SAREL BESTER INGENIEURS BK
Raadgewende Siviele Ingenieurs / Consulting Civil Engineers
Argitektuursdienste / Architectural Services
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Bus/Box 21, CERES, 6835
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Verw: 1731DOV-S2
Datum: 2018/03/15

Mnre Agterfontein Trust
PO Box 77
Ceres
6835

Attention: Mr Dawid Malherbe

PRELIMINARY DESIGN REPORT FOR THE PROPOSED ENLARGEMENT OF DRIEFONTEIN DAM DAM ON RIETVALLEY 364 PORTION 33, DISTRICT CERES, MR D MALHERBE

Your instruction regarding the investigation and preliminary design for the enlargement of Driefontein dam, refers.

1. BACKGROUND

The preliminary design of a dam normally follows after the scoping or feasibility stage during which the position, basic layout as well as the intended storage volume range along with the initial costing have been determined. This will then serve as the basis for the final dam design and contract specifications in line with dam safety regulations in terms of sections 117 to 123, chapter 12 of the National Water Act, 1998 (Act 36 of 1998).

In addition to the aforementioned, before a "License to Construct" can be issued, an environmental impact assessment, namely an *"Environmental Authorisation (EA)"* (previously referred to as the ROD) as well as a *"Water Use License"* have to be obtained from the respective authorities. In order to address these two aspects, a preliminary dam design is required containing specific technical information which then serve as supporting documentation to the respective applications.

The proposed enlargement of Driefontein dam will have a total storage capacity of approximately 320 000m³ and it would mainly be filled by scheduled winter water from the Warmbokkeveld Scheme. The current dam is too small to store all the winter scheduled water and for that reason a substantial portion of the water has been sacrificed and lost to the benefit of downstream water users for many years.

Increasing the dam's capacity by ±80 000m^3 for storing the currently wasted listed winter water, will make it possible for the applicant to expand his current production with about 10ha of deciduous fruits. This would benefit the broader economy by creating work opportunities for the previously disadvantaged groups in the surrounding local communities.

Since the licence application (WULA) is entirely based on an existing water use (ELU), namely scheduled winter water under the Warmbokkeveld Irrigation Board, none of the existing downstream uses will be affected negatively at all.

The proposed site is located within the Warmbokkeveld area, Ceres District about 8km north-east of the town Ceres as the crow flies as shown in ***Appendix A.***

2. ASSIGNMENT

Sarel Bester Engineers has been appointed as the project engineer and coordinator overseeing the various actions and components regarding legal requirements as well as the design of the dam while also handling the Water Use License Application (WULA).

Instruction and appointment was received to continue with the preliminary design stage for licensing purposes. Both the Environmental Impact Assessment (EIA) according to NEMA guidelines as well as the Water Use License Application (WULA) are currently in progress under the care of ***Messrs EnviroAfrica*** and ***Sarel Bester Engineers*** respectively.

The preliminary design normally follows after and is partially based on the outcome from the scoping & feasibility study, in this case in the form of a preliminary site-survey done by *Messrs Boland Opmeting,* dated March 2017. This assignment now takes it further by focussing on certain design aspects as well as certain legal implications including a first round of concept design drawings.

Surveyed data was converted to the WGS84 universal grid system in order to relate and overlay it onto the world map for referencing purposes.

The preliminary design process has checked, verified and updated information obtained from previous documentation as and where required or applicable with regard to storage capacity, expected earthworks quantities as well as the costing of the project for this purpose.

The intention and purpose of the Preliminary Dam Design Report is and therefore will be used to:

- inform you as client of the concerned investigation regarding storage options along with provisional cost estimations,
- serve as supporting technical appendix to DWS for the water use license application,
- serve as technical appendix to DEADP for the environmental impact assessment, and
- serve as a basis to DWS Dam Safety Office for classification and APP matters.

3. APPLICATION & MOTIVATION

The first phase of activation of the Water Use License Application (WULA) has been submitted to Breede-Gourtiz Catchment Management Agency (BGCMA). The motivation will be dealt with in full as a separate technical report, soon to be finalised & submitted by ***Sarel Bester Engineers*** and which will be available on request as listed in ***Appendix I.***

This application is entirely based upon an existing water use (ELU) in the form of scheduled winter water under the Warmbokkeveld Irrigation Board. However, a large percentage of this water have been sacrificed and lost over the years to date to the benefit of downstream users due to limited storage capacity on the property.

This project entails expanding the current enterprise by storing the water previously being sacrificed while growing production by an additional 10ha of fruit. It will thus ensure that the water use right could be used to its full potential, also ensuring the long term economic viability as well as sustainability of the enterprise by creating permanent jobs within the agricultural industry.

The dam site is located within the Dwars River sub-catchment within the upper catchment of the larger Breede River system. The enlargement of Driefontein Dam will have no negative effect on the downstream users since it is based exclusively on existing takings in the form of scheduled water under the Warmbokkeveld Irrigation Scheme.

Other motivational information as required in terms of Section 27 of the National Water Act, forms part of and is included in the WULA being submitted separately.

4. ALTERNATIVES

Farm Rietvalley 364 Portion 33, also known as *Agterfontein,* is situated within the Ceres-basin with a rather flat topography without any other alternative dam sites available on the property. The additional volume-to-be-potted is relatively small and due to the lack of other viable dam sites, it is considered far more economical to rather enlarge an existing dam.

Driefontein Dam is the preferred option between three existing dams on the particular farm for two reasons being that it has the footprint area available for the necessary expansion and secondly it is near the Warmbokkeveld Scheme sluice or outlet. The latter ensuring minimal losses.

5. WATER AVAILABILITY

The deeds information regarding the relevant property as well as the water use information which was obtained from the *Breede-Gouritz Catchment Management Agency* (BGCMA) and soon to be finalised by their *Validation & Verification* process, had been evaluated for purposes of this report. We refer to ***Appendices B&C***.

A) Existing Water Uses:

Takings:

- 514 400m^3 (Warmbokkeveld IB: 64.3ha @ 8 000m^3/ha/a)
- 111 623m^3 (Groundwater)

Storage:

- 239 000m^3 Driefontein Dam (To-be-enlarged)
- 7 213m^3 Vis Dam
- 91 000m^3 Barrak Dam - Surveyed
- **337 213m^3 TOTAL**

B) Current Licence Application:

- Driefontein Dam: 239 000m^3 (Existing)
  80 000m^3 (Additional Storage)
  320 000m^3 (Total Storing)
- New Irrigated Area 10,5ha fruit @ 7 500m3/ha/a

6. DAM SAFETY & CLASSIFICATION

The project entails the proposed enlargement of Driefontein Dam and one of the first steps in the process is to have the proposed dam classified in terms of dam safety regulations. The application was submitted on 14 Sep 2017 to the Dam Safety Office and Driefontein Dam was classified on 25 Oct 2017 as a Small Category I dam with a Low hazard potential rating under reference ***12/2/H101/FA***, refer ***Appendix D***.

Being classified as a Category I dam means that an APP (Approved Professional Person) is not a legal requirement for the design and construction supervision of the dam. However, a basic design is still required for submission and obtaining a license to construct from DWS Dam Safety Office.

