure 14: SANBI BGIS Vegetation map of South Africa (2012 update) combined with CBA overview



## SECTION C: PUBLIC PARTICIPATION

### 1) ADVERTISEMENT AND NOTICE

<b>Publication name</b>	<b>Die Gemsbok</b>	
<b>Date published</b>	<b>6 November 2015</b>	
<b>Site notice position</b>	<b>Latitude</b>	<b>Longitude</b>
N14 off ramp Carolusberg	S29 37.882	E17 56.572
N14 off ramp Concordia	S29 36.485	E17 57.350
Concordia Municipal offices	S29 32.631	E17 56.850
Concordia main street (on fence)	S29 32.631	E17 56.850
Carolusberg shop (where local mail is collected)		
Concordia/Okiep road	S29 33.409	E17 55.846
Okiep main road	S29 33.747	E17 55.395
Okiep Municipal offices	S29 35.814	E17 52.997
Springbok Municipal offices		
<b>Date placed</b>	<b>5 &amp; 6 November 2015</b>	

Include proof of the placement of the relevant advertisements and notices in Appendix E1.

### 2) DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN 733.

Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 733

<b>Title, Name and Surname</b>	<b>Affiliation/ key stakeholder status</b>	<b>Contact details (tel number or e-mail address)</b>
Please Refer to Appendix E2(a)		

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E2. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

### 3) ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

<b>Summary of main issues raised by I&amp;APs</b>	<b>Summary of response from EAP</b>
OCC (Granite mine just south of Concordia) commented (verbal comments to Engineer) that the A2 alternative is likely to impact on an area intended for future mining (long term mining rights).	At that stage Alternative A2 <i>was</i> the preferred option. New possible routes were evaluated, which led to a new preferred route, Alternative A1.

#### 4) COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to the **Final BAR as Appendix E3**.

#### 5) AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
Please refer to Appendix E2(a)					

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

#### 6) CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for any activities (linear or other) where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of registered I&APs must be included as Appendix E5.

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

## SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014 and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

### 1) IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

#### Concordia - Alternative A1

Activity	Impact summary	Significance	Proposed mitigation
<b>Alternative 1 (preferred alternative)</b>			
Geographical and physical	<b>Direct impacts:</b>	Low	Implement EMP; Minimise footprint; ECO monitoring; Use appropriate machinery; Remove old pipeline in sandy areas; Legal asbestos disposal; Good housekeeping and waste management.
	<b>Indirect impacts:</b>	Low	
	<b>Cumulative impacts: After mitigation</b>	Low	
Biological: (vegetation, protected species, CBA's etc.)	<b>Direct impacts:</b>	Medium/low	Implement EMP; Minimise footprint; ECO monitoring; Topsoil removal (seed store); No protected trees to be disturbed; Rehabilitation of whole construction footprint; Obtain permits (NCNCA & DAFF) where applicable; Implement integrated waste management;
	<b>Indirect impacts:</b>	Low	
	<b>Cumulative impacts: After mitigation</b>	Low negative	
Socio-economic	<b>Direct impacts:</b>	Medium/low	Appoint a local representative to assist with the sourcing and appointment of suitable LOCAL people, wherever possible during the construction and operational phase.
	<b>Indirect impacts:</b>	Medium	
	<b>Cumulative impacts: After mitigation</b>	Medium/low positive	
Cultural Historical	<b>Direct impacts:</b>	N/a	No cultural historical features identified.
	<b>Indirect impacts:</b>	N/a	As precaution, contact SAHRA should be any unmarked human remains, or any bones, be exposed or uncovered during construction.
	<b>Cumulative impacts: After mitigation</b>	N/a	
Noise impact	<b>Direct impacts:</b>	Low	Implementation of the EMP; Keeping reasonable working hours near urban areas; Ensure vehicles are well maintained and equipped with silencers; ECO monitoring.
	<b>Indirect impacts:</b>	Low	
	<b>Cumulative impacts: After mitigation</b>	Medium/low negative	

Activity	Impact summary	Significance	Proposed mitigation
<b>Alternative 1 (preferred alternative)</b>			
Visual impact	<b>Direct impacts:</b>	Medium	There is no mitigation apart from painting the pipeline a colour that will blend in with the surroundings.
	<b>Indirect impacts:</b>	Negligible	
	<b>Cumulative impacts: After mitigation</b>	Medium negative	
<b>No-go option</b>			
Maintenance	<b>Direct impacts:</b>	Medium/High	Maintenance without proper environmental control is likely to result in long terms visually and ecologically unacceptable disturbance related impacts.
	<b>Indirect impacts:</b>	Medium	
	<b>Cumulative impacts: After mitigation</b>	Medium/High negative	

### Carolusberg – Alternative A1

Activity	Impact summary	Significance	Proposed mitigation
<b>Alternative 1 (preferred alternative)</b>			
Geographical and physical	<b>Direct impacts:</b>	Low	Implement EMP; Minimise footprint; ECO monitoring; <b>Use appropriate machinery;</b> Remove old pipeline in sandy areas; Legal asbestos disposal; Good housekeeping and waste management.
	<b>Indirect impacts:</b>	Low	
	<b>Cumulative impacts: After mitigation</b>	Low negative	
Biological: (vegetation, protected species, CBA's etc.)	<b>Direct impacts:</b>	Medium/low	Implement EMP; Minimise footprint; ECO monitoring; Topsoil removal (seed store); No protected trees to be disturbed; Rehabilitation of whole construction footprint; Obtain permits (NCNCA & DAFF) where applicable; Implement integrated waste management;
	<b>Indirect impacts:</b>	Low	
	<b>Cumulative impacts: After mitigation</b>	Low negative	
Socio-economic	<b>Direct impacts:</b>	Medium/low	Appoint a local representative to assist with the sourcing and appointment of suitable LOCAL people, wherever possible during the construction and operational phase.
	<b>Indirect impacts:</b>	Medium	
	<b>Cumulative impacts: After mitigation</b>	Medium positive	
Cultural Historical	<b>Direct impacts:</b>	Possibly High	Demarcate heritage sites as No-Go areas with a buffer zone of >20m and avoid. Burial sites may not be disturbed or removed. Contact SAHRA should be any unmarked human remains, or any bones, be exposed or uncovered during construction..
	<b>Indirect impacts:</b>	N/a	
	<b>Cumulative impacts:</b>	Negligible	
Noise impact	<b>Direct impacts:</b>	Medium/low	Implementation of the EMP; Keeping reasonable working hours near urban areas; Ensure vehicles are well maintained and equipped with silencers; ECO monitoring.
	<b>Indirect impacts:</b>	Low	
	<b>Cumulative impacts: After mitigation</b>	Low negative	

Activity	Impact summary	Significance	Proposed mitigation
<b>Alternative 1 (preferred alternative)</b>			
Visual impact	<b>Direct impacts:</b>	Medium/low	There is no mitigation apart from painting the pipeline a colour that will blend in with the surroundings.
	<b>Indirect impacts:</b>	Negligible	
	<b>Cumulative impacts: After mitigation</b>	Medium/low negative	
<b>No-go option</b>			
Maintenance	<b>Direct impacts:</b>	Medium/High	Maintenance without proper environmental control is likely to result in long terms visually and ecologically unacceptable disturbance related impacts.
	<b>Indirect impacts:</b>	Medium	
	<b>Cumulative impacts: After mitigation</b>	Medium/High negative	

