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Environmental Assessment Practitioner:

As per the requirements of the National Environmental Management Act: NEMA, 1998 (Act No.107 of 1998), (NEMA) and the Environmental Impact Assessment Regulations, 2010 (Government Notice No's R544, 545 and 546 of 2010), the following information is pertinent with regards to the Environmental Assessment Practitioner (EAP) that has been appointed for the Scoping and Environmental assessments for the establishment of a residential township on the remaining extent of Portion 37 of the Farm Tamboekiesfontein 173 IR, Germiston, Gauteng.

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Qualifications and Relevant Expertise:

- M Sc Environmental Management (RAU)
- B Art. et Scientae (Town and Regional Planning) (PU for CHE)
- Registration as Member of IAIA – in process
- Relevant Expertise – see attached company profile

TABLE OF CONTENTS

E EXECUTIVE SUMMARY

E1 INTRODUCTION

Inframax Holdings (Pty) Ltd instructed W & L Consultants cc, independent consultants, to proceed with the appropriate Environmental Impact Assessment (EIA) Process for the proposed development of mixed income housing situated on the remaining extent of Portion 37 of the Farm Tamboekiesfontein, 173 IR, Germiston.

E2 GENRAL PROJECT DESCRIPTION

The site is located within service delivery area of Germiston and falls under the jurisdiction of the Ekurhuleni Metropolitan Municipality. The site is zoned 'Undetermined' and it is the intension of the applicant to develop an inland port on the site. The site is located within the jurisdiction of Ekurhuleni Metropolitan Municipality, Germiston Service Center. More specifically the site is located west of the N3, directly east and adjacent to Magagula Heights. The residential area of Zonkizizwe is located north west of the site with Katlehong South directly north of the site. The proposed township will consist of, (1) the upgrading of the engineering infrastructure to accommodate the proposed development, (2) The development will comprise of erven zoned "Special" to accommodate the following land uses (a) manufacturing, warehousing, distribution, business and retail, an intermodal yard, which will include a rail siding, storage facilities, bonded logistics and other such uses associated with an inland port, logistics hub and rail terminal. More specifically the land composition will be as follow:

Proposed Land Use	Area Hectare
Industrial/Warehousing	114.1479
Intermodal yard	32.0171
Logistics	176.4498
Non Developable land	14.4376
Roads	59
Trucking Intermodal yard	42.8174
Wetland Area/Open Space	111.1059
Servitude Power Line	28.0157
Servitude Rail	47.5307
TOTAL	**626.669**

The development will take place over a period of 8 years will be in extent of ±627.485ha for the Inframax Landholding site. The proposed development forms part of a master plan for the larger area where the Inframax Landholding site is seen as phase 1 of the larger development. The land distribution across the total developable area is as follow:

Landholding	Gross Area (ha)
Land A: Inframax Landholding *(Phase 1)*	627.485
Land B: Possible Expansion Area	420.732
Land C: Cemetery	154.250
Land D: Adv. Du Plessis Landholding	401.948
TOTALS	1 604.415

Phase 1 (Inframax Land Holding) will be developed in two stages:

- Stage 1: year 1 to year 5 - this stage will include the development of the truck and Intermodal yard and expected TEU's for container terminal, i.e. 1, 000,000TEU's and the expected pallets, i.e. 4, 500,000 pallets. The estimated development size is 406,754.10m²
- Stage 2: year 6 – year 8 – this stage will consist of the Development of industrial / warehousing. The estimated development size is 737,879.86m².

The total development is planned on a 1000 hectare site and projected on a 15 year timeframe (to completion). This report only assessed the activities to be developed on the Inframax Land Holding that constitutes phase 1 of the total development.

The proposed activities and infrastructure will be developed and constructed in terms of the land use controls formulated specifically for the project. The sensitive nature of portions of the site was taken into consideration from the inception of the project and the layout plan takes into account the sensitive areas identified within the various ecological studies undertaken.

E3 KEY ISSUES

Risks and Key issues were identified and addressed in consultation with Interested and Affected Parties, through an internal process based on similar developments, an environmental impact assessment and a site visit. The following key issues were identified:

- Contamination of ground and surface water;
- Increased surface water runoff;
- Impacts on air quality;
- Increased erosion;
- Floral destruction;
- Faunal displacement and destruction;
- Impact on the sensitive wetland system;
- Economic and Social Impact on existing communities located on a portion of the site and within the larger area;
- Impact on sites of Heritage Value
- Visual intrusion;
- Increase in Traffic Volume;
- Increase in ambient noise levels;
- Crime, Safety & Security risks; and
- Noise pollution

Each issue was assessed and mitigatory measures proposed to such an extent that impacts were minimised or negated.

E4 IMPACT EVALUATION

Each issued identified was evaluated in terms of the most important parameters applicable to environmental management. These include the: *nature, extent, duration, intensity, probability* and *significance* of the potential impact on the environment.

Potential Negative Impacts include:

- *Contamination of ground and surface water* may result due to the deposition of contaminants during the construction phase and the possibility of sewerage leaks, diesel/oil spills during the operational phase. Mitigation measures proposed reduce the significance to "low".
- *Increased surface water runoff* and *erosion* as a result of vegetation clearance and the disturbance of soil during the construction phase. The implementation of mitigation measures reduces the significance rating to "medium to low".

  However potential increase in surface runoff during operation phase due to the lack of vegetation and the presence of hard open spaces is considered to be "high". The implementation of mitigation measures reduces the significance rating to "medium".

- *Impacts on air quality* are related to a direct increase in vehicular and rail activity in the area. The significance rating is "medium".
- *Floral destruction and Faunal displacement and destruction*. Specialist studies conducted indicated that:

  A large section of the site is sensitive. It is recommended that the wetland and its 200m buffer for red listed avifauna, the red listed plant and its 200m buffer as well as a large portion of the natural grassland must be conserved in an open space system. The area to be conserved is depicted in the overall sensitivity map above that includes sensitive areas for African Grass owls, African Marsh Harriers, Harlequin snakes, wetland reliant mammals and the red listed plant species.

  Conclusion: When the layout plan is overlain with the environmental sensitivity map, it is clear that most of the wetland and surrounding buffer areas were excluded from the proposed development. The grassland area to be conserved is however small, but should be seen together with the open space areas on the layout map for the neighbouring site to the east. Therefore the significance rating is "medium".

- *Visual intrusion & Aesthetic impacts* as a result of construction activities, would impact mostly on the adjacent residential areas and agricultural holdings. The implementation of mitigation measures reduces the significance rating to "low" during the construction phase. During the operational phase the buildings will adhere to all design criteria and

therefore the significance rating for the operational phase is viewed as "low".

- *Noise impact* from construction vehicles and construction activities. Mitigation measures including a restriction of the times within which construction activities may take place will reduce the significance to "low".
- *Traffic impacts* as a result of construction vehicles accessing the site. This impact will have a "medium" significance due to, firstly, the increase in the number of vehicles due to the delivering of construction material to the site and secondly, the expected increase in of traffic on the road network during the operational phase.
- *Noise pollution* the expected rise in the ambient noise levels are minimal and will not have a significant impact on noise levels within the area.
- *Three Sites of Heritage Value* was identified namely: Two old cemeteries, which are rated as having high significance on a local level and an old farmstead, which is rated as having high significance on a regional level. Mitigation measures proposed: (1) The graves of the Vermeulen Family (Cemetery nr 1) should be relocated to a formal cemetery due to the level of neglect and disturbance found during the survey. (2) The large informal cemetery (Cemetery nr 3) should be retained as it is still used or the graves could be relocated with permission from SAHRA. (3) The old farm stead should be mapped and formally documented by a Heritage Architect. Permission for demolish to be obtained from SHARA. The significance rating for cemetery nr 1 and the farmstead for the construction phase is viewed as "high" as it falls within the area to be developed during stage 1 of the development phase. The significance rating for cemetery nr 2 is "medium" as it is located within the area to be developed during stage 2 of the development phase. The significance rating for the heritage features during the operation phase is "low" – issues will be resolved and the necessary mitigatory measures would have been implemented.
- *Social Impact study* indicated that the anticipated negative impacts during pre-construction relate to the possible movement of work-seekers into the area and the physical and economic displacement of the Thulasizwe community. The significance rating for the pre-construction phase is "high".

Negative impacts identified during the construction phase are mainly (1) health and safety issues (road, pedestrian safety and the potential increase in HIV/AIDs and STDs); (2) community

disruption (as a result of work seekers in migrating from other parts of the country) and (3) the existing community's perception of having non-local workers in the area. The significance rating for the construction phase is "medium" and mitigation measures will be proposed and implemented.

Potential Positive Impacts include:

- *Vacant land poses a threat to safety and security within the area*. The proposed development will contribute to the prevention of crime and ensure a more safe and secure neighbourhood.
- *The proposed development is inline with the Regional Spatial Development Framework* formulated for the Region. The site is located within the provincial and local urban development boundary.
- *As a result of the resource constraints facing Municipalities*, it has been recognised that development driven by the private sector can help support and secure isolated areas such as the site for conservation and sustainable economic development.
- *Job provision* – the economic feasibility study indicated that the construction phases create ± 81 000 jobs (still to be verified) and against the three million formal jobs in Gauteng, 5 400 jobs secured per annum amounts to 0.18% jobs retained/secured. However, over a 15 year period, this would amount to a total of 2.7% jobs retained/secured against the Gauteng employment base within the first year of the Inland Port's operation.
- *The projected increase in Gauteng's GGP* is estimated to be 6.4% as an indication of the actual quantity of the economic value added over the period.
- *Impact on the Construction Industry* – the R 7.5billion investment over a period of 15 years will contribute to a 2% increase in out put of this sector and is viewed as extremely positive.
- *Property rates and taxes* - Based on current municipal property rates, it is estimated that R150 million could be generated in property rates and taxes to the Ekurhuleni Metropolitan Municipality emanating from the Tambo Springs Inland Port development. This results in a 5% increase on the current property rates and taxes income of the municipality and is rated as significantly positive;
- *Upgrade and improve* the existing municipal infrastructure and ensure effective stormwater management within an area that is lacking in services.
- According to reports written by the Centre for Scientific and Industrial

Research (CSIR) this development will enhance SA‟s logistics competitiveness significantly.

E5 CONCLUSIONS

The "No-Go" scenario is not regarded as an option as the site will be further disturbed and, if left in its current state, the environmental quality of the site will deteriorate.

The opinion is held that the proposed township establishment and resulting planned development of the site, should be viewed as the mechanism that will ensure the quality of the surrounding natural environment is upgraded and protected. The challenge for the developer is therefore to achieve an acceptable balance between appropriate, environmentally responsible development and financial return.

The conclusion and recommendations of this environmental impact assessment study is therefore made in terms of the existing status quo of the site as well as the perceived uses allocated to the site through the township establishment application. The potential environmental impacts associated with the proposed development, are summarised in Table 11 through the Table 27 in terms of extent, duration, intensity, probability, significance and status. Mitigatory measures have been identified, and discussed per potential impact identified.

In summary it is clear that there are potential impacts associated with the proposed development. Taking into account the current state of the natural environment, and mitigation methods proposed, it is concluded that the potential impacts associated with the proposed development can be mitigated successfully.

It can therefore be concluded that (a) the proposed development will have potential impact on the environment and all potential impacts can be mitigated to an acceptable level, (b) from a socio-economic point of view the proposed development will be economically viable and sustainable, (c) the proposed land uses will stimulate much needed job creation and investment in an area currently isolated from the major sectors of employment. The development option is therefore considered to be the most suitable option for the site and (d) it adheres to the policy of infill development and the creation of a small compact urban form.

Table E1: Summary of Construction Impact Ranking

Impact Indicator	Spatial Scale	Duration	Intensity	Cumulative Effects	Probability of Occurrence	Significance without Mitigation	Significance with Mitigation
Air Quality	Local	Short term	High	Medium to high	Definite	Medium	Low
Stormwater	Local	Short term	High	Medium	Definite	Medium	Low
Traffic	Local	Short term	High	High	Definite	Medium	Medium
Socio Economic	National	Short term	High	Medium - Low	Definite	High	High
Ecological	Local	Short term	High	High	Definite	Medium	Medium - Low
Wetland System	Local	None	Low	None	Probable	High	Medium

Shaded impacts require mitigation

Table E2: Summary of Operational Impact Ranking

Impact Indicator	Spatial Scale	Duration	Intensity	Cumulative Effects	Probability of Occurrence	Significance without Mitigation	Significance with Mitigation
Air Quality	Local	Long term	High	Medium to high	Definite	Low	Low
Stormwater	Local	Long term	High	Medium	Definite	Medium	Medium
Traffic	Local	Long term	High	High	Definite	Medium	Medium
Socio Economic	National	Long term	High	Medium - Low	Definite	Medium	Low
Ecological	Local	Long Term	Medium	Medium	Definite	Low	Low
Wetland System	Local	None	Low	None	Improbable	Medium	Low

Shaded impacts require mitigation

TABLE OF CONTENTS

1 INTRODUCTION 6
1.1 Introduction 6
1.2 Overall Approach 8
1.3 Terms of Reference 9
1.4 Study Approach 10
1.5 Purpose of the Environmental Impact Assessment Report 10
1.6 Assumptions & Limitations 11
2 PROJECT DESCRIPTION 12
2.1 Location of Site 12
2.1.1 Regional Setting 12
2.1.2 Local Setting 13
2.2 Property Particulars 14
2.2.1 Description 14
2.2.2 Registered Owner 14
2.3 Activity to be Undertaken 14
2.3.1 Description of Phase of proposed Development 15
2.3.2 Town Planning 16
2.3.3 Estimated Time Frames for Construction 17
3 PUBLIC PARTICIPATION PROCESS 19
3.1 Description of Public Participation Process 19
3.2 Interested and Affected Parties 20
3.3 Conclusions 25
4 BIOPHYSICAL DESCRIPTION OF THE SITE 26
4.1 Physical Features and Characteristics 26
4.1.1 Regional Climate 26
4.1.2 Rainfall 26
4.1.3 Temperature 27
4.1.4 Wind 27
4.2 Natural Ecosystems and Habitats 27
4.2.1 Topography 27
4.2.2 Geology and Soils 27
4.2.3 Surface Water 29
4.2.4 Groundwater and Water Table 30
4.2.5 Air Quality 30
4.2.6 Noise 30
4.2.7 Conservation Areas 30
5 BIOLOGICAL FEATURES AND CHARACTERISTICS 32
5.1 Flora & Fauna 32

5.2 Wetland Delineation and Aquatic Assessment 39
5.5 Cultural Features & Characteristics 41
6 SOCIO-ECONOMIC FEATURES AND CHARACTERISTICS 43
6.1 Town Planning Assessment 43
6.2 Socio-Economic Impact Analysis 49
6.3 Engineering Services 52
6.4 Sense of Place 59
6.5 Traffic & Accessibility 61
6.6 Sensitivity Analyses 62
6.7 Visual Environment 64
6.7.1 Visibility 644
6.7.2 Design 66
6.8 The Advantages of the Proposed Development 66
6.9 Sustainability 68
6.10 Agricultural Potential 68
7 CONSIDERATION OF PROJECT ALTERNATIVES 69
7.1 Localtional Alternatives 69
7.2 Temporal Alternatives 69
7.3 Construction Alternatives 70
7.4 Layout Alternative 70
7.5 No-Go Option 70
8 ENVIRONMENTAL IMPACT ASSESSMENT 73
8.1 Cumulative Effects 73
8.2 Assessment Criteria for Impacts Identified 73
8.2.1 Nature 73
8.2.2 Extent 74
8.2.3 Duration 74
8.2.4 Intensity 74
8.2.5 Probability 75
8.2.6 Significance 75
9 ASSESSMENT OF POTENTIAL IMPACTS ON THE ENVIRONMENT 76
9.1 Environmental Impact Assessment 77
9.1.1 Air Quality 77
9.1.2 Heritage Assessment 78
9.1.3 Ecological Systems 80
9.1.4 Faunal Abundance & Diversity 82
9.1.5 Floral Abundance & Diversity 86
9.1.6 Wetland Delineation & Aquatic Assessment 89

9.1.7 Geology 93
9.1.8 Ground Water 94
9.1.9 Land Use 95
9.1.10 Land Use Alternative 97
9.1.11 Mining Area 97
9.1.12 Open Space 97
9.1.13 Public Response 99
9.1.14 Social Issues 100
9.1.15 Traffic & Infrastructure 102
9.1.16 Surface Water 104
9.1.17 Topography 105
9.1.18 Visual Imapcts 105
9.1.19 Waste Management 107
9.1.20 Cumulative Impacts 108
9.1.21 Residual Impacts 109

10 ENVIRONMENTAL IMPACT STATEMENT 110

11 CONCLUSION 113

LIST OF TABLES

Table 1:	List of Professional Team Members
Table 2:	Proposed Activities
Table 3:	Total Area of Proposed Development
Table 4:	Interested and Affected Parties Identified
Table 5:	Climate of the Germiston
Table 6:	Specialists used
Table 7:	Expected Terminal Capacity
Table 8:	Visual Impact Assessment
Table 9:	Comparative Assessment: No-Go Option and Environmental Costs
Table 10:	List of Environmental Impacts with possible relevance to the Project
Table 11:	Impact Summary Matrix for Air Quality
Table 12:	Impact Summary Matrix for Heritage Assessment
Table 13:	Impact Summary Matrix for Ecological Systems
Table 14:	Impact Summary Matrix for Fauna
Table 15:	Impact Summary Matrix for Flora
Table 16:	Impact Summary Matrix for Wetland Delineation & Aquatic Assessment
Table 17:	Impact Summary Matrix for Geological Conditions
Table 18:	Impact Summary Matrix for Ground Water
Table 19:	Impact Summary Matrix for Land Use

Table 20:	Impact Summary Matrix for Open Space
Table 21:	Impact Summary Matrix for Public Response
Table 22:	Impact Summary Matrix for Social Issues
Table 23:	Impact Summary Matrix for Traffic and Infrastructure
Table 24:	Impact Summary Matrix for Surface Water
Table 25:	Impact Summary Matrix for Potential Visual Impact
Table 26:	Impact Summary Matrix for Waste Generation
Table 27:	Impact Summary Matrix for Cumulative Impacts
LIST OF ANNEXURES	
Annexure A:	MAPS Locality Map Aerial Photographs
Annexure B:	Correspondence with GDARD
Annexure C:	Specialist Report - Geotechnical Report Specialist Report - Engineering Services Report Specialist Report - Fauna & Flora Wetland Delineation & Aquatic Assessment Specialist Report - Heritage Assessment Specialist Report - Socio-Economic Impact Analysis Specialist Report - Traffic Impact Study
Annexure D:	Public Participation
Annexure E:	Correspondence received from Government Departments & Stakeholders
Annexure F:	Township Layout Plan
Annexure G:	EMP

1 INTRODUCTION

1.1 Introduction

Inframax Strategic Properties (Pty) Ltd appointed W & L Consultants cc to obtain authorisation in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) as per Regulation 21(3) of Environmental Impact Assessment Regulations, 2010. The proposed activity is situated on the remaining extent of Portion 37 of the Farm Tamboekiesfontein 173 IR, Germiston, Ekurhuleni Metropolitan Municipality, hereafter referred to as the site. The site is zoned 'Undetermined' and it is the intension of the applicant to develop an inland port on the site.

More specifically the project is a freight transport and logistics focused development including:

- An intermodal yard with rail access;
- A value added logistics park as an economic development zone forming part of a sea, air, road, rail logistics gateway, with a focus on accommodating businesses involved in the transportation, processing, manufacture, warehousing and distribution functions;
- An ancillary business park accommodating a commercial development component; and
- The development of a retail support component for the above.

The aim of the proposed Logistics Hub and Inland Port is to increase freight handling efficiency and to create an international competitive environment. To achieve this, a requirement is that the most advanced telecommunications backup is available, including high speed broadband and sophisticated IT systems; and supporting bulk infrastructure including water, electricity, roads, rail, etc.

The site is located within a sensitive environment and various environmental, social and heritage constraints were identified. It is therefore the intension of the applicant to proactively plan for the utilisation of the site ensuring the protection of the various sensitive systems and the effective utilisation of the site.

The site is located within the Germiston service delivery area of Ekurhuleni Metropolitan Municipality.

The proposed development will take place in the form of a township establishment application. The establishment of a township will allow the zoning of the site to change from 'Undetermined'

to accommodate the following activities on the site:

Proposed Land Use	Area Hectare
Industrial/Warehousing	114.1479
Intermodal yard	32.0171
Logistics	176.4498
Non Developable land	14.4376
Roads	59
Trucking Intermodal yard	42.8174
Wetland Area/Open Space	111.1059
Servitude Power Line	28.0157
Servitude Rail	47.5307
TOTAL	**626.669**

Wary of the sensitivities associated with these types of developments it is the intension to support the overall conservation aims of Gauteng Department of Agriculture and Rural Development (GDARD) and the local authority, whilst strengthening the economic value of the area.

W & L Consultants was appointed to undertake an Environmental Impact Assessment Study for the proposed Tambo Springs Inland Port development. The environmental assessment was done by means of an independent investigation of all the environmental issues associated with the project. The aim of the investigation was to identify and evaluate the opportunities that the natural environment offers to the development and the constraints that it imposes. The Environmental Impact Assessment Process is seen as a structured proactive process that strengthens the role of the environmental issues in strategic decision-making, and recognises the need to integrate environmental considerations into the early stages of the planning process.

The EIA procedure followed to date is in terms of the provisions of the Environmental Impact Assessment (EIA) process as per the National Environmental Management Act: NEMA, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations of 2010 (Government Notice No's R544, 545 and 546 of 2010), governed by the Gauteng Department of Agriculture and Rural Development (GDARD). The process entailed the submission of a Scoping Report and a Plan of Study for Environmental Impact Assessment on 20 October 2011. The documents were reviewed by GDARD (**Annexure B**) and subsequently approved on 31 October

2011. The various issues identified in the Plan of Study for full Environmental Impact Assessment will be addressed in the Environmental Impact Assessment Report.

1.2 Overall approach

The overall approach included the use of a multi-disciplinary team of experts, including relevant specialists. The project team, including specialists comprised of the following:

Table 1: List of Professional Team Members

Name	Organisation	Area of Expertise
Liselle van Niekerk	W and L Consultants cc	Environmental Management
Leon Boshoff	Bigen Africa Engineering Solutions	Engineering Services
Alex van der Schyff	Aeterno Town Planning	Town Planning
Philemon Namane	Mpotseng Infrastructure	Traffic Impact Study & Electrical Report
Vanessa Marais	Galago Environmental	Fauna and Floral Specialists
A Koning & D Botha	Prism Environmental	Wetland Delineation, Classification, Aquatic Study & Impact Assessment
	Intraconsult Cc	Geotechnical Investigation
Kim Moonsamy	Blue IQ Investment Holdings	Socio Economic Impact Analysis
J van Schalkwyk		Heritage Survey

The project team focused on understanding the biophysical, social and economic environment and the values thereof.

Opportunities, constraints and values of the study area were included in the assessment. This was formulated into a vision or desired state of the environment that recognises appropriated development alternatives and control zones.

The abovementioned was used to guide the proposed development and to ensure a sustainable development that is economically viable and sensitive to the existing ecological landscape.

1.3 Terms of Reference

Gauteng Department of Agriculture and Rural Development (GDARD) requested that an Environmental Impact Assessment (EIA) for the proposed township be carried out. The Environmental Impact Assessment together with the public consultation will be undertaken in accordance with the following activities as listed within the EIA Regulations, 2 August 2010:

Indicate the number and date of the relevant Government Notice:	**Activity No (s) (in terms of the relevant notice): e.g. Listing notices 1, 2 or 3**	**Describe each listed activity as per the wording in the relevant listing notice:**
GNR 545, 18 June 2010	15	*"Physical alteration of undeveloped vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use, where the total area to be transformed is 20 hectares or more."*
GNR 544, 18 June 2010	9	*"The construction of facilities or infrastructure exceeding 1000m in length for the bulk transportation of water, sewer, or stormwater –* *(i) with an internal diameter of 0,36m or more, or* *(ii) with a peak throughput of 120 liters per second or more*
GNR 544, 18 June 2010	10	*The construction of facilities or infrastructure for the transmission and distribution of electricity –* *(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts, or* *(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more*
GNR 544, 18 June 2010	11	*The construction of:* *(i) canals;* *(ii) Channels;* *(iii) Dams;* *(iv) Weirs;* *(v) Bulk stormwater outlet structures* *Where such construction occurs within a watercourse or within 32 meters of a watercourse measured from the edge of the watercourse, excluding where such construction will occur behind the development setback line.*

Various factors play a role for the execution of the environmental investigation at this point in time. The terms of reference for this report are to:

1 Register the project with the relevant environmental authorities;
2 Follow the public participation process as set out in Chapter 6 of GNR 543 of 18 June 2010;
3 Compile a Scoping Report and Plan of study for Environmental Impact Assessment (EIA);
4 Conducting Specialist Studies deemed necessary/required;
5 Assessing the issues, impacts and alternatives and
6 Compiling a detailed EIA Report.

The EIA Report is to include a description of the environment as well as the possible issues

that may result from the proposed development. The following issues were addressed:

1 Ecological Impacts including flora, avifauna, mammals, and herpetofauna;
2 Sensitive Wetland area and Aquatic systems;
3 Socio - Economic Impacts;
4 Heritage features;
5 Service infrastructure and
6 Cumulative Impacts.

1.4 Study Approach

The EIA regulations stipulate that an Environmental Impact Assessment (EIA) should be undertaken as the first step in applying for authorisation to proceed with the proposed activity. The objectives of the EIA Report are to:

- Identify Interested and Affected Parties (I & AP's) and inform them of the proposed project;
- Identify any issues and concerns associated with the proposed project;
- Identify alternatives to the proposed project;
- Identify areas of likely impact and relevant environmental issues that will require specific environmental management procedures.
- Provide measures to mitigate the significant impact identified.

1.5 Purpose of the Environmental Impact Assessment Report

The purpose of the Environmental Impact Assessment Report is:

- To provide a detailed biophysical (fauna, flora, soils, geology, storm water, typography, etc.) assessment and ground truth of the site to identify opportunities and constraints for conservation management, spatial, social and economic development;
- Provide a detailed assessment of the context in which the site occurs (existing land uses, roads, and other service infrastructure);
- To consider the functional role of the site in terms of storm water management, ecology, and socially in relation to the City's RSDF strategies on densification, and economic development;
- To ensure that the environmentally sensitive areas are protected and areas for

development are identified;

- To present the results of the scoping phase of the EIA process to the Interested and Affected Parties (I & AP's). The Environmental Impact Assessment Report documents the main issues associated with the proposed development of that require attention, management, and mitigation;
- To allow I & AP's the opportunity of confirming that the concerns and suggestions raised have been adequately documented and addressed in the assessment of the potential environmental impacts.
- To evaluate the layout for the proposed development and
- To document the results of the EIA exercise and present it to GDARD so that they can consider the findings and authorise the project.

1.6 Assumptions and Limitations

1.6.1 Stage of Project

Adequate timing has been allowed for the EIA exercise. Particular note should however be made of the fact that the EIA Report was compiled during the conceptual stages of development. Site selection had already been established and the preferred site is the site evaluated. In addition the layout and design components were established in the conceptual phase and used during the EIA evaluation of the site and proposal.

1.6.2 Availability of Baseline Information

The majority of baseline information was readily available.

1.6.3 Time Constraints

Sufficient time was allowed for the EIA process.

2 PROJECT DESCRIPTION

2.1 Location of Site

2.1.1 Regional Setting

The project is located in Gauteng Province within the City of Germiston Metropolitan Municipality (**Annexure A - Locality Map**). The site is well positioned as it is located in the southern periphery of Johannesburg and within the Johannesburg/Durban road freight and rail corridor.

The site has access to the N3 freeway to Durban which is South Africa‟s major freight transport route, to the N1 to Cape Town, to Port Elizabeth and East London and via the R390, as well as to other freeways to the industrial centres in the Johannesburg and Ekurhuleni Municipalities.

An operational freight railway line, that crosses the N3 on the site, traverses the site. This railway line is capable of linking the main railway lines from Johannesburg to Durban and from Johannesburg to Cape Town, respectively.

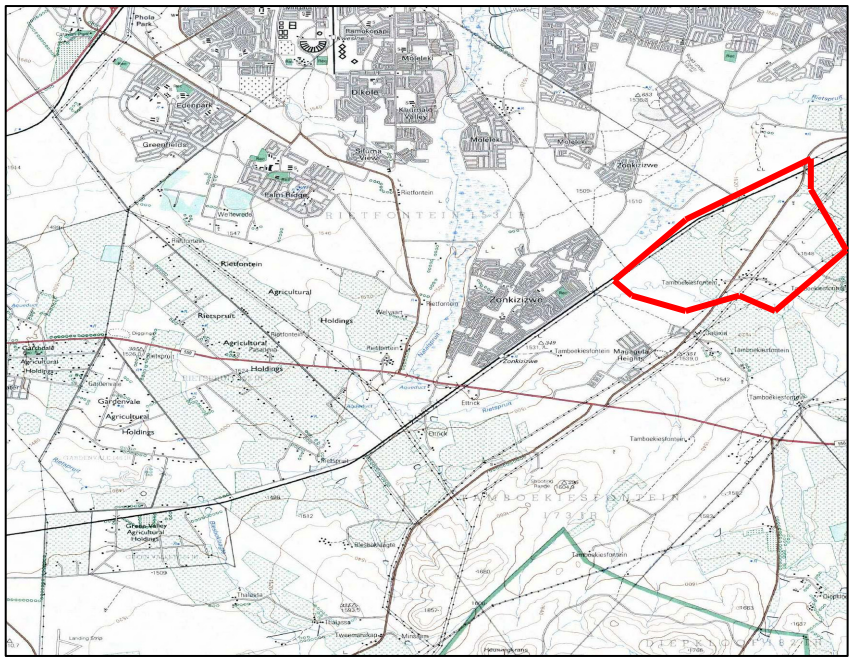


Figure 1: Topographical Map – Re/Ptn 37 Tamboekiesfontein, 173 IR (Thick Red Set)

In terms of road freight, the site is 22 kilometres (kms) from the City Deep Terminal in Johannesburg, and 25 km's from the OR Tambo Air Freight Terminal. The existing road linkages will allow the site to accommodate both full truck load long distance road freight and less than truck load regional distribution. The site has been identified within the spatial development frameworks the Ekurhuleni Metropolitan Municipality and the Municipality have accommodated the proposed development by re-aligning the urban edge to include the site within the urban edge.

2.1.2 Local Setting

The site is located west of the N3, directly east and adjacent to Magagula Heights. The residential area of Zonkizizwe is located north west of the site with Katlehong South directly north of the site. The area identified as the proposed development area for phase 1, namely the site, is largely uninhabited and a portion of the site is farmed. The Thulasizwe community has taken up residence on a portion of the site. They practice subsistence agriculture on a small scale. The site is zoned 'Undetermined'.

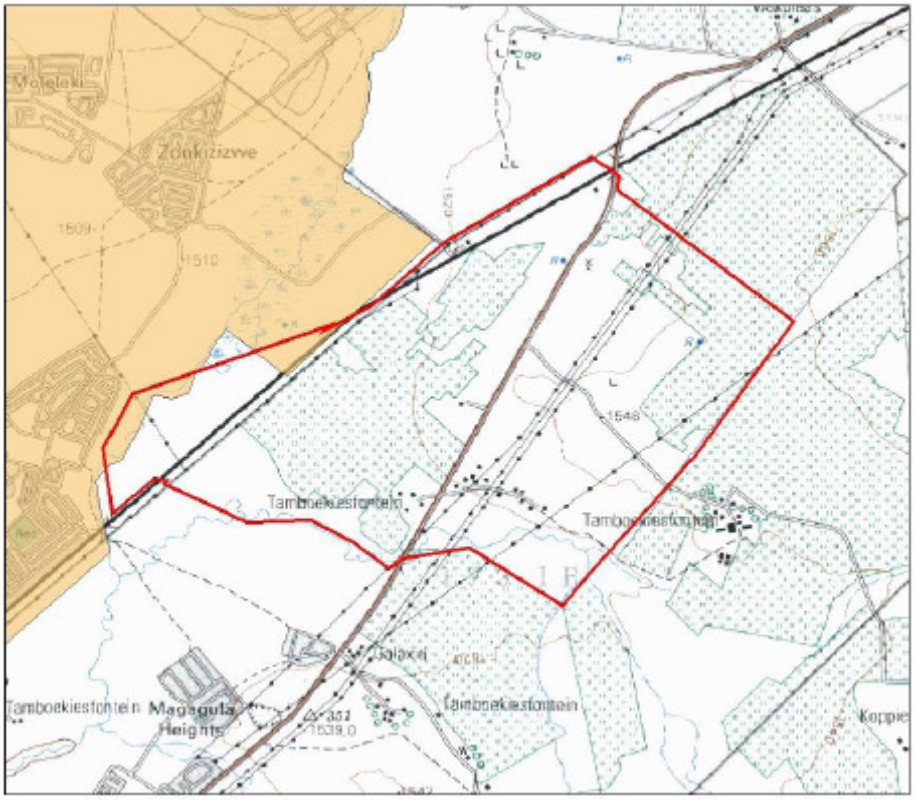


Figure 2: Topographical Map – Re/Ptn 37 Tamboekiesfontein, 173 IR (Thick Red Set)

2.2 Property Particulars

2.2.1 Description

The current property description is: the remaining extent of Portion 37 of the Farm Tamboekiesfontein, 173 IR, Germiston. A Mix Use Township will be established on the site in terms of Section 96 of the Town planning and townships Ordinance, 1986.

2.2.2 Registered Owner

The subject farm portion is registered in favour of:

Project applicant:	Inframax Strategic Properties (Pty) Ltd		
Trading name (if any):	Inframax Holdings(Pty) Ltd		
Contact person:	Mr Tumi Mohulatsi		
Physical address:	113 Mercy Avenue, Waterkloof Glen		
Postal address:	P.O Box 36708, Menlo Park		
Postal code:	0102	**Cell:**	082 826 4246
Telephone:	012 361 0906	**Fax:**	012 348 9808
E-mail:	tmohulatsi@inframax.co.za		

2.3 Activity to be Undertaken

A mix use development is proposed for the site. The site is currently zoned 'Undetermined'. The township establishment application will allow the rezoning of the site from 'Undetermined' to:

Table 2: Proposed Activities

Proposed Land Use	Area Hectare
Industrial/Warehousing	114.1479
Intermodal yard	32.0171
Logistics	176.4498
Non Developable land	14.4376
Roads	59
Trucking Intermodal yard	42.8174
Wetland Area/Open Space	111.1059
Servitude Power Line	28.0157
Servitude Rail	47.5307
TOTAL	**626.669**

The Applicant, Inframax Strategic Properties (Pty) Ltd sees this as the first phase of a 10 - 15 year project and plans to add at least a further 600ha to the identified site over time, which would enable the proposed project to be developed as a world class inland port and logistics facility.

2.3.1 Description of the Phases of the proposed Development

The development will take place over a period of 8 years will be in extent of ±627.485ha for the Inframax Landholding site. The proposed development forms part of a master plan for the larger area where the Inframax Landholding site is seen as phase 1 of the larger development. The land distribution across the total developable area is as follow:

Landholding	Gross Area (ha)
Land A: Inframax Landholding *(Phase 1)*	**627.485**
Land B: Possible Expansion Area	420.732
Land C: Cemetery	154.250
Land D: Adv. Du Plessis Landholding	401.948
TOTALS	**1 604.415**

Phase 1 (Inframax Land Holding) will be developed in two stages:

- Stage 1: year 1 to year 5 - this stage will include the development of the truck and Intermodal yard and expected TEU's for container terminal, i.e. 1, 000,000TEU's and the expected pallets, i.e. 4, 500,000 pallets. The estimated development size is 406,754.10m²
- Stage 2: year 6 – year 8 – this stage will consist of the Development of industrial / warehousing. The estimated development size is 737,879.86m².

The total development is planned on a 1000 hectare site and projected on a 15 year timeframe (to completion). This report only assessed the activities to be developed on the Inframax Land Holding that constitutes phase 1 of the total development. The specific development phases for phase 1 will be:

- **Pre-Construction:**

During the pre-construction phase, the environmental and town planning processes will be completed. The activities that will take place involve the legal and administrative activities

related to the Environmental Authorisation of the project. The establishment of the township and the registration of individual erven are subject to the granting of the Environmental Authorisation.

- **Construction**

The construction phase entails the development of the erven and the construction of the top structures and related infrastructure. Site clearance and the construction of the railway siding internal street and essential township services are but a few of the activities that can take place immediately. The buffer zones to protect the wetland area will be implemented and the area will be fenced off. The mitigation measures, EMP and landscape plan will be implemented and environmental monitoring will be crucial in this phase of the proposed development.

- **Operational**

During the operational phase the erven will be fully developed and functional. The wetland area will be fenced off. The mitigation measures that have been introduced and the stormwater management system and landscape plan will be monitored for effectiveness through an EMP.

2.3.2 Town Planning

The land is a farm portion and it will therefore be required to follow the township establishment route to create individual erven. The main aim of the criteria used in the town planning process will be to design a township that will accommodate various land uses proposed (**Annexure E - Layout Plan**).

Table 3: Total Area of the Proposed Development

Proposed Land Use	Area Hectare
Industrial/Warehousing	114.1479
Intermodal yard	32.0171
Logistics	176.4498
Non Developable land	14.4376
Roads	59
Trucking Intermodal yard	42.8174
Wetland Area/Open Space	111.1059
Servitude Power Line	28.0157
Servitude Rail	47.5307
TOTAL	**626.669**

The size of the property is 626.669ha in extent. The township application was submitted to the City of Germiston Metropolitan Municipality. The application is subject to the granting of the Environmental Authorisation.

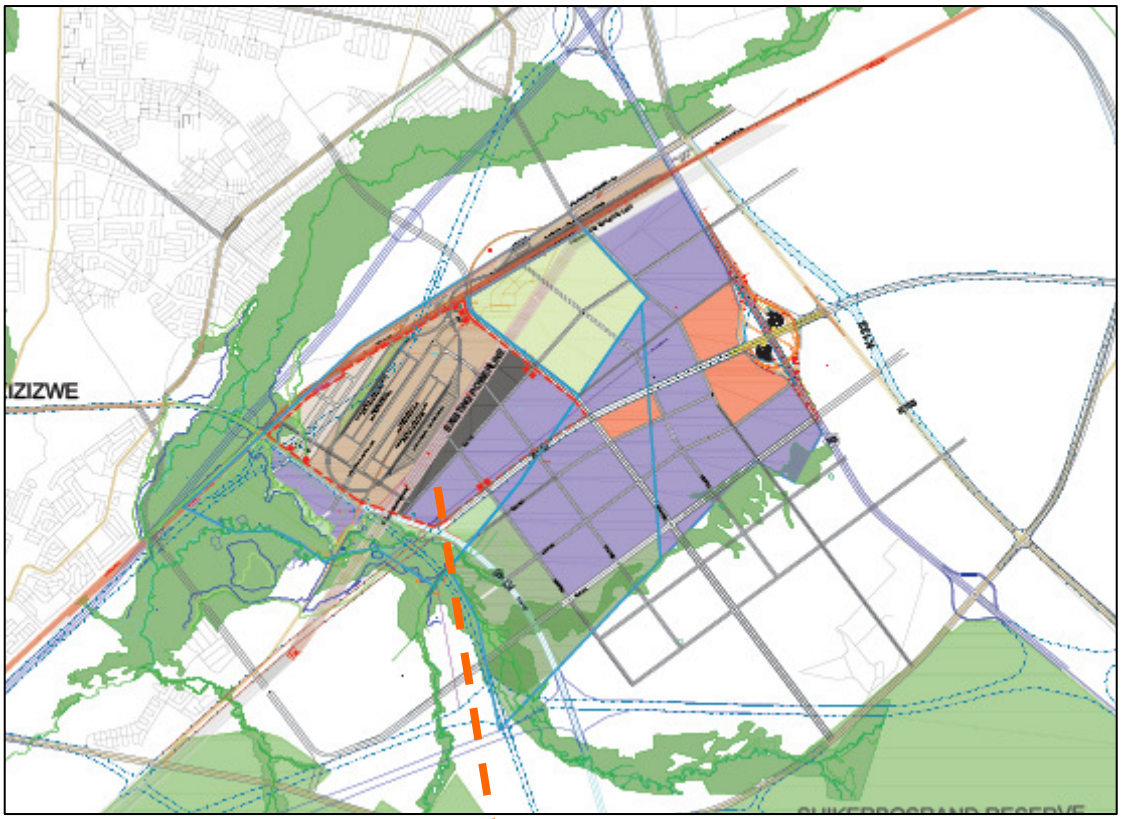


Figure 3: Tambo Springs Master Plan – The site in Thick Red Set (GAPP Architects, February 2012)

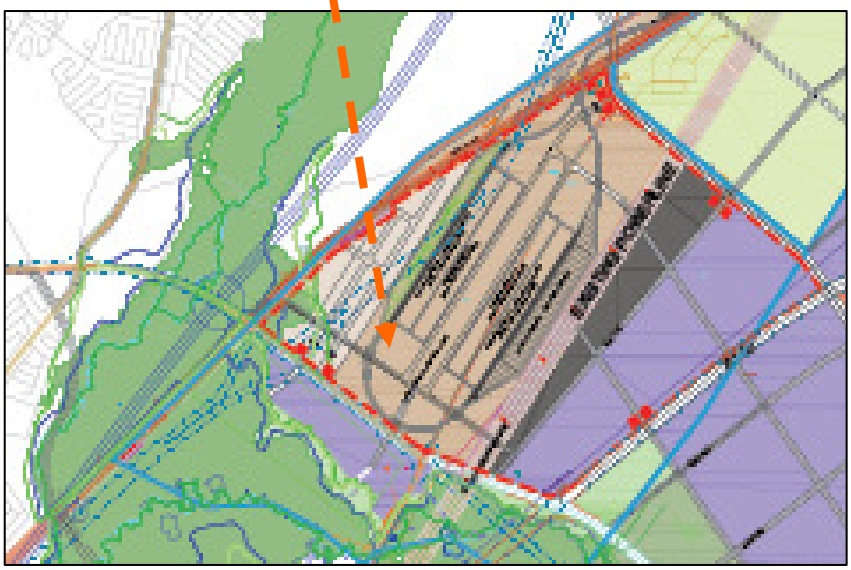


Figure 4: Phase 1(Inframax Land Holding) – The developable area in Thick Red Set. The site in Blue (GAPP Architects, February 2012)

2.3.3 Estimated Time Frames for Construction

As the township establishment process is subject to the Environmental Authorisation, the proclamation of the Township can only start once the environmental process has been finalised. Once completed the, township would be proclaimed. This process can take between six months and a year.

The development of the township is subject to the prevailing economic climate. The site will be developed in two stages and the development will take up to 8 years.

3 PUBLIC PARTICIPATION PROCESS

3.1 Description of Public Participation Process

Public Participation is a cornerstone of any Environmental Impact Assessment. The principles of NEMA (Act No. 107 of 1998) govern many aspects of environmental impact assessments, including public participation. These include provision of sufficient and transparent information on an ongoing basis to stakeholders to allow them to comment and ensuring the participation of previously disadvantaged people, women and youth.

Effective public involvement is an essential component of many decision-making structures, and effective community involvement is the only way in which the power given to communities can be used efficiently. The public participation process is designed to provide sufficient and accessible information to interested and affected parties (I & AP's) in an objective manner to assist them to:

- Raise issues of concern and suggestions for enhanced benefits;
- Verify that their issues have been captured;
- Verify that their issues have been considered by the technical investigations; and
- Comment on the findings of the EIA.

Potential I & AP's were informed of the project during the Scoping Phase as well as during the EIA Phase via the following media:

1 **Scoping Phase**: The project was made public via the following measures: Publication of media advertisements in the following media: Local and regional newspaper. Adverts were placed in The Star Newspaper on the 31 August 2011 and ran until 14 October 2011.

- Highly visible site notices advertising the EIA process were placed on site
- Registered letter were sent to all identified I & AP's on 31 August 2011. Included were: a Letter of Notification, a draft Scoping Document, a Locality Map and a Layout Plan.
- Emailing the draft Scoping Report and its Appendices to all registered IAP's.
- Submission of Scoping Report to various Government Departments and GDARD.
- Posting of Scoping Report to Interested and affected Parties.
- Submission of Scoping Report per hand to Interested and affected parties.

2 **EIA Phase:** Advertisements notifying the public of EIA process and requesting all I & AP's to register their comments, issues and concerns were placed in the Star Newspaper on 27 March 2012. All I & AP's were given until 4 May 2012 to respond.

- Highly visible site notices advertising the EIA process were placed on site
- Registered letter were sent to all identified I & AP's on 31 August 2011. Included were: a Letter of Notification.
- Emailing the draft EIA Report and its Appendices to all registered IAP's requesting the documents.
- Submission of the draft EIA Report to various Government Departments and GDARD.
- Posting of the draft EIA Report to Interested and affected Parties requesting the documents.
- Submission of the Draft EIA Report per hand to Interested and affected parties.

3.2 Interested and Affected Parties

Consultation with the relevant authorities and key interested parties at an early stage in identifying the broad range of issues and alternatives is essential. The following I & AP's were identified:

Table 4: I & AP's identified and informed of the proposed activity

Government Department		
Department/Organisation	**Contact Person**	**Postal Address**
Head of Department Department of Transport and Public Roads	Denis Emett	Private Bag X83 Marshalltown 2107
Department of Health	Dr Mohammed Bismilla	Private Bag X085, Marshalltown 2107
Rand Water: Corporate Environmental Officer	Mr Motloung	Private Bag X 015, Mondeor 2110
Department of Minerals and Energy	Mr JL Ndimande	Private Bag X 5 Braamfontein 2017
ESKOM	Corporate Environmental Officer	P.O Box 1091 Johannesburg 2000
DWAF	Ms B Ngoasheng	Private Bag X995 Germiston 0001
SAHRA	N January	P.O Box 87552 Houghton 2041
SASOL GAS	Shailendra Komal	P.O Box 1234, Randburg 2125

Council for GeoScience	Abraham Thomas	Private Bag X12 Germiston 0001
Municipality		
Director: Development Planning. Ehurhuleni Metropolitan Municipality	Cliff Patterson	P.O Box 145 Germiston 1400
Director: Roads & Transport. Ehurhuleni Metropolitan Municipality	Mr Gideon Beetge	Private Bag X 014 Benoni 1500
Director: Environmental Impact Management Section	Mrs Elsabeth van der Merwe	P.O Box 25 Edenvale 1610
Ekurhuleni Metro: Department of Housing	Mr D Morema	P.O Box 25263 Benoni North 1527
Ward Councillor: Ward 64	Thandile Cynthia Luthuli	079 959 1606

Adjacent Landowners	
1. **Ptn 36 Tamboekiesfontein 173 iR** **Emontic In (Pty) Ltd** CEO – Mr Karl Kebert P.O Box 448 Kliprivier 1871	**2.** **Ptn 36 Tamboekiesfontein 173 IR** **Starlite Aviation** Chairman – Mr Slade Thomas P.O Box 448 Kliprivier 1871
3. **Ptn 53 Tamboekiesfontein 173 IR** Eastern Services Council Andrias Hlongwane Andrias.hlongwane@ekurhuleni.gov.za	**4.** **Ptn 34 Tamboekiesfontein 173 IR** H Hoogenboezem & Seun (Pty) Ltd Roly Pelser rpelser@deloitte.co.za P.O Box 17604 Sunward Park 1470
5. **Advocate Du Plessis** Debbie@steinhoff.co.za P.O Box 122 Stellenbosch 7599	

Comments received from I&AP's on the Scoping Report & Plan of Study for EIA:

- **Transport and Development Facilitation, Gauteng (GAUTRANS):** indicated that the department will not participate in the EIA process however provincial roads are affected and a traffic impact assessment report must be submitted to GAUTRANS for approval.
- **Ekurhuleni Metro – Infrastructure Services: Regional Office - South** indicated that Roets Drive and Moagi road is affected and will have to be extended across the spruit.
- **Department of Mineral Resources (DMR):** there is interest in mining activities in the area

and the applicant needs to contact the relevant Company be fore any development may commence.

- **Department of Water Affairs (DWAF):** The Applicant must apply for all the relevant Water Usage Licenses and the relevant mitigation measure to protect the wetland must be implemented.