7. ENVIRONMENTAL IMPACT

Government Notices R385, R386 & R387 of 21 April 2006, issued under Chapter 5 of the National Environmental Management Act, 1998 (Act 107 of 1998), also known as the "NEMA" procedures determine that Driefontein Dam does trigger certain environmental aspects and therefore qualifies for a Basic Assessment Report (BAR) only. The study and application is currently under way under the auspices of ***Messrs EnviroAfrica.*** The final application will be submitted during the 2nd quarter of 2018 with the Environmental Authorisation (EA) expected towards end of 2018.

8. EMPOWERMENT

Although the applicant, namely the ***Agterfontein Trust***, is considered a Small-Medium Enterprize and has no official BEE project as such, the applicant does complies with standard BBBEE Codes of Good Practice (2007) and has set a goal to redress the past racial & gender discrimination by committing to generate more permanent jobs for the previously disadvantaged groups in its local community, a community that urgently needs it. Furthermore, the owner gives his employees the opportunity to grow and empower themselves in their individual jobs by accredited and in-house training sessions and allowing them various decision-making opportunities.

9. STATUTORY REQUIREMENTS

Various other statutory requirements might be applicable or of importance depending on site specific conditions apart from the regulations already dealt with above.

In this case the proposed dam site is located in a sensitive area concerning hydrology and the input from a Fresh Water Specialist is a requirement.

10. HYDROLOGY

The location of the dam site lies within the H10C quaternary catchment under the auspices and care of the BGCMA. This is an in-stream dam situated within a tributary of the Dwars River, draining into the larger Breede River as shown on ***Appendix E***. The dam has a small catchment with little runoff and is mainly filled by scheduled water from the Warmbokkeveld Irrigation Board and for this reason a full hydrological study is considered unnecessary.

The relevant catchment properties according to the WRC Report TT382/08 (WR2005), also available on GIS-website of Dept Agriculture in cooperation with Elsenburg, are shown in the table below.

Table 2 shows the local catchment information in relation to the quaternary drainage area:

Catchment (ELSENBURG Catchment Delineation Tool)	Quaternary:	Local Catchment
Name / Description	H10C	Driefontein Dam
Area [km²]	260	4.67
Mean Annual Rainfall (MAP) [mm]	1,064	470
Mean Annual Run-off (MAR) [mm]	266	196
Gross Average Run-off (MAR) [x 10^6 m³]	69.2	0.25

11. GEOLOGY

According to the Geological Survey of South Africa, the proposed site falls within the Bokkeveld group and Ceres subgroup with a Voorstehoek formation, all part of the larger Cape System. We refer to ***Appendix F***. These basic formations are described as follows:

- ***Dv*** *– Dark-grey fossiliferous shale, mudstone and siltstone with thin sandstone beds*
- ***Dh*** *– Light-grey feldspathic sandstone, subordinate thin siltstone, gritstone and conglomerate*
- ***Dga*** *– dark-grey, rather lithic and feldspathic sandstone and siltstone, subordinate shale and conglomerate*

The geological investigation identified two relatively near anti- and syncline structures respectively east and west from the dam site both in a northeast-southwest orientation. There is also a geological fault line north from the dam site in a northwest-southeast orientation. In other words, attention should be given to the sealing off of the dam basin. Geological break lines tend to consist of severe disintegrated material which pose the potential for water to be redirected and as a result can cause the dam to leak.

12. WR2005 SITE PROFILE

The Water Research Commission have recently published their updated study of the Water Resources of South Africa since the previous version thereof dated 1990. The updated report, *TT382/08 dated March 2009*, is well recommended by the Department and widely used throughout South Africa as basis when it comes to water management and development issues.

The table below shows a summary of such characteristics or profile regarding the proposed dam site.

Figure	Property Description	Zone / Index / Value	Unit / Scale
Figure 0	Water Management Area	18 ~ Breede	
Figure 1	Rainfall: MAR	400-500	[mm]
Figure 2a	Evaporation (WR90 S-pan)	1700-1800	[mm]
Figure 2b	Evaporation (A-pan)	2000 -2200	[mm]
Figure 3	Runoff: MAR	50-100	[mm]
Figure 4a	Landcover	Cultivated: permanent – commercial irrigated	
Figure 6	Simplified Geology (WR90)	Intercalated arenaceous and argillaceous strata	
Figure 7	Soils (WR90) [Depth / Texture / Relief]	Moderate to deep / Sandy loam / Steep	
Figure 8	Sediment (WR90) [Erodibility Index]	16 ~ Low	High 1-8 Medium 9-15 Low 16-20
Figure 9	Vegetation (Acocks Veld Types)	Temperate and transitional forest and scrub types	
Figure 10	EWR Management Class	Class D- Largely modified	[A-F]
Figure 11	Surface Water Quality - TDS	0-500	[mg/l]
Figure 12	Population Density	0-100	[People / km²]
DWAF GRA2 (2005)	Utilisable Groundwater Exploitation Potential	<2500	[m³/km²/a]

All of the above properties and/or characteristics are well within an acceptable range for when it comes to building a dam and the overall observation and interpretation thereof does not raise any alarms which could potentially impact the design and construction of a dam of this nature.

13. CONCEPTUAL DESIGN

The project entails the design and construction of the proposed enlargement of the Driefontein dam as a zoned earthfill embankment across the valley including an open channel spillway against the right bank and a pipe outlet under the embankment. Die preliminary design drawings are included in ***Appendix H***.

A) Design Characteristics:
The proposed dam is considered an in-stream dam with a straight alignment across the valley with the following characteristics:

Location:	33°21' 10.66"S 19°24' 14.3"E
Driefontein Dam	
Wall crest level (masl)	548,6
Full supply level (masl)	547,1
Lowest ground level (masl)	539,6
Max wall height (m)	8,95
Crest length (m)	390
Crest width (m)	4,0
Upstream slope	1 : 3
Downstream slope	1 : 2
Free board (m)	1,5
Embankment volume (m^3)	10,500
Total earthworks (m^3)	17,800
Nett storage capacity (m^3)	322,000
Flooded area (ha)	13,70
Total footprint (ha)	14,20

B) Foundation: Preliminary visual inspections shows a topsoil layer varying between ±0,3m and ±0,5m thick on a silty to clayey layer between ±1,0 to ±2,0m thick on shale or sandstone formation. The formation is considered adequate and suitable for this type of structure.

C) Material investigation: No formal in-depth soil analyses has been done as yet. Other dams in the vicinity is of similar material and their behaviour over time is considered adequate and stable. The more gravelly and sandy material will be used as unselected mass fill within the up- and downstream embankment zones while the more clayey material will be incorporated into the central core and cut-off zones. Visual inspection of the proposed dam site provisionally suggests that the availability of material from the dam basin seems to be adequate. Light dispersiveness is expected on these types of material based on general erosion marks elsewhere in the valley. However, this characteristic will be addressed formally in the final design by way of either chemical stabilisation, increased compaction or built-in sand filters or a combination thereof.

