(i) The management and conservation of biological diversity within the Republic and of the components of such biological diversity;
(ii) The use of indigenous biological resources in a sustainable manner; and
(iii) The fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources;

(b) To give effect to ratified international agreements relating to biodiversity which are binding on the republic;

(c) To provide for co-operative governance in biodiversity management and conservation; and

(d) To provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.

Implications for proposed development:

Significant- The study area is regarded as 'Irreplaceable' (a 'Critical Biodiversity Area' (CBA) as defined in the C-Plan 3.3) (**Refer to Figure 7: Biodiversity Map and Figure 8: C-Plan 3.3 Irreplaceable Site**).

Flora
The study area falls within the area designated as Egoli Granite Grassland situated in the Grassland Biome. Two study units were identified on the study site which includes Grassland and a Drainage Line cutting through it. Approximately 23% of the remainder of Portion 1 of the Farm Waterval 5IR has a high sensitivity in terms of flora with 77% of the surface area having a low sensitivity. The proposed 22 ha development layout caters for 8 ha of private open space with the purpose of protecting sensitive environments occurring on site.

The development site has been identified as 'Irreplaceable' according to the GDARD C-Plan 3.3 due to the occurrence of the Orange List species *Hypoxis hemerocallidea* which were recorded on the study site and identified as having a moderate sensitivity according to the Flora Assessment (**Refer to Figure 9: Flora Sensitivity Map and Appendix G2: Flora Assessment**).

Although the development site incorporates some Egoli Granite Grassland, its isolation from natural grassland on neighbouring sites is not favourable to its continued pristine status and is deemed to have a **low sensitivity**. The Drainage Line on the other hand remains connected with the Jukskei River system.

It is also important to note that the study area also formed part of the off-set agreement between the developer and GDARD. In such agreement GDARD gave the developer the right to develop Portion 1 of the Farm Waterval 5IR in exchange for another portion of land earmarked for conservation purposes, which is situated outside of the urban edge. Also take note that the GDARD C-Plan regards the flora on the study area as moderate sensitive. ***Refer to Figure 9 below***

Balwin, who is now in a Joint Venture with the land-owner took this agreement into consideration when they invested in the study area.

It is recommended that the relocation of the Orange List species *Hypoxis hemerocallidea* be implemented prior to construction.

Figure 7: C-Plan 3.3 – Biodiversity Map

Figure 8: C-Plan 3.3 Irreplaceable Site.

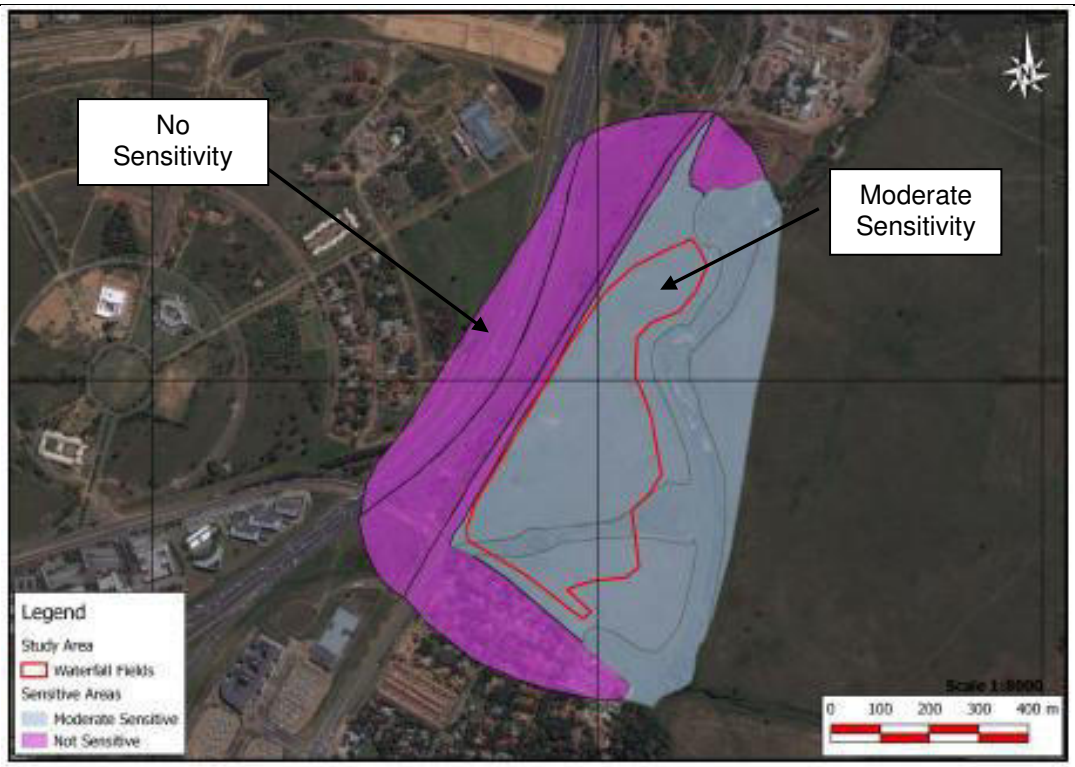


Figure 9: Flora Sensitivity Map

Fauna

The majority of the terrestrial habitats present on the study area remain in its natural state, although alien plant species tend to invade some of the habitats. The current terrestrial habitats do however provide good habitat for a number of small mammals deducted to be present. The Grassland habitat is expected to support several small mammal species on account of the availability of their food source and maintained connectivity with homogenous habitats.

The Riverine habitat is deemed to be **highly sensitive** from a faunal perspective as it produces suitable habitats for Otter and Vlei Rat species. The probability of Red Listed Otter or Vlei Rat species selecting this particular stretch of the Jukskei River suitable for their nesting area is unlikely, on account of some pollution and degradation of the habitat. Otter and Vlei Rat species are however expected to use this part of the Jukskei River as a corridor or passage way to areas suitable for nesting purposes.

The Drainage Line is deemed to be **moderately sensitive** from a faunal perspective as it acts as a tributary to the Jukskei River. No Red Data faunal nesting areas were identified in the Drainage Line; however this habitat is expected to be utilized as a forage resource by these species (**Refer to Figure 10: Fauna Sensitivity Map and Appendix G3: Fauna**

Assessment).

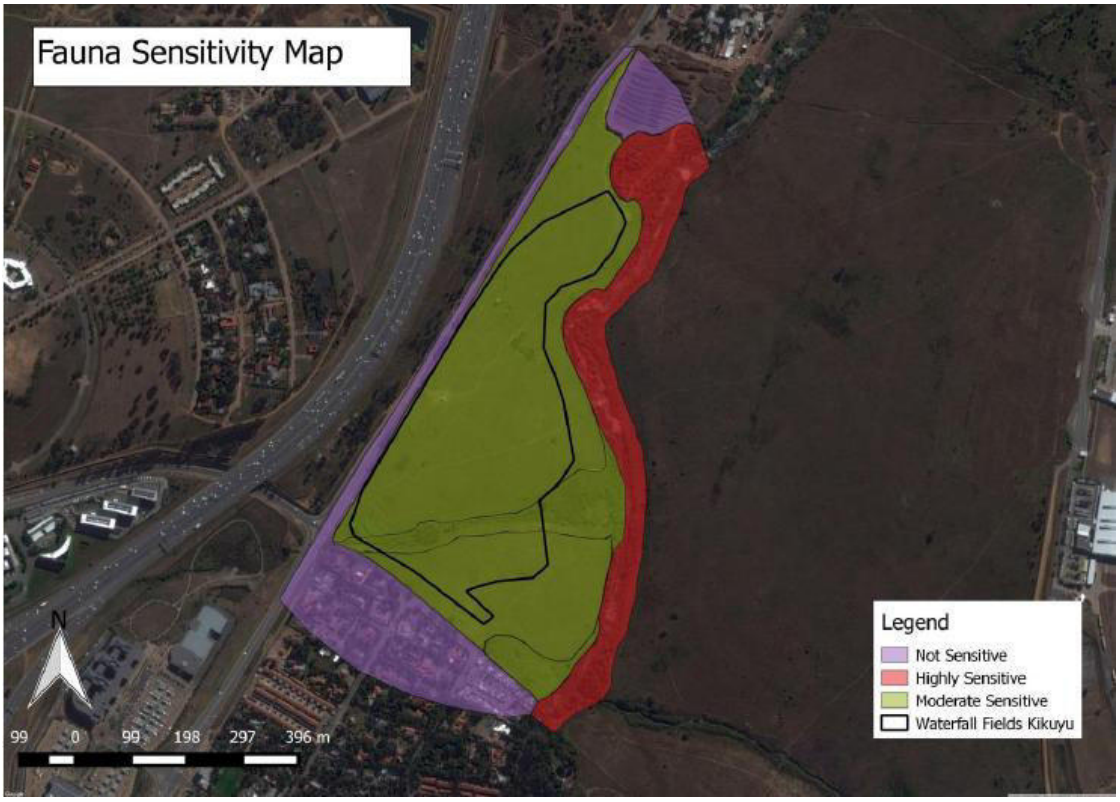


Figure 10: Fauna Sensitivity Map

Avifauna

The discrete habitats identified on the study area supports a moderate richness of bird species. Approximately 162 species have a high to medium occurrence probability, of which one near threatened bird species has a medium probability of occurring and/or being resident within the study area. The following findings were made for each of the associated habitat units within the larger study area (**Refer to Figure 11: Avifauna Sensitivity Map**).

Grassland: No suitable breeding habitat for any threatened or near threatened bird species were observed on site. However, could provide potential foraging habitat for certain threatened species such as the Lanner Falcon. On account of the lack of suitable breeding habitat for species with conservation concern, and the overall low avifaunal species composition, this study unit was identified with a **low avifaunal sensitivity**.

Wetland and drainage line: The intact and largely undisturbed nature of the wetland and drainage line habitat unit, along with the pollution prevention function and high

number of observed bird species, renders this study unit as **highly sensitive** from an avifaunal perspective.

Riverine: The riverine area contains fast flowing, clear water with a number of small rapids, as well as vertical sandbanks and dense overhanging vegetation. Connectivity with neighbouring homogeneous habitat is relatively high, especially towards the north-east and west. Although the connectivity is regarded to be high, the water quality of the Jukskei River is questionable as a result of downstream pollution in the form of solid and chemical waste making its way into the river system. Apart from possible pollution, the riverine habitat unit provides optimal foraging habitat for the near threatened Half-collared Kingfisher, provided that a sustainable food source is available. A single Malachite Kingfisher was however observed within the riverine habitat unit, indicating that it is likely that a food source in the form of small fish, tadpoles and aquatic invertebrates is present. Due to the connectivity function, high avifaunal diversity and optimal habitat for the near threatened Half-collared Kingfisher, this habitat unit was identified to be **highly sensitive** (**Refer to Appendix G4: Avifauna Assessment**).

Wetland

The site contains a channeled valley bottom wetland, with a PES rating of C. The channeled stream enters the Jukskei River, which is a critically modified river in terms of water quality (**Refer to Figure 12: Wetland Delineation**). It is recommended that the delineated wetland be excluded from development. However, due to the state of the hydrology in the area, it would be recommended that the buffer be considered insignificant, where the focus should be placed on rehabilitation and upgrading of the watercourse.

The buffer will contribute very little to the protection of the watercourse, it is for this reason that the buffer be removed, and development incorporate and rehabilitate the functionality of the wetland. It should be noted that the development should always be designed outside of the floodlines to reduce risk to flooding (as wetlands on the Halfway House granite dome cannot attenuate flooding) (**Refer to Appendix G5: Wetland Assessment**).

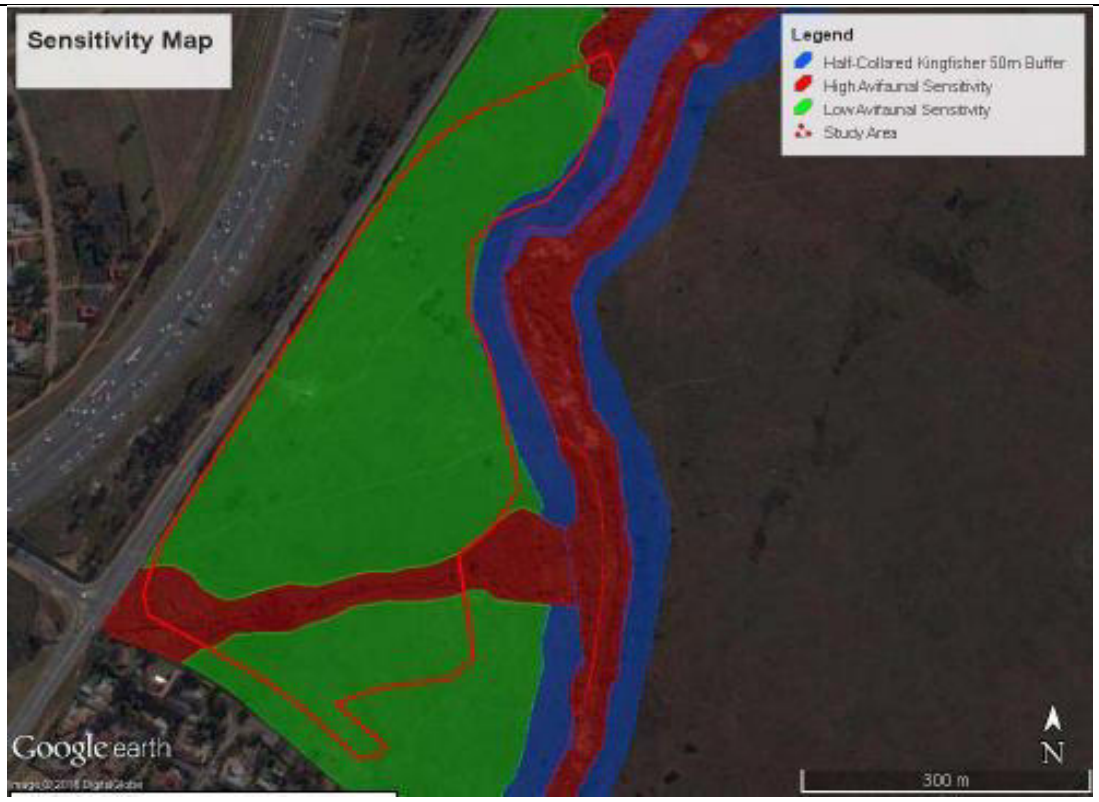


Figure 11: Avifauna Sensitivity Map

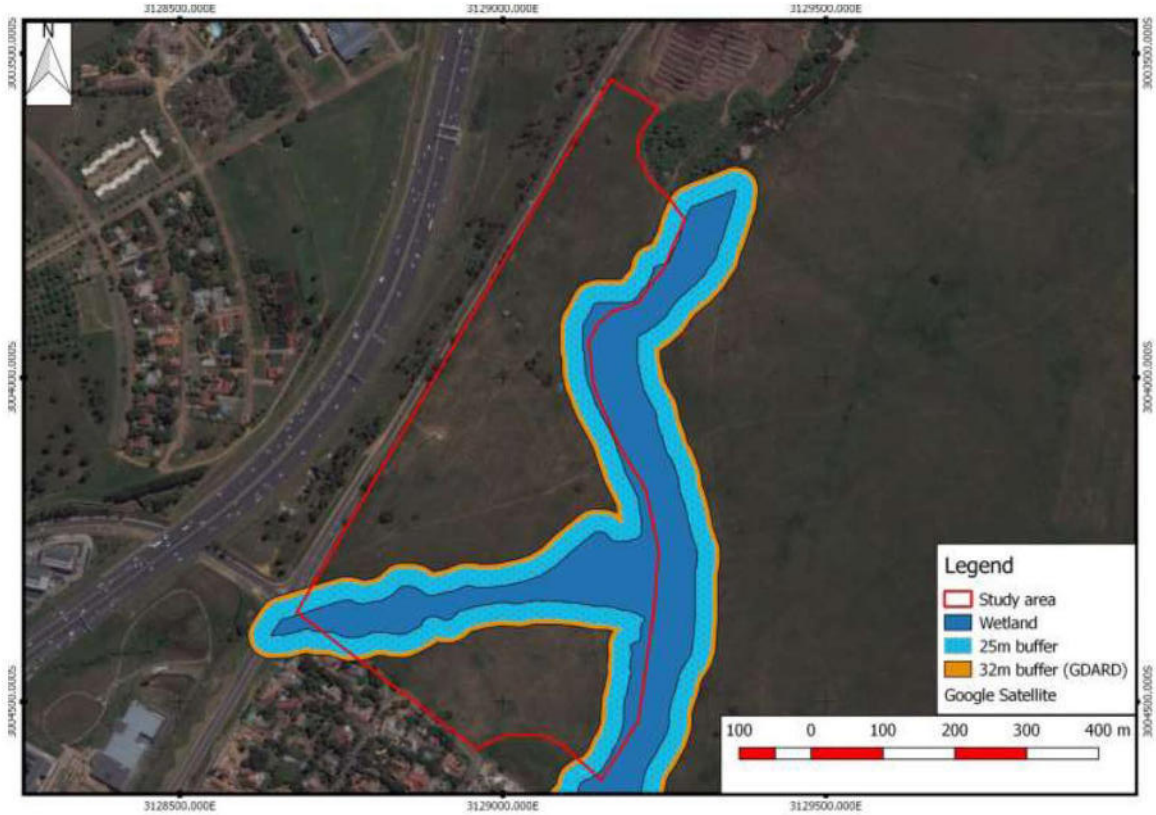


Figure 12: Wetland Delineation

The Land Exchange Matter/Offset Agreement

All the portions of land on the Farm Waterval 5 IR, which belong to the Mias Family, were included in a land swap transaction with GDARD.

The land swap transaction is applicable to the study area and therefore the conservation of Egoli Granite Grassland on site is not recommended. Refer to **Figure 13** for detail regarding land donated to GDARD for conservation purposes as well as **Appendix I** for the Land Exchange Memorandum of Agreement concluded with GDARD.

According to the Land Exchange Memorandum of Agreement the following properties comprising of Egoli Granite Grassland were donated to GDARD as offset area for the proposed development of the Remaining Extent of Portion 1 of the Farm Waterval 5 IR:

- Portion 6 of Doorinrandjie Farm;
- Portion 112 of Doorinrandjie Farm;
- Portion 106 of Doorinrandjie Farm; and
- Portion 39 of Doorinrandjie Farm.

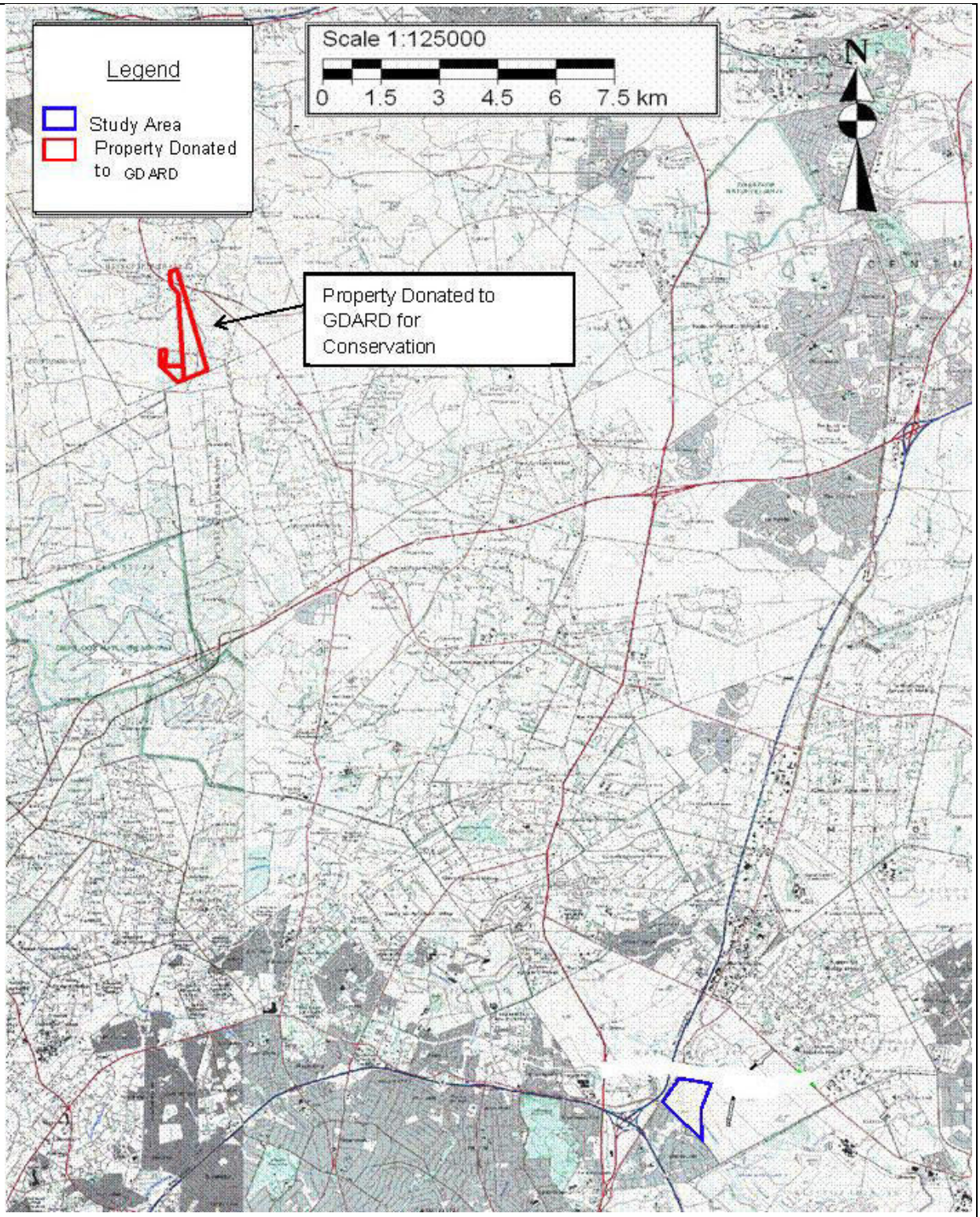


Figure 13: Property Donated to GDARD for Conservation

Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	**National**	**1 June 1983**

This act provides for control over the utilization of natural agricultural resources of South Africa in order to promote the conservation of soil, water sources and the vegetation as well as the combating of weeds and invader plants; and for matters connecting therewith.

Implications for the development

Not Significant – According to the Gauteng Agricultural Potential Atlas (GAPA 4), the site has a **low** agricultural potential (**Refer to Figure 14: Agricultural Potential**). In addition, GIS Data and GIDS data from GDARD also clearly indicates that the development is located with in the Gauteng Urban Edge (2010) (**Refer to Figure 15: Urban Edge**), and does not fall within any of the Seven Agriculture Hubs identified for the Gauteng province.

