Fire Scoping Report for Development of ERF 3122 - Hartenbos

Authors:	**CF Pool**	**SJ van Zyl**
Postal Address:	**Private Bag x 6531**	**Private Bag x 6531**
	George	**George**
	6530	**6530**
Email:	**Tiaan.Pool@nmmu.ac.za**	**Salmon.vanzyl@gmail.com**
Mobile:	**+27 (0)72 374 2347**	**+27 (0)72 733 1692**
Office:	**+27 (0)44 801 5024**	**+27 (0)44 801 5140**

Contents

1. Declaration of independence

1.1. The authors, do hereby declare that they are independent of the client and that all opinions expressed in this document are substantially their own.

1.2. The information contained in the report is presented based on information obtained in good faith and is accurate based on facts available at the time of writing. The Authors reserves the right to amend any part of the said report as new information becomes available.

2. About the authors

2.1. CF Pool has been involved in veldfires since 1989, has conducted numerous veldfire investigations and presented different courses in Fire Management (Including Fire Investigation and Fire Simulation courses).

2.2. He is a qualified Forester who grew up on a plantation and practised forestry for 17 years before taking up a lecturing position in 2000 at the Nelson Mandela Metropolitan University (NMMU). As fires are the biggest threat to forestry in SA and part of a forester's way of life, his involvement in veldfire management laid the foundation of his experience and knowledge of veldfires. He is also the editor of the "Fire Manager's Handbook on Veld and Forest Fires, Strategy, Tactics and Safety - South African Edition." He has served as expert witness in the High Court and is regularly consulted in his capacity as an expert fire investigator. He has also compiled fire management plans for landowners.

2.3. In addition, he has presented papers at international conferences on the topic of Fire Management, lectured abroad and is involved in the National Fire Management Workgroup of South Africa. He has written several articles on Fire Management related topics for different magazines. His highest qualification is a Master degree in Forestry (completed in 2012) with the focus on fire behaviour. Pool is acknowledged by the forestry and other industries for his knowledge of fire behaviour, firefighting, fire management, fire ecology and numerous other fire- related topics.

2.4. Pool has developed and registered the first Fire Management qualification in Africa and is the programme coordinator for the Forestry programme at the Nelson Mandela University.

2.5. SJ van Zyl is a lecturer in Forestry and Veldfire Management at the NMU. He has been involved in various veld and forest fire investigations since 2011 and the

compilation of fire protection plans for residential urban Interface developments. He has completed a Fire Investigation course (Cum-Laude, NMMU), and is a certified user of the Carnegie Landsat Analysis System (CLASlite). He is skilled in interpreting satellite images and compiling electronic maps. His highest qualification is a Masters in Forestry (Cum-Laude, NMMU, 2015). He is currently pursuing a PhD with a specialisation in Disaster Risk Management (Redesigning wildfire management for disaster risk reduction in South Africa: A complex socio-ecological systems approach). He was an active police reservist from 2006 to 2015 and is, therefore, familiar with investigation and crime scene management procedures. Additionally, he completed an Incident Command System programme and served as a Section Chief on the incident management team of the 2017 Knysna/Plettenberg Bay Fire Complex.

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3. Introduction

3.1. This document is an expansion of the “Fire Constraints for Development of ATKV ERF 3122 – Hartenbos” reports of 31 August 2017 and 20 February 2018. This updated report comments on the proposed layout of the development with reference to suggestions made by the authors during the constraints analysis phase of the development.

3.2. Since writing the report versions mentioned in 3.1. above a new developer has taken over the project and the development is now referred to as the Hartenbos Garden Estate/Hartenbos Natuur-Landgoed.

3.3. The new developer made changes to the layout of the proposed development and this report incorporates these changes without removing commentary on the previous design layouts to show whether the developer has remained within the safe build area as defined in our previous constraint analyses.

3.4. The report aims to guide the developers and future owners of the property on avoiding possible damage to structures in the event of veldfires.

3.5. The report does however not deal directly with specific future management interventions for fire protection on the property. This level of detail will be added to the impact report that will form part of the next phase of the development process. The information and comments contained in this report are sufficient for determining safe building areas from a fire management perspective.

3.6. Recommendations of this report are based on the current environmental conditions that exist in the area and that future developments such as further residential developments adjacent to the area might have an influence on the recommendations within this document.

3.7. Erf No. 3122 (Hereafter referred to as “the property”) was previously utilised as agricultural land. The property is situated on the western edge of the Hartenbos Heuwels residential area. Hartenbos Heuwels forms part of the Mossel Bay Municipal area, which in turn is part of the Eden District Municipality in the Southern Cape.

3.8. The property rests on a plateau in the hilly landscape west of the N2 Freeway that passes through the Hartenbos area. Although the property itself is relatively flat, the area bordering it forms a gentle downward slope with a network of valleys draining away from the plateau. To the east and south, there are shallow valleys that become deeper as it progresses into the adjoining area.

3.9. The primary vegetation type within the property is Brandwag Fynbos Renoster Thicket (Helme, 2016). Renosterveld forms part of the Fynbos biome and it is an endangered vegetation type, however the Renosterveld vegetation on the site is disturbed and therefore not of pristine conservation value. Renosterveld is a fire driven ecosystem. This implies that the vegetation relies on a natural fire cycle for rejuvenation and continued survival and as it grows to maturity, it becomes highly flammable.

4. Fire Occurrence

4.1. Fire occurrence on the property was evident through remnants of previous fires when the site was visited first visited in 2011. Although most destructive fires in the region are driven by strong, dry and hot north-westerly berg winds, it was reported that a fire that occurred on 26 December 2009 entered the property from a South-westerly direction and may likely have been started by a campfire.

4.2. On 21 January 2019, a large veldfire damaged two houses in the area adjacent the proposed development. The fire also burnt a large portion of the Erf 3122.

4.3. Where hazardous fuels exist on the boundaries of the property there is a threat to residential units. This is true for any urban interface development. The authors are however confident that the layouts proposed by the developers adequately take this treat into account and adhered to our mitigating recommendations.

5. Regional Weather

5.1. According to the Koppen classification (Thwaites, 1987), the climate of the Southern Cape region is classified as moderate humid. By implication this indicates that temperatures in this area are below -3 °C (night) and 18°C (day) during the coldest months, while during the warmest months the average temperature is below 22°C. There is not a distinct wet season and rain can be expected throughout the year. Autumn and spring months are associated with the highest rainfall during the year. The weather is largely controlled by the passage of cold fronts (Tyson 1971).

5.2. Based on weather data from 2014-2017, the mean annual precipitation for the area was 652 millimetres, the average temperature 17°C, with a maximum of 37°C and a minimum of 2°C (Weatherunderground, 2017).