Response to Comments received on the Scoping Report & Plan of Study for EIA:

- **Transport and Development Facilitation, Gauteng (GAUTRANS):** A traffic Impact Study will be submitted to the the department as part of the Application.
- **Ekurhuleni Metro – Infrastructure Services: Regional Office – South:** The extension of Moagi Drive and Roets Road doe not form part of the proposed infrastructure development for phase 1 and is therefore no assessed in this application.
- **Department of Mineral Resources (DMR):** The matter will be addressed by the Applicant.
- **Department of Water Affairs (DWAF):** A site meeting was held with the official from DWAF on 22 February 2012. All issues were discussed with the official and the relevant WULA applications will be submitted to the Department by the Wetland Specialist.

Comments received from I&AP's on the EIA Report:

- **Emontic:** the Draft EIAR was submitted to Montic Dairy for comment. The CEO of Montic Dairy, Mr Karl Kebert, requested a meeting to discussion the contents of the document with specific reference to the roads affected by the proposed development and the affect thereof on Montic Dairy. A meeting between the Applicant and the Interested and affected Party was held on 23 April 2012. The attendance register is attached as proof (Annexure D). As confirmation of what was discussed in the meeting a letter was received from MM Town Planning Services on behalf of Montic Dairy. The following issues were identified:
    - Access to the site will be from D817. Montic Dairy operational activities should not be adversely affected during the construction phase of the whole development, as this road is used for distribution.
    - Any possible diversions should make use of reliable roads and detours around the N3 are not acceptable.
    - The K148 route dissects the property of Montic Dairy and the construction thereof will significantly impact on the property of Montic Dairy.
    - An acceptable road surface must be put in place before the proposed portion of the D817 is re-aligned.

- The proposed development should not at any time impact or affect the operations of Montic Dairy.

- **Ekurhuleni Environmental Resource Management:**
  - Potential impact on the Wetland Area: The wetland study submitted is accepted and the recommendations in the study should be adhered to.
  - Biodiversity and Open Space Strategy: The current open space function is that of a natural open space. The municipality is satisfied that the sensitive areas have been left out from the open space node.
  - Enhancement of Natural environment;
  - Sustainable Development Practices;
  - Potential reduction of CO^2 levels;
  - Protection of Ecosystems and biodiversity;
  - Pollution control measures; and
  - Impact on high potential agricultural land within the area;
- **Department of Water Affairs:** No activities to take place within the 1:100 year floodline or within 100m from water resources without Authorisation from the Department.
  - Appropriate measures to be taken to prevent spillages or environmental pollution.
  - No channelling or impediment of water flow shall be allowed within the wetland area;
  - Stormwater control measure to be put into place;
  - Erosion measures to be implemented;
  - Concerns from I & AP's to be considered;
  - DWA to be notified of pollution incidents.
- **GDARD:** confirmation from the Local Authority or relevant service provider that bulk services (e.g. water supply, sewerage and waste disposal, energy, storm water) and related services such as road infrastructure will be provided to the proposed development;
  - Inclusion of a Storm Water Management Plan;
  - Proof of Notification of all relevant I & AP's
  - Shape files and composite map.

Response to comments received on the EIA Report:

- **Emontic:** Response was submitted to MM Town Planning services on 9 May 2012 addressing all issues and concerns identified. The response was draft by W & L Consultants on behalf of the Applicant – Inframax. The response is as follow:

- The D817 is a public road and falls within the control of the Transport Department. As such, any closure, deviations or disruptions to the road and its traffic must be approved by the Transport Department. The Applicant as responsible developers will adhere to the recommendations of the Transport Department when implementing the proposed Tambo Springs Master Plan. The Transport Department must approve the diverted road before they allow the existing D817 to be closed. They will set the specifications and control the process.
- The K148 is a provincial road planned by the Gauteng Department of Roads and Transport and the issue regarding the impact of this road must be taken up with them. The Applicant (Inframax) was not involved in the design and planning of this road. Should this road be constructed it would be the responsibility of the Gauteng Department of Roads and Transport, and the entire process would be driven by the Gauteng Department of Roads and Transport.

It is therefore clear that it is not the intent of Inframax to disrupt the operations of Montic Dairy. The consultation that Inframax has initiated with Montic Dairy from the start of the process will continue during the implementation phase of the Tambo Springs Inland Port development to avoid disruptions to Montic Dairy's operations and to ensure that all parties benefit from development and investment within the area.

The letter is attached as proof of communication (Annexure E).

- **Ekurhuleni Environmental Resource Management:**
  - Enhancement of Natural environment: Sensitive areas identified are excluded from the development as indicated in the specialist studies. The natural flow of water will be maintained and monitored as per the wetland study. Water quality test have been done by the wetland specialist and was submitted to DWA as part of the WULA application. The water quality test include a dry month test (winter) and a wet season test (summer).
  - Sustainable Development Practices: The project will be developed in phases. Phase 1 included the development of the railway siding and upgrade of roads and installation of relevant services. Therefore sustainability and the potential of the implementation of sustainable development practices will be discussed and implemented during the following phases where the possibility of implementing green building practices could be investigated by the architects and urban designers.
  - Potential reduction of CO^2 levels: The aim of the project is to contribute to the reduction of road transport by establishing a world class inland pot and logistics hub. The switch from road transport to railway will contribute to the reduction of CO^2 levels

locally and regionally. Although it would be minimal at first, the contribution will increase as the various phases of the project is rolled out over the 10 year period.

- Protection of Ecosystems and biodiversity: All sensitive areas will be protected within the applicable bufferzones.
- Pollution control measures: The area where pollution could occur would be the inter modal yard. Developments within the yard would adhere to the relevant health and safety regulations.
- Impact on high potential agricultural land within the area: The site itself is not identified as high agricultural land and the proposed activities would be contained with the boundaries of the project site.

- **GDARD:** confirmation from the Local Authority or relevant service provider that bulk services (e.g. water supply, sewerage and waste disposal, energy, storm water) and related services such as road infrastructure will be provided to the proposed development: The Applicant will upgrade and install all relevant engineering services as required for the project. The engineering services report is attached in Annexure C.
    - Inclusion of a Storm Water Management Plan: Stormwater Management Plan is attached in Annexure C;
    - Proof of Notification of all relevant I & AP's: Proof of notification is attached in Annexure D. Correspondence received from all I & AP's is attached in Annexure E;
    - Shape files and composite map: Shape files are on the accompanying CD and the composite map is attached in Annexure F.

3.3 CONCLUSIONS

- Site notices were placed on the site for all to see.
- Interested and Affected parties were notified during the scoping phase as well as during the EIA phase and as a result comments were received from Stakeholders, surrounding land owners as well as Government Departments. Their letters are included for perusal in **Annexure E**.
- All issues and concerns identified were addressed.

4 BIOPHYSICAL DESCRIPTION OF THE SITE

4.1 Physical Features and Characteristics

4.1.1 Regional Climate

Table 5: Climate of Germiston

CLIMATE OF SOUTH AFRICA WB 42 CLIMATE STATISTICS 1961 - 1990

Number: 0476399 0 Name: **JAN SMUTS - WO ϕ = 26° 8' S λ = 28° 14' E HT: 1694 m Period: 1961-1990

AIR TEMPERATURE IN DEGREES CELSIUS

	AVERAGE OF DAILY				MAXIMUM (TX) P = 29 Years									MINIMUM (TN) P = 29 Years												
	MAX	MIN	MEAN	RANGE	HIGHEST (TXX)			AVERAGE NUMBER OF DAYS WITH TX					LOWEST (TXN)			HIGHEST (TNX)			AVERAGE NUMBER OF DAYS WITH TN					LOWEST (TNN)			
	$\overline{TX}$	$\overline{TN}$	$(\overline{TX}+\overline{TN})/2$	$\overline{TX}-\overline{TN}$	MAX	YY/DD	MEAN	>=35	>=30	>=25	>=20	>=15	<10	MEAN	MIN	YY/DD	MAX	YY/DD	MEAN	>=20	<15	<10	<5	<0	<-5	MEAN	MIN	YY/DD	
J	25,6	14,7	20,1	11,0	35,4	73/19	30,2	0,0	2,1	18,6	29,9	30,9	0,0	19,3	13,8	80/08	20,3	83/29	18,1	0,1	16,7	0,5	0,0	0,0	0,0	11,0	7,2	77/02	J
F	25,1	14,1	19,6	10,9	33,5	83/25	29,1	0,0	0,9	15,0	26,7	28,2	0,0	19,4	14,8	88/10	20,4	87/20	17,4	0,0	17,7	0,8	0,0	0,0	0,0	10,3	6,0	90/24	F
M	24,0	13,1	18,6	10,9	31,9	73/15	28,0	0,0	0,3	12,8	28,3	30,8	0,0	17,5	12,7	75/18	21,2	84/02	16,9	0,0	25,2	2,3	0,0	0,0	0,0	8,5	2,1	74/19	M
A	21,1	10,3	15,7	10,8	29,3	87/02	25,5	0,0	0,0	3,0	20,5	28,9	0,0	14,6	7,4	72/30	19,0	87/07	14,7	0,0	29,0	12,5	0,9	0,0	0,0	4,7	0,5	65/26	A
M	18,9	7,2	13,1	11,6	26,4	83/01	23,0	0,0	0,0	0,3	11,5	28,7	0,1	13,0	9,1	69/21	17,5	79/01	12,3	0,0	30,8	25,6	6,7	0,3	0,0	1,6	-2,5	73/31	M
J	16,0	4,1	10,1	12,0	23,1	88/04	20,4	0,0	0,0	0,0	1,8	21,0	1,1	9,5	1,5	64/20	12,6	79/06	9,3	0,0	30,0	29,6	17,0	3,0	0,0	-1,9	-8,2	79/13	J
J	16,7	4,1	10,4	12,5	24,4	88/17	21,1	0,0	0,0	0,0	2,6	24,1	0,7	10,4	6,7	89/18	12,0	78/29	8,8	0,0	31,0	30,7	18,5	2,3	0,0	-1,9	-5,1	90/14	J
A	19,4	6,2	12,8	13,1	26,2	86/27	24,4	0,0	0,0	0,8	14,6	28,1	0,3	11,8	6,9	83/08	14,8	78/12	12,0	0,0	31,0	27,4	9,7	1,6	0,0	-0,6	-5,0	72/02	A
S	22,8	9,3	16,1	13,5	31,1	83/29	28,4	0,0	0,1	10,6	23,5	28,6	0,3	13,4	6,1	74/05	18,0	78/28	15,2	0,0	29,0	15,5	3,4	0,5	0,0	1,8	-3,3	89/08	S
O	23,8	11,2	17,5	12,6	32,2	65/31	29,4	0,0	1,1	13,3	26,1	30,0	0,1	14,5	9,3	73/16	20,3	61/24	16,6	0,0	27,5	9,2	1,4	0,0	0,0	4,7	0,2	65/20	O
N	24,2	12,7	18,4	11,5	32,9	90/14	29,5	0,0	0,9	13,3	26,7	29,3	0,1	15,9	7,6	68/11	20,7	81/06	17,1	0,1	24,7	3,3	0,2	0,0	0,0	7,3	1,5	76/26	N
D	25,2	13,9	19,6	11,3	32,4	84/29	29,8	0,0	0,0	17,7	29,3	30,9	0,0	18,1	12,6	75/16	20,3	82/23	17,6	0,1	21,2	1,0	0,1	0,0	0,0	9,6	3,5	70/07	D
YR	21,9	10,1	16,0	11,8	35,4	73/19	31,4	0	6	105	242	340	3	7,7	1,5	64/20	21,2	84/02	19,1	0	314	158	58	8	0	-3,0	-8,2	79/13	YR

PRECIPITATION (and FOG). DRY- AND WETBULB TEMPERATURES. RELATIVE HUMIDITY and CLOUD COVER

	PRECIPITATION (R mm) P = 29 Years													P = 26 Years				TEMPERATURE (° C)						REL. HUM. (%)					CLOUD			
	MONTH	24 HOUR MAX		TOTAL PER MONTH / YEAR				AVERAGE NO. OF DAYS WITH R (mm) >=						AVE NO. OF DAYS WITH				DRY BULB P = 29 Years			WET BULB P = 29 Years			P = 29 Years				IN EIGHTHS P = 29			
	$\overline{TOT}$	RXX	YY/DD	MAX	YEAR	MIN	YEAR	0,1 AVE	0,1 MAX	0,1 MIN	1	5	10	30	TH	HA	SN	FOG	$\overline{08}$	$\overline{14}$	$\overline{20}$	$\overline{08}$	$\overline{14}$	$\overline{20}$	$\overline{08}$	$\overline{14}$	$\overline{20}$	MAX	MIN	$\overline{08}$	$\overline{14}$	$\overline{20}$	
J	125	188	72/20	338	1972	56	1974	15,9	22	10	11,8	6,8	3,8	0,6	2,4	0,4	0,0	2,1	17,9	24,1	19,9	15,4	17,3	15,8	78	50	65	97	24	4,4	5,0	4,7	J
F	90	56	90/13	191	1976	13	1984	11,2	17	5	8,2	5,0	3,2	0,5	2,1	0,1	0,0	2,1	17,1	23,6	19,4	14,9	16,9	15,4	80	50	65	96	25	4,1	4,8	4,1	F
M	91	92	67/20	219	1987	16	1965	11,9	19	2	8,5	5,0	2,9	0,7	2,0	0,1	0,0	4,1	16,0	22,8	18,3	13,9	15,9	14,3	80	48	63	96	27	3,8	4,7	3,6	M
A	54	50	90/28	130	1971	4	1985	8,6	16	2	6,5	3,2	1,8	0,2	1,4	0,1	0,0	4,6	13,3	20,1	15,3	11,1	13,5	11,5	79	46	61	97	22	3,3	4,0	2,8	A
M	13	70	76/03	80	1976	0	1987	2,9	12	0	1,9	0,8	0,4	0,0	1,5	0,0	0,0	4,6	10,3	18,1	12,4	7,6	10,6	8,1	71	37	51	97	19	2,0	2,3	1,3	M
J	9	31	63/12	59	1963	0	1985	2,0	7	0	1,1	0,6	0,3	0,0	0,4	0,1	0,0	3,3	6,7	15,3	9,4	4,3	8,1	5,3	70	34	47	97	16	1,6	1,6	1,0	J
J	4	17	70/16	22	1985	0	1989	1,0	4	0	0,6	0,3	0,1	0,0	0,7	0,1	0,1	3,3	6,8	15,9	9,9	4,2	8,2	5,2	68	31	42	97	13	1,3	1,3	0,8	J
A	6	21	79/19	47	1979	0	1980	2,1	10	0	1,2	0,4	0,1	0,0	1,2	0,0	0,1	2,2	9,5	18,5	12,7	6,1	9,7	7,0	64	28	38	97	10	1,6	1,5	1,0	A
S	27	62	87/27	175	1987	0	1989	3,7	14	0	2,6	1,4	0,8	0,2	2,6	0,1	0,1	2,4	13,3	21,9	16,4	9,2	12,1	9,8	62	29	38	96	10	2,1	2,2	1,9	S
O	72	110	85/30	198	1964	12	1980	9,8	18	4	6,8	4,1	2,2	0,3	3,8	0,7	0,0	2,5	15,4	22,6	17,6	11,5	13,9	11,8	67	38	50	97	12	3,4	3,9	3,4	O
N	117	65	62/06	230	1962	39	1990	15,2	24	9	11,3	6,6	4,1	0,8	2,1	0,3	0,0	2,4	16,7	22,8	18,0	13,4	15,4	13,6	73	46	62	97	19	4,3	4,8	4,3	N
D	105	102	78/22	181	1986	38	1980	14,9	21	10	11,4	6,8	3,6	0,3	2,6	0,1	0,0	1,6	17,7	23,8	19,2	14,6	16,5	14,8	74	47	61	97	23	4,3	4,9	4,6	D
YR	713	188	72/20	1019	1987	443	1984	99	120	76	72	41	23	4	73	3	0	35	13,4	20,8	15,7	10,5	13,2	11,1	73	41	54	98	8	3,0	3,4	2,8	YR

Period = years covering the data for all the columns of both tables. P = Average number of years covering the data in the columns concerned. $\overline{TX}$ = Average maximum, $\overline{TN}$ = Average minimum air temperature
TXX = Highest maximum, MAX = highest in P years. TXN = Lowest maximum, MIN = lowest in P years. TNX = Highest minimum, MAX = highest in P years. TNN = Lowest minimum, MIN = lowest in P years.
$\overline{\ }$ = MEAN = AVE = AVERAGE e.g. $\overline{08}$, $\overline{14}$, $\overline{20}$ = MEANS of observations which were made on these hours (SAST). YY/DD = Year/Day of occurrence of the extreme in the previous column.
(Number of days (NOD) with TX >= 10) = (NOD in the month - NOD with TX < 10). TH = Thunder, HA = Hail, SN = Snow, FOG = fog. > signifies greater than, >= signifies greater than or equal to.
(Number of days (NOD) with TN < 20) = (NOD in the month - NOD with TN >= 20). < signifies less than, <= signifies less than or equal to.

4.1.2 Rainfall

Rain falls mostly between October and April, usually in the form of thundershowers. The area receives an average annual rainfall of 713 mm. On average approximately 99 rainy days occur per year. With the extensive surface areas of concrete and tar now present as a result of the urban development, the runoff into the streams often reach flood proportions after heavy downpours.

4.1.3 Temperature

Temperatures range between an average monthly high of 25.60C in January and an average minimum of 4.10C in June. Germiston has an enviable climate; warm to hot summers with fairly high rainfall, and cool to cold winters with little or no rain. Midwinter temperatures often drop below freezing and the regular frost may be severe. Cycles of prolonged drought are a natural phenomenon.

4.1.4 Wind

The dominant wind direction between November and February is a northwesterly wind. This pattern is directly associated with the Highveld storm system that build up during the day and bring rain typically in the afternoon. Moisture laden air is brought from the Northwest sector along the axis of the tropical temperate trough. As storms build up to the southwest a wind reversal occurs. The wind changes to a south westerly direction in line with the storm movement. Wind reversal occurs after the storms have passed and come from the northeast.

4.2 Natural Ecosystems and Habitats

4.2.1 Topography

The topography of this area is a function of the geology, the ground slopes from 1557m AMSL in the south eastern corner of the site to 1515m AMSL at the upper reaches of the floodplain of the spruit in the north western sector of the site.

4.2.2 Geology and Soils

Intraconsult conducted a geotechnical investigation for the site (**Annexure C - Geotechnical Report**). The work included field work, review of existing data, a gravity survey, borehole drilling, sampling, borehole logging, test pit profiling, analysis and a report. The result of this investigation is included in the report attached.

The site is located on chert-rich dolomite of the Malmani Subgroup, Chuniespoort Group of the Transvaal Super Group. Dolerite occurs in large areas of the site. Shallow dolomite bedrock conditions were confirmed in scattered locations. Furthermore the site is located in the Natalspruit West Dolomite Groundwater Sub-Compartment. The dolomite groundwater is anticipated between a depth of 32m and 5m within the bedrock.

Based on the geohydrological data and the geological information the dolomite stability of the site is classified in terms of the following Dolomite Hazard Zones:

Dolomite Hazard Zone 1:	An area characterised as reflecting a medium inherent suceptibility of medium to large size sinkhole and subsidence formation (with small sub-areas of low susceptibility of all size sinkhole and subidence formation and small sub-areas of high susceptibility for small size sinkhole and subsidence formation) with respect to ingress of water and a low susceptibility with respect to groundwater level drawdown. In the event of groundwater level drawdown the susceptibility of the subsurface profile remains unchanged from an ingress of water perspective. **Composite characterisation: Inherent Hazard Class 3/4(1)(5)1//1.**
Dolomite Hazard Zone 2:	Area characterised as reflecting a medium to high inherent susceptibility of medium (with sub-areas of high for small) size sinkhole and subsidence formation with respect to ingress of water and a low inherent susceptibility of all-size sinkhole and subsidence formation with respect to groundwater level drawdown. In the event of groundwater level drawdown the susceptibility of the subsurface profile remains unchanged from an ingress of water perspective**. Composite characterisation: Inherent Hazard Class 3/6(5)//1.**
Dolomite Hazard Zone 3:	Area characterised as reflecting a high inherent susceptibility of medium to large size sinkhole and subsidence formation with respect to ingress of water and a high inherent susceptibility of all-size sinkhole and subsidence formation with respect to groundwater level drawdown. In the event of groundwater level drawdown the susceptibility of the subsurface profile remains unchanged from an ingress of water perspective. **Composite characterisation: Inherent Hazard Class 6/7//7.**
Dolomite Hazard Zone 4:	Area characterised as reflecting a high inherent susceptibility of large to very large size sinkhole and subsidence formation with respect to ingress of water and a high inherent susceptibility of very large size sinkhole and subsidence formation with respect to groundwater level drawdown. In the event of groundwater level drawdown the susceptibility of the subsurface profile remains unchanged from an ingress of water perspective. **Composite characterisation: Inherent Hazard Class 7/8//8.**

(Intraconsult, Volume 1: October 2011)

Based on the above the site was classified as: ***H, C & S***. The Report concluded that:

Appropriate foundation design and water precautionary measures are provided together with recommendations aimed at the adoption of a pro-active water bearing services maintenance strategy. Particular emphasis is placed on the need to manage storm water falling onto, moving across and exiting the site. Storm water should be effectively and efficiently removed from the immediate area around structures, into the municipal storm water system.

Based on this detailed field work, the borehole and soil profiles and analyses of the laboratory soil test results, the site area has been further sub-divided into (preliminary) Soil Site Class Sub-Areas in terms of the Code of Practice composite Site Classes (H,C & S). Soil Maps are provided with our interpretation of the near surface conditions as an overlay to the dolomite stability zones. This composite drawing is intended to assist with the future planning and development of the site. Rationally designed foundation solutions will be required for all structures potentially to be developed in these dolomitic sub-areas.

(Intraconsult, Volume 1: October 2011)

The following map indicates the dolomite zones:

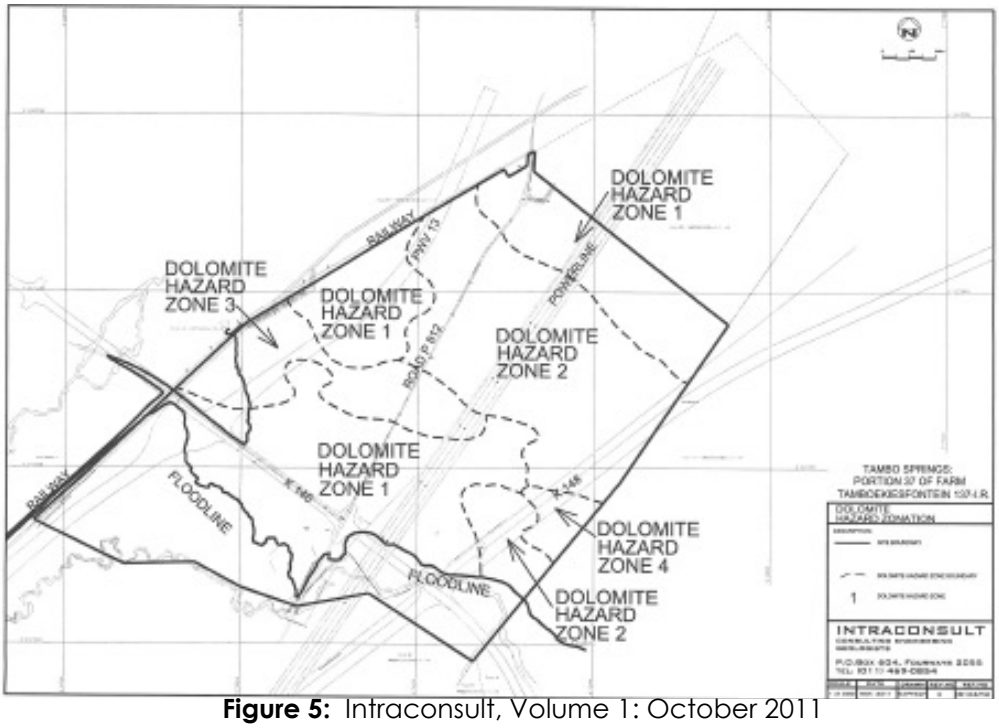


Figure 5: Intraconsult, Volume 1: October 2011

The geotechnical investigation is attached in **Annexure C** – **Geotechnical Report**.

4.2.3 Surface Water

Drainage takes place in a south westerly direction into a drainage valley that forms the western boundary of the site. The site is affected by a floodline and wetland.

4.2.4 Groundwater and Water Table

The ground slopes from 1557m AMSL in the south eastern corner of the site to 1515m AMSL at the upper reaches of the floodplain of the spruit in the north western sector of the site. The data indicated that the groundwater level can be expected at a depth of 22m in the south eastern corner to 5m and ground surface on the floodplain of the spruit. The spruit and aquifer appears to be hydraulically connected according to the geotechnical report.

A shallow or perched water table should be anticipated in sub-areas underlain by dolerite. Furthermore pedocrete materials and harder ferricrete have developed in the near surface soil horizons in sectors of the site indicating variable to poor internal drainage conditions.

4.2.5 Air Quality

No readily available data exist on air quality in the area. The air quality can be said to be typical of a peri-urban situation. The air quality is impacted upon by: veldt fires, vehicular emissions and the adjacent residential and commercial areas.

4.2.6 Noise

The proposed high-density residential development will most likely bring about additional vehicular traffic on the roads in the immediate vicinity of the development. The morning and afternoon peak period traffic volumes, in particular, will increase tangibly.

The proposed development should not have a negative impact on noise levels within the area.

4.2.7 Conservation Areas

According to the Ecological Assessment Mucina & Rutherford (2006) indicates that the site falls within Carltonville Dolomite Grassland and Eastern temperate freshwater wetlands. The authors described the Carltonville Dolomite Grassland as species-rich grassland with shallow soil and slightly undulating plains on dolomite dissected by prominent rocky chert ridges. This grassland falls within a warm-temparate summer-rainfall region with high summer temperatures and severe frequent winter frosts. This vegetation unit is considered vulnerable.

The site is in close proximity to the boundary of the Suikerbos Nature Reserve and the Platkoppie Landfill site.

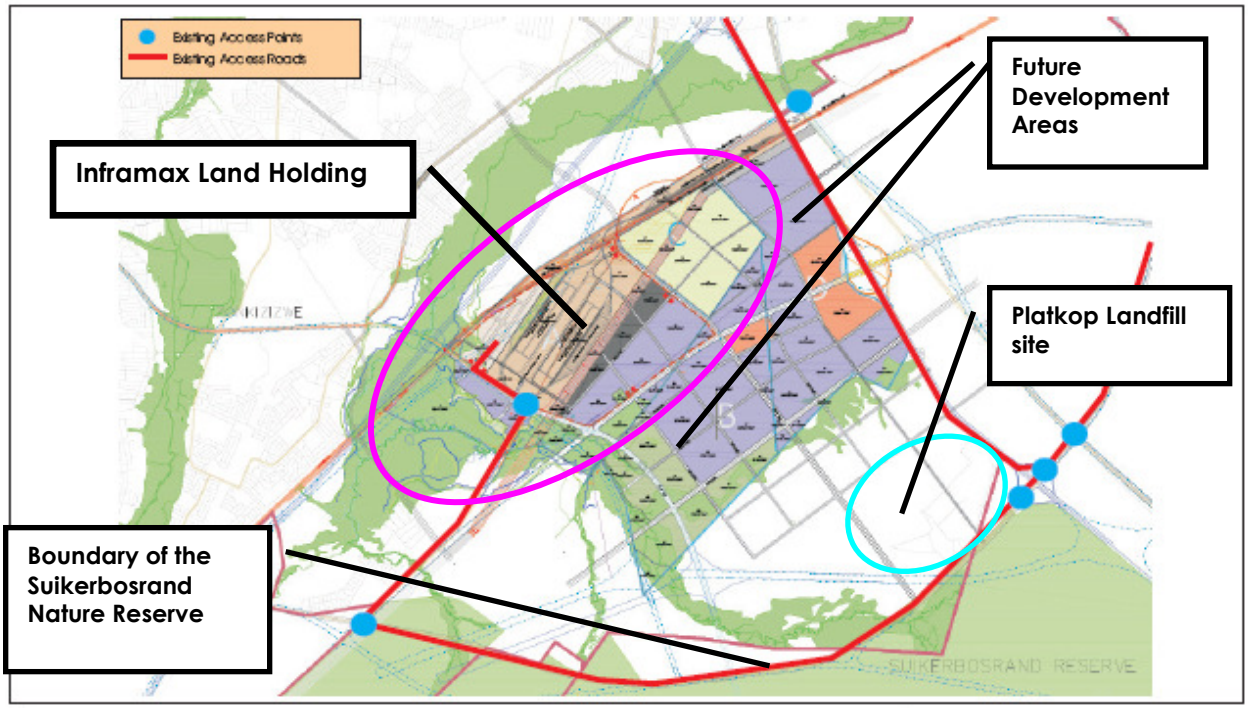


Figure 6: Location of Site in relation to Suikerbosrand Nature Reserve

5 BIOLOGICAL FEATURES AND CHARACTERISTICS

5.1 Fauna & Flora

Galago Environmental Consultants under took the following studies: Flora, Fauna, Mammals, and Herpetofauna (**Annexure C**).

- **Methodology:**
  - Information about the Red List and Orange List plant species that occur in the area was obtained from GDARD. The Guidelines issued by GDARD to specialists as well as various publications were consulted about the habitat preferences of the Red- and Orange List species concerned.
  - The SANBI list of plants recorded in the 2628AC quarter degree grid square was obtained and consulted to verify the record of occurrence of the plant species seen on the site.
  - A desktop study of the habitats of the Red List and Orange List species known to occur in the area was done before the site visit.
  - The study site was visited on 22 October 2011 and 8 November 2011.
  - One or more plots, depending on the size and composition of the vegetation, were selected at random from each study unit for detailed study. Each plot, which measured about 10m x 10m, was surveyed in a random crisscross fashion and the plant species recorded. Areas where the habitat was suitable for the Red List species known to occur in the quarter degree grid square were examined in detail.
  - Areas on the site and accessible areas on the neighbouring properties within 200 meters of the boundaries of the site where the habitat was suitable for the Red List species known to occur in the quarter degree grid were examined in detail. The site visits were done by the following specialists:

Table 6: Specialists used (Galago, Executive Summary, 2012:3):

This investigation was conducted by the following specialists:

Specialists	Aspect Investigated	Qualifications	Prof. Registration	Date of Field Survey
Rautenbach, I.L.	Mammalogy	Ph.D., T.H.E.D.	Pr. Nat. Sci.	22 October 2011
Van Wyk, J.C.P.	Herpetology	M.Sc. (Zoology)	Pr. Nat. Sci.	22 October 2011
Lemmer, P	Botany	B. Sc	Cert. Sci. Nat	8 November 2011
Geyser, R.	Avifauna		Pending	22 October 2011
Coetzer, L.A.	Botany review	D.Sc.	Pr. Nat. Sci.	
Kemp, A.C.	Avifauna review	Ph.D.	Pr. Nat. Sci.	
Marais, V.	Environmental Impacts and maps	BL Landscape Architecture		

The following represents a summary of their findings:

- **Flora:**

Four vegetation study units were identified on the study site:

- *Eragrostis – Elionurus* grassland;
- Wetland;
- Mixed alien and indigenous vegetation; and
- Cultivated fields.

The *Eragrostis – Elionurus* grassland and the Wetland were considered sensitive. One Red List species was found in the wetland opposite Zonkizizwe township. Two Orange List species were found in the *Eragrostis – Elionurus* grassland and one in the Wetland. Mitigation measures proposed: A 200 meter buffer must be maintained around the Red List species as any development within the recommended buffer zone might destroy the population of this species.

Suitable habitat for four of the Red List species existed in the wetland and for one species in the *Eragrostis – Elionurus* grassland within 200 meters of the boundary of the site. Mitigation measures proposed: A monitoring programme for the relevant Red List and Orange List species should be maintained for the study site and also for the areas within 200 meters of the boundaries of the site.

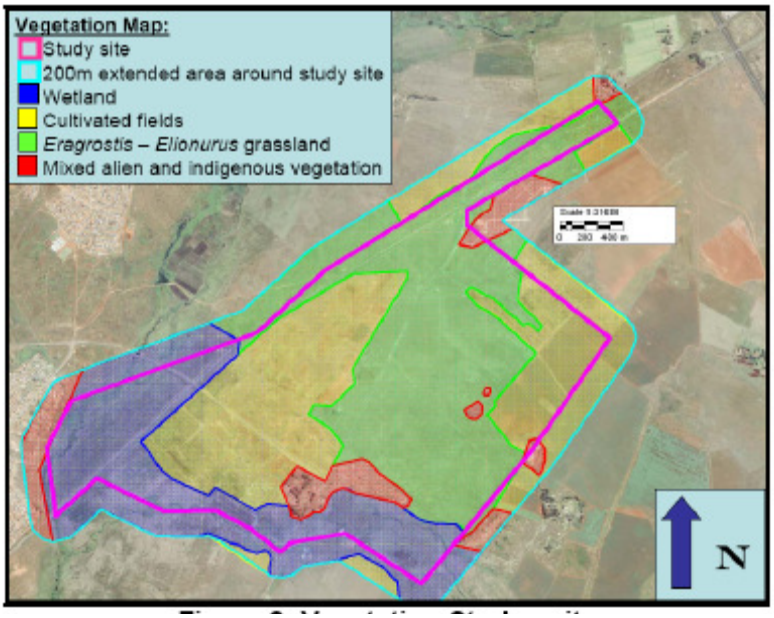


Figure 7: Vegetation Study units (Galago Environmental, November 2011:6)

- **Mammal:**

The mammal study found that the open perennial water sources on the site are too modest to allow for the permanent or even infrequent occurrence of spotted-necked or clawless otters.

The specialist concluded that otters may occasionally venture onto the site during exceptionally wet spells, but that is regarded as a rare event.

In terms of wetland vegetation the specialist found that the lush semi-aquatic vegetation along streams and marshy areas provide ideal habitat for the rough-haired golden mole, the listed shrews as well as the African marsh rat. This confirms the exclusions of the wetland area from any form of development or side-effects of the construction and operational phases of the development.

The investigation of the terrestrial portion of the site showed that the area is severely disturbed, either by ploughing or overgrazing. The proposed development will displace most of the terrestrial species recorded, but according to the report none of these can be regarded as rare or even sensitive. All species are common and widespread, and their loss will be of little conservation consequence at a national level.

The investigation concluded that with the exclusion of the wetland and the suitable buffer zone superimposed on appropriate management practices, the proposed development should not result in a loss of ecological sensitive and important habitat units, ecosystem function (e.g. reduction in water quality, soil pollution), loss of mammal habitat, nor of loss/displacement of threatened or protected species.

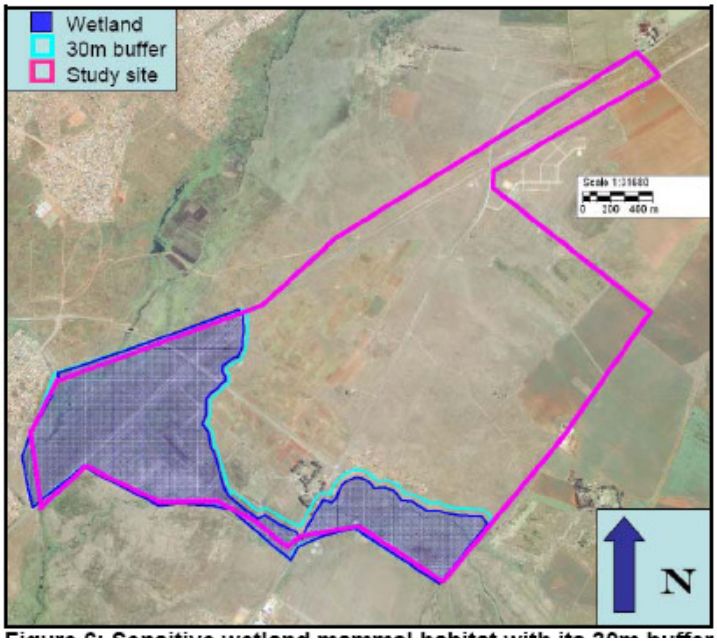


Figure 8: Sensitive wetland mammal habitat with its 30m buffer (Galago Environmental, November 2012:11)

- **Avifuana:**

The Avifuana study concluded that three Red Data avifaunal species (African Grass-Owl, Black-winged Pratincole and African Marsh-Harrier) are likely to make use of the wetland habitat on the study site and one Red Data avifaunal species (Lesser Kestrel) is likely to make use of the **open grassland habitat** on the study site.

The wetland habitat is therefore deemed highly sensitive for Avifaunal Red Data Species and other avifaunal species that occur or that are likely to occur within the wetland habitat system. They are depended of this habitat system for foraging, roosting and breeding purposes. This also includes a terrestrial buffer zone of 200 m from the wetland edge of the Rietspruit and its tributaries.

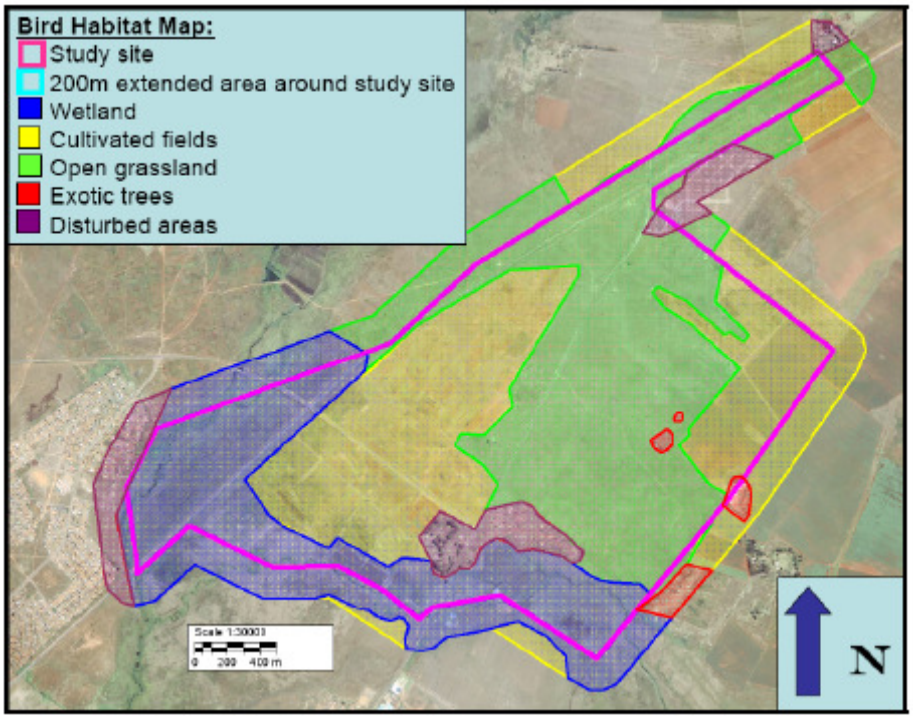


Figure 9: Bird habitat systems identified from the study site (Galago Environmental, November 2011:8)

The following mitigation measures are proposed: (1) No development should be allowed within the wetland habitat systems on the study site as well as within 200 m from the wetland on both sides of the wetland system and the entire length of the Rietspruit and its tributaries. This 200 m will act as a minimum terrestrial buffer for African Grass-Owls and African March Harriers. Secondly grazing by livestock should be limited within the wetland and adjacent grassland. This will allow the wetland to recover and become more favourable for Red Data avifaunal species. The following map shows the 200m buffer zone applicable:

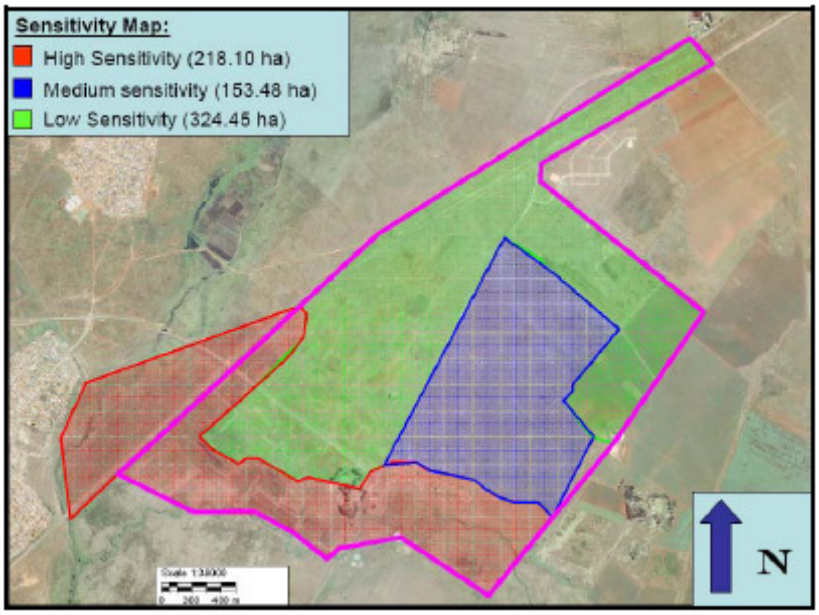


Figure 10: Avifaunal sensitivity map including the 200m buffer area around the wetland (Galago Environmental, November 2011:27)

- **Herpetelogical:**

The herpetological report found that firstly, the water and associated wetlands support narrowly adapted moisture-reliant herpetofauna and their life-support mechanisms. This justifies excluding the wetland area from any form of development or side-effects of the construction and operational phases of the development. Secondly, in the natural veldt areas there are numerous moribund termite mounds, the ideal habitat for the striped harlequin snake. The snake is known to occur in the nearby Suikerbosrand Nature Reserve. The report therefore recommended that the natural grassland that borders the wetland be excluded from any development. The report indicated that the terrestrial habitat is spatially by far the most prominent, although large tracts of land have been ploughed and is therefore classified as ecologically non-functional.

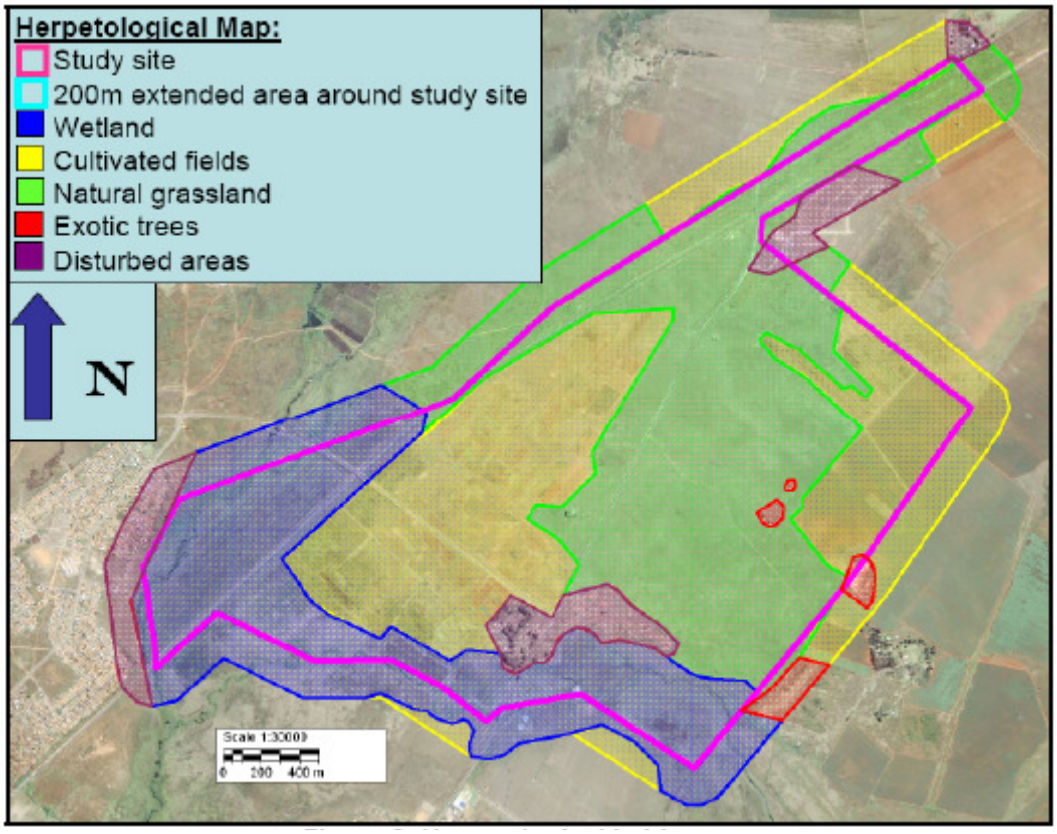


Figure 11: Herpetological Habitat Map (Galago Environmental, November 2011:7)

The sensitivity map for the herpetological assessment is as follow:

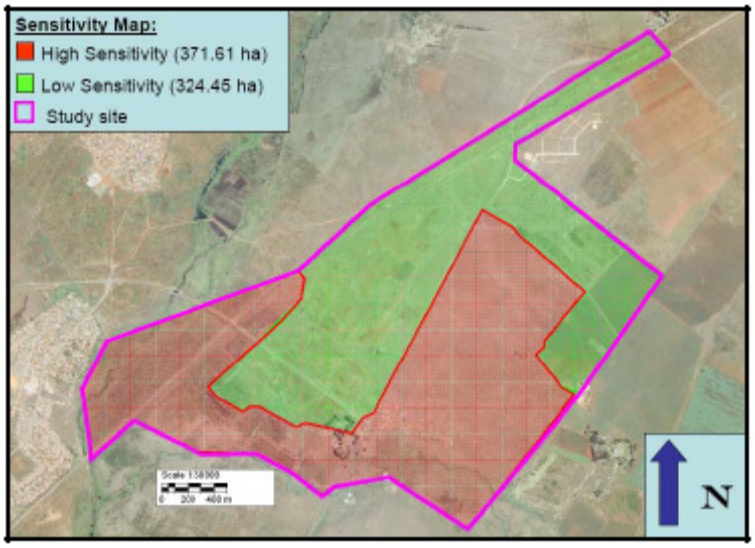


Figure 12: Herpetological Sensitivity Map (Galago Environmental, November 2011:

Various mitigation measures were proposed by the specialist consultants. The most important being that no development should be allowed within the wetland habitat systems on the study site as well as within 200 m from the wetland on both sides of the wetland system and the entire length of the Rietspuit and its tributaries. The 200 m buffer will act as a minimum terrestrial buffer for African Grass-Owls and African March Harriers.

Furthermore an appropriate management authority (e.g. the body corporate) that must be contractually bound to implement the Environmental Management Plan (EMP) and Record of Decision (ROD) during the operational phase of the development should be identified and informed of their responsibilities in terms of the EMP and ROD. All areas designated as sensitive (i.e the wetland) in a sensitivity mapping exercise should be incorporated into an open space system. Development should be located on the areas of lowest sensitivity.

The following composite map shows the sensitivity map overlain with the proposed layout plan:

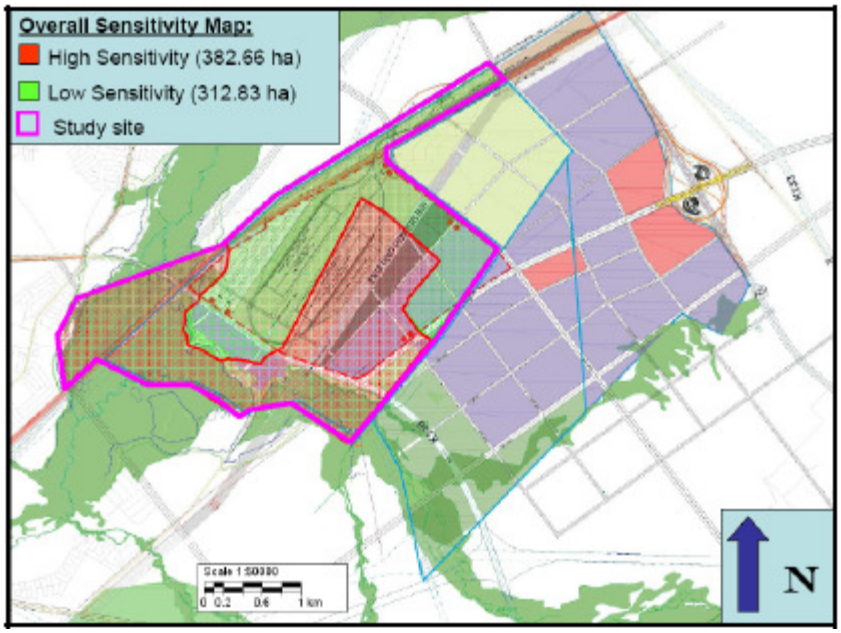


Figure 13: Composite Map - Layout plan overlain with the Environmental Sensitivity Map

The report concluded that where the layout plan is overlain with the environmental sensitivity map (Figure 13), it is clear that most of the wetland and surrounding buffer areas were excluded from the proposed development. The grassland area to be conserved is however very small, but should be seen together with the open space areas on the layout map for the neighbouring site to the east.