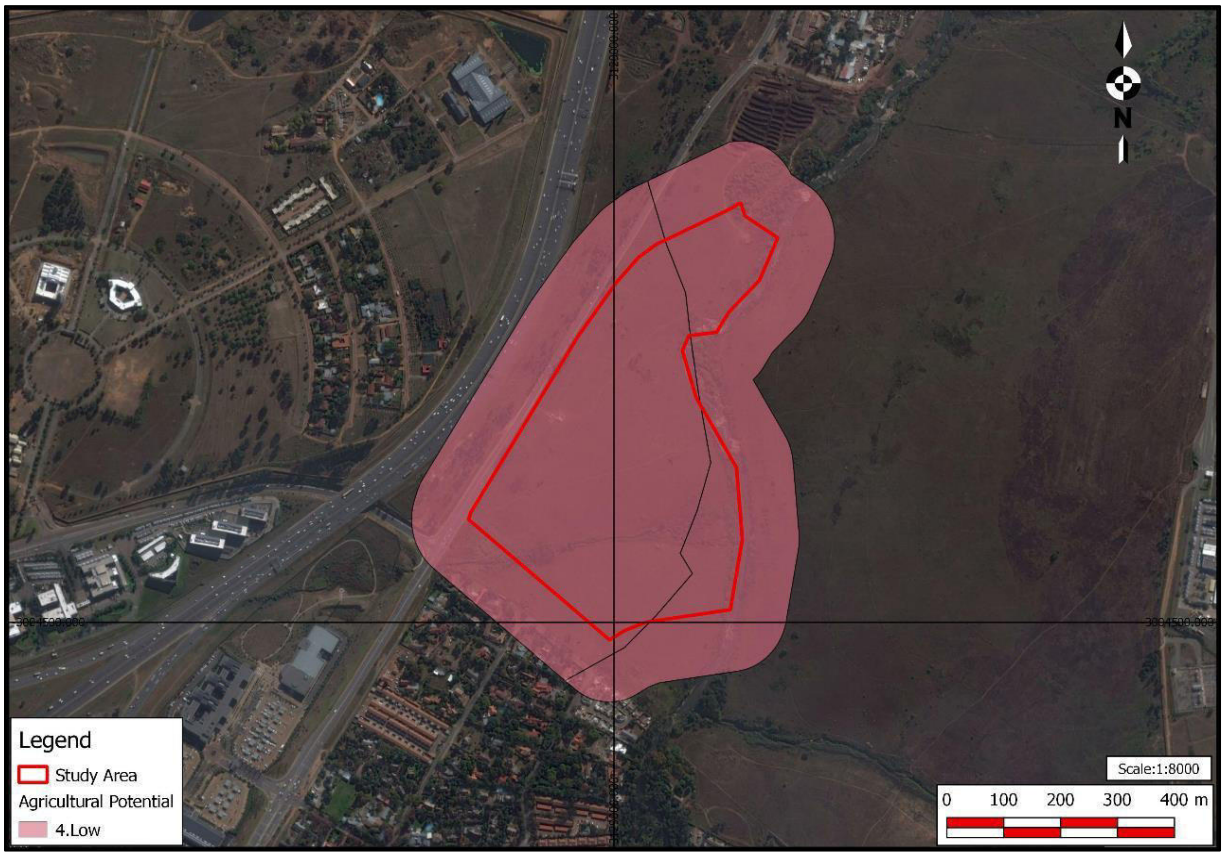


Figure 14: Agricultural Potential

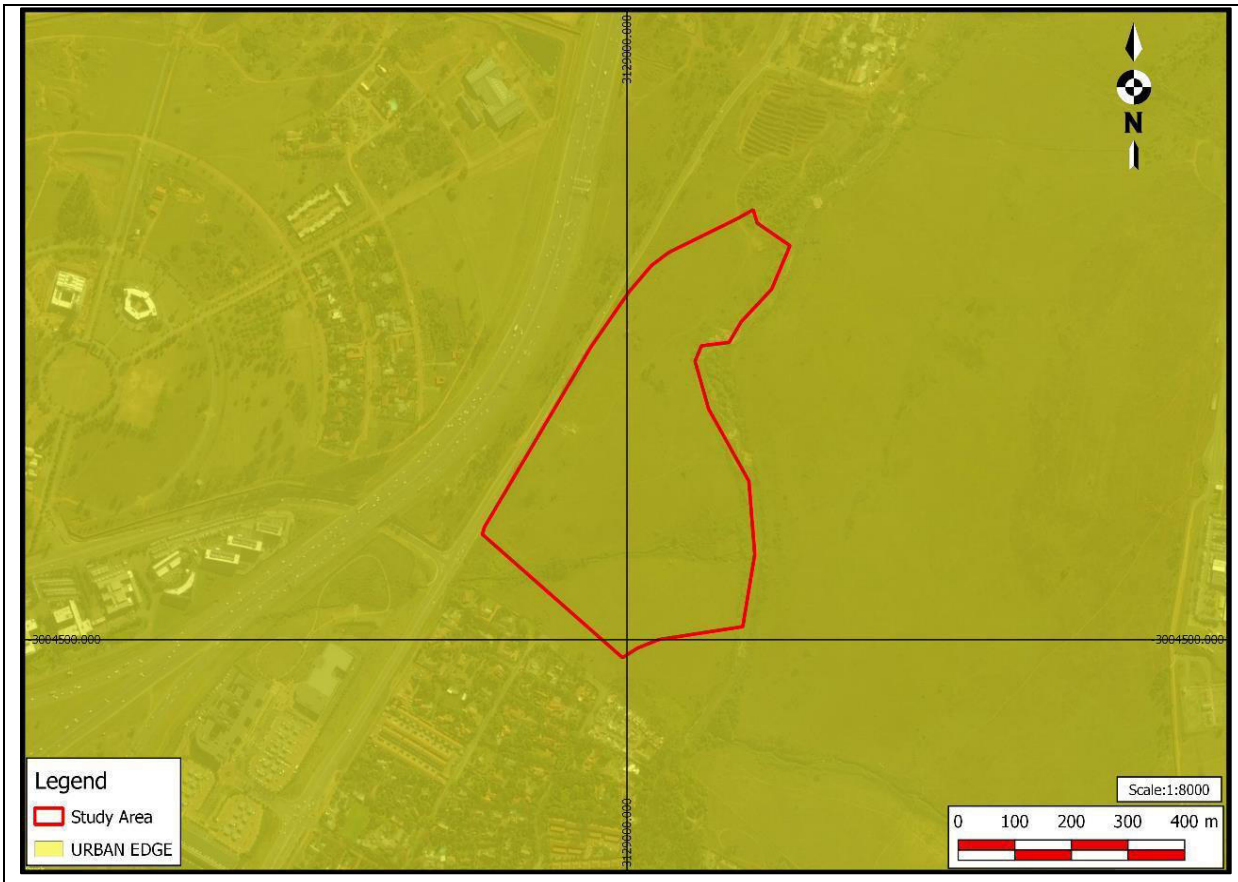


Figure 15: Urban Edge

National Environmental Management: Waste Act (Act 59 of 2009)	**National**	**11 June 2010**

This Act came into effect on 11 June 2009. It aims to consolidate waste management in South Africa, and contains a number of commendable provisions, including:

- The establishment of a national waste management strategy, and national and provincial norms and standards, for amongst other, the classification of waste, waste service delivery, and tariffs for such waste services;
- Addressing reduction, reuse, recycling and recovery of waste;
- The requirements for industry and local government to prepare integrated waste management plans;
- The establishment of control over contaminated land;
- Identifying waste management activities that requires a license, which currently include facilities for the storage, transfer, recycling, recovery, treatment and disposal of waste on land;
- Co-operative governance in issuing licenses for waste management facilities, by means of which a licensing authority can issue an integrated or consolidated license jointly with other organs of state that has legislative control over the activity; and
- The establishment of a national waste information system.

Implication for the development:

Not Significant – No waste management license will be required during the construction or operational phases of the proposed Township. Due to the fact that a limited amount of solid construction waste will be stored and handled on the site, before it is hauled away and dumped at the nearest registered landfill site.

Red List Plant Species Guidelines	**Provincial**	**26 June 2006**

The purpose of these guidelines is to promote the conservation of Red Listed Plant Species in Gauteng, which are species of flora that face risk of extinction in the wild. By protecting Red Listed Plant Species, conservation of diverse landscapes is promoted which forms part of the overall environmental preservation of diverse ecosystems, habitats, communities, populations, species and genes in Gauteng.

These Guidelines are intended to provide a decision-making support tool to any person or organization that is responsible for managing, or whose actions affect, areas in Gauteng where populations of Red Listed Plant Species grow, whether such person or organization be an organ of state or private entity or individual; thereby enabling the conservation of the Red List Plant Species that occur in Gauteng.

Implication for the development:

Not Significant – No Red Listed species have been recorded on site. The Riverine area does however provide for an optimal habitat for the near threatened Half-collared Kingfisher.

GDARD Draft Ridges Policy	**Provincial**	**2007**

This policy is provided for the protection, conservation and maintenance of ridges within the Gauteng Province. Ridges play an important role in biodiversity and ecosystem functioning as they provide niche habitats for a number of species. Ridges must be viewed as playing a critical role in the preservation of migratory corridors for faunal and floral species.

Implications for the development:

Not Significant- According to the GDARD Draft Ridges Policy no development should take place on slopes steeper than 8.8%. The existing development does not occur in an area classified as a ridge in terms of GDARDs draft ridges policy (**Refer to Figure 6 – Ridges**).

Draft Policy on the protection of Agricultural Land, 2006	**Provincial**	**2006**

GDARD identified 7 Agricultural Hubs in Gauteng Province. These hubs are earmarked for agricultural activities and there are policies and guidelines that should be taken into consideration when one plans to develop in these hubs areas. Urban development is usually not supported in these hubs.

Implications for the development:

Not Significant. The study area is not situated within any of the 7 agricultural hubs identified

for Gauteng.		
Gauteng Noise Control Regulations, 1999	**Provincial**	**1999**
The regulation controls noise pollution. According to the acceptable noise levels in a residential area situated within an urban area is 55dBA and the maximum acceptable noise levels in a rural area is 45dBA. ***Implications for the Development:*** During the construction phase of the proposed development, the impact of noise could be problematic, but such impacts are generally short term. One should note that practical mitigation measures for noise pollution are low, but certain measures can be implemented to mitigate the severity (**Refer to Appendix H (EMPr) for a list of suitable guidelines and mitigation measures**).		
The Gauteng Transport Infrastructure Act, 2001	**Provincial**	**2001**
The Act was created to consolidate the laws relating to roads and other types of transport infrastructure in Gauteng; and to provide for the planning, design, development, construction, financing, management, control, maintenance, protection and rehabilitation of provincial roads, railway lines and other transport infrastructure in Gauteng; and to provide for matter connected therewith. ***Implications for the proposed development*** **Not Significant -** All developments in Gauteng must take the Gauteng Road network into consideration and no development may be planned across any provincial or K-route indicated on the published alignments. The proposed K60 is located approximately 200 m to the north of the site and the proposed K101 adjacent to and west of the site. There are no K-routes planned through the proposed application site.		
Gauteng Transport Infrastructure Amendment Act; 2003	**Provincial**	**2003**
The aim of this Amendment Act is to amend the Gauteng Transport Infrastructure Act, 2001 so as to amend and insert certain definitions; to provide for the necessary land use rights with respect to stations and for the necessary powers of the MEC to enter into contracts for road and rail projects; to amend the procedure in relation to route determination; to make a second environmental investigation at the stage of preliminary design of a road or railway line unnecessary where the competent environmental authority decides that the environmental investigation at the stage of route determination is adequate; and to provide for incidental matters.		

Implications for the Development:

Not significant- The development has already taken the existing and planned provincial roads into consideration.

Description of compliance with the relevant legislation, policy or guideline:

Legislation, policy of guideline	Description of compliance
National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended).	The proposed development will be in line with the principles contained in NEMA and it will promote sustainable development.
Environmental Impact Assessment Regulations in terms of Chapter 5 of the National Environmental Management Act, 1998 (Act No 107 of 1998)	The application for the proposed development consist of activities listed under Notice R. 983 (Listing No. 1) and R. 985 (Listing No. 3) and therefore a Basic Assessment Report will be submitted to GDARD for consideration.
National Water Act, 1998 (Act No. 36 of 1998)	The proposed development is subjected to flood lines of a natural stream / water course within an expected frequency of 1:50 and 1:100 years. The stream located on the southern portion of the site flows west to east into the Jukskei River which is located to the east of the site. The proposed development will require the construction of a bridge over the watercourse. A Water Use Licence Application (WULA) will be applied for in terms of Section 21 (i) and (c) of the National Water Act, 1998 (Act 36 of 1998) which is administered by the Department of Water and Sanitation
National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)	During the construction phase, dust and the generation of noise can become a significant factor, especially to the surrounding landowners. However if the development is well planned and if the mitigating measures are successfully implemented the proposed development's contribution to air pollution and the generation of air pollution can become less significant.
National Heritage Resources Act, 1999 (Act No. 45 of 1965 (NHRA)	No heritage sites were identified on/near the site earmarked for development.
National Environmental Management Protected Areas Act, 2003 (Act No. 57 of 2003)	The site is not affected by a ridge.
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)	The study area is regarded as 'Irreplaceable' (a 'Critical Biodiversity Area' (CBA) in accordance with the C-Plan 3.3).
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	According to the Gauteng Agricultural Potential Atlas (GAPA 4), the site has a low agricultural potential. In addition, GIS Data and GIDS data from GDARD also clearly indicates that the development is located within the Gauteng Urban Edge (2010), and does not fall within any of the Seven Agriculture Hubs identified for the Gauteng province.
National Environmental	No waste management license will be required during

Management: Waste Act (Act 59 of 2009)	the construction or operational phases of the proposed Township. Due to the fact that a limited amount of solid construction waste will be stored and handled on the site, before it is hauled away and dumped at the nearest registered landfill site.
Red List Plant Species Guidelines	The riverine area has been identified as highly sensitive due to the connectivity function, high avifaunal diversity and optimal habitat for the near threatened Half-collared Kingfisher.
GDARD Draft Ridges Policy	According to the GDARD Draft Ridges Policy no development should take place on slopes steeper than 8.8%. The existing development occurs in an area classified as a ridge in terms of GDARDs draft ridges policy.
Draft Policy on the protection of Agricultural Land, 2006	The study area is not situated within any of the 7 agricultural hubs identified for Gauteng.
Gauteng Noise Control Regulations, 1999	During the construction phase of the proposed development, the impact of noise could be problematic, but such impacts are generally short term. One should note that practical mitigation measures for noise pollution are low, but certain measures can be implemented to mitigate the severity.
The Gauteng Transport Infrastructure Act, 2001	All developments in Gauteng must take the Gauteng Road network into consideration and no development may be planned across any provincial or K-route indicated on the published alignments. The proposed K60 is located approximately 200 m to the north of the site and the proposed K101 adjacent to and west of the site. There are no K-routes planned through the proposed application site.
Gauteng Transport Infrastructure Amendment Act; 2003	The development has already taken the existing and planned provincial roads into consideration.

3. ALTERNATIVES

Describe the proposal and alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished. The determination of whether the 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.

The no-go option must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. **Do not** include the no go option into the alternative table below.

Note: 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.

Please describe the process followed to reach (decide on) the list of alternatives below

3.1 Alternatives considered-

Locality Alternatives:
The site forms part of the bigger farm Waterval which over the years has been developed with a mix of land uses to provide in the need identified in this area. It is also a well-defined pocket of land which is centrally located within the greater Johannesburg area.

The site is situated within a rapidly growing area strategically located in close proximity to Maxwell Drive, the N1 Freeway, the proposed K60 and K101 Provincial Roads and Allandale Road.

The Farm Waterval and the broader environs have been characterised by growth, and a large percentage of all new developments are being created for the Greater Johannesburg Metropolitan area. Within this growth sector, a number of non-residential townships are proclaimed and other townships are in the process of being established.

The site is extremely well suited for various residential uses due to its excellent accessibility, visibility and location.

The development of the proposed township in question will benefit the area and advance the goals of Council's aims to provide a range of dwelling types to cater for the varying demands of the population and income groups. Numerous officials throughout the official hierarchy have advocated higher residential densities, especially for dwelling types to cater for the varying demands of the population and income group.

An alternative location has not been considered as the study area is ideally suitable for the proposed residential development.

Land Use Alternatives:

Two former applications were submitted to GDARD for a school, but the site was not regarded as ideal for a school (mainly from a traffic point of view). There is however a large need for schools in the area and the required educational sites is now located within the Waterval Fields development, which is located to the immediate east of the study area. The Waterval Fields development site is larger and it was possible to provide better access and traffic circulation around the schools provided in this pocket.

Layout Alternatives: (Important to read this section)
The developer has considered various layout alternatives in order to utilize the site to its fullest potential whilst not intruding on the sensitive natural units present on site.

The applicant arranged integrated planning meetings on a bi-weekly basis at the offices of LYT architects who are appointed to assist with the development layout from an aesthetic and functional point of view. All the specialists on the project team (traffic engineers, electrical engineers, storm water engineers, civil engineers, architects, town and regional planners, urban designers, environmental consultants (Bokamoso as EAP) attended the integrated planning meetings.

During the meetings the environmental sensitivity maps were used as the form giving element and the initial layout encroached into the wetland/riparian and wetland/riparian buffer area.

The proposed layout on the table was also tested by the various appointed specialists with the organs of state that have an interest in the development (i.e. GDRT, the various services and infrastructure departments of the involved local authority, DWS, the environmental division of the CoJ, SAHRA etc.) and their inputs have also been taken into consideration during the finalisation of the proposed layout.

The minutes of the bi-weekly meetings held to achieve a layout, which will promote sustainable development and holistic and integrated planning at the strategic planning stages are available on request.

Also take note that the project team also took the off-set agreement into consideration when the layout was finalised. The proposed development layout therefore excludes the grassland areas, but it conserves the watercourse and watercourse buffer areas, even thought the wetland specialist did not regard it as necessary to apply a wetland buffer from a geo-hydrological/ hydrological, ecological and erosion prevention point of view.

Various storm water management concepts were considered during the layout planning stages of the development. The concept of attenuation throughout the development site (above the watercourse buffer) and attenuation within the wetland buffer are options that were also considered. It was eventually decided to apply a storm water management concept, which will include in-stream attenuation and the discharge of storm water by means of smaller storm water pipes just above the watercourse buffer into smaller stilling basin structures. The water will then be purified when running through the buffer area by means of the implementation of landscaping features such as rocks and wetland related vegetation. No major ground works will be required for the implementation of such water purification features in the buffer zone.

The in stream attenuation will take place in an old dam that was formerly constructed at the confluence of the tributary and the Jukskei River. Signs of this dam is still visible on the aerial photographs.

The proposed upgrading of the old dam structure will not only contribute to the prevention of erosion and siltation along the river, but it will also create an attractive feature in the landscape which will in the longer term provide for an improved ecological system within and around the river.

No-go alternative
The “No-Go” alternative is not regarded as a viable alternative considering that the site would become vulnerable to illegal occupation and degradation. The proposed development provides an opportunity to rehabilitate and preserve the sensitive riverine and wetland areas located on site.

The site is furthermore situated in area which is currently experiencing significant development pressure. The land-owner also entered into an off-set agreement with GDARD in order to open the land on their farm up for urban development. The land-owner informed their partners in the development that it will be possible to develop across the grassland areas, which formed part of the off-set agreement and which is isolated and fragmented by development.

Preferred option
The preferred option is thus to develop the site into a high density residential development together with open space, catering for the residential need in the area without compromising on the community sense of place. No Land Use, Locality or Layout Alternatives have been assessed in this Report.

Provide a description of the alternatives considered

No.	**Alternative type**, either alternative: site on property, properties, activity, design, technology, energy, operational or other(provide details of "other")	**Description**
1	Proposal	• High density Residential Development.
2	Alternative 1	Not Applicable
3	Alternative 2	Not Applicable
	Etc.	

In the event that no alternative(s) has/have been provided, a motivation must be included in the table below.

As mentioned the development of a school has been considered for the study area, but the educational sites were relocated to the adjacent Waterfall fields. The new location of the school sites allows for better and safer access to the school site and the surrounding environment will also allow for better circulation around the school and for safer pedestrian movement. The provision of a pedestrian bridge across the river has been on the table at the planning sessions, but this proposal must still be investigated in more detail. If such a pedestrian bridge becomes a requirement at a later stage, the applicant will compile and submit a Part 2 amendment application to GDARD and the required Section 21 Water-Use License application to DWS for such structure. (This is if GDARD decides to grant authorisation for the project)

The **preferred option** is to develop the site into a high density residential development together with open space, catering for the housing shortage in the area without compromising on the community sense of place.

The rationale for not assessing alternatives for this development includes the following:

- The proposed land use is in line with the zoning of the land use of the surrounding properties and the greater area;
- According to the Gauteng Agricultural Potential Atlas (GAPA 4) the study area has a low agricultural potential;
- From a socio-economic point of view; there is a need for housing in this area and due to the accessibility of the site, it is ideal for residential development;
- The proposed layout makes optimum use of the study area; and
- The "No-Go" alternative is not regarded as a viable alternative considering that the site would become vulnerable to illegal occupation and degradation;

4. PHYSICAL SIZE OF THE ACTIVITY

Indicate the total physical size (footprint) of the proposal as well as alternatives. Footprints are to include all new infrastructure (roads, services etc.), impermeable surfaces and landscaped areas:

	Size of the activity:
Proposed activity ***(Total environmental (landscaping, parking, etc.) and the building footprint)***	14.0571 ha
Alternatives:	
Alternative 1 (if any)	NA
Alternative 2 (if any)	NA
	Ha/ m^2

or, for linear activities:

	Length of the activity:
Proposed activity	NA
Alternatives:	
Alternative 1 (if any)	NA
Alternative 2 (if any)	NA
	m/km

Indicate the size of the site(s) or servitudes (within which the above footprints will occur):

	Size of the site/servitude:
Proposed activity	22.3118 ha
Alternatives:	
Alternative 1 (if any)	NA
Alternative 2 (if any)	NA
	Ha/m^2

5. SITE ACCESS

Proposal

Does ready access to the site exist, or is access directly from an existing road?	YES	**NO x**
If NO, what is the distance over which a new access road will be built		m

Describe the type of access road planned:

Access to the property will be gained from Maxwell Drive for which the proposed alignment runs along the southern boundary of the study area. As already mentioned the involved section of Maxwell dive must still be constructed and another EIA application applied for authorisation of Maxwell Drive, which forms a very important link in the road network system of the Midrand area. The construction of this section of Maxwell Drive will link it to the future K60 (**Refer to Figure 4: Proposed Access and Culvert Position and Appendix G6: Traffic Impact Assessment**).

The proposed access road will cross the stream and associated wetland located on the southern portion of the site (**Refer to Figure 4: Proposed Access and Culvert Position**).

Take note that the CoJ (in their comments regarding the DBAR) required that the access road bridge across the watercourse be constructed to stretch across the watercourse and the watercourse buffer in order to prevent damage to the watercourse. This requirement was discussed with the appointed civil and traffic engineers during an integrated planning session and the engineers indicated that this will be extremely expensive and it will require the implementation of a major bridge system, which will be out of scale for this residential development. The proposed bridge crossing with a very large span will also have an impact on the vertical alignment of the roads that will lead to the bridge and it will require a significant amount of filling.