5.3. Bergwinds are north-westerly winds and mainly occur in the winter months from the middle of June to late August. Bergwinds, however, are not only limited to winter months and increasingly occur throughout the year. In Annexure 1 the average wind direction and seeds can be observed. These strong winds substantially increase the fire risk by lowering the moisture content of both living and dead fuel material, create high air temperatures and decrease the relative humidity, which increases the likelihood of fires igniting and spreading. Bergwinds provide favourable conditions for extreme fire events (Tyson, 1973; Pool & de Ronde, 2002).

6. Localised Winds

6.1. Because of the topographical location of the property, it is constantly exposed to wind. This is due to the absence of tall trees and structures to break the force of the wind. The valleys towards the north-western end of the property will channel and accelerate the warm and dry NW bergwinds and residences facing these valleys will be exposed to a higher threat from fire than others. These valley winds can cause fires to spot and become uncontrollable.

6.2. The average wind speed in the area is ± 11km/h but during periods of strong wind, gusts exceeding 150km/h have been measured.

7. Topographical and Vegetative concerns

7.1. The land adjacent to the property is sloping terrain with valleys. Should a fire start in

these areas it will likely burn with a fast uphill spread since fuel on slopes is preheated by rising hot air. This increases the risk associated with the warm and dry western front of the property. As mentioned, the valleys also pose a high fire risk as it will funnel and accelerate wind.

7.2. Alien invader vegetation in the area will lead to a higher fire hazard on the property. Encroaching invaders in the area increases the fuel load, supplementing it with more woody material and creating a deeper fuel bed for fire to burn in. An added disadvantage in this regard is that exotic woody species burn more intensely than fires in the indigenous flora species. Therefore, alien vegetation in and next to the property should be managed to ensure that the flammable fuel load is kept to a minimum. Weed control in this area should ideally be done before development of the areas starts, to allow burning out of dry dead woody material that has been cleared.

7.3. Once the final layout of the development has been confirmed; a specific management regime for the ecological burning of fynbos vegetation within the property must be established during the impact phase of the development for future implementation. This is only needed if the botanical specialists recommend the burning of the area that is not developed. From a long-term fire management perspective it is advisable that such prescribed burning regimes be implemented in order to reduce fuel build-up.

8. Fire hazard and risk zones.

8.1. The north-western front of the property has been identified as the highest hazard area for possible future wildfire threat. In South Africa, the north-westerly aspect of a site is usually its most dangerous area because it receives the greatest amount of solar radiation during the day -making it warm and dry - and it is exposed to maximum radiation during the warmest part of the day. Not only is this area exposed to the NW berg winds, but a community centre and an industrial area to the north western side of the property may be a likely source of fire.

8.2. This is also the direction from which the 2019 fire (paragraph 4.2) entered the property.

8.3. If the areas indicated as Portion 59 of farm 217 and Erf 1852 (Sonskynvallei Housing Extension Phase 3) are developed as residential areas, it should reduce the threat of

fire from this area.

8.4. Erf 1853 bordering the property from the west stretching all along the border of the property to the north-east, has been identified as a conservation area. This implies that alien vegetation will be removed and prescribed burning will take place as prescribed in the environmental plan. In the event that this area is managed as a pristine conservation area, it should also reduce the fire hazard it poses to the property.

8.5. The valleys to the east of the property also pose a moderate risk due to alien weed infestation that adds to the fuel load.

8.6. Bordering the southern boundary of the property are valleys that are invested with woody aliens and evidence of human activity and dumping is evident. Although this area faces away from the dominant berg winds, it also poses a marginal threat to residential units close to this area and it is not recommended that development should take place in this area or directly bordering the area.

8.7. To summarise: the north-westerly boundary of the area carries the highest risk from fires and it is recommended that a strip of at least 20m be kept clear from developments. The areas directly in front of the valleys in this area should be kept free of development for at least 30m. The rest of the property should have a strip of at least 10m kept free of development. It is further recommended that units bordering the boundary area of the property, be developed in such a way that lawns and gardens face outwards towards the boundaries of the property. The areas where development is not recommended should be utilised to establish buffer zones that can act as a defendable area in case of fire. Annexure 2 shows a map that reflects the hazards and resultant risks to the property.

9. Suitability of proposed development layouts from a veldfire risk perspective

9.1. The authors are satisfied that their fire risk constraint recommendations have been adequately considered by the developers.

9.2. During a constraints meeting held on 31 October 2017 the developer discussed various proposed layouts. The developer presented a preferred layout that would enhance the viability and the sustainability of the development. The preferred layout however infringed slightly into the constraint zones of various experts. Each of these

zones of infringement were discussed during the meeting. Since an extra safety margin was included in the original fire constraint analysis the attending fire expert (SJ van Zyl) provisionally accepted the proposed changes subject to further scrutiny of an electronic version of the layout and infringement zones.

9.3. The maps of the preferred layout were supplied (Annexure 3), and upon careful consideration the authors conditionally accepted the proposed changes with additional suggestions (Annexure 3). Thereafter the developers submitted a revised layout (Annexure 4).

9.4. The authors are fully satisfied that the developers addressed their concerns in the revised layout. The revised layout (dated 30 January 2018) (Annexure 4) is considered safe for development from a fire management perspective.

9.5. On 28 February a new proposed layout dated 27 February 2018 (Annexure 5) was received. The main changes were highlighted as follow:

9.5.1. Erven 1 – 4 in the far north have been moved closer to the reservoir (the space used to be open). There is no additional fire risk associated with this change;

9.5.2. Erven 102, 103, 106 & 107 have been introduced at the southern exit (the space used to be open) There is no additional fire risk associated with this change;

9.5.3. There are some minor changes to some ‘internal erven’ that were of the larger type (500-700sq/m) that are now of the smaller type 200sq/m. There is no additional fire risk associated with this change;

9.5.4. There are some additional open space linkages built into the revised plan that can be seen with the red lines. These changes are beneficial from a fire management perspective since it provides access and additional area that can be used for defendable space.

9.6. The authors are satisfied that the revised layout dated 27 February 2018 (Annexure 5) is safe for development from a fire management perspective. This layout adequately addresses all of the fire management concerns previously raised.

9.7. On 5 March 2020 the authors were advised that a new layout was being proposed by the developer (Annexure 6). Subsequently this layout was revised again and presented for consideration on 3 March 2021 (Annexure 7 & 8).

9.8. After careful consideration, the authors are satisfied that the revised layouts (Annexure 6, 7 & 8) do not exceed any of the constraints set from a fire management perspective. The proposed layouts therefore meet the approval of the authors.

References

Helme, N.A. (2016). Botanical impact assessment of proposed development on erf 3122, Hartenbos, Western Cape. Unpublished report.

Pool, CF & de Ronde, C (2002) Integration of Fire Management system in the Southern Cape region, Forest Fire Research & Wildland Fire Safety, Viegas (ed.) Mill press, Rotterdam, ISBN 90-77017-72-01

Teie, William C. (2003) *Fire managers Handbook on Veld & Forest Fires strategy, tactics & safety South African Edition*, edited by Christiaan F. Pool, printed & bound in SA by Intrepid Printers (Pty) Ltd, Pietermaritzburg, KwaZulu Natal

Thwaites, R.N., 1987. The Classification and analysis of forest sites: Grabouw and Lebanon State Forests, Western Cape region. Centre report No S86/2. Saasveld Research Centre, South African Forest Research Institute.