5.2 Wetland Delineation and Aquatic Assessment

Prism Environmental Cc undertook the wetland delineation and aquatic assessment. The site Investigation was conducted in August 2011. The specialists involved are:

- Report Author: Mr A Koning *(B-Tech Nature Conservation)*
- Report Co-Authors: Mr D Botha (*M.A Environmental Management; PHED)*
  Prof L R Brown *(Pri.Sci.Nat)*

The following represent a summary of the findings of the report:

- **General:**

The wetland and aquatic areas are located in the quaternary catchment C22C of the Upper Vaal Water Management Area (WMA8). The study area is located within the Grassland Biome (Biome 6) of the Highveld.

- **Findings – Wetland Assessment**
  - The wetland is classified as a flood plain wetland;
  - The hydrological integrity is rated as a Category D – meaning approximately 505 of the hydrological integrity has been lost;
  - The geomorphic processes of the wetland was classified as a Category D – meaning a large change in the geomorphic process occurred and the is appreciably altered;
  - The vegetation community has been disturbed and is classified as a Category D – meaning the vegetation community has been largely altered and alien/ruderal species are found in equal abundance to indigenous wetland vegetation;
  - The direct and indirect service of the wetland was rate "low";
  - The ecological importance and sensitivity was rated "low".
- **Findings – Aquatic Assessment**
  - The Dissolved Oxygen (DO) concentrations have a limiting effect on the aquatic biota at the site during the august survey;
  - The Total Dissolved Salt (TDS) values recorded for the test sites were considered to be high and have a limiting effect on the aquatic biota;
  - The habitat availability of test sites 1 and 3 were classified as fair/adequate and for test site 2 it was rated as poor/inadequate;
  - The results for the invertebrate habitat integrity assessment system (IHIAS) showed that the sites have reached a critical level of impairment;
  - Based on the SASS5 results the biotic integrity at site 1 was classified as "moderate" and at site 2 as being "poor".

The following map indicates the hydrology for the area:

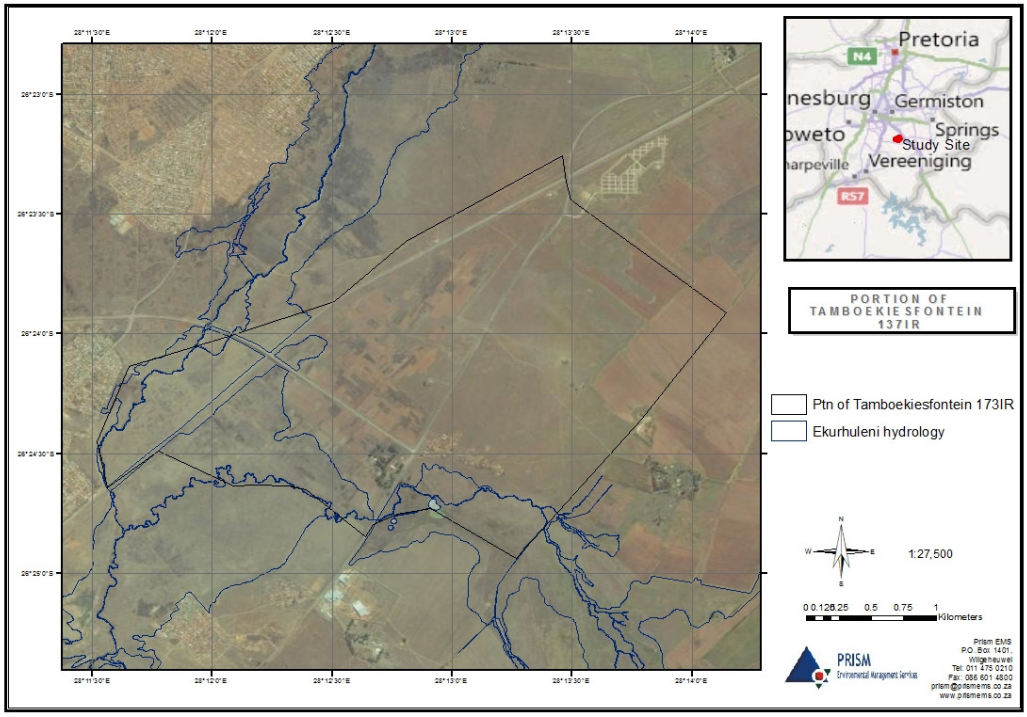


Figure 14: Hydrology for the site and surrounding area (Prism Environmental, March 2012)

The wetland and associated buffer as delineated by Prism Environmental is as follow:

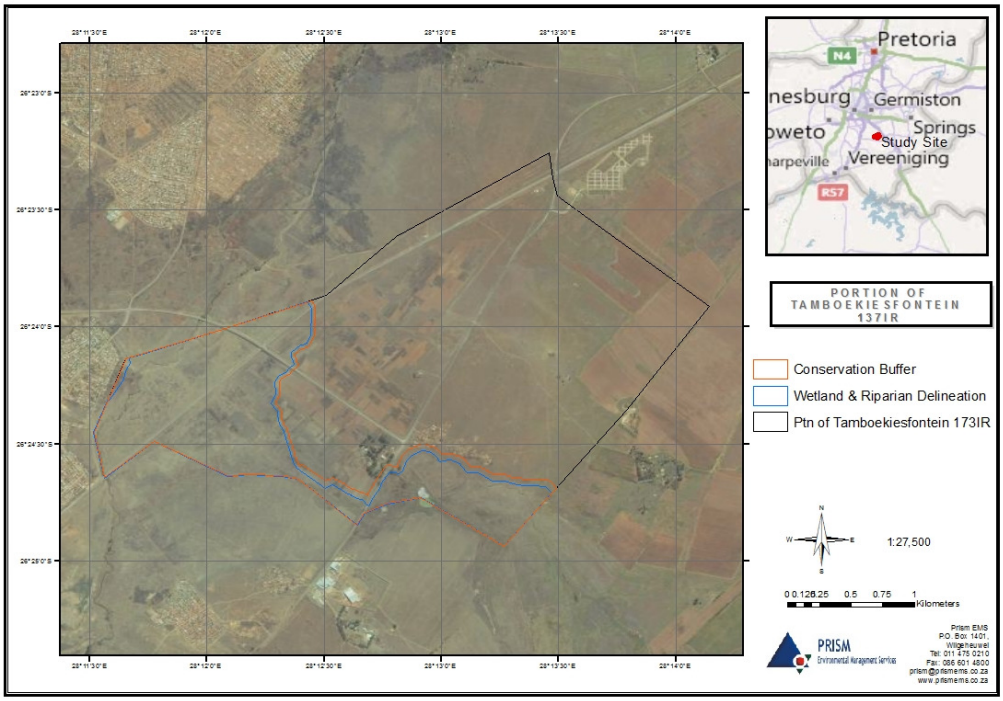


Figure 15: Conservation Buffer – Wetland (Prism Environmental, August 20110

It is concluded that the proposed site layout plan has taken into consideration the findings of the wetland assessment and aquatic study and ensured that the wetland and buffer zone is conserved. No development will take place in the wetland and applicable buffer zone.

5.3 Cultural Features and Characteristics

Heritage sites were found on the site. Therefore a Heritage Survey was commissioned. The Heritage survey was under taken by Dr J van Schalkwyk (D Litt et Phil). The findings of the report are as follow:

❑ **General:**

Three sites rated to have significance have been identified in the study area. They are:

• Two old cemeteries, which are rated as having high significance on a local level.

• An old farmstead, which is rated as having high significance on a regional level.

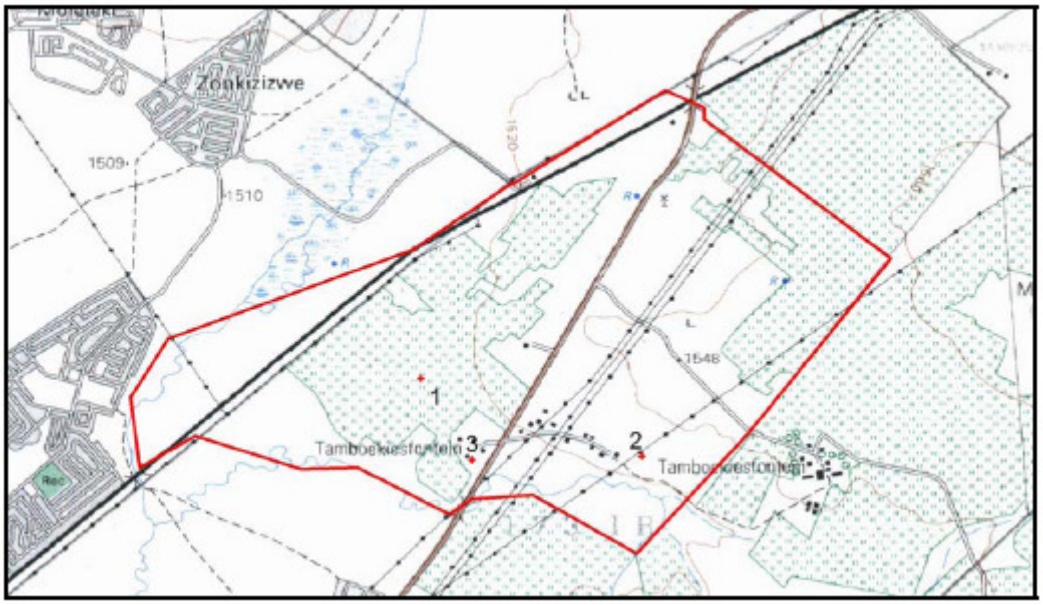


Figure 16: The study area, showing the location of the identified sites (Van Schalkwyk, 2007:11)

❑ **Site 1:** S 26.40522; E 28.20902

This was identified as a small farm cemetery with graves of the Vermeulen family as well as other people. The grave yard has been disturbed with most of the headstones have been pushed over, and the contents of two to the graves have been exhumed. The specialist recommended that all the graves are relocated to a formal cemetery

- Significance rating is: High ;

- Mitigation actions recommended: to retain the graves or, alternatively, relocate after following correct procedure ;
- Legal requirements: Permits, SAHRA permits, police, notification, consultation, relocation.

❑ **Site 2:** S 26.40973; E 28.22176

This is a very large informal cemetery, with approximately 200 graves. The cemetery is a very large feature and is still in use by the local community, and it is therefore recommended that it is retained and formalised by fencing it off, maintaining the site and identifying the authority for looking after it.

- Significance Rating: High on a local level ;
- Mitigation actions recommended: to retain the graves or, alternatively, relocate after following correct procedure ;
- Legal requirements: Permits, SAHRA permits, police, notification, consultation, relocation.

❑ **Site 3:** S 26.40992; E 28.21193

This is an old farmstead, consisting of a house, outbuildings, barns, etc. now mostly in ruins. It was found that based on style and material used, some elements seem to be older than 60 years

- Significance rating: High on a regional level
- Mitigation actions recommended: mapping of the site by a heritage architecture will be necessary;
- Legal requirements: should the building be demolished, a permit from SAHRA has to be issued.

It is concluded that sites 1 and 3 have a "high" significance rating. These two sites will be impacted on during stage 1 of the development phase. It is therefore necessary that the correct procedures are followed to obtain permission from SAHRA to relocate the graves and to demolish the house (if approved by SAHRA). Site 2 will only be affected during stage two of the development phase. It is recommended that the same procedures are followed for this site as for the aforementioned sites.

6 SOCIO-ECONOMIC FEATURES AND CHARACTERISTICS

6.1 Town Planning Assessment

In terms of the Peri-Urban Town Planning Scheme of 1975, the site is zoned "Undetermined". To accommodate the proposed development, the site has recently been incorporated into the Urban Development Boundary of the Ekurhuleni Metropolitan Municipality and is earmarked for an Inland Port in terms of the revision of the Metropolitan Spatial Development Framework (MSDF) 2010/2011.

6.1.1 Land Use Assessment

The town planning application done by Aeteron Town Planners will apply for the following land uses to accommodate the proposed inland port development:

- Erven 1 to 4

Proposed zoning: "Special" for railway purposes including rail siding, arrivals and departures yard, maintenance depot and other related and subservient uses.

The erven are earmarked as the arrival and departure yard for the terminal. It is located off the mainline so that it does not impact on the current mainline operations. Provision has also been made on the erven for a locomotive and wagon maintenance facility. The aforementioned erven will be transferred to Transnet after promulgation of the township.

- Erf 5

Proposed zoning: "Special" for transportation centre including railway facilities, container depot, inland port, logistics hub, intermodal terminus, truck staging, security, access control, ablution facilities, administration and offices, stacking space for containers, customs clearance equipment maintenance and repair area as well as other related and subservient uses.

The layout plan shows an area of ± 46ha for a trucking and intermodal yard/staking area and logistics space. The position of the stacking area relative to the terminal blocks and warehousing area ensure undisturbed and secure operations. It will have a dedicated and secure access point from Road K146.

Erf 5 will accommodate the truck staging area, ablution facilities, administrative facilities, access control areas, equipment maintenance and repair area as well as empty container storage

space. Although this erf is presently shown as one erf the intention is to subdivide this erf into smaller erven with a private road system. The entire area will be secured and controlled.

- Erven 6 to 9, 12 and 15

Proposed zoning: "Special" for transportation centre including railway facilities, container depot, inland port, logistics hub, intermodal terminus, truck staging, security, access control, ablution facilities, administration and offices, stacking space for containers, customs clearance, equipment maintenance and repair area as well as other related and subservient uses.

The abovementioned erven will primarily accommodate the intermodal terminal i.e. railway network designed as a loop, the road to road terminal and road to rail container stacking area. The proposed terminal will be able to handle road to road and road to rail containers as well as palletised goods. The terminals are positioned parallel to the road and stacking area and terminal blocks are adjacent or parallel to one another.

The exchange yard design is based on a 100 wagon train(2400m in length). When operating at full capacity it will be able to handle 1 million containers TEU's. The rail network has a curve radius of 300m and a gradient of 1:800 which conforms to the acceptable design criteria. It comprises of 10 lines (5 lines for arrivals and 5 lines for departures). The terminal operations will also be in a secure and controlled area.

- Erven 10, 11, 13 and 14

Proposed zoning: "Special" for transportation centre including railways facilities, container depot, inland port, logistics hub, intermodal terminus, truck staging, security, access control, ablution facilities, administration and offices, stacking space for containers, customs clearance, equipment maintenance and repair area, Industrial 1 uses as well as other related and subservient uses.

The above erven are earmarked for Industrial 1 uses as well as for a trucking and intermodal yard and storage space. Should erf 6 reach full capacity erven 10, 11 13 and 14 could also be used for this purpose.

- Erven 16-22

Proposed zoning: "Industrial 1" purposes for industries, offices, commercial purposes, showrooms, motor dealers, panel beaters, builder's yard, service industries, fitment centre, motor workshop as well as other related and subservient uses.

The planned use for the erven is "Industrial 1" to accommodate industrial uses and warehousing associated with the inland port. Noxious industries are not accommodated within the zoning of "Industrial 1".

- Erven 24-26

Proposed zoning: "Private Open Space" for parks, gardens, nature reserves, botanical gardens, conservation, heritage sites, monuments, historical buildings, play parks, open spaces, squares and buildings used in conjunction with municipal purposes and cemetery.

The above erven are zoned private open space as requested by the town planner at Ekurhuleni Metropolitan Municipality. The 1:100 year flood line, wetland area, and environmental sensitive areas as well as community graves are all accommodated within this private open space.

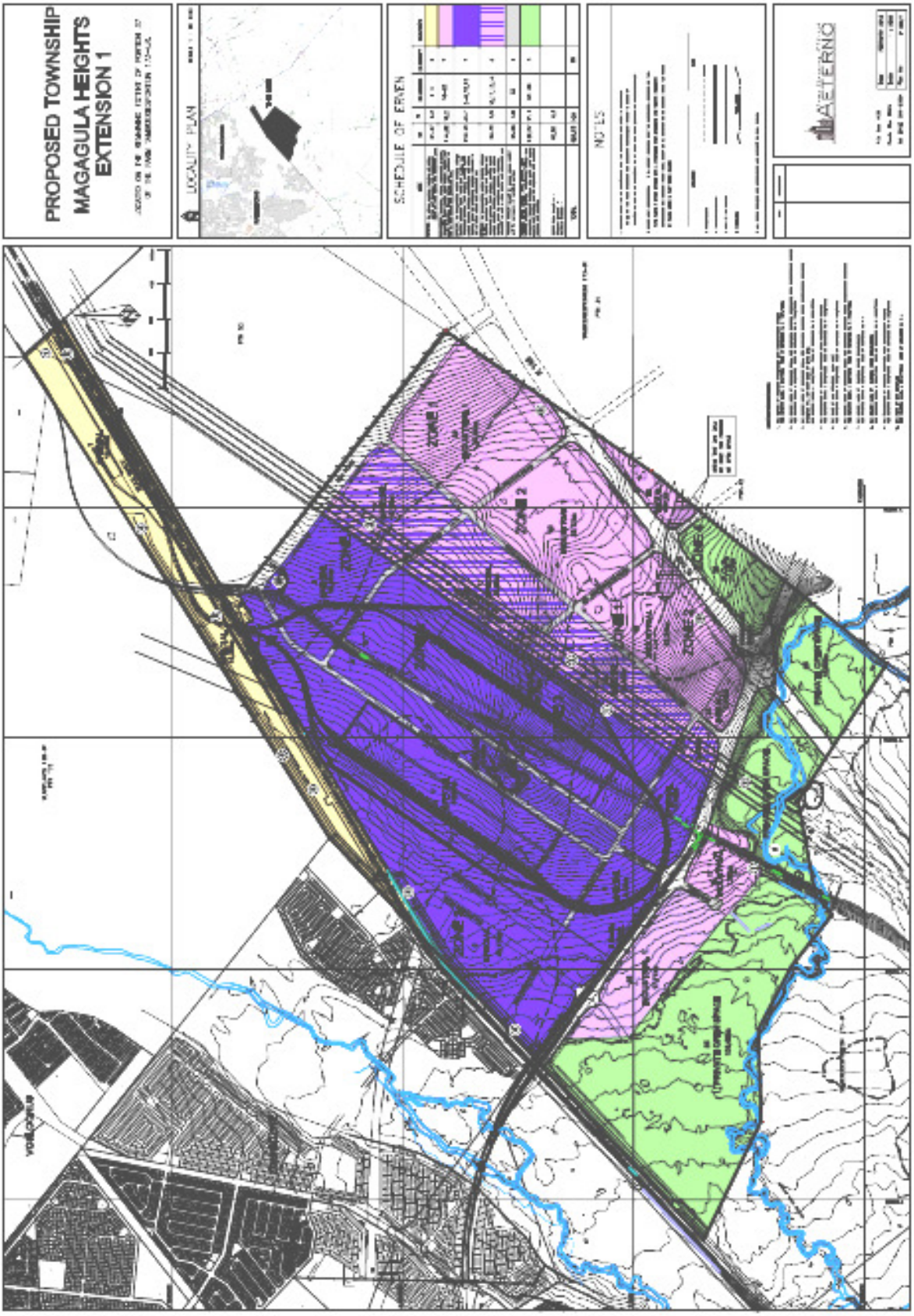
- Erf 23

Proposed zoning" "Special" for access, access control and the conveyance of municipal services.

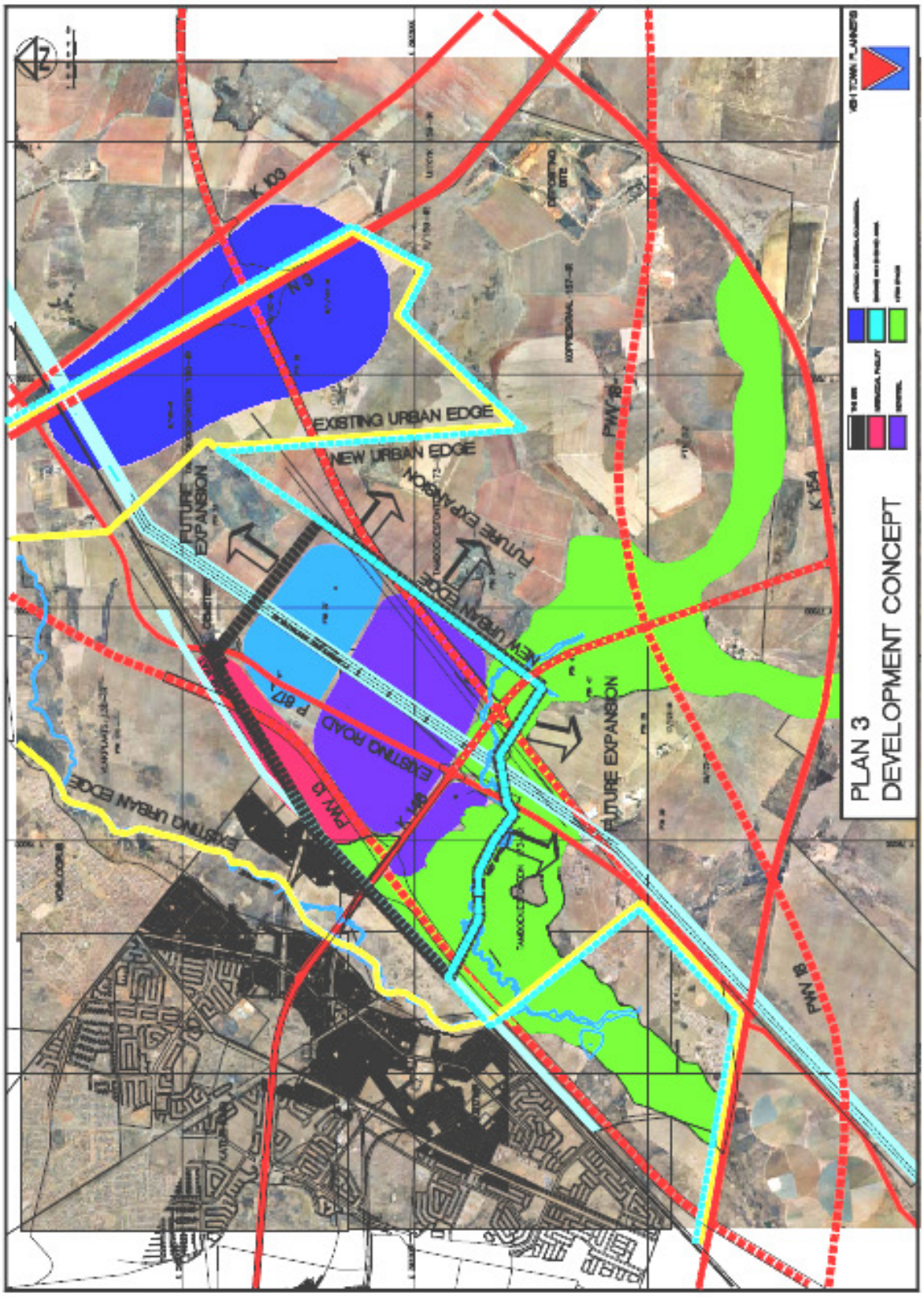
As a high degree of security is required for the proposed operation all the roads (with the exception of the K- Roads and Road D817) which are to be realigned shall be private roads.

This would enable the developer to impose access control points on these roads so that the entire area, bounded by the Provincial K Roads, becomes a secure and controlled area.

The proposed land use and layout plan as discussed above is as follow:


PROPOSED TOWNSHIP
MAGAGULA HEIGHTS
EXTENSION 1
LOCALITY PLAN
SCHEDULE OF ERVEN
NOTES
AETERNO

To illustrate the aforementioned land use proposal a development proposal was formulated:



6.1.2 Regional Spatial Development Framework

The "Ekurhuleni Metropolitan Municipality Spatial Development Framework Review, 2010 - 2011" (MSDF) looked at Inland Ports/Logistic Hubs and referred to the study commissioned by Transnet, namely the "Sentrarand Pre Feasibility Study" completed in 2007. This study concluded that "…the option of citing an intermodal terminal in Gauteng, capable of accommodating the intermodal traffic entering the Province and its capture area will provide a positive solution to reduce volumes in already congested areas." (MSDF Review, 2010/2011, Report 2: 68).

Furthermore the MSDF specifically refers to the Tambo Springs Inland Port (MSDF Review, 2010/2011, Report 2: 38-39). The MSDF states that although currently the site is located outside of the urban edge the Municipality decided that "Based on the merit of the submission it is recommended that the application or the extension of the Urban Edge be supported, on condition that the land to be included into the urban edge be utilised only for the purpose of an inland port (freight hub).

Therefore the main structuring elements of the region are:

- **Proximity to Major Markets:** The proposed inland port located 30 kilometers south of the Johannesburg CBD would have easy access to the Johannesburg and Tshwane markets and further north into Africa. Other important markets in the Gauteng area including Nigel/Springs, Vereeniging, Sasolburg and Heidelberg are also well linked to the site.

- **Accessibility:** The site is accessible from the N3 highway (main route to Durban) as well as the possibility of a regional link across the southern fringe of the Ekurhuleni/Johannesburg urban area to the N1 Highway (main route to Cape Town and Port Elizabeth). Access to the site from the N3 is obtained via the K154 (R550) interchange at Glenroy.
  The K154 (R550) extends westwards to link with Road R59, the highway linking Johannesburg and Vereeniging.

  Proposed future roads are: the proposed road K146 will provide an additional link to the N3 highway at the Petroport. The proposed PWV 18 will provide a link between the R59 and the N1 highway which is the main road link to Cape Town. The proposed road PWV 13/15 will provide a link to OR Tambo International Airport, to the north.

Furthermore the site is linked to OR Tambo International Airport (± 25 kilometres to the north) via several main roads.

- **Railway:** The Glenroy railway line that runs along the northern boundary of the site is a dual directional freight line between Johannesburg/Alberton/Vereeniging/Cape Town line some 15 kilometers west of the site and the Johannesburg/ Germiston/ Durban line about 7 kilometers east of the site. In the future a passenger rail link from Kwesine Station in Katlehong is proposed to link into the site. This will provide the opportunity for overnight freight delivery to the city.

  As mentioned in a previous section the proposed development of an inland port and logistics hub requires an area of at least 1000ha. The site in question is approximately 600 hectares of which about 450 hectares will be suitable for development. In addition, the two adjoining farm portions are available for development. This would ensure that the required 1000 hectares can be relatively easily assembled.

Conclusion:

It is therefore clear that the proposed development fulfils all of the above requirements and that this development has specifically been included in the spatial development framework and is therefore in line with all policies and objectives drafted for the area.

6.2 Socio Economic Impact Analysis

The socio-economic impact analysis was completed by Blue IQ investment Holdings (Pty) Ltd in October 2011. It is a comprehensive document that assesses the following:

- *Adjacent Properties*
- *Existing Road and Rail Networks*
- *Technical description of the Project*
- *Economic Analysis*
- *Socio economic Baseline and*
- *Social and Economic Impact Analysis*

The following represents a short summary of the results as documented in the executive summary of the document (Blue IQ, October 2011:3-4):

- *"Employment statistics reflect the employed populations in the focus areas as : Magagula (19%), Zonkizizwe (17.5%), Zonkizizwe Extension (16.6%) and Zonkizizwe Extension 2 (18%. Unemployed and „not economically active" populations in the Focus Areas can be deemed „high" as statistics show that Magagula, Zonkizizwe, Zonkizizwe Extension and Zonkizizwe Extension 2 have 46.3%, 49%, 50.8% and 48% of such populations, respectively;*
- *Anticipated negative impacts during pre-construction relate to the possible movement of work-seekers into the area and the physical and economic displacement of the Thulasizwe community5;*
- *Negative impacts during construction focus on health and safety issues (road, pedestrian safety and the potential increase in HIV/AIDs and STDs); community disruption (as a result of work seekers in migrating from other parts of the country) and the existing community's perception of having non-local workers in the area;*
- *The operations phase of the proposed development will show differing negative impacts, but specifically related to the industry competition that would be created and the potential effect it may have on the local price of goods and services; the health and safety of all in the proximate communities (related to the increased traffic and an expanding population); the anticipated pressure on municipal-provided services such as electricity, sanitation, water, schools and health facilities; and the local community's perceived preferential access to job opportunities;*
- *The estimated investment in the development equates to a 0.8% increase annually in Gauteng's GGP over fifteen years or a 12% increase relative to the initial GGP base;*
- *The construction phases may see an increase of 81 000 jobs (still to be verified) and against the three million formal jobs in Gauteng, 5 400 jobs secured per annum amounts to 0.18% jobs retained/secured. However, over a 15 year period, this would amount to a total of 2.7% jobs retained/secured against the Gauteng employment base (when considering only the first year of the Inland Port's operation);*
- *The total increase of the NPV of the GGP value added by Tambo Springs Inland Port on the Gauteng economy (direct, indirect and induced) is estimated on an annual basis at 0.7% pa and 1.1% for Johannesburg and Ekurhuleni combined. The total economic value added (thus all the individual years added together over 15 years) relative to the initial base, will increase the Gauteng GGP by 6.4% - as an indication of the actual quantity of the economic value added over the period;*
- *The impact on the construction industry with an estimated R7.5 billion investment over a 15 year period amounts to a 2% increase in output in this sector and this is significantly positive;*

- *The impact on employment, over a 15 year period, is a total increase in employment in Gauteng of 3.5%, relative to the initial base. However, the year on year additional employment is 0.2% on average;*
- *Based on current municipal property rates published by Ekurhuleni Metropolitan Municipality, it is estimated that R150 million could be generated in property rates and taxes to the municipality emanating from the Tambo Springs Inland Port development. This is a 5% increase on the current property rates and taxes income of the municipality and is rated as significantly positive;*
- *The potential impact on Government revenue is also significantly large. The increased GGP emanating from this proposed project, under many assumptions, has the potential of increasing the national revenue income over a 15 year period by R21 billion (or R1.4 billion per annum on average). This excludes local rates and taxes calculated above. What makes this statistic significant, assuming the project is economically "* (Blue IQ, 2011:3-4)

The report concluded that the proposed development will greatly contribute to the competitiveness of South Africa's logistics sector.

Meetings had with the local communities indicated that:

- During the construction phase of the development A Community Health and Safety Plan should be drafted to identify risks and appropriate risk management activities, including appropriate ways to secure the Inland Port site. Furthermore a Resident's Forum and the local existing Community Policing Forum must be used as vehicles to convey appropriate health and safety information to affected communities. On-going Grievance management procedures must be implemented. It is important that safe pedestrian crossings be implemented to reduce health and safety concerns and increase efficiency of mobility.
- During the operational phase the current municipal and provincially provided services such as educational and health facilities, libraries and community facilities will endure added pressure due to the increased population of workers (and their families) in the area.

Furthermore the report recommended that the social impact on the Thulasizwe community be assessed. Specific recommendations with regard to the Thulasizwe community are as follow:

- *"A full scale SEIA that focuses solely on the Thulasizwe community, with livelihoods restoration as a central theme to be addressed;*
- *The SEIA should include a full household survey and asset inventory so that the recommendations towards a RAP (with a resettlement budget) could be made;*

- *Ensure that the SEIA focuses on the host land. Impacts relating to host communities or the movement of people into the area must be assessed. For example, the indication at present is that the Thulasizwe community will be moved across the Magagula Heights road. The proposed resettlement land is surrounded by two roads (the road Katlehong and the Magagula Heights road (D817)), a rail line which is still operational, and potentially the new housing development (to be constructed by Deenin Property Developers). This is hugely contrasting to their present location, where they have access to only the Magagula Heights road. Specific safety concerns (for community members and free roaming livestock) may be raised based on the amount of vehicle, rail and people traffic that will surround them; and*
- *Negotiate all aspects of resettlement with the community (agreement on type of housing, location, whether land/ housing entitlements are offered, whether a phased approach to resettlement is to be undertaken, when will the resettlement start, will there be interim livelihoods support or assistance in agricultural food production, how will vulnerable people within the community be supported during the move, is there a moving allowance provided, etc)* " (Blue IQ, 2011:79-80)

It is concluded that the above findings be assessed by the developer and all recommendations be implemented with the help of the relevant Specialist Consultants.

6.3 Engineering Services

Reports for the various services were compiled by the following participating consulting firms:

Name	Organisation	Area of Expertise
Leon Boshoff	Bigen Africa Engineering Solutions	Engineering Services
Philemon Namane	Mpotseng Infrastructure	Traffic Impact Study & Electrical Report

6.3.1 Water

- **Water Supply:**

The Ekurhuleni Metropolitan Municipality (EMM) is the Water Service Authority for the Tambo Springs development in terms of the Water Services Act (Act No. 108 of 1997). The Tambo Springs development site does not fall within any of the current EMM water distribution zones. Various options for the supply of water to the development was assessed and the findings of the investigation showed that the most cost effective supply alternative for the total development will be to supply water from a new proposed Tambo Springs reservoir system. This will entail the

construction of a new reservoir, water tower and pump station at the highest point on the development site.

The final reservoir system for the complete future development will consist of a lower lying area that will be supplied directly from the reservoir and a higher lying area that will be supplied via the water tower. Two pump stations will be required – one to fill the water tower from the reservoir (Tambo Springs pump station) and one to supply water from the Rand Water system to the reservoir (Mahoodisa Road pump station). (**Annexure C** – Bigen Africa Report). The following represents an extract from Figure A of the engineering report indicating the proposed location for the water reservoir:

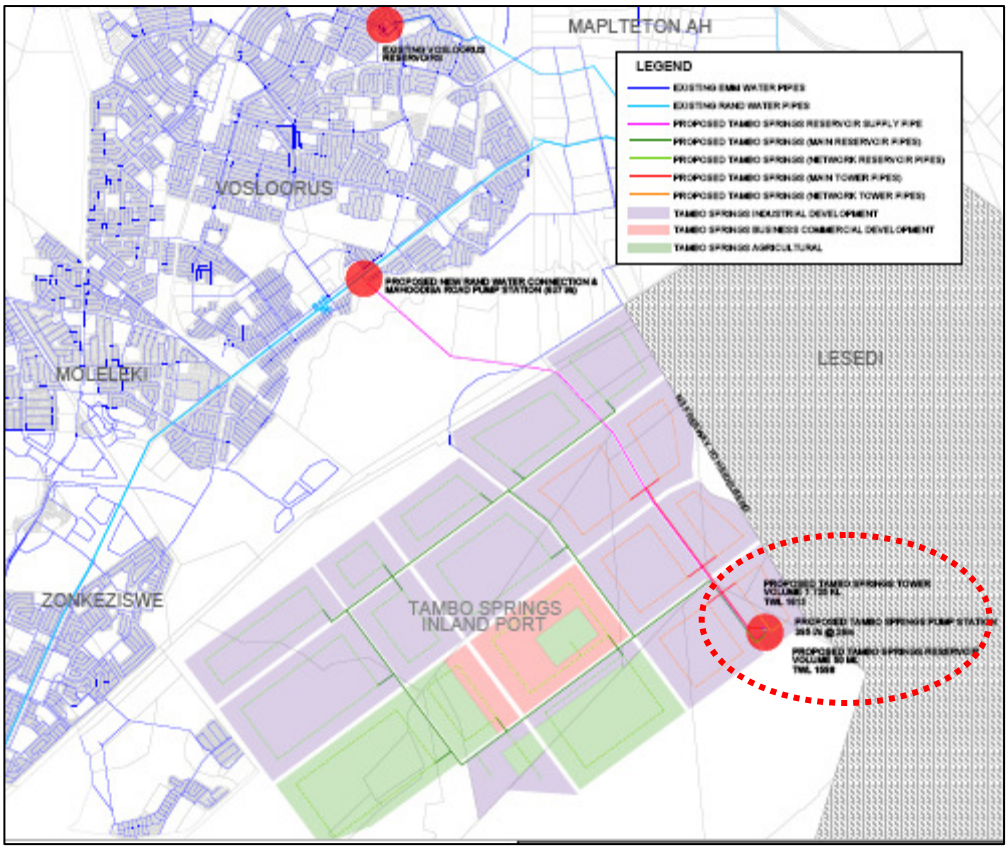


Figure 17: Extract - Proposed Water Reservoir (Bigen Africa: Figure A)

❑ **Water Demand:**

Meetings with Rand Water confirmed that even Phase 1 of the development cannot be supplied directly from Rand Water's B8/B16 pipeline without supplying storage volume. It is therefore recommended that the first reservoir be constructed on the highest portion of the Inframax Land Holdings to enable Phase 1 of the development to proceed.

This position will provide a static water pressure of between 30 m and 60 m, which is on the low side and depending on the position of the buildings an elevated tank or reservoir may be required. (Need min 25 m pressure during peak flow). The required 48h reservoir storage capacity for phase 1 is 7.2 Ml.

The existing Mahoodisa Road pump station will be able too supply the Phase 1 reservoir. The pump station will be able to deliver 250.5 l/s, however the pumping requirement for the proceeding of phase one only is calculated to be 62 l/s (based on 1.3 x AADD) which is less than what the station can deliver.

A supply pipe between the Mahoodisa Road pump station and the new 10 Ml reservoir will be required. The diameter for the ultimate reservoir supply pipe from the Mahoodisa Road pump station to the final reservoir is 250 mmØ. The recommendation is to construct the 450Ø ultimate reservoir supply pipe. The water supply from the reservoir to the Phase 1 consumption points can be done via a temporary connection to the pump line between the Mahoodisa Road pump station and the reservoir. This is a temporary connection and will be closed off when the rest of the network to and from the final reservoirs is implemented.

6.3.2 Sewerage

The proposed development site does not fall within any of the existing Ekurhuleni sewer drainage areas, but can be incorporated into the area that drains directly under gravity to the Waterval WWTP. However, depending on the outcome of some further surveys required the development may fall within the sub-drainage area of a new sewage pump station being planned by ERWAT. This pump station, if implemented, will pump into the area that drains directly under gravity to the Waterval WWTP (**Annexure C** – GLS Report).

Currently neither the existing 600Ø outfall sewer at the downstream end of the proposed development site nor the existing 1500Ø main Waterval outfall sewer has sufficient capacity to accommodate any additional flow. Both of these pipes are already flowing at more than full capacity. Therefore extensive upgrading to these pipes was recommended in the ERWAT master plan.

Therefore the proposal put forward for phase 1 in the engineering report is as follow:

- A temporary Sewage Treatment Package plant or the upgrading of the affected main outfall sewers will be required. The upgrading requirements, depending on the position where the connection to the existing system will be made, are still to be done in accordance with the ERWAT master plan. The requirements of such a pump station can be calculated as follows:

  Pumping requirement = Maximum dry weather inflow / 0.7

  = 40.3 / 0.7

  = 57.5 l/s

The report indicated that the proposed Sewage Treatment Package plant will suffice for the Phase 1 outflow treatment and can be bypassed and removed once the rest of the development proceeds and when the ERWAT outfall sewers have been upgraded.

Prism Environmental Cc was appointed by the Applicant to obtain the relevant waste license as per the procedures stipulated in the Waste Management Act. Separate applications will be submitted for the license as per the Act.

6.3.3 Stormwater Management

There is no existing stormwater reticulation system within the catchment area of the proposed development. A stormwater management plan was commissioned and will be submitted to city of Germiston Metropolitan Municipality for Approval (**Annexure C** – Bigen Africa Report). Calculations showed that of the entire 627 ha of Area A (Inframax Land Holdings), Phase 1, approximately 430 ha will contain buildings or be paved or partly paved. In light of the aforementioned the purpose of the Stormwater Management Plan for Phase 1 of the proposed development is to ensure that the regulations and precautionary measures are applied in so far as stormwater management is concerned and to minimize the possibility of subsidence as well as flooding and pollution of the existing streams.

The management responsibilities for the management of stormwater will be as follow:

- The Developer, Inframax Strategic Properties, will be responsible for managing the stormwater related activities on site during the implementation phases of the development.
- During the implementation stage the developer may delegate certain of the responsibilities to the appointed professional team and contractors to implement the stormwater management plan, but will retain overall responsibility. Once the handover of the

development is complete, the Ekurhuleni Metropolitan Municipality will be responsible for the management, operation and maintenance of the stormwater system outside secure areas.

- Inside the secure areas it will be the responsibility of the governing bodies of the secure areas.

The main objective of the stormwater management plan for phase 1 is to restrict development within the floodplains so as to be consistent with the objectives of protecting life and property against major floods and preserving the natural environment. Areas within the project area affected by major floods (floodlines) have been excluded from the layout as stipulated in Chapter 14 of the National Water Act, Act No.36, 1998. The 1:100 year floodline (area which will be affected during the occurrence of the greatest storm in 100 years) have been calculated. These flood planes will be zoned as public open space and will not be utilised for any development or cemetery sites.

The following represents as summary of the mitigation measures pertaining to internal drainage facilities as discussed on pages 8 -10 of the Stormwater Management Plan drafted by Bigen Africa and attached in Annexure C of this report:

- *"The internal stormwater drainage system will be designed to convey stormwater generated internally (within the development boundaries) in a subsurface system that will not have a negative impact on upstream and downstream areas.*
- *Due to the area being dolomitic special care will be taken to minimise or avoid the ponding and ingress of water.*
- *Minor floods (low severity, occurring more frequently) will be accommodated in subsurface stormwater systems which consist of kerb inlets, manholes and pipe culverts that will drain the water from paved areas and roof drainage.*
- *During major floods (high severity, occur less frequently) the excess water will be conveyed by the road system and paved areas to suitable points of discharge. The conveyance of water on road surfaces will be done in accordance with the stipulations in the Ekurhuleni Metropolitan Municipality Design Standards.*
- *Any natural pond or water feature shall be rendered impervious with a permanent reinforced concrete lining without joints and be monitored for any loss of water.*
- *Rainwater down pipes shall discharge into concrete lined drainage channels (with sealed joints), which discharge the storm water at least 1.5 m away from the buildings.*
- *If no gutters with rainwater down pipes are provided for the buildings, a 1.5 m wide concrete*

apron (minimum) shall be provided.

- *Retaining walls shall either have weep holes if exposed to the outside or if this is not possible a subsurface drainage system must be installed to prevent the built-up of groundwater, and must be connected into the sewerage reticulation where no underground storm water system exists.*
- *All storm water channels within 10 m of a building shall be lined with a permanent impervious membrane such as an engineered Bentonite clay lining or any other approved alternative method. This is specifically applicable to the natural drainage course of the proposed development."* (Bigen Africa, Stormwate Management Report, 8-10:2012)

In addition the report includes erosion control measures the proposed stormwater design methodology. The report concludes that within the development of the site the developer and his professional team, including the contractor, shall be responsible for ensuring that the requirements of this Stormwater Management Plan are met.

6.3.4 Internal and external roads

The design guidelines of Gautrans and Ekurhuleni Metropolitan Municipality, supplemented by the Guidelines for Human Settlement Planning and Design (Red Book) were used to establish the criteria. The criteria are given for various road classes on relevant road reserve widths. This design will be finalised after the rezoning, the final development layout is approved, and before construction drawings are submitted for approval. A structural design period of 20 years will be adopted. A more detailed discussion of the roads will follow in Section 6.5 – Traffic Impact Assessment.

6.3.5 Refuse removal

All access points and road reserves will be designed to accommodate the municipal refuse removal services. The service is fully operational throughout the City of Germiston, and no problems are envisaged with regards to capacity.

6.3.6 Electricity

The proposed development falls within the boundaries Ekurhuleni Municipality which is also the electrical supply authority for the area. Any large electrical bulk supplies must therefore be arranged with the Municipality. The Municipality will then lodge the applications with ESKOM. Presently there are no large consumers in the proposed development area.

None of the substations in the area have the capacity to cater fully for the additional load of the proposed development. Only limited capacity is available and indications are that the initial load could be catered for in the short term via a switching station on the edge of the first phase of the development at the intersection of route K149 and the railway line. This switching station will be supplied by means of an overhead line from the existing Zonkizizwe substation of ESKOM to the west of the proposed development.

The loads for the various land uses for Phase 1 were calculated and are shown in the table below:

Inframax's Landholding	
Industrial/warehousing	18 447kVA
Intermodal yard area (additional)	1 239kVA
Logistics	11 322kVA
Trucking intermodal yard	1 395kVA
Total: Phase 1	**32 403kVA**

ESKOM planned an 88kV line along the eastern side of the Railway line running past the development. The position of this line is on the proposed development. The route was discussed with ESKOM and ESKOM indicated that they will investigate an alternative route for this line. This line will possibly be on the western side of the railway line. This proposed line will be the source from which the proposed substation/s for future developments obtains their power.

It is therefore concluded that for phase 1 the switching station proposed above must be built in such fashion that it can be converted with minimum cost to a proper substation.

6.3.7 Rail

The focus of the proposed transportation framework is to create linkages to the west, east, and south of the study area, with rail access point on the south, area to open it up and achieve integration with the surrounding areas. The expected terminal capacity that the development will operate at when fully developed is calculated as follow:

Table 7: Expected Terminal Capacity (Mpotseng, 2012:11)

Terminal Type	Expected Capacity
Container Terminal	• 1, 000, 000 TEU's/pa • 32 trains per day (50 wagon trains)
Palletised Terminal	• 4, 500, 000 pallets per annum • 12 trains per day

The rail terminal was designed in conjunction with Transnet and is included in the layout plan for Phase 1 – Inframax Land Holdings. The rail terminal will be developed in stage 1 of phase 1 of the proposed development. The development of the rail terminal is critical and is seen as the most critical design element of phase 1.

6.3.8 Conclusions

The previous paragraphs dealt exclusively with various engineering service items and it was shown that the installation and construction of service infrastructure is critical to the successful implementation of the proposed land use activities planned for phase 1, the Inframax Land Holdings area (i.e the site).

From a services point of view, there are sustainable solutions for all municipal services necessary for the proposed development. A Services Agreement will be drafted that will govern the phased implementation of the relevant services necessary for the development of the proposed activities.

6.4 Sense of Place

The concept of "a sense of place" does not equate simply to the creation of picturesque landscapes or pretty buildings, but to recognise the importance of a sense of belonging. Embracing the uniqueness of a place as opposed to standardisation attains the quality of the place. In terms of the natural environment it requires the identification, a response to and the emphasis of the distinguishing features and characteristics of landscapes. Different natural landscapes suggest different responses. Accordingly, the proposed residential development project should respond to the natural environment and features of importance.

The current "sense of place" of the specific site provides a perception of a vacant, open space area with pockets of subsistence farming scattered throughout the area.

It is very important that the site should be seen within the context of the future developments planned for the site and adjacent pockets of land. One should take cognisance of the fact that the site and surrounding pockets of land have been earmarked for the inland port development and associated land uses. Furthermore one must take cognisance of the fact that once completed the proposed inland port development would encompass 1000hectares of land covering the remaining vacant portions of land as illustrated in the layout plan below:

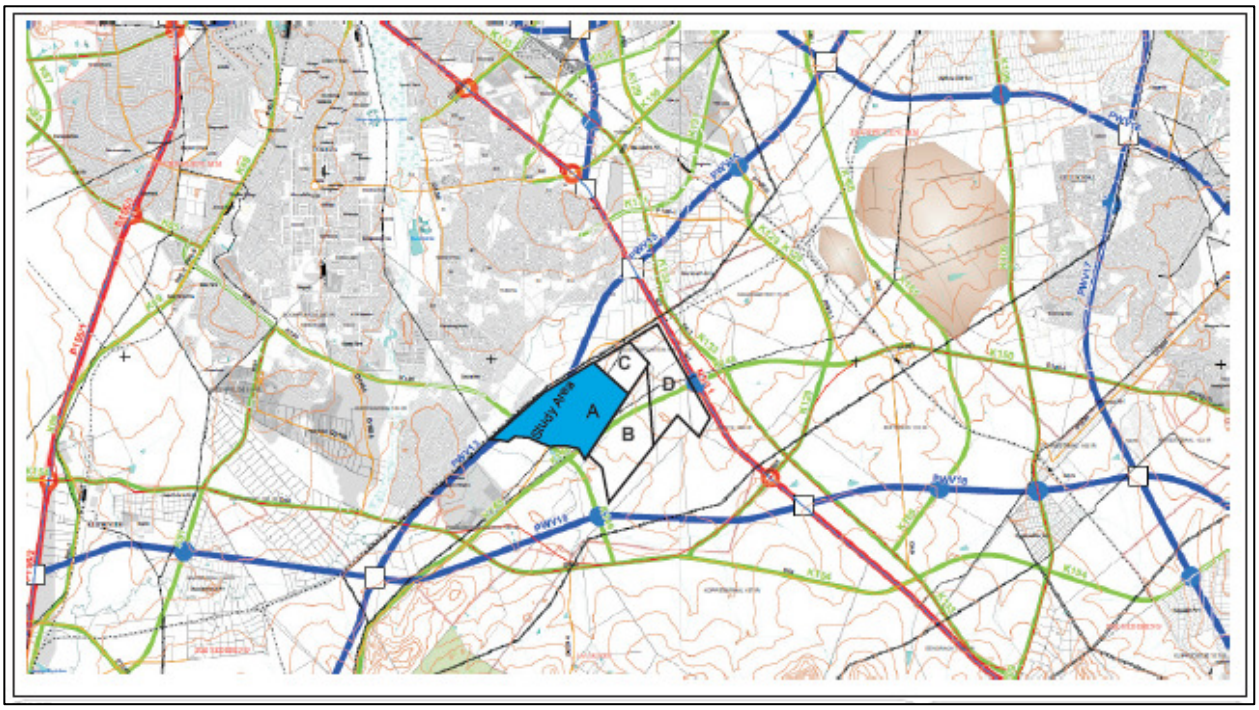


Figure 18: The site and adjacent land portions (Mpotseng, 2012: Fig 3-1)

It is therefore concluded that although the current sense of place may be that of a rural area located adjacent to an urban area, one can not ignore that this area is (1) included within the urban development boundary, and earmarked specifically for the proposed inland port development and (2) the proposed development although characterised by several developmental and environmental constraints have managed to mitigate these constraints to an acceptable level. The implication is therefore that, should all the mitigation measures and design measures be implemented the site and the adjacent land holdings could successfully be developed whilst conserving the sensitive environment in which it is located.