Obviously the intention with the design of the bridge structure will be to limit the impacts on the flow regime and the current ecological systems, but most new bridge crossings are designed to prevent/ restrict damage (i.e. the battery of pipes/ culverts concept can be applied). Such concept allows for the undisturbed flow of sub-surface water through the “battery of pipes/ culverts” to be implemented below the surface of the road/ bridge structure.

The proposed bridge structure must also comply with the requirements and specifications of DWS and the details as approved by DWS will also be forwarded to GDARD and the CoJ.

Erosion and siltation are regarded as a major problem on the Halfway House Granites and especially along the Jukskei River and its tributaries. The effective usage of infrastructural features such as bridge crossings are in many cases recommended, because such structures can be designed to act as silt traps, erosion prevention features and as water attenuation structures, without compromising the long term ecological potential and integrity of the riverine system. If well planned and managed such structures can enhance the ecological potential and hydrological characteristics.

Include the position of the access road on the site plan (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

Alternative 1 – Not Applicable

Does ready access to the site exist, or is access directly from an existing road?		NO
If NO, what is the distance over which a new access road will be built		m

Describe the type of access road planned:

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

Alternative 2– Not Applicable

Does ready access to the site exist, or is access directly from an existing road?		NO
If NO, what is the distance over which a new access road will be built		m

Describe the type of access road planned:

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

PLEASE NOTE: Points 6 to 8 of Section A must be duplicated where relevant for alternatives

Section A 6-8 has been duplicated **0** Number of times

(Only complete when applicable)

6. LAYOUT OR ROUTE PLAN

A detailed site or route (for linear activities) plan(s) must be prepared for each alternative site or alternative activity. It must be attached to this document. The site or route plans must indicate the following:

- the layout plan is printed in colour and is overlaid with a sensitivity map (if applicable);
- layout plan is of acceptable paper size and scale, e.g.
  - A4 size for activities with development footprint of 10sqm to 5 hectares;
  - A3 size for activities with development footprint of > 5 hectares to 20 hectares;
  - A2 size for activities with development footprint of >20 hectares to 50 hectares);
  - A1 size for activities with development footprint of >50 hectares);

- The following should serve as a guide for scale issues on the layout plan:
  - A0 = 1: 500
  - A1 = 1: 1000
  - A2 = 1: 2000
  - A3 = 1: 4000
  - A4 = 1: 8000 (±10 000)
- shapefiles of the activity must be included in the electronic submission on the CD's;
- the property boundaries and Surveyor General numbers of all the properties within 50m of the site;
- the exact position of each element of the activity as well as any other structures on the site;
- the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, sewage pipelines, septic tanks, storm water infrastructure;
- servitudes indicating the purpose of the servitude;
- sensitive environmental elements on and within 100m of the site or sites (including the relevant buffers as prescribed by the competent authority) including (but not limited thereto):
  - Rivers and wetlands;
  - the 1:100 and 1:50 year flood line;
  - ridges;
  - cultural and historical features;
  - areas with indigenous vegetation (even if it is degraded or infested with alien species);
- Where a watercourse is located on the site at least one cross section of the water course must be included (to allow the position of the relevant buffer from the bank to be clearly indicated)

FOR LOCALITY MAP (NOTE THIS IS ALSO INCLUDED IN THE APPLICATION FORM REQUIREMENTS)

- the scale of locality map must be 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 locality map and all other maps must be in colour;
- locality map must show property boundaries and numbers within 100m of the site, and for poultry and/or piggery, locality map must show properties within 500m and prevailing or predominant wind direction;
- for gentle slopes the 1m contour intervals must be indicated on the map and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the map;
- areas with indigenous vegetation (even if it is degraded or infested with alien species);
- locality map must show exact position of development site or sites;
- locality map showing and identifying (if possible) public and access roads; and
- the current land use as well as the land use zoning of each of the properties adjoining the site or sites.

7. SITE PHOTOGRAPHS

Colour photographs from the center 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 the appropriate Appendix**.** It should be supplemented with additional photographs of relevant features on the site, where applicable.

8. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 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 to be attached in the appropriate Appendix.

SECTION B: DESCRIPTION OF RECEIVING ENVIRONMENT

Note: Complete Section B for the proposal and alternative(s) (if necessary)

Instructions for completion of Section B for linear activities

1) For linear activities (pipelines etc.) it may be necessary to complete Section B for each section of the site that has a significantly different environment.
2) Indicate on a plan(s) the different environments identified
3) Complete Section B for each of the above areas identified
4) Attach to this form in a chronological order
5) Each copy of Section B must clearly indicate the corresponding sections of the route at the top of the next page.

Section B has been duplicated for sections of the route	**NA**	times

Instructions for completion of Section B for location/route alternatives

1) For each location/route alternative identified the entire Section B needs to be completed
2) Each alterative location/route needs to be clearly indicated at the top of the next page
3) Attach the above documents in a chronological order

Section B has been duplicated for location/route alternatives	**NA**	times	(complete only when appropriate)

Instructions for completion of Section B when both location/route alternatives and linear activities are applicable for the application

Section B is to be completed and attachments order in the following way

- All significantly different environments identified for Alternative 1 is to be completed and attached in a chronological order; then
- All significantly different environments identified for Alternative 2 is to be completed and attached chronological order, etc.

Section B - Section of Route	**NA**	(complete only when appropriate for above)
Section B – Location/route Alternative No.	**NA**	(complete only when appropriate for above)

1. PROPERTY DESCRIPTION

Property description: (Including Physical Address and Farm name, portion etc.)	Located on a Part of the Remainder of Portion 1 of the Farm Waterval 5 IR, on the north eastern quadrant of the intersection between Maxwell Drive and the K101 Provincial Road, Midrand, Gauteng Province.

2. ACTIVITY POSITION

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 decimal degrees. The degrees should have at least six decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

Alternative: Proposed Development	**Latitude (S):**	**Longitude (E):**
	26° 06’ 28.79” S	**28° 06’ 29.96” E**

In the case of linear activities: NA

Alternative:	**Latitude (S):**	**Longitude (E):**
• Starting point of the activity	°	°
• Middle point of the activity	°	°
• End point of the activity	°	°

For route alternatives that are longer than 500m, please provide co-ordinates taken every 250 meters along the route and attached in the appropriate Appendix

Addendum of route alternatives attached ☐

The 21 digit Surveyor General code of each cadastral land parcel

PROPOSAL	T	O	I	R	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	1
ALT. 1																					
ALT. 2																					
etc.																					

3. GRADIENT OF THE SITE

Indicate the general gradient of the site.

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

Refer to Figure 16: Slope Map.

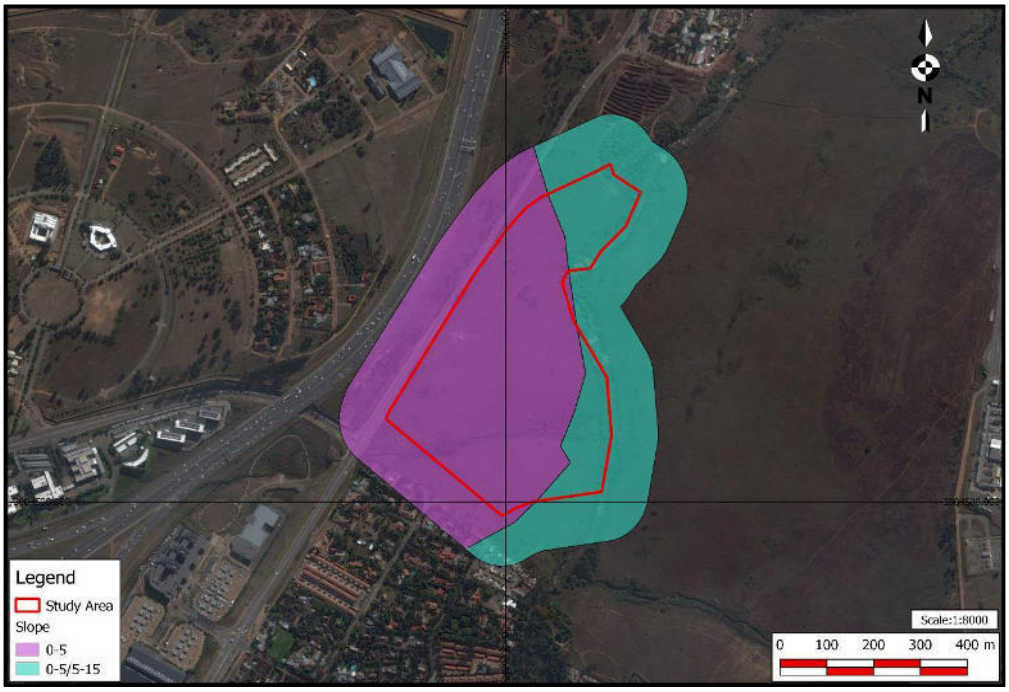


Figure 16: Slope Map

4. LOCATION IN LANDSCAPE

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

Ridgeline	Plateau	Side slope of hill/ridge	Valley	Plain	**Undulating plain/low hills**	**River front**

5. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

a) Is the site located on any of the following?

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

(Information in respect of the above will often be available at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by Geological Survey may also be used).

Geology

The site is underlain by gneiss, migmatite or porphyritic granodiorite of the Halfway House Granite. A northwest-southeast striking syenite dyke and north-south striking diabase dyke are indicated within the south boundaries. Prominent quartz veins also strike through the portion north of the Jukskei in a northwesterly direction.

Soils

The following Soil forms were encountered on site:

- Longlands (seasonal and temporary zone)
- Wasbank (terrestrial zone approaching temporary)
- Glenrosa (terrestrial zone)
- Permanent zone consisted of a flowing stream

(**Refer to Figure 17: Soil Map**)

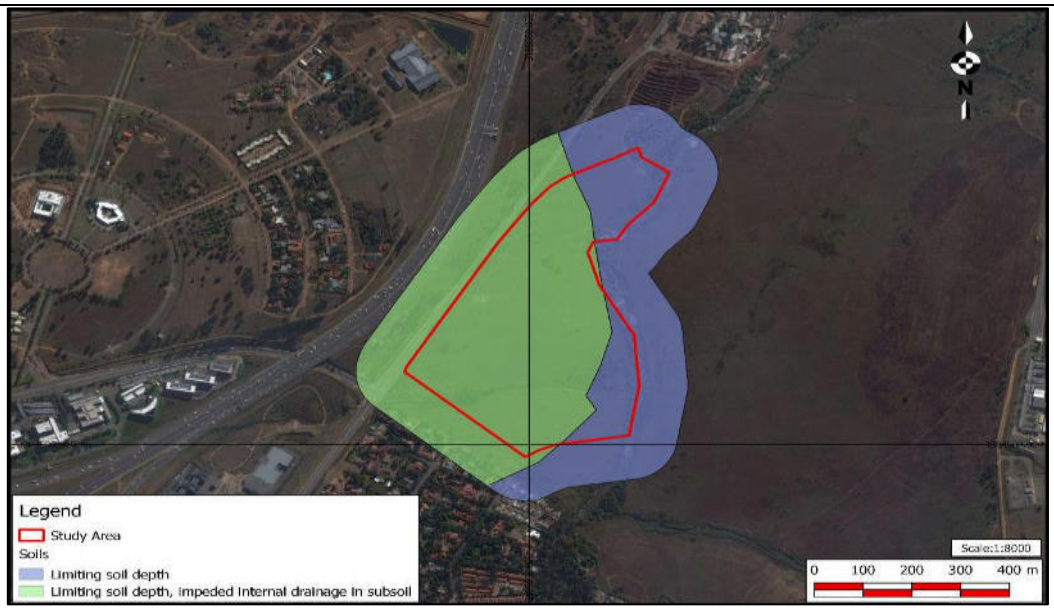


Figure 17: Soil Map

b) are any caves located on the site(s)	YES	**NO X**

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):	**Longitude (E):**
°	°

c) are any caves located within a 300m radius of the site(s)	YES	**NO X**

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):	**Longitude (E):**
°	°

d) are any sinkholes located within a 300m radius of the site(s)	YES	**NO X**

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):	**Longitude (E):**
°	°

If any of the answers to the above are “YES” or “unsure”, specialist input may be requested by the Department

6. AGRICULTURE

Does the site have high potential agriculture as contemplated in the Gauteng Agricultural Potential Atlas (GAPA 4)?	YES	**NO X**

Please note: The Department may request specialist input/studies in respect of the above.

7. GROUNDCOVER

To be noted that the location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Indicate the types of groundcover present on the site and include the estimated percentage found on site

Natural veld - good condition % = 80	**Natural veld with scattered aliens % =20**	Natural veld with heavy alien infestation % =	Veld dominated by alien species % =	Landscaped (vegetation) % =
Sport field % =	Cultivated land % =	Paved surface (hard landscaping) % =	Building or other structure % =	Bare soil % =

Please note: The Department may request specialist input/studies depending on the nature of the groundcover and potential impact(s) of the proposed activity/ies.

Are there any rare or endangered flora or fauna species (including red list species) present on the site	YES	**NO x**

If YES, specify and explain:

Are there any rare or endangered flora or fauna species (including red list species) present within a 200m (if within urban area as defined in the Regulations) or within 600m (if outside the urban area as defined in the Regulations) radius of the site.	YES	**NO x**

If YES, specify and explain:

Are there any special or sensitive habitats or other natural features present on the site?	**YES x**	NO x

If YES, specify and explain:

The entire site has been identified by GDARD as 'Irreplaceable' in terms of the Gauteng C-Plan 3.3.

Was a specialist consulted to assist with completing this section	**YES x**	NO

If yes complete specialist details

Name of the specialist (1):	Mr Cornè Niemandt Reviewed by: J.V. van Greuning (Pr. Sci. Nat. reg. no. 400168/08)
Qualification(s) of the specialist:	M.Sc. Plant Science
Postal address:	P O Box 11375, Maroelana
Postal code:	0161

Telephone:	012 346 3810	Cell:	-
E-mail:	corne@bokamoso.net	Fax:	086 570 5659

Are any further specialist studies recommended by the specialist?	YES	**NO x**
If YES, specify:		
If YES, is such a report(s) attached?	YES	NO

If YES list the specialist reports attached below

Signature of specialist: _____ Date:

Name of the specialist (2):	CW Vermeulen Reviewed by: Reinier F. Terblanche (M.Sc, Cum Laude; Pr.Sci.Nat, Reg. No. 400244/05) Lukas Niemand (MSc Zoology – UP; Pr.Sci.Nat, Reg. No. 400095/06)
Qualification(s) of the specialist:	(BSc (Hons) Environmental Soil Science)
Postal address:	P O Box 11375, Maroelana
Postal code:	0161

Telephone:	012 346 3810	Cell:	-
E-mail:	cw@bokamoso.net	Fax:	086 570 5659

Are any further specialist studies recommended by the specialist?	YES	**NO x**
If YES, specify:		
If YES, is such a report(s) attached?	YES	NO

If YES list the specialist reports attached below

Signature of specialist: _____ Date:

Name of the specialist (3):	Garth van Rooyen Reviewed by: Dr. J. Dabrowski (Pr.Sci.Nat, Reg. No. 115166)
Qualification(s) of the specialist:	
Postal address:	P O Box 11375, Maroelana
Postal code:	0161

Telephone:	012 346 3810	Cell:	-
E-mail:	garth@bokamoso.net	Fax:	086 570 5659

Are any further specialist studies recommended by the specialist?	YES	**NO x**
If YES, specify:		
If YES, is such a report(s) attached?	YES	NO

If YES list the specialist reports attached below

Signature of specialist: _____ Date:

Please note; If more than one specialist was consulted to assist with the filling in of this section then this table must be appropriately duplicated

8. LAND USE CHARACTER OF SURROUNDING AREA

Using the associated number of the relevant current land use or prominent feature from the table below, fill in the position of these land-uses in the vacant blocks below which represent a 500m radius around the site

1. Vacant land	**2. River, stream, wetland**	3. Nature conservation area	4. Public open space	5. Koppie or ridge
6. Dam or reservoir	7. Agriculture	**8. Low density residential**	9. Medium to high density residential	10. Informal residential
11. Old age home	12. Retail	13. Offices	**14. Commercial & warehousing**	15. Light industrial
16. Heavy industrial[AN]	17. Hospitality facility	18. Church	19. Education facilities	20. Sport facilities
21. Golf course/polo fields	22. Airport[N]	23. Train station or shunting yard[N]	24. Railway line[N]	**25. Major road (4 lanes or more)[N]**
26. Sewage treatment plant[A]	27. Landfill or waste treatment site[A]	28. Historical building	29. Graveyard	30. Archeological site
31. Open cast mine	32. Underground mine	33.Spoil heap or slimes dam[A]	34. Small Holdings	
Other land uses (describe):				

NOTE: Each block represents an area of 250m X 250m, if your proposed development is larger than this please use the appropriate number and orientation of hashed blocks

NORTH

1	**1**	**31**	**2/1**	**1**
1	**25**	**14/31**	**2/1**	**1**
14/1/8	**25**		**2/1**	**1**
14/1	**1/14**	**8**	**2/1**	**1**
14	**8**	**8**	**2/1**	**1**

WEST EAST

SOUTH

Note: More than one (1) Land-use may be indicated in a block

Please note: The Department may request specialist input/studies depending on the nature of the land use character of the area and potential impact(s) of the proposed activity/ies. Specialist reports that look at health & air quality and noise impacts may be required for any feature above and in particular those features marked with an "A" and with an "N" respectively.

Have specialist reports been attached	YES	**NO x**

If yes indicate the type of reports below

9. SOCIO-ECONOMIC CONTEXT

Describe the existing social and economic characteristics of the area and the community condition as baseline information to assess the potential social, economic and community impacts.

The site forms part of the bigger farm Waterval which over the years has been developed with a mix of land uses to provide in the need identified in this area. The Farm Waterval and the broader environs have been characterized by growth, with a large percentage of all new developments being created for the Greater Johannesburg Metropolitan area. Within this growth sector, a number of non-residential townships are proclaimed and other townships are in the process of being established.

10. CULTURAL/HISTORICAL FEATURES

Please be advised that if section 38 of the National Heritage Resources Act 25 of 1999 is applicable to your proposal or alternatives, then you are requested to furnish this Department with written comment from the South African Heritage Resource Agency (SAHRA) – Attach comment in appropriate annexure

38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as-

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
(b) the construction of a bridge or similar structure exceeding 50m in length;
(c) any development or other activity which will change the character of a site-
(i) exceeding 5 000 m2 in extent; or
(ii) involving three or more existing erven or subdivisions thereof; or
(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
(d) the re-zoning of a site exceeding 10 000 m2 in extent; or
(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

Are there any signs of culturally (aesthetic, social, spiritual, environmental) 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?	YES	**NO X**

If YES, explain:

If uncertain, the Department may request that specialist input be provided to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist if one was already appointed:

Will any building or structure older than 60 years be affected in any way?	YES	**NO x**
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES	**NO x**

If yes, please attached the comments from SAHRA in the appropriate Appendix

SECTION C: PUBLIC PARTICIPATION (SECTION 41)

The Environmental Assessment Practitioner must conduct public participation process in accordance with the requirement of the EIA Regulations, 2014.

1. LOCAL AUTHORITY PARTICIPATION

Local authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of the application at least thirty (30) calendar days before the submission of the application to the competent authority.

Was the draft report submitted to the local authority for comment?	**YES x**	NO
If yes, has any comments been received from the local authority?	YES	**NO x**

If "YES", briefly describe the comment below (also attach any correspondence to and from the local authority to this application):

A Draft BAR Report was made available to GDARD, DWS and the City of Johannesburg (CoJ) for comment from 14 July to 15 August 2016. Bokamoso received comments from the CoJ and such comments were taken into consideration during the compilation of the FBAR. Also take note that the comments were addressed in issues ad response report attached as ***Appendix E***.

The storm water management concepts were also discussed with DWS at pre-application consultations and the Section 21 WULA has already been compiled.

If "NO" briefly explain why no comments have been received or why the report was not submitted if that is the case.

2. CONSULTATION WITH OTHER STAKEHOLDERS

Any stakeholder that has a direct interest in the activity, site or property, such as servitude holders and service providers, should be informed of the application at least **thirty (30) calendar days** before the submission of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders?	YES	**NO x**

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

If "NO" briefly explain why no comments have been received

A thorough public participation process, which included the publication of a notice in a local newspaper, the erecting of site notices at prominent points and the handing out public notices, was followed. No persons/organisations registered as I&APs, and no comments were received. All relevant stakeholders were notified of the application and provided with the Draft Report, which was also available on the Bokamoso website as well as a public library for viewing.

Please note that the first phase of the Public Participation (PP) was done twice (for a School on 29 May 2015 as well as a Residential development on 12 November 2015) prior to this application. Both applications were withdrawn seeing that the project was taken over by a new developer and the Public Participation was repeated for the current application. For purposes of this new application no comments or registration was received, however the previous registered Interested and Affected Parties were once again given the opportunity to register and comment on this project. No Comments were received.

A Draft BAR Report was made available to GDARD, DWS and the City of Johannesburg (CoJ) for comment from 14 July to 15 August 2016. Bokamoso received comments from the CoJ and such comments were taken into consideration during the compilation of the FBAR. Also take note that the comments were addressed in issues ad response report attached as ***Appendix E***.

3. GENERAL PUBLIC PARTICIPATION REQUIREMENTS

The Environmental Assessment Practitioner must ensure that the public participation process is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees and ratepayers associations. Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was flawed.

The EAP must record all comments and respond to each comment of the public / interested and affected party before the application report is submitted. The comments and responses must be captured in a Comments and Responses Report as prescribed in the regulations and be attached to this application.

4. APPENDICES FOR PUBLIC PARTICIPATION

All public participation information is to be attached in the appropriate Appendix. The

information in this Appendix is to be ordered as detailed below

Appendix 1 – Proof of site notice

Appendix 2 – Written notices issued as required in terms of the regulations

Appendix 3 – Proof of newspaper advertisements

Appendix 4 –Communications to and from interested and affected parties

Appendix 5 – Minutes of any public and/or stakeholder meetings

Appendix 6 - Comments and Responses Report

Appendix 7 –Comments from I&APs on Basic Assessment (BA) Report

Appendix 8 –Comments from I&APs on amendments to the BA Report

Appendix 9 – Copy of the register of I&APs

SECTION D: RESOURCE USE AND PROCESS DETAILS

Note: Section D is to be completed for the proposal and alternative(s) (if necessary)

Instructions for completion of Section D for alternatives

1) For each alternative under investigation, where such alternatives will have different resource and process details (e.g. technology alternative), the entire Section D needs to be completed
4) Each alterative needs to be clearly indicated in the box below
5) Attach the above documents in a chronological order

Section D has been duplicated for alternatives	**0**	times	(complete only when appropriate)

Section D Alternative No.	"insert alternative number"	(complete only when appropriate for above)

1. WASTE, EFFLUENT, AND EMISSION MANAGEMENT

Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	**YES x**	NO
If yes, what estimated quantity will be produced per month?	Unknown m^3	

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

Construction waste will be collected and stored in 6 m^3 skips on-site. The construction waste will then be collected by a licensed service provider and disposed of at a suitable registered waste disposal site. No more than 100 m^3 of general waste (including construction waste) will be stored on site at any given time.

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

Construction waste will be disposed of at an approved waste disposal site.