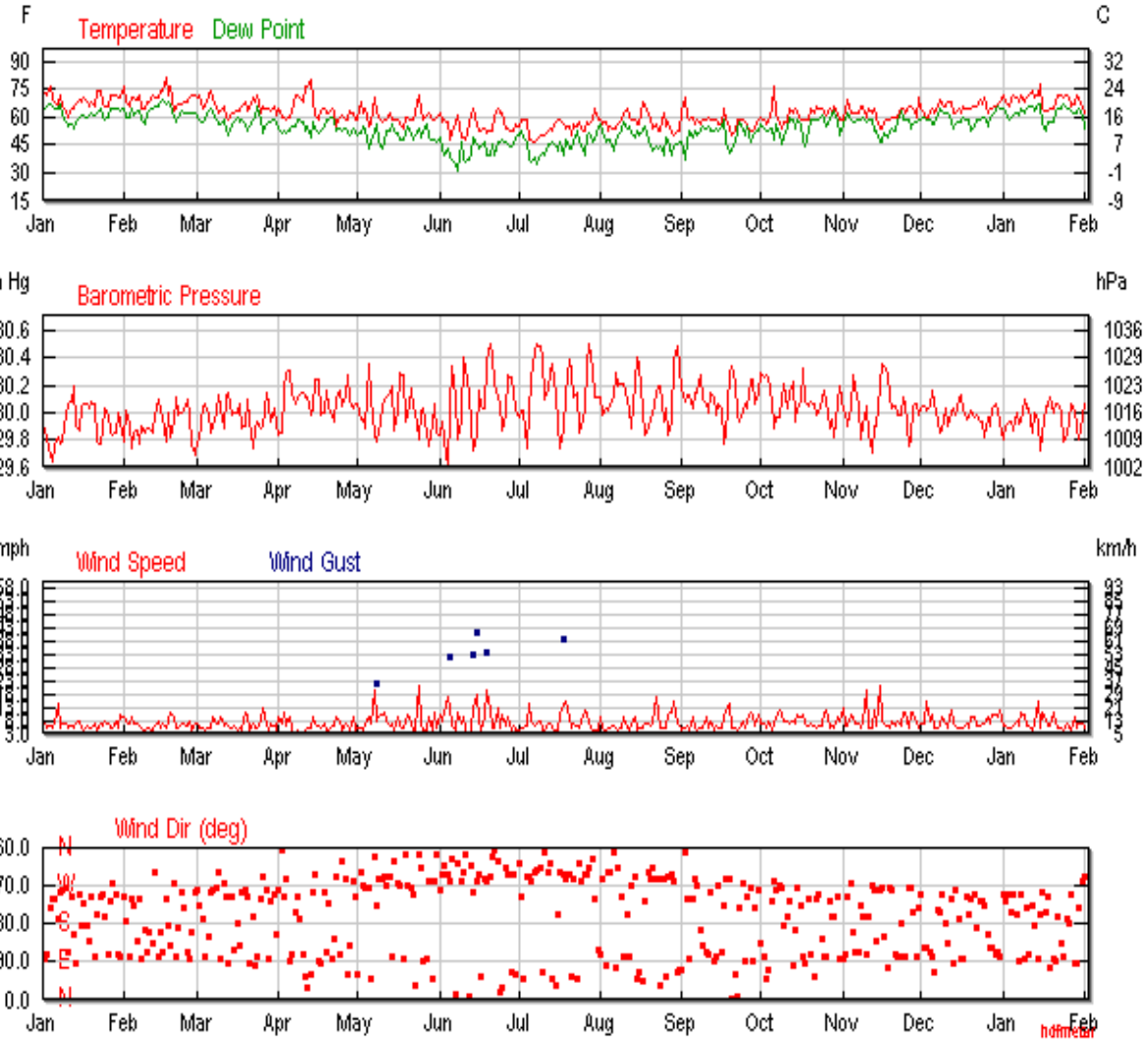
Tyson, P.D., 1971. Outeniqualand: The George Knysna area. Department of Geography, University of Wits No 2. 23pp.

Weatherunderground. (2017) *George Airport***,** [online] [Accessed 19 August 2017]

Annexure 1: Weather in the region

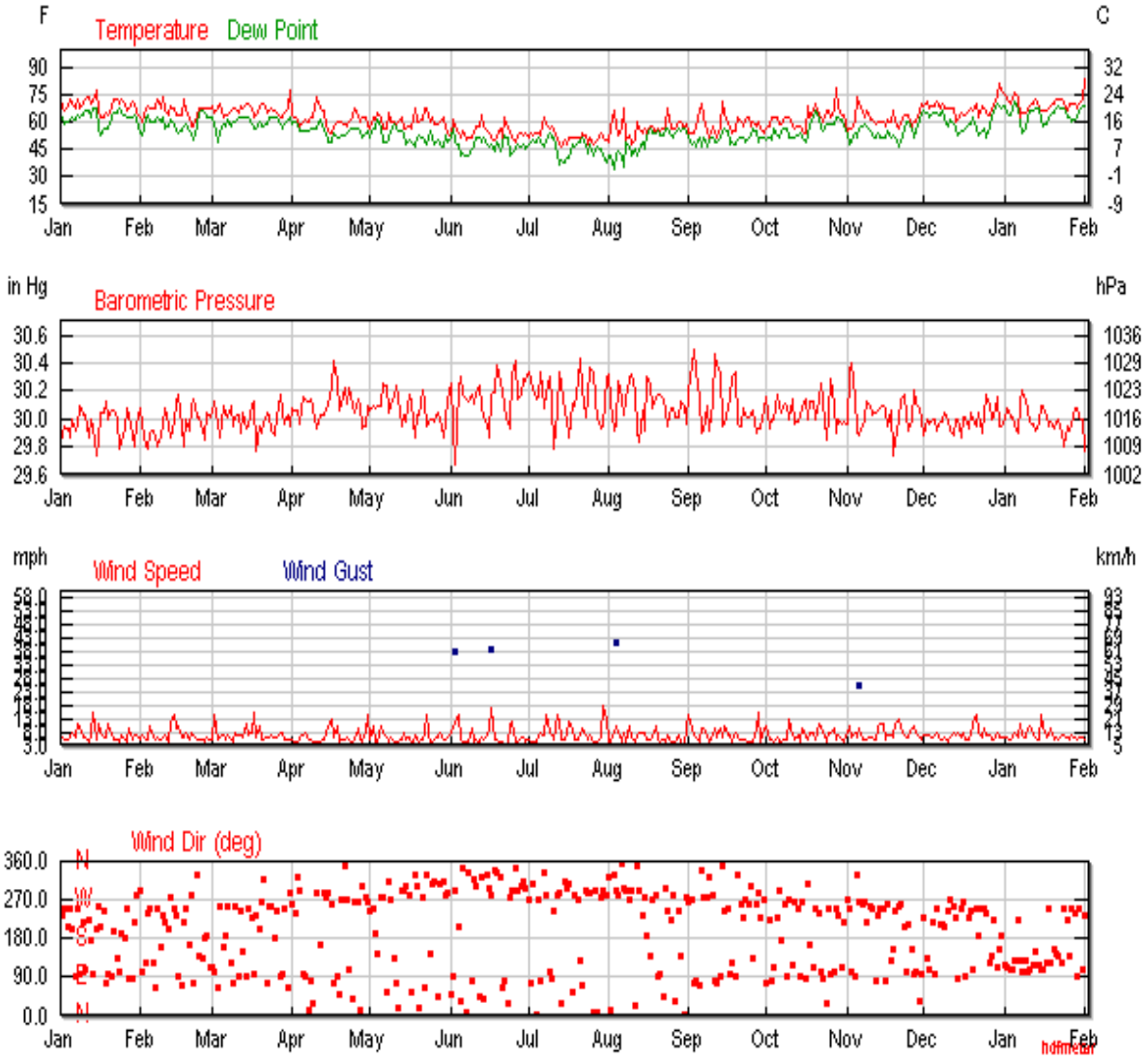
Weather History George Airport Jan 2014-2015