### Carolusberg – Alternative A2

Activity	Impact summary	Significance	Proposed mitigation
<b>Alternative 1 (preferred alternative)</b>			
Geographical and physical	<b>Direct impacts:</b>	Medium	Implement EMP; Minimise footprint; ECO monitoring; Use appropriate machinery; Remove old pipeline in sandy areas; Legal asbestos disposal; Good housekeeping and waste management.
	<b>Indirect impacts:</b>	Low	
	<b>Cumulative impacts: After mitigation</b>	Low negative	
Biological: (vegetation, protected species, CBA's etc.)	<b>Direct impacts:</b>	Medium/low	Implement EMP; Minimise footprint; ECO monitoring; Topsoil removal (seed store); No protected trees to be disturbed; Rehabilitation of whole construction footprint; Obtain permits (NCNCA & DAFF) where applicable; Implement integrated waste management;
	<b>Indirect impacts:</b>	Low	
	<b>Cumulative impacts: After mitigation</b>	Low negative	
Socio-economic	<b>Direct impacts:</b>	Medium/low	Appoint a local representative to assist with the sourcing and appointment of suitable LOCAL people, wherever possible during the construction and operational phase.
	<b>Indirect impacts:</b>	Medium	
	<b>Cumulative impacts: After mitigation</b>	Medium positive	
Cultural Historical	<b>Direct impacts:</b>	Possibly High	Demarcate heritage sites as No-Go areas with a buffer zone of >20m and avoid. Burial sites may not be disturbed or removed. Contact SAHRA should be any unmarked human remains, or any bones, be exposed or uncovered during construction..
	<b>Indirect impacts:</b>	N/a	
	<b>Cumulative impacts:</b>	Negligible	
Noise impact	<b>Direct impacts:</b>	Medium/low	Implementation of the EMP; Keeping reasonable working hours near urban areas; Ensure vehicles are well maintained and equipped with silencers; ECO monitoring.
	<b>Indirect impacts:</b>	Low	
	<b>Cumulative impacts: After mitigation</b>	Low negative	

Activity	Impact summary	Significance	Proposed mitigation
<b>Alternative 1 (preferred alternative)</b>			
Visual impact	<i>Direct impacts:</i>	Low	There is no mitigation apart from painting the pipeline a colour that will blend in with the surroundings.
	<i>Indirect impacts:</i>	Negligible	
	<i>Cumulative impacts: After mitigation</i>	Low negative	
<b>No-go option</b>			
Maintenance	<i>Direct impacts:</i>	Medium/High	Maintenance without proper environmental control is likely to result in long terms visually and ecologically unacceptable disturbance related impacts.
	<i>Indirect impacts:</i>	Medium	
	<i>Cumulative impacts: After mitigation</i>	Medium/High negative	

### Carolusberg – Alternative A3

Activity	Impact summary	Significance	Proposed mitigation
<b>Alternative 1 (preferred alternative)</b>			
Geographical and physical	<i>Direct impacts:</i>	Medium/high	Implement EMP; Minimise footprint; ECO monitoring; Use appropriate machinery; Remove old pipeline in sandy areas; Legal asbestos disposal; Good housekeeping and waste management.
	<i>Indirect impacts:</i>	Medium	
	<i>Cumulative impacts: After mitigation</i>	Medium/low negative	
Biological: (vegetation, protected species, CBA's etc.)	<i>Direct impacts:</i>	Medium/high	Implement EMP; Minimise footprint; ECO monitoring; Topsoil removal (seed store); No protected trees to be disturbed; Rehabilitation of whole construction footprint; Obtain permits (NCNCA & DAFF) where applicable; Implement integrated waste management;
	<i>Indirect impacts:</i>	medium	
	<i>Cumulative impacts: After mitigation</i>	Medium/low negative	
Socio-economic	<i>Direct impacts:</i>	Medium/low	Appoint a local representative to assist with the sourcing and appointment of suitable LOCAL people, wherever possible during the construction and operational phase.
	<i>Indirect impacts:</i>	Medium	
	<i>Cumulative impacts: After mitigation</i>	Medium positive	
Cultural Historical	<i>Direct impacts:</i>	Possibly High	Demarcate heritage sites as No-Go areas with a buffer zone of >20m and avoid. Burial sites may not be disturbed or removed. Contact SAHRA should be any unmarked human remains, or any bones, be exposed or uncovered during construction..
	<i>Indirect impacts:</i>	N/a	
	<i>Cumulative impacts:</i>	Negligible	
Noise impact	<i>Direct impacts:</i>	Medium/low	Implementation of the EMP; Keeping reasonable working hours near urban areas; Ensure vehicles are well maintained and equipped with silencers; ECO monitoring.
	<i>Indirect impacts:</i>	Low	
	<i>Cumulative impacts: After mitigation</i>	Low negative	

Activity	Impact summary	Significance	Proposed mitigation
<b>Alternative 1 (preferred alternative)</b>			
Visual impact	<i>Direct impacts:</i>	Medium	There is no mitigation apart from painting the pipeline a colour that will blend in with the surroundings.
	<i>Indirect impacts:</i>	Negligible	
	<i>Cumulative impacts: After mitigation</i>	Medium negative	
<b>No-go option</b>			
Maintenance	<i>Direct impacts:</i>	Medium/High	Maintenance without proper environmental control is likely to result in long terms visually and ecologically unacceptable disturbance related impacts.
	<i>Indirect impacts:</i>	Medium	
	<i>Cumulative impacts: After mitigation</i>	Medium/High negative	

A complete impact assessment in terms of Regulation 19(3) of GN 733 must be included as Appendix F.

## 2) ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

### Concordia alternatives

There are no logical route alternatives, which will either reduce construction or maintenance costs. As a result the Engineers opted to install the new pipeline adjacent to the existing (in order to be able to maintain water supply during construction). However, to reduce the physical impact on the rocky sections and to reduce construction cost, it is proposed that sections of the pipeline (crossing the rocky koppies) will be located above ground. With regards to the old pipeline (after commissioning of the new pipeline), it is proposed that only the above ground pipeline sections and those located within the sandy soil areas will be removed. This again to reduce costs and also to minimise impact on the natural veld over the koppies areas.

The most significant impacts associated with the proposed project are:

- Short term temporary impact on natural veld (in very good condition on the koppies) and areas of tourist importance (flowering hotspots as a result of previous agricultural areas in some of the sandy sections).
- Although the vegetation (especially the rocky koppies) is mostly still in good condition, it is not considered vulnerable in terms of ecological conservation targets.
- No nationally protected tree species will be impacted.
- A number of plant species protected in terms of the Northern Cape Nature Conservation Act, Act 9 of 2009 is likely to be disturbed or impacted, and application for a flora permit will have to be submitted to the DENC.
- No critical biodiversity areas will be impacted.
- The new pipeline will have a temporary impact on a number of small seasonal drainage lines. However, it will be in the same construction footprint as the original pipeline.



**No-go alternative (compulsory)**

It is very important to note that the “No-Go Alternative” will not result in a status quo or no impact. It will only mean that the capacity of the two pipelines cannot be expanded. The existing infrastructure will remain under pressure (struggling to meet current demands) and is likely to prohibit/restrict future development in these two areas (service restrictions). The maintenance and operational costs of the Carolusberg line will continue to rise (more expensive water).

The no-go alternative will also NOT mean that many of the impacts associated with the expansion WILL NOT occur. In fact it is very likely that both these pipelines will have to be replaced in any case, as part of maintenance as a result of the many failures. This will mean that the pipeline will be replaced as emergency repairs or in sections over a time, without any environmental control, which might result in a much higher overall environmental impact over which there will be very little control.

**Carolusberg alternatives**

A number of alternative route options were investigated by the design engineers, mainly because the existing pipeline route to Carolusberg is very expensive to operate (pump costs) and to maintain (difficult access). The main purpose of the various route options was to find the shortest route “around” the koppies between Okiep and Carolusberg in order to minimise pumping costs.

**Alternative A1 (preferred): (12.7 km with an average slope of 2.3%)****Advantages:**

- Second choice from an engineering perspective to A2 because it is slightly longer (construction costs will be higher).
- Slope and operational costs most acceptable.
- Located mostly in the sandy soils associated with Namaqualand Blommenveld.
- Will not impact on vulnerable vegetation types or critical biodiversity areas.
- Will not impact on nationally protected tree species.
- In addition almost 90% of the line will be located within a road reserve or urban areas, which will further lessen impacts on natural vegetation and bioregional conservation targets.
- No additional roads will have to be constructed.