Will the activity produce solid waste during its operational phase?	**YES x**	NO
If yes, what estimated quantity will be produced per month?	Unknown m^3	

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

Domestic waste will be removed by the City of Johannesburg (CoJ) and disposed of at a registered landfill site.

Has the municipality or relevant service provider confirmed that sufficient air space exists for treating/disposing of the solid waste to be generated by this activity? The CoJ confirmed that they can provide the required municipal services to the study area. ***The services reports are attached hereto as Appendix F1.*** A meeting was also held with the environmental and infrastructure panning divisions of the CoJ and we received positive comments from CoJ after the meeting. ***The comments of CoJ is attached hereto as Appendix E***	**YES**	NO

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

N/A

Note: 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, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?	YES	**NO x**

If yes, inform the competent authority and request a change to an application for scoping and EIA.

Is the activity that is being applied for a solid waste handling or treatment facility?	YES	**NO x**

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.

Describe the measures, if any, that will be taken to ensure the optimal reuse or recycling of materials:

NA

Liquid effluent (other than domestic sewage)

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	YES	**NO x**
If yes, what estimated quantity will be produced per month?		m^3
If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the liquid effluent to be generated by this activity (ies)?	YES	NO

Will the activity produce any effluent that will be treated and/or disposed of on site?	Yes	**NO x**
If yes, what estimated quantity will be produced per month?		m^3

If yes describe the nature of the effluent and how it will be disposed.

Note that if effluent is to be treated or disposed on site the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA

Will the activity produce effluent that will be treated and/or disposed of at another facility?	YES	**NO x**

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:

Liquid effluent (domestic sewage)

Will the activity produce domestic effluent that will be disposed of in a municipal sewage system?	**YES x**	NO
If yes, what estimated quantity will be produced per month?		m^3

The layout of the proposed council sewerage reticulation is shown on ***Figure 18: Sewer Reticulation***[1].

The new council sewer mains will be constructed outside the 1:100 year floodline. Servitudes will be registered over this sewer line. All sewer mains within the development will remain private, these sewers will gravitate to the lowest point on the site where the pipe will connect into the proposed new council sewer main. The council sewer main will connect into the existing Bruma outfall sewer Ø2000 mm. The main sewer collection pipe will be a 200mm diameter uPVC Class 400 @1:200 the velocity in the pipe will be 0.931 m/s and flow depth of 101 mm. (**Refer to Appendix G7: Services Report**).

If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the domestic effluent to be generated by this activity (ies)?	YES	**NO x**

The CoJ confirmed that they can provide the required municipal services to the study area. ***The services reports are attached hereto as Appendix F1***

A meeting was also held with the environmental and infrastructure panning divisions of the CoJ and we received positive comments from CoJ after the meeting.

[1] *Figure 18 has been enlarged and included under Appendix A.*

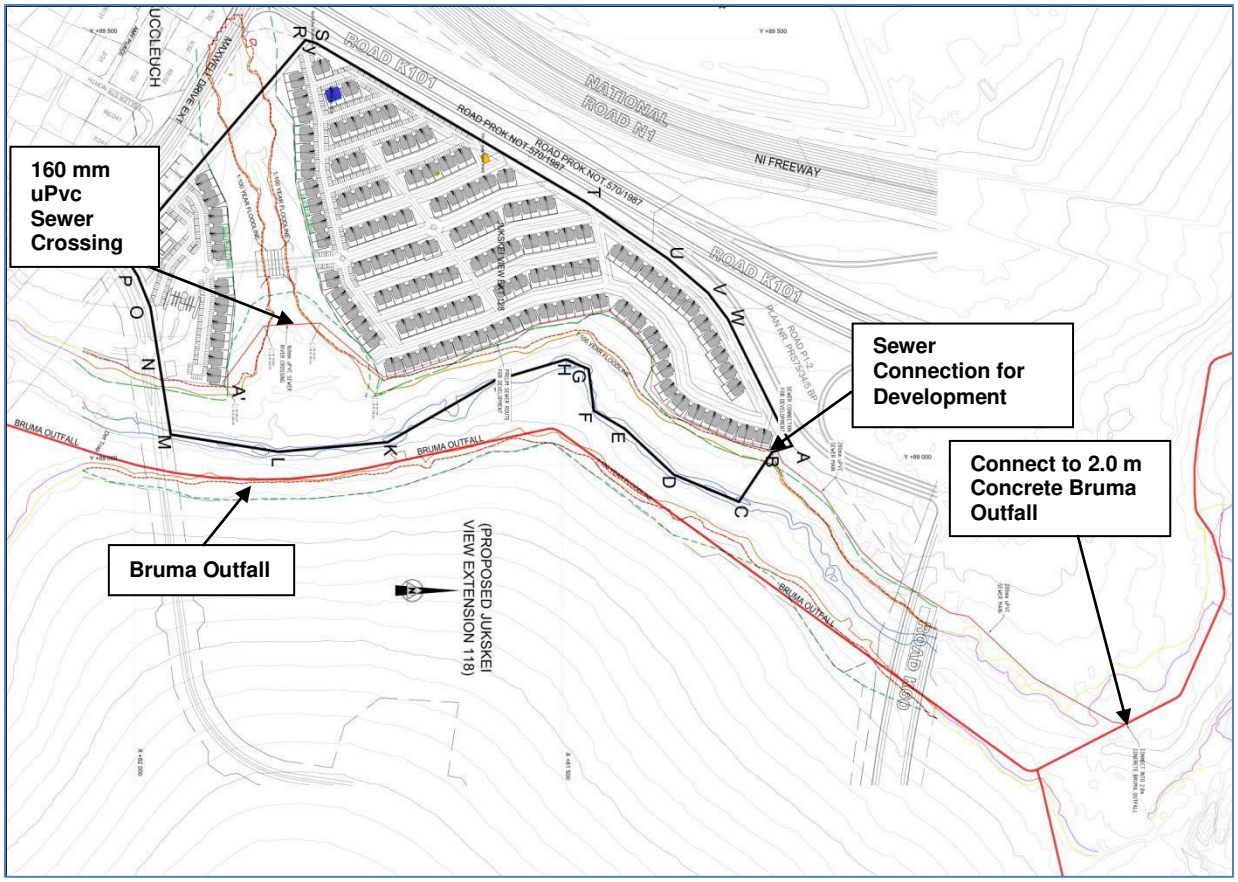


Figure 18: Sewer Reticulation

Will the activity produce any effluent that will be treated and/or disposed of on site?	YES	**NO x**

If yes describe how it will be treated and disposed of.

Emissions into the atmosphere

Will the activity release emissions into the atmosphere?	YES	**NO x**
If yes, is it controlled by any legislation of any sphere of government?	YES	NO

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.

If no, describe the emissions in terms of type and concentration:

2. WATER USE

Indicate the source(s) of water that will be used for the activity

municipal	Directly from water board	groundwater	river, stream, dam or lake	other	the activity will not use water

A new Ø200 mm water pipe will be laid next to the existing council water main from the intersection of Argyle Ave (Buccleuch) and the northern boundary of Frakenwald Ext 27. This new Ø200 mm water main will connect into the existing Ø400 mm water main.
The total instantaneous flow will be 22.127 l/s (domestic); therefore a 200 mm diameter uPVc water main will adequately supply the development. The 200 mm diameter uPVC water main will have a max velocity of 0.902 m/s with peak domestic flow. The length of the water supply line from the tie in at the 400mm pipe to the site is ±2.5 km (**Refer to Figure 19: Water Connection[2] and Appendix G7: Services Report**).

Note that two layout options have been considered for the development (**Refer to Figure 19a: Water Connection – Option 1 and Figure 19b: Water Connection – Option 1**).

Refer to Appendix F1 for confirmation of services supplied by specialist.

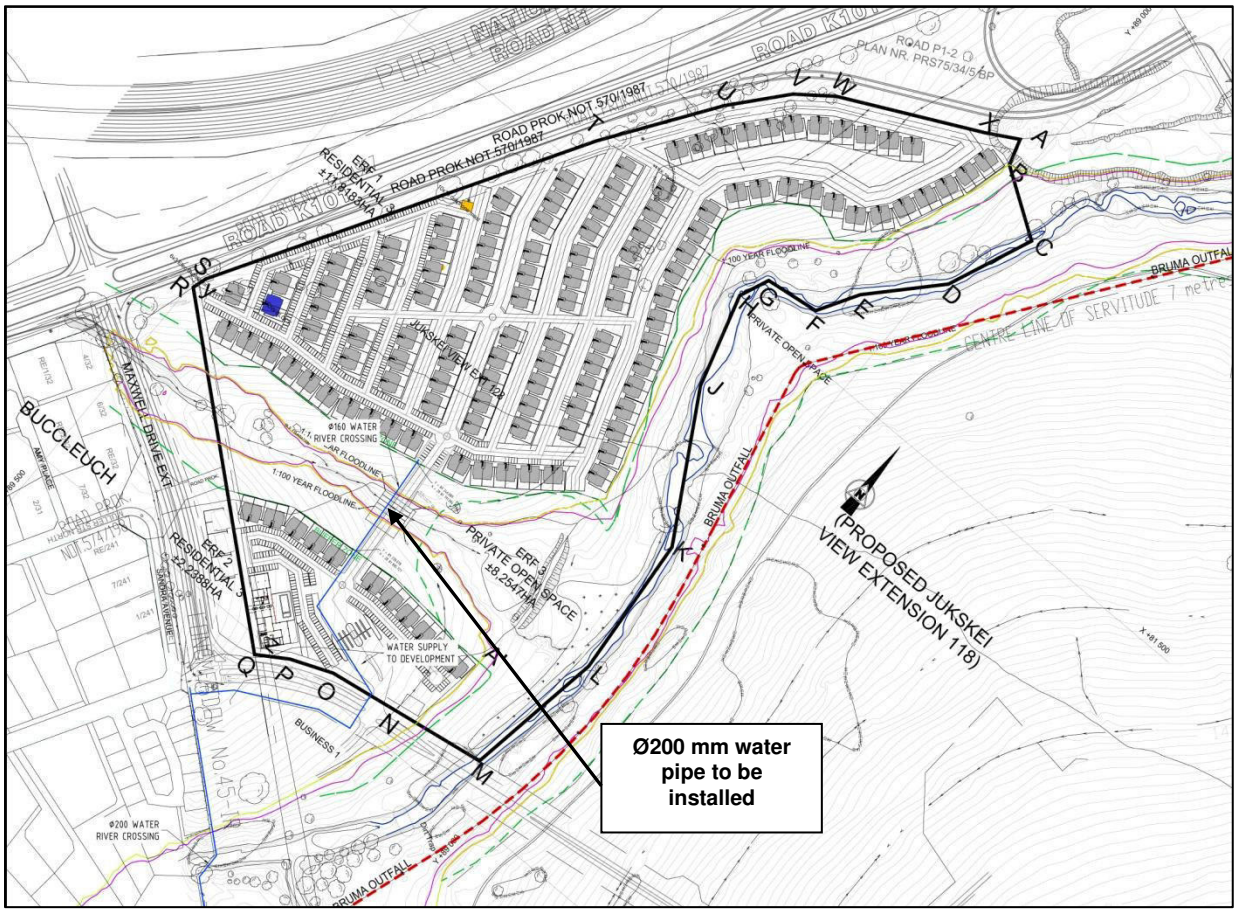


Figure 19a: Water Connection (Option 1)

[2] *Figure 19 has been enlarged and included under Appendix A.*

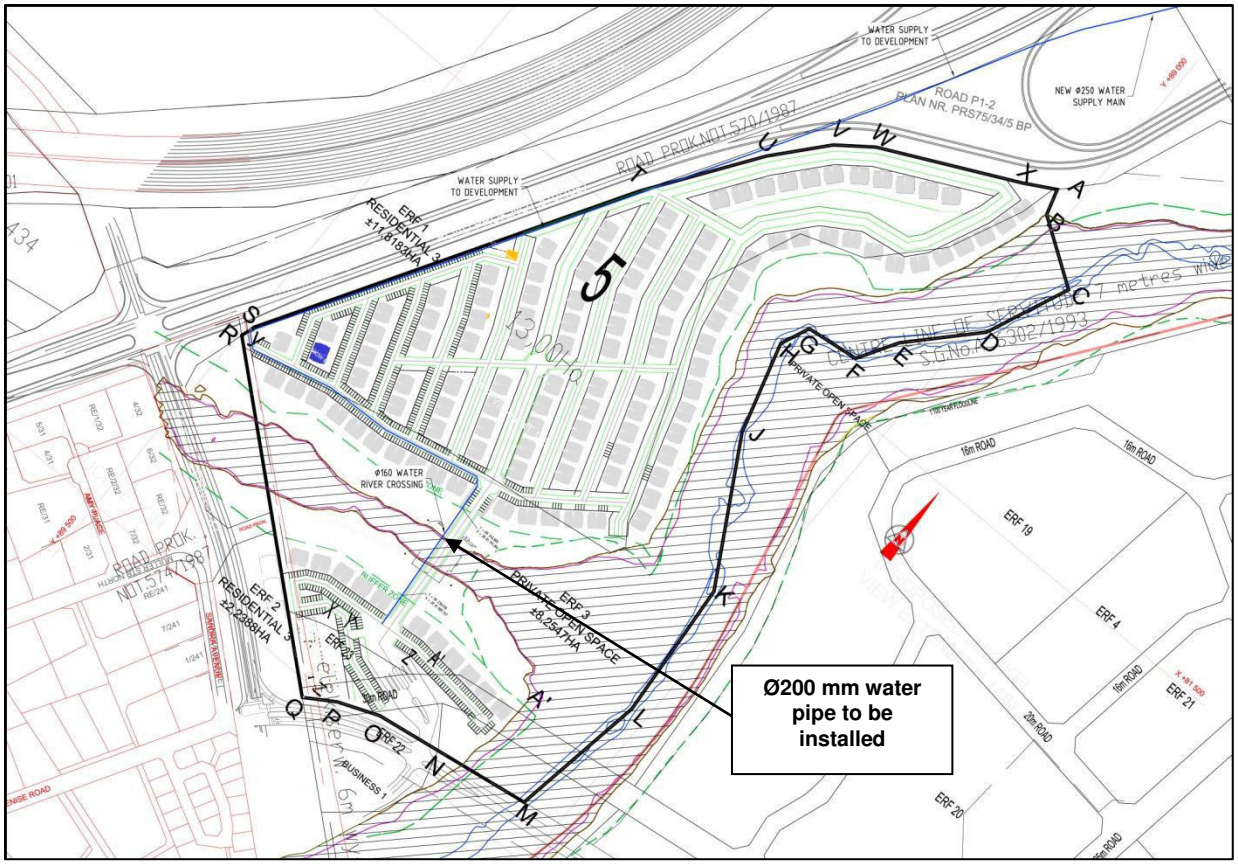


Figure 20b: Water Connection (Option 2)

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: **NA** | liters

If Yes, please attach proof of assurance of water supply, e.g. yield of borehole, in the appropriate Appendix - **NA**

Does the activity require a water use permit from the Department of Water Affairs?	YES	NO

If yes, list the permits required

If yes, have you applied for the water use permit(s)?	YES	NO
If yes, have you received approval(s)? (attached in appropriate appendix)	YES	NO

3. POWER SUPPLY

Please indicate the source of power supply e.g. Municipality / Eskom / Renewable energy source

City of Johannesburg.

If power supply is not available, where will power be sourced from?

NA

The CoJ confirmed that they can provide the required municipal services to the study area. ***The services reports are attached hereto as Appendix F1***

A meeting was also held with the environmental and infrastructure panning divisions of the CoJ and we received positive comments from CoJ after the meeting.

Refer to Appendix F2 for confirmation of services supplied by Eskom

4. ENERGY EFFICIENCY

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

A Northern orientation was specifically considered in the design and layout of the residential units in order to maximize natural light and heat and accordingly curb the use of electricity.

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

NA

5. STORM WATER MANAGEMENT

The storm water system within the development is to remain private and maintained by the Section 21 Company. The underground storm water system is designed for a 5-year recurrence interval. The roads acting as an overflow channel will manage all storms exceeding the 1: 5 year recurrences.

There will attenuation for the control of storm water within the development to be constructed within the tributary of the Jukskei River prior to the confluence with the Jukskei River.
(**Refer to Figure 20: Storm Water Layout and Appendix G7: Services Report**).

The water attenuation structure will be located on the footprint of a historical dam. The footprint and embankments associated with such dam is still visible in the riparian zone. The storm water management concept for the study area is to discharge the storm water generated into the riverine system by means of smaller pipes that are evenly distributed throughout the study area. The idea is for the pipes to discharge the storm water into the 32m buffer zone area before the water inters into the buffer area. The water will then run through a man-made bio-logical filtering system, consisting of a combination of smaller rocks/stones and some wetland vegetation. No formal storm water attenuation, which involve major earth works will be implemented in the buffer area.

The proposed storm water management concept is based on a former storm water proposal of the applicant, which was recently supported by the CoJ for a development in the same area. ***More detail of the concept approved/ supported by CoJ is available on request. It was decided not to include such drawings/ information of another development as part of the DBAR, because it can create confusion when evaluating the application.***

The proposed access road will cross the stream and associated wetland located on the southern portion of the site (**Refer to Figure 4: Proposed Access and Culvert Position**).
Take note that the CoJ (in their comments regarding the DBAR) required that the access road bridge across the watercourse be constructed to stretch across the watercourse and the watercourse buffer in order to prevent damage to the watercourse. This requirement was

discussed with the appointed civil and traffic engineers during an integrated planning session and the engineers indicated that this will be extremely expensive and it will require the implementation of a major bridge system, which will be out of scale for this residential development. The proposed bridge crossing with a very large span will also have an impact on the vertical alignment of the roads that will lead to the bridge and it will require a significant amount of filling.

Obviously the intention with the design of the bridge structure will be to limit the impacts on the flow regime and the current ecological systems, but most new bridge crossings are designed to prevent/ restrict damage (i.e. the battery of pipes/ culverts concept can be applied). Such concept allows for the undisturbed flow of sub-surface water through the "battery of pipes/ culverts" to be implemented below the surface of the road/ bridge structure.

The proposed bridge structure must also comply with the requirements and specifications of DWS and the details as approved by DWS will also be forwarded to GDARD and the CoJ.

Erosion and siltation are regarded as a major problem on the Halfway House Granites and especially along the Jukskei River and its tributaries. The effective usage of infrastructural features such as bridge crossings are in many cases recommended, because such structures can be designed to act as silt traps, erosion prevention features and as water attenuation structures, without compromising the long term ecological potential and integrity of the riverine system. If well planned and managed such structures can enhance the ecological potential and hydrological characteristics.

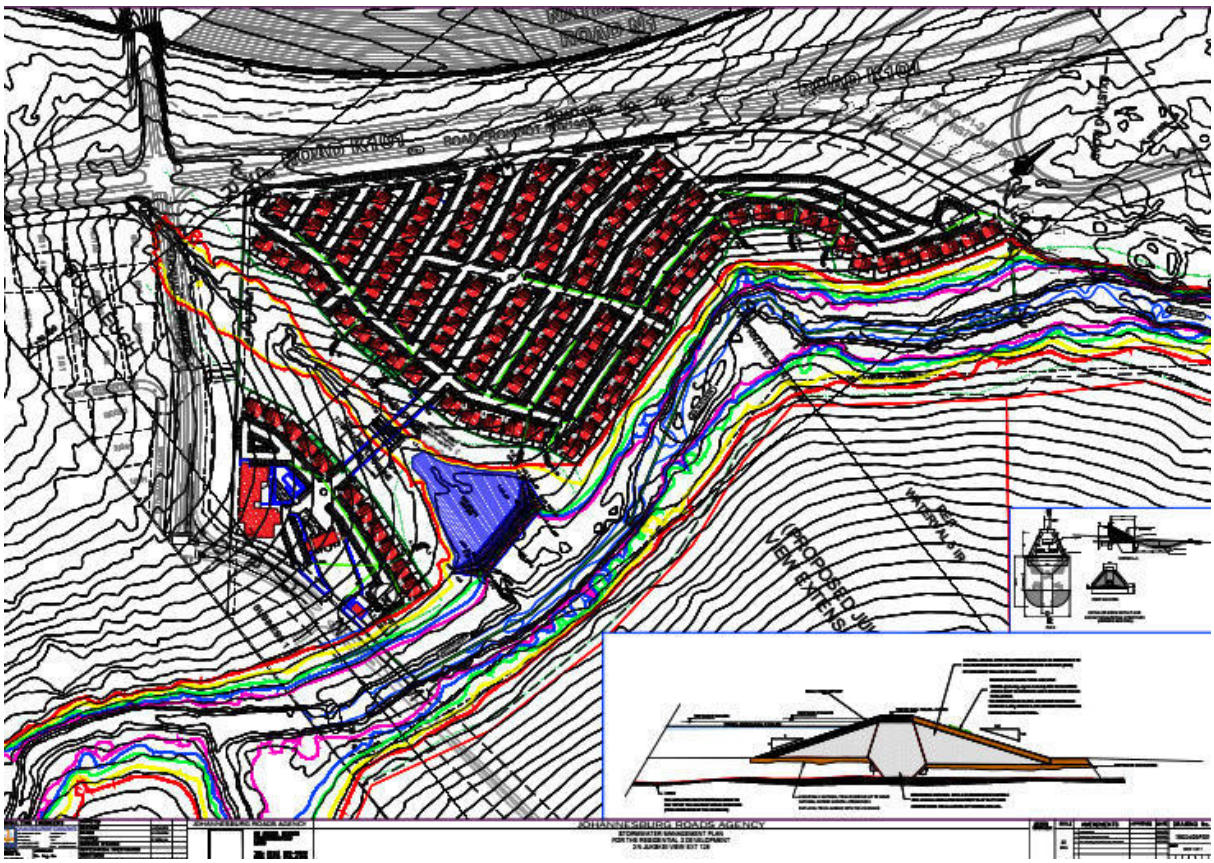


Figure 21: Storm Water Layout Plan

SECTION E: 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 as well as the impacts of not implementing the activity (Section 24(4) (b) (i).

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summarise the issues raised by interested and affected parties.

No I&APs registered during the Public Participation period and no comments were received.

Summary of response from the practitioner to the issues raised by the interested and affected parties (including the manner in which the public comments are incorporated or why they were not included)
(A full response must be provided in the Comments and Response Report that must be attached to this report):

NA

2. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION AND OPERATIONAL PHASE

Briefly describe the methodology utilised in the rating of significance of impacts

Significance Description Methodology

The significance of Environmental Impacts will be assessed in the EIA process in accordance with the following method:

Significance is the product of probability and severity. Probability describes the likelihood of the impact actually occurring, and is rated as follows:

- ❑ Improbable - Low possibility of impact to occur either because of design or historic experience. Rating = 2
- ❑ Probable - Distinct possibility that impact will occur. Rating = 3
- ❑ Highly probable - Most likely that impact will occur. Rating = 4
- ❑ Definite - Impact will occur, in the case of adverse impacts

regardless of any prevention measures.
Rating = 5

The severity factor is calculated from the factors given to “intensity” and “duration”. Intensity and duration factors are awarded to each impact, as described below.