	Max	Avg	Min
Max Temperature	37 °C	22 °C	12 °C
Mean Temperature	27 °C	17 °C	8 °C
Min Temperature	21 °C	12 °C	2 °C
Wind	138 km/h	11 km/h	0 km/h
Gust Wind	87 km/h	54 km/h	26 km/h



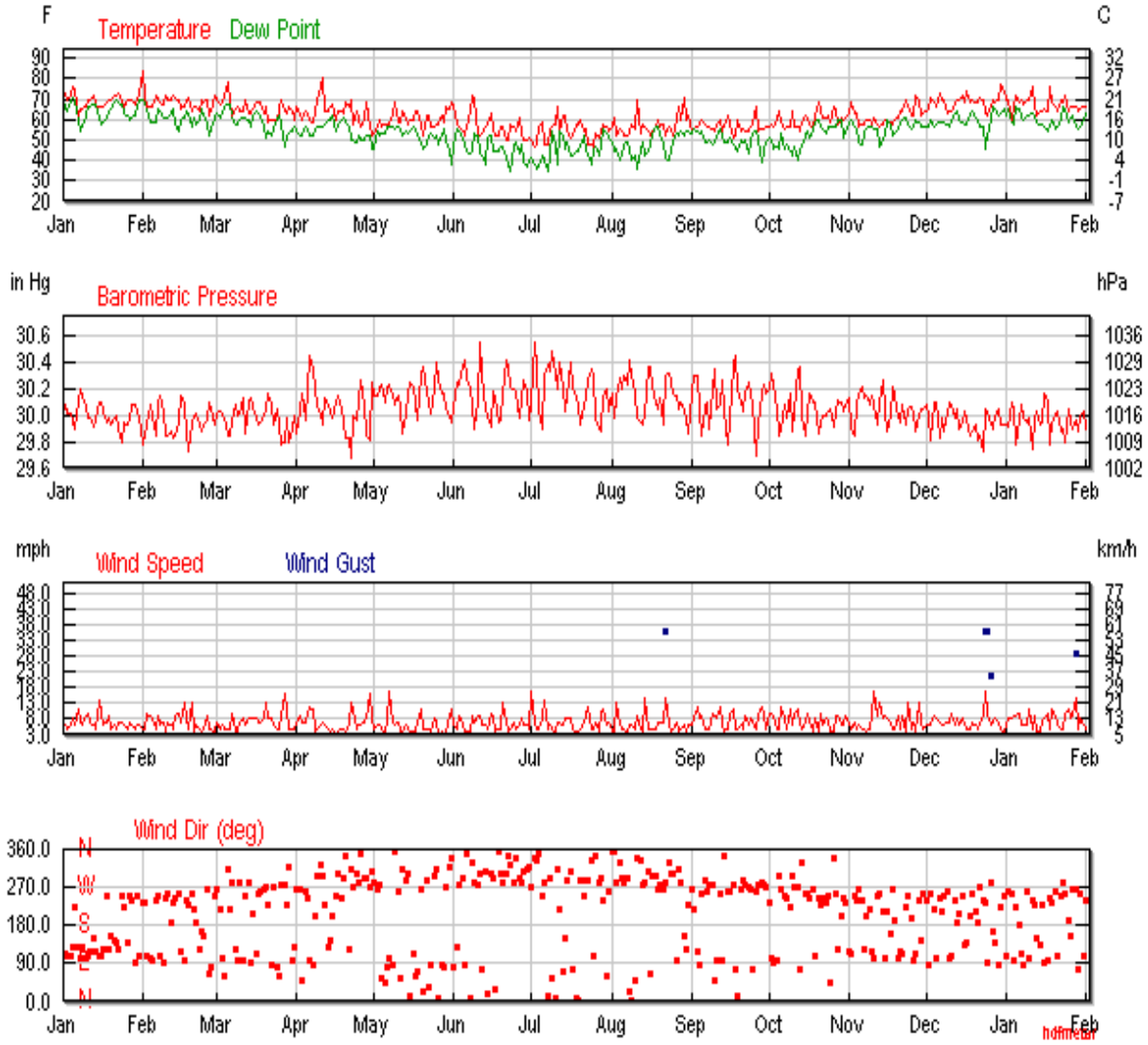
Weather History George Airport Jan 2015-2016

	Max	Avg	Min
Max Temperature	37 °C	21 °C	12 °C
Mean Temperature	29 °C	17 °C	8 °C
Min Temperature	22 °C	12 °C	3 °C
Wind	55 km/h	11 km/h	0 km/h
Gust Wind	80 km/h	53 km/h	29 km/h