D) Embankment design: The overall layout is a straight aligned in-stream dam across the valley with the wall crest length of ±390m. The proposed internal embankment profile will be zoned with a selected clayey core and cut-off zones plus unselected up- and downstream mass earthfill zones. Awaiting the outcome of the formal soil testing to be carried out for final design purposes, consideration will be given to the necessity and introduction of built-in sand drains. Due to the possibility of dispersiveness, the core and cut-off zones will be compacted to a higher density in the order of 98% Proctor. The planned maximum wall height is in the order of ±9,0m with the upstream slope provisionally set at 1v : 3h, the downstream slope at 1v : 2h and the crest width at 4m.

E) Drainage: Due to the height and the possibility of dispersiveness, as mentioned above, and pending the outcome of the soil tests, the internal embankment profile might require an optional built-in drainage system in the form of a curtain drain on the downstream side of the

core plus a blanket drain or evenly spaced strip drains over the downstream solumn area. Apart from this, drainage will also rely on the normal phreatic movement of moisture through the earthfill structure itself.

F) Stability: This aspect is considered part of the final design exercise when a complete slope and internal stability analysis will be conducted based on the results forthcoming from the soil testing. Pending the outcome of these results, including the stability calculations, the proposed profile has been evaluated against and based upon applicable statistics obtained from a database of dams without any obvious risks being identified at this stage. However, the final design will include a formal design based on finite element stability calculation models.

G) Outlet works: The outlet is currently planned as a single ø300mm class 9 pipe in reinforced concrete with a flanged sluice-gate control valve and manifold on the downstream side. It will also be fitted with a sieve pipe on pedestals or alternatively a custom built float unit at the upstream inlet end. This will be sufficient for irrigation purposes as well as for emptying the dam or lowering the water level in case of an emergency condition, say within 15 days.

H) Spillway & Flood management: Driefontein dam will be equipped with an open side channel spillway with concrete sill at the right flank leading the flood water safely past and away from the embankment toe and back into the stream bed. The erodibility index is 16 on a scale of 1 to 20 with 1 being high and 20 being low, in other words the index is classified as low. The dry freeboard is provisionally set at ±1,0m based on the flood requirements.

I) Special Requirements: Releasing water for instream flow requirements (IFR) will probably be a requirement of the water use license (WUL) with reference to required auditing. In order to comply, the outlet of the dam will be equipped with a scour system including a calibrated measuring weir or device. This aspect is considered a specialised item and the design thereof will form part of the detail design.

J) Maintenance and Operation: The dam is situated in a winter rainfall area but will be filled during the winter season primarily with listed water supplied and delivered by the Warmbokkeveld Irrigation Scheme within the Dwarsrivier catchment area. The operation and supervision of the dam will take place under the direct control of the owners or delegated authority on a seasonal cycle.

K) Specifications: Relevant and applicable specifications are envisaged for this purpose. It is recommended that the following standardised specifications be considered as basis and part of the construction contract:

- General Conditions of Contract for Construction Works (2010)
- SANS/SABS 1200AD: General (Small Dams)
- SANS/SABS 1200DE: Small Earth Dams
- SANS/SABS 1200GA: Concrete (Small Works)
- SANS/SABS 1200L: Medium Pressure Pipeline

14. QUALITY CONTROL

The site surveying, planning, design and construction supervision will be handled by personnel of *Sarel Bester Engineers*. Regular inspections and in-situ compaction tests will be conducted during the construction phase in order to ensure quality of workmanship in accordance with SABS/SANS standards.

15. DOWNSTREAM DEVELOPMENT

The proposed dam is considered an in-stream dam located ±12km upstream from the confluence with the Dwarsrivier. The potential flood area consists mainly of cultivated land. The river also passes through the town Ceres before it joins the Dwarsrivier. Downstream development consist of a few single isolated dwellings and minor roads as well as the district road between Ceres and Touwsrivier within the potential flood zone. The potential loss of life and expected economic damage is considered reasonable according to the outcome of the classification of the dam by Dam Safety Office (DSO).

16. COSTING

The estimated costing of the project is based on recent tender prices of similar type projects within the Western Cape region. The basic costing of the project was done by using related data from other projects and dividing the sum total of all the earthmoving and related costs by the sum total of all the bulk earthmoving volumes in order to obtain an all inclusive unit price for earthmoving. Additional allowance was then made for other costs such as overhead costs, concrete & outlet related costs as well as diverse & unforeseen cost items. The sum total of these give the estimated project cost as set out on the attached preliminary design evaluation sheet included as ***Appendix G*** and summarized as follows:

Description	Driefontein dam
Max Wall Height (m)	8,90
Total Earthmoving (m^3)	17 850
Nett Storage Capacity (m^3)	±320 000
Storage : Earthworks	±5.4
Estimated Cost (R)	±R1,252,000

Driefontein dam entails the enlargement of an existing dam. The storage ratio was calculated as the ratio between the total volume of material to be moved and the capacity gain with regard to the enlargement. Dam sites are considered more viable or economical when the storage ratio is about 5 and higher. The figures above show the storage versus earthworks ratio in the order of 5,4 which is considered on the better side when it comes to the economics of building the dam.

In this case, the earthworks costing was calculated at a basic rate of **±R45/m³** accounting for ±65% of the total cost which translates to an estimated project cost in the order of **R1,25mill**, excluding fees etc.

17. SUMMARY

Driefontein dam is planned as an in-stream dam situated in a tributary of the Dwarsrivier within the catchment of the larger Breede River system. The water use license application is for additional storing for water from the Warmbokkeveld Irrigation Scheme. Irrigation from the dam will be by means of pumping from the dam.

The layout of the enlargement of the dam will remain similar to the existing wall with the increased footprint on the inside of the dam, ie on the upstream side. The spillway will be relocated higher up against the right abutment in a similar way as an open channel with concrete sill at the full supply level. The dam will also be equipped with a new outlet pipe encased in concrete under the embankment.

The application is based on existing scheduled winter water which could not be stored in the past due to limited storage capacity to date. The additional storage of winter water will be used for summer irrigation which will in turn increase the irrigated area by 10ha.

The license application for the 'taking' and 'storing' of water as well as the environmental impact assessment have both been initiated under the auspices of our offices and those of Messrs *EnviroAfrica* respectively. The purpose of this document is therefore also to provide certain technical information as part of the above applications to the various departments regarding the proposed works.

All taken into account based on proper engineering, the site is considered suitable for a dam of this nature.

18. APPENDIXES

A) Locality Map
B) Title Deed information
C) BGCMA / Warmbokkeveld WUA listing
D) Classification, dated 25 Oct 2017
E) Hydrological Map
F) Geological Map
G) Preliminary Design Evaluation: Quantities & Costing
H) Drawing 1731-S2-01; Contour Layout Plan & Construction Detail
I) Water Use Licence Application
(Available on Request)

You are welcome to contact us in case of uncertainty about the contents or if more information is required about any aspect or component herein.

We trust that you will find the above in order.