The Intensity factor is awarded to each impact according to the following method:

Low intensity - natural and man made functions not affected – Factor 1

Medium intensity - environment affected but natural and man made functions and processes continue - Factor 2

High intensity - environment affected to the extent that natural or man made functions are altered to the extent that it will temporarily or permanently cease or become dysfunctional - Factor 4

Duration is assessed and a factor awarded in accordance with the following:

Short term - <1 to 5 years - Factor 2

Medium term - 5 to 15 years - Factor 3

Long term - impact will only cease after the operational life of the activity, either because of natural process or by human intervention - Factor 4.

Permanent - mitigation, either by natural process or by human intervention, will not occur in such a way or in such a time span that the impact can be considered transient - Factor 4.

The severity rating is obtained from calculating a severity factor, and comparing the severity factor to the rating in the table below. For example:

The Severity factor	=	Intensity factor X Duration factor
	=	2 x 3
	=	6

A Severity factor of six (6) equals a Severity Rating of Medium severity (Rating 3) as per table below:

SEVERITY RATINGS

RATING	FACTOR
Low Severity (Rating 2)	Calculated values 2 to 4
Medium Severity (Rating 3)	Calculated values 5 to 8
High Severity (Rating 4)	Calculated values 9 to 12
Very High severity (Rating 5)	Calculated values 13 to 16
Severity factors below 3 indicate no impact	

A Significance Rating is calculated by multiplying the Severity Rating with the Probability Rating.

The significance rating should influence the development project as described below:

- Low significance (calculated Significance Rating 4 to 6)
  Positive impact and negative impacts of low significance should have no influence on the proposed development project.

- Medium significance (calculated Significance Rating >6 to 15)
  Positive impact: Should weigh towards a decision to continue
  Negative impact: Should be mitigated to a level where the impact would be of medium significance before project can be approved.

- High significance (calculated Significance Rating 16 and more)
  Positive impact: Should weigh towards a decision to continue, should be enhanced in final design.

  Negative impact: Should weigh towards a decision to terminate proposal, or mitigation should be performed to reduce significance to at least medium

significance rating.

The significance methodology used by Bokamoso was prescribed to environmental consultants during various courses on Impact Assessments. No methodology can be accurate to a numerical value where the environment is concerned, because it cannot be measured. Numerical values are only an indication of the significance or severance of impacts. If we do not agree with the outcome of the assessment, we will adjust the numerical value to reflect a more realistic significance. The methodology only acts as an aid to the environmental consultant and the consultant needs to use his/her experience in the field together with the methods in order to reach a realistic significance of impacts. Bokamoso, in particular Ms. Lizelle Gregory, has extensive experience in the field of impact assessments.

Briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the construction phase for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

CONSTRUCTION PHASE				
PROPOSAL				
Potential impacts:	**Significance rating of impacts (positive or negative):**	**Proposed mitigation:**	**Significance rating of impacts after mitigation:**	**Risk of the impact** and **mitigation not being implemented**
BIODIVERSITY AND CONSERVATION				
Destruction of habitat due to vegetation clearing.	**Medium (-)**	• Development should be located on the areas of lowest sensitivity. • Before construction is initiated, the open space system should be fenced-off from ecologically sensitive areas, and all construction-related impacts must be contained within the fenced-off development areas. • Dumping of builders' rubble and other waste in the areas earmarked for exclusion must be prevented, through fencing or other management measures. These areas must be properly managed throughout the lifespan of the project in terms of fire, eradication of exotics etc. to ensure continuous biodiversity. • Outside lighting should be designed to minimize impacts on important pollinators. All outside lighting should be directed away from sensitive areas. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (yellow) lights should be used wherever possible. • Declared weed and invader species must be removed. A pre- and post-construction alien and invasive control, monitoring and eradication programme must be implemented along with an ongoing programme to ensure persistence of indigenous species. A qualified botanist/ecologist should compile and supervise the implementation of this programme. • All areas of disturbed and compacted soils need to be ripped and re-profiled. Rehabilitation of natural vegetation should proceed in accordance with a rehabilitation plan compiled by a specialist registered in terms of the Natural Scientific Professions Act (No. 27 of 2003) in the field of Ecological Science. • It is strongly prohibited for Red Listed species to be relocated, but should be protected in-situ. This means that if any Red Listed species is recorded at a site, the relevant buffers should be applied	**Low (-)**	**Vegetation clearing will lead to the destruction of the existing 'Irreplaceable' habitat.**
Loss of Fauna and Flora	**Medium (-)**		**Low (-)**	**Site clearing will lead to the loss of Fauna and Flora**
Irreversible loss of biodiversity	**Medium (-)**		**Low (-)**	**Site clearing will lead to the irreversible loss of biodiversity.**
Soil contamination	**Low (-)**		**Very Low (-)**	**Contamination of soil due to construction activities.**
Soil disturbance	**Low (-)**		**Very Low (-)**	**Disturbance of soil by construction activities.**
Gully formation and erosion	**Low (-)**		**Very Low (-)**	**Erosion caused by construction activities.**

		and no construction may take place within this area. • If found on site, the persistence of Red List populations should be ensured and the mortality of individuals of all Red and Orange Listed species should be reduced. This should form part of a monitoring programme. A qualified botanist/ecologist should compile and supervise the implementation of this programme. • A qualified flora specialist must assist with the relocation of the Orange Listed Hypoxis sp that were identified on the study area. Such species must be relocated during the correct season and prior to construction. The appointed ECO and fora specialist must visit the site prior to the construction phase in order to identify the species to be relocated and in order to identify the area, within the watercourse buffer, where the *Hypoxis sp* will be accommodated. • No dumping of waste should take place within the study area. If any spills or waste deposits occur, they should be immediately cleaned up. • The proposed bridge structure across the tributary of the Jukskei River must be designed to cause minimum disturbance to the ecological and hydrological functioning of the riverine system. It must also be designed to assist with the prevention of erosion and siltation. If well planned and managed the bridge structure can also be designed to act as attenuation feature.		
AIR QUALITY				
Fugitive particulate emissions (dust) related to construction activities.	**Medium (-)**	• Dust Control measures to be put in place as per the EMPr. • Dust and fume level monitoring	**Low (-)**	**Dust pollution caused by construction activities.**
Construction vehicle gas emissions	**Medium (-)**		**Low (-)**	**Vehicle gas emissions caused by construction vehicles.**
HERITAGE RESOURCES				
Destruction of unidentified heritage sites	**Low (-)**	• If archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.	**Low (+)**	**Heritage resources destroyed by construction activities.**

WATER RESOURCES				
Surface and Groundwater contamination: **Contamination of water resources through storm water runoff, spills and leaks.**	**Low (-)**	• A comprehensive storm water management plan indicating the management of all surface runoff generated as a result of the development (during both the construction and operational phases) prior to entering any natural drainage system must be submitted and approved by the local authority and DWS and submitted to GDARD prior to construction activities commencing. • Construction guidelines shall be provided for the prevention and restriction of erosion and siltation during both the construction and operational phases. • Attenuation features and energy dissipaters (i.e. stilling basins) must preferably be installed on the study area to break the speed of the water and to act as silt traps. • Surface storm water generated as a result of the development must not be channelled directly into any natural drainage system or wetland. • The storm water management plan must indicate how surface runoff will be retained outside of the demarcated buffer/flood zone and how the natural release of retained surface runoff will be simulated. • The storm water management plan should be designed in a way that aims to ensure that post development runoff does not exceed predevelopment values in: - Peak discharge for any given storm; - Total volume of runoff for any given storm; - Frequency of runoff; and - Pollutant and debris concentrations reaching water courses. • Bio-swale and bio-filters could be installed to minimize the risk of pollutants entering the natural drainage system of the area. • Prevention and detection of spills/leaks to be continuously carried out. • Provide adequate sanitation. • Off-site vehicle maintenance enforced. • Environmental awareness to be implemented. • The proposed bridge structure must be designed to allow for the free flow of sub-surface water underneath the road surface/ filled areas. The effective management of sub-surface drainage and the prevention of erosion and siltation during the bridge construction phase must also be addressed. Temporary measures to prevent	**Very Low (-)**	**Contamination of water resources caused by construction activities.**

		such impacts must be prescribed and implemented prior to disturbing the area. The construction phase measures must be discussed with DWS and CoJ prior to the implementation of such measures. The compilation of a specific bridge construction rehabilitation plan after the finalisation of the type of bridge structure to be implemented, must be a requirement.		
Surface water flows will be altered during the construction phase.	**High (-)**	• Construction activities should preferably take place during the winter months. • If it is not possible for construction activities to take place during the winter months, construction activities should take place in phases in order to prevent large exposed areas that will cause an increase in the speed of surface water. • When storm water planning is done, every attempt possible should be made to keep the post construction and pre-construction flows similar. • The proposed bridge structure must be designed to allow for the minimum disturbance to surface water flows. The effective management of surface drainage and the prevention of erosion and siltation during the bridge construction phase must also be addressed. Temporary measures to prevent such impacts must be prescribed and implemented prior to disturbing the area. The construction phase measures must be discussed with DWS and CoJ prior to the implementation of such measures. The compilation of a specific bridge construction rehabilitation plan after the finalisation of the type of bridge structure to be implemented, must be a requirement.	**Low (-)**	**Surface water flows altered leading to environmental degradation.**
WASTE MANAGEMENT				
Soil/water/air pollution due to improper waste handling, storage and disposal	**Low (-)**	•General litter from construction workers as wells as construction waste on site must be effectively controlled. •With the implementation of mitigation methods all impacts can be prevented. •Rubble and general construction waste on site should be removed at regular intervals. •All waste must be separated according to type and stored in separate drums, adequately marked according to waste sort.	**Very low (-)**	**Pollution (soil/water/air) due to the improper handling of waste during the construction phase.**

		• The Contractor shall prevent littering and the random discard of solid waste on the site. • Waste collected during the construction phase will be recycled, re-used or recovered as far as economically feasible.		
NOISE				
Nuisance to neighbouring residents and businesses due to noise from construction activities.	**Medium – High (-)**	• The contractor must be familiar with and adhere to any regulations (including Gauteng Noise Control Regulations and SANS 10103 provisions) and local by-laws regarding the generation of noise and hours of operation. • All construction activity will take place during normal working hours (between 6am and 5pm). • Transport vehicle tailgates will be kept closed where possible. • Surrounding communities must be notified in advance of noisy construction activities. • All equipment should be provided with standard silencers. Silencer units on vehicles and equipment must be kept in good working order. • Construction staff working in areas where the 8-hour ambient noise levels exceed 85 Dba should wear ear protection equipment.	**Low (-)**	**Nuisance noise caused by construction activities.**
TRAFFIC				
Increased traffic in the project area and in the region	**Medium (-)**	• All contractors should commit to following road safety rules. • Traffic to and from the construction site should be limited to daylight hours. • Appropriate signage must be placed. • Contractor must ensure that trucks are not overloaded.	**Low (-)**	**Traffic in and around the site will be increased.**
Risks to the safety of pedestrians and road users	**Medium – High (-)**		**Low (-)**	**Reduced safety of pedestrians and road users.**
WASTE WATER (EFFLUENT)				
Water contamination and health hazards due to inadequate sanitation	**Medium – High (-)**	• Sufficient ablution facilities shall be provided to service the construction site. • Ablution facilities shall be serviced on a regular basis by an approved service provider. • Contents of ablution facilities (e.g. chemical toilets) shall be disposed of to a permitted/ licensed waste water treatment works and the necessary measures shall be taken to ensure that it will not impact on the operations of the waste water treatment works.	**Low (-)**	**Contamination of water caused by inadequate sanitation.**

		• The designated service provider will make details of inspection reports available to the contractor. • Clean and dirty water shall be separated and dirty water shall be contained and re-used where practical possible.		

OPERATIONAL PHASE				
PROPOSAL				
Potential impacts:	**Significance rating of impacts (positive or negative):**	**Proposed mitigation:**	**Significance rating of impacts after mitigation:**	**Risk of the impact** and **mitigation not being implemented**
BIODIVERSITY AND CONSERVATION				
Removal of weed and invader species	**Medium (+)**	• Declared weed and invader species must be removed. • As much vegetation growth as possible should be promoted within the proposed development area in order to protect soils and to reduce the percentage of the surface area which is left as bare ground. In this regard special mention is made of the need to use indigenous vegetation species as the first choice during landscaping. • No dumping of waste should take place within the study area.	**High (+)**	**Proliferation of invader species.**
Promotion of indigenous vegetation species for landscaping	**Medium – Low (+)**		**High (+)**	**Soil erosion caused by bare soil.**
Soil contamination	**Medium (-)**		**Low (-)**	**Contamination of soil due to illegal dumping.**
Restoration of Wetland	**High (+)**	• Implementation of a rehabilitation plan for the enhancement and restoration of the wetland area.	**High (+)**	**Wetland restoration.**
SERVICES				
Increase in storm water runoff from hard surfaces	**High (-)**	• Implementation of a storm water management plan	**Low (-)**	**Increased quantity and the speed of the storm water across the study area and into the**

				water bodies and adjacent properties.

No -go				
Potential impacts:	**Significance rating of impacts (positive or negative):**	**Proposed mitigation:**	**Significance rating of impacts after mitigation:**	**Risk of the impact** and **mitigation not being implemented**
BIODIVERSITY AND CONSERVATION				
Protection of habitat identified as 'Irreplaceable' (GDARD C-Plan)	**Medium-High (+)**	• Management of invader species. • Controlled access to the area to prevent illegal occupation, dumping and destruction of habitat.	**High (+)**	**Destruction of natural habitat.**
Proliferation of invader species	**Medium (-)**	• Management of invader species.	**Low (+)**	**Destruction of natural habitat**

List any specialist reports that were used to fill in the above tables. Such reports are to be attached in the appropriate Appendix.

Appendix G1: Heritage Impact Assessment Appendix G2: Flora Assessment Appendix G3:Fauna Assessment Appendix G4:Avifauna Assessment Appendix G5:Hydropedology Assessment

Describe any gaps in knowledge or assumptions made in the assessment of the environment and the impacts associated with the proposed development.

NA

3. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING AND CLOSURE PHASE

Briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the decommissioning and closure phase for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

Please note that Impact resulting from the construction phase is similar to those resulting from the decommissioning and closure phase. Please refer to previous section (Impacts that may result from the Construction Phase).

List any specialist reports that were used to fill in the above tables. Such reports are to be attached in the appropriate Appendix.

NA

Where applicable indicate the detailed financial provisions for rehabilitation, closure and ongoing post decommissioning management for the negative environmental impacts.

NA

4. CUMULATIVE IMPACTS

Describe potential impacts that, on their own may not be significant, but is significant when added to the impact of other activities or existing impacts in the environment. Substantiate response:

Construction phase: - Biodiversity and Conservation – Irreversible loss of biodiversity caused by vegetation clearance. - Decreased water quality in the Jukskei River caused by insufficient storm water management. - Air quality – Addition to existing ambient conditions The cumulative impact of dust during construction will be negligible as it will be

mitigated in accordance with the EMPr. The site will be rehabilitated, reducing the dust levels on site.
- Increase in ambient noise during the construction phase – impact to be managed in accordance with the EMPr.

5. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that sums up the impact that the proposal 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.

Proposal

It is foreseen that the proposed development of Jukskei View X128 will not have a significant impact on the environment if areas of ecological significance are avoided and if the mitigation measures proposed are implemented.

Apart form the proposed bridge crossing required to provide access, the delineated wetland will not be affected by the development and has been excluded from the development footprint. The applicant also allowed for a 32m wetland buffer, even though the wetland specialist did not regard it as necessary to provide a buffer.

The impact on the Grassland area is not regarded as significant seeing that the connectivity of the Grassland is limited as it is surrounded by urban development. The impact on the floral biodiversity is not regarded as significant providing that the Orange Listed species *Hypoxis hemerocallidea*, recorded on the study site, is relocated prior to construction.

The land-owner furthermore entered into an off-set agreement with GDARD for development across the grassland areas on Portion 1 of the Farm Waterval 5IR and the study area formed part of the larger farm included in the off-set agreement.

The impact on avifauna is summarised below:
- Impact on the Grassland unit is considered to have a low significance seeing that it has a low avifaunal sensitivity.
- Impact on the highly sensitive wetland and drainage line is considered to have a low significance providing that this area is excluded from the development footprint.
- Impact on the highly sensitive riverine area is considered to have a low significance providing that this area is excluded from the development and the recommendations in the EMPr are adhered to.

Alternative 1

NA

Alternative 2

NA

No-go (compulsory)

If the status quo is maintained it is highly unlikely that any Red Data Species or species of

conservation significance will occur in the study area due to the disconnectedness of the Grassland unit. The site could pose a safety risk caused by the possible illegal invasion of the property.

6. IMPACT SUMMARY OF THE PROPOSAL OR PREFERRED ALTERNATIVE

For proposal:

- The development will have a positive impact on the proliferation of invader species due to the implementation of an Invader Management Plan;
- The significance of the impact on air quality during the construction phase will be low seeing that control measures will be put in place as per the EMPr;
- Nuisance to neighboring residents and businesses due to noise from construction activities will be reduced by adhering to the Gauteng Noise Control Regulations, SANS 10103 provisions and local by-laws regarding the generation of noise and hours of operation;
- The significance of the impact on heritage features is low as the destruction of unidentified heritage sites during construction will be avoided by immediately reporting such a find to a heritage practitioner so that an investigation and evaluation of the finds can be made;
- The significance of the impact on water resources i.e. surface and groundwater contamination (contamination of water resources through storm water runoff, spills and leaks) will be low seeing that environmental awareness will be emphasized, a buffer will be provided around the watercourse and due to the fact that the EMP and rehabilitation plans provide mitigation measures and guidelines;
- The significance of the impact on soil/water/air pollution due to improper waste handling, storage and disposal will be very low if proper waste management is carried out on site;
- The Increased traffic in the project area and in the region and the risks to the safety of pedestrians and road users will be reduced after mitigation; and
- Water contamination and health hazards due to inadequate sanitation during the construction phase will be avoided by providing adequate sanitation on site.

For alternative:

NA

Having assessed the significance of impacts of the proposal and alternative(s), please provide an overall summary and reasons for selecting the proposal or preferred alternative.

- There is a need for accommodation in this rapidly developing area;
- The study area formed part of an off-set agreement and is strategically situated for a residential development that is affordable to people that work/ will work in the area;
- The smaller higher density units will be more affordable and will create the opportunity for an improved lifestyle to medium and lower income levels;
- The proposed development will promote the optimum utilisation of services;
- The proposed development will be in line with and will complement the surrounding land-uses;
- The study area is already subjected to edge effects and the grassland area is isolated and fragmented;
- The development of the study area creates an opportunity to relocate the Orange Listed *Hypoxis sp* to the wetland buffer area ad to ensure the future conservation of such species;
- The watercourses associated with the study area is already subject to severe

erosion and siltation problems. Water quality is also a problem. If well planned and managed the in-stream attenuation structures and the infrastructural features within the buffer zones and proposed across the tributary of the Jukskei River can assist with the prevention of erosion, siltation and water pollution. It can also assist with he creation of habitats and in the long term it can contribute to increased bio-diversity;
- The proposed development will contribute significantly to the upgrading and implementation of services in this area, which is earmarked for urban development;
- The proposed development will promote infill development and will prevent urban sprawl;
- The proposed development will contribute to increased rates and taxes payable to the CoJ;
- The proposed development will be sustainable, because funds will be available for the management and rehabilitation of the open space areas associated with the riverine system;
- Security along the river and in the area will be increased;
- The development will aid in eradicating declared weed and invader species which will contribute to the biodiversity of the riverine and wetland area;
- The development will contribute to job creation during the Construction and Operational phases.

7. SPATIAL DEVELOPMENT TOOLS

Indicate the application of any spatial development tool protocols on the proposed development and the outcome thereof.

Geographic Information System (PlanetGIS) was utilized to identify areas of biodiversity concern that may be affected by the proposed development.

The planning frameworks, policies and plans of the provincial and local authorities were considered during the layout planning stages and will also be taken into consideration during the project construction and operational phases.

8. RECOMMENDATION OF THE 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 as bound by professional ethical standards and the code of conduct of EAPASA).

YES	NO
X	

If “NO”, indicate the aspects that require further assessment 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:

- The detail design of the proposed bridge structure across the tributary of the Jukskei River must be designs to cause minimum impacts on the hydrological and ecological systems associated with the riverine system d wetlands.
- All infrastructure and features to be implemented in the watercourse and watercourse buffer areas must be designed to prevent erosion, siltation and water pollution. It must also assist with water attenuation and habitat creation where required;
- DWS must approve the proposed in-stream attenuation proposed at the locality of the old dam. The implementation of the in-stream attenuation must be planned to cause minimal disruption to the existing ecological and hydrological functions;
- Storm water management measures, erosion prevention measures and siltation prevention measures must be implemented during the construction and operational phases of the development;
- A watercourse rehabilitation plan for all development phases must be compiled and submitted to DWS, CoJ and GDARD prior to commencement with the construction of the bridge structure and other infrastructure within the watercourse and watercourse buffer areas. DWS and CoJ must support the proposed storm water management concept for the development. The approved storm water management plans must be submitted to GDARD prior to implementation of such concept;
- The plant species to be used in the open space area associated with the watercourse and watercourse buffer area must be indigenous and preferable endemic. The species must also be selected to accommodate bird species and insects that will be able to adapt to the surrounding urban developments;
- The Orange Listed species identified on the study area must be identified by the ECO and the flora specialist prior to the construction phase and it must be relocated to the watercourse buffer area. The flora specialist (in collaboration with the GDARD specialist) must identify the areas most suitable for the relocation of the species. The flora specialist must oversee the transplantation process.

9. THE NEEDS AND DESIRABILITY OF THE PROPOSED DEVELOPMENT (as per notice 792 of 2012, or the updated version of this guideline)

The site forms part of the bigger farm Waterval which over the years has been developed with a mix of land uses to provide in the need identified in this area. It is also a well-defined pocket of land which is centrally located within the greater Johannesburg area, with Midrand in general to the north, Johannesburg suburbs to the south and west and Kempton Park to the east.

The site is situated within a rapidly growing area strategically located in close proximity to Maxwell Drive, the N1 Freeway, the proposed K60 and K101 Provincial Roads and Allandale Road.

The Farm Waterval and the broader environs, have been characterized by growth, and where a large percentage of all new developments are being created for the

Greater Johannesburg Metropolitan area. Within this growth sector, a number of non-residential townships are proclaimed and other townships are in the process of being established. For example to name a few; Jukskei View Extensions 69, 70, 77, 78, 79, 80, 81, 110, 111 and 111.

The site will also be very accessible from a road transport point of view as it is situated east of proposed K101 Provincial Road and south of proposed K60 Provincial Road, which provides access to Allandale Road to the north and is also situated west of the R55, which provides access to the M1 Freeway and also Allandale Road. These roads provide easy access to the Ben Schoeman Freeway via the Allandale and Buccleuch Interchanges.

The land in the Midrand area is much sought after for development due to its high level of accessibility, proximity to work opportunities and residential areas and has a high level of location desirability.