**Disadvantages:**

- The first section (above ground section) of the pipeline is very short, but will be highly visible as one drives from Okiep to Concordia.
- It will pass near significant heritage features, but mitigation will be easy.
- It is likely to impact on a number of plant species protected in terms of the NCNCA and application for a flora permit will have to be submitted to the DENC.

**Alternative A2: (12.4 km with an average slope of 4.2%)****Advantages:**

- First choice from an engineering perspective because it is slightly shorter than A1.
- Slope and operational costs acceptable.
- Might impact on nationally protected tree species (Kokerboom), but this can be mitigated.
- Will not impact on vulnerable vegetation types or critical biodiversity areas.

- Most of the pipeline will be above ground as most of it will cross over Namaqualand Klipkoppe.

**Disadvantages:**

- It will impact on an area with existing mining rights (which negated the viability of this option).
- The pipeline will mostly be located within almost undisturbed natural veld.
- It is likely to impact on a number of plant species protected in terms of the NCNCA and application for a flora permit will have to be submitted to the DENC.
- It will pass near significant heritage features, and small route alterations may have to be made.
- Short sections of additional maintenance access roads will have to be established.

**Alternative A3: (10.8 km with an average slope of 4.7%)**

**Advantages:**

- Shortest route, but pass over private land.
- Slope and operational costs acceptable.
- Most of the pipeline will be above ground as most of it will cross over Namaqualand Klipkoppe.

**Disadvantages:**

- A large portion of the pipeline will be located within a critical biodiversity area.
- The first section of the pipeline will be highly visible as one drives along the back road between Springbok and Carolusberg.
- The pipeline will mostly be located within almost undisturbed natural veld.
- Might impact on nationally protected plant species (e.g. Kokerboom).
- It is likely to impact on a number of plant species protected in terms of the NCNCA and application for a flora permit will have to be submitted to the DENC.
- It will pass near significant heritage features, and small route alterations may have to be made.
- Short sections of additional maintenance access roads may have to be established.

**No-go alternative (compulsory)**

It is very important to note that the "No-Go Alternative" will not result in a *status quo* or no impact. It will only mean that the capacity of the two pipelines cannot be expanded. The existing infrastructure will remain under pressure (struggling to meet current demands) and is likely to prohibit/restrict future development in these two areas (service restrictions). The maintenance and operational costs of the Carolusberg line will continue to rise (more expensive water).

The no-go alternative will also NOT mean that many of the impacts associated with the expansion WILL NOT occur. In fact it is very likely that both these pipelines will have to be replaced in any case, as part of maintenance as a result of the many failures. This will mean that the pipeline will be replaced as emergency repairs or in sections over a time, without any environmental control, which might result in a much higher overall environmental impact over which there will be very little control.

## SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?	<b>YES</b>	NO
--	------------	----

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment).

--

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application.

### Recommended conditions

- All construction must be done in accordance with an approved construction and operational phase Environmental Management Plan (EMP), which must be developed by a suitably experienced Environmental Assessment Practitioner.
- A suitably experienced ECO must be appointed to ensure compliance with environmental conditions of the Environmental Authorization.
- Application for a flora permit must be made in terms of the NCNCA with regards to protected species listed in Schedule 1 and 2 of the act.
- Access should be limited to existing routes and any additional temporary access routes must be approved by the ECO and rehabilitated on completion.
- When working near urban areas, construction should adhere to during reasonable working hours in order to minimise noise nuisance.
  
- All significant biodiversity features must be identified and mapped on the site plans. This includes all areas falling within Ecological support areas, Critical Biodiversity Areas (CBA1 & CBA2) as well as any river crossing. Special care must be taken when working in any of these areas.
- Before any work is done the construction footprint must be clearly demarcated (with the aim at minimal width/smallest footprint). The demarcation must include the total footprint necessary to execute the work, but must aim at minimum disturbance.
- All access to the klipkoppe areas must be approved by the ECO during construction, aiming at minimum disturbance.
- Before construction the footprint must be scanned by a botanist or suitably qualified ECO in order to identify plants of significance. The Botanist must advise on the best way to minimise the impact (e.g. through Search & Rescue) on such plants taking the following into account:
  - All *Aloe* (Alwyn), *Aloidendron dichotomum* (Kokerboom), *Bulbine*, *Crassula* and *Cotyledon* species encountered must be transplanted directly off the construction footprint wherever encountered.
  - A watering program must be implemented for transplanted plants.
  - All efforts must be made to protect all mature indigenous trees that might be encountered.
- Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO.
- Indiscriminate clearing of areas must be avoided.

- Identified heritage features must be demarcated as “No-Go” areas with a buffer zone of >20 m. Burial sites may not be disturbed or removed.
- SAHRA must be contacted should any archaeological or heritage remains be encountered during construction.
- In areas where the pipeline will be placed underground topsoil (the top 15 – 20 cm of soil) must be removed and protected to be re-used during the rehabilitation after construction (the purpose being to re-use as much of the seed and bulb stock within the topsoil layer for re-establishing these species in the disturbed areas).
- All watercourses and stream must be classified as significant environmental features. When working within or near any watercourse:
  - The impact on the riparian corridor must be minimised through footprint minimisation.
  - River or stream function must be restored as part of rehabilitation.
  - River crossing should be done during low flow (dry season) wherever possible.
  - River crossings should be diagonally to the river banks (the shortest route possible).
  - Adequate measures must be implemented to ensure against erosion.
- All alien vegetation must be removed from within the construction footprint (the road reserve) and immediate surroundings (especially river corridors).
  - It is imperative that the correct alien eradication methods are employed (especially with regards to *Prosopis* control) as incorrect methods **WILL** aggravate the infestation (Please refer to the specific alien control methods described within the EMP).
  - Follow up work must be carried out after rehabilitation to ensure that no invasive alien plant re-establishes itself.
- All construction areas must be suitably rehabilitated on completion of the project.
  - This includes the removal of all excavated material, spoil and rocks, all construction related material and all waste material.
  - It also included replacing the topsoil back on top of the excavation as well as shaping the area to represent the original shape of the environment.
  - All absolute aboveground infrastructure associated with the original pipeline must be removed.
  - Not removing the old underground pipeline (especially within the rocky sections) should reduce the direct impact and footprint significantly, but any aboveground remains from the original pipeline should be removed.

Is an EMP attached?

YES

NO

The EMPr must be attached as Appendix G.


The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Any other information relevant to this application and not previously included must be attached in Appendix J.

*A. J. J. Bates*

NAME OF EAP



SIGNATURE OF EAP

*15 July 2016*

DATE

## SECTION F: APPENDIXES

The following appendixes are attached:

### Appendix A: Maps

- A1: Regional Location Map
- A2: Local Location Map
- A3: Vegetation Map
- A4: Namakwa District Sector Plan (Biodiversity sensitivity map)
- A5: General Soil map
- A8: Land cover map

### Appendix B: Photographs

### Appendix C: Facility illustration(s)

N/a

### Appendix D: Specialist reports (including terms of reference)

- D1: Biodiversity assessment
- D2: Archaeological assessment

### Appendix E: Public Participation

- E1: Proof of PPP
  - E1(a): Proof of Advertisement
  - E1(b): Proof of posters
- E2: Key Stakeholders
  - E2(a) Register of I&AP's
  - E2(b): Proof of notification of registered I&AP's
- E3: Comments received
  - E3(a): Comments
  - E3(b): Comments & response report
- E4: Proof of notification to Organs of State (Refer to E2(b) above)
- E5: Register of I&AP's (Refer to E2(a) above)
- E6: Stakeholder correspondence & minutes of meetings  
N/a

### Appendix F: Impact Assessment

### Appendix G: Environmental Management Programme (EMPr)

### Appendix H: Details of EAP and expertise

### Appendix I: Specialist's declaration of interest

- I1: Declaration from Biodiversity Specialist
- I2: Declaration from Archaeological Specialist