It is therefore the intention of the applicant to change the current sense of place to such an

extent that it conserves the sensitive environmental landscape whilst opening up the area to investment and creating job opportunities within an area currently isolated from economic growth and development opportunities.

6.5 Traffic and Accessibility

A comprehensive traffic impact study was compiled and is included in **Annexure C** of this document. The findings of the document are as follow:

- *"Phase 1 of the development stages includes development of a trucking and intermodal yard is on Inframax Land Holdings (the site) property. Warehousing and/or light industrial developments are also planned. The speed at which these developments will occur will depend on economic factors affecting the development.*
- *The PWV13/15, K146 and D817 are affected by the development. The PWV13 will need to be realigned to accommodate planned truck and intermodal yard on the northern boundary of the development along the existing alignment and K146 is also affected by the wetland areas on the south of the development.*
- *The construction of access intersections can be phased in as the various parts of Tambo Springs are developed. It is however, essential to ensure that adequate access capacity is provided at various stages of development phasing."* (Mpotseng, 2012:48)

Phase 1(the site) development traffic will have minimal impact on most of the intersection analysed. The most significant impacts will be experienced on the following roads:

- Barry Marais Road (M43) and Nederveen Highway (R103)
- Nederveen Highway (R103) and Kliprivier Road (R550)
- Kliprivier Road (R550) and N3 West Ramp
- Kliprivier Road (R550) and N3 East Ramp
- Kliprivier Road (R550) and Magagula Heights Road (D817)

The report indicated that there are 6 existing access points whilst a total five new access points are planned around the development, two on the western boundary along K146 (one for heavy vehicles and one for light vehicles), one along the K148 on the southern boundary for light vehicles and two on the eastern boundary along proposed extension of Mnganu Street which is expected to give access to local traffic, i.e. public transport, etc.

From the report it is clear that the construction of access intersections can be phased in as the various parts of Tambo Springs are developed. It is however, essential to ensure that adequate access capacity is provided at various stages of development phasing. The report assumed that they will be implemented as follows:

- Year 1 to Year 3 – Intersection upgrades
- Year 4 to Year 5 – Design and construction of K148
- Year 6 to Year 8 – Design and construction of K146

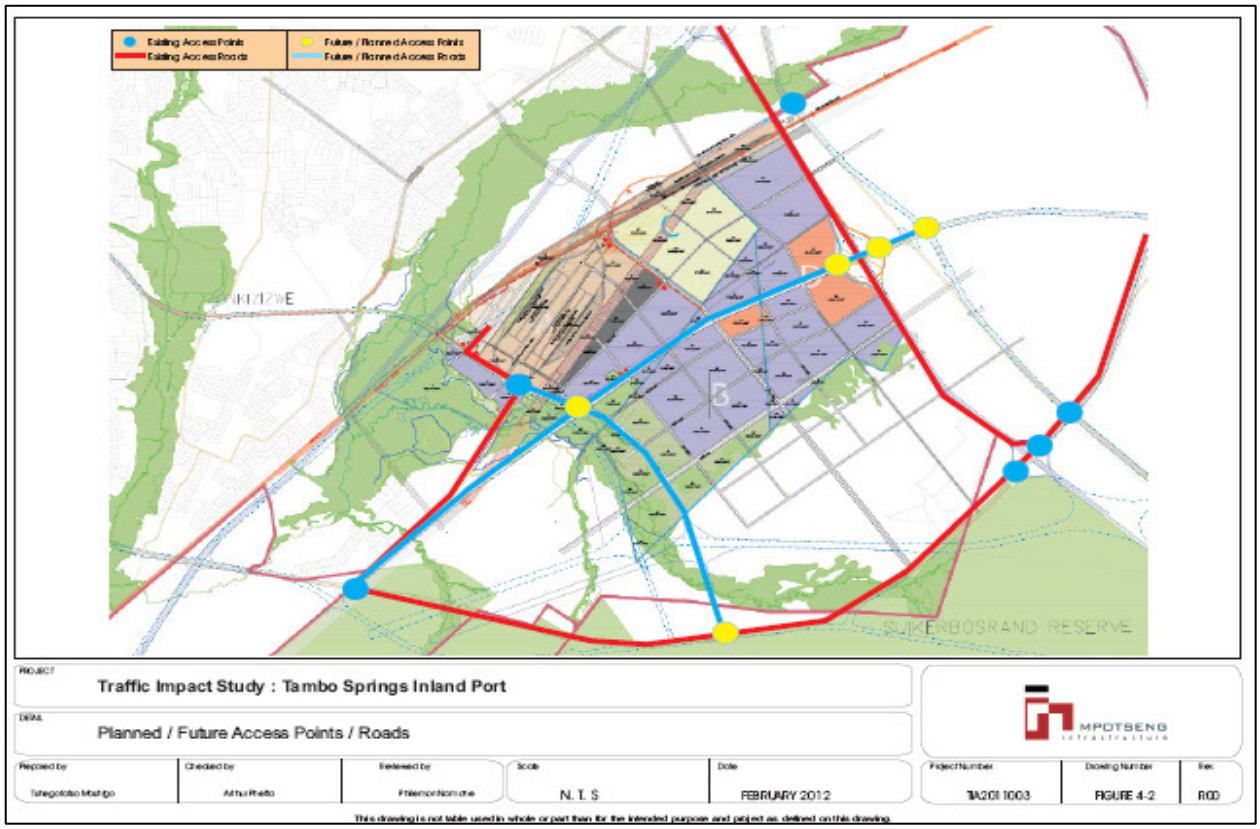


Figure 19: Existing and Future Access Points (Mpotseng, 2012: Fig 4-2)

The report concluded that with the implementation of the proposed road and intersection upgrades, the proposed infrastructure could accommodate the development.

6.6 Sensitivity Analyses

In order to establish where development activities will impact more negatively on the site, a sensitivity analysis was done by making use of a variety of sensitivity parameters. Such parameters were chosen based on the natural resources that would be most sensitive to disturbance of any kind. A set of layers containing information with varying sensitivities were

overlain with each other and a spatial map generated to indicate cumulative sensitivity. The following information layers were used to establish the cumulative sensitivity of the natural resources on the site:

- Ecology;
- Dolomite
- Hydrology
- Gradient;
- Visual sensitivity

- ***Gradient***

The site (Area A) slopes from 1560m AMSL from the south eastern side to 1515m AMSL on the north western side of the proposed development site over a distance of approximately 2800 m. The site has an average slope approximately of 1.6% or 1:60. The topography of the western corner of the phase 1 site is very flat and consists mainly of the Koppies Kraal Spruit flood plain.

The 1:100 year floodline indicated on the portion of land on the southern side of the railway line next to the fill of the link road into Vosloorus, is caused by the man-made road fill. The engineering report indicated that this portion of the site could be raised by approximately 1m up to the existing railway line cutting, to recover the land portion for the intermodal yard. This proposal was discussed with the official from DWAF at the site visit on 22 February. An agreement was reached that this could be possible as it is a man made wet area.

As the development flat areas along the Koppies Kraal Spruit flood plain would be avoided, it is concluded that the overall sensitivity rating of the proposed area to be used for development in terms of gradient is "low".

- ***Hydrology***

This area is drained mainly by means of sheet wash. The site is affected by the 1:100 year floodline. A wetland is found on the western boundary of the site. The overall sensitivity rating of the site in terms of Hydrology is "high".

- ***Dolomite***

The site is underlain by dolomite of the Malmani Subgroup, Chuniespoort Group of the Transvaal Super Group. Dolerite occurs in large areas of the site. Shallow dolomite bedrock conditions were confirmed in scattered locations. Furthermore the site is located in the Natalspruit West

Dolomite Groundwater Sub-Compartment. The dolomite groundwater is anticipated between a depth of 32m and 5m within the bedrock. However due to the proposed land use, the overall sensitivity rating of the site in terms of soil is "low".

- ***Ecology***

According to the attached specialist reports, the wetland area and its buffer zone is considered highly sensitive. Therefore a 200m buffer zone was demarcated to protect the wetland and flood plain. The overall sensitivity rating of the site in terms of vegetation is "high" for the wetland area and buffer zone and "medium - low" for the area set aside for development purposes.

- ***Visual sensitivity***

To be discussed in section 6.7.

6.7 Visual Environment

6.7.1 Visibility

The following visual assessment criteria have been used to determine the impact of the proposed project on the state of the environment - the respective shading of each impact indicates the significance:

Table 8: Visual Impact Assessment

	Impact		
Criteria	**High**	**Medium**	**Low**
1. Visibility	A particularly definite place with an almost tangible dominant ambience or theme	A place which projects a loosely defined theme or ambience	A place having little or no ambience with which it can be associated
2. Visual Quality	A very attractive setting with great variation and interest but no clutter	A setting which has some aesthetic and visual merit	A setting which has little or no aesthetic value
3. Surrounding Landscape Compatibility	Cannot accommodate proposed development without it appearing totally out of place	Can accommodate the proposed development without appearing totally out of place	Ideally suits or matches the proposed development

	Impact		
Criteria	**High**	**Medium**	**Low**
	visually		
4. Character	The site or surrounding area exhibits a definite character	The site or surrounding area exhibits some character	The site or surrounding area exhibits little or no character
5. Scale	A landscape which has horizontal and vertical elements in high contrast to human scale	A landscape with some horizontal and vertical elements in some contrast to human scale	Where vertical variation is limited and most elements are related to the human and horizontal scale
6. Visual Absorption Capacity	The ability of the landscape not to accept a proposed development because of a uniform texture, flat slope and limited vegetation cover	The ability of the landscape to less easily accept visually a particular type of development because of a less diverse landform, vegetation and texture	The ability of the landscape to easily accept visually a particular type of development because of its diverse landform, vegetation and texture
7. View Distance	If uninterrupted view distances to the site are > than 5km	If uninterrupted view distances to the site are < than 5km but > 1km	If uninterrupted view distances to the site are > than 500m and < 1000m
8. Critical Views	Views of the site seen by people from sensitive view sheds, egg. farms, nature areas, hiking trails.	Some views of the site from sensitive view sheds	Limited or partial views to the site from sensitive view sheds

The visual quality and aesthetic appeal of the open space area is an important quality and feature of the site. A large open space area, such as the site, provides a visual relief in an otherwise built up environment.

The visual analysis assessed the visual quality of the site from the major roads around the site, as this is the experience that most people would have of the site. By following this methodology a general understanding of the visual sensitivity and accessibility could be obtained. The findings were as follow:

- The sensitive wetland area is a prominent landscape feature visible from the R550 (Kliprivier Road) and the D817 at the intersection with the R550.
- The proposed development footprint portion of the site is most visible from the areas located along the D817, with the southern corner of the site most visible from the R550.
- The eastern portion of the site is most visible from the N3 highway.
- The north-eastern portion of the site is most visible from Land Portion C, namely the existing cemetery operated by Ekurhuleni Municipality.

Findings:

- The visual sensitivity of the individual landowners bordering the site and the existing community located on the site is considered to be "high".
- Whereas the visibility in terms of traffic is considered to be "high" on the R550, D817 and the intersection of the R550 and the K148 for the area to be used for development.

6.7.2 Design

The proposed development will impact on the surrounding environment by change of land use/activity, building style, an increase in visual building mass and roads. The main objective of the township layout is to minimise the potential impacts created by the change in activity and thus the visual appearance of the proposed development, and to complement the existing developments. In saying that it must be noted that the proposed development will impact on the surrounding areas as the proposed land uses are vastly different from the land uses found in the surrounding area.

It is therefore concluded that the proposed development will have a significant impact on the area and the surrounding communities and therefore the architectural design should strive to soften the visual impact and to reduce the impacts to acceptable levels.

6.8 The Advantages of the Proposed Development

The proposed development will have a number of advantages, not only from a financial point of view for the developer, but also from a social and environmental point of view. The main

advantages are:

- The *sensitive wetland area* and buffer zone will be fenced off and protected from human impacts.
- *Stormwater flow* will be managed in terms of a properly designed and constructed system.
- The security situation in the area will improve as a result of the development. Access to the land will be restricted, which will eliminate illegal occupation of the land, dumping, and destruction of natural habitat by vagrants.
- *Employment* will be created within an area where people have little or no access to places of employment.
- An *integrated sustainable community* is proposed with access to community facilities;
- *Investment* will be brought into an area that has been isolated, economically, due to the lack of infrastructure within the area.
- *Rehabilitation of the natural environment* and eradication of all alien vegetation will be possible through a landscaping plan. This will contribute to improve the quality of the natural environment.
- *Job provision* – the economic feasibility study indicated that the construction phases create ± 81 000 jobs (still to be verified) and against the three million formal jobs in Gauteng, 5 400 jobs secured per annum amounts to 0.18% jobs retained/secured. However, over a 15 year period, this would amount to a total of 2.7% jobs retained/secured against the Gauteng employment base within the first year of the Inland Port' s operation.
- *The projected increase in Gauteng's GGP* is estimated to be 6.4% as an indication of the actual quantity of the economic value added over the period.
- *Impact on the Construction Industry* – the R 7.5billion investment over a period of 15 years will contribute to a 2% increase in out put of this sector and is viewed as extremely positive.
- *Property rates and taxes* - Based on current municipal property rates, it is estimated that R150 million could be generated in property rates and taxes to the Ekurhuleni Metropolitan Municipality emanating from the Tambo Springs Inland Port development. This results in a 5% increase on the current property rates and taxes income of the municipality and is rated as significantly positive;

The above-mentioned is but a few of the anticipated advantages expected. The various reports attached in **Annexure C** discuss the advantages identified as per the various sectors.

6.9 Sustainability

Sustainable development implies the adoption of a holistic view of the interdependent relationship between human society and the natural environment. It acknowledges the link between impact of human activities on the functioning of physical and social environments, and vice versa. In a developing country and especially in a developing urban area, the focus must be on sustainable development, and where possible preservation and conservation.

The socio-economic impact analysis assessed the sustainability of the proposed development of the inland port and associated land uses and concluded that it would contribute immensely to the economic development of Johannesburg and Gauteng Province.

6.10 Agricultural Potential

The provincial urban edge, compiled by the Gauteng Department of Development Planning and Local Government dated 2002, is the primary spatial guideline tool utilised by Germiston to determine the local urban development boundary. In this instance the land is located within the local urban development boundary as well as the provincial boundary.

The site forms a fragmented pocket of agricultural land located adjacent to a residential area. Further more, the soil analysis indicated that the soils are not suitable for agricultural production. Therefore the opinion is held that agricultural production is not viable on the site as the site is too small for dry crop farming and the site is located within the urban development boundary as well as the provincial boundary. This area is earmarked for infill development and specifically that of an inland port.

7 CONSIDERATION OF PROJECT ALTERNATIVES

The potential of Johannesburg's freight logistics have not been fully developed by the public sector authorities and agencies serving the area over the years. As a result, this sector of the economy is characterised by excessive use, and wear, of roads by freight operators, dramatic decline in rail usage, increased congestion and fragmented freight planning. South Africa's freight logistics system is not meeting the country's needs and not keeping up with developments taking place within this sector around the world.

Therefore there is a need for a new inland port and logistics gateway that will contribute significantly to meeting Gauteng's need to increase the current freight logistics capacity/throughput in and out of Johannesburg, to anticipated 3 million TEU's by 2015 and a potential 4 million TEU's by 2020 with the potential to further increases thereafter.

7.1 Locational Alternatives

Tambo Springs Inland Port is exceptionally well positioned in this respect as it is located in the southern periphery of Johannesburg and within the Johannesburg/Durban road freight and rail corridor. It has, therefore, access to the N3 freeway to Durban (South Africa's major freight transport route), to the N1 to Cape Town and via the R390, to Port Elizabeth and East London as well as to other freeways to the industrial centres just south of Johannesburg namely: Heidelberg, Vereeniging, Vanderbijl Park and Sasolburg, all of which are within 20 to 60km radius. Furthermore the site is also only 22km from the City Deep Terminal and 25km from the Oliver Tambo Air Freight Terminal. These excellent road linkages will allow the site to accommodate both FTL (full truck load) long distance road freight and LTL (less than truck load) regional distribution.

Freight rail will be accommodated via the existing dual directional links that already run through the site to all of abovementioned areas. Therefore the Tambo Springs development can contribute significantly to optimising the country's existing infrastructure, particularly that of the Ngqura Deep Water Port near Port Elizabeth. It is therefore clear that no alternative location was investigated as all surveys done indicated that the existing site is the best location for the proposed development.

7.2 Temporal Alternatives

The timing for the development does not play an important role in terms of suitable weather

conditions. Heavy rains may delay construction activities for short periods. The only timing constraint is the availability of the approvals from the controlling authorities, and the market demand for the proposed development.

7.3 Construction Alternatives

Alternative construction methods will not have an impact on the viability of the project due to the nature of it. However, sound construction and founding principles for the development of the perceived activities and especially the filling station, shall be applied at all times.

7.4 Layout Alternative

The proposed layout plan was influenced by the environmental constraints found on the site. All the existing environmental constraints and subsequent recommendations made by the specialist consultants were included in the layout plan discussed in this document. The relevant specialist consultants have approved the layout plan and therefore no alternative layout plan is included for assessment.

7.5 The No-Go Option

In essence, the No-Go Alternative would ultimately mean that the state of the environment would be retained as it is presently, with obvious advantages and disadvantages to the natural environment. An objective and unbiased comparative assessment is provided below between the No-Go Option and the environmental costs of the proposed project, should the development not take place. The environmental costs are portrayed in terms of the impact on the land over the short to long term.

Table 9: Comparative Assessment between the No-Go Option and the Environmental Costs of the proposed project

No-Go Option	Environmental Costs
Alteration of topography due to development	The minor topographical changes to the land are not considered to be of any significance. Changes will be positive and will improve drainage patterns.
Physical Features of the Site	The western portion of the site is characterised by a sensitive wetland area and buffer zone. Whilst the central portion of the site is viewed as sensitive in terms of grassland. Therefore the land use proposal and layout plan focuses on

No-Go Option	Environmental Costs
	conserving the sensitive areas and therefore acknowledges the 200m buffer zone enforced by the specialists. The 200m buffer zone protects the wetland area and sensitive vegetation found in the area. The sensitive grassland area was set aside for development by the specialists due to the fact that an additional piece of land on the southern boundary of the site is included within the buffer zone. This area is viewed as sufficient by the specialist. The specialist reports concluded that the sensitive areas will be adequately protected against any potential impacts. Furthermore the development area will be fenced off ensuring that construction activities do not encroach within the 200m buffer zone area. The developable area will remain fenced off during the operational phase off the development, ensuring that human impact is minimised. Should the site be left vacant there would be no control over what happens on the site and activities that may be harmful to the natural environment could increase such as the illegal dumping of household and construction material, destruction of natural habitat by quad bikes and four wheel vehicles, illegal occupation of the land and subsistence farming practices taking place within the flood plain area. The opinion is therefore held that the proposed development would enable the sensitive habitat to be conserved whereas the current status quo would result in the destruction of sensitive vegetation over the long term.
Geology/Soils	The proposed development will over the long term eliminate further disturbance of the vegetation cover and will prevent further soil erosion.
Surface Water	The proposed development will have a positive impact on the surface water in the sense that stormwater will be retained on the property before discharging it into the

No-Go Option	Environmental Costs
	system. Where as currently stormwater is being discharged into the system uncontrolled.
Groundwater	There is currently no data available to assess the quality of groundwater.
Air Quality	Air quality will not be affected.
Noise	Noise levels will increase due to the nature of the proposed activities.
Vegetation	The existing vegetation will be impacted on; however the sensitive portions will not be impacted on and is protected within a 200m buffer zone.
Fauna	If the vacant area is left unprotected the specie diversity may decline due to illegal land use practices.
Socio-Economic Features	The social economic impact is vast with approximately 80 000 jobs that could be created over a period of 15 years. Therefore the proposed development will contribute towards the establishment of social facilities, upliftment of communities, and over the long term, sectors within the regional economy.

The No-Go option is an option but is not seen as a viable or sustainable option for the site. Leaving the site vacant will contribute to environmental degradation, dumping, littering, use of the site as a dirt track for quad bike racing and other illegal activities. This could lead to the loss of sensitive habitat as identified within the specialist reports. Therefore the proposed development provides a unique opportunity to protect the highly sensitive wetland area and buffer zone whilst allowing development on the non-sensitive portion of the site.

8 ENVIRONMENTAL IMPACT ASSESSMENT

The overall aim of an ecologically sound development project is to minimise the negative impacts of the project on the environment, thus limiting the ecological footprint of the project while moving towards greater sustainability over the longer term.

8.1 Cumulative Effects

It is important to assess the natural environment using a systems approach that will consider the cumulative impact of various actions. Cumulative impact refers to the impact on the environment, which results from the incremental impact of the actions when added to other past, present and reasonably foreseeable future actions regardless of what agencies or persons undertake such actions. Cumulative impacts can result from individually minor but collectively significant actions or activities taking place over a period of time. Cumulative effects can take place so frequently in time that the effects cannot be assimilated by the environment.

An assessment of the impact that the proposed development may have on the environment includes evaluating the impact according to a series of assessment criteria. This has been undertaken by considering the effects that may result should the impact occur. This was evaluated according to the inputs received from I & AP's and on the basis of experience gained from similar projects.

8.2 Assessment Criteria for Impacts Identified

As a means of determining the significance of the various impacts that can or may be associated with the proposed project, a series of assessment criteria were used for each impact. These criteria include an examination of the nature, extent, duration, intensity and probability of the impact occurring, and assessing whether the impact will be positive or negative for the natural as well as biophysical environments at, and surrounding, the site. The following criteria have been adapted from those proposed in the EIA Guideline Document (April 1998).

8.2.1 Nature

This is an appraisal of the type of effect the activity would have on the affected environment. This description includes what is being affected and how.

8.2.2 Extent

This indicates the spatial area that may be affected by the impact and further describes the possibility that adjoining areas may be impacted upon. This includes four classes that are listed as follows:

- Local (extending only as far as the site);
- Limited (limited to the site and it's immediate surrounds);
- Regional (extending beyond immediate surrounds to affect a larger area); and
- National or international.

8.2.3 Duration

This refers to the period of time that the impact may be operative for (i.e. the lifetime of the impact). This includes the following four classes that are listed as follows:

- Short (i.e. 0 - 5 years);
- Medium (i.e. 5 - 15 years);
- Long (i.e. > 15 years and/or where natural processes will return following the cessation of the activity or following human intervention);
- Permanent (i.e. where 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).

8.2.4 Intensity

This indicates whether the impact is likely to be destructive or have a lesser effect. Three such classes of intensity are defined and these are listed as:

- Low (i.e. where natural, cultural and social functions and processes are not affected by the development);
- Medium (i.e. where the natural, cultural and/or social functions and processes are affected by the development but can continue in a modified way);
- High (i.e. where natural, cultural and/or social functions or processes are altered to the extent that it will temporarily or permanently cease).

8.2.5 Probability

This refers to the likelihood of the impact actually occurring. The following four classes are used to describe the probability of the impact:

- Improbable (i.e. low possibility of the impact);
- Probable (i.e. a distinct possibility exists that the impact will occur);
- Highly probable (i.e. more than likely that the impact will occur);
- Definite (i.e. the impact will occur regardless of any preventative mitigation/measures).

8.2.6 Significance

The significance of the impact (i.e. whether it will lead to a marked change in the environment or not) is determined though a synthesis of the aspects produced in terms of their nature, duration, intensity, extent and probability. Four classes of significance exist including:

- None (i.e. the impact will not have an influence on the decision and requires no mitigation);
- Low (i.e. the impact will have a limited influence on the decision and requires mitigation to manage the environment);
- Medium (i.e. it is likely to have an influence on the decision and requires mitigation)
- High (i.e. Mitigation is required and this may not be sufficient to ensure that the environment is not detrimentally affected by the proposed development).

9 ASSESSMENT OF POTENTIAL IMPACTS ON THE ENVIRONMENT

Table 10 below indicates the relevance of the various environmental aspects that may be affected by the proposed development. An environmental aspect here refers to a potential environmental impact that may arise as a result of the development. Where it is known or where it has been recorded that such an impact does occur at the site, this has also been included in the table.

Table 10: List of Environmental Impacts with possible relevance to the Project

Environmental Aspect	Relevant
Air Quality	X
Heritage Assessment	√
Cumulative Impacts	√
Ecological Systems	√
Faunal Abundance and Diversity	√
Floral Abundance and diversity	√
Geology	√
Ground water	√
Land Use	√
Mining area	*X*
Open Space	√
Public Response	√
Social & Economic Issues	√
Soils	√
Surface water	√
Topography	√
Visual Impact	√
Traffic	√
Waste management	√

The relevant issues have each been assessed taking into account information obtained from the applicant, I & AP's and specialist's inputs. The issues of significance are discussed in more detail below and mitigation measures are proposed for the meaningful management and monitoring thereof.

9.1 Environmental Impact Assessment

9.1.1 Air Quality

Status Quo Conditions

The quality of air in the specific area is reasonably good and the only localised air pollution occurs with veldt fires. Air quality is most affected during the winter months due to the burning of coal for cooking and heating within the surrounding residential communities.

Impact Assessment for the Development Phases

- **Construction**

The proposed development phase may have a negative impact on the air quality as a result of increased emissions from construction vehicles and equipment as well as the generation of dust during construction activities.

The impact during this phase is likely to be of limited extent, long duration, low intensity and an improbable occurrence

- **Operational**

During this phase the completed development would eliminate the occurrence of dust. The proposed development is regarded as a major traffic generator, with light and heavy vehicular traffic expected and a rail terminal. Pollution by emissions from vehicles, will not increase substantially, the project should therefore not have a significant impact on the surrounding environment.

The proposed impact is likely to be of limited extent, short duration, medium intensity and probable occurrence.

Table 11: Impact Summary Matrix for Air Quality

Nature	**Air Quality**		**Status**	**Low**
Impact source(s)	Dust			
Affected stakeholders	Surrounding landowners			
Magnitude	*Extent*	**Limited**		

Nature	**Air Quality**		**Status**	**Low**
	Intensity	**Medium**		
	Duration	**Short**		
	Probability	**Probable**		
Significance	*Without mitigation*	**Medium**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Option:

- Clear vegetation only from areas where construction will start right away
- Apply water or other dust suppressive methods to temporary road surfaces during construction;
- Lower speed limits on construction site. This can reduce dust emissions by 22%;
- Upgrade entrance and exit roads to be used by construction vehicles by: (1) improving the particle size, shape and mineral types that make up the surface and base materials of the entrance and exit roads and (2) add surface gravel to reduce the source of dust emission;
- Minimise the volume of material tracked-out onto road surfaces by construction vehicles by: (1) filling in muddy areas with gravel or other surface material and (2) stabilising shoulders of roads with gravel/vegetation.
- No open fires should be allowed on the construction site.

9.1.2 Heritage Assessment

Status Quo Conditions

Three sites rated to have significance have been identified in the study area. They are:

• Two old cemeteries, which are rated as having high significance on a local level.

• An old farmstead, which is rated as having high significance on a regional level.

Impact Assessment for the Development Phases

- **Construction**

It is concluded that sites 1 and 3 have a "high" significance rating. These two sites will be impacted on during stage 1 of the development phase. It is therefore necessary that the correct procedures are followed to obtain permission from SAHRA to relocate the graves and to demolish the house (if approved by SAHRA). Site 2 will only be affected during stage two of the development phase. It is recommended that the same procedures are followed

for this site as for the aforementioned sites.

The impact during this phase is likely to be of limited extent, short duration, high intensity and a definite occurrence

- **Operational**

During this phase the impacts on the heritage sites would have been addressed as per SHARA specifications.

The impact during this phase is likely to be of limited extent, short duration, low intensity and a improbable occurrence

Table 12: Impact Summary Matrix for Heritage Assessment

Nature	**Heritage Sites**		**Status**	**High**
Impact source(s)	Construction activities			
Affected stakeholders	Site 1: Small graveyard of the Vermeulen Family Site 2: Larger Cemetery still in use Site 3: The Old Farm Stead			
Magnitude	*Extent*	**Limited**		
	Intensity	**High**		
	Duration	**Short**		
	Probability	**Probable**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium**		

Prevention, Mitigation, and Management Option:

- **Site 1:** S 26.40522; E 28.20902

The specialist recommended that all the graves are relocated to a formal cemetery

  - Mitigation actions recommended: to retain the graves or, alternatively, relocate after following correct procedure ;
  - Legal requirements: Permits, SAHRA permits, police, notification, consultation, relocation.

- **Site 2:** S 26.40973; E 28.22176

The cemetery is a very large feature and is still in use by the local community, and it is therefore recommended that it is retained and formalised by fencing it off, maintaining the site and identifying the authority for looking after it.

- Mitigation actions recommended: to retain the graves or, alternatively, relocate after following correct procedure ;
- Legal requirements: Permits, SAHRA permits, police, notification, consultation, relocation.

❑ **Site 3:** S 26.40992; E 28.21193

This is an old farmstead, consisting of a house, outbuildings, barns, etc. now mostly in ruins.

- Mitigation actions recommended: mapping of the site by a heritage architecture will be necessary;
- Legal requirements: should the building be demolished, a permit from SAHRA has to be issued.

9.1.3 Ecological Systems

Status Quo Conditions

According to Mucina & Rutherford (2006) the site falls within Carltonville Dolomite Grassland and Eastern temperate freshwater wetlands. The authors described the Carltonville Dolomite Grassland as species-rich grassland with shallow soil and slightly undulating plains on dolomite dissected by prominent rocky chert ridges. This grassland falls within a warm-temparate summer-rainfall region with high summer temperatures and severe frequent winter frosts. This vegetation unit is considered vulnerable.

The Eastern temperate freshwater wetlands (Mucina & Rutherford 2006) are a vegetation unit found around water bodies with stagnant water: lakes, pans, periodically flooded vleis and edges of calmly flowing rivers within the Grassland biome. Features flat landscapes or shallow depressions filled with water bodies supporting aquatic and hygrophylous vegetation. Soils are peaty to vertic. Vleis or pans form where flow of water is impeded by impermeable soils or erosion-resistant features such as dolerite intrusions. Found in summer rainfall region with frequent winter frosts. The associated wetland is classified as a floodplain wetland.

Impact Assessment for the Development Phases

❑ **Construction Phase**

Construction activities typically impact negatively on ecological systems owing to the impacts of stormwater runoff, erosion, noise and the general increase in activity, pollution and the like. These impacts are not likely to have a significant impact on the sensitive environment as it will be localised and contained to the proposed development site.

The proposed impact is likely to be of limited extent, short duration, low intensity and a probable occurrence.

- **Operational**

The anticipated improved water management system and proposed rehabilitation of the existing habitat after construction should have a positive impact on the micro ecology of the site. The site will only be partially developed; a large open space area of ±200ha will remain. The sensitive wetland area and applicable buffer zone is included within this protected area and will therefore by protected from development by a 200m buffer zone that is regarded as the line of no development.

The proposed impact is likely to be of limited extent, long duration, high intensity and a probable occurrence.

Table 13: Impact Summary Matrix for Ecological Systems

Nature	**Ecological Systems**		**Status**	**High - Medium**
Impact source(s)	Fauna, Flora, Wetland Area, buffer zone, Avifauna, & Herptofauna			
Affected stakeholders	Site specific			
Magnitude	*Extent*	**Limited**		
	Intensity	**High**		
	Duration	**Permanent**		
	Probability	**Definite**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium**		

Prevention, Mitigation and Management Options:

- The construction area to be fenced off before construction commences.

- No development to be allowed within the 200m buffer zone area as per the layout plan.
- Construction should be limited to daylight hours.
- The ECO and the site manager should determine soil stockpile areas.
- No artificial lighting should be allowed within the ecological sensitive areas.
- Only indigenous plants should be allowed in the gardens and landscaped areas.
- Implement the guidelines of the EMP and the mitigation measures proposed by the specialists.

9.1.4 Faunal Abundance and Diversity

Status Quo Conditions

Mammals: The mammal study found that the open perennial water sources on the site are too modest to allow for the permanent or even infrequent occurrence of spotted-necked or clawless otters. The specialist concluded that otters may occasionally venture onto the site during exceptionally wet spells, but that is regarded as a rare event.

In terms of wetland vegetation the specialist found that the lush semi-aquatic vegetation along streams and marshy areas provide ideal habitat for the rough-haired golden mole, the listed shrews as well as the African marsh rat. This confirms the exclusions of the wetland area from any form of development or side-effects of the construction and operational phases of the development.

The investigation of the terrestrial portion of the site showed that the area is severely disturbed, either by ploughing or overgrazing. The proposed development will displace most of the terrestrial species recorded, but according to the report none of these can be regarded as rare or even sensitive. All species are common and widespread, and their loss will be of little conservation consequence at a national level.

The investigation concluded that with the exclusion of the wetland and the suitable buffer zone superimposed on appropriate management practices, the proposed development should not result in a loss of ecological sensitive and important habitat units, ecosystem function (e.g. reduction in water quality, soil pollution), loss of mammal habitat, nor of loss/displacement of threatened or protected species.

Avifauna: Three Red Data avifaunal species are likely to make use of the wetland habitat on the study site:

- **African Grass-Owl** (*Tyto capensis*): The wetland habitat and more specifically the wetland grass area south of the tributary of the Rietspruit on the southern border of the study site could offer suitable breeding, roosting and foraging habitat for African Grass-Owl if proper veldt management practices are implemented. Currently the wetland vegetation is under severe grazing pressure resulting in any dense wetland grass cover and adjacent grassland being trampled by livestock and African Grass-Owl generally avoids areas that are subjected to intense grazing or burning and this is probably the largest factor why none were observed on the study site. It is likely that African Grass-Owls that breed within the Suikerbosrand Nature Reserve will move up and down the tributary to forage and possibly expand their breeding range when young birds are dispersing from the nests. This is also applicable for the Rietspruit west of the study site.
- **African Marsh-Harrier:** The wetland habitat, especially the *Pragmites australis* and *Typha capensis* vegetation, that flanks the tributary of the Rietspruit offers suitable foraging habitat for this species.
- **Black-winged Pratincole:** Although suitable habitat exits for this species it is unlikely that any development on the study site will have a negative affect on this species due to the generally disturbed and degraded state of the main habitats.
- **Lesser Kestrel:** Lesser Kestrel might on occasion move through the area during migration and might use the area for hunting purposes. The SABAP2 data for the 2628AC q.d.g.c. and for the 2620_2810 pentad indicate that this species was not observed in this region. The SABAP1 data indicate a low reporting rate. There are however no documented records for this species for the area on and surrounding the study site. It is highly likely that this species will forage over the open grassland habitat on site on occasion during their migration periods. It is unlikely that development on the open grassland area will have a negative affect on the population of this species and there are still large areas with suitable open grassland and fallow fields surrounding the study site that will favour this species for foraging purposes.

Herpetological: Of the 48 reptile species which may occur on the study site, three were confirmed during the site visit and of the possible 12 amphibian species which may occur on the study site, one was confirmed during the site visit.

- **Striped harlequin snake:** has been recorded in this quarter degree grid cell (Ditsong National Museum of Natural History or TVL Museum Records), and many moribund termitaria, where this species is most likely to be found, are present on the study site. This species has also been

recorded on the nearby Suikerbosrand Nature Reserve (Koen, 2007). It is very difficult to confirm whether this cryptic snake is present on any study site, but the possibility that it occurs on this particular study site does exist.

- **Giant Bullfrog:** The study site has a few temporary pans next to the stream in the wetland, which is a potential breeding site for giant bullfrogs. These breeding sites are temporary, which bullfrogs prefer in order to avoid predation from fish. If the species occurs on the study site, its breeding habitat should be protected if the wetlands are protected and excluded from any development. The chances are however very slim that any bullfrogs occur on the study site.

Impact Assessment for the Development Phases

- **Construction**

Heavy construction machinery and vehicles will definitely alter the faunal habitat on the portion of the site to be used for development. However this should be a short-term impact that will re-establish itself after construction activities. Where possible sensitive species must be rescued and relocated. The sensitive portion of the site will not be affected as the construction site will be fenced off.

The proposed development phase is likely to be of limited extent, short duration, medium intensity, and probable occurrence.

- **Operational**

The sensitive area within the 200m buffer zone will remain undeveloped and the specie diversity will remain as is.

The proposed operational phase is likely to be of limited extent, long duration, high intensity and definite occurrence.

Table 14: Impact Summary Matrix for Fauna

Nature	**Faunal**		**Status**	**High**
Impact source(s)	Mammals, Avifuana & Herpetofauna			
Affected stakeholders	Site Specific			
Magnitude	*Extent*	**Limited**		
	Intensity	**High**		
	Duration	**Long**		

	Probability	**Definite**
Significance	*Without mitigation*	**High**
	With mitigation	**Medium - Low**

Prevention, Mitigation, and Management Options:

The following mitigation measures were taken from the reports compiled and represent a summary of the mitigation measures proposed:

- The contractor(s) must ensure that no herpetofauna species are disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.
- A study to elucidate the potential for harmful dust and sediment effluent emanating from the development and operational phases of the development that may contaminate the wetland, should be commissioned.
- The open space system should be fenced off prior to construction commencing (including site clearing and pegging). All construction-related impacts (including service roads, temporary housing, temporary ablution, disturbance of natural habitat, storing of equipment/building materials/vehicles or any other activity) should be excluded from the open space system. Access of vehicles to the open space system should be prevented and access of people should be controlled, both during the construction and operational phases. Movement of indigenous fauna should however be allowed (i.e. no solid walls, e.g. through the erection of palisade fencing).
- Outside lighting should be designed to minimize impacts on fauna. 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.
- In order to minimize artificially generated surface storm-water runoff, total sealing of paved areas such as parking lots, driveways, pavements and walkways should be avoided. Permeable material should rather be utilized for these purposes.
- The crossing of natural drainage systems should be minimized and only constructed at the shortest possible route, perpendicular to the natural drainage system. Where possible, bridge crossings should span the entire stretch of the buffer zone.

Furthermore it is recommended that the open space system should be managed in accordance with an EMP that complies with the *Minimum Requirements for Ecological Management Plans* and forms part of the EMP.

9.1.5 Floral Abundance and Diversity

Status Quo Conditions

- Four **vegetation study units** were identified:

  o *Eragrostis – Elionurus* grassland: The habitat of the *Eragrostis – Elionurus* grassland study unit was suitable for one of the Red List species and two of the Orange List species. No Red List species were found in this study unit, but two Orange List species, *Boophone disticha* (Cape poison bulb) and *Hypoxis hemerocallidea* (African potato) were found sparsely scattered over the study unit.

  o Wetland: Connectivity with wetland vegetation existed upstream and downstream of both drainage lines. Of the 174 plant species recorded on the site 63 were recorded in the wetland vegetation study unit. Of these, 52 were indigenous species. The habitat of the Wetland study unit was suitable for four of the Red List species and one Orange List species. One of the Red List species, *Argyrolobium campicola* was found on the flood plain of the Riet Spruit and one Orange List species was found sparsely scattered along the drainage line of both the Riet Spruit and its tributary.

  o Mixed alien and indigenous vegetation: The species diversity of this study unit was low. Of the 174 plant species recorded on the site 30 were recorded in the mixed alien and indigenous vegetation study unit. Of these, 18 were indigenous species. The habitat of this study unit was not suitable for any of the Red List species or Orange List species known to occur in the quarter degree grid square. The vegetation of this study unit was not considered sensitive.

  o Cultivated fields: This study unit consisted of the large formal cultivated fields of surrounding farms and the small patches of informal fields south-east of, and abutting, the railway line. Most of these fields were still lying fallow after the winter. The species diversity of this study unit was low. The habitat of this study unit was not suitable for any of the Red List species or Orange List species known to occur in the quarter degree grid square.

- **Medicinal plants:** of the 174 plant species recorded on the site, 28 species with medicinal properties were found.
- **Alien Plants:** Twenty-one alien plant species, of which four species were Category 1 Declared weeds, three were Category 2 Declared invaders and one was a Category 3 Declared invader, were recorded on the site.
- **Orange listed species:** The habitat was suitable for all three of the Orange List plant species known to occur in the 2628AC quarter degree grid square. All three of these species were found

- **Red listed species:** Twelve Red List plant species are known to occur in the 2628AC quarter degree grid square, three of these within 5 km of the site. The habitat was suitable for these three species, as well as for another two Red List species, one of which was found in the flood plain of the Riet Spruit.

Impact Assessment for the Development Phases

- **Construction**

Construction activities are likely to have definite impact on the *Eragrostis* grassland found over the central portion of the site. The wetland area and associated vegetation will not be impacted on due to it being protected within a 200m buffer zone. Indigenous vegetation must be protected as far a possible. Care must be taken to control the invasion of disturbed areas by alien plants.

The proposed development is likely to be *of limited extent, short duration, high intensity and definite occurrence.*

- **Operational**

There should be no further impact on the remaining natural vegetation during the operational phase of the development. The establishment of indigenous landscaped areas will improve the abundance of diversity of the floral species. The wetland area and 200m buffer zone will remain fenced off.

The potential impact during this phase is likely to be *of limited extent, long duration, high intensity and improbable occurrence.*

Table 15: Impact Summary Matrix for Flora

Nature	**Flora**		**Status**	**Medium**
Impact source(s)	*Eragrostis – Elionurus* grassland Wetland Mixed alien and indigenous vegetation Cultivated fields			
Affected stakeholders	Local Specific			
Magnitude	*Extent*	**Limited - confined to area to be used for development**		
	Intensity	**Medium – confined to area to be used for development**		
	Duration	**Long**		

	Probability	**Probable –** for the *Eragrostis – Elionurus* grassland **Improbable** – for the Wetland, Mixed alien and indigenous vegetation and Cultivated fields
Significance	*Without mitigation*	**High**
	With mitigation	**Medium**

Combined Sensitivity Map and Layout Plan (Composite Map):

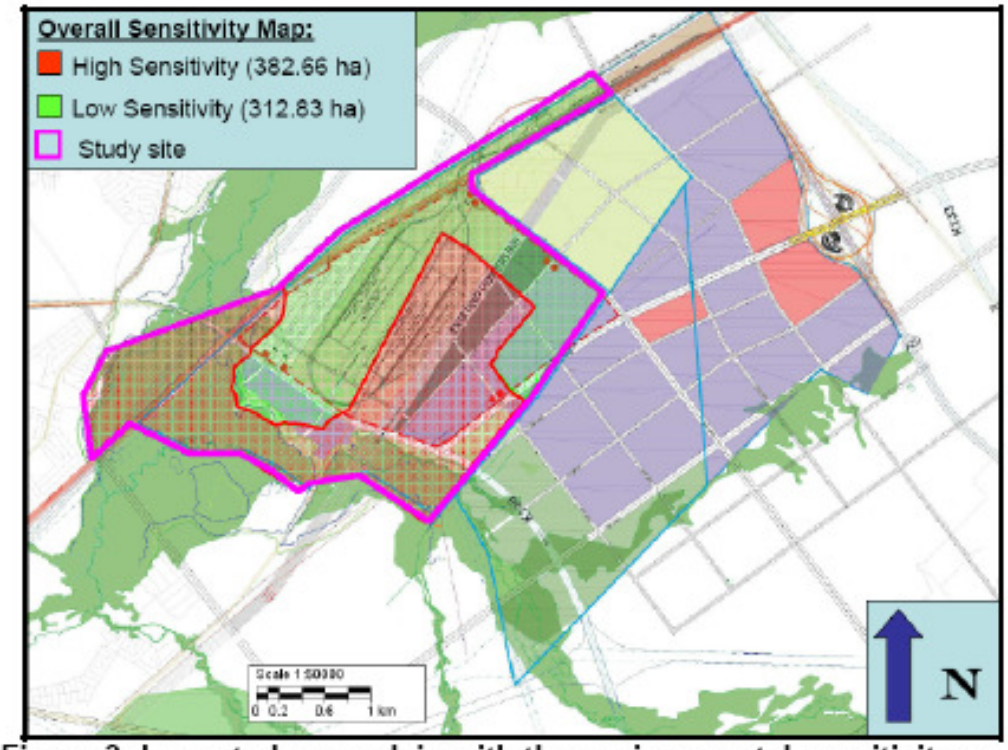


Figure 3: Layout plan overlain with the environmental sensitivity map

The Specialist report concluded that "…*where the layout plan is overlain with the environmental sensitivity map, it is clear that most of the wetland and surrounding buffer areas were excluded from the proposed development. The grassland area to be conserved is however very small, but should be seen together with the open space areas on the layout map for the neighbouring site to the east.*"

Prevention, Mitigation, and Management Options:

The following mitigation measures were proposed by the Specialist Consultants, Galago Environmental:

- An appropriate management authority that must be contractually bound to implement the Environmental Management Plan (EMP) and Record of Decision (ROD) during the

operational phase of the development should be identified and informed of their responsibilities in terms of the EMP and ROD.

- All areas designated as sensitive in a sensitivity mapping exercise should be incorporated into an open space system. Development should be located on the areas of lowest sensitivity.
- The Ecological Management Plan should:
    - include an ongoing monitoring and eradication programme for all non-indigenous species, with specific emphasis on invasive and weedy species
    - include a comprehensive surface runoff and storm water management plan, indicating how all surface runoff generated as a result of the development (during both the construction and operational phases) will be managed (e.g. artificial wetlands or storm water and flood retention ponds) prior to entering any natural drainage system or wetland and how surface runoff will be retained outside of any demarcated buffer or flood zones and subsequently released to simulate natural hydrological conditions
    - ensure the persistence of all Red and Orange List species
    - minimize artificial edge effects (e.g. water runoff from developed areas and application of chemicals)
    - result in a report back to the Directorate of Nature Conservation on an annual basis.
- Where possible, trees naturally growing on the site should be retained as part of the landscaping.
- The sensitive area on site must be fenced off from the proposed development to ensure that the construction activities do not impact on this area. No dogs are allowed in this area.
- Pedestrian routes through the sensitive area should be laid out by the Botanist and be permanent to ensure that none of the red listed plants will be impacted negatively.

9.1.6 Wetland Delineation and Aquatic Assessment

Status Quo Conditions

❑ **Wetland Classification:**

- The hydrological integrity of the wetland, the geomorphic processes of the wetlands and the vegetation communities of the wetland have all been seriously modified and was assigned a D category;
- The direct services provided by the wetland were very low. The indirect services were rated as low for the wetland. The Ecological Importance and Sensitivity was also low.

- **Aquatic Assessment:**

  - DO concentrations were considered to have a limiting effect on aquatic biota at site TF1 and TF2 during the August 2011 survey;
  - TDS values recorded are considered to be high and are considered to have a limiting effect on aquatic biota;
  - Habitat availability at sites TF1 and TF3 during the August 2011 survey was recorded to be adequate / fair and site TF2 was recorded to be poor / inadequate.
  - Based on the IHIA results habitat integrity at all the sites has reached a critical level of impairment;
  - Based on the SASS5 results biotic integrity at site TF1 was classified as 'Moderate' (PES Class C). This can be attributed to the adequate habitat availability at this site. Site TF2 was classified as being "Poor" (PES Class E/F).