The precinct has excellent visibility from Maxwell Drive, proposed K60 and K101 Provincial Roads and the N1 Freeway. The precinct serves a growing residential and non-residential area which is emerging in the Midrand precinct. There is tremendous need to ensure the sustainability of this area by the creation of various residential dwellings to cater for all age groups of the population in the area.

The site under consideration is extremely well located within this developing precinct. The township will provide for various residential dwellings to cater for all age groups and income groups of the population.

This site, being a large tract of land on a highly visible and easily accessible route, offers a unique development opportunity for the proposed land use within the area.

People at different stages of their lives require different forms of accommodation and, as such, the residential township will offer a range of dwelling types to cater for the varying demands of the population and income groups.

The rising costs of land and transportation, together with the sprawl of the metropolitan area, have resulted in the growing acceptance of the need for increased densities, by both the home-owners and the authorities.

The development of the proposed township will benefit the area and advance the goals of Council's aims to provide a range of dwelling types to cater for the varying demands of the population and income groups.

Numerous officials throughout the official hierarchy have advocated higher residential densities, especially for dwelling types to cater for the varying demands of the population and income group.

10. THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED *(CONSIDER WHEN THE ACITIVTY IS EXPECTED TO BE CONCLUDED)*

10 Years

11. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR) (must include post construction monitoring requirements and when these will be concluded.)

If the EAP answers "Yes" to Point 7 above then an EMP is to be attached to this report as an Appendix

EMPr attached	**Yes**

SECTION F: APPENDIXES

The following appendixes must be attached as appropriate (this list is inclusive, but not exhaustive):

It is required that if more than one item is enclosed that a table of contents is included in the appendix

Appendix A: Site plan(s) – *(must include a scaled layout plan of the proposed activities overlain on the site sensitivities indicating areas to be avoided including buffers)*

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Route position information

Appendix E: Public participation information

Appendix F: Water use license(s) authorisation, SAHRA information, service letters from municipalities, water supply information

Appendix G: Specialist reports

Appendix H: EMPr

Appendix I: Land Exchange Agreement with GDARD

CHECKLIST

To ensure that all information that the Department needs to be able to process this application, please check that:

- Where requested, supporting documentation has been attached;
- All relevant sections of the form have been completed.

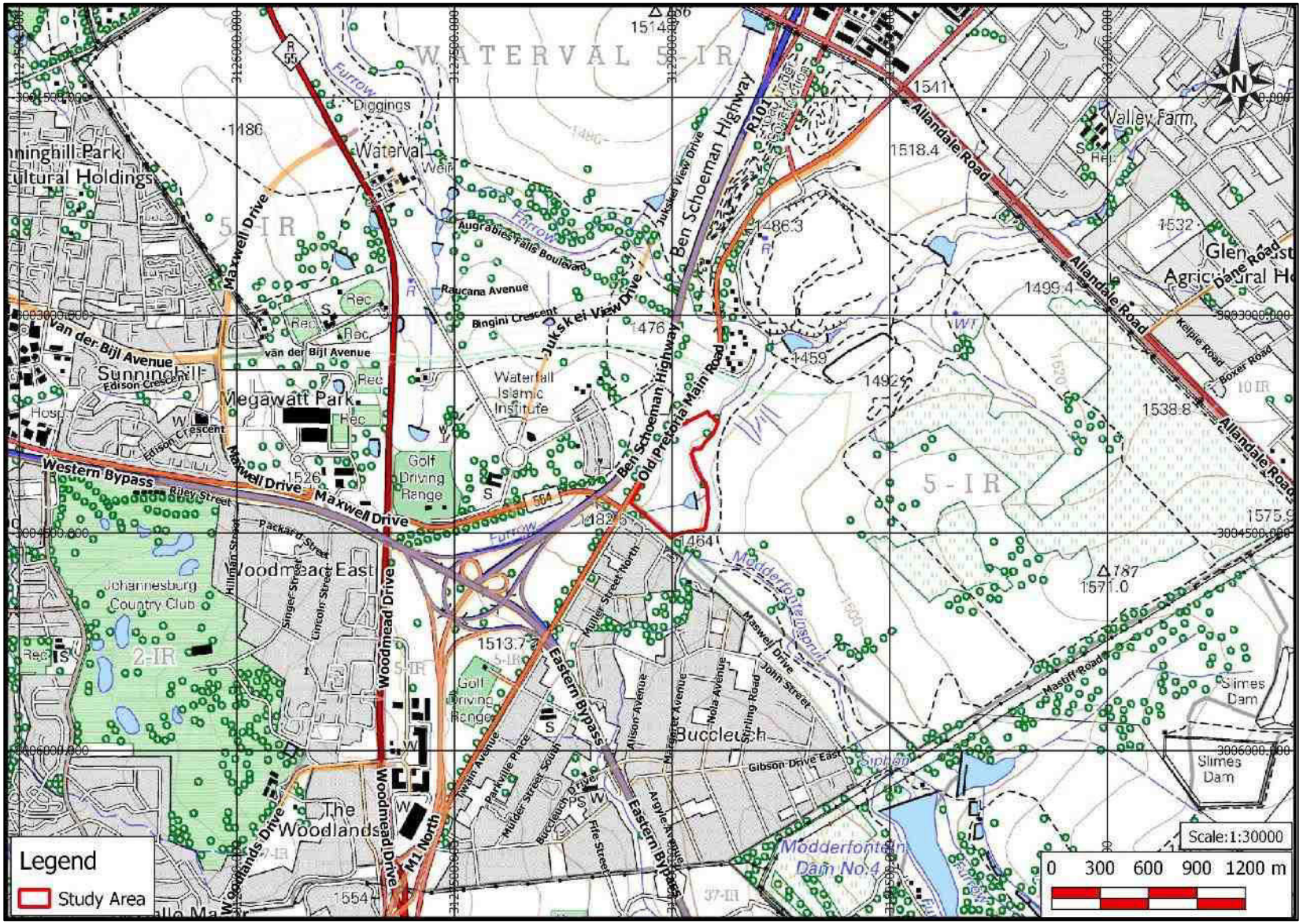
APPENDICES

APPENDIX A: SITE PLANS

Bokamoso Environmental Consultants
Website: www.bokamoso.net
E-Mail: info@bokamoso.net

Jukskei View Extension 128

Locality Map



Projection – Transverse Mercator
Datum- Hartebeeshoek 1994
Reference Ellipsoid –WGS 1984
Central Meridian -29

Bokamoso Environmental Consultants
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E-Mail: info@bokamoso.net

Jukskei View Extension 128

Aerial Map

Projection – Transverse Mercator
Datum- Hartebeeshoek 1994
Reference Ellipsoid –WGS 1984
Central Meridian -29

Y +89 500

X +81 500

X +81 50

RE/1
WATERVAL 5 IR

ROAD K101

ROAD P1-2
PLAN NR. PRS75/34/5 2

NATIONAL
ROAD N1

ROAD PROK.NOT.570/1987

ERF 3
RESIDENTIAL 3
±1,1103HA

10x3 cellphone mast

ERF 1
RESIDENTIAL 3
±10,7080HA

1:100 YEAR FLOODLINE

PRIVATE OPEN SPACE

RE/1
WATERVAL 5 IR

1:100 YEAR FLOODLINE

GROSS AREA	= 22.3118 Ha
NETT SITE AREA	= 14.0571 Ha
P.O.S AREA	= 8.2547 Ha
TOTAL BLOCKS	= 124 BLOCKS
TOTAL UNITS	= 1240 UNITS

Watercourse – Jukskei River

(PROPOSED JUKSKEI
VIEW EXTENSION 118)

Grassland/ C-Plan Irreplaceable Site

6x3 Elec Substation

BUFFER ZONE

ERF 4
PRIVATE OPEN
SPACE
±8,2547HA

1:100 YEAR FLOODLINE

1:100 YEAR FLOODLINE

BUFFER ZONE

MAXWELL DRIVE EXT

ROAD WORK NOT STARTED

ERF 2
RESIDENTIAL 3
±2,2388HA

BUCCLEUCH

4/32
6/32
RE/1/32
RE/32
5/31
4/31
7/32
6/31
AMY PLACE
MOLLER STR
E241
SANDRA

X +82 000

X +82 000

A
B
C
D
E
F
G
H
J
K
L
M
N
O
P
Q
R
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X
y

N

INFORMATION

General Notes

Format: A1

This drawing is not to be scaled, all figured dimensions to be used.

All Dimensions and cadastral setting out information to be thoroughly checked on site and all or any discrepancies to be reported to the **Architect** before any work is put in hand.

All work is to comply with the **NATIONAL BUILDING REGULATIONS (NBR) AND BUILDING STANDARDS** act 103 of 1977 as amended

All work is to comply with all relevant specifications and codes of practice of the **SOUTH AFRICAN BUREAU OF STANDARDS (SABS) / SOUTH AFRICAN NATIONAL STANDARDS (SANS)** and amendments thereto.

HEALTH AND SAFETY: All construction activities to conform to the **OCCUPATIONAL HEALTH AND SAFETY ACT 1993 (Act No 85 of 1993)**

All materials and workmanship to be as per the **MODEL PREAMBLES FOR TRADES 2008**, and any further additional preambles as noted in the Bills of Quantities.

All work is to comply with all relevant specifications and codes of practice of the **NATIONAL HOME BUILDERS REGISTRATION COUNCIL (NHBRC)** (Where applicable)

ELECTRICAL Engineer: (Where applicable) All materials and workmanship to be as specified on the Consultants drawings.

STRUCTURAL and CIVIL Engineer: (Where applicable) All materials and workmanship to be as specified on the Consultants drawings.

RATIONAL FIRE Engineer: (Where applicable) All materials and workmanship to be as specified on the Consultants drawings.

WET SERVICES Engineer: (Where applicable) All materials and workmanship to be as specified on the Consultants drawings.

SPECIALIST CONSULTANTS (Where applicable) All materials and workmanship to be as specified on the Consultants drawing.

GENERAL
-Keep unauthorised persons off the site at all times.
-Maintain and protect the site datum level, set up by the land surveyor.
-Prevent structural or other damage to remaining portions of the building(s). Make good all existing work damaged during alterations.
-Ensure that service connections (electrical, telephone, water supply, sewers, etc.) are not interfered with. give notice to the local authority and the architect if disconnection of alteration is necessary.
-Minimise disturbance and nuisance from dust and noise.
-Remove all removable fittings that could be damaged, mark and store until after painting, and refit where applicable.
-All work is to comply with the National Building Regulations and Building Standards Act number 103 of 1977 as amended and all relevant specifications and codes of practice of the SABS and amendments thereto.
-Vertical dpc's to all changes in floor level where ground level is higher than finished floor level, continuous vertical dpm to be installed.
-Dpc's under all walls and screen walls to be a minimum of 150mm above finished ground level.
-All drains under building to be adequately encased in concrete with river sand, suitable for carrying loads unless otherwise specified.
-Inspection eyes to all bends and junctions to be easily accessible with marked covers at ground level.
-Rodding eyes to be provided where necessary.
-100mmø upvc soil pipes to have a minimum fall of 1:60. all vent pipes to extend 900mm above roof level unless otherwise stated. all waste fittings to have deep 'p' re-seal traps and to be fully accessible for repairs.
-Top of any drain to be at least 300mm above ground level. concealed waste pipes to be sleeved.
-Stair treads to be a minimum 250mm, stair risers to be a maximum of 200mm.
-Balustrade heights to be 1000mm minimum. Baluster openings to be a minimum of 100mm.
-Flashings to all changes in roof levels.
-Surface beds to be on approved waterproofing membrane forming a continuous membrane with the dpc's under walls.
-All habitable rooms to have a minimum of 10% natural light.
-All glazing to comply with Part N of SABS 10400.
-Maximum permissible air leakage for openable glazing to comply with Clause 4.4.3.1.1 of SANS 204:2011.
-Maximum permissible air leakage for non-openable glazing to comply with Clause 4.4.3.1.2 of SANS 204:2011.
-Solar water heating systems to comply with SANS 204, Clause 4.5.2.
-All exposed pipes to and from hot water cylinders to be insulated to comply with SANS 204, Clauses 4.5.2.4 &5

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rev:	description:	date:
J	ISSUED FOR INFORMATION	2016.06.28
Hh	ISSUED FOR INFORMATION	2016.06.22
H	ISSUED FOR INFORMATION	2016.06.14
G	ISSUED FOR INFORMATION	2016.06.03
F	ISSUED FOR INFORMATION	2016.05.31
E OPTION B	ISSUED FOR INFORMATION	2016.05.30
D	ISSUED FOR INFORMATION	2016.05.21
C	ISSUED FOR INFORMATION	2016.05.18
B	ISSUED FOR INFORMATION	2016.05.12
A	ISSUED FOR INFORMATION	2016.05.10

client: Balwin PROPERTIES

KIKUYU WATERFALL

project: WATERFALL FIELDS & WATERFALL RIDGE

erf no:

LYT ARCHITECTURE.CONCEPTS.LIFE.FORM.SPACE

Reception: 2nd Floor, 3 Melrose Square,Melrose Arch, +27 11 061 9700
www.lyt.co.za

drawing title: KIKUYU SDP 2
SITE PLAN - PHASE 1 & 2

INFORMATION	tender	construction
Architectural	1:1500 @A1	2016.05.10
discipline:	scale:	date:
E S / LDB	L DB	E S /LDB
design:	drawn:	check:

project: 3539 | dwg no: SP-A100 | rev: K-2

Bokamoso Environmental Consultants
Website: www.bokamoso.net
E-Mail: info@bokamoso.net

Jukskei View Extension 128

C Plan Area

Projection – Transverse Mercator
Datum- Hartebeeshoek 1994
Reference Ellipsoid –WGS 1984
Central Meridian -29

Bokamoso Environmental Consultants
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E-Mail: info@bokamoso.net

Jukskei View Extension 128
C Plan

Projection – Transverse Mercator
Datum- Hartebeeshoek 1994
Reference Ellipsoid –WGS 1984
Central Meridian -29

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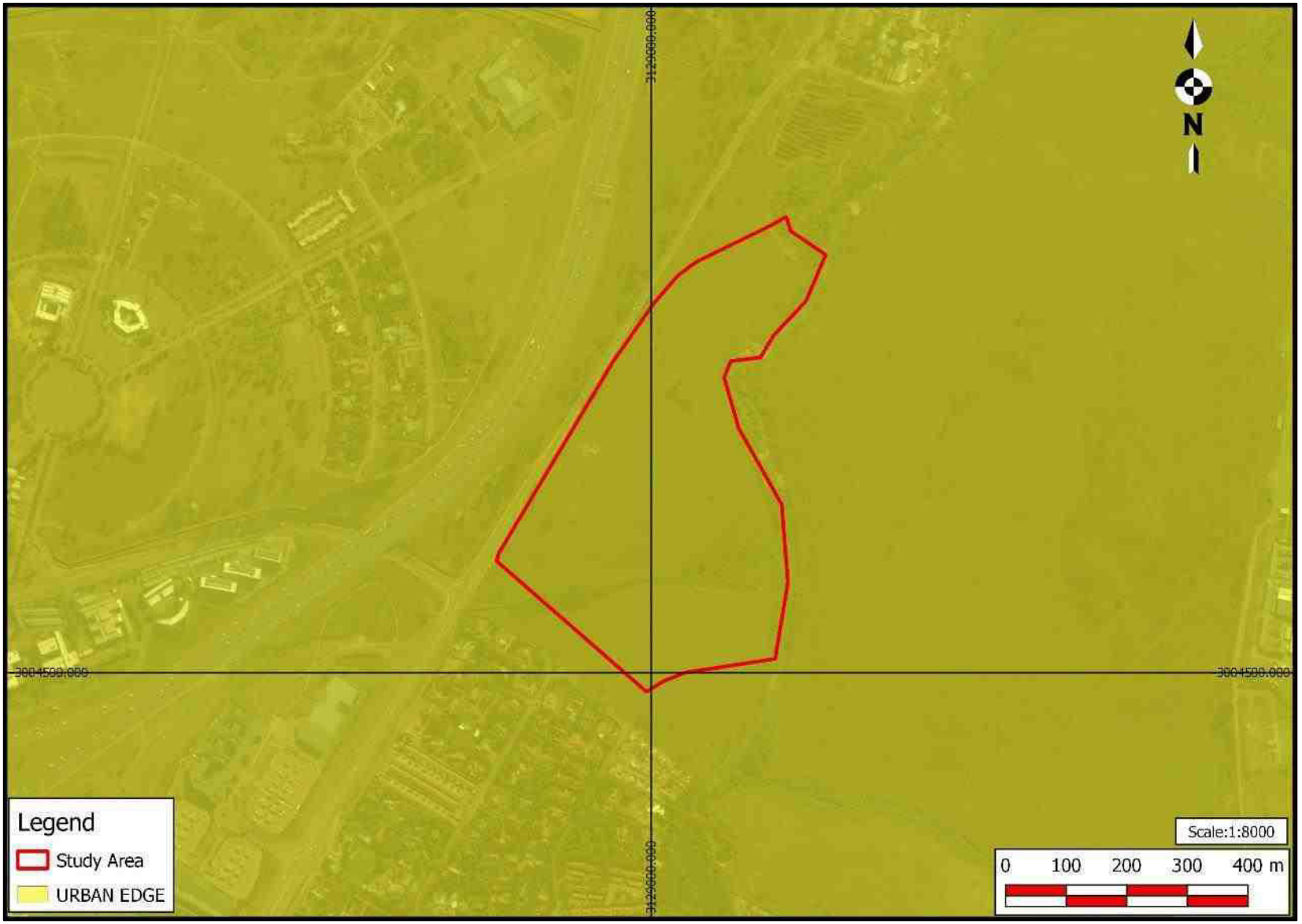
E-Mail: info@bokamoso.net

Jukskei View Extension 128
Urban Edge



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Datum- Hartebeeshoek 1994
Reference Ellipsoid –WGS 1984
Central Meridian -29

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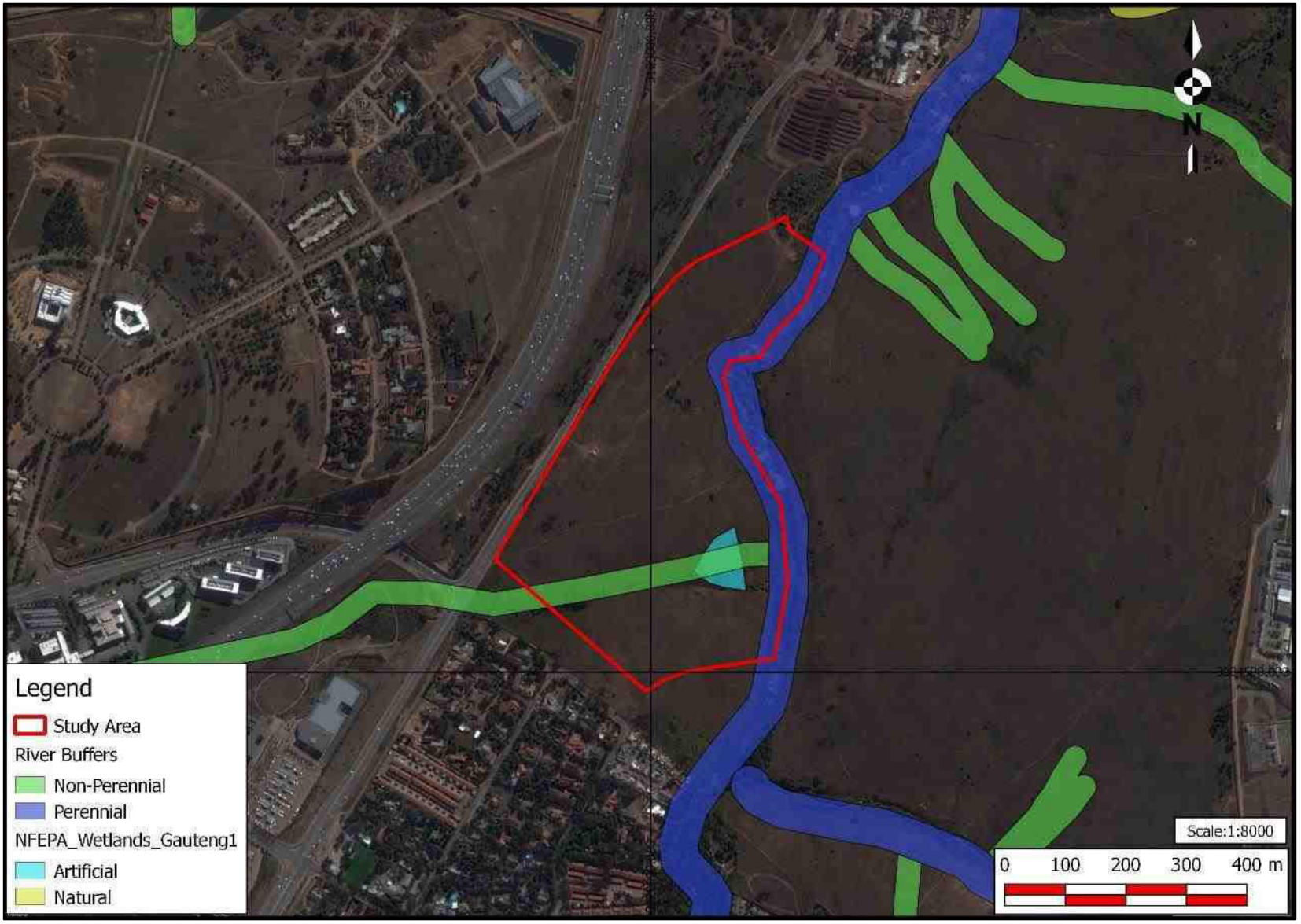
Jukskei View Extension 128