### Appendix J: Additional Information

None

## APPENDIX A

### **MAPS & SITE PLANS**

---

***A1: Location map***

***A2: Location map local***

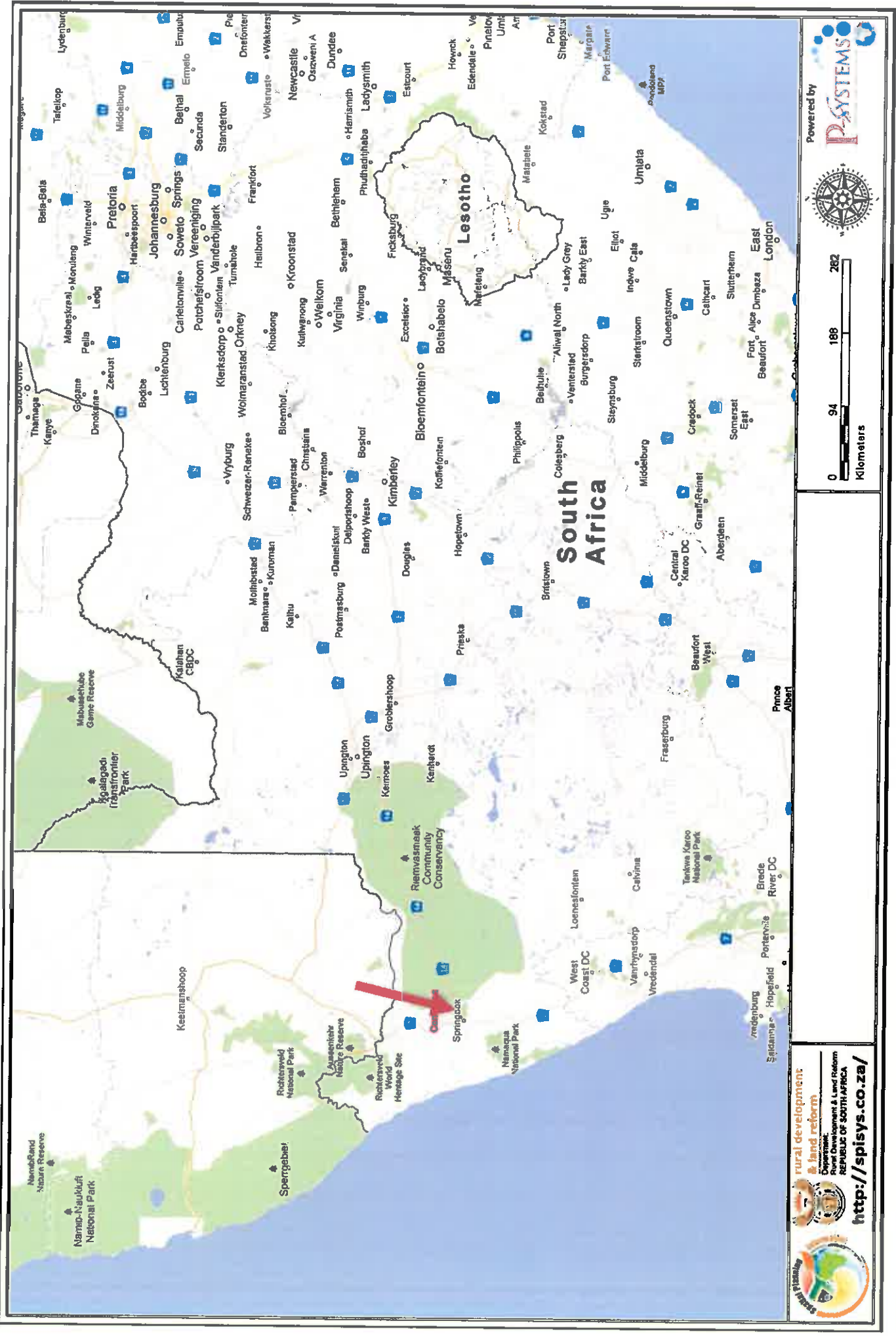
***A3: Vegetation Map of SA***

***A4: Namakwa Biodiversity Sector Map***

***A5: General Soil Map***

***A6: Land Cover Map***

**FIGURE 1: LOCATION OF THE PROPOSED PROJECT, NORTHERN