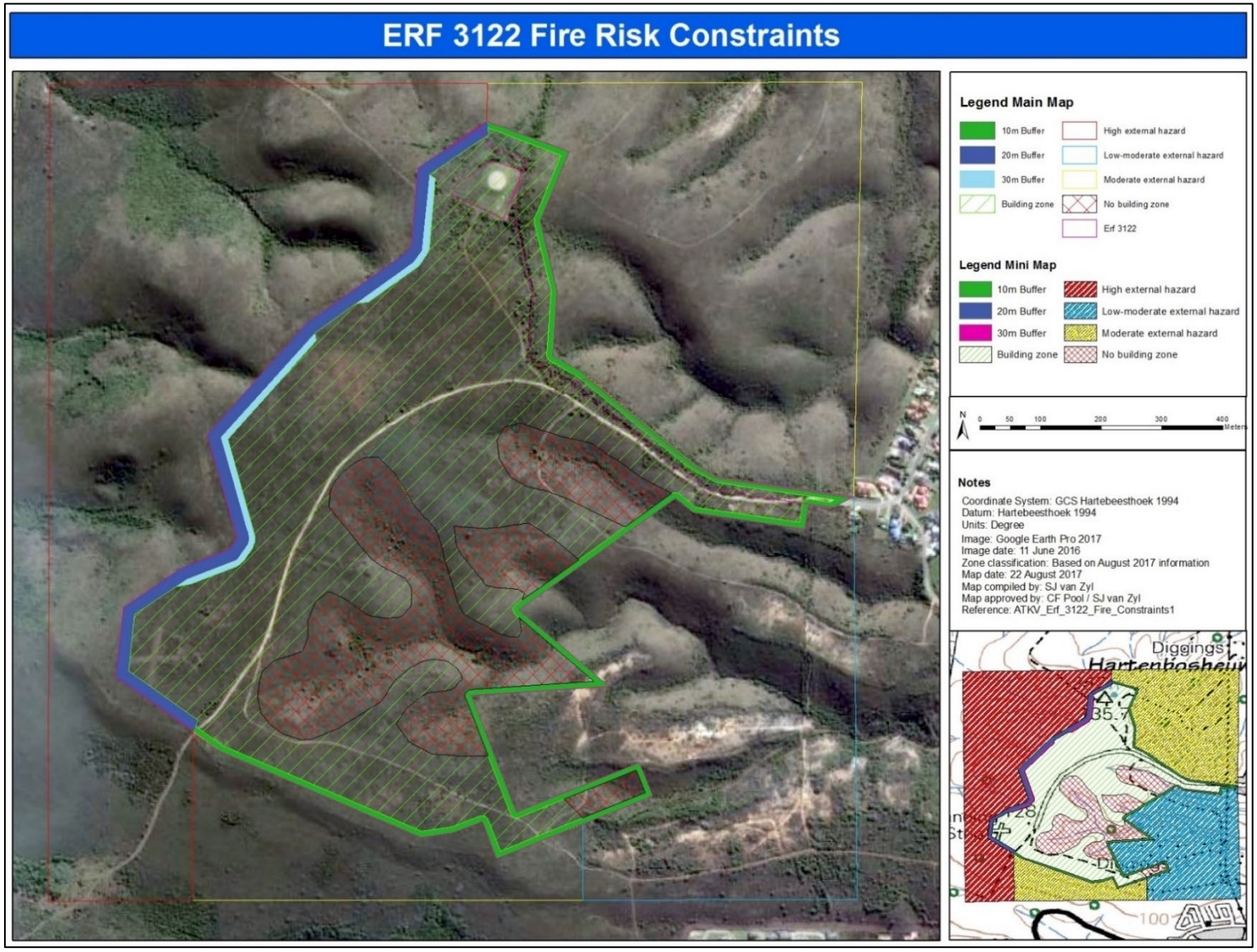
Weather History George Airport Jan 2016-2017

	Max	Avg	Min
Max Temperature	37 °C	22 °C	12 °C
Mean Temperature	29 °C	17 °C	8 °C
Min Temperature	22 °C	12 °C	2 °C
Wind	175 km/h	11 km/h	0 km/h
Gust Wind	80 km/h	53 km/h	35 km/h