Impact Assessment for the Development Phases

- **Construction**

Runoff from the construction areas may result in contamination of wetland soils. The following impacts may result in changes to the soil structure:

- Heavy construction vehicles moving within the wetland;
- Stock piling;
- Construction on the wetland;
- Spills from machinery;
- The mixing of concrete;
- Clearing of vegetation for construction.
- Dust and sediment runoff from construction activities;
- Loss of vegetation due to vegetation clearing during the construction phase;

The proposed development is likely to be *of limited extent, short duration, high intensity and definite occurrence.*

- **Operational**

The following impacts may occur during the operational phase:

- Diesel and oil spills from equipment and machinery; and
- Higher and faster run off from the inland port.
- Sedimentation and runoff from the railway siding; and

- Increase in the velocity of the runoff from the proposed roads and hardened surfaces due to the development.

The proposed development is likely to be of limited extent, long duration, high intensity and probable occurrence.

Table 16: Impact Summary Matrix for Wetland Delineation and Aquatic Assessment

Nature	**Wetland and Aquatic**		**Status**	**Medium**
Impact source(s)	Wetland area and Aquatic Systems			
Affected stakeholders	Local Specific			
Magnitude	*Extent*	**Limited - confined to area to be used for development**		
	Intensity	**Medium – confined to area to be used for development**		
	Duration	**Long**		
	Probability	**Improbable**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium –** for construction phase **Low –** for operational phase		

Prevention, Mitigation, and Management Options:

The following mitigation measures and risks were identified by the Specialist (Prism Environmental):

Risk identified		**Comments**
Compacting of wetland soils	Heavy construction vehicles moving within wetlands	Heavy construction vehicles and transport vehicles will potentially compact wetland soils due to the close proximity to the wetlands. Ingress into wetlands must be kept to a minimum
	Stock piling	Stock piling must be avoided within the delineated wetlands. Stockpiles must be bermed to prevent sedimentation of the wetlands. "First out, last in' method must be practised in terms of the removal of the soil
	Construction on wetlands	Construction activities in close proximity to wetlands and within wetlands will compact soils

Risk identified		**Comments**
Contamination of soils resulting in chemical structure change	Spills from machinery and construction vehicles	Construction vehicles and machinery that aren't maintained and serviced will potentially spill oil, diesel and other contaminants into the wetland
	Mixing of concrete to build the inland port	Mixing must not be done on the ground or near wetlands. The cement needs to be contained
Soil erosion	Clearing of land for construction	Due to the construction covering a large area the erosion potential due to land clearing is high

More specifically the following measures should be implemented:

- *"During construction, traversing the wetland must be kept to a minimum. Construction vehicles must keep to a single path into the construction site and a single path out of the construction site to prevent unnecessary impact to the wetland;*
- *A suitably qualified Environmental Control Officer (ECO) must be appointed during the construction phase to oversee the construction of the proposed development*
- *All construction should be done in the dry season (winter) to prevent surface water runoff and contamination and erosion of the wetlands. In the wet season the soil will be water logged and the construction vehicles will have difficulty getting into the site. This will also have an impact on the wetland soils;*
- *Mixing of cement for the construction of the associated infrastructure must not be done on the bare soil at least 50 m from the edge of the wetland and must be mixed on mixing trays, to prevent the cement contaminating the wetland soils.*
- *During the project, any accidental spills into the wetlands must be contained, cleaned up, and the areas rehabilitated; and*
- *Where soils have been compacted, these should be loosened by labourers on foot (for small sections) or ripped by tractor (in large areas).*
- *Silt nets and geo-fibres should be put in place to avoid erosion in areas cleared for construction;*
- *A maintenance monitoring programme of all components of the proposed inland port and associated infrastructure must be developed for the duration of operation. This programme should be audited and checked annually."* (Prism Environmental, 2012:49-50).

9.1.7 Geology

Status Quo Conditions

The geotechnical report concluded that the site the site is located on chert-rich dolomite of the Malmani Subgroup, Chunispoort Group, of the Transvaal Supergroup. Dolerite occurs in large areas of the site. Shallow dolomite bedrock conditions are also confirmed in scattered locations. The Inherent Hazard Zonation of the site, which is also shown on the layout plan, provides guidance for land use planning of the site. The majority of the site with the exception of Dolomite Hazard Zone 4 is suitable for an inland port.

Impact Assessment for the Development Phases

- **Construction**

Excavations for foundations should be inspected to ensure that the founding medium meets the design criteria. Test holes should be drilled where deemed necessary. Foundations should be constructed in terms of the NHBRC Standards and Guidelines of 1995 in order to mitigate the prevailing geological conditions. Further a recognised professional civil engineer should monitor all excavation work and installation.

The potential impact during this phase is likely to be of limited extent, long duration, high intensity and definite occurrence.

- **Operational**

There should be no further impact on the geological conditions during the operation phase of the development.

The potential impact during this phase is likely to be of limited extent, long duration, high intensity and definite occurrence.

Table 17: Impact Summary Matrix for Geological Conditions

Nature	**Geotechnical conditions**		**Status**	**Medium**
Impact source(s)	Underlying strata			
Affected stakeholders	Site Specific			
Magnitude	*Extent*	**Limited**		

	Intensity	**Medium**
	Duration	**Long**
	Probability	**Probable**
Significance	*Without mitigation*	**Medium**
	With mitigation	**Low**

Prevention, Mitigation, and Management Options:

- Test holes should be drilled for every proposed development and foundations must be inspected by an Engineer;
- Appropriate foundation design and water precautionary measures are prescribed together with recommendations aimed at the adoption of a pro-active water bearing services maintenance strategy. Particular emphasis is placed on the need to manage storm water falling onto, moving across and exiting the site. Storm water should be effectively and efficiently removed from the immediate area around structures, into the municipal storm water system
- Rationally designed foundation solutions will be required for all structures. For more details of foundation design and water precautionary measures see Intraconsult's report IR1067R dated 12 October 2011.
- The Council for Geoscience is supporting the recommendations of Intraconsult's report.

9.1.8 Ground Water

Status Quo Conditions

During the rainy season a shallow water table may be present on the site. No seepages were encountered in the test pits. There are no known boreholes on the site.

Impact Assessment for the Development Phases

- **Construction**

The construction of the proposed township will not impact on the ground water quality or quantity.

The proposed development phase is likely to be of limited extent, short duration, low intensity and probable occurrence.

- **Operational**

The development will not have an effect on the quality of the ground water.

This phase is likely to be of limited extent, long duration, low intensity and probable occurrence.

Table 18: Impact Summary Matrix for Ground Water

Nature	**Ground Water Table**		**Status**	**Low**
Impact source(s)	Under ground water table			
Affected stakeholders	Site Specific			
Magnitude	*Extent*	**Limited**		
	Intensity	**Low**		
	Duration	**N/A**		
	Probability	**Improbable**		
Significance	*Without mitigation*	**Low**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Options:

- The necessary damp proofing precautions should be taken underneath structures;
- Provision must be made to prevent an ingress of water onto subsurface structures or beneath foundations;
- Non-ferrous metal pipes or plastic pipes are recommended for wet services;
- Implement the recommendations of the EMP for construction activities; and
- Wastes and rubble on the site must be removed on a regular basis.

9.1.9 Land Use - Proposal

Status Quo Conditions

The site is zoned 'Undetermined' in terms of the Germiston Town Planning Scheme. The site is mostly vacant. However the community of Thulasizwe is located on a small portion of the site. The community practices subsistence agricultural over portions of the site especially the flood plain area.

Impact Assessment for the Development Phases

- **Construction**

During the first phase, township services will be installed. This is a normal process of any

development and the surrounding area will not be significantly impacted on, as the construction activities will take place on the site itself. There may be an increase in the number of construction vehicles in the area. The second phase will comprise of the construction of top structures, railway terminal and roads. An increase in the number of construction vehicles, people and construction material will be experienced during this phase.

The proposed development phase is likely to be of local extent, short duration, medium intensity and definite occurrence.

- **Operational**

The land use during this phase will be as follow:

Proposed Land Use	Area Hectare
Industrial/Warehousing	114.1479
Intermodal yard	32.0171
Logistics	176.4498
Non Developable land	14.4376
Roads	59
Trucking Intermodal yard	42.8174
Wetland Area/Open Space	111.1059
Servitude Power Line	28.0157
Servitude Rail	47.5307
TOTAL	**626.669**

The proposed development will be spread out over the entire site except the wetland area and 200m buffer zone. The development will take place in two stages and will be phase 1 of a larger development concept that once fully developed will constitute 1000ha in extent. In light of the above it can be concluded that:

The operational phase is likely to be of local extent, long duration, low intensity and definite occurrence.

Table 19: Impact Summary Matrix for Land Use

Nature	**Proposed Land Use**		**Status**	**Medium**
Impact source(s)	Site Specific			
Affected stakeholders	Site Specific			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**Medium**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Options:

- The construction activities should be controlled and managed through an EMP;
- Each subsequent land use, developed within the township, must be monitored, and controlled through a site development plan, and the conditions of establishment formulated during the township establishment process.

9.1.10 Land Use - Alternative

No alternative density proposals were investigated. The Council is willing to support the proposed development. Different Architectural designs will be investigated by the developer and submitted to the Council for approval.

9.1.11 Mining Area

Status Quo Conditions

No mining activities are currently taking place on the site.

9.1.12 Open Space

Status Quo Conditions

The specialist reports concluded that the wetland area system can be regarded as highly sensitive in terms of connectivity. Furthermore the report indicated that the buffer of 200m for the near threatened plant species should be sufficient for the conservation of the wetland system and sensitive vegetation. Development of the sensitive *Eragostis* grassland area is

allowed as a portion of land toward the southern side of the site is being conserved to ensure connectivity and conservation of the species identified.

The report concluded that there is a need for conservation planning and actions which address the larger wetland area.

Impact Assessment for the Development Phases

- **Construction**

All construction activities will be confined to the proposed development footprint. The open space area will not be impacted on as the portion to be used for development will be fenced off.

The proposed development phase is likely to be of limited extent, short duration, low intensity, and improbable occurrence.

- **Operational**

The proposed township development will not intrude in to the sensitive areas as it will be fenced off.

The proposed operational phase is likely to be of limited extent, long duration, low intensity and improbable occurrence.

Table 20: Impact Summary Matrix for Open Space

Nature	**Open Space Area**		**Status**	**Low**
Impact source(s)	Wetland area and buffer zone			
Affected stakeholders	Site and surrounding open space areas			
Magnitude	*Extent*	**Limited**		
	Intensity	**Low**		
	Duration	**Permanent**		
	Probability	**Improbable**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Options:

The following mitigation measures were proposed by Galago Environmental Cc:

- *"Invasive vegetation to be eradicated.*
- *The wetland and buffer zone area to be managed through an appropriate management authority (e.g. the body corporate) that must be contractually bound to implement the Environmental Management Plan (EMP) and Record of Decision (ROD) during the operational phase of the development should be identified and informed of their responsibilities in terms of the EMP and ROD.*
- *The open space system should be managed in accordance with an EMP that complies with the Minimum Requirements for Ecological Management Plans and forms part of the EMP.*
- *The open space system should be fenced off prior to construction commencing (including site clearing and pegging). All construction-related impacts (including service roads, temporary housing, temporary ablution, disturbance of natural habitat, storing of equipment/building materials/vehicles or any other activity) should be excluded from the open space system. Access of vehicles to the open space system should be prevented and access of people should be controlled, both during the construction and operational phases. Movement of indigenous fauna should however be allowed (i.e. no solid walls, e.g. through the erection of palisade fencing)"* (Galago Environmental, 2012:70.

9.1.13 Public Response

Status Quo Conditions

No Negative responses were received for the Scoping phase of the EIA process.

Impact Assessment for the Development Phases

- **Construction**

Construction activities are likely to generate an increased amount of public response and issues. The public should be kept informed of progress and activities that may affect them.

The impact is likely to be of limited extent, short duration, low intensity and probable occurrence.

- **Operational**

During this phase all the concerns and issues should have been addressed and the public response should be minimal.

The potential impact on the air quality is likely to be of local extent, long duration, low intensity and probable occurrence.

Table 21: Impact Summary Matrix for Public Response

Nature	**Surrounding community and stake holders**		**Status**	**Medium**
Impact source(s)	All interested and affected parties			
Affected stakeholders	Regional			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**Medium**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Options:

- Establish a communication link between the developer and I& AP's, and
- Respond to public issues fast and effectively.

9.1.14 Social Issues

Status Quo Conditions

The SEIA done by Blue IQ indicated that the Thulasizwe community was established before 1965 for the farm labourers that worked on nearby farms. The number of households found within this informal settlement is 97 (2011). There are however, reports that there are other people that have settled within Thulasizwe, but who do not hold South African identification documentation or any country identification and are considered illegal immigrants. There are approximately 10-15 families with this profile. The social specialist team were told that the unidentified residents are not very approachable. The Thulasizwe community is situated at the junction of the Magagula Heights road (D817) and the road to Katlehong (Rivett-Carnett), across the road from the old farmhouse.

The community have been consulted by the Applicant (Inframax) on a number of occasions, also in the company of the local Ward Councillor. The study indicated that the community seems happy to move off the area as they have been informed that they will be shifted across the road (between the Katlehong road (Rivett-Carnett), Magagula Heights road (D817), and the railway line), and provided with proper housing units with water and electricity. This arrangement is proposed by the Applicant (Inframax).

Impact Assessment for the Development Phases

- **Pre – Construction**

The report by Bue IQ indicated that compensation should be provided in cases of economic displacement stemming from the clearance of land. This should be done before construction begins and will be once-off. Furthermore disclosure regarding the development must emphasize that only the Thulasizwe community has been deemed the affected community, no other resettlement or land claims will be entertained. A full asset inventory (part of the Resettlement Action Plan) of the Thulasizwe community must be undertaken prior to the announcement of the project, thus avoiding opportunistic settler claims (Blue IQ, 2011:88)

The impact of the proposed development on the social issues is likely to be of local extent, short duration, high intensity and definite occurrence.

- **Operational**

The proposed township and the development of various land use activities on the site will contribute to job creation within the area, and attract investment to the area. Local communities will benefit directly from the proposed developments, resulting in social upliftment, and skills development.

The proposed township will combat the development of illegal land uses. In addition the propose development will contribute to the rehabilitation of the natural environment. This will be achieved through the introduction of indigenous vegetation, which will improve the visual quality of the land. The result will be a specific sense of place that will be to the advantage of the surrounding environment.

The impact of the proposed development during this phase is likely to be of local extent, long duration, medium intensity and probable occurrence.

Table 22: Impact Summary Matrix for Social Issues

Nature	**Surrounding community and stake holders**		**Status**	**Medium**
Impact source(s)	Thulasizwe Community			
Affected stakeholders	Local and Regional			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium**		

Prevention, Mitigation, and Management Options

A Land Acquisition and Compensation Plan (LACP) will be developed to structure and manage compensation and economic displacement (loss of cultivated lands). This will identify cases of legitimate entitlement. A Compensation Committee with extensive knowledge and understanding of the claimant's background, and what constitutes fair and equitable compensation, will be put together as the decision-making body for compensation issues. All compensation issues will need to be addressed before the construction phase.

Local government should be involved in the implementation of the LACP, through a carefully structured Compensation Committee. Key roles will be; participation in agreeing fair compensation, and in the identification and securing of replacement land. Interaction around issues of compensation will be implemented via the LACP. By the end of pre-construction, it is expected that there will be no outstanding land and compensation issues to address. There will no longer be a need for the Compensation Committee by the Operations phase.

9.1.15 Traffic and Infrastructure

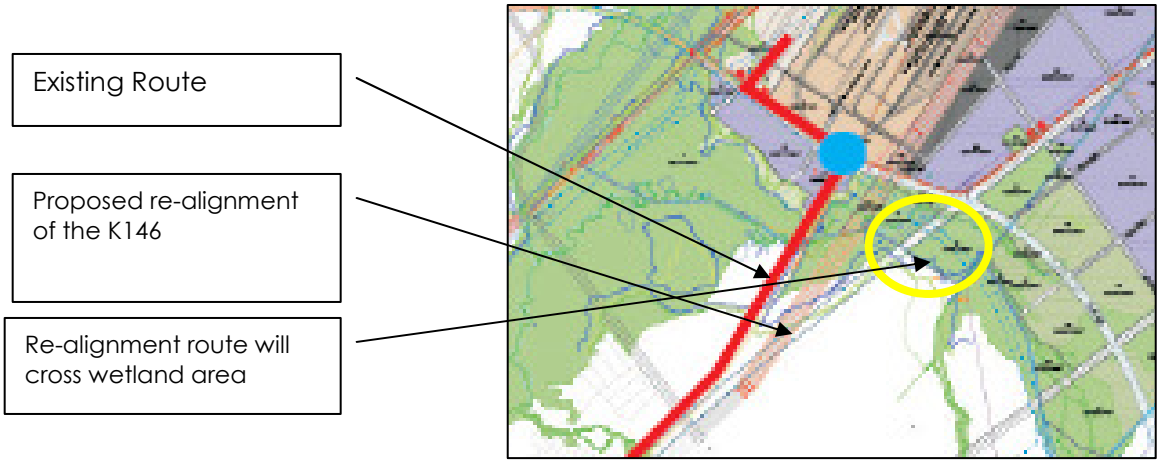
Status Quo Conditions

The PWV13/15, K146 and D817 are affected by the development. The PWV13 will need to be realigned to accommodate planned truck and intermodal yard on the northern boundary of the development along the existing alignment and K146 is also affected by the wetland areas on the south of the development.

Impact Assessment for the Development Phases

- **Construction**

The most significant impact during the construction phase will be the re-alignment of the K146:



The proposed development phase is likely to be of limited extent, short duration, high intensity and a definite occurrence.

- **Operational**

During the operational phase all roads will be constructed as per design specifications and mitigation measures will be implemented. Affected areas will be rehabilitated.

The proposed development phase is likely to be of limited extent, long duration, low intensity and definite occurrence.

Table 23: Impact Summary Matrix for Traffic and Infrastructure

Nature	**Surrounding community and stake holders**		**Status**	**High**
Impact source(s)	Existing roads and proposed re-alignment of the K146			
Affected stakeholders	Local and Regional			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Definite**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium**		

Prevention, Mitigation, and Management Options

- Building of the proposed access roads to be to the satisfaction of the Council;
- All internal roads to be developed according to the site development plan to the satisfaction of the Council;
- All the necessary WULA applications to be submitted to DWAF for the proposed re-alignment of the K146 where it traverses the wetland area.

9.1.16 Surface Water

Status Quo Conditions

The site in its present state with the existing activities on it, does not impact on the drainage and natural water regime. No formal stormwater system is present in the area.

Impact Assessment of the Development Phases

- **Construction**

During the development of the township, pollution of the surface water resources as a result of erosion by rainwater could occur. This will require that stormwater runoff from the construction site is adequately controlled in such ways that impacts like siltation, erosion, and sedimentation do not occur.

The proposed development phase is likely to be of limited extent, short duration, high intensity and probable occurrence.

- **Operational**

Once the proposed township is operation, there will be an increase in run-off from buildings and paved surfaces. Preventative measures should be put into place to prevent soil erosion and no water to enter the wetland area uncontrolled.

The proposed operational phase is likely to be of limited extent, long duration, low intensity and a improbable occurrence.

Table 24: Impact Summary Matrix for Surface Water

Nature	**Surface Water**	**Status**	**High**
Impact source(s)	Existing flow towards the low point of the site and the wetland area		

Affected stakeholders	Limited	
Magnitude	*Extent*	**Limited**
	Intensity	**High**
	Duration	**Permanent**
	Probability	**Highly probable**
Significance	*Without mitigation*	**High**
	With mitigation	**Medium**

Prevention, Mitigation, and Management Options:

- The careful position of soil piles, and runoff control, during all phases of development, and planting of some vegetative cover after completion (indigenous groundcover, grasses etc.) will limit the extent of erosion occurring on the site.
- Sufficient measures must be implemented to prevent the possible contamination of surrounding surface water and groundwater.
- Provision of adequate toilet facilities must be implemented to prevent the possible contamination of surface and ground (borehole) water close to the construction area.
- Heavy construction machinery must be regularly serviced and checked for oil and fuel leaks.
- The timing of clearing activities is of vital importance. Clearing activities and earth scraping should preferably be restricted to the dry season in order to prevent erosion and siltation. The dry months are also the period when the majority of species are either dormant or finished with their breeding activities.
- Preventative measures should be put into place in order to prevent excessive stormwater run-off from the developed areas from entering the external roads.
- All mitigation measures proposed in the Wetland report and Fauna and Flora reports to be implemented.

9.1.17 Topography

The proposed development will not impact on the topography of the area. The water flow patterns will be maintained and no major alterations will be made to the current ground levels.

9.1.18 Visual Impacts

Status Quo Conditions

The visual character of the area is that of a rural landscape. The existing open space area

dominates the landscape. The existing vacant land forms a focal point along the R550 and the D817.

Taking the above into account, potentially negative impacts can still be expected in terms of the aesthetic quality of the surrounding area as a result of the proposed development. The Visual Impact Assessment has confirmed this. However, the impact of the development will be positive in the light of the proposed quality of the development as well as the proposed landscaping programme.

The visual impact of the proposed development is likely to be of limited extent, long duration, low intensity and definite occurrence.

Table 25: Impact Summary matrix for Potential Visual Impacts

Nature	**Surrounding community**		**Status**	**High**
Impact source(s)	All surrounding landowners			
Affected stakeholders	Regional			
Magnitude	*Extent*	**Regional**		
	Intensity	**High**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium**		

Prevention, Mitigation and Management Options

- The specific foundation design criteria recommended in the geotechnical report should be adhere to.
- Construction site to be clearly demarcated and secured;
- No individuals to be allowed on construction site without the permission of the project manager;
- All waste material to be collected on a daily basis and stored within designated containers;
- Area where equipment would be stored to be fenced off and secured;
- An adequate number of toilets shall be supplied and maintained for the use of the Contractor's personnel. The Contractor shall at all times during construction provide

adequate sanitary facilities on site so that all employees are within easy reach of sanitary facilities.

- Regular inspections shall be carried out to ensure toilets are kept in a hygienic state. Toilet paper shall be supplied to all toilets. Staff shall be advised to the fact that they should use these toilets at all times.
- Cement mixing shall only be done at specific areas allocated by the ECO. Cleaning of cement mixing and handling equipment shall only be done using proper cleaning trays. All empty bags shall be removed from the site for appropriate disposal at an approved waste disposal site. Any spillage, which may occur, will be investigated and immediate action shall be taken.

9.1.19 Waste Management

Status Quo Conditions

The waste generated by the proposed project, will be removed as part of the municipal service in the area.

Impact Assessment for the Development Phases

- **Construction**

Construction activities are likely to generate wastes. All wastes should be removed to an approved waste disposal site.

The impact is likely to be of local extent, short duration, low intensity and highly probable occurrence

- **Operational**

Waste during this phase will be removed as part of the municipal services.

The potential impact on the air quality is likely to be of limited extent, long duration, low intensity and highly probable occurrence

Table 26: Impact Summary Matrix for Waste Generation

Nature	**Waste Generation**		**Status**	**Medium**
Impact source(s)	Waste generated during construction and operational phase			
Affected stakeholders	Limited			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**Medium**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Options:

- Provide litter traps where the stormwater enter the municipal system, and
- Incorporate a waste management plan to remove litter from the site.

9.1.20 Cumulative Impacts

Status Quo Conditions

Cumulative impacts refer to the combined interaction of impacts that on their own may not be significant, but when these impacts occur together, then their impact is manifested. Impacts could interact together to contribute a more significant impact.

The anticipated impacts resulting from construction and implementation of this development could potentially result in cumulative negative effects by also considering the following:

- Surface water pollution;
- Increased runoff;
- Ground water pollution;
- Traffic Impact;

The cumulative long-term impact of the project on the surrounding environment is considered to be medium to low, when the mitigation measures and the EMP are applied properly.

Currently the cumulative impacts mentioned above are relevant to the existing developments located adjacent to the site. It must be noted that landscaping and re-vegetation as well as the establishment of urban gardens will help to reduce the velocity of stormwater runoff and

increase the infiltration of water. Surface water pollution will be contained as the area has comprehensive stormwater infrastructure systems to which the site will connect.

Table 27: Impact Summary Matrix for Cumulative Impacts

Nature	**Surrounding community and open space areas**		**Status**	**Medium**
Impact source(s)	Surrounding community and open space areas			
Affected stakeholders	Regional			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**Medium**		
	With mitigation	**Low**		

9.1.21 Residual Impacts

Residual impacts are those impacts that will remain notwithstanding the implementation of mitigation measures. Potential residual impacts are those associated with the following:

- Loss of natural vegetation cover;
- Light pollution;
- Increased surface runoff;
- Increased illumination;
- Increase in traffic volumes.

10 ENVIRONMENTAL IMPACT STATEMENT AND CONCLUSIONS

The purpose of this report is to provide the relevant authority with sufficient information on the potential impacts of the proposed development, to make an informed decision. Potential impacts were identified in consultation with specialists and through the technical expertise and experience of W & L Consultants. The report sought to ascertain the impact of the proposed development on the environment, which included the social environment, and the probability of impacts occurring.

The construction and operational phase of the proposed development can pose various significant risks to the environment. The issues related to the development were identified, discussed and assessed in terms of various criteria such as extent, duration, intensity and significance. Mitigation measures were listed during all phases of the project and the possible alternatives were reviewed and assessed. In addition an Environmental Management Plan (EMP) is included that outlines all mitigation measures to be implemented during the construction phase of the development (**Annexure F**).

10.1 KEY ISSUES

Risks and Key issues were identified and addressed in consultation with Interested and Affected Parties, through an internal process based on similar developments, an environmental impact assessment and a site visit. The following key issues were identified:

- Contamination of ground and surface water;
- Increased surface water runoff;
- Impacts on air quality;
- Increased erosion;
- Floral destruction;
- Faunal displacement and destruction;
- Visual intrusion;
- Traffic Impacts;
- Increased ambient noise levels;
- Crime, Safety & Security risks;
- Noise pollution and
- Social and Economic issues

Each issue was assessed and mitigatory measures proposed to such an extent that impacts were minimised or negated.

10.2 IMPACT EVALUATION

Each issued identified was evaluated in terms of the most important parameters applicable to environmental management. These include the: *nature, extent, duration, intensity, probability* and *significance* of the potential impact on the environment.

Potential Negative Impacts include:

- *Contamination of ground and surface water* may result due to the deposition of contaminants during the construction phase and the possibility of sewage leaks during the operational phase. Mitigation measures proposed reduce the significance to "low".
- *Increased surface water runoff* and *erosion* as a result of vegetation clearance and the disturbance of soil during the construction phase. The implementation of mitigation measures reduces the significance rating to "low".
- *Impacts on air quality* are related to a direct increase in vehicular activity in the area. Due to the proposed activities the significance rating is "medium to low".
- *Floral destruction and Faunal displacement and destruction*. Biodiversity is considered to be medium - low. The implementation of mitigation measures reduces the significance rating to "medium".
- *Visual intrusion & Aesthetic impacts* as a result of construction activities, would impact most on the adjacent areas. The implementation of mitigation measures reduces the significance rating to "medium" during the construction phase. The significance rating for the operational phase is viewed as "low" with the implementation of all design criteria,
- *Noise impact* from construction vehicles and construction activities. Mitigation measures including a restriction of the times within which construction activities may take place will reduce the significance to "low".
- *Traffic impacts* as a result of construction vehicles accessing the site. This impact will have a "medium" significance due to, firstly, the increase in the number of vehicles due to the delivering of construction material to the site and secondly, the expected increase in of traffic on the road network during the operational phase.

- *Social impacts* resulting from the relocation of the community currently found on the site is considered to be "high" during the pre-construction phase and "low" during the operational phase.

Potential Positive Impacts include:

- *The site is a sensitive ecological area*. However if not developed, the site would remain derelict and would be subject to illegal land use practices such as dumping of solid waste, subsistence agricultural farming and uncontrolled storm water practices. Therefore the proposed development would ensure that the sensitive wetland area is protected and rehabilitated.
- *The proposed development is inline with the Regional Spatial Development Framework* formulated for the Region.
- *As a result of the resource constraints facing Municipalities*, it has been recognised that development driven by the private sector can help support and secure isolated areas such as the site for conservation and sustainable economic development.
- *Job provision* to the local and regional communities and contractors as a result of the construction activities.
- *Upgrade and improve* the existing municipal infrastructure.
- *Investment* in an area isolated from economic development.
- *Contributing to the growth and development* of the construction Industry in Gauteng.
- *Property rates and taxes* - Based on current municipal property rates, it is estimated that R150 million could be generated in property rates and taxes to the Ekurhuleni Metropolitan Municipality emanating from the Tambo Springs Inland Port development. This results in a 5% increase on the current property rates and taxes income of the municipality.

11 CONCLUSION

It is recognised from the EIA process that an environmental investigation needs to consider feasible alternatives, including the No-Go option for any proposed development. Accordingly, it is submitted that the nature and extent of the potential environmental impacts associated with the proposed township development are generally medium in both extent and severity. The impacts that may have significance, are manageable, and in most cases, positive in nature and direction.

The cumulative impact of the issues presented could be reduced to acceptable levels by means of mitigation measures over and above those prescribed within the direct impact assessment. The mitigation and management measures outlined in this Environmental Impact Assessment Report with respect to potential impacts or issues should result in limited negative impacts on the natural environment.

It is further concluded that the potential environmental impacts recorded for the development proposal, could be managed in terms of an Environmental Management Plan, which should be an integral part of the construction contract. It is therefore submitted that the project may be authorised by the Department of Agriculture, Conservation and Environment, in terms of the conditions and requirements of this report and that the construction of the various activities, be managed in terms of an Environmental Management Plan (**Annexure F**).

DOCUMENT CONTROL:

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Authorised/Prepared by:	 **Liselle van Niekerk** Environmental Assessment Practitioner (EAP)	

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1	1	Electronic	Tumi Mohulatsi	Project Manager
1	3	Hard copies	EO	GDARD

Environmental Assessment Practitioner:

As per the requirements of the National Environmental Management Act: NEMA, 1998 (Act No.107 of 1998), (NEMA) and the Environmental Impact Assessment Regulations, 2010 (Government Notice No's R544, 545 and 546 of 2010), the following information is pertinent with regards to the Environmental Assessment Practitioner (EAP) that has been appointed for the Scoping and Environmental assessments for the establishment of a residential township on the remaining extent of Portion 37 of the Farm Tamboekiesfontein 173 IR, Germiston, Gauteng.

Contact Details of the Environmental Assessment Practitioner:

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W & L CONSULTANTS
REG. NO. CK 89/020810/23

Qualifications and Relevant Expertise:

- M Sc Environmental Management (RAU)
- B Art. et Scientae (Town and Regional Planning) (PU for CHE)
- Registration as Member of IAIA – in process
- Relevant Expertise – see attached company profile

TABLE OF CONTENTS

E EXECUTIVE SUMMARY

E1 INTRODUCTION

Inframax Holdings (Pty) Ltd instructed W & L Consultants cc, independent consultants, to proceed with the appropriate Environmental Impact Assessment (EIA) Process for the proposed development of mixed income housing situated on the remaining extent of Portion 37 of the Farm Tamboekiesfontein, 173 IR, Germiston.

E2 GENRAL PROJECT DESCRIPTION

The site is located within service delivery area of Germiston and falls under the jurisdiction of the Ekurhuleni Metropolitan Municipality. The site is zoned 'Undetermined' and it is the intension of the applicant to develop an inland port on the site. The site is located within the jurisdiction of Ekurhuleni Metropolitan Municipality, Germiston Service Center. More specifically the site is located west of the N3, directly east and adjacent to Magagula Heights. The residential area of Zonkizizwe is located north west of the site with Katlehong South directly north of the site. The proposed township will consist of, (1) the upgrading of the engineering infrastructure to accommodate the proposed development, (2) The development will comprise of erven zoned "Special" to accommodate the following land uses (a) manufacturing, warehousing, distribution, business and retail, an intermodal yard, which will include a rail siding, storage facilities, bonded logistics and other such uses associated with an inland port, logistics hub and rail terminal. More specifically the land composition will be as follow:

Proposed Land Use	Area Hectare
Industrial/Warehousing	114.1479
Intermodal yard	32.0171
Logistics	176.4498
Non Developable land	14.4376
Roads	59
Trucking Intermodal yard	42.8174
Wetland Area/Open Space	111.1059
Servitude Power Line	28.0157
Servitude Rail	47.5307
TOTAL	**626.669**

The development will take place over a period of 8 years will be in extent of ±627.485ha for the Inframax Landholding site. The proposed development forms part of a master plan for the larger area where the Inframax Landholding site is seen as phase 1 of the larger development. The land distribution across the total developable area is as follow:

Landholding	Gross Area (ha)
Land A: Inframax Landholding *(Phase 1)*	627.485
Land B: Possible Expansion Area	420.732
Land C: Cemetery	154.250
Land D: Adv. Du Plessis Landholding	401.948
TOTALS	1 604.415

Phase 1 (Inframax Land Holding) will be developed in two stages:

- Stage 1: year 1 to year 5 - this stage will include the development of the truck and Intermodal yard and expected TEU's for container terminal, i.e. 1, 000,000TEU's and the expected pallets, i.e. 4, 500,000 pallets. The estimated development size is 406,754.10m²
- Stage 2: year 6 – year 8 – this stage will consist of the Development of industrial / warehousing. The estimated development size is 737,879.86m².

The total development is planned on a 1000 hectare site and projected on a 15 year timeframe (to completion). This report only assessed the activities to be developed on the Inframax Land Holding that constitutes phase 1 of the total development.

The proposed activities and infrastructure will be developed and constructed in terms of the land use controls formulated specifically for the project. The sensitive nature of portions of the site was taken into consideration from the inception of the project and the layout plan takes into account the sensitive areas identified within the various ecological studies undertaken.

E3 KEY ISSUES

Risks and Key issues were identified and addressed in consultation with Interested and Affected Parties, through an internal process based on similar developments, an environmental impact assessment and a site visit. The following key issues were identified:

- Contamination of ground and surface water;
- Increased surface water runoff;
- Impacts on air quality;
- Increased erosion;
- Floral destruction;
- Faunal displacement and destruction;
- Impact on the sensitive wetland system;
- Economic and Social Impact on existing communities located on a portion of the site and within the larger area;
- Impact on sites of Heritage Value
- Visual intrusion;
- Increase in Traffic Volume;
- Increase in ambient noise levels;
- Crime, Safety & Security risks; and
- Noise pollution

Each issue was assessed and mitigatory measures proposed to such an extent that impacts were minimised or negated.

E4 IMPACT EVALUATION

Each issued identified was evaluated in terms of the most important parameters applicable to environmental management. These include the: *nature, extent, duration, intensity, probability* and *significance* of the potential impact on the environment.

Potential Negative Impacts include:

- *Contamination of ground and surface water* may result due to the deposition of contaminants during the construction phase and the possibility of sewerage leaks, diesel/oil spills during the operational phase. Mitigation measures proposed reduce the significance to "low".
- *Increased surface water runoff* and *erosion* as a result of vegetation clearance and the disturbance of soil during the construction phase. The implementation of mitigation measures reduces the significance rating to "medium to low".

  However potential increase in surface runoff during operation phase due to the lack of vegetation and the presence of hard open spaces is considered to be "high". The implementation of mitigation measures reduces the significance rating to "medium".

- *Impacts on air quality* are related to a direct increase in vehicular and rail activity in the area. The significance rating is "medium".
- *Floral destruction and Faunal displacement and destruction*. Specialist studies conducted indicated that:

  A large section of the site is sensitive. It is recommended that the wetland and its 200m buffer for red listed avifauna, the red listed plant and its 200m buffer as well as a large portion of the natural grassland must be conserved in an open space system. The area to be conserved is depicted in the overall sensitivity map above that includes sensitive areas for African Grass owls, African Marsh Harriers, Harlequin snakes, wetland reliant mammals and the red listed plant species.

  Conclusion: When the layout plan is overlain with the environmental sensitivity map, it is clear that most of the wetland and surrounding buffer areas were excluded from the proposed development. The grassland area to be conserved is however small, but should be seen together with the open space areas on the layout map for the neighbouring site to the east. Therefore the significance rating is "medium".

- *Visual intrusion & Aesthetic impacts* as a result of construction activities, would impact mostly on the adjacent residential areas and agricultural holdings. The implementation of mitigation measures reduces the significance rating to "low" during the construction phase. During the operational phase the buildings will adhere to all design criteria and

therefore the significance rating for the operational phase is viewed as "low".

- *Noise impact* from construction vehicles and construction activities. Mitigation measures including a restriction of the times within which construction activities may take place will reduce the significance to "low".
- *Traffic impacts* as a result of construction vehicles accessing the site. This impact will have a "medium" significance due to, firstly, the increase in the number of vehicles due to the delivering of construction material to the site and secondly, the expected increase in of traffic on the road network during the operational phase.
- *Noise pollution* the expected rise in the ambient noise levels are minimal and will not have a significant impact on noise levels within the area.
- *Three Sites of Heritage Value* was identified namely: Two old cemeteries, which are rated as having high significance on a local level and an old farmstead, which is rated as having high significance on a regional level. Mitigation measures proposed: (1) The graves of the Vermeulen Family (Cemetery nr 1) should be relocated to a formal cemetery due to the level of neglect and disturbance found during the survey. (2) The large informal cemetery (Cemetery nr 3) should be retained as it is still used or the graves could be relocated with permission from SAHRA. (3) The old farm stead should be mapped and formally documented by a Heritage Architect. Permission for demolish to be obtained from SHARA. The significance rating for cemetery nr 1 and the farmstead for the construction phase is viewed as "high" as it falls within the area to be developed during stage 1 of the development phase. The significance rating for cemetery nr 2 is "medium" as it is located within the area to be developed during stage 2 of the development phase. The significance rating for the heritage features during the operation phase is "low" – issues will be resolved and the necessary mitigatory measures would have been implemented.
- *Social Impact study* indicated that the anticipated negative impacts during pre-construction relate to the possible movement of work-seekers into the area and the physical and economic displacement of the Thulasizwe community. The significance rating for the pre-construction phase is "high".

Negative impacts identified during the construction phase are mainly (1) health and safety issues (road, pedestrian safety and the potential increase in HIV/AIDs and STDs); (2) community

disruption (as a result of work seekers in migrating from other parts of the country) and (3) the existing community's perception of having non-local workers in the area. The significance rating for the construction phase is "medium" and mitigation measures will be proposed and implemented.

Potential Positive Impacts include:

- *Vacant land poses a threat to safety and security within the area*. The proposed development will contribute to the prevention of crime and ensure a more safe and secure neighbourhood.
- *The proposed development is inline with the Regional Spatial Development Framework* formulated for the Region. The site is located within the provincial and local urban development boundary.
- *As a result of the resource constraints facing Municipalities*, it has been recognised that development driven by the private sector can help support and secure isolated areas such as the site for conservation and sustainable economic development.
- *Job provision* – the economic feasibility study indicated that the construction phases create ± 81 000 jobs (still to be verified) and against the three million formal jobs in Gauteng, 5 400 jobs secured per annum amounts to 0.18% jobs retained/secured. However, over a 15 year period, this would amount to a total of 2.7% jobs retained/secured against the Gauteng employment base within the first year of the Inland Port's operation.
- *The projected increase in Gauteng's GGP* is estimated to be 6.4% as an indication of the actual quantity of the economic value added over the period.
- *Impact on the Construction Industry* – the R 7.5billion investment over a period of 15 years will contribute to a 2% increase in out put of this sector and is viewed as extremely positive.
- *Property rates and taxes* - Based on current municipal property rates, it is estimated that R150 million could be generated in property rates and taxes to the Ekurhuleni Metropolitan Municipality emanating from the Tambo Springs Inland Port development. This results in a 5% increase on the current property rates and taxes income of the municipality and is rated as significantly positive;
- *Upgrade and improve* the existing municipal infrastructure and ensure effective stormwater management within an area that is lacking in services.
- According to reports written by the Centre for Scientific and Industrial

Research (CSIR) this development will enhance SA‟s logistics competitiveness significantly.

E5 CONCLUSIONS

The "No-Go" scenario is not regarded as an option as the site will be further disturbed and, if left in its current state, the environmental quality of the site will deteriorate.

The opinion is held that the proposed township establishment and resulting planned development of the site, should be viewed as the mechanism that will ensure the quality of the surrounding natural environment is upgraded and protected. The challenge for the developer is therefore to achieve an acceptable balance between appropriate, environmentally responsible development and financial return.

The conclusion and recommendations of this environmental impact assessment study is therefore made in terms of the existing status quo of the site as well as the perceived uses allocated to the site through the township establishment application. The potential environmental impacts associated with the proposed development, are summarised in Table 11 through the Table 27 in terms of extent, duration, intensity, probability, significance and status. Mitigatory measures have been identified, and discussed per potential impact identified.

In summary it is clear that there are potential impacts associated with the proposed development. Taking into account the current state of the natural environment, and mitigation methods proposed, it is concluded that the potential impacts associated with the proposed development can be mitigated successfully.

It can therefore be concluded that (a) the proposed development will have potential impact on the environment and all potential impacts can be mitigated to an acceptable level, (b) from a socio-economic point of view the proposed development will be economically viable and sustainable, (c) the proposed land uses will stimulate much needed job creation and investment in an area currently isolated from the major sectors of employment. The development option is therefore considered to be the most suitable option for the site and (d) it adheres to the policy of infill development and the creation of a small compact urban form.

Table E1: Summary of Construction Impact Ranking

Impact Indicator	Spatial Scale	Duration	Intensity	Cumulative Effects	Probability of Occurrence	Significance without Mitigation	Significance with Mitigation
Air Quality	Local	Short term	High	Medium to high	Definite	Medium	Low
Stormwater	Local	Short term	High	Medium	Definite	Medium	Low
Traffic	Local	Short term	High	High	Definite	Medium	Medium
Socio Economic	National	Short term	High	Medium - Low	Definite	High	High
Ecological	Local	Short term	High	High	Definite	Medium	Medium - Low
Wetland System	Local	None	Low	None	Probable	High	Medium

Shaded impacts require mitigation

Table E2: Summary of Operational Impact Ranking

Impact Indicator	Spatial Scale	Duration	Intensity	Cumulative Effects	Probability of Occurrence	Significance without Mitigation	Significance with Mitigation
Air Quality	Local	Long term	High	Medium to high	Definite	Low	Low
Stormwater	Local	Long term	High	Medium	Definite	Medium	Medium
Traffic	Local	Long term	High	High	Definite	Medium	Medium
Socio Economic	National	Long term	High	Medium - Low	Definite	Medium	Low
Ecological	Local	Long Term	Medium	Medium	Definite	Low	Low
Wetland System	Local	None	Low	None	Improbable	Medium	Low

Shaded impacts require mitigation

TABLE OF CONTENTS

1 INTRODUCTION 6
1.1 Introduction 6
1.2 Overall Approach 8
1.3 Terms of Reference 9
1.4 Study Approach 10
1.5 Purpose of the Environmental Impact Assessment Report 10
1.6 Assumptions & Limitations 11
2 PROJECT DESCRIPTION 12
2.1 Location of Site 12
2.1.1 Regional Setting 12
2.1.2 Local Setting 13
2.2 Property Particulars 14
2.2.1 Description 14
2.2.2 Registered Owner 14
2.3 Activity to be Undertaken 14
2.3.1 Description of Phase of proposed Development 15
2.3.2 Town Planning 16
2.3.3 Estimated Time Frames for Construction 17
3 PUBLIC PARTICIPATION PROCESS 19
3.1 Description of Public Participation Process 19
3.2 Interested and Affected Parties 20
3.3 Conclusions 25
4 BIOPHYSICAL DESCRIPTION OF THE SITE 26
4.1 Physical Features and Characteristics 26
4.1.1 Regional Climate 26
4.1.2 Rainfall 26
4.1.3 Temperature 27
4.1.4 Wind 27
4.2 Natural Ecosystems and Habitats 27
4.2.1 Topography 27
4.2.2 Geology and Soils 27
4.2.3 Surface Water 29
4.2.4 Groundwater and Water Table 30
4.2.5 Air Quality 30
4.2.6 Noise 30
4.2.7 Conservation Areas 30
5 BIOLOGICAL FEATURES AND CHARACTERISTICS 32
5.1 Flora & Fauna 32

5.2 Wetland Delineation and Aquatic Assessment 39
5.5 Cultural Features & Characteristics 41
6 SOCIO-ECONOMIC FEATURES AND CHARACTERISTICS 43
6.1 Town Planning Assessment 43
6.2 Socio-Economic Impact Analysis 49
6.3 Engineering Services 52
6.4 Sense of Place 59
6.5 Traffic & Accessibility 61
6.6 Sensitivity Analyses 62
6.7 Visual Environment 64
6.7.1 Visibility 644
6.7.2 Design 66
6.8 The Advantages of the Proposed Development 66
6.9 Sustainability 68
6.10 Agricultural Potential 68
7 CONSIDERATION OF PROJECT ALTERNATIVES 69
7.1 Localtional Alternatives 69
7.2 Temporal Alternatives 69
7.3 Construction Alternatives 70
7.4 Layout Alternative 70
7.5 No-Go Option 70
8 ENVIRONMENTAL IMPACT ASSESSMENT 73
8.1 Cumulative Effects 73
8.2 Assessment Criteria for Impacts Identified 73
8.2.1 Nature 73
8.2.2 Extent 74
8.2.3 Duration 74
8.2.4 Intensity 74
8.2.5 Probability 75
8.2.6 Significance 75
9 ASSESSMENT OF POTENTIAL IMPACTS ON THE ENVIRONMENT 76
9.1 Environmental Impact Assessment 77
9.1.1 Air Quality 77
9.1.2 Heritage Assessment 78
9.1.3 Ecological Systems 80
9.1.4 Faunal Abundance & Diversity 82
9.1.5 Floral Abundance & Diversity 86
9.1.6 Wetland Delineation & Aquatic Assessment 89

9.1.7 Geology 93
9.1.8 Ground Water 94
9.1.9 Land Use 95
9.1.10 Land Use Alternative 97
9.1.11 Mining Area 97
9.1.12 Open Space 97
9.1.13 Public Response 99
9.1.14 Social Issues 100
9.1.15 Traffic & Infrastructure 102
9.1.16 Surface Water 104
9.1.17 Topography 105
9.1.18 Visual Imapcts 105
9.1.19 Waste Management 107
9.1.20 Cumulative Impacts 108
9.1.21 Residual Impacts 109

10 ENVIRONMENTAL IMPACT STATEMENT 110

11 CONCLUSION 113

LIST OF TABLES

Table 1:	List of Professional Team Members
Table 2:	Proposed Activities
Table 3:	Total Area of Proposed Development
Table 4:	Interested and Affected Parties Identified
Table 5:	Climate of the Germiston
Table 6:	Specialists used
Table 7:	Expected Terminal Capacity
Table 8:	Visual Impact Assessment
Table 9:	Comparative Assessment: No-Go Option and Environmental Costs
Table 10:	List of Environmental Impacts with possible relevance to the Project
Table 11:	Impact Summary Matrix for Air Quality
Table 12:	Impact Summary Matrix for Heritage Assessment
Table 13:	Impact Summary Matrix for Ecological Systems
Table 14:	Impact Summary Matrix for Fauna
Table 15:	Impact Summary Matrix for Flora
Table 16:	Impact Summary Matrix for Wetland Delineation & Aquatic Assessment
Table 17:	Impact Summary Matrix for Geological Conditions
Table 18:	Impact Summary Matrix for Ground Water
Table 19:	Impact Summary Matrix for Land Use

Table 20:	Impact Summary Matrix for Open Space
Table 21:	Impact Summary Matrix for Public Response
Table 22:	Impact Summary Matrix for Social Issues
Table 23:	Impact Summary Matrix for Traffic and Infrastructure
Table 24:	Impact Summary Matrix for Surface Water
Table 25:	Impact Summary Matrix for Potential Visual Impact
Table 26:	Impact Summary Matrix for Waste Generation
Table 27:	Impact Summary Matrix for Cumulative Impacts
LIST OF ANNEXURES	
Annexure A:	MAPS Locality Map Aerial Photographs
Annexure B:	Correspondence with GDARD
Annexure C:	Specialist Report - Geotechnical Report Specialist Report - Engineering Services Report Specialist Report - Fauna & Flora Wetland Delineation & Aquatic Assessment Specialist Report - Heritage Assessment Specialist Report - Socio-Economic Impact Analysis Specialist Report - Traffic Impact Study
Annexure D:	Public Participation
Annexure E:	Correspondence received from Government Departments & Stakeholders
Annexure F:	Township Layout Plan
Annexure G:	EMP

1 INTRODUCTION

1.1 Introduction

Inframax Strategic Properties (Pty) Ltd appointed W & L Consultants cc to obtain authorisation in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) as per Regulation 21(3) of Environmental Impact Assessment Regulations, 2010. The proposed activity is situated on the remaining extent of Portion 37 of the Farm Tamboekiesfontein 173 IR, Germiston, Ekurhuleni Metropolitan Municipality, hereafter referred to as the site. The site is zoned 'Undetermined' and it is the intension of the applicant to develop an inland port on the site.