CAPE PROVINCE**



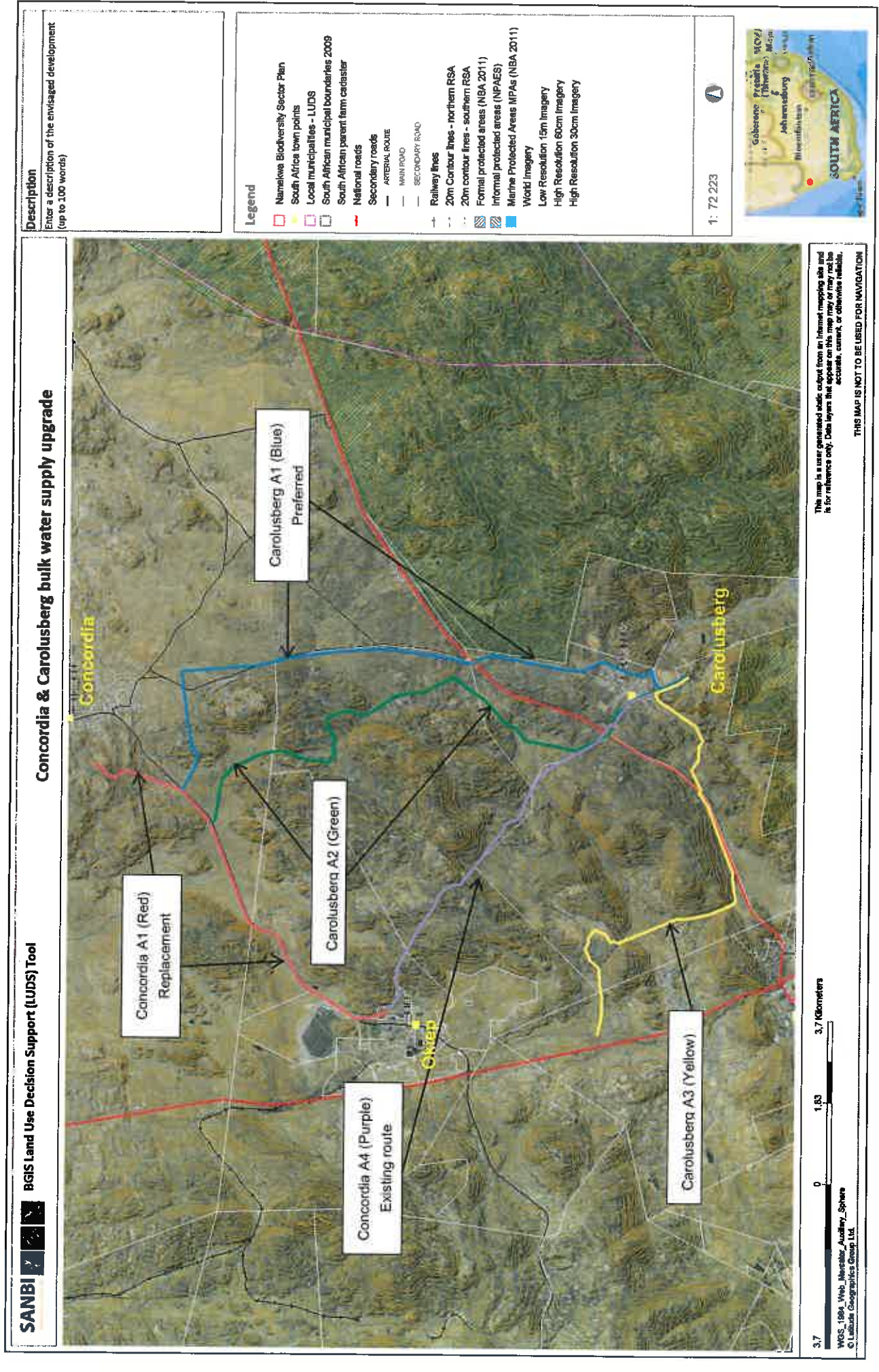

  
**rural development & land reform**
  
 Department of Rural Development & Land Reform
   
 REPUBLIC OF SOUTH AFRICA
   
<http://spisys.co.za/>

0 94 188 282
   
 Kilometers
   

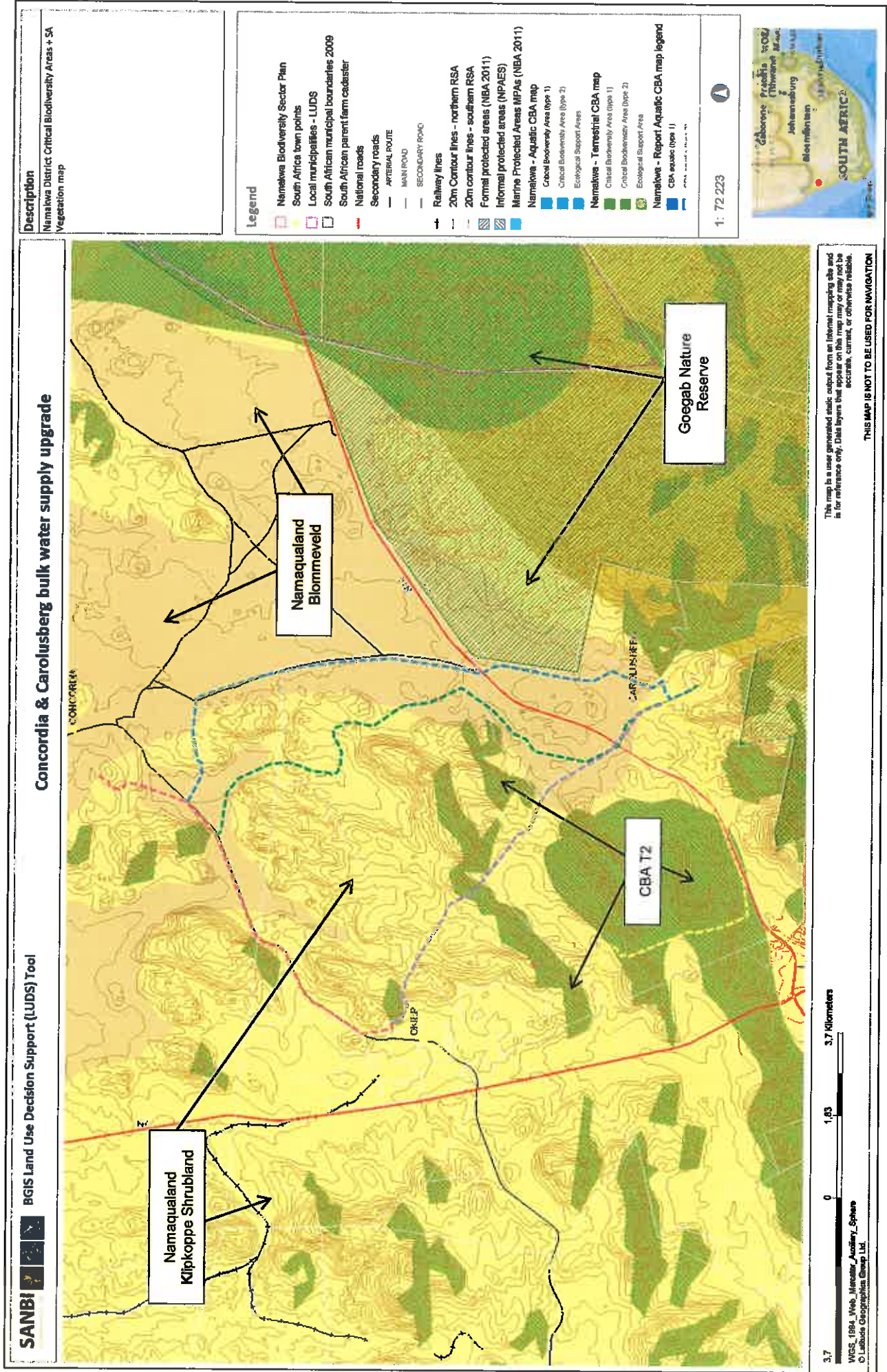
  
 Powered by
   



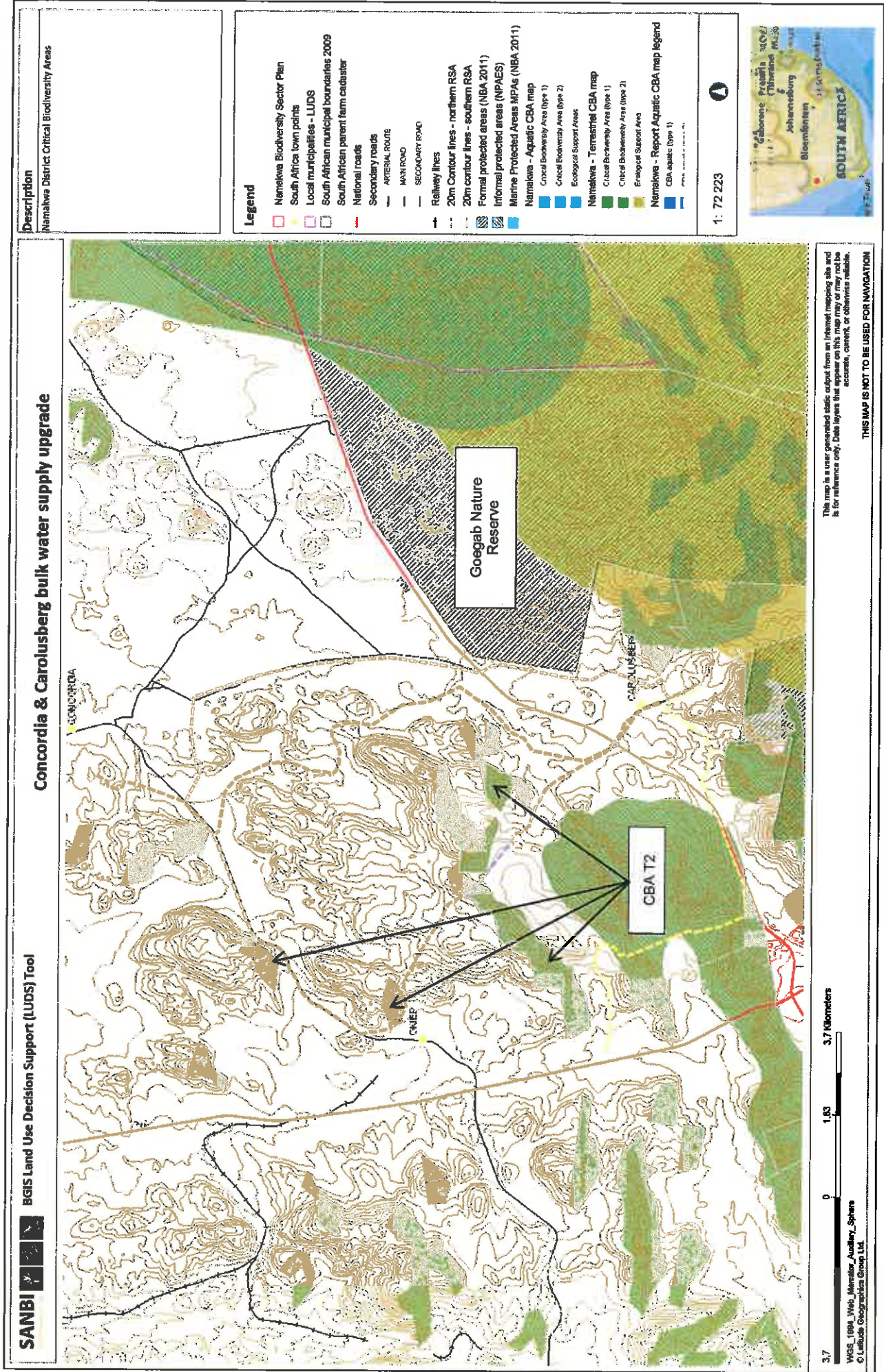