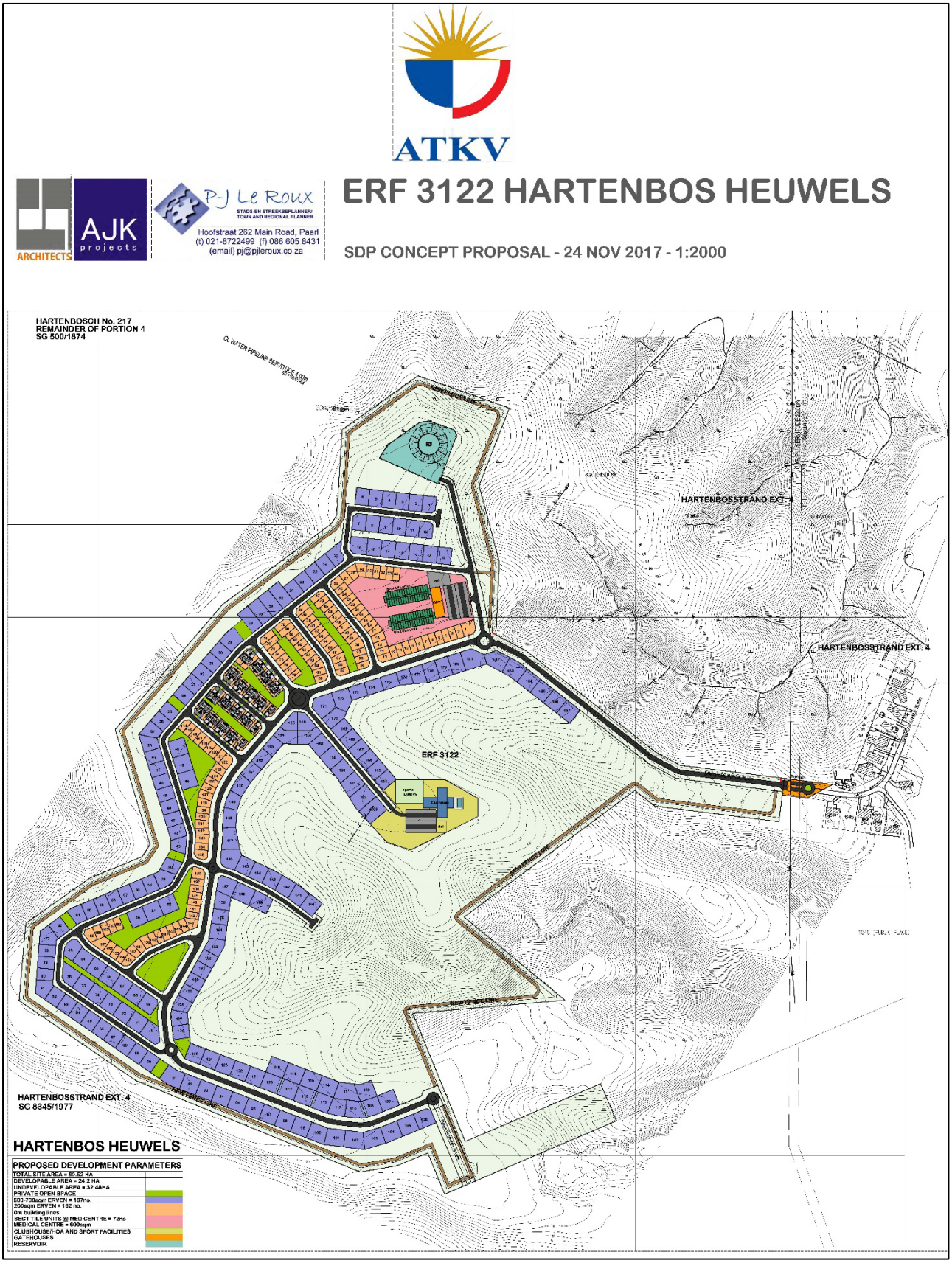


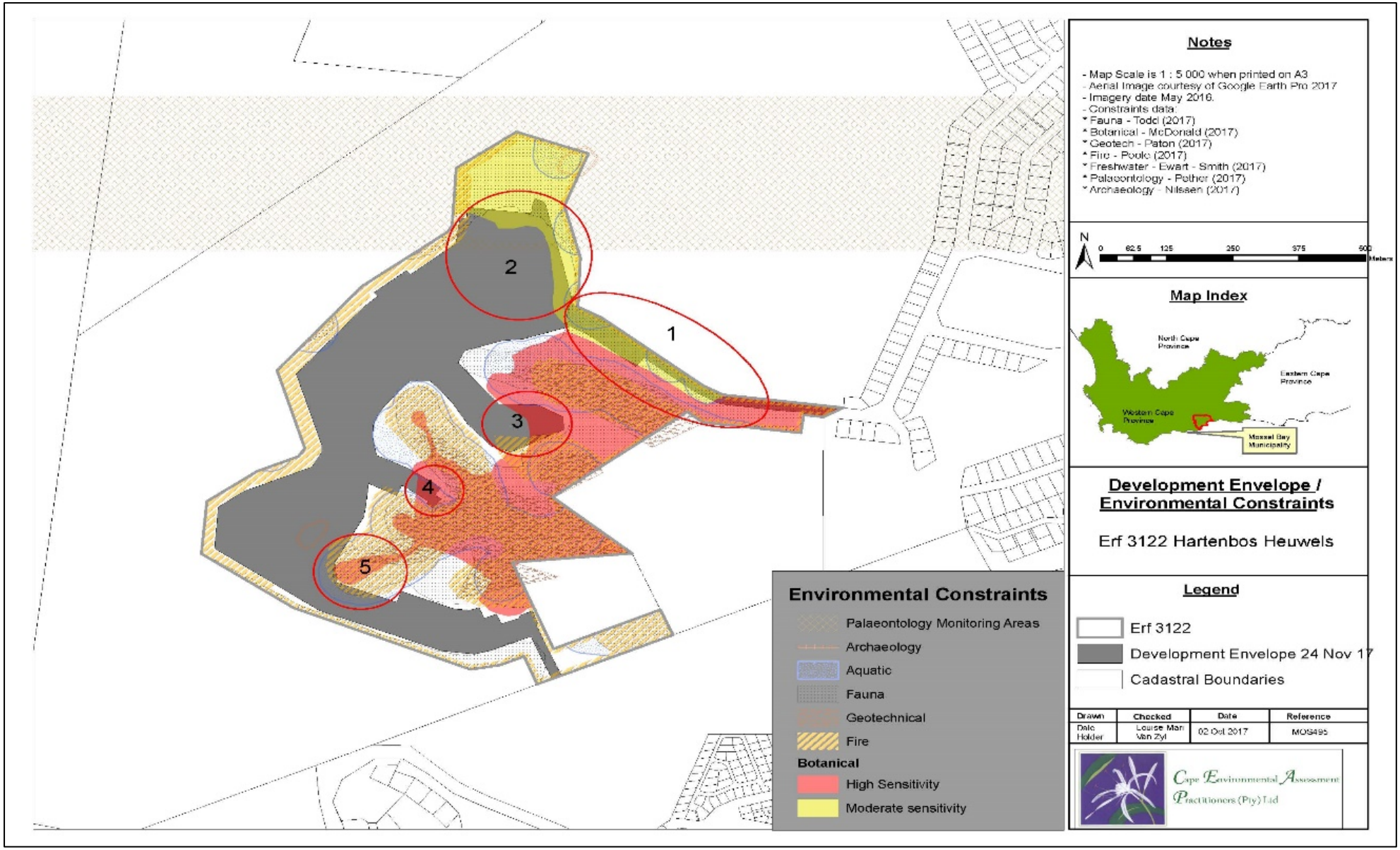
(Accessed 19/08/2017 @ https://www.wunderground.com/history/)

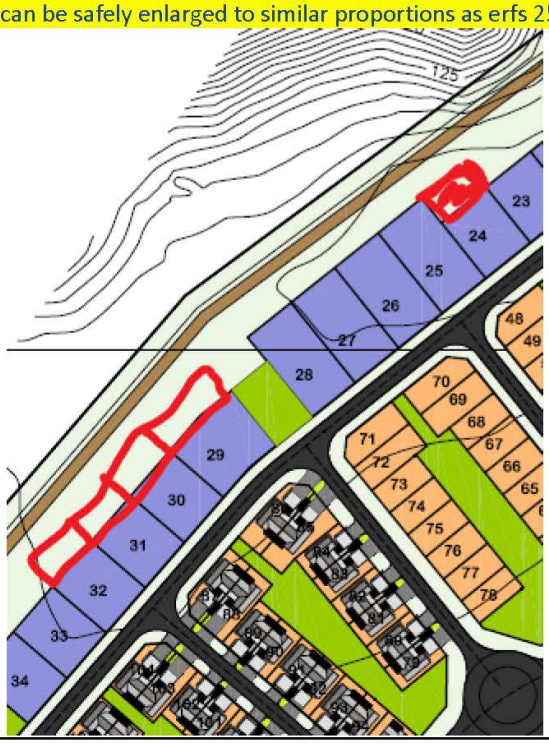
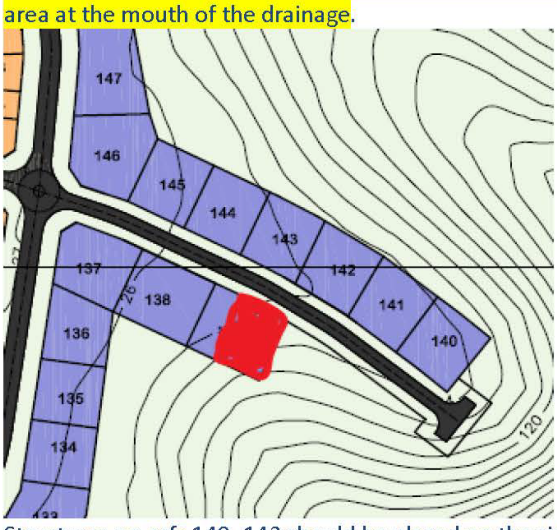
Annexure 2: Fire constraints map