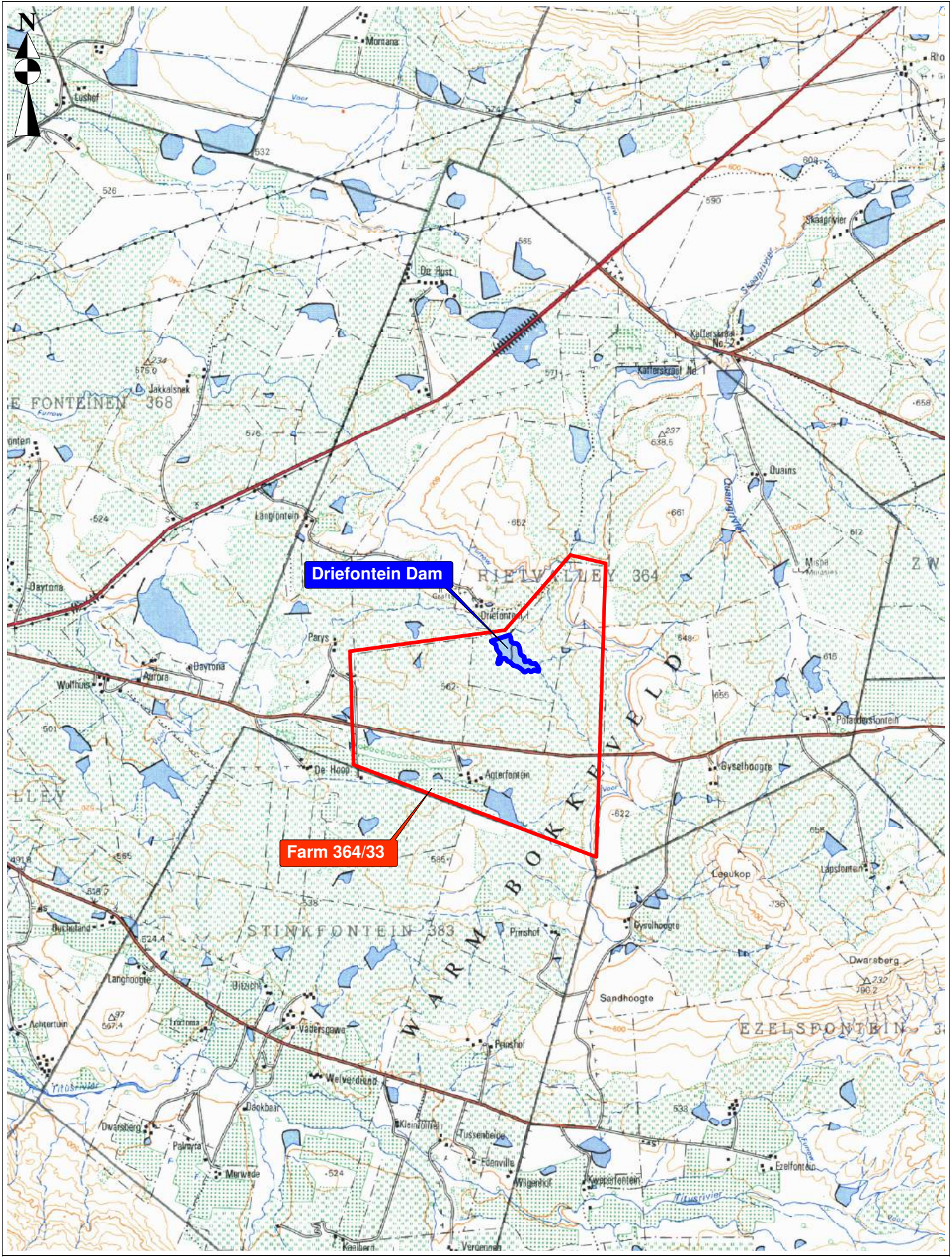
Yours faithfully

M Charl Bester (Pr Ing)

Copies to:	Me Inge Erasmus, EnviroAfrica, Somerset-West

APPENDIX A

LOCALITY MAP



SAREL BESTER INGENIEURS BK
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MC BESTER
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Tel 023 312 2017 / Epos sbri@telkomsa.net

Client: Agterfontein Trust
PO Box 77
CERES
6835

Project: Locality Map
Proposed Enlargement of
Driefontein Dam

Project Ref: 1731

Map Ref: 3319AD

Scale: 1: 50 000

APPENDIX B

TITLE DEED INFORMATION

WinDeed Database Property Report

windeed
A LexisNexis® Product

RIETVALLEY, 364, 33 (CAPE TOWN)

GENERAL INFORMATION

Date Requested	2017/05/17 15:46
Deeds Office	CAPE TOWN
Information Source	WINDEED DATABASE
Reference	1731

PROPERTY INFORMATION

Property Type	FARM
Farm Name	RIETVALLEY
Farm Number	364
Portion Number	33
Local Authority	WITZENBERG DC
Registration Division	CERES RD
Province	WESTERN CAPE
Diagram Deed	T7235/1908
Extent	521.4910H
Previous Description	-
LPI Code	C01900000000036400033

OWNER INFORMATION

Owner 1 of 1

Type	TRUST
Name	AGTERFONTEIN TRUST
ID / Reg. Number	2311/2005
Title Deed	T21759/2007
Registration Date	2007/03/23
Purchase Price (R)	1,700,000
Purchase Date	2005/11/25
Share	0.00
Microfilm	2009 0143 5608
Multiple Properties	NO
Multiple Owners	NO

ENDORSEMENTS (9)

#	Document	Institution	Amount (R)	Microfilm
1	B10684/1994	FIRST NAT BANK	300,000	2007 0677 3895
2	B39305/1986	BARCLAYS NAT BANK LTD	70,000	2007 0680 3112
3	B41887/1984	BARCLAYS	50,000	2007 0680 3098
4	B5618/1982	-	UNKNOWN	2007 0677 3883
5	B64025/1998	FIRST NAT BANK OF SOUTHERN AFRICA LTD	1,000,000	2007 0671 1388
6	B981/1989	FIRST NAT BANK OF S A LTD	150,000	2007 0671 1366
7	B4295/2009	FIRSTRAND BANK LTD	1,000,000	2009 0143 5591
8	FARM CE 364/33	-	UNKNOWN	1985 0022 0868
9	B31786/2010	FIRSTRAND BANK LTD	1,000,000	-

HISTORIC DOCUMENTS (4)

#	Document	Owner	Amount (R)	Microfilm
1	T21040/1974	MALHERBE DAVID GERHARDUS	0	2007 0680 1379

2	B64027/1998	KAAP AGRI BEDRYF LTD	300,000	2008 0248 3978
3	B32489/1983	-	UNKNOWN	2002 0711 3489
4	B58789/1991	KAAP AGRI BEDRYF LTD	300,000	2008 0278 0807

APPENDIX C

BGCMA / WARMBOKKEVELD WUA LISTING

BREEDE-GOURITZ

Catchment Management Agency
Opvanggebied Bestuusagentskap
I-Arhente yoLawulo lomMandla nokungqongileyo
51 Baring Street Worcester 6850, Private Bag X3055 Worcester 6850

Jan van Staden
023-3468000
4/4/3/1284-C01900000000036400033-0

REGISTERED MAIL

Agterfontein Trust
Posbus 77
Ceres
6835

Dear David Malherbe

APPLICATION FOR THE VERIFICATION OF EXISTING LAWFUL WATER USE IN TERMS OF THE NATIONAL WATER ACT, 1998 (ACT 36 OF 1998): CONFIRMATION OF EXISTING LAWFUL WATER USE IN TERMS OF SECTION 35(4)