Rivers and Wetlands



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Reference Ellipsoid –WGS 1984
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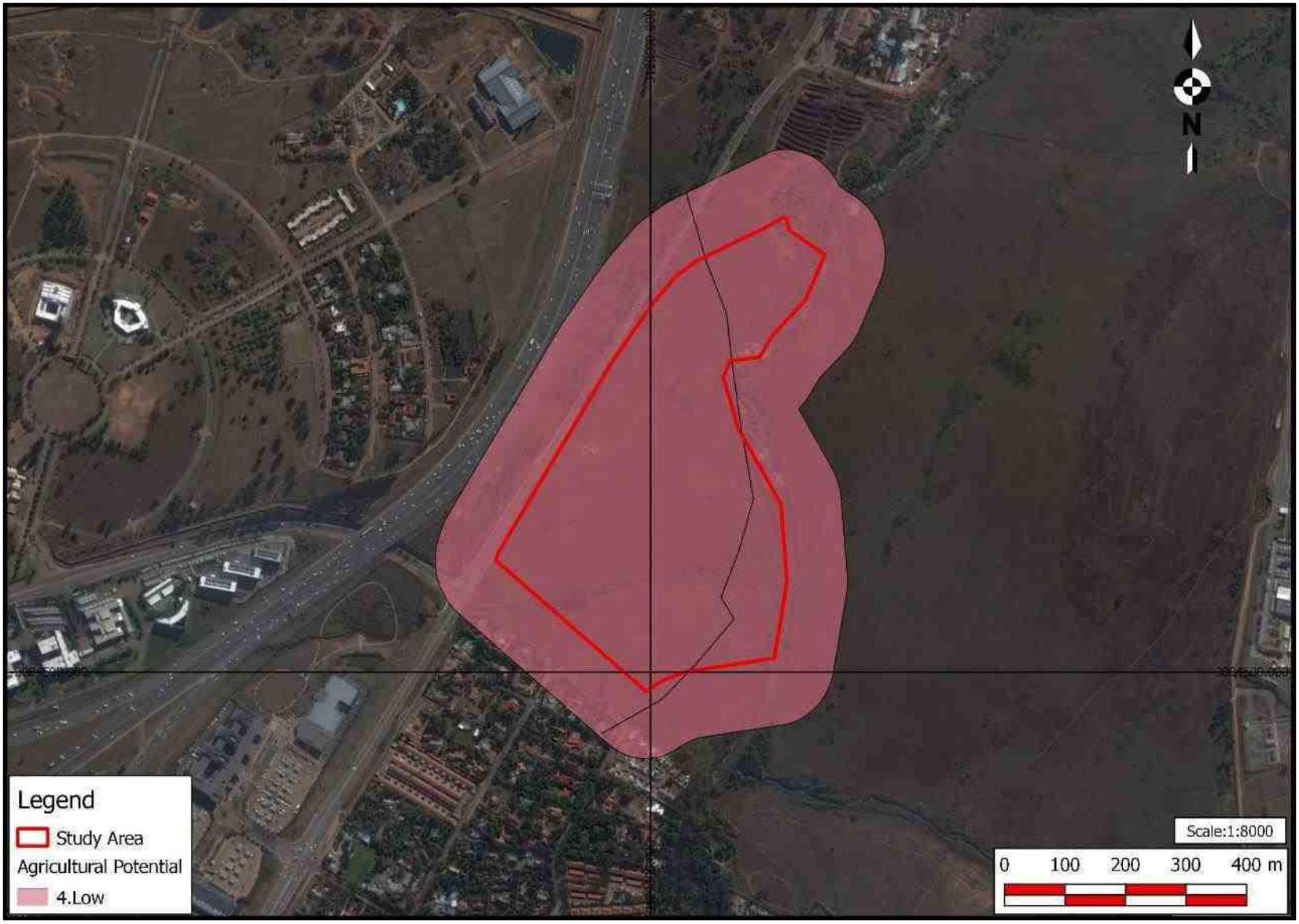
E-Mail: info@bokamoso.net

Jukskei View Extension 128

Agricultural Potential



Projection – Transverse Mercator
Datum- Hartebeeshoek 1994
Reference Ellipsoid –WGS 1984
Central Meridian -29

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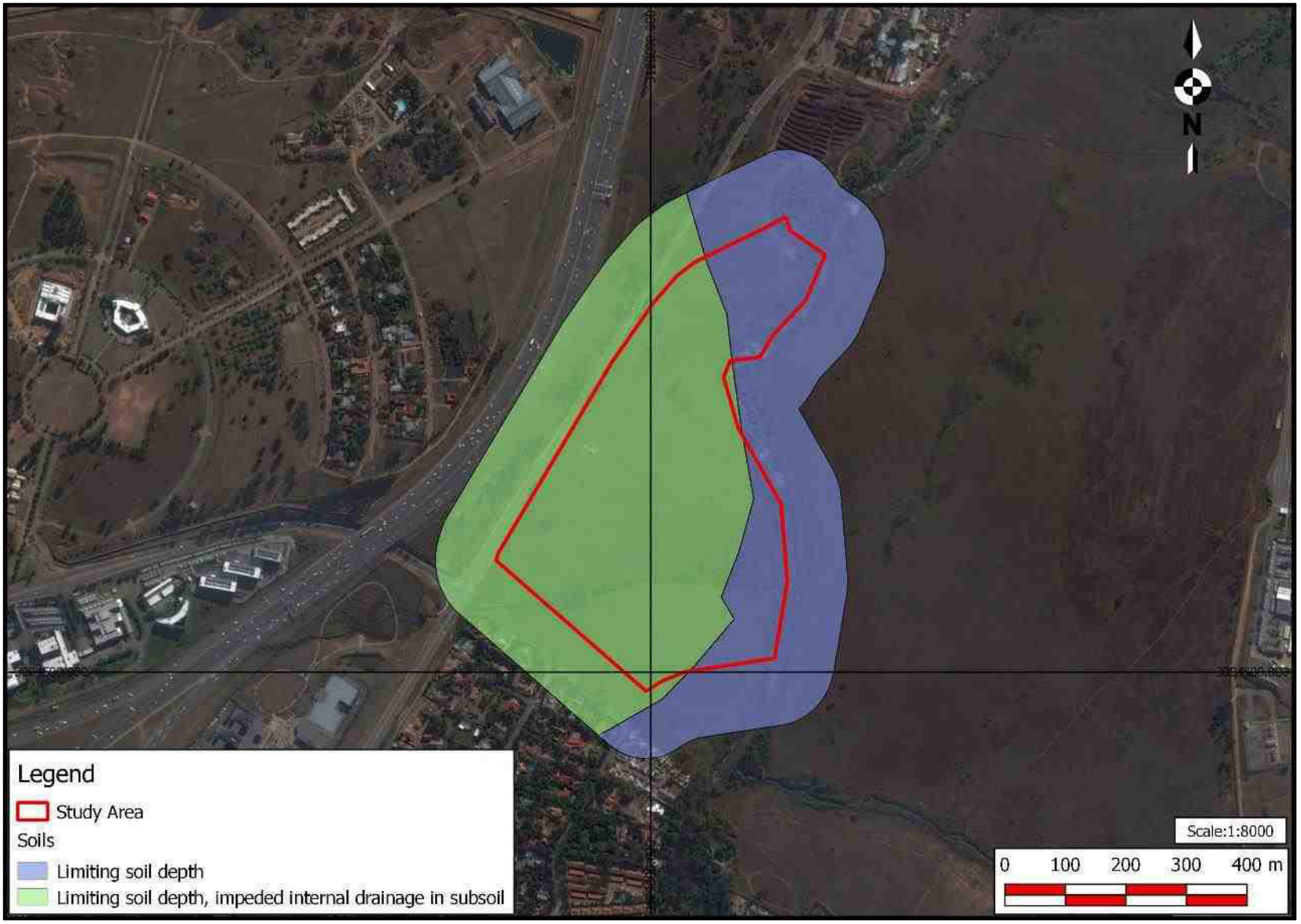
E-Mail: info@bokamoso.net

Jukskei View Extension 128

Soils



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Datum- Hartebeeshoek 1994
Reference Ellipsoid –WGS 1984
Central Meridian -29

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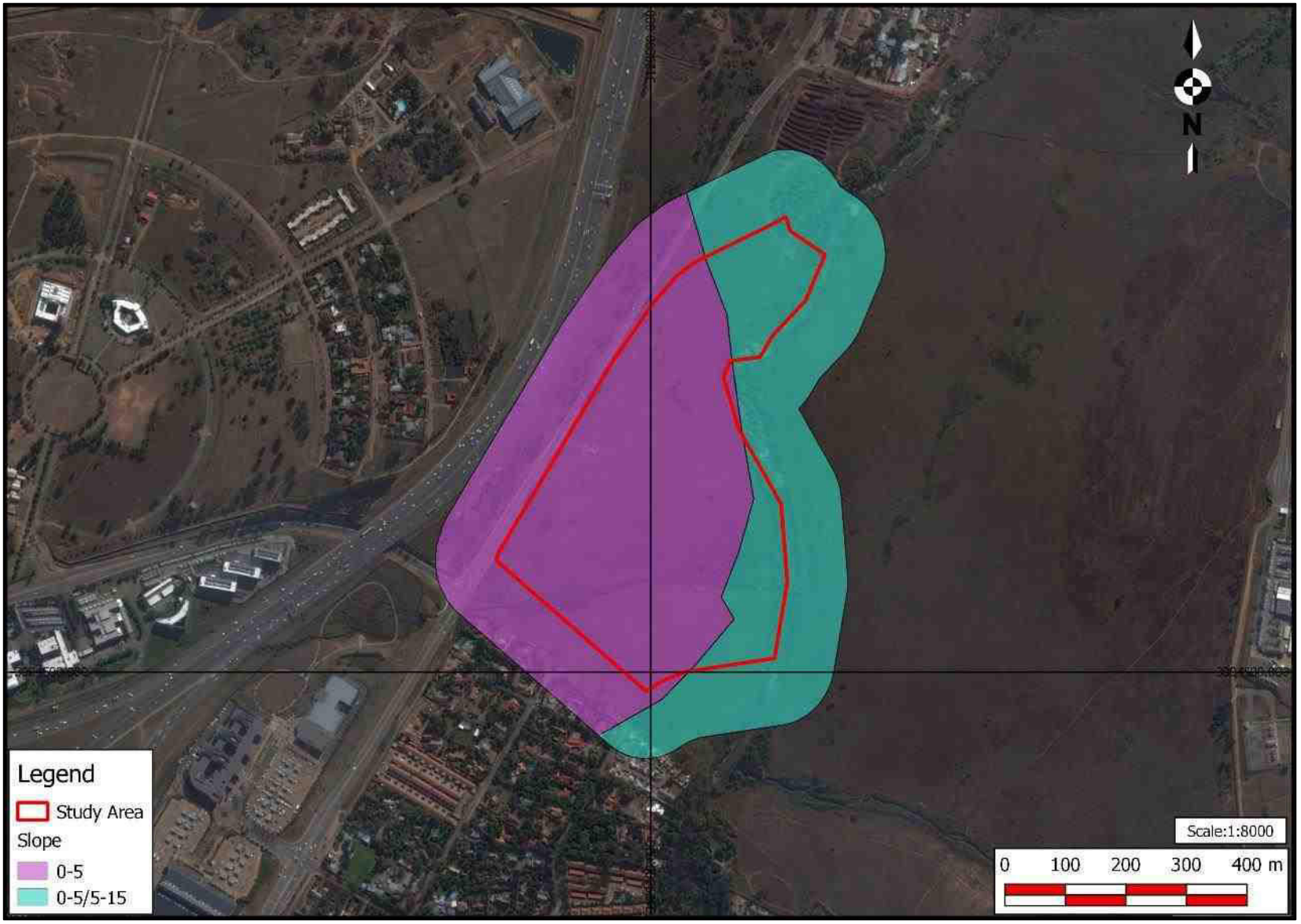
Jukskei View Extension 128

Slope



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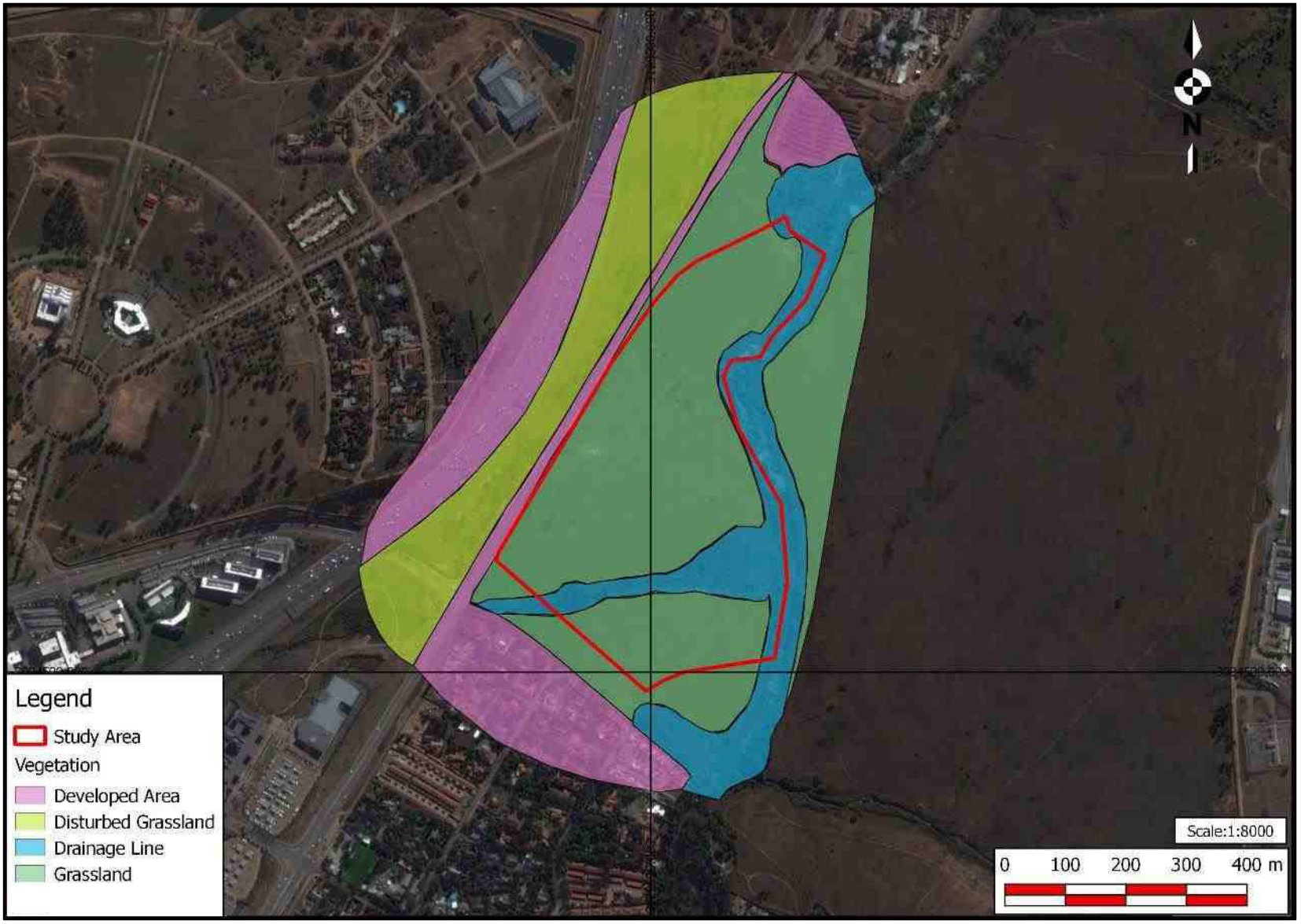
Jukskei View Extension 128

Vegetation



Projection – Transverse Mercator
Datum- Hartebeeshoek 1994
Reference Ellipsoid –WGS 1984
Central Meridian -29

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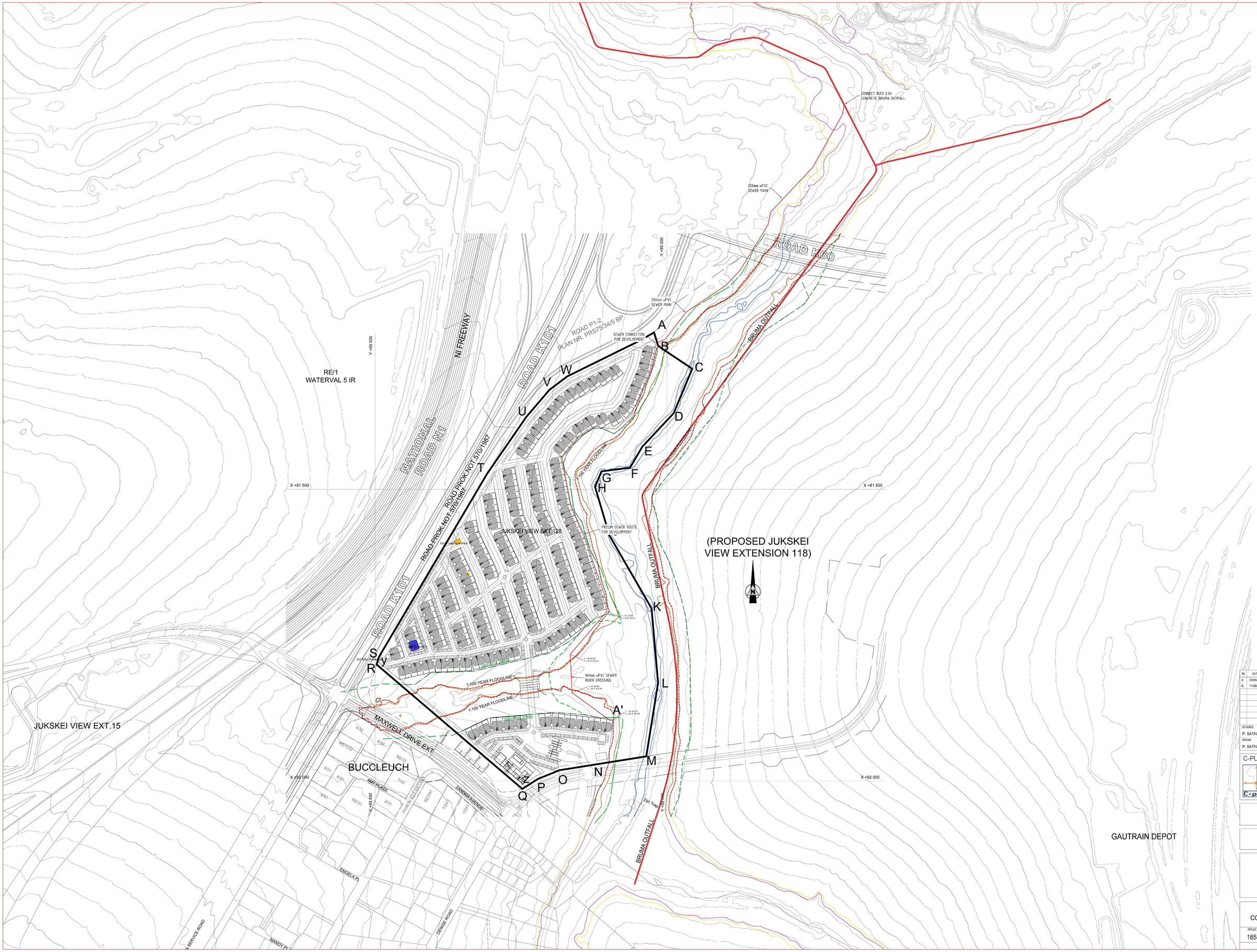
Jukskei View Extension 128

Ridges

Projection – Transverse Mercator
Datum- Hartebeeshoek 1994
Reference Ellipsoid –WGS 1984
Central Meridian -29



NO	DATE	REVISION
A	23/06/2016	ISSUED FOR INFORMATION
B	11/08/2016	

DESIGNED P. SATHABRIDGE	DATE 23/06/2016
DRAWN P. SATHABRIDGE	DATE 23/06/2016

C-PLAN CIVIL ENGINEERS (PT

459 Ontdekkers Road
Florida Hills
Roodepoort

P.O. B
Westg
1734

Tel: (011) 472 2277
Fax: (011) 472 2305

E-Mail: prasl
Web: www

CLIENT
BALWIN PROPERTIES

ARCHITECT / MAIN AGENT
LYT ARCHITECTURE

PROJECT
RESIDENTIAL 3 DEVELOPMEN
ON JUKSKEI VIEW
EXT. 128

DRAWING TITLE
SEWER
CONNECT INTO BRUMA OUT

PROJECT NO	DRAWING No
16532	300-P001

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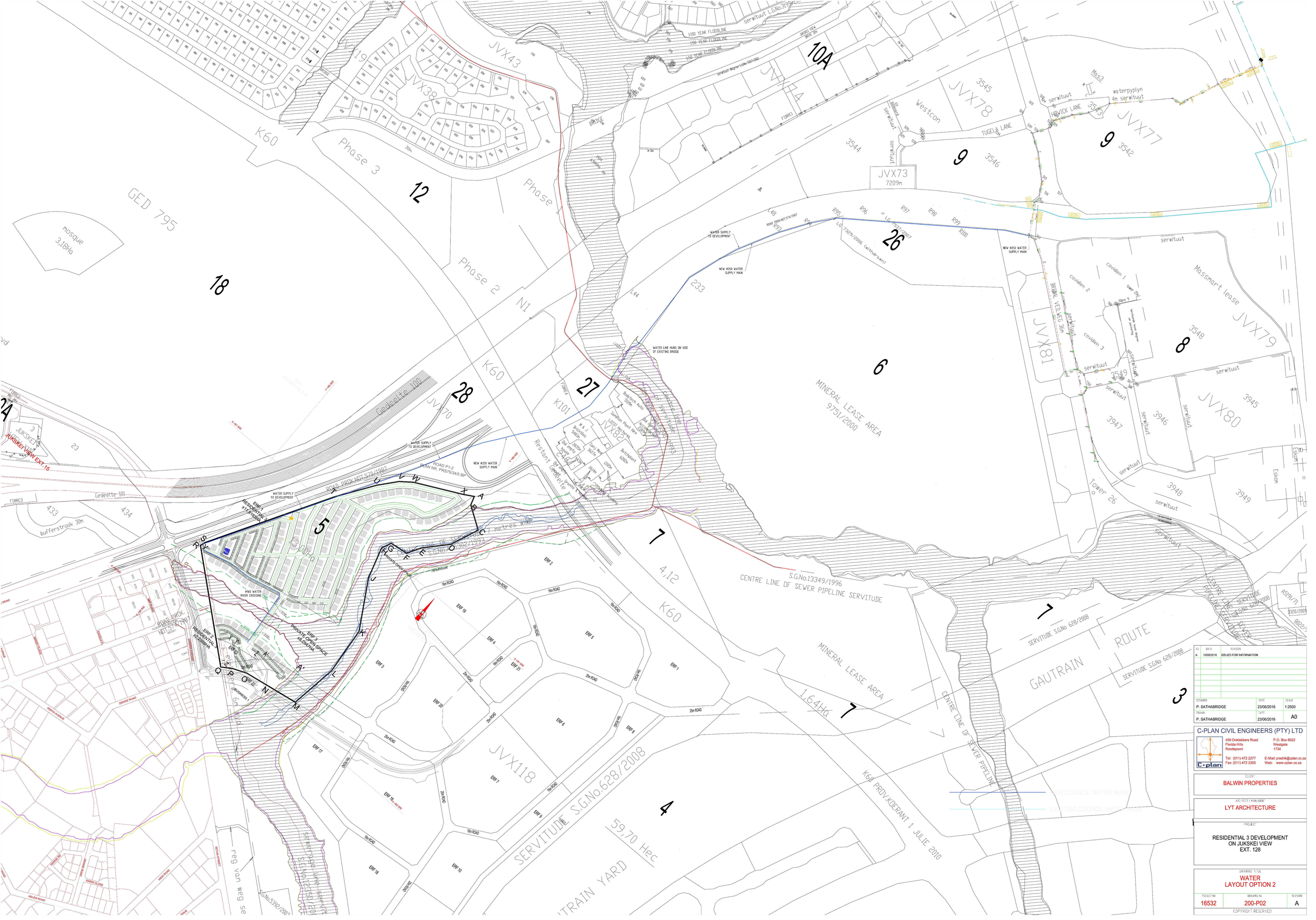
JUKSKEI VIEW EXT 15
K60
Phase 3
Phase 2
Phase 1
N1
GED 795
mosque
3,19Ha
18
12
JVX43
JVX38
JVX39
JVX70
JVX82
JVX118
JVX73
7209m
JVX78
JVX77
JVX79
JVX80
JVX81
10A
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28
233
Westcon
3544
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3542
3548
3549
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3946
3945
3948
3949
Eskom
HENWICK LANE
TUGELA LANE
serwituut
waterpyplyn
4m serwituut
Mast3
covidien 1
covidien 2
covidien 3
Tower 26
Tower 9
BRIBAL VEILWEG 36m
Massmart lease
MINERAL LEASE AREA
9751/2000
1,64Ha
59,70 Hec
TRAIN YARD
GAUTRAIN
ROUTE
SERVITUDE S.G.No 628/2008
CENTRE LINE OF SEWER PIPELINE SERVITUDE
S.G.No.13349/1996
CENTRE LINE OF SEWER PIPELINE SERVITUDE S.G.No.5382/2007
CENTRE LINE OF SEWER PIPELINE SERVITUDE S.G.No 628/2008
K60 PROV.KOERANT 1 JULIE 2010
EXISTING COUNCIL WATER MAIN
NEW COUNCIL WATER MAIN
WATER LINE HUNG ON SIDE OF EXISTING BRIDGE
NEW Ø250 WATER SUPPLY MAIN
WATER SUPPLY TO DEVELOPMENT
ROAD P1-2 PLAN NR. PRST634/5 BP
ROAD PRK.NO1 S70/1997
Gedeelte 101
FIBRE3
buffertrook 30m
JUKSKEI VIEW
ERF 1 RESIDENTIAL 3 3,1768HA
ERF 2 RESIDENTIAL 3 2,2288HA
ERF 3 PRIVATE OPEN SPACE 25,254HA
ERF 4 PRIVATE OPEN SPACE
Ø160 WATER RIVER CROSSING
ERF 5 PRIVATE OPEN SPACE
ERF 6 PRIVATE OPEN SPACE
ERF 7 PRIVATE OPEN SPACE
ERF 8 PRIVATE OPEN SPACE
ERF 9 PRIVATE OPEN SPACE
ERF 10 PRIVATE OPEN SPACE
ERF 11 PRIVATE OPEN SPACE
ERF 12 PRIVATE OPEN SPACE
ERF 13 PRIVATE OPEN SPACE
ERF 14 PRIVATE OPEN SPACE
ERF 15 PRIVATE OPEN SPACE
ERF 16 PRIVATE OPEN SPACE
ERF 17 PRIVATE OPEN SPACE
ERF 18 PRIVATE OPEN SPACE
ERF 19 PRIVATE OPEN SPACE
ERF 20 PRIVATE OPEN SPACE
ERF 21 PRIVATE OPEN SPACE
15m ROAD
20m ROAD
25m ROAD
1400 YEAR FLOOD LINE
150 YEAR FLOOD LINE
50 YEAR FLOOD LINE
Bridge
Bridge
Bridge