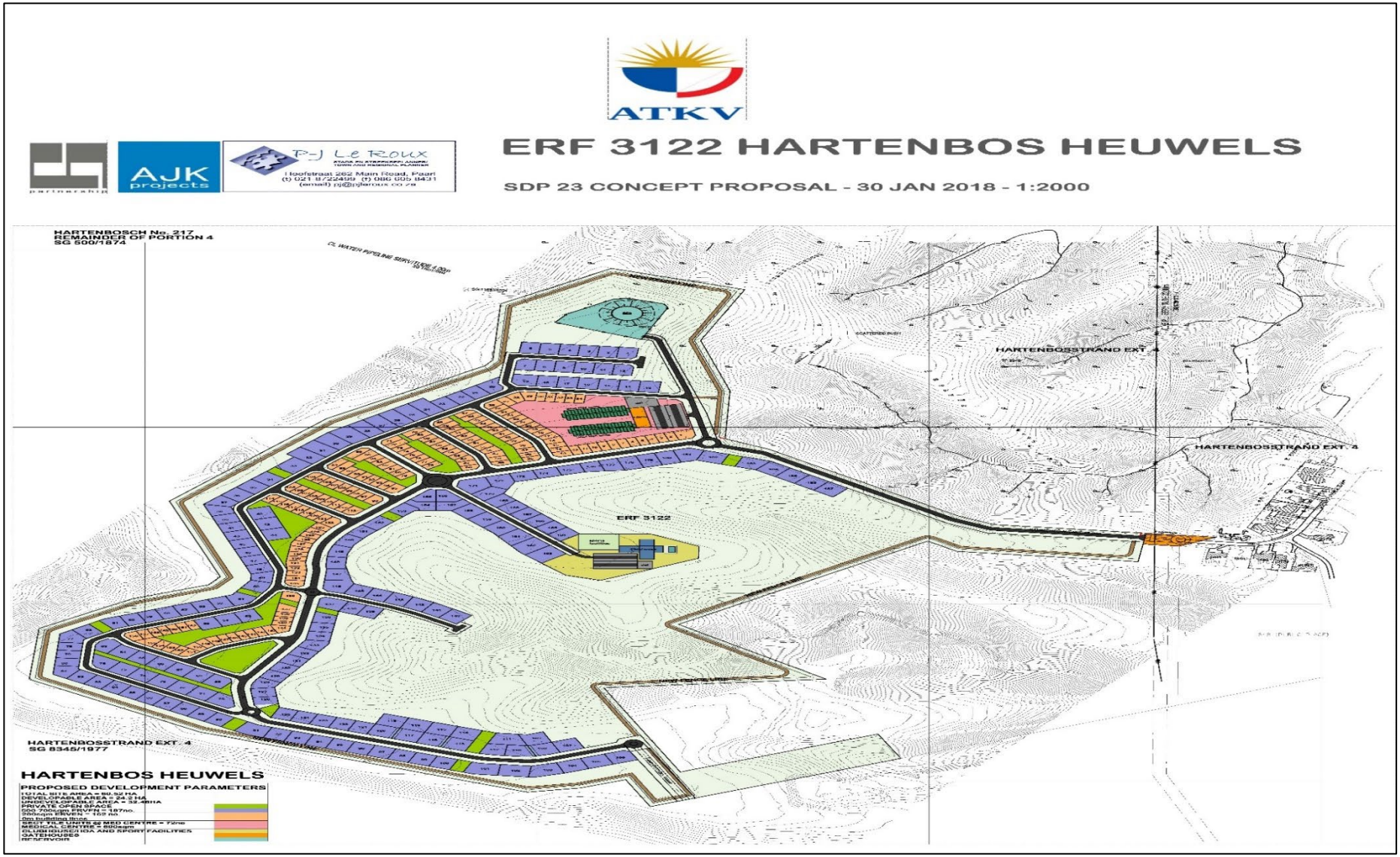
Annexure 3: Development proposal and fire scoping comments




Notes
- Map Scale is 1 : 5 000 when printed on A3
- Aerial Image courtesy of Google Earth Pro 2017
- Imagery date May 2016.
- Constraints data:
* Fauna - Todd (2017)
* Botanical - McDonald (2017)
* Geotech - Paton (2017)
* Fire - Poole (2017)
* Freshwater - Ewart - Smith (2017)
* Palaeontology - Pether (2017)
* Archaeology - Nilssen (2017)
N
0 62.5 125 250 375 500 Meters
Map Index
North Cape Province
Eastern Cape Province
Western Cape Province
Mossel Bay Municipality
Development Envelope / Environmental Constraints
Erf 3122 Hartenbos Heuwels
Legend
Erf 3122
Development Envelope 24 Nov 17
Cadastral Boundaries
Drawn
Checked
Date
Reference
Date Holder
Louise Marx Van Zyl
02 Oct 2017
MOS495
Cape Environmental Assessment Practitioners (Pty) Ltd
1
2
3
4
5
Environmental Constraints
Palaeontology Monitoring Areas
Archaeology
Aquatic
Fauna
Geotechnical
Fire
Botanical
High Sensitivity
Moderate sensitivity

AREA	SPECIALIST	COMMENT
1	Fire	Changes acceptable.
2	Fire	Changes acceptable. Not technically in zone 2 but... erfs 24, and 29 -32 can be safely enlarged to similar proportions as erfs 25 – 28. 
3	Fire	Changes acceptable.
4	Fire	Changes acceptable with the following additional mitigation measures: Erf 139 should be reduced to half its size as it is situated on a high risk area at the mouth of the drainage.  Structures on erfs 140 -143 should be placed on the side of the erf that is the furthest from the drainage to create defendable space should a fire burn into the drainage (This should be the general practice for all erfs bordering flammable material).
5	Fire	Changes acceptable.