More specifically the project is a freight transport and logistics focused development including:

- An intermodal yard with rail access;
- A value added logistics park as an economic development zone forming part of a sea, air, road, rail logistics gateway, with a focus on accommodating businesses involved in the transportation, processing, manufacture, warehousing and distribution functions;
- An ancillary business park accommodating a commercial development component; and
- The development of a retail support component for the above.

The aim of the proposed Logistics Hub and Inland Port is to increase freight handling efficiency and to create an international competitive environment. To achieve this, a requirement is that the most advanced telecommunications backup is available, including high speed broadband and sophisticated IT systems; and supporting bulk infrastructure including water, electricity, roads, rail, etc.

The site is located within a sensitive environment and various environmental, social and heritage constraints were identified. It is therefore the intension of the applicant to proactively plan for the utilisation of the site ensuring the protection of the various sensitive systems and the effective utilisation of the site.

The site is located within the Germiston service delivery area of Ekurhuleni Metropolitan Municipality.

The proposed development will take place in the form of a township establishment application. The establishment of a township will allow the zoning of the site to change from 'Undetermined'

to accommodate the following activities on the site:

Proposed Land Use	Area Hectare
Industrial/Warehousing	114.1479
Intermodal yard	32.0171
Logistics	176.4498
Non Developable land	14.4376
Roads	59
Trucking Intermodal yard	42.8174
Wetland Area/Open Space	111.1059
Servitude Power Line	28.0157
Servitude Rail	47.5307
TOTAL	**626.669**

Wary of the sensitivities associated with these types of developments it is the intension to support the overall conservation aims of Gauteng Department of Agriculture and Rural Development (GDARD) and the local authority, whilst strengthening the economic value of the area.

W & L Consultants was appointed to undertake an Environmental Impact Assessment Study for the proposed Tambo Springs Inland Port development. The environmental assessment was done by means of an independent investigation of all the environmental issues associated with the project. The aim of the investigation was to identify and evaluate the opportunities that the natural environment offers to the development and the constraints that it imposes. The Environmental Impact Assessment Process is seen as a structured proactive process that strengthens the role of the environmental issues in strategic decision-making, and recognises the need to integrate environmental considerations into the early stages of the planning process.

The EIA procedure followed to date is in terms of the provisions of the Environmental Impact Assessment (EIA) process as per the National Environmental Management Act: NEMA, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations of 2010 (Government Notice No's R544, 545 and 546 of 2010), governed by the Gauteng Department of Agriculture and Rural Development (GDARD). The process entailed the submission of a Scoping Report and a Plan of Study for Environmental Impact Assessment on 20 October 2011. The documents were reviewed by GDARD (**Annexure B**) and subsequently approved on 31 October

2011. The various issues identified in the Plan of Study for full Environmental Impact Assessment will be addressed in the Environmental Impact Assessment Report.

1.2 Overall approach

The overall approach included the use of a multi-disciplinary team of experts, including relevant specialists. The project team, including specialists comprised of the following:

Table 1: List of Professional Team Members

Name	Organisation	Area of Expertise
Liselle van Niekerk	W and L Consultants cc	Environmental Management
Leon Boshoff	Bigen Africa Engineering Solutions	Engineering Services
Alex van der Schyff	Aeterno Town Planning	Town Planning
Philemon Namane	Mpotseng Infrastructure	Traffic Impact Study & Electrical Report
Vanessa Marais	Galago Environmental	Fauna and Floral Specialists
A Koning & D Botha	Prism Environmental	Wetland Delineation, Classification, Aquatic Study & Impact Assessment
	Intraconsult Cc	Geotechnical Investigation
Kim Moonsamy	Blue IQ Investment Holdings	Socio Economic Impact Analysis
J van Schalkwyk		Heritage Survey

The project team focused on understanding the biophysical, social and economic environment and the values thereof.

Opportunities, constraints and values of the study area were included in the assessment. This was formulated into a vision or desired state of the environment that recognises appropriated development alternatives and control zones.

The abovementioned was used to guide the proposed development and to ensure a sustainable development that is economically viable and sensitive to the existing ecological landscape.

1.3 Terms of Reference

Gauteng Department of Agriculture and Rural Development (GDARD) requested that an Environmental Impact Assessment (EIA) for the proposed township be carried out. The Environmental Impact Assessment together with the public consultation will be undertaken in accordance with the following activities as listed within the EIA Regulations, 2 August 2010:

Indicate the number and date of the relevant Government Notice:	**Activity No (s) (in terms of the relevant notice): e.g. Listing notices 1, 2 or 3**	**Describe each listed activity as per the wording in the relevant listing notice:**
GNR 545, 18 June 2010	15	*"Physical alteration of undeveloped vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use, where the total area to be transformed is 20 hectares or more."*
GNR 544, 18 June 2010	9	*"The construction of facilities or infrastructure exceeding 1000m in length for the bulk transportation of water, sewer, or stormwater –* *(i) with an internal diameter of 0,36m or more, or* *(ii) with a peak throughput of 120 liters per second or more*
GNR 544, 18 June 2010	10	*The construction of facilities or infrastructure for the transmission and distribution of electricity –* *(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts, or* *(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more*
GNR 544, 18 June 2010	11	*The construction of:* *(i) canals;* *(ii) Channels;* *(iii) Dams;* *(iv) Weirs;* *(v) Bulk stormwater outlet structures* *Where such construction occurs within a watercourse or within 32 meters of a watercourse measured from the edge of the watercourse, excluding where such construction will occur behind the development setback line.*

Various factors play a role for the execution of the environmental investigation at this point in time. The terms of reference for this report are to:

1 Register the project with the relevant environmental authorities;
2 Follow the public participation process as set out in Chapter 6 of GNR 543 of 18 June 2010;
3 Compile a Scoping Report and Plan of study for Environmental Impact Assessment (EIA);
4 Conducting Specialist Studies deemed necessary/required;
5 Assessing the issues, impacts and alternatives and
6 Compiling a detailed EIA Report.

The EIA Report is to include a description of the environment as well as the possible issues

that may result from the proposed development. The following issues were addressed:

1 Ecological Impacts including flora, avifauna, mammals, and herpetofauna;
2 Sensitive Wetland area and Aquatic systems;
3 Socio - Economic Impacts;
4 Heritage features;
5 Service infrastructure and
6 Cumulative Impacts.

1.4 Study Approach

The EIA regulations stipulate that an Environmental Impact Assessment (EIA) should be undertaken as the first step in applying for authorisation to proceed with the proposed activity. The objectives of the EIA Report are to:

- Identify Interested and Affected Parties (I & AP's) and inform them of the proposed project;
- Identify any issues and concerns associated with the proposed project;
- Identify alternatives to the proposed project;
- Identify areas of likely impact and relevant environmental issues that will require specific environmental management procedures.
- Provide measures to mitigate the significant impact identified.

1.5 Purpose of the Environmental Impact Assessment Report

The purpose of the Environmental Impact Assessment Report is:

- To provide a detailed biophysical (fauna, flora, soils, geology, storm water, typography, etc.) assessment and ground truth of the site to identify opportunities and constraints for conservation management, spatial, social and economic development;
- Provide a detailed assessment of the context in which the site occurs (existing land uses, roads, and other service infrastructure);
- To consider the functional role of the site in terms of storm water management, ecology, and socially in relation to the City's RSDF strategies on densification, and economic development;
- To ensure that the environmentally sensitive areas are protected and areas for

development are identified;

- To present the results of the scoping phase of the EIA process to the Interested and Affected Parties (I & AP's). The Environmental Impact Assessment Report documents the main issues associated with the proposed development of that require attention, management, and mitigation;
- To allow I & AP's the opportunity of confirming that the concerns and suggestions raised have been adequately documented and addressed in the assessment of the potential environmental impacts.
- To evaluate the layout for the proposed development and
- To document the results of the EIA exercise and present it to GDARD so that they can consider the findings and authorise the project.

1.6 Assumptions and Limitations

1.6.1 Stage of Project

Adequate timing has been allowed for the EIA exercise. Particular note should however be made of the fact that the EIA Report was compiled during the conceptual stages of development. Site selection had already been established and the preferred site is the site evaluated. In addition the layout and design components were established in the conceptual phase and used during the EIA evaluation of the site and proposal.

1.6.2 Availability of Baseline Information

The majority of baseline information was readily available.

1.6.3 Time Constraints

Sufficient time was allowed for the EIA process.

2 PROJECT DESCRIPTION

2.1 Location of Site

2.1.1 Regional Setting

The project is located in Gauteng Province within the City of Germiston Metropolitan Municipality (**Annexure A - Locality Map**). The site is well positioned as it is located in the southern periphery of Johannesburg and within the Johannesburg/Durban road freight and rail corridor.

The site has access to the N3 freeway to Durban which is South Africa‟s major freight transport route, to the N1 to Cape Town, to Port Elizabeth and East London and via the R390, as well as to other freeways to the industrial centres in the Johannesburg and Ekurhuleni Municipalities.

An operational freight railway line, that crosses the N3 on the site, traverses the site. This railway line is capable of linking the main railway lines from Johannesburg to Durban and from Johannesburg to Cape Town, respectively.

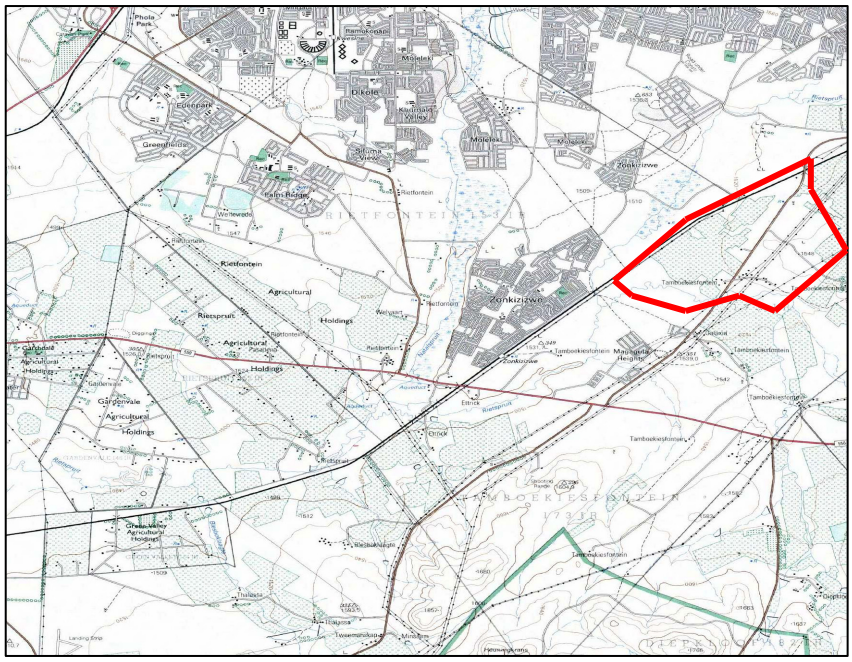


Figure 1: Topographical Map – Re/Ptn 37 Tamboekiesfontein, 173 IR (Thick Red Set)

In terms of road freight, the site is 22 kilometres (kms) from the City Deep Terminal in Johannesburg, and 25 km's from the OR Tambo Air Freight Terminal. The existing road linkages will allow the site to accommodate both full truck load long distance road freight and less than truck load regional distribution. The site has been identified within the spatial development frameworks the Ekurhuleni Metropolitan Municipality and the Municipality have accommodated the proposed development by re-aligning the urban edge to include the site within the urban edge.

2.1.2 Local Setting

The site is located west of the N3, directly east and adjacent to Magagula Heights. The residential area of Zonkizizwe is located north west of the site with Katlehong South directly north of the site. The area identified as the proposed development area for phase 1, namely the site, is largely uninhabited and a portion of the site is farmed. The Thulasizwe community has taken up residence on a portion of the site. They practice subsistence agriculture on a small scale. The site is zoned 'Undetermined'.

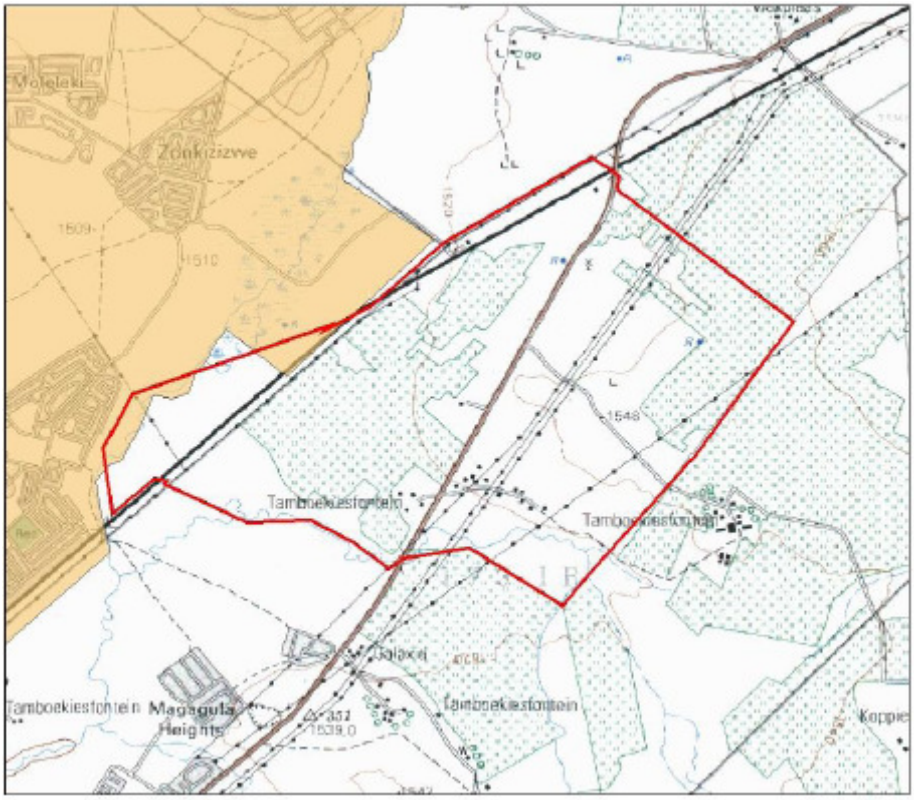


Figure 2: Topographical Map – Re/Ptn 37 Tamboekiesfontein, 173 IR (Thick Red Set)

2.2 Property Particulars

2.2.1 Description

The current property description is: the remaining extent of Portion 37 of the Farm Tamboekiesfontein, 173 IR, Germiston. A Mix Use Township will be established on the site in terms of Section 96 of the Town planning and townships Ordinance, 1986.

2.2.2 Registered Owner

The subject farm portion is registered in favour of:

Project applicant:	Inframax Strategic Properties (Pty) Ltd		
Trading name (if any):	Inframax Holdings(Pty) Ltd		
Contact person:	Mr Tumi Mohulatsi		
Physical address:	113 Mercy Avenue, Waterkloof Glen		
Postal address:	P.O Box 36708, Menlo Park		
Postal code:	0102	**Cell:**	082 826 4246
Telephone:	012 361 0906	**Fax:**	012 348 9808
E-mail:	tmohulatsi@inframax.co.za		

2.3 Activity to be Undertaken

A mix use development is proposed for the site. The site is currently zoned 'Undetermined'. The township establishment application will allow the rezoning of the site from 'Undetermined' to:

Table 2: Proposed Activities

Proposed Land Use	Area Hectare
Industrial/Warehousing	114.1479
Intermodal yard	32.0171
Logistics	176.4498
Non Developable land	14.4376
Roads	59
Trucking Intermodal yard	42.8174
Wetland Area/Open Space	111.1059
Servitude Power Line	28.0157
Servitude Rail	47.5307
TOTAL	**626.669**

The Applicant, Inframax Strategic Properties (Pty) Ltd sees this as the first phase of a 10 - 15 year project and plans to add at least a further 600ha to the identified site over time, which would enable the proposed project to be developed as a world class inland port and logistics facility.

2.3.1 Description of the Phases of the proposed Development

The development will take place over a period of 8 years will be in extent of ±627.485ha for the Inframax Landholding site. The proposed development forms part of a master plan for the larger area where the Inframax Landholding site is seen as phase 1 of the larger development. The land distribution across the total developable area is as follow:

Landholding	Gross Area (ha)
Land A: Inframax Landholding *(Phase 1)*	**627.485**
Land B: Possible Expansion Area	420.732
Land C: Cemetery	154.250
Land D: Adv. Du Plessis Landholding	401.948
TOTALS	**1 604.415**

Phase 1 (Inframax Land Holding) will be developed in two stages:

- Stage 1: year 1 to year 5 - this stage will include the development of the truck and Intermodal yard and expected TEU's for container terminal, i.e. 1, 000,000TEU's and the expected pallets, i.e. 4, 500,000 pallets. The estimated development size is 406,754.10m²
- Stage 2: year 6 – year 8 – this stage will consist of the Development of industrial / warehousing. The estimated development size is 737,879.86m².

The total development is planned on a 1000 hectare site and projected on a 15 year timeframe (to completion). This report only assessed the activities to be developed on the Inframax Land Holding that constitutes phase 1 of the total development. The specific development phases for phase 1 will be:

- **Pre-Construction:**

During the pre-construction phase, the environmental and town planning processes will be completed. The activities that will take place involve the legal and administrative activities

related to the Environmental Authorisation of the project. The establishment of the township and the registration of individual erven are subject to the granting of the Environmental Authorisation.

- **Construction**

The construction phase entails the development of the erven and the construction of the top structures and related infrastructure. Site clearance and the construction of the railway siding internal street and essential township services are but a few of the activities that can take place immediately. The buffer zones to protect the wetland area will be implemented and the area will be fenced off. The mitigation measures, EMP and landscape plan will be implemented and environmental monitoring will be crucial in this phase of the proposed development.

- **Operational**

During the operational phase the erven will be fully developed and functional. The wetland area will be fenced off. The mitigation measures that have been introduced and the stormwater management system and landscape plan will be monitored for effectiveness through an EMP.

2.3.2 Town Planning

The land is a farm portion and it will therefore be required to follow the township establishment route to create individual erven. The main aim of the criteria used in the town planning process will be to design a township that will accommodate various land uses proposed (**Annexure E - Layout Plan**).

Table 3: Total Area of the Proposed Development

Proposed Land Use	Area Hectare
Industrial/Warehousing	114.1479
Intermodal yard	32.0171
Logistics	176.4498
Non Developable land	14.4376
Roads	59
Trucking Intermodal yard	42.8174
Wetland Area/Open Space	111.1059
Servitude Power Line	28.0157
Servitude Rail	47.5307
TOTAL	**626.669**

The size of the property is 626.669ha in extent. The township application was submitted to the City of Germiston Metropolitan Municipality. The application is subject to the granting of the Environmental Authorisation.

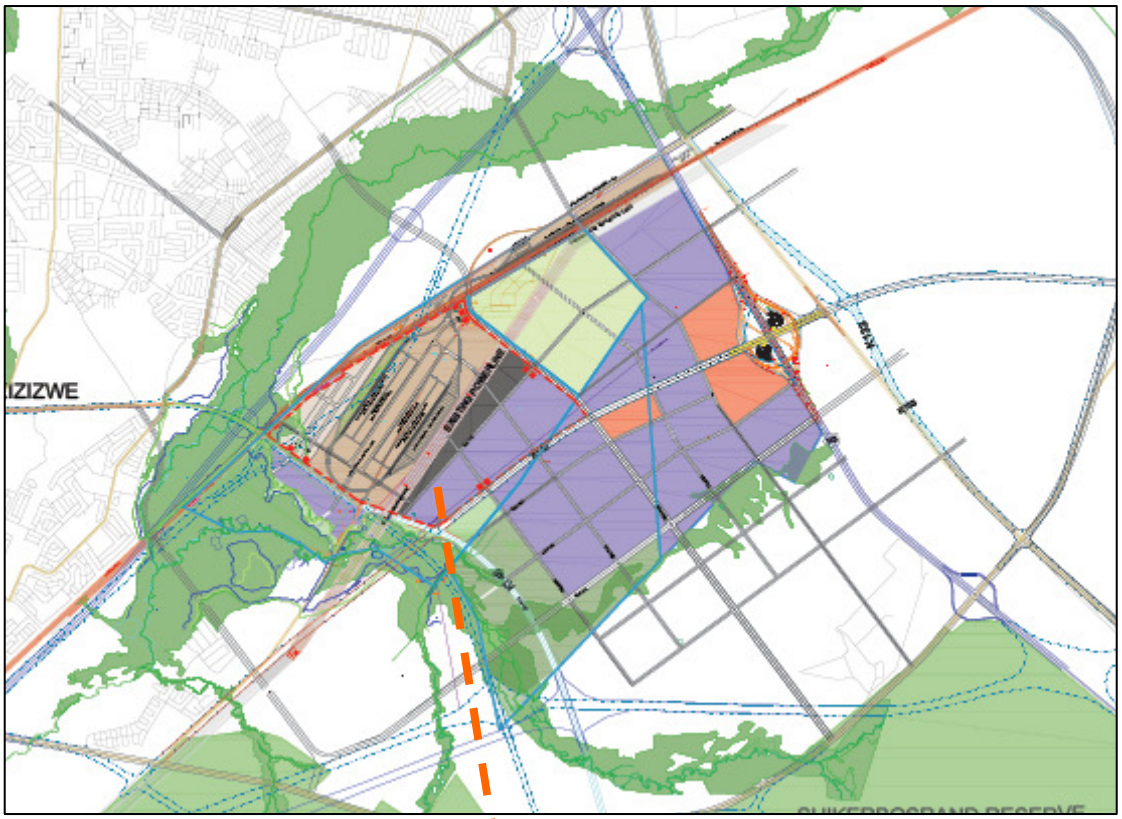


Figure 3: Tambo Springs Master Plan – The site in Thick Red Set (GAPP Architects, February 2012)

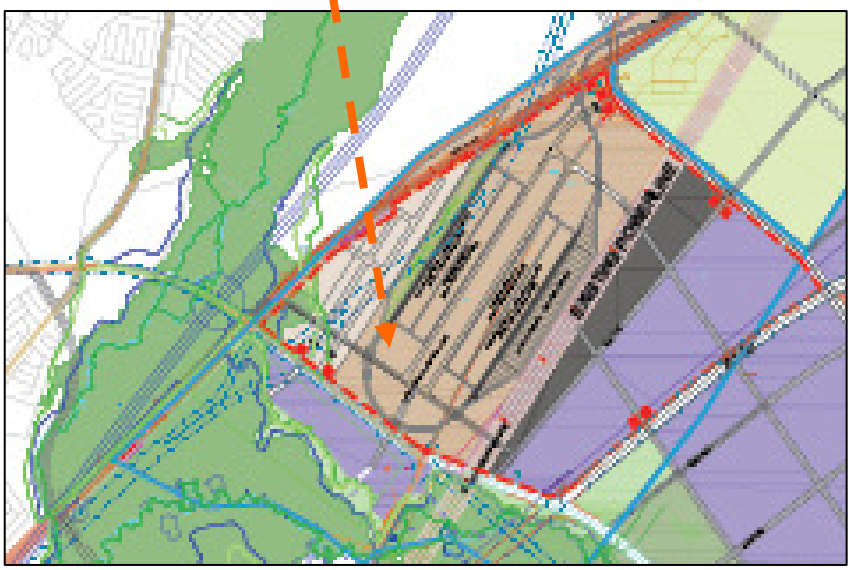


Figure 4: Phase 1(Inframax Land Holding) – The developable area in Thick Red Set. The site in Blue (GAPP Architects, February 2012)

2.3.3 Estimated Time Frames for Construction

As the township establishment process is subject to the Environmental Authorisation, the proclamation of the Township can only start once the environmental process has been finalised. Once completed the, township would be proclaimed. This process can take between six months and a year.

The development of the township is subject to the prevailing economic climate. The site will be developed in two stages and the development will take up to 8 years.

3 PUBLIC PARTICIPATION PROCESS

3.1 Description of Public Participation Process

Public Participation is a cornerstone of any Environmental Impact Assessment. The principles of NEMA (Act No. 107 of 1998) govern many aspects of environmental impact assessments, including public participation. These include provision of sufficient and transparent information on an ongoing basis to stakeholders to allow them to comment and ensuring the participation of previously disadvantaged people, women and youth.

Effective public involvement is an essential component of many decision-making structures, and effective community involvement is the only way in which the power given to communities can be used efficiently. The public participation process is designed to provide sufficient and accessible information to interested and affected parties (I & AP's) in an objective manner to assist them to:

- Raise issues of concern and suggestions for enhanced benefits;
- Verify that their issues have been captured;
- Verify that their issues have been considered by the technical investigations; and
- Comment on the findings of the EIA.

Potential I & AP's were informed of the project during the Scoping Phase as well as during the EIA Phase via the following media:

1 **Scoping Phase**: The project was made public via the following measures: Publication of media advertisements in the following media: Local and regional newspaper. Adverts were placed in The Star Newspaper on the 31 August 2011 and ran until 14 October 2011.

- Highly visible site notices advertising the EIA process were placed on site
- Registered letter were sent to all identified I & AP's on 31 August 2011. Included were: a Letter of Notification, a draft Scoping Document, a Locality Map and a Layout Plan.
- Emailing the draft Scoping Report and its Appendices to all registered IAP's.
- Submission of Scoping Report to various Government Departments and GDARD.
- Posting of Scoping Report to Interested and affected Parties.
- Submission of Scoping Report per hand to Interested and affected parties.

2 **EIA Phase:** Advertisements notifying the public of EIA process and requesting all I & AP's to register their comments, issues and concerns were placed in the Star Newspaper on 27 March 2012. All I & AP's were given until 4 May 2012 to respond.

- Highly visible site notices advertising the EIA process were placed on site
- Registered letter were sent to all identified I & AP's on 31 August 2011. Included were: a Letter of Notification.
- Emailing the draft EIA Report and its Appendices to all registered IAP's requesting the documents.
- Submission of the draft EIA Report to various Government Departments and GDARD.
- Posting of the draft EIA Report to Interested and affected Parties requesting the documents.
- Submission of the Draft EIA Report per hand to Interested and affected parties.

3.2 Interested and Affected Parties

Consultation with the relevant authorities and key interested parties at an early stage in identifying the broad range of issues and alternatives is essential. The following I & AP's were identified:

Table 4: I & AP's identified and informed of the proposed activity

Government Department		
Department/Organisation	**Contact Person**	**Postal Address**
Head of Department Department of Transport and Public Roads	Denis Emett	Private Bag X83 Marshalltown 2107
Department of Health	Dr Mohammed Bismilla	Private Bag X085, Marshalltown 2107
Rand Water: Corporate Environmental Officer	Mr Motloung	Private Bag X 015, Mondeor 2110
Department of Minerals and Energy	Mr JL Ndimande	Private Bag X 5 Braamfontein 2017
ESKOM	Corporate Environmental Officer	P.O Box 1091 Johannesburg 2000
DWAF	Ms B Ngoasheng	Private Bag X995 Germiston 0001
SAHRA	N January	P.O Box 87552 Houghton 2041
SASOL GAS	Shailendra Komal	P.O Box 1234, Randburg 2125

Council for GeoScience	Abraham Thomas	Private Bag X12 Germiston 0001
Municipality		
Director: Development Planning. Ehurhuleni Metropolitan Municipality	Cliff Patterson	P.O Box 145 Germiston 1400
Director: Roads & Transport. Ehurhuleni Metropolitan Municipality	Mr Gideon Beetge	Private Bag X 014 Benoni 1500
Director: Environmental Impact Management Section	Mrs Elsabeth van der Merwe	P.O Box 25 Edenvale 1610
Ekurhuleni Metro: Department of Housing	Mr D Morema	P.O Box 25263 Benoni North 1527
Ward Councillor: Ward 64	Thandile Cynthia Luthuli	079 959 1606

Adjacent Landowners	
1. **Ptn 36 Tamboekiesfontein 173 iR** **Emontic In (Pty) Ltd** CEO – Mr Karl Kebert P.O Box 448 Kliprivier 1871	**2.** **Ptn 36 Tamboekiesfontein 173 IR** **Starlite Aviation** Chairman – Mr Slade Thomas P.O Box 448 Kliprivier 1871
3. **Ptn 53 Tamboekiesfontein 173 IR** Eastern Services Council Andrias Hlongwane Andrias.hlongwane@ekurhuleni.gov.za	**4.** **Ptn 34 Tamboekiesfontein 173 IR** H Hoogenboezem & Seun (Pty) Ltd Roly Pelser rpelser@deloitte.co.za P.O Box 17604 Sunward Park 1470
5. **Advocate Du Plessis** Debbie@steinhoff.co.za P.O Box 122 Stellenbosch 7599	

Comments received from I&AP's on the Scoping Report & Plan of Study for EIA:

- **Transport and Development Facilitation, Gauteng (GAUTRANS):** indicated that the department will not participate in the EIA process however provincial roads are affected and a traffic impact assessment report must be submitted to GAUTRANS for approval.
- **Ekurhuleni Metro – Infrastructure Services: Regional Office - South** indicated that Roets Drive and Moagi road is affected and will have to be extended across the spruit.
- **Department of Mineral Resources (DMR):** there is interest in mining activities in the area

and the applicant needs to contact the relevant Company be fore any development may commence.

- **Department of Water Affairs (DWAF):** The Applicant must apply for all the relevant Water Usage Licenses and the relevant mitigation measure to protect the wetland must be implemented.

Response to Comments received on the Scoping Report & Plan of Study for EIA:

- **Transport and Development Facilitation, Gauteng (GAUTRANS):** A traffic Impact Study will be submitted to the the department as part of the Application.
- **Ekurhuleni Metro – Infrastructure Services: Regional Office – South:** The extension of Moagi Drive and Roets Road doe not form part of the proposed infrastructure development for phase 1 and is therefore no assessed in this application.
- **Department of Mineral Resources (DMR):** The matter will be addressed by the Applicant.
- **Department of Water Affairs (DWAF):** A site meeting was held with the official from DWAF on 22 February 2012. All issues were discussed with the official and the relevant WULA applications will be submitted to the Department by the Wetland Specialist.

Comments received from I&AP's on the EIA Report:

- **Emontic:** the Draft EIAR was submitted to Montic Dairy for comment. The CEO of Montic Dairy, Mr Karl Kebert, requested a meeting to discussion the contents of the document with specific reference to the roads affected by the proposed development and the affect thereof on Montic Dairy. A meeting between the Applicant and the Interested and affected Party was held on 23 April 2012. The attendance register is attached as proof (Annexure D). As confirmation of what was discussed in the meeting a letter was received from MM Town Planning Services on behalf of Montic Dairy. The following issues were identified:
    - Access to the site will be from D817. Montic Dairy operational activities should not be adversely affected during the construction phase of the whole development, as this road is used for distribution.
    - Any possible diversions should make use of reliable roads and detours around the N3 are not acceptable.
    - The K148 route dissects the property of Montic Dairy and the construction thereof will significantly impact on the property of Montic Dairy.
    - An acceptable road surface must be put in place before the proposed portion of the D817 is re-aligned.

- The proposed development should not at any time impact or affect the operations of Montic Dairy.

- **Ekurhuleni Environmental Resource Management:**
  - Potential impact on the Wetland Area: The wetland study submitted is accepted and the recommendations in the study should be adhered to.
  - Biodiversity and Open Space Strategy: The current open space function is that of a natural open space. The municipality is satisfied that the sensitive areas have been left out from the open space node.
  - Enhancement of Natural environment;
  - Sustainable Development Practices;
  - Potential reduction of CO^2 levels;
  - Protection of Ecosystems and biodiversity;
  - Pollution control measures; and
  - Impact on high potential agricultural land within the area;
- **Department of Water Affairs:** No activities to take place within the 1:100 year floodline or within 100m from water resources without Authorisation from the Department.
  - Appropriate measures to be taken to prevent spillages or environmental pollution.
  - No channelling or impediment of water flow shall be allowed within the wetland area;
  - Stormwater control measure to be put into place;
  - Erosion measures to be implemented;
  - Concerns from I & AP's to be considered;
  - DWA to be notified of pollution incidents.
- **GDARD:** confirmation from the Local Authority or relevant service provider that bulk services (e.g. water supply, sewerage and waste disposal, energy, storm water) and related services such as road infrastructure will be provided to the proposed development;
  - Inclusion of a Storm Water Management Plan;
  - Proof of Notification of all relevant I & AP's
  - Shape files and composite map.

Response to comments received on the EIA Report:

- **Emontic:** Response was submitted to MM Town Planning services on 9 May 2012 addressing all issues and concerns identified. The response was draft by W & L Consultants on behalf of the Applicant – Inframax. The response is as follow:

- The D817 is a public road and falls within the control of the Transport Department. As such, any closure, deviations or disruptions to the road and its traffic must be approved by the Transport Department. The Applicant as responsible developers will adhere to the recommendations of the Transport Department when implementing the proposed Tambo Springs Master Plan. The Transport Department must approve the diverted road before they allow the existing D817 to be closed. They will set the specifications and control the process.
- The K148 is a provincial road planned by the Gauteng Department of Roads and Transport and the issue regarding the impact of this road must be taken up with them. The Applicant (Inframax) was not involved in the design and planning of this road. Should this road be constructed it would be the responsibility of the Gauteng Department of Roads and Transport, and the entire process would be driven by the Gauteng Department of Roads and Transport.

It is therefore clear that it is not the intent of Inframax to disrupt the operations of Montic Dairy. The consultation that Inframax has initiated with Montic Dairy from the start of the process will continue during the implementation phase of the Tambo Springs Inland Port development to avoid disruptions to Montic Dairy's operations and to ensure that all parties benefit from development and investment within the area.

The letter is attached as proof of communication (Annexure E).

- **Ekurhuleni Environmental Resource Management:**
  - Enhancement of Natural environment: Sensitive areas identified are excluded from the development as indicated in the specialist studies. The natural flow of water will be maintained and monitored as per the wetland study. Water quality test have been done by the wetland specialist and was submitted to DWA as part of the WULA application. The water quality test include a dry month test (winter) and a wet season test (summer).
  - Sustainable Development Practices: The project will be developed in phases. Phase 1 included the development of the railway siding and upgrade of roads and installation of relevant services. Therefore sustainability and the potential of the implementation of sustainable development practices will be discussed and implemented during the following phases where the possibility of implementing green building practices could be investigated by the architects and urban designers.
  - Potential reduction of CO^2 levels: The aim of the project is to contribute to the reduction of road transport by establishing a world class inland pot and logistics hub. The switch from road transport to railway will contribute to the reduction of CO^2 levels

locally and regionally. Although it would be minimal at first, the contribution will increase as the various phases of the project is rolled out over the 10 year period.

- Protection of Ecosystems and biodiversity: All sensitive areas will be protected within the applicable bufferzones.
- Pollution control measures: The area where pollution could occur would be the inter modal yard. Developments within the yard would adhere to the relevant health and safety regulations.
- Impact on high potential agricultural land within the area: The site itself is not identified as high agricultural land and the proposed activities would be contained with the boundaries of the project site.

- **GDARD:** confirmation from the Local Authority or relevant service provider that bulk services (e.g. water supply, sewerage and waste disposal, energy, storm water) and related services such as road infrastructure will be provided to the proposed development: The Applicant will upgrade and install all relevant engineering services as required for the project. The engineering services report is attached in Annexure C.
    - Inclusion of a Storm Water Management Plan: Stormwater Management Plan is attached in Annexure C;
    - Proof of Notification of all relevant I & AP's: Proof of notification is attached in Annexure D. Correspondence received from all I & AP's is attached in Annexure E;
    - Shape files and composite map: Shape files are on the accompanying CD and the composite map is attached in Annexure F.

3.3 CONCLUSIONS

- Site notices were placed on the site for all to see.
- Interested and Affected parties were notified during the scoping phase as well as during the EIA phase and as a result comments were received from Stakeholders, surrounding land owners as well as Government Departments. Their letters are included for perusal in **Annexure E**.
- All issues and concerns identified were addressed.

4 BIOPHYSICAL DESCRIPTION OF THE SITE

4.1 Physical Features and Characteristics

4.1.1 Regional Climate

Table 5: Climate of Germiston

CLIMATE OF SOUTH AFRICA WB 42 CLIMATE STATISTICS 1961 - 1990

Number: 0476399 0 Name: **JAN SMUTS - WO ϕ = 26° 8' S λ = 28° 14' E HT: 1694 m Period: 1961-1990

AIR TEMPERATURE IN DEGREES CELSIUS

	AVERAGE OF DAILY				MAXIMUM (TX) P = 29 Years									MINIMUM (TN) P = 29 Years												
	MAX	MIN	MEAN	RANGE	HIGHEST (TXX)			AVERAGE NUMBER OF DAYS WITH TX					LOWEST (TXN)			HIGHEST (TNX)			AVERAGE NUMBER OF DAYS WITH TN					LOWEST (TNN)			
	$\overline{TX}$	$\overline{TN}$	$(\overline{TX}+\overline{TN})/2$	$\overline{TX}-\overline{TN}$	MAX	YY/DD	MEAN	>=35	>=30	>=25	>=20	>=15	<10	MEAN	MIN	YY/DD	MAX	YY/DD	MEAN	>=20	<15	<10	<5	<0	<-5	MEAN	MIN	YY/DD	
J	25,6	14,7	20,1	11,0	35,4	73/19	30,2	0,0	2,1	18,6	29,9	30,9	0,0	19,3	13,8	80/08	20,3	83/29	18,1	0,1	16,7	0,5	0,0	0,0	0,0	11,0	7,2	77/02	J
F	25,1	14,1	19,6	10,9	33,5	83/25	29,1	0,0	0,9	15,0	26,7	28,2	0,0	19,4	14,8	88/10	20,4	87/20	17,4	0,0	17,7	0,8	0,0	0,0	0,0	10,3	6,0	90/24	F
M	24,0	13,1	18,6	10,9	31,9	73/15	28,0	0,0	0,3	12,8	28,3	30,8	0,0	17,5	12,7	75/18	21,2	84/02	16,9	0,0	25,2	2,3	0,0	0,0	0,0	8,5	2,1	74/19	M
A	21,1	10,3	15,7	10,8	29,3	87/02	25,5	0,0	0,0	3,0	20,5	28,9	0,0	14,6	7,4	72/30	19,0	87/07	14,7	0,0	29,0	12,5	0,9	0,0	0,0	4,7	0,5	65/26	A
M	18,9	7,2	13,1	11,6	26,4	83/01	23,0	0,0	0,0	0,3	11,5	28,7	0,1	13,0	9,1	69/21	17,5	79/01	12,3	0,0	30,8	25,6	6,7	0,3	0,0	1,6	-2,5	73/31	M
J	16,0	4,1	10,1	12,0	23,1	88/04	20,4	0,0	0,0	0,0	1,8	21,0	1,1	9,5	1,5	64/20	12,6	79/06	9,3	0,0	30,0	29,6	17,0	3,0	0,0	-1,9	-8,2	79/13	J
J	16,7	4,1	10,4	12,5	24,4	88/17	21,1	0,0	0,0	0,0	2,6	24,1	0,7	10,4	6,7	89/18	12,0	78/29	8,8	0,0	31,0	30,7	18,5	2,3	0,0	-1,9	-5,1	90/14	J
A	19,4	6,2	12,8	13,1	26,2	86/27	24,4	0,0	0,0	0,8	14,6	28,1	0,3	11,8	6,9	83/08	14,8	78/12	12,0	0,0	31,0	27,4	9,7	1,6	0,0	-0,6	-5,0	72/02	A
S	22,8	9,3	16,1	13,5	31,1	83/29	28,4	0,0	0,1	10,6	23,5	28,6	0,3	13,4	6,1	74/05	18,0	78/28	15,2	0,0	29,0	15,5	3,4	0,5	0,0	1,8	-3,3	89/08	S
O	23,8	11,2	17,5	12,6	32,2	65/31	29,4	0,0	1,1	13,3	26,1	30,0	0,1	14,5	9,3	73/16	20,3	61/24	16,6	0,0	27,5	9,2	1,4	0,0	0,0	4,7	0,2	65/20	O
N	24,2	12,7	18,4	11,5	32,9	90/14	29,5	0,0	0,9	13,3	26,7	29,3	0,1	15,9	7,6	68/11	20,7	81/06	17,1	0,1	24,7	3,3	0,2	0,0	0,0	7,3	1,5	76/26	N
D	25,2	13,9	19,6	11,3	32,4	84/29	29,8	0,0	0,0	17,7	29,3	30,9	0,0	18,1	12,6	75/16	20,3	82/23	17,6	0,1	21,2	1,0	0,1	0,0	0,0	9,6	3,5	70/07	D
YR	21,9	10,1	16,0	11,8	35,4	73/19	31,4	0	6	105	242	340	3	7,7	1,5	64/20	21,2	84/02	19,1	0	314	158	58	8	0	-3,0	-8,2	79/13	YR

PRECIPITATION (and FOG). DRY- AND WETBULB TEMPERATURES. RELATIVE HUMIDITY and CLOUD COVER

	PRECIPITATION (R mm) P = 29 Years													P = 26 Years				TEMPERATURE (° C)						REL. HUM. (%)					CLOUD			
	MONTH	24 HOUR MAX		TOTAL PER MONTH / YEAR				AVERAGE NO. OF DAYS WITH R (mm) >=						AVE NO. OF DAYS WITH				DRY BULB P = 29 Years			WET BULB P = 29 Years			P = 29 Years				IN EIGHTHS P = 29			
	$\overline{TOT}$	RXX	YY/DD	MAX	YEAR	MIN	YEAR	0,1 AVE	0,1 MAX	0,1 MIN	1	5	10	30	TH	HA	SN	FOG	$\overline{08}$	$\overline{14}$	$\overline{20}$	$\overline{08}$	$\overline{14}$	$\overline{20}$	$\overline{08}$	$\overline{14}$	$\overline{20}$	MAX	MIN	$\overline{08}$	$\overline{14}$	$\overline{20}$	
J	125	188	72/20	338	1972	56	1974	15,9	22	10	11,8	6,8	3,8	0,6	2,4	0,4	0,0	2,1	17,9	24,1	19,9	15,4	17,3	15,8	78	50	65	97	24	4,4	5,0	4,7	J
F	90	56	90/13	191	1976	13	1984	11,2	17	5	8,2	5,0	3,2	0,5	2,1	0,1	0,0	2,1	17,1	23,6	19,4	14,9	16,9	15,4	80	50	65	96	25	4,1	4,8	4,1	F
M	91	92	67/20	219	1987	16	1965	11,9	19	2	8,5	5,0	2,9	0,7	2,0	0,1	0,0	4,1	16,0	22,8	18,3	13,9	15,9	14,3	80	48	63	96	27	3,8	4,7	3,6	M
A	54	50	90/28	130	1971	4	1985	8,6	16	2	6,5	3,2	1,8	0,2	1,4	0,1	0,0	4,6	13,3	20,1	15,3	11,1	13,5	11,5	79	46	61	97	22	3,3	4,0	2,8	A
M	13	70	76/03	80	1976	0	1987	2,9	12	0	1,9	0,8	0,4	0,0	1,5	0,0	0,0	4,6	10,3	18,1	12,4	7,6	10,6	8,1	71	37	51	97	19	2,0	2,3	1,3	M
J	9	31	63/12	59	1963	0	1985	2,0	7	0	1,1	0,6	0,3	0,0	0,4	0,1	0,0	3,3	6,7	15,3	9,4	4,3	8,1	5,3	70	34	47	97	16	1,6	1,6	1,0	J
J	4	17	70/16	22	1985	0	1989	1,0	4	0	0,6	0,3	0,1	0,0	0,7	0,1	0,1	3,3	6,8	15,9	9,9	4,2	8,2	5,2	68	31	42	97	13	1,3	1,3	0,8	J
A	6	21	79/19	47	1979	0	1980	2,1	10	0	1,2	0,4	0,1	0,0	1,2	0,0	0,1	2,2	9,5	18,5	12,7	6,1	9,7	7,0	64	28	38	97	10	1,6	1,5	1,0	A
S	27	62	87/27	175	1987	0	1989	3,7	14	0	2,6	1,4	0,8	0,2	2,6	0,1	0,1	2,4	13,3	21,9	16,4	9,2	12,1	9,8	62	29	38	96	10	2,1	2,2	1,9	S
O	72	110	85/30	198	1964	12	1980	9,8	18	4	6,8	4,1	2,2	0,3	3,8	0,7	0,0	2,5	15,4	22,6	17,6	11,5	13,9	11,8	67	38	50	97	12	3,4	3,9	3,4	O
N	117	65	62/06	230	1962	39	1990	15,2	24	9	11,3	6,6	4,1	0,8	2,1	0,3	0,0	2,4	16,7	22,8	18,0	13,4	15,4	13,6	73	46	62	97	19	4,3	4,8	4,3	N
D	105	102	78/22	181	1986	38	1980	14,9	21	10	11,4	6,8	3,6	0,3	2,6	0,1	0,0	1,6	17,7	23,8	19,2	14,6	16,5	14,8	74	47	61	97	23	4,3	4,9	4,6	D
YR	713	188	72/20	1019	1987	443	1984	99	120	76	72	41	23	4	73	3	0	35	13,4	20,8	15,7	10,5	13,2	11,1	73	41	54	98	8	3,0	3,4	2,8	YR

Period = years covering the data for all the columns of both tables. P = Average number of years covering the data in the columns concerned. $\overline{TX}$ = Average maximum, $\overline{TN}$ = Average minimum air temperature
TXX = Highest maximum, MAX = highest in P years. TXN = Lowest maximum, MIN = lowest in P years. TNX = Highest minimum, MAX = highest in P years. TNN = Lowest minimum, MIN = lowest in P years.
$\overline{\ }$ = MEAN = AVE = AVERAGE e.g. $\overline{08}$, $\overline{14}$, $\overline{20}$ = MEANS of observations which were made on these hours (SAST). YY/DD = Year/Day of occurrence of the extreme in the previous column.
(Number of days (NOD) with TX >= 10) = (NOD in the month - NOD with TX < 10). TH = Thunder, HA = Hail, SN = Snow, FOG = fog. > signifies greater than, >= signifies greater than or equal to.
(Number of days (NOD) with TN < 20) = (NOD in the month - NOD with TN >= 20). < signifies less than, <= signifies less than or equal to.

4.1.2 Rainfall

Rain falls mostly between October and April, usually in the form of thundershowers. The area receives an average annual rainfall of 713 mm. On average approximately 99 rainy days occur per year. With the extensive surface areas of concrete and tar now present as a result of the urban development, the runoff into the streams often reach flood proportions after heavy downpours.

4.1.3 Temperature

Temperatures range between an average monthly high of 25.60C in January and an average minimum of 4.10C in June. Germiston has an enviable climate; warm to hot summers with fairly high rainfall, and cool to cold winters with little or no rain. Midwinter temperatures often drop below freezing and the regular frost may be severe. Cycles of prolonged drought are a natural phenomenon.

4.1.4 Wind

The dominant wind direction between November and February is a northwesterly wind. This pattern is directly associated with the Highveld storm system that build up during the day and bring rain typically in the afternoon. Moisture laden air is brought from the Northwest sector along the axis of the tropical temperate trough. As storms build up to the southwest a wind reversal occurs. The wind changes to a south westerly direction in line with the storm movement. Wind reversal occurs after the storms have passed and come from the northeast.

4.2 Natural Ecosystems and Habitats

4.2.1 Topography

The topography of this area is a function of the geology, the ground slopes from 1557m AMSL in the south eastern corner of the site to 1515m AMSL at the upper reaches of the floodplain of the spruit in the north western sector of the site.

4.2.2 Geology and Soils

Intraconsult conducted a geotechnical investigation for the site (**Annexure C - Geotechnical Report**). The work included field work, review of existing data, a gravity survey, borehole drilling, sampling, borehole logging, test pit profiling, analysis and a report. The result of this investigation is included in the report attached.

The site is located on chert-rich dolomite of the Malmani Subgroup, Chuniespoort Group of the Transvaal Super Group. Dolerite occurs in large areas of the site. Shallow dolomite bedrock conditions were confirmed in scattered locations. Furthermore the site is located in the Natalspruit West Dolomite Groundwater Sub-Compartment. The dolomite groundwater is anticipated between a depth of 32m and 5m within the bedrock.