JUKSKEI VIEW EXT.15

BEN SCHOEMAN HIGHWAY

N1 FREEWAY

N1 FREEWAY NATIONAL ROAD N1

ROAD P12-2 @ PLAN NR. PR37/34/56P

ROAD K101

ROAD PROK NO1 5701/86P

ERF RESIDENTIAL 3 4.1855HA

ERF RESIDENTIAL 3 4.2288HA

ERF PRIVATE OPEN SPACE 35.0477HA

PROPOSED JUKSKEI VIEW EXTENSION 118)

PROPOSED NEW K60 ROUTE

PROPOSED NEW K101 ROUTE

GAUTRAIN DEPOT

BRUMA OUTFALL

SERVICE LINE OF SERVITUDE 7 metres wide

100 YEAR FLOODLINE

1:100 YEAR FLOODLINE

Ø160 WATER RIVER CROSSING

Ø200 WATER RIVER CROSSING

WATER SUPPLY TO DEVELOPMENT

NEW Ø200 WATER SUPPLY MAIN

BUCCLEUCH

WOODMEAD EXT.40

WOODMEAD EXT.24

EASTERN SERVICE ROAD

MAXWELL DRIVE EXT

DENNE AVENUE

PERTH AVENUE

DENRE ROAD

BROOK ROAD

MUTTY STREET

PARKVILLE ROAD

MULLER PLACE

MULLER STREET SOUTH

HELEN ROAD

NOLA AVENUE

MARGARET AVENUE

JUNE STREET

GILLIAN ROAD

ELIZABETH AVENUE

WENDY LANE

NEW COUNCIL WATER MAIN

EXISTING COUNCIL WATER MAIN

NO	DATE	REVISION
A	23/06/2016	ISSUED FOR INFORMATION
B	11/08/2016	UPDATED TO LATEST LAYOUT

DESIGNED	DATE	SCALE
P. SATHABRIDGE	23/06/2016	1:2500
DRAWN	DATE	
P. SATHABRIDGE	23/06/2016	A0

C-PLAN CIVIL ENGINEERS (PTY) LTD

459 Omtdekkers Road
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E-Mail: prashk@cplan.co.za
Web: www.cplan.co.za

CLIENT
BALWIN PROPERTIES

ARCHITECT / MAIN AGENT
LYT ARCHITECTURE

PROJECT
RESIDENTIAL 3 DEVELOPMENT
ON JUKSKEI VIEW
EXT. 128

DRAWING TITLE
WATER
LAYOUT OPTION 1

PROJECT NO	DRAWING No	REVISION
16532	200-P01	B

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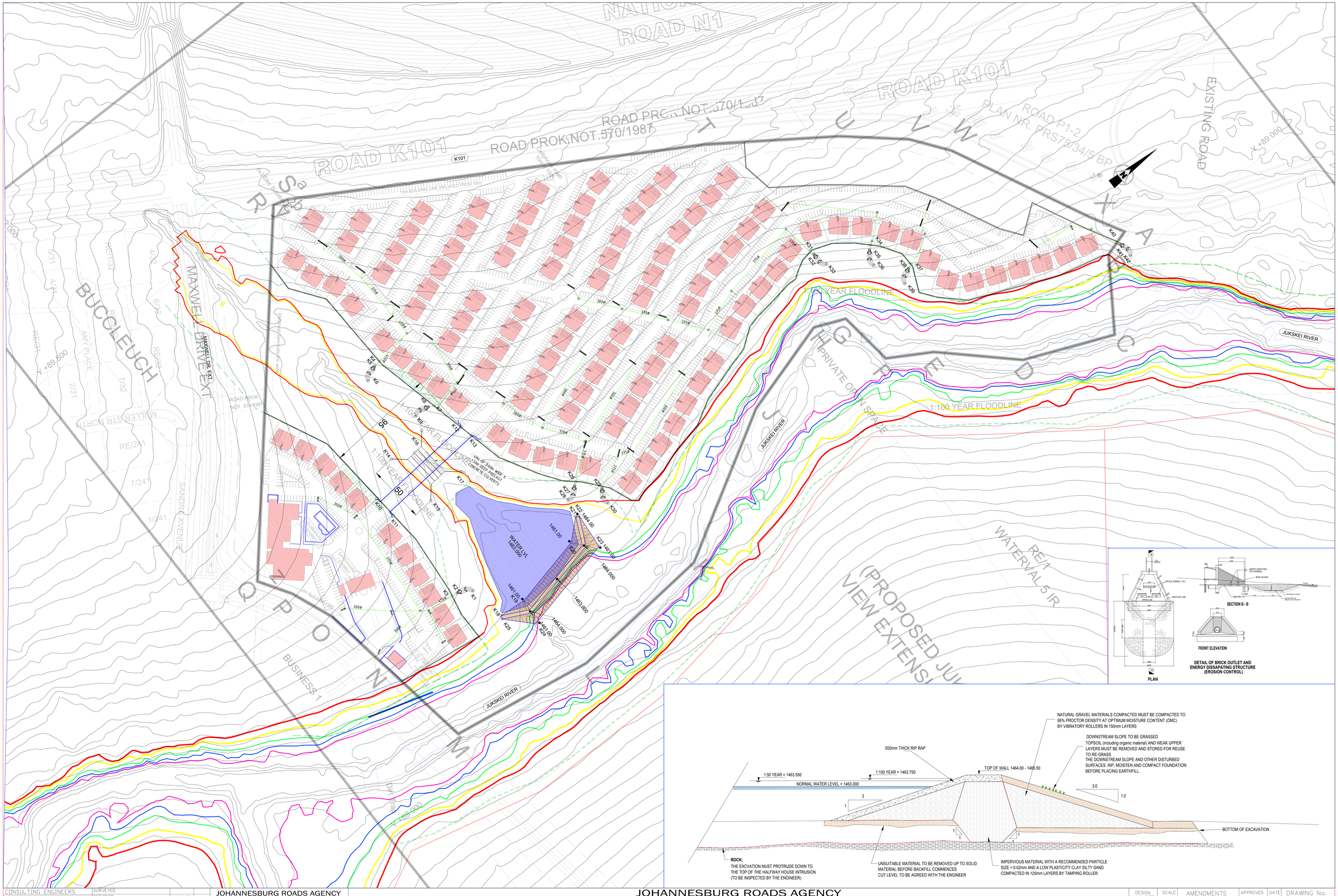
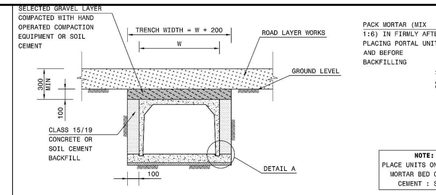

ROAD N1
ROAD K101
ROAD PROK.NOT.570/1987
ROAD PROK.NOT.570/1987
K101
ROAD P1-2
PLAN NR. PRST6734/5 BP
EXISTING ROAD
Y +89 000
Sa
R
V
BUCCLEUCH
MAXWELL DR EXT
MAXWELL DRIVE EXT
AMY PLACE
MILLERSTR NORTH
SANDRA AVENUE
BUSINESS 1
JUKSKEI RIVER
1:100 YEAR FLOODLINE
1:50 YEAR FLOODLINE
PRIVATE OPEN SPACE
JUKSKEI VIEW EXTENSION
(PROPOSED JUKSKEI VIEW EXTENSION)
RE/1 WATERVAL 5 IR
WATER LVL 1465.000
1464.00
1461.00
1464.000
1463.000
1465.000
1461.00
1461.000
1465.00
1465.00
1464.00
1461.00
1464.000
1463.000
1465.000
1461.00

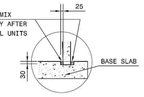
±11,8183HA

N

SETTING OUT TABLES		
POINT	X-COORD	Y-COORD
C1	2881879.296	89263.365
C2	2881814.647	89213.581
C3	2881850.789	89210.206
C4	2881855.439	89259.989



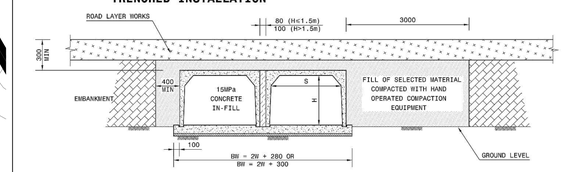
TRENCHED INSTALLATION



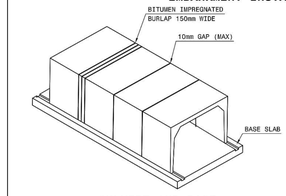
DETAIL A

NOTE:
PLACE UNITS ON A THIN
MORTAR BED OF 1:6
CEMENT : SAND

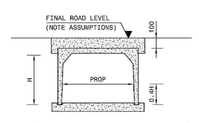
CULVERT SIZE.			FOUNDATION CONDITIONS 1 & 2		FOUNDATION CONDITIONS 3 & 4	
SPAN (mm)	x	HEIGHT (mm)	CLASS	FILL (m)	CLASS	FILL (m)
600	x	300		10.2		5.6
600	x	450	200 S	11.0	200 S	6.0
600	x	600		12.0		6.4
750	x	300		8.7		4.9
750	x	450	175 S	9.2	175 S	5.2
750	x	600		10.0		5.5
750	x	750		10.5		5.8
900	x	300		8.6		4.8
900	x	450		9.0		5.1
900	x	600	175 S	9.5	175 S	5.3
900	x	750		10.0		5.6
900	x	900		10.2		5.8
1200	x	300		7.1		4.1
1200	x	450		7.4		4.3
1200	x	600	150 S	7.7	150 S	4.4
1200	x	900		8.2		4.7
1200	x	1200		8.8		5.0
1500	x	300		4.5		2.9
1500	x	450		4.7		3.0
1500	x	600	100 S	4.9	100 S	3.1
1500	x	900		5.3		3.3
1500	x	1200		5.6		3.5
1500	x	1500		6.0		3.7
1800	x	600		3.3		2.4
1800	x	900		3.6		2.5
1800	x	1200	75 S	3.8	75 S	2.7
1800	x	1500		4.0		2.8
1800	X	1800		4.3		2.9
2100	x	600		3.3		2.4
2100	x	900		3.5		2.6
2100	x	1200	75 S	3.7	75 S	2.7
2100	x	1500		3.9		2.8
2100	x	1800		4.1		2.9
2100	x	2100		4.3		3.0
2400	x	600		3.2		2.4
2400	x	900		3.4		2.5
2400	x	1200	75 S	3.5	75 S	2.1
2400	x	1500		3.7		2.9
2400	x	1800		3.8		2.8
2400	x	2400		4.0		3.0
3000	x	600		3.1		2.4
3000	x	900		3.2		2.5
3000	x	1200		3.3		2.6
3000	x	1500	75 S	3.4	75 S	2.7
3000	x	1800		3.5		2.7
3000	x	2400		3.7		2.9
3000	X	3000		3.1		2.7
3600	x	600		3.1		2.4
3600	x	900		3.1		2.5
3600	x	1200		3.2		2.6
3600	x	1500	75 S	3.3	75 S	2.6
3600	x	1800		3.3		2.7
3600	x	2400		3.5		2.8
3600	X	3000		3.5		2.7



EMBANKMENT INSTALLATION



CULVERT AND BASE CONFIGURATION



NOTE :
FOR H>1.5m PROVIDE HORIZONTAL PROPS
AT 0.4 x HEIGHT ABOVE BASE DURING
BACKFILLING AND COMPACTION. ONE PROP
PER PRECAST UNIT

TEMPORARY PROPPING ARRANGEMENT

TABLE 1. Maximum fill height on S-load culverts under SNABC traffic loading

REFERENCE DRAWINGS

THIS DRAWING FORMS PART OF AND MUST BE READ IN CONJUNCTION WITH TYPICAL DRAWINGS TD-S-C-001 & TD-S-C-002

NOTES
PERMISSIBLE FILL HEIGHTS
THE RELATIONSHIP BETWEEN THE S-LOAD CULVERT CLASSES DEFINED IN SANS 986 AND THE CORRESPONDING MAXIMUM PERMISSIBLE FILL HEIGHTS TO MEET THE TMH7 REQUIREMENT WAS CALCULATED AND IS GIVEN IN TABLE 1. IF CULVERTS ARE TO BE PLACED UNDER HIGHER FILLS THAN THOSE GIVEN IN THIS TABLE THEN A HIGHER S-LOAD CLASS MUST BE SPECIFIED.

DEFINITIONS
YIELDING FOUNDATION CONDITIONS OCCUR WHEN THE FOUNDING MATERIAL AND THE FILL MATERIAL ARE EXPECTED TO SETTLE AT EQUAL RATES (COMPRESSIBLE MATERIAL). THE LOADING IS CALCULATED IN ACCORDANCE WITH TMH7 PART 2 CLAUSE 2.3.3.2(2).

UNYIELDING FOUNDATION CONDITIONS OCCUR WHEN THE FOUNDATION MATERIAL IS INCOMPRESSIBLE (SOFT ROCK OR OTHER HARDER MATERIAL). THE LOADING IS CALCULATED IN ACCORDANCE WITH TMH7 PART 2 CLAUSE 2.3.3.2(3) AND (4).

TRENCH CONDITION OCCURS WHEN CULVERTS ARE LAID IN A NARROW EXCAVATION AND BACKFILLED TO GROUND LEVEL

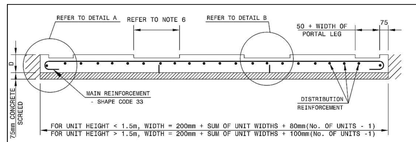
EMBANKMENT (UNTRENCHED) CONDITION OCCURS WHEN CULVERTS ARE LAID AT GROUND LEVEL AND BACKFILLED TO FINAL FORMATION LEVEL.

THE COMBINATIONS OF FOUNDATION AND INSTALLATION CONDITIONS USED IN TMH7 ARE DEFINED AS;
CONDITION 1: CULVERTS IN TRENCH IN UNYIELDING FOUNDATION WITH NO PROJECTION.
CONDITION 2: CULVERTS UNTRENCHED ON YIELDING FOUNDATION.
CONDITION 3: CULVERTS UNTRENCHED ON UNYIELDING FOUNDATION FOR h > 1.7b
CONDITION 4: CULVERTS UNTRENCHED ON UNYIELDING FOUNDATION FOR h <1.7b

WHERE h = FILL HEIGHT IN METRES (ABOVE UNIT)
b = OVERALL TRENCH WIDTH OR, IF UNTRENCHED, OVERALL CULVERT WIDTH, IN METRES.

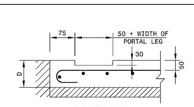
ASSUMPTIONS
THE FOLLOWING ASSUMPTIONS AND CLAUSES OF TMH7 PART 1 AND 2 WERE USED TO COMPILE TABLE 1

- A MINIMUM FILL HEIGHT OF 300mm OVER THE CULVERT UNITS. WHERE THIS CANNOT BE ACHIEVED A 100mm REINFORCED CONCRETE SLAB MUST BE USED.
- STANDARD TRAFFIC LOADING (SNABC) AS DESCRIBED IN CLAUSE 2.6.1.2.
- FILL MATERIAL UNIT WEIGHT 20kN/m³[CLAUSE 2.3.1]
- CONCRETE UNIT HEIGHT 24kN/m³[CLAUSE 2.2.1]
- HORIZONTAL EARTH PRESSURE 7.8kN/m² PER METRE DEPTH [CLAUSE 2.4.2]
- ULTIMATE LIMIT STATE LOAD FACTORS TABLE 7.



TYPICAL SECTION THROUGH CULVERT SHOWING FLOOR SLAB REINFORCEMENT

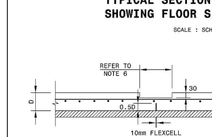
SCALE : SCHEMATIC



DETAIL A

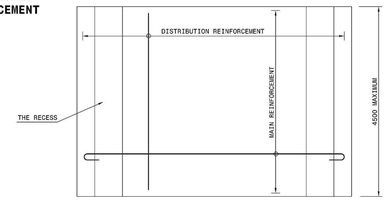
SCALE : SCHEMATIC

NOTES:
1. CONCRETE CLASS 30/19.
2. MINIMUM COVER TO REINFORCEMENT IS 50mm.
3. ALL MAIN REINFORCEMENT TO BE FULLY ANCHORED BOTH SIDES.
4. STOOLS SHALL BE PROVIDED TO SUPPORT THE REINFORCEMENT WHERE THE SPAN OF THE PORTAL IS GREATER THAN 1 200mm.
5. THE COMBINATIONS OF FOUNDATION AND INSTALLATION CONDITIONS USED ARE DEFINED AS FOLLOWS:
   CONDITION 1: CULVERTS IN TRENCH ON UNYIELDING FOUNDATION WITH NO PROJECTION.
   CONDITION 2: CULVERTS UNTRENCHED ON YIELDING FOUNDATION.
   CONDITION 3: CULVERTS UNTRENCHED ON UNYIELDING FOUNDATION FOR h > 1.7 x b.
   CONDITION 4: CULVERTS UNTRENCHED ON UNYIELDING FOUNDATION FOR h < 1.7 x b.
   WHERE h = FILL HEIGHT IN METRES
   b = OVERALL TRENCH WIDTH OR, IF UNTRENCHED, OVERALL CULVERT WIDTH, IN METRES.
6. FOR H < 1.5m, THE WIDTH = 130mm + 2 x WIDTH OF PORTAL LEG, FOR H > 1.5m, THE WIDTH = 150mm + 2 x WIDTH OF PORTAL LEG.



DETAIL B

SCALE : SCHEMATIC

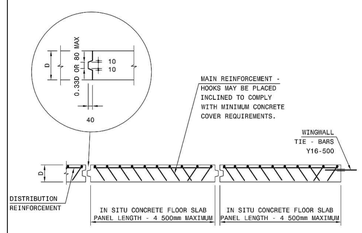


PLAN VIEW FOR SLAB REINFORCEMENT

SCALE : SCHEMATIC

TYPICAL SECTION THROUGH FLOOR SLAB REINFORCEMENT

SCALE : SCHEMATIC



JOINT DETAILS BETWEEN FLOOR SLAB SECTIONS

SCALE : SCHEMATIC

	FOUNDATION CONDITIONS 1 & 2				FOUNDATION CONDITIONS 3 & 4			
	TRENCHED ON UNYIELDING AND UNTRENCHED ON YIELDING				UNTRENCHED ON UNYIELDING			
SPAN (mm)	CLASS	FLOOR THICKNESS D - (mm)	MAIN REINFORCEMENT	DISTRIBUTION REINFORCEMENT	CLASS	FLOOR THICKNESS D - (mm)	MAIN REINFORCEMENT	DISTRIBUTION REINFORCEMENT
600	200 S	150	Y12-150	Y10-250	200 S	150	Y10-200	Y10-250
750	175 S	150	Y12-150	Y10-250	175 S	150	Y10-200	Y10-250
900	175 S	150	Y12-120	Y10-250	175 S	150	Y10-200	Y10-250
1200	150 S	160	Y12-100	Y10-200	150 S	160	Y12-200	Y10-200
1500	100 S	175	Y12-100	Y10-200	100 S	175	Y12-200	Y10-200
1800	75 S	190	Y12-100	Y10-200	75 S	190	Y12-200	Y10-200
2100	75 S	220	Y12-100	Y10-200	75 S	220	Y12-200	Y10-200
2400	75 S	260	Y12-100	Y10-200	75 S	260	Y12-100	Y10-200
3000	75 S	320	Y16-120	Y10-200	75 S	320	Y16-200	Y10-200
3600	75 S	330	Y16-100	Y10-200	75 S	330	Y16-200	Y10-200

REFERENCE DRAWINGS

THIS DRAWING FORMS PART OF AND MUST BE READ IN CONJUNCTION WITH TYPICAL DRAWINGS TD-S-C-002

THE PURPOSE OF THE CULVERT IS TO SPAN AN EXISTING WATER WAY. THE CULVERT WILL PROVIDE ACCESS FOR VEHICULAR AND PEDESTRIAN TRAFFIC TO THE PROPOSED DEVELOPMENT OF JUKSKEI VIEW EXT 128. A SURFACED ROADWAY WITH PEDESTRIAN SIDEWALKS WILL BE CONSTRUCTED ON THE CULVERT.

NO	DATE	REVISION
A	11/05/2016	ISSUED FOR INFORMATION

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CHECKED: K.C. OOUKAAS
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ARCHITECT / MAIN AGENT:
PROJECT: JUKSKEI VIEW EXT 128 KIKUYU RESIDENTIAL 3 DEVELOPMENT
DRAWING TITLE: RIVER CROSSING
SHEET: SHEET 1 OF 1
DRAWING No.: 16532-100-P001
REVISION: A

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