Annexure 4: Revised development proposal dated 30 January 2018



Annexure 5: Revised development proposal dated 27 February 2018

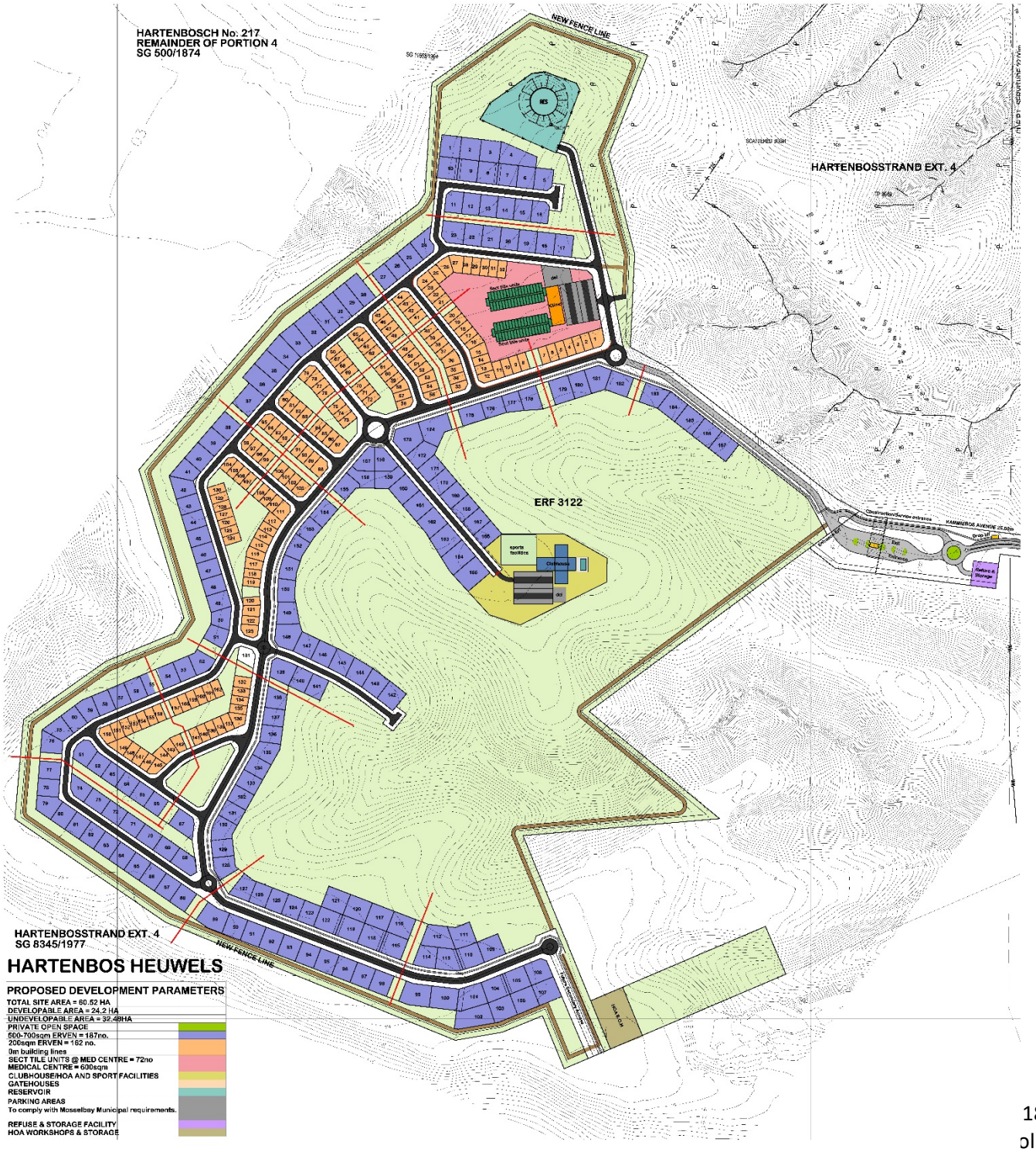
ATKV

AJK projects partnership

P-J Le Roux
Hoofstraat 262 Main Road, Paarl
(t) 021-8722499 (f) 086 605 8431
(email) pj@pjleroux.co.za

ERF 3122 HARTENBOS HEUWELS

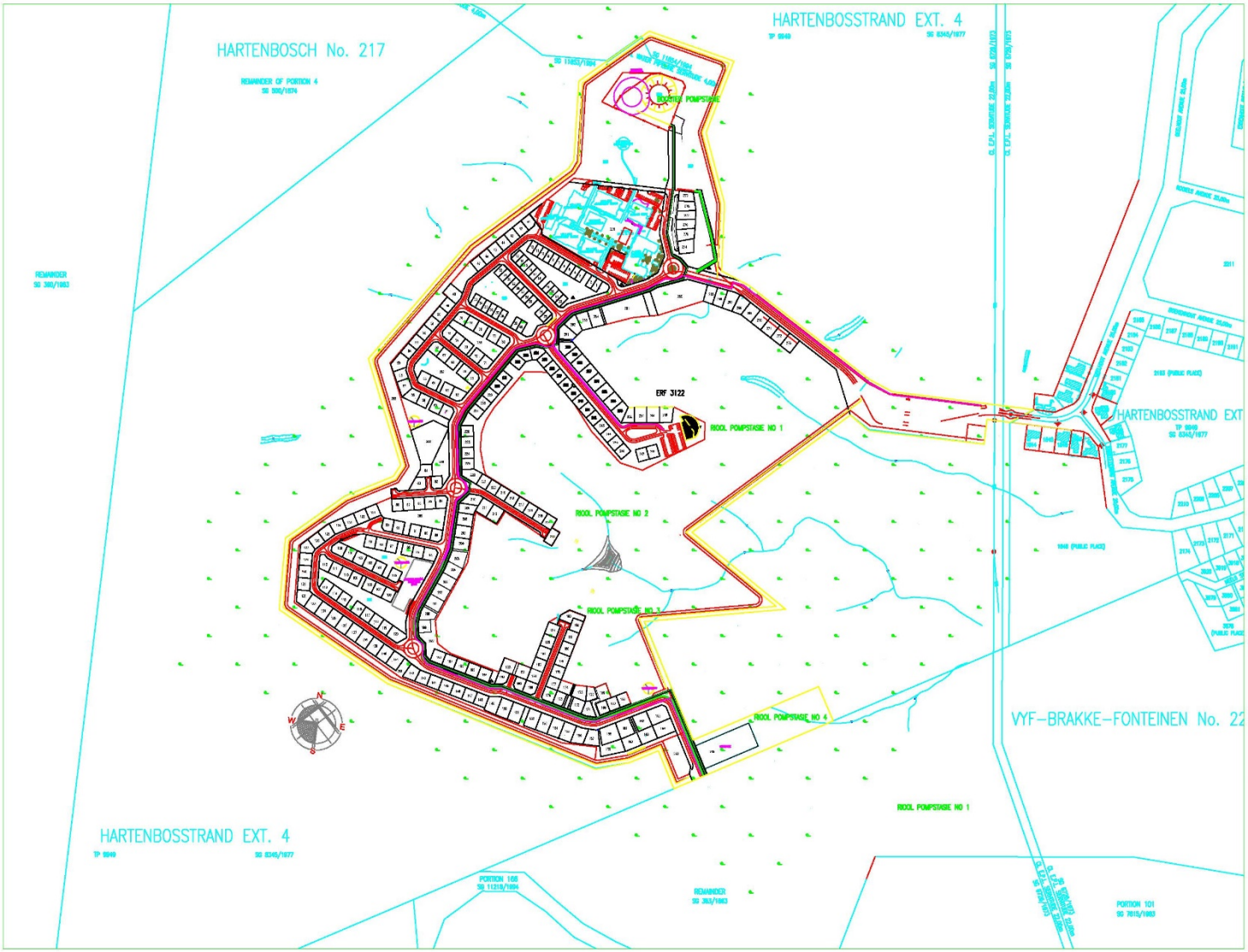
SDP 23 CONCEPT PROPOSAL 23(3)- 27 FEB 2018 - 1:2000



H & van Zyl

Annexure 6: Revised development proposal dated 03 March 2020

Annexure 7: Revised development proposal dated November 2020



Annexure 8: Revised development proposal dated 20 December 2020