**FIGURE 2: PROPOSED CONCORDIA AND CAROLUSBERG PIPELINE UPGRADE ROUTES**



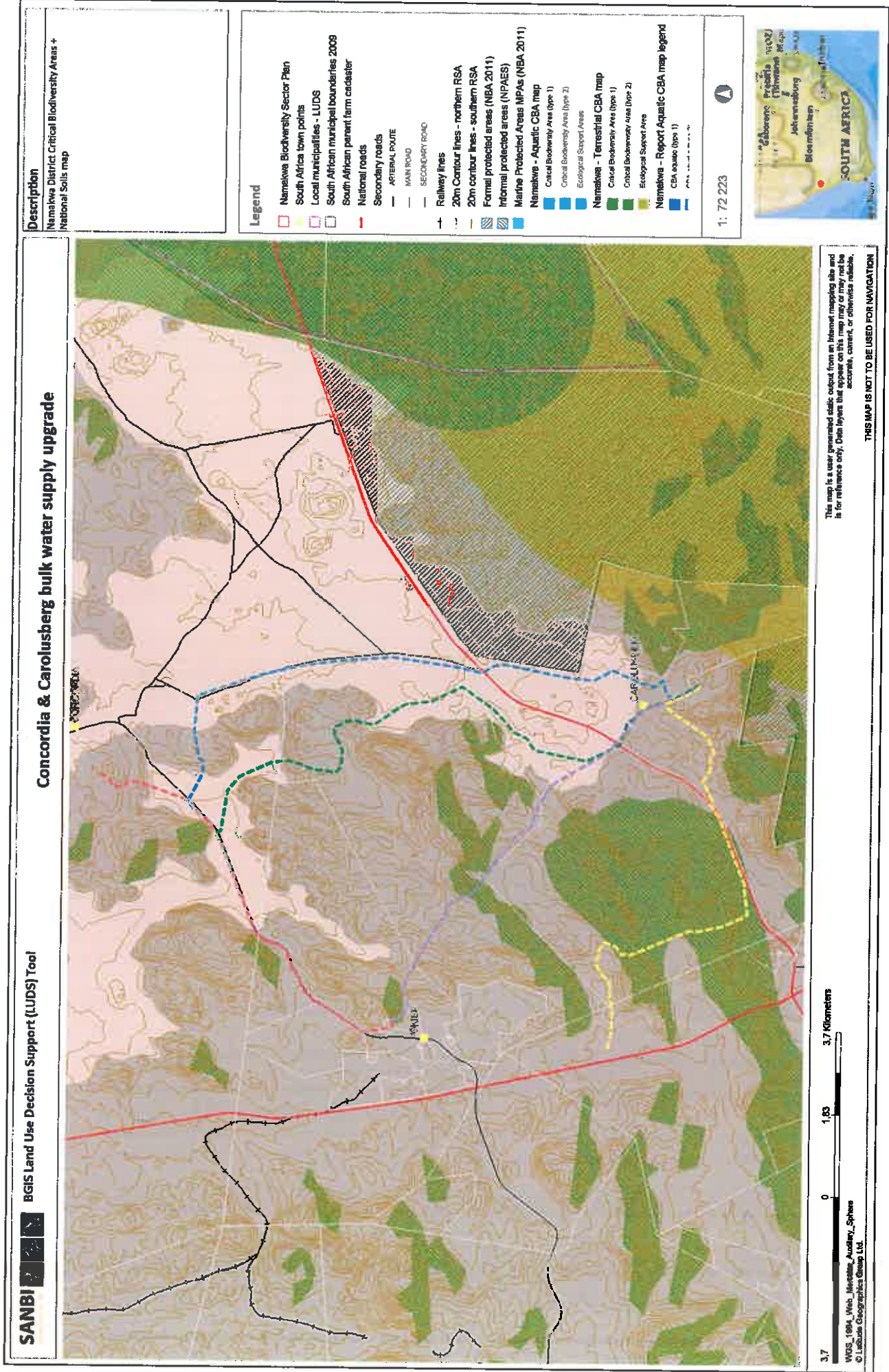
**FIGURE 3: VEGETATION MAP OF SOUTH AFRICA (WITH CBA AREAS OVERLAID), SHOWING THE PROPOSED ROUTES**



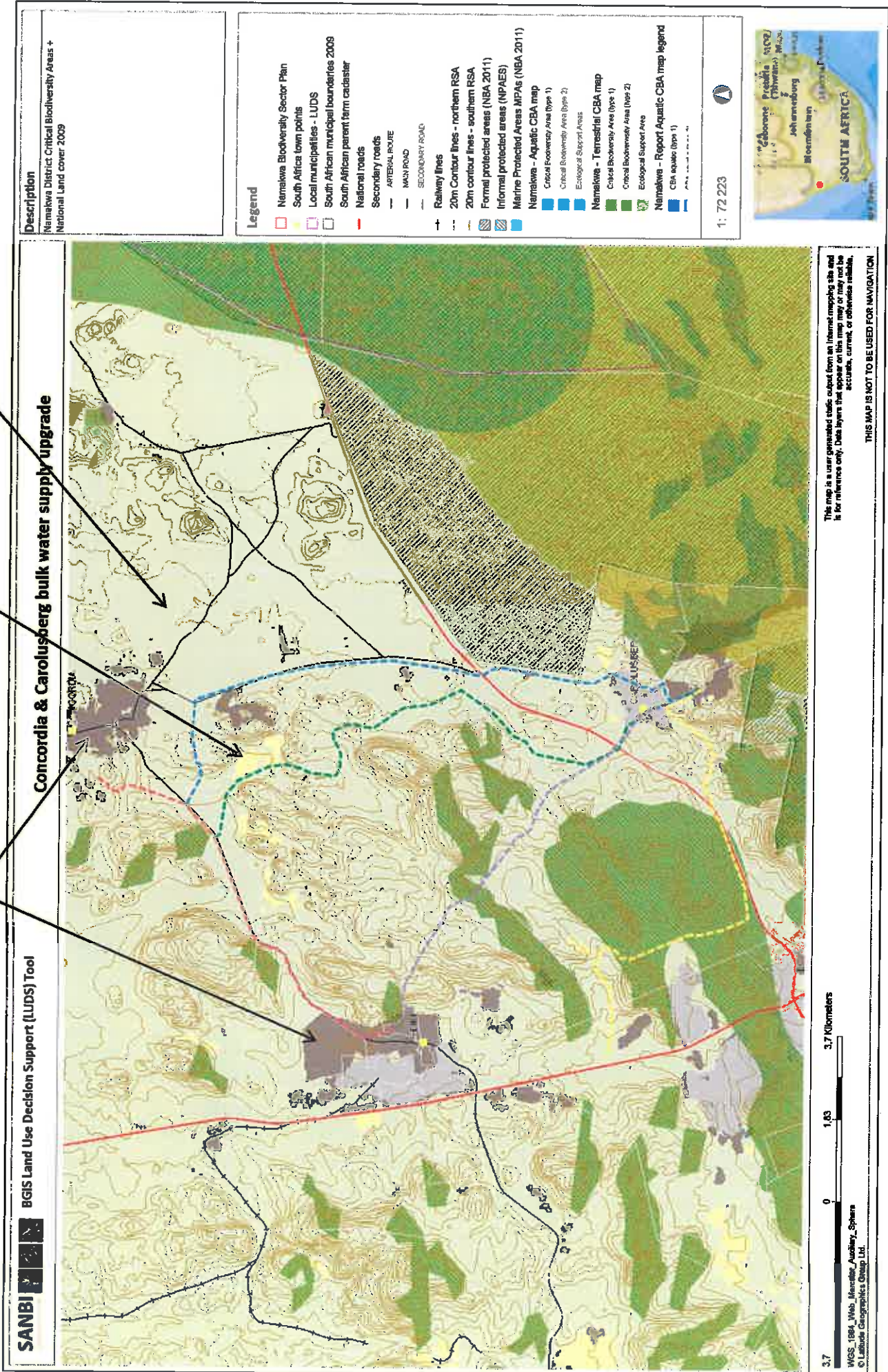
**FIGURE 4: NAMAKWA DISTRICT CONSERVATION PLAN, INDICATING CBA'S AND THE GOEGAB NATURE RESERVE IN RELATION TO PROPOSED DEVELOPMENT**