Based on the geohydrological data and the geological information the dolomite stability of the site is classified in terms of the following Dolomite Hazard Zones:

Dolomite Hazard Zone 1:	An area characterised as reflecting a medium inherent suceptibility of medium to large size sinkhole and subsidence formation (with small sub-areas of low susceptibility of all size sinkhole and subidence formation and small sub-areas of high susceptibility for small size sinkhole and subsidence formation) with respect to ingress of water and a low susceptibility with respect to groundwater level drawdown. In the event of groundwater level drawdown the susceptibility of the subsurface profile remains unchanged from an ingress of water perspective. **Composite characterisation: Inherent Hazard Class 3/4(1)(5)1//1.**
Dolomite Hazard Zone 2:	Area characterised as reflecting a medium to high inherent susceptibility of medium (with sub-areas of high for small) size sinkhole and subsidence formation with respect to ingress of water and a low inherent susceptibility of all-size sinkhole and subsidence formation with respect to groundwater level drawdown. In the event of groundwater level drawdown the susceptibility of the subsurface profile remains unchanged from an ingress of water perspective**. Composite characterisation: Inherent Hazard Class 3/6(5)//1.**
Dolomite Hazard Zone 3:	Area characterised as reflecting a high inherent susceptibility of medium to large size sinkhole and subsidence formation with respect to ingress of water and a high inherent susceptibility of all-size sinkhole and subsidence formation with respect to groundwater level drawdown. In the event of groundwater level drawdown the susceptibility of the subsurface profile remains unchanged from an ingress of water perspective. **Composite characterisation: Inherent Hazard Class 6/7//7.**
Dolomite Hazard Zone 4:	Area characterised as reflecting a high inherent susceptibility of large to very large size sinkhole and subsidence formation with respect to ingress of water and a high inherent susceptibility of very large size sinkhole and subsidence formation with respect to groundwater level drawdown. In the event of groundwater level drawdown the susceptibility of the subsurface profile remains unchanged from an ingress of water perspective. **Composite characterisation: Inherent Hazard Class 7/8//8.**

(Intraconsult, Volume 1: October 2011)

Based on the above the site was classified as: ***H, C & S***. The Report concluded that:

Appropriate foundation design and water precautionary measures are provided together with recommendations aimed at the adoption of a pro-active water bearing services maintenance strategy. Particular emphasis is placed on the need to manage storm water falling onto, moving across and exiting the site. Storm water should be effectively and efficiently removed from the immediate area around structures, into the municipal storm water system.

Based on this detailed field work, the borehole and soil profiles and analyses of the laboratory soil test results, the site area has been further sub-divided into (preliminary) Soil Site Class Sub-Areas in terms of the Code of Practice composite Site Classes (H,C & S). Soil Maps are provided with our interpretation of the near surface conditions as an overlay to the dolomite stability zones. This composite drawing is intended to assist with the future planning and development of the site. Rationally designed foundation solutions will be required for all structures potentially to be developed in these dolomitic sub-areas.

(Intraconsult, Volume 1: October 2011)

The following map indicates the dolomite zones:

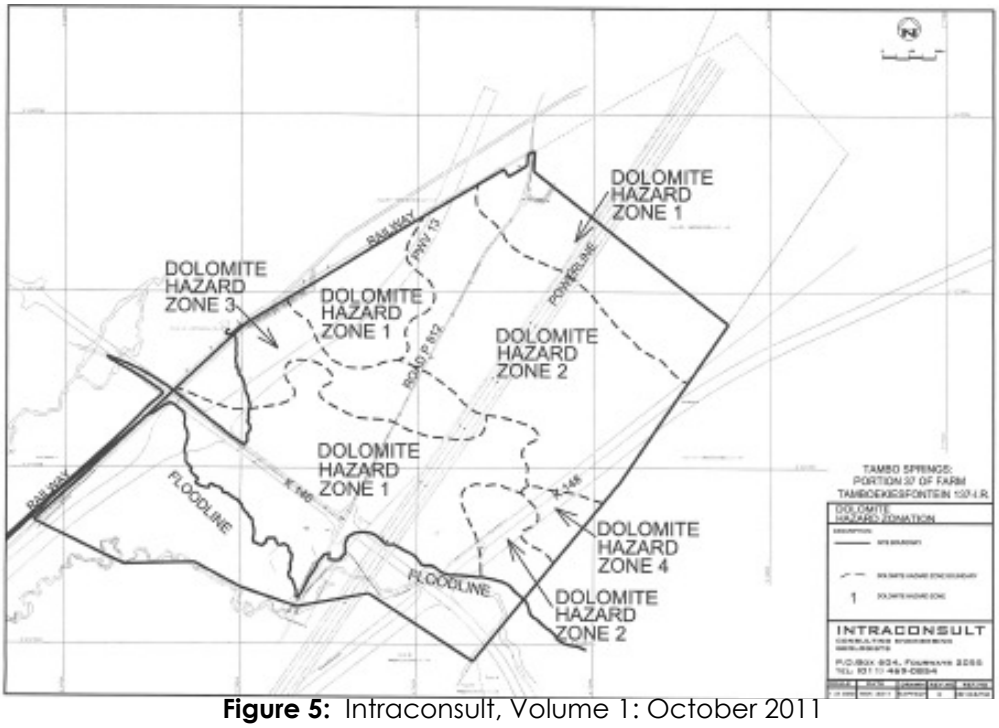


Figure 5: Intraconsult, Volume 1: October 2011

The geotechnical investigation is attached in **Annexure C** – **Geotechnical Report**.

4.2.3 Surface Water

Drainage takes place in a south westerly direction into a drainage valley that forms the western boundary of the site. The site is affected by a floodline and wetland.

4.2.4 Groundwater and Water Table

The ground slopes from 1557m AMSL in the south eastern corner of the site to 1515m AMSL at the upper reaches of the floodplain of the spruit in the north western sector of the site. The data indicated that the groundwater level can be expected at a depth of 22m in the south eastern corner to 5m and ground surface on the floodplain of the spruit. The spruit and aquifer appears to be hydraulically connected according to the geotechnical report.

A shallow or perched water table should be anticipated in sub-areas underlain by dolerite. Furthermore pedocrete materials and harder ferricrete have developed in the near surface soil horizons in sectors of the site indicating variable to poor internal drainage conditions.

4.2.5 Air Quality

No readily available data exist on air quality in the area. The air quality can be said to be typical of a peri-urban situation. The air quality is impacted upon by: veldt fires, vehicular emissions and the adjacent residential and commercial areas.

4.2.6 Noise

The proposed high-density residential development will most likely bring about additional vehicular traffic on the roads in the immediate vicinity of the development. The morning and afternoon peak period traffic volumes, in particular, will increase tangibly.

The proposed development should not have a negative impact on noise levels within the area.

4.2.7 Conservation Areas

According to the Ecological Assessment Mucina & Rutherford (2006) indicates that the site falls within Carltonville Dolomite Grassland and Eastern temperate freshwater wetlands. The authors described the Carltonville Dolomite Grassland as species-rich grassland with shallow soil and slightly undulating plains on dolomite dissected by prominent rocky chert ridges. This grassland falls within a warm-temparate summer-rainfall region with high summer temperatures and severe frequent winter frosts. This vegetation unit is considered vulnerable.

The site is in close proximity to the boundary of the Suikerbos Nature Reserve and the Platkoppie Landfill site.

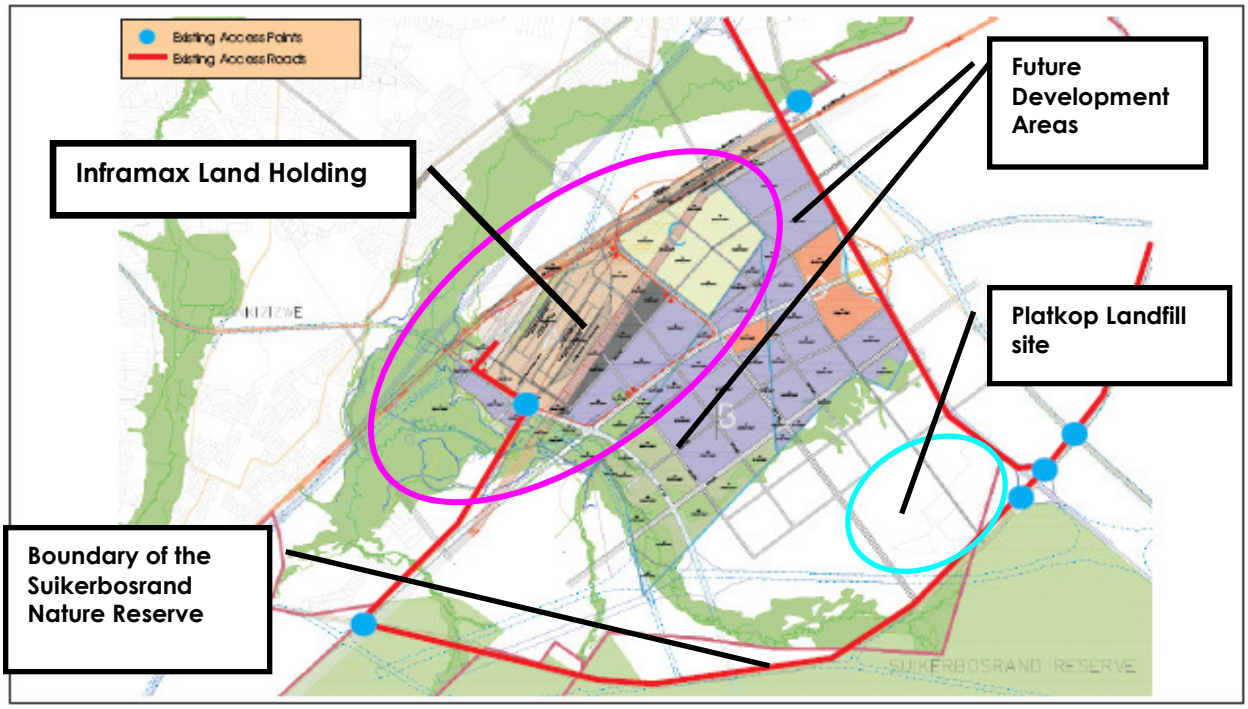


Figure 6: Location of Site in relation to Suikerbosrand Nature Reserve

5 BIOLOGICAL FEATURES AND CHARACTERISTICS

5.1 Fauna & Flora

Galago Environmental Consultants under took the following studies: Flora, Fauna, Mammals, and Herpetofauna (**Annexure C**).

- **Methodology:**
  - Information about the Red List and Orange List plant species that occur in the area was obtained from GDARD. The Guidelines issued by GDARD to specialists as well as various publications were consulted about the habitat preferences of the Red- and Orange List species concerned.
  - The SANBI list of plants recorded in the 2628AC quarter degree grid square was obtained and consulted to verify the record of occurrence of the plant species seen on the site.
  - A desktop study of the habitats of the Red List and Orange List species known to occur in the area was done before the site visit.
  - The study site was visited on 22 October 2011 and 8 November 2011.
  - One or more plots, depending on the size and composition of the vegetation, were selected at random from each study unit for detailed study. Each plot, which measured about 10m x 10m, was surveyed in a random crisscross fashion and the plant species recorded. Areas where the habitat was suitable for the Red List species known to occur in the quarter degree grid square were examined in detail.
  - Areas on the site and accessible areas on the neighbouring properties within 200 meters of the boundaries of the site where the habitat was suitable for the Red List species known to occur in the quarter degree grid were examined in detail. The site visits were done by the following specialists:

Table 6: Specialists used (Galago, Executive Summary, 2012:3):

This investigation was conducted by the following specialists:

Specialists	Aspect Investigated	Qualifications	Prof. Registration	Date of Field Survey
Rautenbach, I.L.	Mammalogy	Ph.D., T.H.E.D.	Pr. Nat. Sci.	22 October 2011
Van Wyk, J.C.P.	Herpetology	M.Sc. (Zoology)	Pr. Nat. Sci.	22 October 2011
Lemmer, P	Botany	B. Sc	Cert. Sci. Nat	8 November 2011
Geyser, R.	Avifauna		Pending	22 October 2011
Coetzer, L.A.	Botany review	D.Sc.	Pr. Nat. Sci.	
Kemp, A.C.	Avifauna review	Ph.D.	Pr. Nat. Sci.	
Marais, V.	Environmental Impacts and maps	BL Landscape Architecture		

The following represents a summary of their findings:

- **Flora:**

Four vegetation study units were identified on the study site:

- *Eragrostis – Elionurus* grassland;
- Wetland;
- Mixed alien and indigenous vegetation; and
- Cultivated fields.

The *Eragrostis – Elionurus* grassland and the Wetland were considered sensitive. One Red List species was found in the wetland opposite Zonkizizwe township. Two Orange List species were found in the *Eragrostis – Elionurus* grassland and one in the Wetland. Mitigation measures proposed: A 200 meter buffer must be maintained around the Red List species as any development within the recommended buffer zone might destroy the population of this species.

Suitable habitat for four of the Red List species existed in the wetland and for one species in the *Eragrostis – Elionurus* grassland within 200 meters of the boundary of the site. Mitigation measures proposed: A monitoring programme for the relevant Red List and Orange List species should be maintained for the study site and also for the areas within 200 meters of the boundaries of the site.

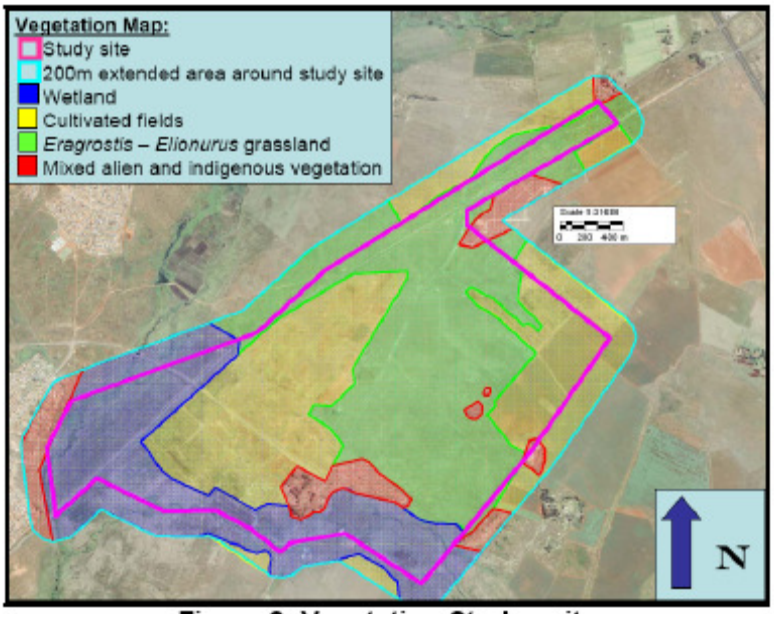


Figure 7: Vegetation Study units (Galago Environmental, November 2011:6)

- **Mammal:**

The mammal study found that the open perennial water sources on the site are too modest to allow for the permanent or even infrequent occurrence of spotted-necked or clawless otters.

The specialist concluded that otters may occasionally venture onto the site during exceptionally wet spells, but that is regarded as a rare event.

In terms of wetland vegetation the specialist found that the lush semi-aquatic vegetation along streams and marshy areas provide ideal habitat for the rough-haired golden mole, the listed shrews as well as the African marsh rat. This confirms the exclusions of the wetland area from any form of development or side-effects of the construction and operational phases of the development.

The investigation of the terrestrial portion of the site showed that the area is severely disturbed, either by ploughing or overgrazing. The proposed development will displace most of the terrestrial species recorded, but according to the report none of these can be regarded as rare or even sensitive. All species are common and widespread, and their loss will be of little conservation consequence at a national level.

The investigation concluded that with the exclusion of the wetland and the suitable buffer zone superimposed on appropriate management practices, the proposed development should not result in a loss of ecological sensitive and important habitat units, ecosystem function (e.g. reduction in water quality, soil pollution), loss of mammal habitat, nor of loss/displacement of threatened or protected species.

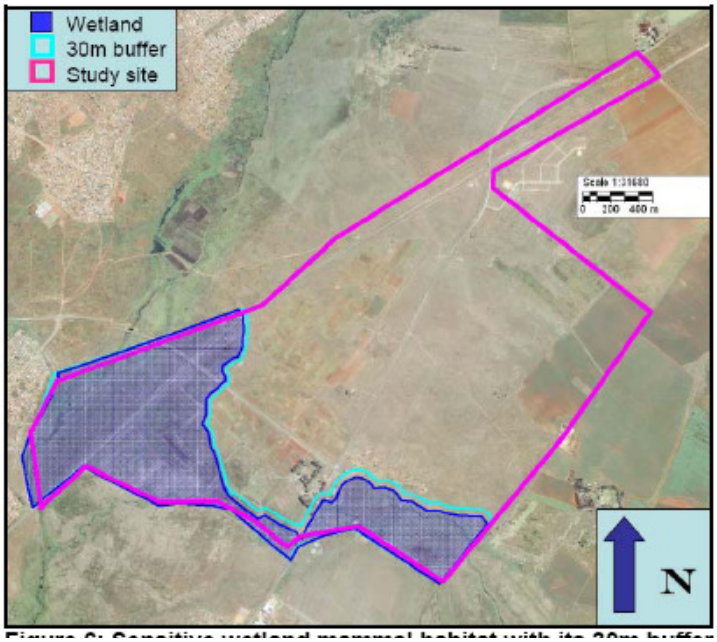


Figure 8: Sensitive wetland mammal habitat with its 30m buffer (Galago Environmental, November 2012:11)

- **Avifuana:**

The Avifuana study concluded that three Red Data avifaunal species (African Grass-Owl, Black-winged Pratincole and African Marsh-Harrier) are likely to make use of the wetland habitat on the study site and one Red Data avifaunal species (Lesser Kestrel) is likely to make use of the **open grassland habitat** on the study site.

The wetland habitat is therefore deemed highly sensitive for Avifaunal Red Data Species and other avifaunal species that occur or that are likely to occur within the wetland habitat system. They are depended of this habitat system for foraging, roosting and breeding purposes. This also includes a terrestrial buffer zone of 200 m from the wetland edge of the Rietspruit and its tributaries.

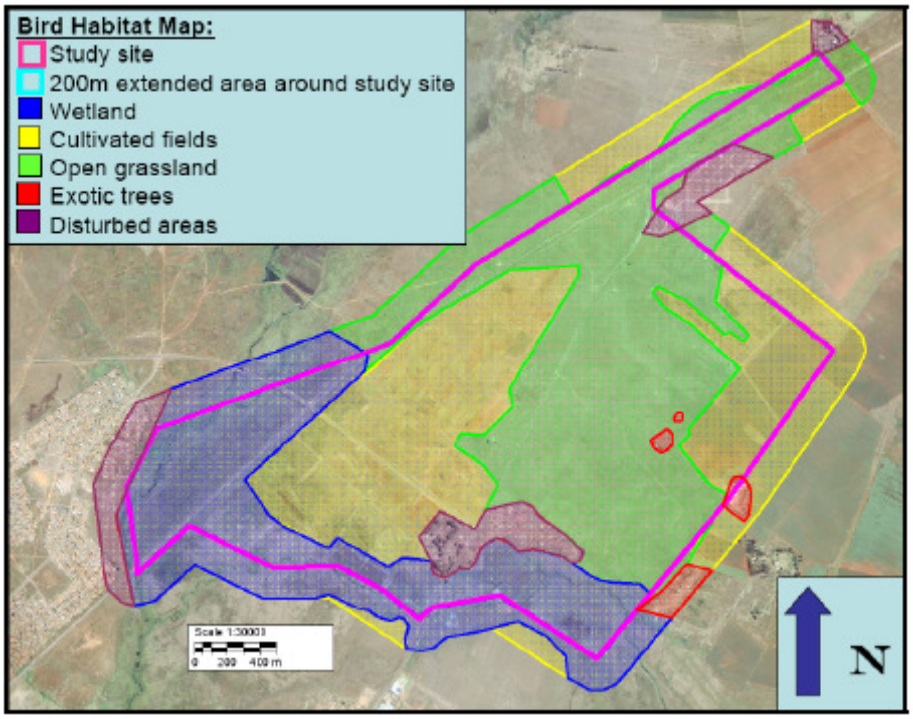


Figure 9: Bird habitat systems identified from the study site (Galago Environmental, November 2011:8)

The following mitigation measures are proposed: (1) No development should be allowed within the wetland habitat systems on the study site as well as within 200 m from the wetland on both sides of the wetland system and the entire length of the Rietspruit and its tributaries. This 200 m will act as a minimum terrestrial buffer for African Grass-Owls and African March Harriers. Secondly grazing by livestock should be limited within the wetland and adjacent grassland. This will allow the wetland to recover and become more favourable for Red Data avifaunal species. The following map shows the 200m buffer zone applicable:

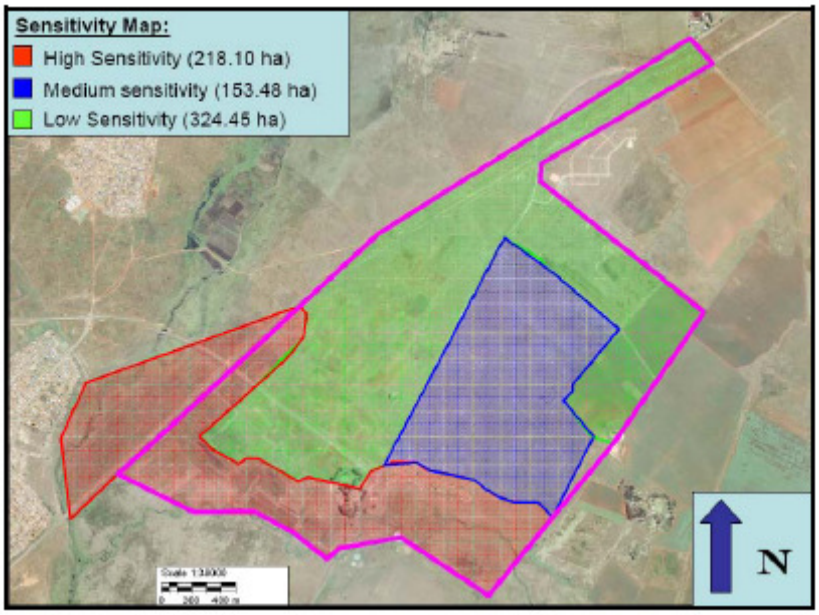


Figure 10: Avifaunal sensitivity map including the 200m buffer area around the wetland (Galago Environmental, November 2011:27)

- **Herpetelogical:**

The herpetological report found that firstly, the water and associated wetlands support narrowly adapted moisture-reliant herpetofauna and their life-support mechanisms. This justifies excluding the wetland area from any form of development or side-effects of the construction and operational phases of the development. Secondly, in the natural veldt areas there are numerous moribund termite mounds, the ideal habitat for the striped harlequin snake. The snake is known to occur in the nearby Suikerbosrand Nature Reserve. The report therefore recommended that the natural grassland that borders the wetland be excluded from any development. The report indicated that the terrestrial habitat is spatially by far the most prominent, although large tracts of land have been ploughed and is therefore classified as ecologically non-functional.

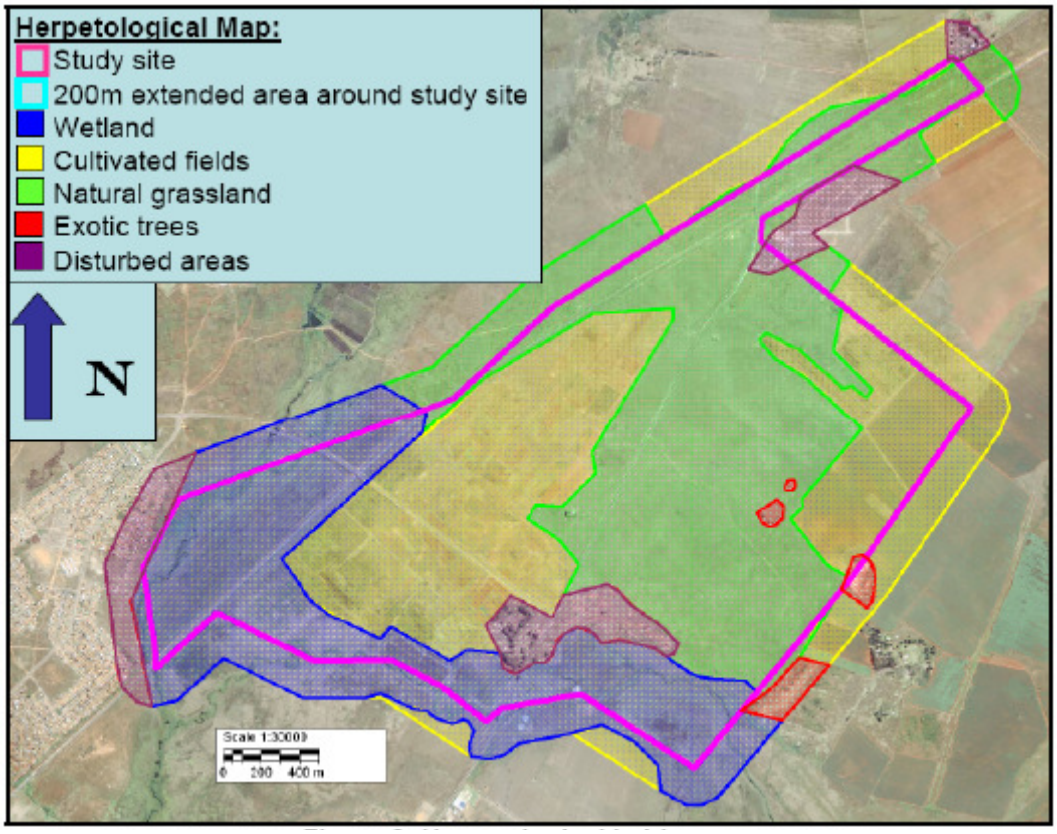


Figure 11: Herpetological Habitat Map (Galago Environmental, November 2011:7)

The sensitivity map for the herpetological assessment is as follow:

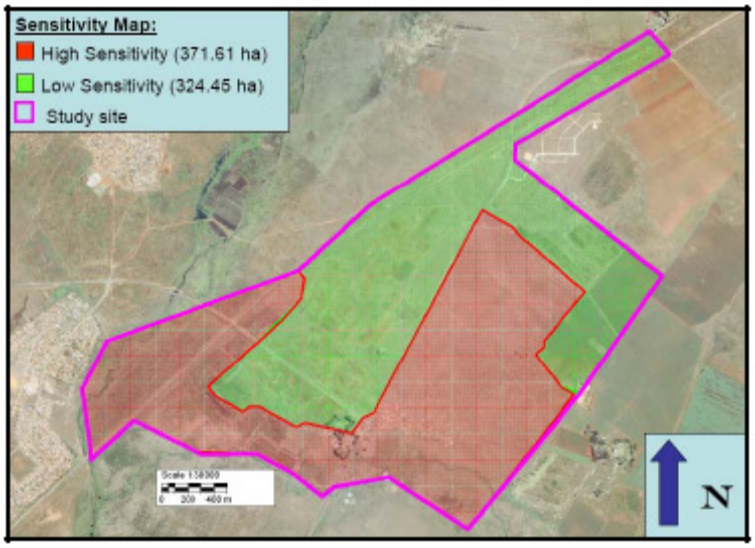


Figure 12: Herpetological Sensitivity Map (Galago Environmental, November 2011:

Various mitigation measures were proposed by the specialist consultants. The most important being that no development should be allowed within the wetland habitat systems on the study site as well as within 200 m from the wetland on both sides of the wetland system and the entire length of the Rietspuit and its tributaries. The 200 m buffer will act as a minimum terrestrial buffer for African Grass-Owls and African March Harriers.

Furthermore an appropriate management authority (e.g. the body corporate) that must be contractually bound to implement the Environmental Management Plan (EMP) and Record of Decision (ROD) during the operational phase of the development should be identified and informed of their responsibilities in terms of the EMP and ROD. All areas designated as sensitive (i.e the wetland) in a sensitivity mapping exercise should be incorporated into an open space system. Development should be located on the areas of lowest sensitivity.

The following composite map shows the sensitivity map overlain with the proposed layout plan:

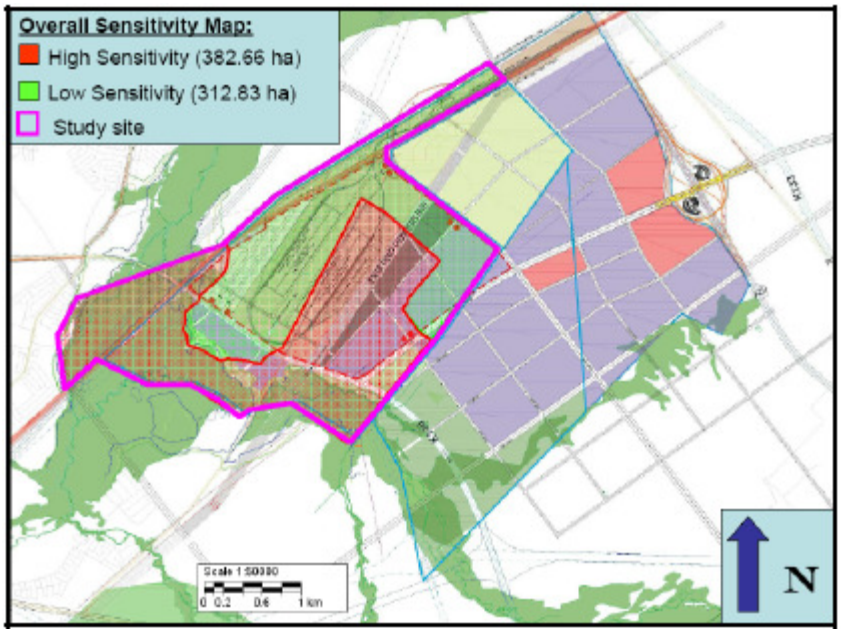


Figure 13: Composite Map - Layout plan overlain with the Environmental Sensitivity Map

The report concluded that where the layout plan is overlain with the environmental sensitivity map (Figure 13), it is clear that most of the wetland and surrounding buffer areas were excluded from the proposed development. The grassland area to be conserved is however very small, but should be seen together with the open space areas on the layout map for the neighbouring site to the east.

5.2 Wetland Delineation and Aquatic Assessment

Prism Environmental Cc undertook the wetland delineation and aquatic assessment. The site Investigation was conducted in August 2011. The specialists involved are:

- Report Author: Mr A Koning *(B-Tech Nature Conservation)*
- Report Co-Authors: Mr D Botha (*M.A Environmental Management; PHED)*
  Prof L R Brown *(Pri.Sci.Nat)*

The following represent a summary of the findings of the report:

- **General:**

The wetland and aquatic areas are located in the quaternary catchment C22C of the Upper Vaal Water Management Area (WMA8). The study area is located within the Grassland Biome (Biome 6) of the Highveld.

- **Findings – Wetland Assessment**
  - The wetland is classified as a flood plain wetland;
  - The hydrological integrity is rated as a Category D – meaning approximately 505 of the hydrological integrity has been lost;
  - The geomorphic processes of the wetland was classified as a Category D – meaning a large change in the geomorphic process occurred and the is appreciably altered;
  - The vegetation community has been disturbed and is classified as a Category D – meaning the vegetation community has been largely altered and alien/ruderal species are found in equal abundance to indigenous wetland vegetation;
  - The direct and indirect service of the wetland was rate "low";
  - The ecological importance and sensitivity was rated "low".
- **Findings – Aquatic Assessment**
  - The Dissolved Oxygen (DO) concentrations have a limiting effect on the aquatic biota at the site during the august survey;
  - The Total Dissolved Salt (TDS) values recorded for the test sites were considered to be high and have a limiting effect on the aquatic biota;
  - The habitat availability of test sites 1 and 3 were classified as fair/adequate and for test site 2 it was rated as poor/inadequate;
  - The results for the invertebrate habitat integrity assessment system (IHIAS) showed that the sites have reached a critical level of impairment;
  - Based on the SASS5 results the biotic integrity at site 1 was classified as "moderate" and at site 2 as being "poor".

The following map indicates the hydrology for the area:

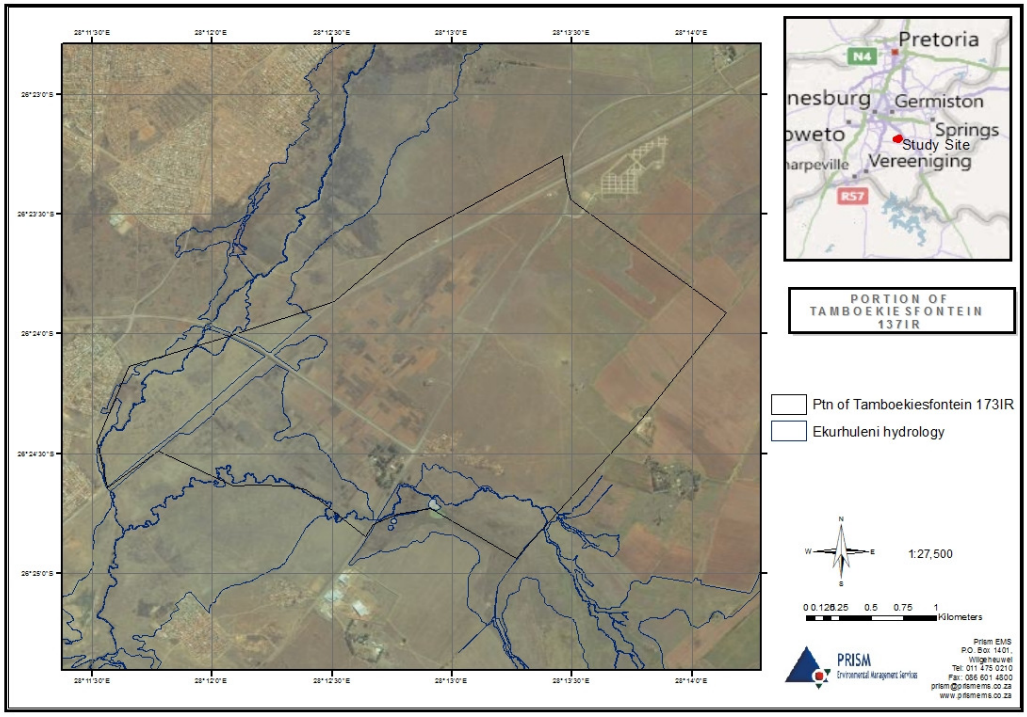


Figure 14: Hydrology for the site and surrounding area (Prism Environmental, March 2012)

The wetland and associated buffer as delineated by Prism Environmental is as follow:

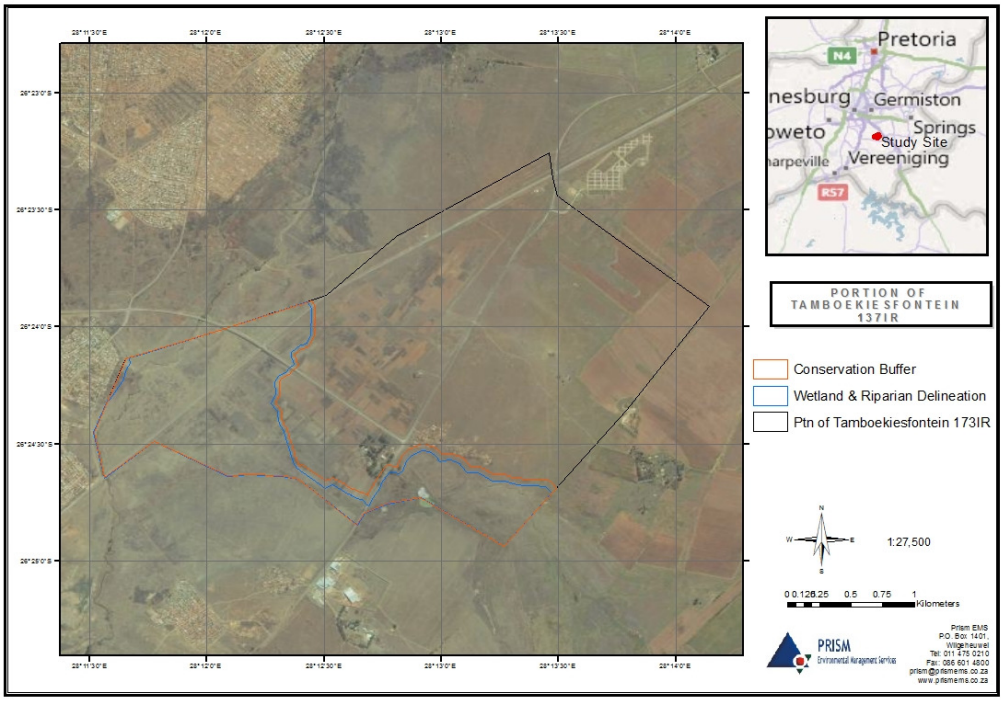


Figure 15: Conservation Buffer – Wetland (Prism Environmental, August 20110

It is concluded that the proposed site layout plan has taken into consideration the findings of the wetland assessment and aquatic study and ensured that the wetland and buffer zone is conserved. No development will take place in the wetland and applicable buffer zone.

5.3 Cultural Features and Characteristics

Heritage sites were found on the site. Therefore a Heritage Survey was commissioned. The Heritage survey was under taken by Dr J van Schalkwyk (D Litt et Phil). The findings of the report are as follow:

❑ **General:**

Three sites rated to have significance have been identified in the study area. They are:

• Two old cemeteries, which are rated as having high significance on a local level.

• An old farmstead, which is rated as having high significance on a regional level.

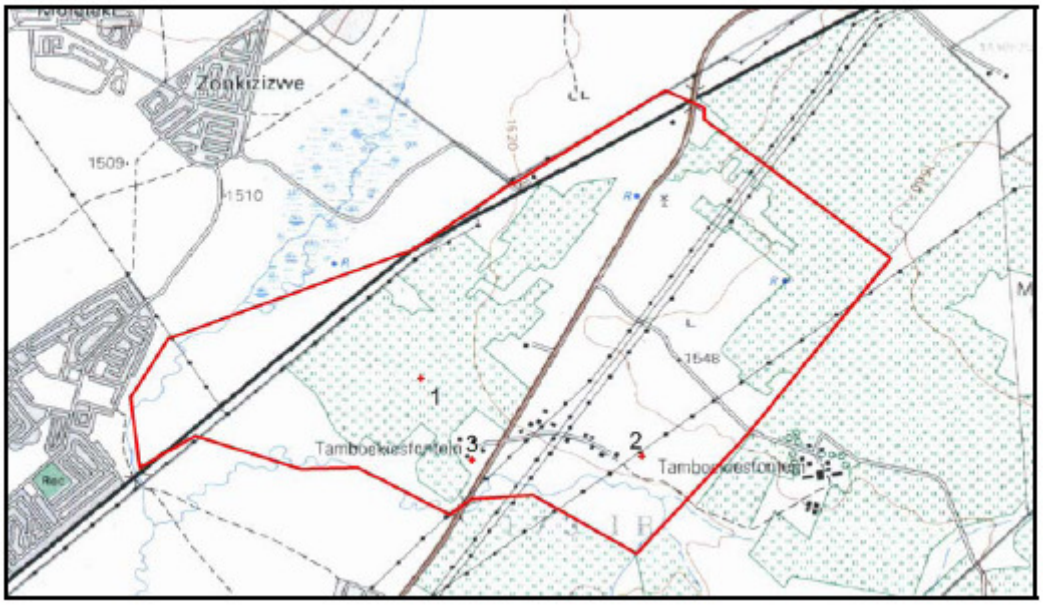


Figure 16: The study area, showing the location of the identified sites (Van Schalkwyk, 2007:11)

❑ **Site 1:** S 26.40522; E 28.20902

This was identified as a small farm cemetery with graves of the Vermeulen family as well as other people. The grave yard has been disturbed with most of the headstones have been pushed over, and the contents of two to the graves have been exhumed. The specialist recommended that all the graves are relocated to a formal cemetery

- Significance rating is: High ;

- Mitigation actions recommended: to retain the graves or, alternatively, relocate after following correct procedure ;
- Legal requirements: Permits, SAHRA permits, police, notification, consultation, relocation.

❑ **Site 2:** S 26.40973; E 28.22176

This is a very large informal cemetery, with approximately 200 graves. The cemetery is a very large feature and is still in use by the local community, and it is therefore recommended that it is retained and formalised by fencing it off, maintaining the site and identifying the authority for looking after it.

- Significance Rating: High on a local level ;
- Mitigation actions recommended: to retain the graves or, alternatively, relocate after following correct procedure ;
- Legal requirements: Permits, SAHRA permits, police, notification, consultation, relocation.

❑ **Site 3:** S 26.40992; E 28.21193

This is an old farmstead, consisting of a house, outbuildings, barns, etc. now mostly in ruins. It was found that based on style and material used, some elements seem to be older than 60 years

- Significance rating: High on a regional level
- Mitigation actions recommended: mapping of the site by a heritage architecture will be necessary;
- Legal requirements: should the building be demolished, a permit from SAHRA has to be issued.

It is concluded that sites 1 and 3 have a "high" significance rating. These two sites will be impacted on during stage 1 of the development phase. It is therefore necessary that the correct procedures are followed to obtain permission from SAHRA to relocate the graves and to demolish the house (if approved by SAHRA). Site 2 will only be affected during stage two of the development phase. It is recommended that the same procedures are followed for this site as for the aforementioned sites.

6 SOCIO-ECONOMIC FEATURES AND CHARACTERISTICS

6.1 Town Planning Assessment

In terms of the Peri-Urban Town Planning Scheme of 1975, the site is zoned "Undetermined". To accommodate the proposed development, the site has recently been incorporated into the Urban Development Boundary of the Ekurhuleni Metropolitan Municipality and is earmarked for an Inland Port in terms of the revision of the Metropolitan Spatial Development Framework (MSDF) 2010/2011.

6.1.1 Land Use Assessment

The town planning application done by Aeteron Town Planners will apply for the following land uses to accommodate the proposed inland port development:

- Erven 1 to 4

Proposed zoning: "Special" for railway purposes including rail siding, arrivals and departures yard, maintenance depot and other related and subservient uses.

The erven are earmarked as the arrival and departure yard for the terminal. It is located off the mainline so that it does not impact on the current mainline operations. Provision has also been made on the erven for a locomotive and wagon maintenance facility. The aforementioned erven will be transferred to Transnet after promulgation of the township.

- Erf 5

Proposed zoning: "Special" for transportation centre including railway facilities, container depot, inland port, logistics hub, intermodal terminus, truck staging, security, access control, ablution facilities, administration and offices, stacking space for containers, customs clearance equipment maintenance and repair area as well as other related and subservient uses.

The layout plan shows an area of ± 46ha for a trucking and intermodal yard/staking area and logistics space. The position of the stacking area relative to the terminal blocks and warehousing area ensure undisturbed and secure operations. It will have a dedicated and secure access point from Road K146.

Erf 5 will accommodate the truck staging area, ablution facilities, administrative facilities, access control areas, equipment maintenance and repair area as well as empty container storage

space. Although this erf is presently shown as one erf the intention is to subdivide this erf into smaller erven with a private road system. The entire area will be secured and controlled.

- Erven 6 to 9, 12 and 15

Proposed zoning: "Special" for transportation centre including railway facilities, container depot, inland port, logistics hub, intermodal terminus, truck staging, security, access control, ablution facilities, administration and offices, stacking space for containers, customs clearance, equipment maintenance and repair area as well as other related and subservient uses.

The abovementioned erven will primarily accommodate the intermodal terminal i.e. railway network designed as a loop, the road to road terminal and road to rail container stacking area. The proposed terminal will be able to handle road to road and road to rail containers as well as palletised goods. The terminals are positioned parallel to the road and stacking area and terminal blocks are adjacent or parallel to one another.

The exchange yard design is based on a 100 wagon train(2400m in length). When operating at full capacity it will be able to handle 1 million containers TEU's. The rail network has a curve radius of 300m and a gradient of 1:800 which conforms to the acceptable design criteria. It comprises of 10 lines (5 lines for arrivals and 5 lines for departures). The terminal operations will also be in a secure and controlled area.

- Erven 10, 11, 13 and 14

Proposed zoning: "Special" for transportation centre including railways facilities, container depot, inland port, logistics hub, intermodal terminus, truck staging, security, access control, ablution facilities, administration and offices, stacking space for containers, customs clearance, equipment maintenance and repair area, Industrial 1 uses as well as other related and subservient uses.

The above erven are earmarked for Industrial 1 uses as well as for a trucking and intermodal yard and storage space. Should erf 6 reach full capacity erven 10, 11 13 and 14 could also be used for this purpose.

- Erven 16-22

Proposed zoning: "Industrial 1" purposes for industries, offices, commercial purposes, showrooms, motor dealers, panel beaters, builder's yard, service industries, fitment centre, motor workshop as well as other related and subservient uses.

The planned use for the erven is "Industrial 1" to accommodate industrial uses and warehousing associated with the inland port. Noxious industries are not accommodated within the zoning of "Industrial 1".

- Erven 24-26

Proposed zoning: "Private Open Space" for parks, gardens, nature reserves, botanical gardens, conservation, heritage sites, monuments, historical buildings, play parks, open spaces, squares and buildings used in conjunction with municipal purposes and cemetery.

The above erven are zoned private open space as requested by the town planner at Ekurhuleni Metropolitan Municipality. The 1:100 year flood line, wetland area, and environmental sensitive areas as well as community graves are all accommodated within this private open space.

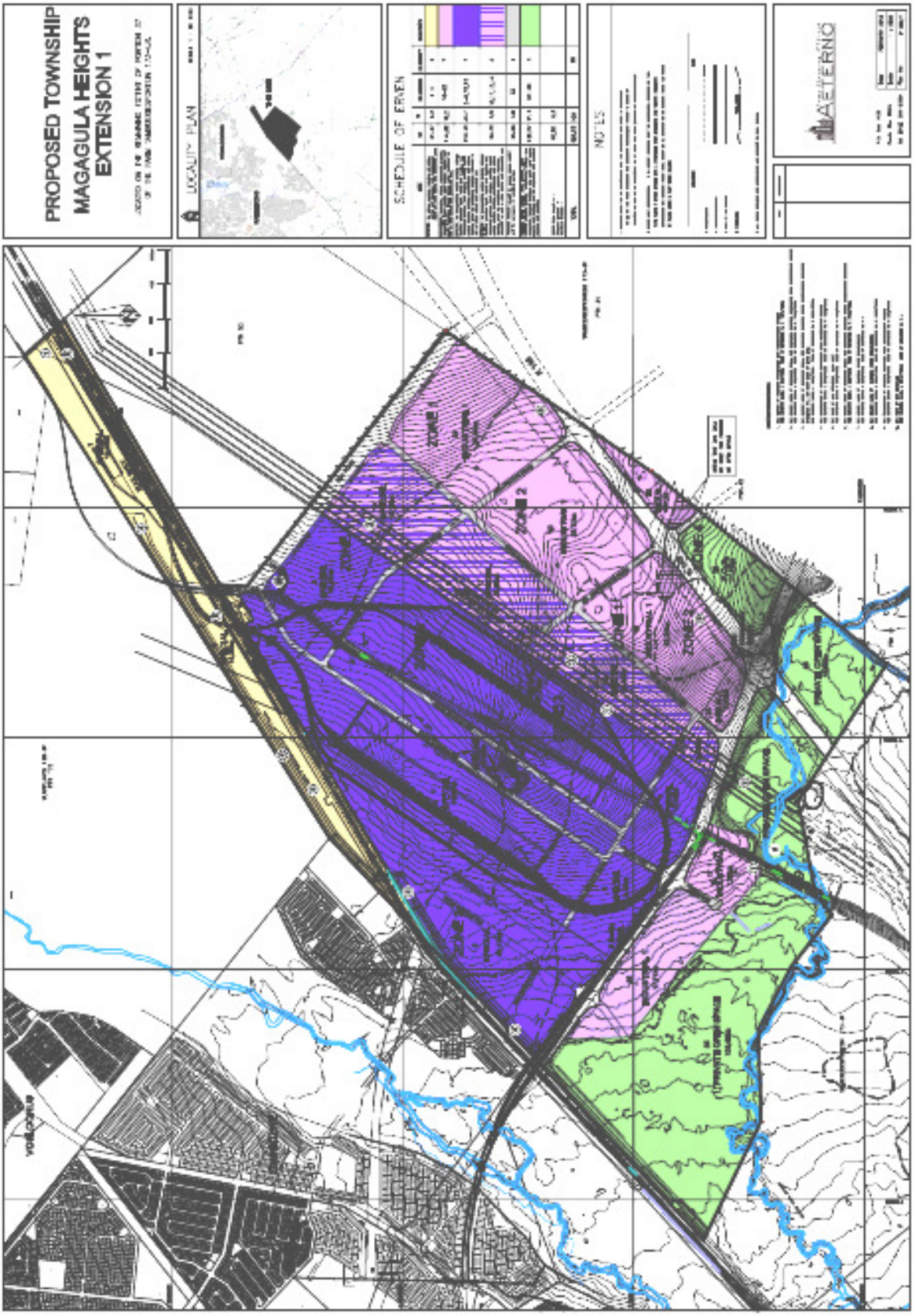
- Erf 23

Proposed zoning" "Special" for access, access control and the conveyance of municipal services.