PROPERTY DESCRIPTION: C01900000000036400033, 33/364, 521.79 ha

You are hereby informed that the lawfulness and extent of your water use on the above mentioned property has been determined by the responsible authority, as delegated by the Minister of Water and Sanitation, in terms of Section 35(4) as follows:

Section of NWA	Type of Water Use	Existing Lawful Water Use		
		Volume (m^3/annum)*	Source	Irrigation Board or Water User Association Scheme
21(a)	Taking of water for irrigation purposes	514400	WUA/IB Scheme	Warmbokkeveld IB
21(a)	Taking of water for irrigation purposes	111623	Groundwater	
21(b)	Storage of water	285213		

* In the case of **Storage**, the Existing Lawful Water Use is in m^3

In terms of Section 35(4) of the Act this determination is also the extent of the existing lawful water use as contemplated in Section 32(1) for this property, which may be continued with under Section 34(1) subject to any existing conditions or obligations related to the water use.

No water use in excess of the lawful water use as set out herein may be used on this property without authorisation by the responsible authority.

In terms of Section 148(1) (e) of the Act you may appeal against any decision on the verification of these water use(s) to the Water tribunal within 30 (thirty) days from the date of this letter. The Registrar of the Water Tribunal is Mr Robert Mabe and his contact details are:

Postal Address
The Registrar
Water Tribunal
Private Bag X316
PRETORIA, 0001

Physical Address
Room 322
Waterbron Building
191 Francis Baard Street
PRETORIA, 0002

Contact
Tel: 012 336 7034
Cell: 082 611 1691
Email: MabeR@dwa.gov.za

A copy of the appeal must be submitted to this office.

Your water use registration will be amended to reflect the above details. A new registration certificate will then be issued to you. If an appeal is lodged, your registration certificate may be amended again depending on the outcome of the appeal.

Yours faithfully

PHAKAMANI BUTHELEZI
CHIEF EXECUTIVE OFFICER

Date: 17 February 2015

APPENDIX D

CLASSIFICATION, DATED 25 OCT 2017

water & sanitation
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

Private Bag X313, PRETORIA, 0001. Sedibeng Building 185, Francis Baard Street, PRETORIA, 0001.
Tel: +27 12 336 7500 www.dws.gov.za

modisel@dws.gov.za

Ms L A Modise
(012) 336-7758
12/2/H101/FA

25 OCT 2017

Trustee
Agterfontein Trust
P O Box 77
CERES
6835

ATTENTION: MR D MALHERBE (Email: admin@agterfontein.co.za)

Sir

CLASSIFICATION AND REGISTRATION OF DAM WITH A SAFETY RISK IN TERMS OF CHAPTER 12 OF THE NATIONAL WATER ACT, 1998 (ACT 36 OF 1998) READ WITH REGULATIONS 2, 3 AND 37 OF THE REGULATIONS PUBLISHED IN GOVERNMENT NOTICE R. 139 OF 24 FEBRUARY 2012: DRIEFONTEIN DAM SITUATED ON PORTION 33 OF THE FARM RIETVALLEY 364, DIVISION OF CERES

A. APPLICATION

Your application dated 14 September 2017 refers.

B. CLASSIFICATION

1. The classification of **Driefontein Dam** is as follows:

Vertical wall height Storage capacity	7,4 meters 239 000 cubic meters
Size classification Hazard potential rating Category	Small Low I

2. The classification is based on available information. If you have any information on the basis of which you feel the classification is incorrect, you should submit a substantiated application in writing for its revision.

C. CONFIRMATION OF REGISTRATION FOR DAM SAFETY PURPOSES

It is hereby confirmed that Driefontein Dam has been registered for dam safety purposes in terms of section 120 of the National Water Act, 1998 in your name. A printout reflecting information on the dam as stored on computer database at this Department is attached. Please check the correctness of the information shown and inform the Dam Safety Office of this Department in writing of any errors.

12/2/H101/FA

D. THIS LETTER SHALL NOT BE CONSTRUED AS CONFERRING EXEMPTION FROM COMPLIANCE WITH THE FOLLOWING:

1. The provisions of Chapter 4 of the National Water Act, 1998 pertaining to the lawful water use. Address enquiries and applications in this regard to the following address:

Chief Director: Western Cape
Department of Water and Sanitation
Private Bag X16
SANLAMHOF Tel: (021) 941 6000
7532 Fax: (021) 941 6100

2. The provisions and regulations of the National Environmental Management Act, 1998 (Act No. 107 of 1998) regarding control over activities which may have a detrimental effect on the environment.

Yours faithfully

Letter signed by: Ms L A Modise
Designation: Senior Administration Clerk: Dam Safety Regulation
Date: 25 OCT 2017

Enclosure: Registration information

20 September 2017

Department of Water and Sanitation - Dam Safety Office

Registration Details of a Dam Registered in terms of Dam Safety Legislation of Chapter 12 of the National Water Act (Act No. 36 of 1998)

(Please note that registration for dam safety legislation is not an entitlement for water use in terms of Chapter 4 of the National Water Act)

Departmental File No. : 12/2/	H101/FA	*WARMS Dam ID:*	0
Water management area	8 *Dam Status:* REG	*Drainage Nr:*	H10C
Name of dam	DRIEFONTEIN DAM		
Latitude	33 21 10 *Longitude* 19 24 14	*Lat sec:*	10.00
Town nearest:	CERES	*Long sec:*	14.00
Distance from town (km)	8 *WMA*	Breede-Gouritz	
Name of farm	RIETVALLEY 364 PTN 33		
Magisterial District	CERES		
Province:	WESTERN CAPE	*Water Management Region:*	WESTERN CAPE
Date of completion			
Raising or Alteration Date			
River			
Wall type	EARTHFILL		
Wall height (m)	7.4		
Crest length (m)	300		
Spillway			
Capacity (1000 cub. m)	239		
Surface area of water (ha)	10.5	*Catchment area (sq km)*	0
Purpose	IRRIGATION		

Owner	*Person in Control (if not the same as the owner)*
TRUSTEE	MR
AGTERFONTEIN TRUST	MALHERBE D.
P.O BOX 77	
CERES	
6835	
Tel no. 023 312-1225	*Tel no.*
Cell no.	*Cell no.*
Email / Fax admin@agterfontein.co.za	*Email / Fax*