**FIGURE 5: SANBI BIGIS MAP SHOWING THE SOIL TYPES EXPECTED (LIGHT BROWN ASSOCIATED WITH BLOMMEVELD, REMAINDER KLIPKOPPE SHRUBLAND)**



**FIGURE 6: SANBI BGIS LAND COVER MAP, SHOWING MINING (DARK BROWN), AGRICULTURE (YELLOW) AND NATURAL VELD (GREEN)**



## APPENDIX B

### ***SITE PHOTOGRAPHS***

---

*Overview photos of the pipeline routes*

CONCORDIA PIPELINE: ALTERNATIVE A1 (REPLACEMENT PIPELINE)

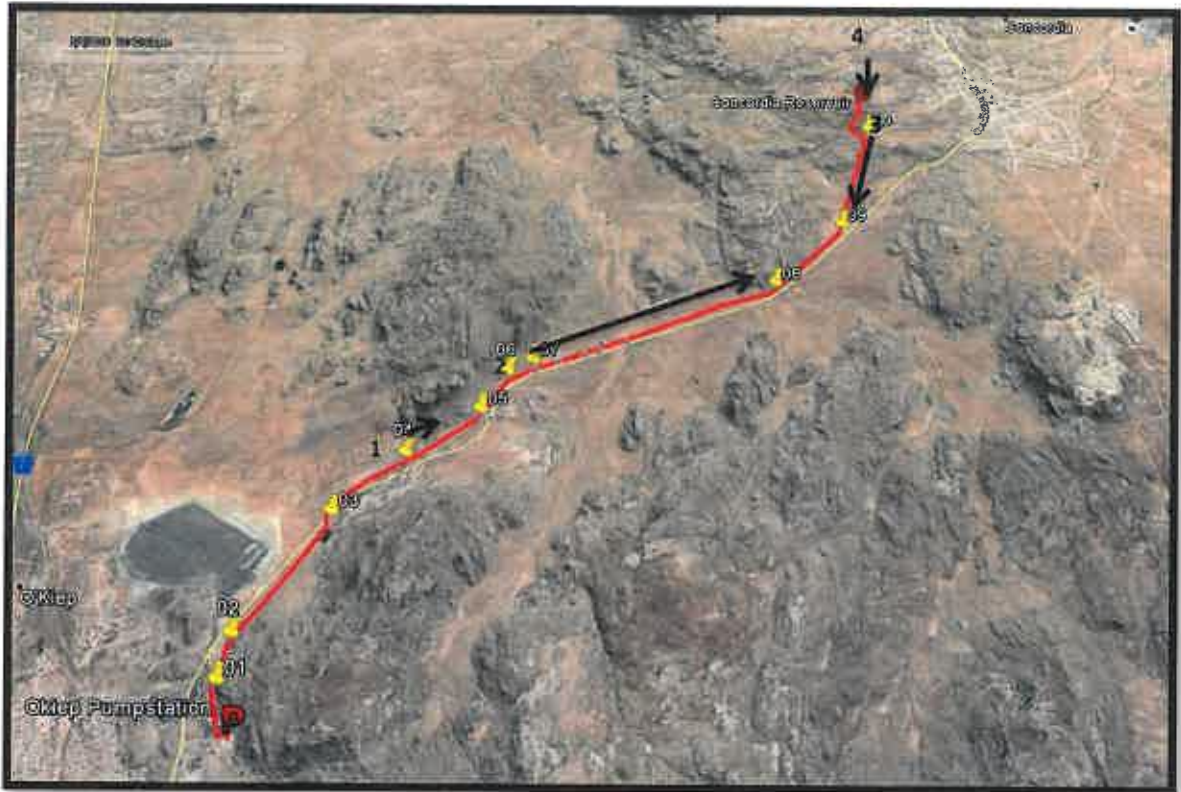


Photo 1: Looking onto first koppie from Okiep towards Concordia



Photo 2: Looking over valley from Okiep towards Concordia



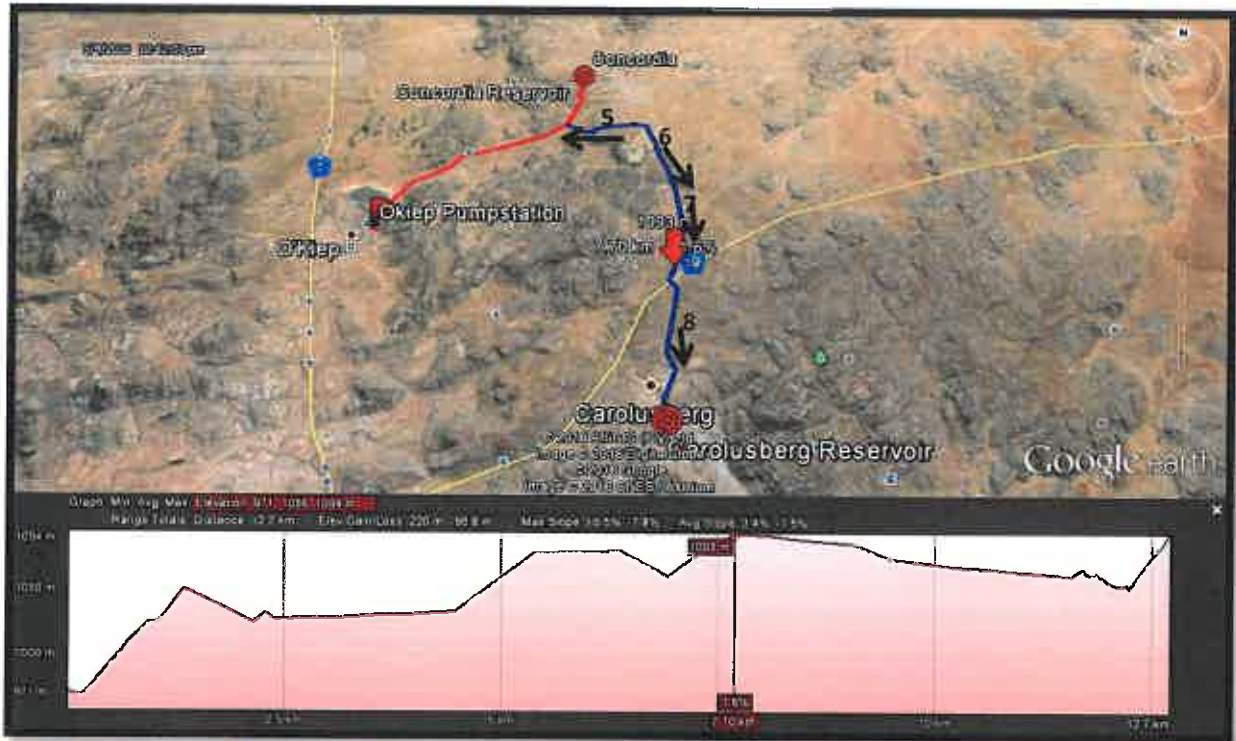
Photo 3: Looking down onto valley from the Concordia reservoir



Photo 4: Concordia reservoir



**CAROLUSBERG PIPELINE: ALTERNATIVE A1 (Preferred alternative)**



**Photo 5: Looking down onto valley towards Okiep**



**Photo 6: Following road from Concordia to Carolusberg**



**Photo 7: Road between Concordia and Carolusberg**

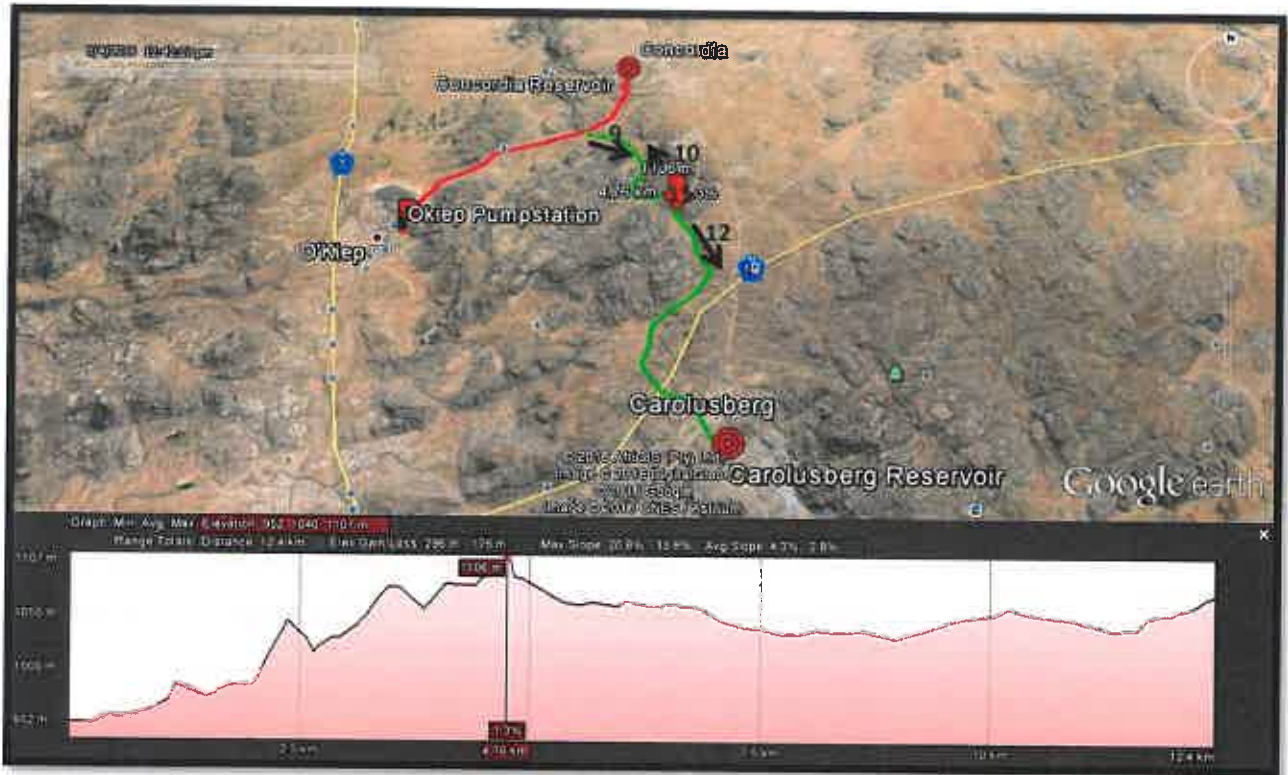


**Photo 8: Eastern access road towards Carolusberg**





**CAROLUSBERG PIPELINE: ALTERNATIVE A2**



**Photo 9: Looking towards Carolusberg into valley**



**Photo 10: Looking back from over valley towards Concordia**



**Photo 11: Agriculture within valley**



**Photo 12: Looking towards Carolusberg from klipkoppes**



CAROLUSBERG PIPELINE: ALTERNATIVE A3



Photo 13: Looking back towards Springbok north



Photo 14: Looking over valley behind Springbok Industrial



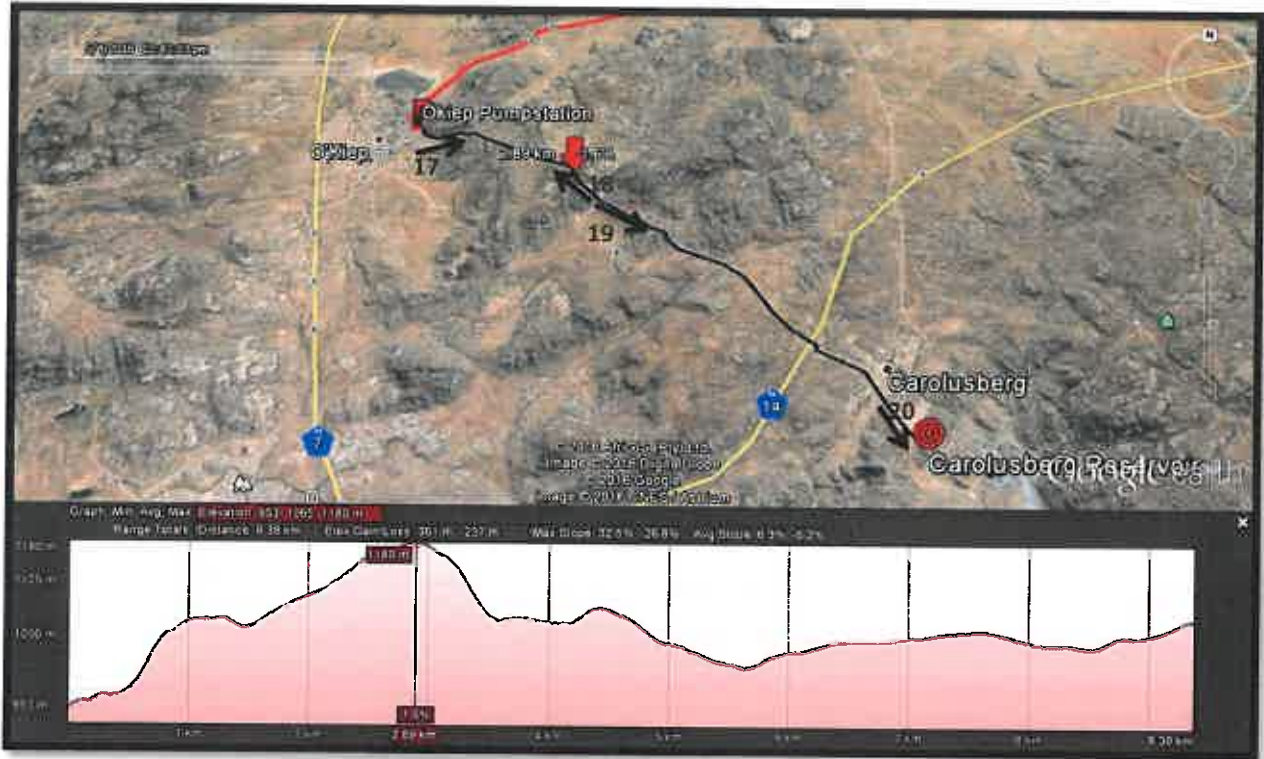
Photo 15: Looking back towards Springbok north



Photo 16: Route adjacent the N14 towards Pofadder



**CAROLUSBERG PIPELINE: ALTERNATIVE A4 (Original route)**



**Photo 17: The pipeline just east of Okiep (CBA)**



**Photo 18: Looking back towards Okiep (CBA)**



**Photo 19: Looking towards Carolusberg within the CBA**



**Photo 20: The Carolusberg Reservoirs**



## APPENDIX C

### ***FACILITY ILLUSTRATIONS***

---

*N/a*

## APPENDIX D

### ***SPECIALIST REPORTS***

---

***D1: Biodiversity Assessment***

***D2: Archaeological Assessment***

## APPENDIX D(1)

### ***SPECIALIST REPORTS***

---

***D1: Biodiversity Assessment***