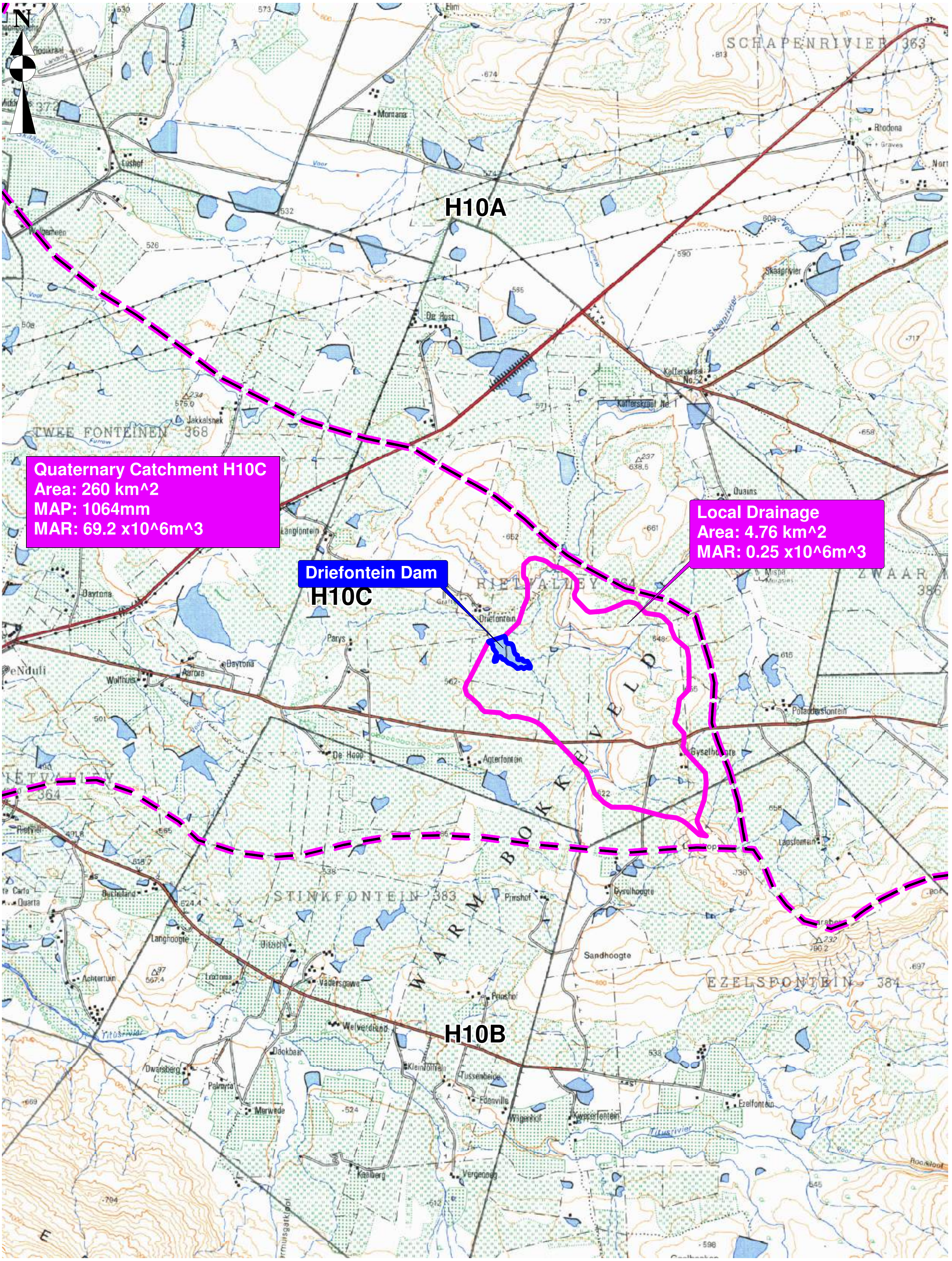
Designer	*Contractor*
SAREL BESTER ENGINEERS	

Registration date: 2017/09/20

Size	Small	*Hazard Rating:*	Low	*Category*	1
Classification date:	2017/09/20	*Date Last DSE*			
Date Completion Report:		*Number Last DSE:*	0		

APPENDIX E

HYDROLOGICAL MAP



SAREL BESTER INGENIEURS BK
MC BESTER
Pr. Ing., LSAISI: 970598, LSACAP: T1218
Tel 023 312 2017 / Epos sbri@telkomsa.net

Client: Agterfontein Trust
PO Box 77
CERES
6835

Project: Hydrology Map
Proposed Enlargement of
Driefontein Dam

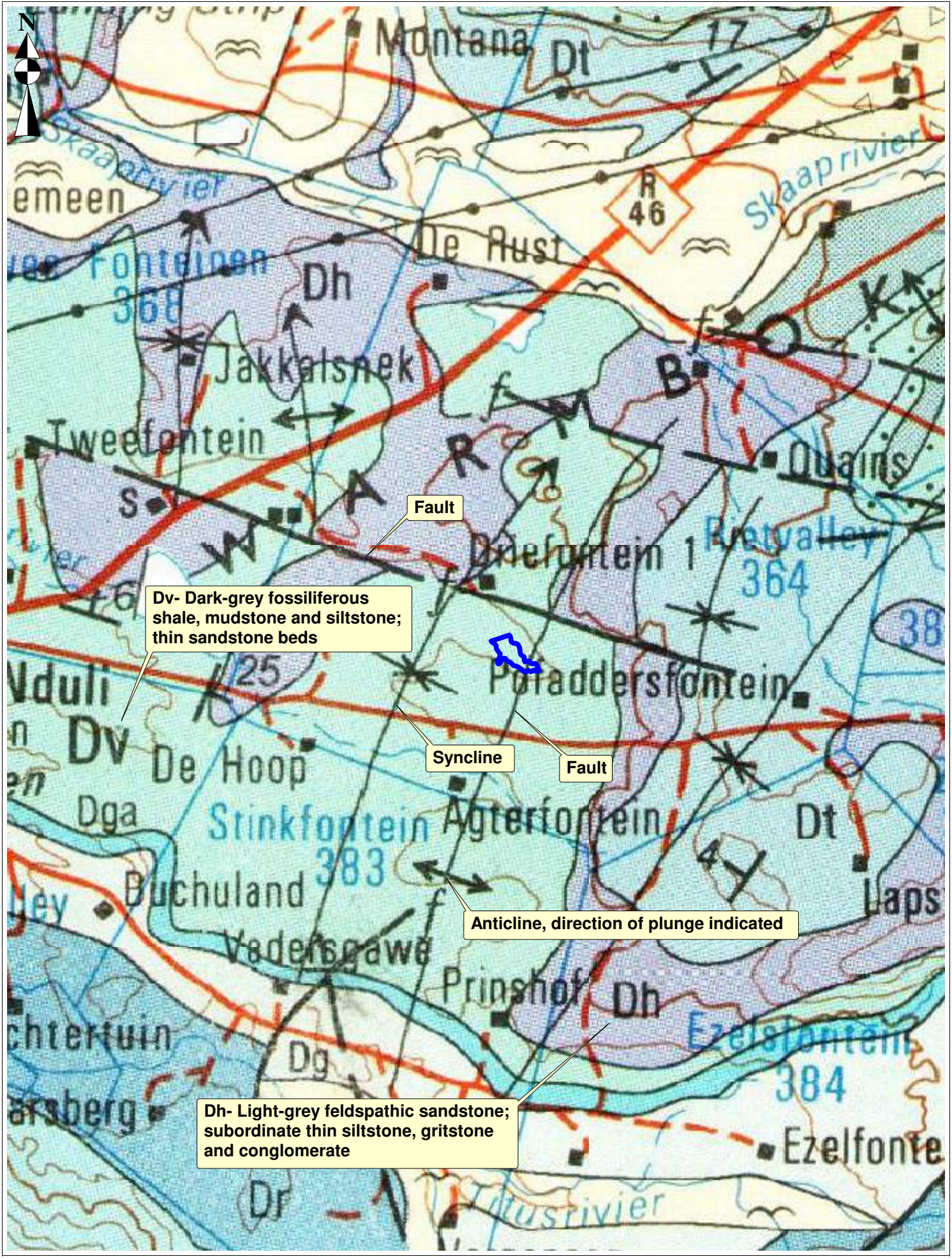
Map Ref: 3319AD

Project Ref: 1731

Scale: 1: 50 000

APPENDIX F

GEOLOGICAL MAP



SAREL BESTER INGENIEURS BK
MC BESTER
Pr. Ing., LSAISI: 970598, LSACAP: T1218
Tel 023 312 2017 / Epos sbri@telkomsa.net

Client: Agterfontein Trust
PO Box 77
CERES
6835

Project: Geology Map
Proposed Enlargement of
Driefontein Dam

Project Ref: 1731

Scale: 1: 50 000

Map Ref: 3319AD

APPENDIX G

PRELIMINARY DESIGN EVALUATION: QUANTITIES & COSTING

PRELIMINARY EVALUATION OF THE PROPOSED EARTH DAM: QUANTITIES AND COSTING

Client: **AGTERFONTEIN TRUST**
Address: Posbus 77
CERES 6835
Dam: **DRIEFONTEIN DAM**
Notes: 1. VAT EXCL.
2. DW opmetings gekombineer met SBRI

Project Nr.: **1731**
Annexure: **A**
Date: 05-Feb-18

Version: *Mrt 2018*

Report by: Charl Bester
SAREL BESTER ENGINEERS
P.O. Box 21, Ceres 6835
Ph: 023-312 2017
Fax: 086-514 3350

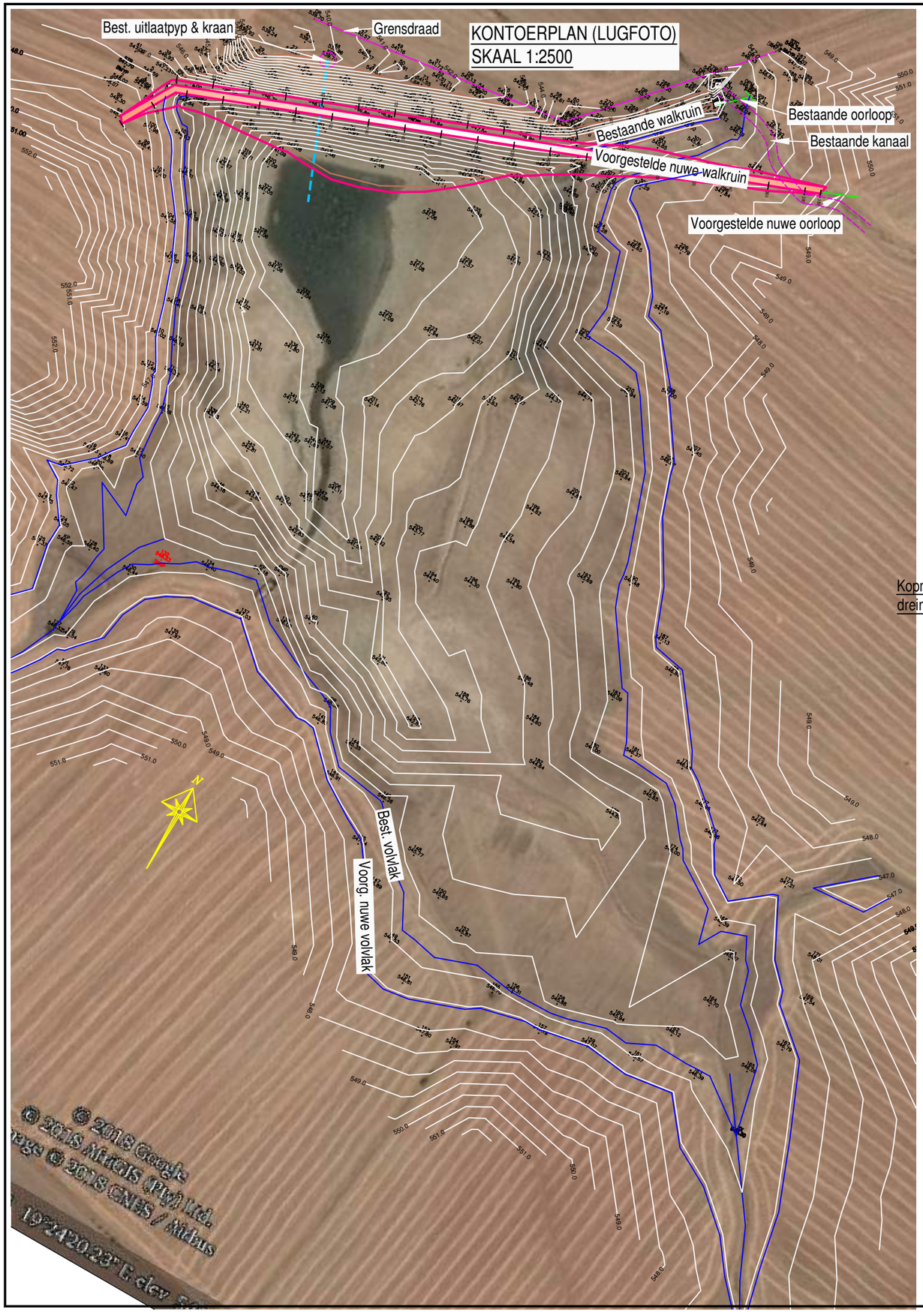
Design Parameters & Assumptions:

Crest width (m):	4.0	*Cut-off depth (m):*	3.00	*Earthmoving Cost (R/m³):*	45.00
Upstream slope 1:	3.0	*Cut-off base (m):*	4.00	*Engineering Fees Scale (%):*	8.0%
Downstream Slope 1:	2.0	*Cut-off slope 1:*	0.75	*Fees Base Value (R):*	R 11,500,000
Percentage of fill from dam basin:	50%	*Application (m³/ha):*	7,000	*Verhoging (J / N):*	J

Item	Description		Unit	Stadium / Wall position / Terrain				
				Stadium 1	Stadium 2	Stadium 3	Stadium 4	Stadium 5
	1 EMBANKMENT			*Existing*	*Enlargement*			
1.1	Wall crest level		masl	547.00	548.55			
1.2	Lowest ground level below wall		masl	539.60	539.60			
1.3	Maximum wall height		m	7.40	8.95	#N/A	#N/A	#N/A
1.4	Wall crest length		m	298.0	391.0			
1.5	Wall volume - excluding cut-off		m³	0	10,500			
1.6	Cut-off trench excavation		m³	*0*	7,331	#N/A	#N/A	#N/A
1.7	**Total earthmoving**		**m³**	**0**	**17,831**	**#N/A**	**#N/A**	**#N/A**
	2 STORAGE CAPACITY							
2.1	Full supply level		masl	546.30	547.05			
2.2	Draw-off level		masl	541.00	541.00			
2.3	Total free-board		m	0.70	1.50	0.00	0.00	0.00
2.4	Maximum depth above draw-off level		m	5.30	6.05	0.00	0.00	0.00
2.5	Nett capacity from contours		m³	227,000	317,500			
2.6	Capacity gain from excavations		m³	0	5,250	0	0	0
2.7	**Potential gross capacity**		**m³**	**227,000**	**322,750**	**0**	**0**	**0**
2.8	Water surface		ha	10.40	13.70			
2.9	Potential irrigation		ha	32.43	46.11	0.00	0.00	0.00
2.10	Average water depth		m	2.18	2.36	#DIV/0!	#DIV/0!	#DIV/0!
2.11	Ratio Storage : Earthworks			*nvt*	5.37	#N/A	#N/A	#N/A
2.12	Recommended pipe diameter		mm	250	300	150	150	150
	3 COSTING (Excl VAT)							
3.1	Overhead & Preparation	10%	Rand	0	123,447	#N/A	#N/A	#N/A
3.2	Earthworks (excavate & construct)	65%	Rand	0	802,406	#N/A	#N/A	#N/A
3.3	Concrete & Outlet works	15%	Rand	0	202,844	#N/A	#N/A	#N/A
3.4	Diverse & Unforeseen	10%	Rand	0	123,447	#N/A	#N/A	#N/A
3.5			Rand					
3.6	**Estimated Construction Cost**		**Rand**	**0**	**1,252,145**	**#N/A**	**#N/A**	**#N/A**
3.7	Adjusted Fees percentage		%	*0.0%*	10.8%	#N/A	#N/A	#N/A
3.8	Engineers costs (ECSA Fees)		Rand	0	134,707	#N/A	#N/A	#N/A
3.9	Engineers costs (Disbursements)		Rand		40,000			
3.10	**Estimated Engineers Costs**		**Rand**	**0**	**174,707**	**#N/A**	**#N/A**	**#N/A**
3.11			Rand					
3.12			Rand					
3.13	**Total estimated capital cost**		**Rand**	**0**	**1,426,852**	**#N/A**	**#N/A**	**#N/A**
3.14	Capital costs per m³ gross capacity		Rand	0.00	4.42	#N/A	#N/A	#N/A
3.15	Capital costs per irrigated hectare		Rand	0	30,946	#N/A	#N/A	#N/A

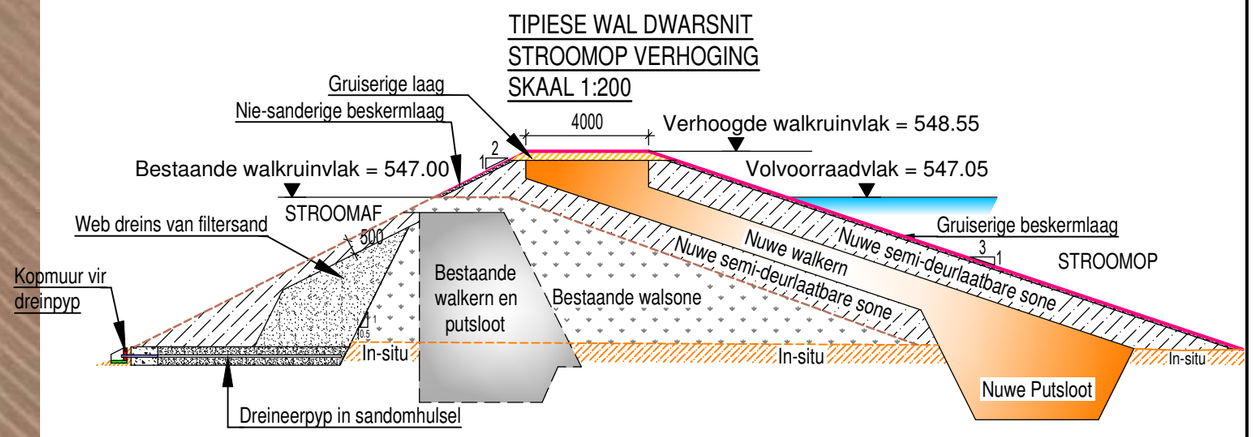
APPENDIX H

DRAWING 1731-S2-01

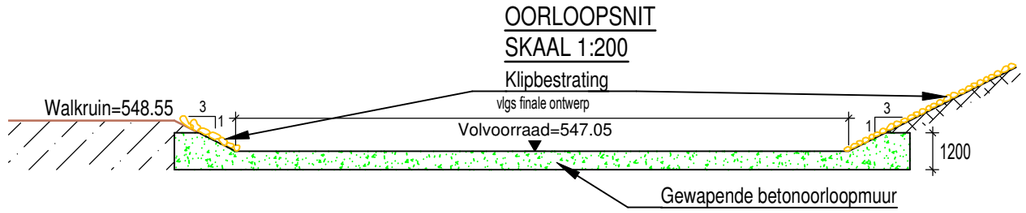


TEGNIESE IN LIGTING: DRIEFONTEIN DAM		BESTAANDE	VERHOGING
Walkruinwydte (m)		±4.00	4.00
Wakruinhoogte (mbsv)		547.00	548.55
Laagste grondvlak stroomaf (mbsv)		539.60	539.60
Maksimum walhoogte (m)		7.40	8.95
Walkruinlengte (m)		298.00	391.00
Stroomop helling	1:	3.00	3.00
Stroomaf helling	1:	2.00	2.00
Walinhoud (m³)		**	10 500
Totale beraamde grondveskuiwing (m³)		**	17 800
Volvoorraadvlak (mbsv)		546.30	547.05
Totale vryboord (m)		0.70	1.50
Bruto bakmaat (m³)		227 000	321 000
Oorstroomde area (ha)		10.40	13.70
Dam voetspoor area (ha)		11.00	14.20

TIPIESE WAL DWARSNIT
STROOMOP VERHOGING
SKAAL 1:200



OORLOOPSNIT
SKAAL 1:200



KLIËNT: Agterfontein Trust
Posbus 77
CERES
6835

PROJEK:
VOORGESTELDE VERHOGING VAN DRIEFONTEIN DAM

DETAIL:
Kontoerplan (Lugfoto), Wal & Oorloop Snitte

SAREL BESTER INGENIEURS
Raadgewende Siviele Ingenieurs
Argitektuursdienste
MC BESTER
Pr.Ing., B.Ing., LSAISI- 970598, LSACAP-T1218
Posbus 21, CERES, 6835
Tel.023-312 2017 * Faks 086-514 3350
e-pos: admin@sbri.co.za

Datum: 14/03/2018

GETEKEN	DATUM	SKAAL	VEL
SC Hartzenberg	MRT. 2018	soos getoon	1 van 1

OPGEMEET	ONTWERP	TEK. NO.	HER.
SC Hartzenberg	Sarel Bester Ingenieurs	1731-S2-01	

A3

APPENDIX I

WATER USE LICENCE APPLICATION

(Available on Request)