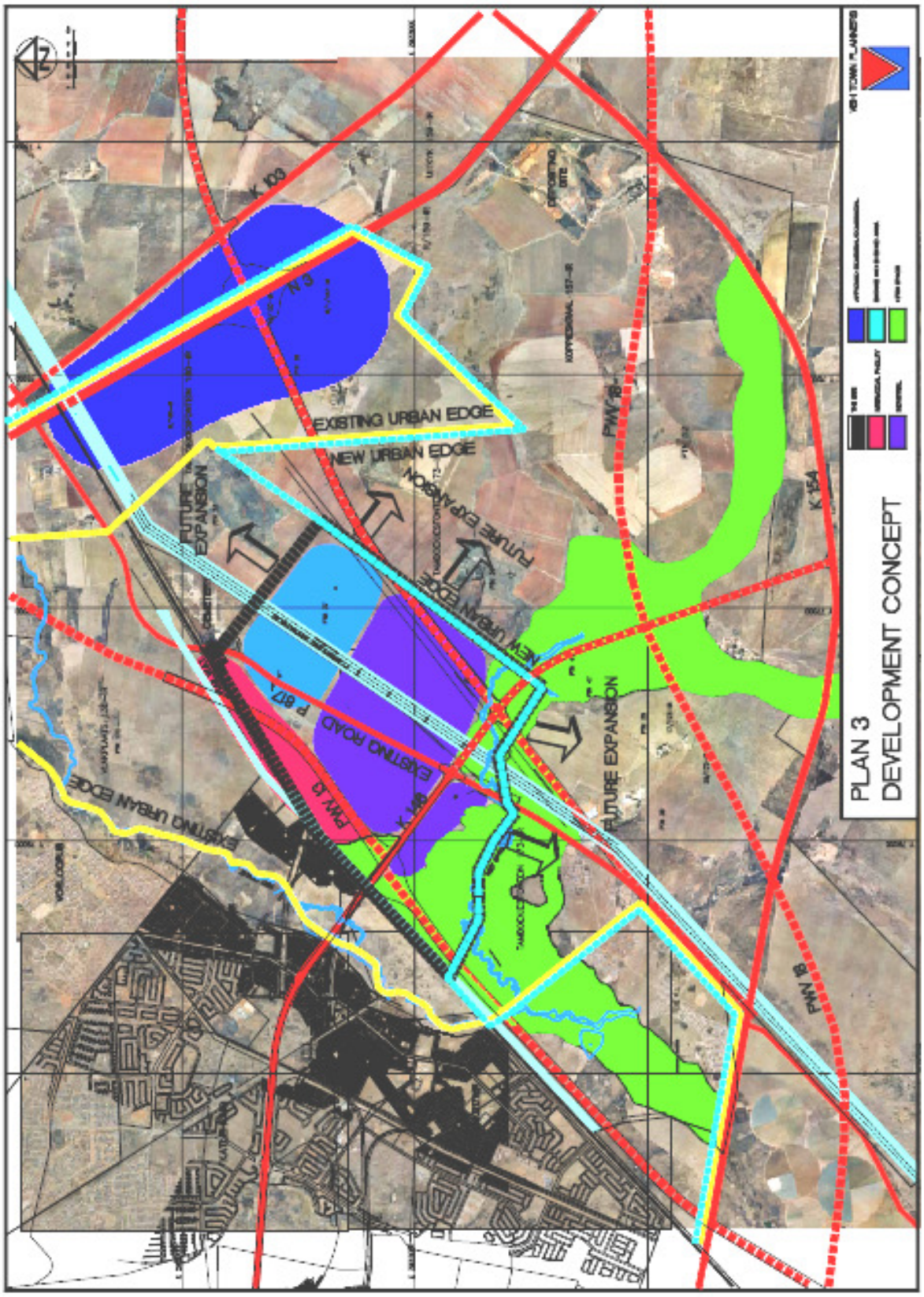
As a high degree of security is required for the proposed operation all the roads (with the exception of the K- Roads and Road D817) which are to be realigned shall be private roads.

This would enable the developer to impose access control points on these roads so that the entire area, bounded by the Provincial K Roads, becomes a secure and controlled area.

The proposed land use and layout plan as discussed above is as follow:


PROPOSED TOWNSHIP
MAGAGULA HEIGHTS
EXTENSION 1
LOCALITY PLAN
SCHEDULE OF ERVEN
NOTES
AETERNO

To illustrate the aforementioned land use proposal a development proposal was formulated:



6.1.2 Regional Spatial Development Framework

The "Ekurhuleni Metropolitan Municipality Spatial Development Framework Review, 2010 - 2011" (MSDF) looked at Inland Ports/Logistic Hubs and referred to the study commissioned by Transnet, namely the "Sentrarand Pre Feasibility Study" completed in 2007. This study concluded that "…the option of citing an intermodal terminal in Gauteng, capable of accommodating the intermodal traffic entering the Province and its capture area will provide a positive solution to reduce volumes in already congested areas." (MSDF Review, 2010/2011, Report 2: 68).

Furthermore the MSDF specifically refers to the Tambo Springs Inland Port (MSDF Review, 2010/2011, Report 2: 38-39). The MSDF states that although currently the site is located outside of the urban edge the Municipality decided that "Based on the merit of the submission it is recommended that the application or the extension of the Urban Edge be supported, on condition that the land to be included into the urban edge be utilised only for the purpose of an inland port (freight hub).

Therefore the main structuring elements of the region are:

- **Proximity to Major Markets:** The proposed inland port located 30 kilometers south of the Johannesburg CBD would have easy access to the Johannesburg and Tshwane markets and further north into Africa. Other important markets in the Gauteng area including Nigel/Springs, Vereeniging, Sasolburg and Heidelberg are also well linked to the site.

- **Accessibility:** The site is accessible from the N3 highway (main route to Durban) as well as the possibility of a regional link across the southern fringe of the Ekurhuleni/Johannesburg urban area to the N1 Highway (main route to Cape Town and Port Elizabeth). Access to the site from the N3 is obtained via the K154 (R550) interchange at Glenroy.
  The K154 (R550) extends westwards to link with Road R59, the highway linking Johannesburg and Vereeniging.

  Proposed future roads are: the proposed road K146 will provide an additional link to the N3 highway at the Petroport. The proposed PWV 18 will provide a link between the R59 and the N1 highway which is the main road link to Cape Town. The proposed road PWV 13/15 will provide a link to OR Tambo International Airport, to the north.

Furthermore the site is linked to OR Tambo International Airport (± 25 kilometres to the north) via several main roads.

- **Railway:** The Glenroy railway line that runs along the northern boundary of the site is a dual directional freight line between Johannesburg/Alberton/Vereeniging/Cape Town line some 15 kilometers west of the site and the Johannesburg/ Germiston/ Durban line about 7 kilometers east of the site. In the future a passenger rail link from Kwesine Station in Katlehong is proposed to link into the site. This will provide the opportunity for overnight freight delivery to the city.

  As mentioned in a previous section the proposed development of an inland port and logistics hub requires an area of at least 1000ha. The site in question is approximately 600 hectares of which about 450 hectares will be suitable for development. In addition, the two adjoining farm portions are available for development. This would ensure that the required 1000 hectares can be relatively easily assembled.

Conclusion:

It is therefore clear that the proposed development fulfils all of the above requirements and that this development has specifically been included in the spatial development framework and is therefore in line with all policies and objectives drafted for the area.

6.2 Socio Economic Impact Analysis

The socio-economic impact analysis was completed by Blue IQ investment Holdings (Pty) Ltd in October 2011. It is a comprehensive document that assesses the following:

- *Adjacent Properties*
- *Existing Road and Rail Networks*
- *Technical description of the Project*
- *Economic Analysis*
- *Socio economic Baseline and*
- *Social and Economic Impact Analysis*

The following represents a short summary of the results as documented in the executive summary of the document (Blue IQ, October 2011:3-4):

- *"Employment statistics reflect the employed populations in the focus areas as : Magagula (19%), Zonkizizwe (17.5%), Zonkizizwe Extension (16.6%) and Zonkizizwe Extension 2 (18%. Unemployed and „not economically active" populations in the Focus Areas can be deemed „high" as statistics show that Magagula, Zonkizizwe, Zonkizizwe Extension and Zonkizizwe Extension 2 have 46.3%, 49%, 50.8% and 48% of such populations, respectively;*
- *Anticipated negative impacts during pre-construction relate to the possible movement of work-seekers into the area and the physical and economic displacement of the Thulasizwe community5;*
- *Negative impacts during construction focus on health and safety issues (road, pedestrian safety and the potential increase in HIV/AIDs and STDs); community disruption (as a result of work seekers in migrating from other parts of the country) and the existing community's perception of having non-local workers in the area;*
- *The operations phase of the proposed development will show differing negative impacts, but specifically related to the industry competition that would be created and the potential effect it may have on the local price of goods and services; the health and safety of all in the proximate communities (related to the increased traffic and an expanding population); the anticipated pressure on municipal-provided services such as electricity, sanitation, water, schools and health facilities; and the local community's perceived preferential access to job opportunities;*
- *The estimated investment in the development equates to a 0.8% increase annually in Gauteng's GGP over fifteen years or a 12% increase relative to the initial GGP base;*
- *The construction phases may see an increase of 81 000 jobs (still to be verified) and against the three million formal jobs in Gauteng, 5 400 jobs secured per annum amounts to 0.18% jobs retained/secured. However, over a 15 year period, this would amount to a total of 2.7% jobs retained/secured against the Gauteng employment base (when considering only the first year of the Inland Port's operation);*
- *The total increase of the NPV of the GGP value added by Tambo Springs Inland Port on the Gauteng economy (direct, indirect and induced) is estimated on an annual basis at 0.7% pa and 1.1% for Johannesburg and Ekurhuleni combined. The total economic value added (thus all the individual years added together over 15 years) relative to the initial base, will increase the Gauteng GGP by 6.4% - as an indication of the actual quantity of the economic value added over the period;*
- *The impact on the construction industry with an estimated R7.5 billion investment over a 15 year period amounts to a 2% increase in output in this sector and this is significantly positive;*

- *The impact on employment, over a 15 year period, is a total increase in employment in Gauteng of 3.5%, relative to the initial base. However, the year on year additional employment is 0.2% on average;*
- *Based on current municipal property rates published by Ekurhuleni Metropolitan Municipality, it is estimated that R150 million could be generated in property rates and taxes to the municipality emanating from the Tambo Springs Inland Port development. This is a 5% increase on the current property rates and taxes income of the municipality and is rated as significantly positive;*
- *The potential impact on Government revenue is also significantly large. The increased GGP emanating from this proposed project, under many assumptions, has the potential of increasing the national revenue income over a 15 year period by R21 billion (or R1.4 billion per annum on average). This excludes local rates and taxes calculated above. What makes this statistic significant, assuming the project is economically "* (Blue IQ, 2011:3-4)

The report concluded that the proposed development will greatly contribute to the competitiveness of South Africa's logistics sector.

Meetings had with the local communities indicated that:

- During the construction phase of the development A Community Health and Safety Plan should be drafted to identify risks and appropriate risk management activities, including appropriate ways to secure the Inland Port site. Furthermore a Resident's Forum and the local existing Community Policing Forum must be used as vehicles to convey appropriate health and safety information to affected communities. On-going Grievance management procedures must be implemented. It is important that safe pedestrian crossings be implemented to reduce health and safety concerns and increase efficiency of mobility.
- During the operational phase the current municipal and provincially provided services such as educational and health facilities, libraries and community facilities will endure added pressure due to the increased population of workers (and their families) in the area.

Furthermore the report recommended that the social impact on the Thulasizwe community be assessed. Specific recommendations with regard to the Thulasizwe community are as follow:

- *"A full scale SEIA that focuses solely on the Thulasizwe community, with livelihoods restoration as a central theme to be addressed;*
- *The SEIA should include a full household survey and asset inventory so that the recommendations towards a RAP (with a resettlement budget) could be made;*

- *Ensure that the SEIA focuses on the host land. Impacts relating to host communities or the movement of people into the area must be assessed. For example, the indication at present is that the Thulasizwe community will be moved across the Magagula Heights road. The proposed resettlement land is surrounded by two roads (the road Katlehong and the Magagula Heights road (D817)), a rail line which is still operational, and potentially the new housing development (to be constructed by Deenin Property Developers). This is hugely contrasting to their present location, where they have access to only the Magagula Heights road. Specific safety concerns (for community members and free roaming livestock) may be raised based on the amount of vehicle, rail and people traffic that will surround them; and*
- *Negotiate all aspects of resettlement with the community (agreement on type of housing, location, whether land/ housing entitlements are offered, whether a phased approach to resettlement is to be undertaken, when will the resettlement start, will there be interim livelihoods support or assistance in agricultural food production, how will vulnerable people within the community be supported during the move, is there a moving allowance provided, etc)* " (Blue IQ, 2011:79-80)

It is concluded that the above findings be assessed by the developer and all recommendations be implemented with the help of the relevant Specialist Consultants.

6.3 Engineering Services

Reports for the various services were compiled by the following participating consulting firms:

Name	Organisation	Area of Expertise
Leon Boshoff	Bigen Africa Engineering Solutions	Engineering Services
Philemon Namane	Mpotseng Infrastructure	Traffic Impact Study & Electrical Report

6.3.1 Water

- **Water Supply:**

The Ekurhuleni Metropolitan Municipality (EMM) is the Water Service Authority for the Tambo Springs development in terms of the Water Services Act (Act No. 108 of 1997). The Tambo Springs development site does not fall within any of the current EMM water distribution zones. Various options for the supply of water to the development was assessed and the findings of the investigation showed that the most cost effective supply alternative for the total development will be to supply water from a new proposed Tambo Springs reservoir system. This will entail the

construction of a new reservoir, water tower and pump station at the highest point on the development site.

The final reservoir system for the complete future development will consist of a lower lying area that will be supplied directly from the reservoir and a higher lying area that will be supplied via the water tower. Two pump stations will be required – one to fill the water tower from the reservoir (Tambo Springs pump station) and one to supply water from the Rand Water system to the reservoir (Mahoodisa Road pump station). (**Annexure C** – Bigen Africa Report). The following represents an extract from Figure A of the engineering report indicating the proposed location for the water reservoir:

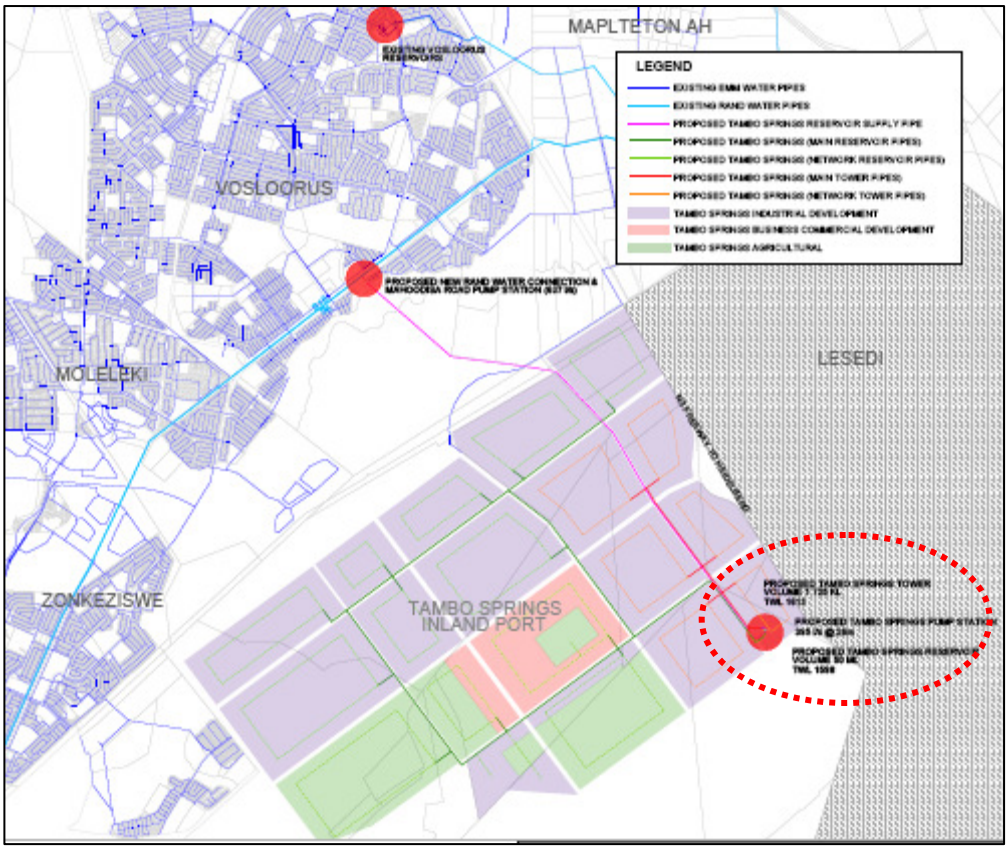


Figure 17: Extract - Proposed Water Reservoir (Bigen Africa: Figure A)

❑ **Water Demand:**

Meetings with Rand Water confirmed that even Phase 1 of the development cannot be supplied directly from Rand Water's B8/B16 pipeline without supplying storage volume. It is therefore recommended that the first reservoir be constructed on the highest portion of the Inframax Land Holdings to enable Phase 1 of the development to proceed.

This position will provide a static water pressure of between 30 m and 60 m, which is on the low side and depending on the position of the buildings an elevated tank or reservoir may be required. (Need min 25 m pressure during peak flow). The required 48h reservoir storage capacity for phase 1 is 7.2 Ml.

The existing Mahoodisa Road pump station will be able too supply the Phase 1 reservoir. The pump station will be able to deliver 250.5 l/s, however the pumping requirement for the proceeding of phase one only is calculated to be 62 l/s (based on 1.3 x AADD) which is less than what the station can deliver.

A supply pipe between the Mahoodisa Road pump station and the new 10 Ml reservoir will be required. The diameter for the ultimate reservoir supply pipe from the Mahoodisa Road pump station to the final reservoir is 250 mmØ. The recommendation is to construct the 450Ø ultimate reservoir supply pipe. The water supply from the reservoir to the Phase 1 consumption points can be done via a temporary connection to the pump line between the Mahoodisa Road pump station and the reservoir. This is a temporary connection and will be closed off when the rest of the network to and from the final reservoirs is implemented.

6.3.2 Sewerage

The proposed development site does not fall within any of the existing Ekurhuleni sewer drainage areas, but can be incorporated into the area that drains directly under gravity to the Waterval WWTP. However, depending on the outcome of some further surveys required the development may fall within the sub-drainage area of a new sewage pump station being planned by ERWAT. This pump station, if implemented, will pump into the area that drains directly under gravity to the Waterval WWTP (**Annexure C** – GLS Report).

Currently neither the existing 600Ø outfall sewer at the downstream end of the proposed development site nor the existing 1500Ø main Waterval outfall sewer has sufficient capacity to accommodate any additional flow. Both of these pipes are already flowing at more than full capacity. Therefore extensive upgrading to these pipes was recommended in the ERWAT master plan.

Therefore the proposal put forward for phase 1 in the engineering report is as follow:

- A temporary Sewage Treatment Package plant or the upgrading of the affected main outfall sewers will be required. The upgrading requirements, depending on the position where the connection to the existing system will be made, are still to be done in accordance with the ERWAT master plan. The requirements of such a pump station can be calculated as follows:

  Pumping requirement = Maximum dry weather inflow / 0.7

  = 40.3 / 0.7

  = 57.5 l/s

The report indicated that the proposed Sewage Treatment Package plant will suffice for the Phase 1 outflow treatment and can be bypassed and removed once the rest of the development proceeds and when the ERWAT outfall sewers have been upgraded.

Prism Environmental Cc was appointed by the Applicant to obtain the relevant waste license as per the procedures stipulated in the Waste Management Act. Separate applications will be submitted for the license as per the Act.

6.3.3 Stormwater Management

There is no existing stormwater reticulation system within the catchment area of the proposed development. A stormwater management plan was commissioned and will be submitted to city of Germiston Metropolitan Municipality for Approval (**Annexure C** – Bigen Africa Report). Calculations showed that of the entire 627 ha of Area A (Inframax Land Holdings), Phase 1, approximately 430 ha will contain buildings or be paved or partly paved. In light of the aforementioned the purpose of the Stormwater Management Plan for Phase 1 of the proposed development is to ensure that the regulations and precautionary measures are applied in so far as stormwater management is concerned and to minimize the possibility of subsidence as well as flooding and pollution of the existing streams.

The management responsibilities for the management of stormwater will be as follow:

- The Developer, Inframax Strategic Properties, will be responsible for managing the stormwater related activities on site during the implementation phases of the development.
- During the implementation stage the developer may delegate certain of the responsibilities to the appointed professional team and contractors to implement the stormwater management plan, but will retain overall responsibility. Once the handover of the

development is complete, the Ekurhuleni Metropolitan Municipality will be responsible for the management, operation and maintenance of the stormwater system outside secure areas.

- Inside the secure areas it will be the responsibility of the governing bodies of the secure areas.

The main objective of the stormwater management plan for phase 1 is to restrict development within the floodplains so as to be consistent with the objectives of protecting life and property against major floods and preserving the natural environment. Areas within the project area affected by major floods (floodlines) have been excluded from the layout as stipulated in Chapter 14 of the National Water Act, Act No.36, 1998. The 1:100 year floodline (area which will be affected during the occurrence of the greatest storm in 100 years) have been calculated. These flood planes will be zoned as public open space and will not be utilised for any development or cemetery sites.

The following represents as summary of the mitigation measures pertaining to internal drainage facilities as discussed on pages 8 -10 of the Stormwater Management Plan drafted by Bigen Africa and attached in Annexure C of this report:

- *"The internal stormwater drainage system will be designed to convey stormwater generated internally (within the development boundaries) in a subsurface system that will not have a negative impact on upstream and downstream areas.*
- *Due to the area being dolomitic special care will be taken to minimise or avoid the ponding and ingress of water.*
- *Minor floods (low severity, occurring more frequently) will be accommodated in subsurface stormwater systems which consist of kerb inlets, manholes and pipe culverts that will drain the water from paved areas and roof drainage.*
- *During major floods (high severity, occur less frequently) the excess water will be conveyed by the road system and paved areas to suitable points of discharge. The conveyance of water on road surfaces will be done in accordance with the stipulations in the Ekurhuleni Metropolitan Municipality Design Standards.*
- *Any natural pond or water feature shall be rendered impervious with a permanent reinforced concrete lining without joints and be monitored for any loss of water.*
- *Rainwater down pipes shall discharge into concrete lined drainage channels (with sealed joints), which discharge the storm water at least 1.5 m away from the buildings.*
- *If no gutters with rainwater down pipes are provided for the buildings, a 1.5 m wide concrete*

apron (minimum) shall be provided.

- *Retaining walls shall either have weep holes if exposed to the outside or if this is not possible a subsurface drainage system must be installed to prevent the built-up of groundwater, and must be connected into the sewerage reticulation where no underground storm water system exists.*
- *All storm water channels within 10 m of a building shall be lined with a permanent impervious membrane such as an engineered Bentonite clay lining or any other approved alternative method. This is specifically applicable to the natural drainage course of the proposed development."* (Bigen Africa, Stormwate Management Report, 8-10:2012)

In addition the report includes erosion control measures the proposed stormwater design methodology. The report concludes that within the development of the site the developer and his professional team, including the contractor, shall be responsible for ensuring that the requirements of this Stormwater Management Plan are met.

6.3.4 Internal and external roads

The design guidelines of Gautrans and Ekurhuleni Metropolitan Municipality, supplemented by the Guidelines for Human Settlement Planning and Design (Red Book) were used to establish the criteria. The criteria are given for various road classes on relevant road reserve widths. This design will be finalised after the rezoning, the final development layout is approved, and before construction drawings are submitted for approval. A structural design period of 20 years will be adopted. A more detailed discussion of the roads will follow in Section 6.5 – Traffic Impact Assessment.

6.3.5 Refuse removal

All access points and road reserves will be designed to accommodate the municipal refuse removal services. The service is fully operational throughout the City of Germiston, and no problems are envisaged with regards to capacity.

6.3.6 Electricity

The proposed development falls within the boundaries Ekurhuleni Municipality which is also the electrical supply authority for the area. Any large electrical bulk supplies must therefore be arranged with the Municipality. The Municipality will then lodge the applications with ESKOM. Presently there are no large consumers in the proposed development area.

None of the substations in the area have the capacity to cater fully for the additional load of the proposed development. Only limited capacity is available and indications are that the initial load could be catered for in the short term via a switching station on the edge of the first phase of the development at the intersection of route K149 and the railway line. This switching station will be supplied by means of an overhead line from the existing Zonkizizwe substation of ESKOM to the west of the proposed development.

The loads for the various land uses for Phase 1 were calculated and are shown in the table below:

Inframax's Landholding	
Industrial/warehousing	18 447kVA
Intermodal yard area (additional)	1 239kVA
Logistics	11 322kVA
Trucking intermodal yard	1 395kVA
Total: Phase 1	**32 403kVA**

ESKOM planned an 88kV line along the eastern side of the Railway line running past the development. The position of this line is on the proposed development. The route was discussed with ESKOM and ESKOM indicated that they will investigate an alternative route for this line. This line will possibly be on the western side of the railway line. This proposed line will be the source from which the proposed substation/s for future developments obtains their power.

It is therefore concluded that for phase 1 the switching station proposed above must be built in such fashion that it can be converted with minimum cost to a proper substation.

6.3.7 Rail

The focus of the proposed transportation framework is to create linkages to the west, east, and south of the study area, with rail access point on the south, area to open it up and achieve integration with the surrounding areas. The expected terminal capacity that the development will operate at when fully developed is calculated as follow:

Table 7: Expected Terminal Capacity (Mpotseng, 2012:11)

Terminal Type	Expected Capacity
Container Terminal	• 1, 000, 000 TEU's/pa • 32 trains per day (50 wagon trains)
Palletised Terminal	• 4, 500, 000 pallets per annum • 12 trains per day

The rail terminal was designed in conjunction with Transnet and is included in the layout plan for Phase 1 – Inframax Land Holdings. The rail terminal will be developed in stage 1 of phase 1 of the proposed development. The development of the rail terminal is critical and is seen as the most critical design element of phase 1.

6.3.8 Conclusions

The previous paragraphs dealt exclusively with various engineering service items and it was shown that the installation and construction of service infrastructure is critical to the successful implementation of the proposed land use activities planned for phase 1, the Inframax Land Holdings area (i.e the site).

From a services point of view, there are sustainable solutions for all municipal services necessary for the proposed development. A Services Agreement will be drafted that will govern the phased implementation of the relevant services necessary for the development of the proposed activities.

6.4 Sense of Place

The concept of "a sense of place" does not equate simply to the creation of picturesque landscapes or pretty buildings, but to recognise the importance of a sense of belonging. Embracing the uniqueness of a place as opposed to standardisation attains the quality of the place. In terms of the natural environment it requires the identification, a response to and the emphasis of the distinguishing features and characteristics of landscapes. Different natural landscapes suggest different responses. Accordingly, the proposed residential development project should respond to the natural environment and features of importance.

The current "sense of place" of the specific site provides a perception of a vacant, open space area with pockets of subsistence farming scattered throughout the area.

It is very important that the site should be seen within the context of the future developments planned for the site and adjacent pockets of land. One should take cognisance of the fact that the site and surrounding pockets of land have been earmarked for the inland port development and associated land uses. Furthermore one must take cognisance of the fact that once completed the proposed inland port development would encompass 1000hectares of land covering the remaining vacant portions of land as illustrated in the layout plan below:

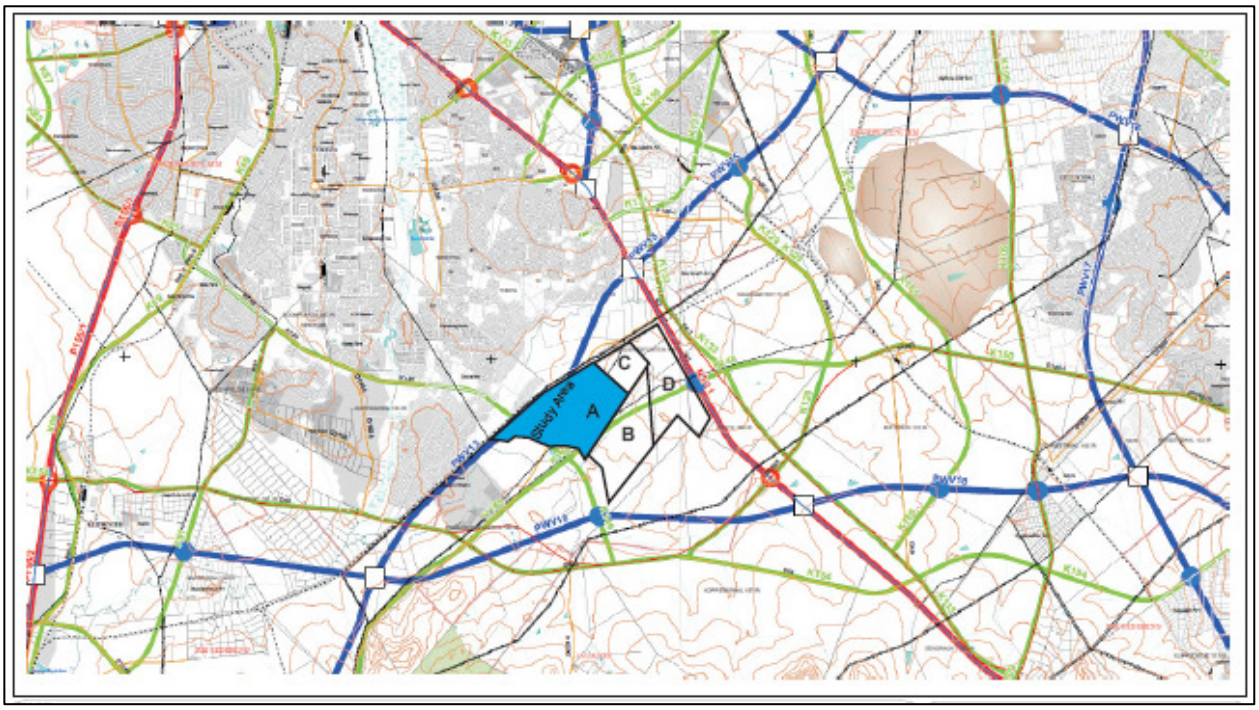


Figure 18: The site and adjacent land portions (Mpotseng, 2012: Fig 3-1)

It is therefore concluded that although the current sense of place may be that of a rural area located adjacent to an urban area, one can not ignore that this area is (1) included within the urban development boundary, and earmarked specifically for the proposed inland port development and (2) the proposed development although characterised by several developmental and environmental constraints have managed to mitigate these constraints to an acceptable level. The implication is therefore that, should all the mitigation measures and design measures be implemented the site and the adjacent land holdings could successfully be developed whilst conserving the sensitive environment in which it is located.

It is therefore the intention of the applicant to change the current sense of place to such an

extent that it conserves the sensitive environmental landscape whilst opening up the area to investment and creating job opportunities within an area currently isolated from economic growth and development opportunities.

6.5 Traffic and Accessibility

A comprehensive traffic impact study was compiled and is included in **Annexure C** of this document. The findings of the document are as follow:

- *"Phase 1 of the development stages includes development of a trucking and intermodal yard is on Inframax Land Holdings (the site) property. Warehousing and/or light industrial developments are also planned. The speed at which these developments will occur will depend on economic factors affecting the development.*
- *The PWV13/15, K146 and D817 are affected by the development. The PWV13 will need to be realigned to accommodate planned truck and intermodal yard on the northern boundary of the development along the existing alignment and K146 is also affected by the wetland areas on the south of the development.*
- *The construction of access intersections can be phased in as the various parts of Tambo Springs are developed. It is however, essential to ensure that adequate access capacity is provided at various stages of development phasing."* (Mpotseng, 2012:48)

Phase 1(the site) development traffic will have minimal impact on most of the intersection analysed. The most significant impacts will be experienced on the following roads:

- Barry Marais Road (M43) and Nederveen Highway (R103)
- Nederveen Highway (R103) and Kliprivier Road (R550)
- Kliprivier Road (R550) and N3 West Ramp
- Kliprivier Road (R550) and N3 East Ramp
- Kliprivier Road (R550) and Magagula Heights Road (D817)

The report indicated that there are 6 existing access points whilst a total five new access points are planned around the development, two on the western boundary along K146 (one for heavy vehicles and one for light vehicles), one along the K148 on the southern boundary for light vehicles and two on the eastern boundary along proposed extension of Mnganu Street which is expected to give access to local traffic, i.e. public transport, etc.

From the report it is clear that the construction of access intersections can be phased in as the various parts of Tambo Springs are developed. It is however, essential to ensure that adequate access capacity is provided at various stages of development phasing. The report assumed that they will be implemented as follows:

- Year 1 to Year 3 – Intersection upgrades
- Year 4 to Year 5 – Design and construction of K148
- Year 6 to Year 8 – Design and construction of K146

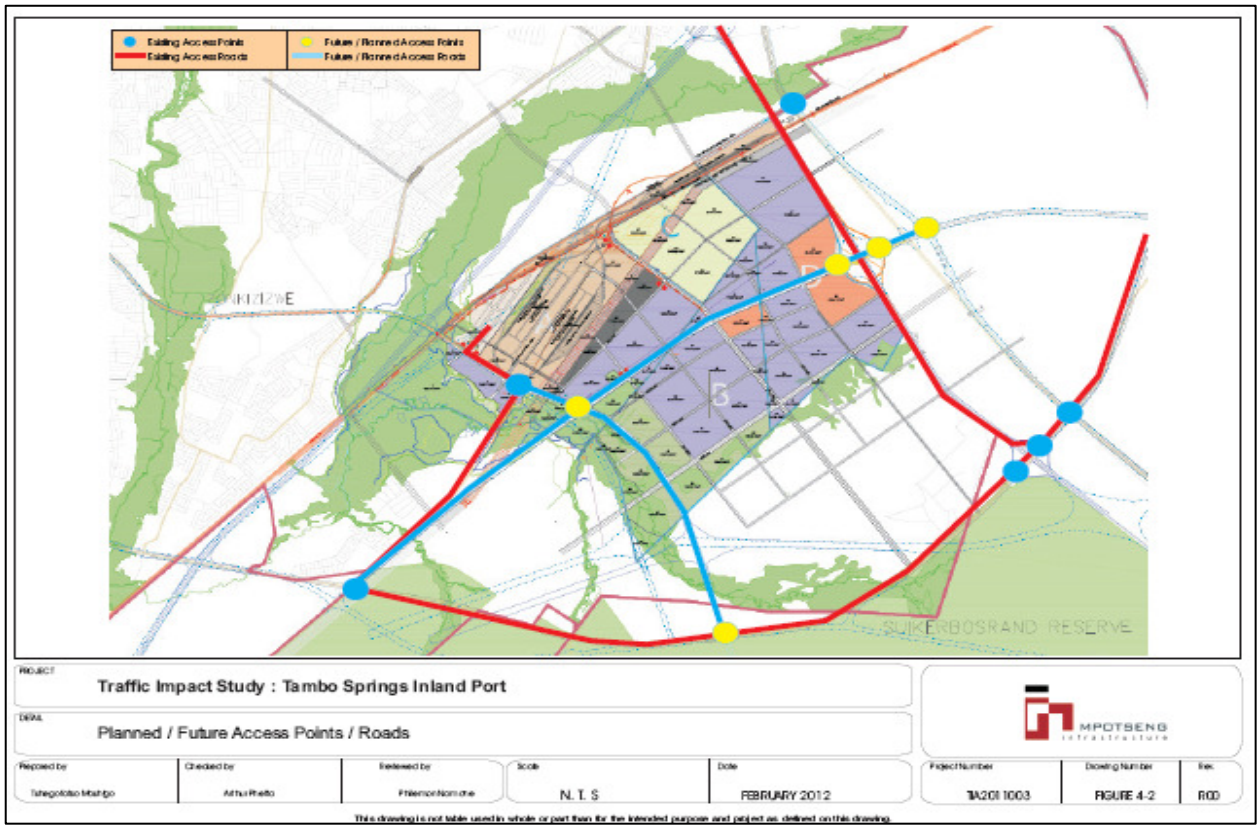


Figure 19: Existing and Future Access Points (Mpotseng, 2012: Fig 4-2)

The report concluded that with the implementation of the proposed road and intersection upgrades, the proposed infrastructure could accommodate the development.

6.6 Sensitivity Analyses

In order to establish where development activities will impact more negatively on the site, a sensitivity analysis was done by making use of a variety of sensitivity parameters. Such parameters were chosen based on the natural resources that would be most sensitive to disturbance of any kind. A set of layers containing information with varying sensitivities were

overlain with each other and a spatial map generated to indicate cumulative sensitivity. The following information layers were used to establish the cumulative sensitivity of the natural resources on the site:

- Ecology;
- Dolomite
- Hydrology
- Gradient;
- Visual sensitivity

- ***Gradient***

The site (Area A) slopes from 1560m AMSL from the south eastern side to 1515m AMSL on the north western side of the proposed development site over a distance of approximately 2800 m. The site has an average slope approximately of 1.6% or 1:60. The topography of the western corner of the phase 1 site is very flat and consists mainly of the Koppies Kraal Spruit flood plain.

The 1:100 year floodline indicated on the portion of land on the southern side of the railway line next to the fill of the link road into Vosloorus, is caused by the man-made road fill. The engineering report indicated that this portion of the site could be raised by approximately 1m up to the existing railway line cutting, to recover the land portion for the intermodal yard. This proposal was discussed with the official from DWAF at the site visit on 22 February. An agreement was reached that this could be possible as it is a man made wet area.

As the development flat areas along the Koppies Kraal Spruit flood plain would be avoided, it is concluded that the overall sensitivity rating of the proposed area to be used for development in terms of gradient is "low".

- ***Hydrology***

This area is drained mainly by means of sheet wash. The site is affected by the 1:100 year floodline. A wetland is found on the western boundary of the site. The overall sensitivity rating of the site in terms of Hydrology is "high".

- ***Dolomite***

The site is underlain by dolomite of the Malmani Subgroup, Chuniespoort Group of the Transvaal Super Group. Dolerite occurs in large areas of the site. Shallow dolomite bedrock conditions were confirmed in scattered locations. Furthermore the site is located in the Natalspruit West

Dolomite Groundwater Sub-Compartment. The dolomite groundwater is anticipated between a depth of 32m and 5m within the bedrock. However due to the proposed land use, the overall sensitivity rating of the site in terms of soil is "low".

- ***Ecology***

According to the attached specialist reports, the wetland area and its buffer zone is considered highly sensitive. Therefore a 200m buffer zone was demarcated to protect the wetland and flood plain. The overall sensitivity rating of the site in terms of vegetation is "high" for the wetland area and buffer zone and "medium - low" for the area set aside for development purposes.

- ***Visual sensitivity***

To be discussed in section 6.7.

6.7 Visual Environment

6.7.1 Visibility

The following visual assessment criteria have been used to determine the impact of the proposed project on the state of the environment - the respective shading of each impact indicates the significance:

Table 8: Visual Impact Assessment

	Impact		
Criteria	**High**	**Medium**	**Low**
1. Visibility	A particularly definite place with an almost tangible dominant ambience or theme	A place which projects a loosely defined theme or ambience	A place having little or no ambience with which it can be associated
2. Visual Quality	A very attractive setting with great variation and interest but no clutter	A setting which has some aesthetic and visual merit	A setting which has little or no aesthetic value
3. Surrounding Landscape Compatibility	Cannot accommodate proposed development without it appearing totally out of place	Can accommodate the proposed development without appearing totally out of place	Ideally suits or matches the proposed development

	Impact		
Criteria	**High**	**Medium**	**Low**
	visually		
4. Character	The site or surrounding area exhibits a definite character	The site or surrounding area exhibits some character	The site or surrounding area exhibits little or no character
5. Scale	A landscape which has horizontal and vertical elements in high contrast to human scale	A landscape with some horizontal and vertical elements in some contrast to human scale	Where vertical variation is limited and most elements are related to the human and horizontal scale
6. Visual Absorption Capacity	The ability of the landscape not to accept a proposed development because of a uniform texture, flat slope and limited vegetation cover	The ability of the landscape to less easily accept visually a particular type of development because of a less diverse landform, vegetation and texture	The ability of the landscape to easily accept visually a particular type of development because of its diverse landform, vegetation and texture
7. View Distance	If uninterrupted view distances to the site are > than 5km	If uninterrupted view distances to the site are < than 5km but > 1km	If uninterrupted view distances to the site are > than 500m and < 1000m
8. Critical Views	Views of the site seen by people from sensitive view sheds, egg. farms, nature areas, hiking trails.	Some views of the site from sensitive view sheds	Limited or partial views to the site from sensitive view sheds

The visual quality and aesthetic appeal of the open space area is an important quality and feature of the site. A large open space area, such as the site, provides a visual relief in an otherwise built up environment.

The visual analysis assessed the visual quality of the site from the major roads around the site, as this is the experience that most people would have of the site. By following this methodology a general understanding of the visual sensitivity and accessibility could be obtained. The findings were as follow:

- The sensitive wetland area is a prominent landscape feature visible from the R550 (Kliprivier Road) and the D817 at the intersection with the R550.
- The proposed development footprint portion of the site is most visible from the areas located along the D817, with the southern corner of the site most visible from the R550.
- The eastern portion of the site is most visible from the N3 highway.
- The north-eastern portion of the site is most visible from Land Portion C, namely the existing cemetery operated by Ekurhuleni Municipality.

Findings:

- The visual sensitivity of the individual landowners bordering the site and the existing community located on the site is considered to be "high".
- Whereas the visibility in terms of traffic is considered to be "high" on the R550, D817 and the intersection of the R550 and the K148 for the area to be used for development.

6.7.2 Design

The proposed development will impact on the surrounding environment by change of land use/activity, building style, an increase in visual building mass and roads. The main objective of the township layout is to minimise the potential impacts created by the change in activity and thus the visual appearance of the proposed development, and to complement the existing developments. In saying that it must be noted that the proposed development will impact on the surrounding areas as the proposed land uses are vastly different from the land uses found in the surrounding area.

It is therefore concluded that the proposed development will have a significant impact on the area and the surrounding communities and therefore the architectural design should strive to soften the visual impact and to reduce the impacts to acceptable levels.

6.8 The Advantages of the Proposed Development

The proposed development will have a number of advantages, not only from a financial point of view for the developer, but also from a social and environmental point of view. The main

advantages are:

- The *sensitive wetland area* and buffer zone will be fenced off and protected from human impacts.
- *Stormwater flow* will be managed in terms of a properly designed and constructed system.
- The security situation in the area will improve as a result of the development. Access to the land will be restricted, which will eliminate illegal occupation of the land, dumping, and destruction of natural habitat by vagrants.
- *Employment* will be created within an area where people have little or no access to places of employment.
- An *integrated sustainable community* is proposed with access to community facilities;
- *Investment* will be brought into an area that has been isolated, economically, due to the lack of infrastructure within the area.
- *Rehabilitation of the natural environment* and eradication of all alien vegetation will be possible through a landscaping plan. This will contribute to improve the quality of the natural environment.
- *Job provision* – the economic feasibility study indicated that the construction phases create ± 81 000 jobs (still to be verified) and against the three million formal jobs in Gauteng, 5 400 jobs secured per annum amounts to 0.18% jobs retained/secured. However, over a 15 year period, this would amount to a total of 2.7% jobs retained/secured against the Gauteng employment base within the first year of the Inland Port' s operation.
- *The projected increase in Gauteng's GGP* is estimated to be 6.4% as an indication of the actual quantity of the economic value added over the period.
- *Impact on the Construction Industry* – the R 7.5billion investment over a period of 15 years will contribute to a 2% increase in out put of this sector and is viewed as extremely positive.
- *Property rates and taxes* - Based on current municipal property rates, it is estimated that R150 million could be generated in property rates and taxes to the Ekurhuleni Metropolitan Municipality emanating from the Tambo Springs Inland Port development. This results in a 5% increase on the current property rates and taxes income of the municipality and is rated as significantly positive;

The above-mentioned is but a few of the anticipated advantages expected. The various reports attached in **Annexure C** discuss the advantages identified as per the various sectors.

6.9 Sustainability

Sustainable development implies the adoption of a holistic view of the interdependent relationship between human society and the natural environment. It acknowledges the link between impact of human activities on the functioning of physical and social environments, and vice versa. In a developing country and especially in a developing urban area, the focus must be on sustainable development, and where possible preservation and conservation.

The socio-economic impact analysis assessed the sustainability of the proposed development of the inland port and associated land uses and concluded that it would contribute immensely to the economic development of Johannesburg and Gauteng Province.

6.10 Agricultural Potential

The provincial urban edge, compiled by the Gauteng Department of Development Planning and Local Government dated 2002, is the primary spatial guideline tool utilised by Germiston to determine the local urban development boundary. In this instance the land is located within the local urban development boundary as well as the provincial boundary.

The site forms a fragmented pocket of agricultural land located adjacent to a residential area. Further more, the soil analysis indicated that the soils are not suitable for agricultural production. Therefore the opinion is held that agricultural production is not viable on the site as the site is too small for dry crop farming and the site is located within the urban development boundary as well as the provincial boundary. This area is earmarked for infill development and specifically that of an inland port.

7 CONSIDERATION OF PROJECT ALTERNATIVES

The potential of Johannesburg's freight logistics have not been fully developed by the public sector authorities and agencies serving the area over the years. As a result, this sector of the economy is characterised by excessive use, and wear, of roads by freight operators, dramatic decline in rail usage, increased congestion and fragmented freight planning. South Africa's freight logistics system is not meeting the country's needs and not keeping up with developments taking place within this sector around the world.

Therefore there is a need for a new inland port and logistics gateway that will contribute significantly to meeting Gauteng's need to increase the current freight logistics capacity/throughput in and out of Johannesburg, to anticipated 3 million TEU's by 2015 and a potential 4 million TEU's by 2020 with the potential to further increases thereafter.

7.1 Locational Alternatives

Tambo Springs Inland Port is exceptionally well positioned in this respect as it is located in the southern periphery of Johannesburg and within the Johannesburg/Durban road freight and rail corridor. It has, therefore, access to the N3 freeway to Durban (South Africa's major freight transport route), to the N1 to Cape Town and via the R390, to Port Elizabeth and East London as well as to other freeways to the industrial centres just south of Johannesburg namely: Heidelberg, Vereeniging, Vanderbijl Park and Sasolburg, all of which are within 20 to 60km radius. Furthermore the site is also only 22km from the City Deep Terminal and 25km from the Oliver Tambo Air Freight Terminal. These excellent road linkages will allow the site to accommodate both FTL (full truck load) long distance road freight and LTL (less than truck load) regional distribution.

Freight rail will be accommodated via the existing dual directional links that already run through the site to all of abovementioned areas. Therefore the Tambo Springs development can contribute significantly to optimising the country's existing infrastructure, particularly that of the Ngqura Deep Water Port near Port Elizabeth. It is therefore clear that no alternative location was investigated as all surveys done indicated that the existing site is the best location for the proposed development.

7.2 Temporal Alternatives

The timing for the development does not play an important role in terms of suitable weather

conditions. Heavy rains may delay construction activities for short periods. The only timing constraint is the availability of the approvals from the controlling authorities, and the market demand for the proposed development.

7.3 Construction Alternatives

Alternative construction methods will not have an impact on the viability of the project due to the nature of it. However, sound construction and founding principles for the development of the perceived activities and especially the filling station, shall be applied at all times.

7.4 Layout Alternative

The proposed layout plan was influenced by the environmental constraints found on the site. All the existing environmental constraints and subsequent recommendations made by the specialist consultants were included in the layout plan discussed in this document. The relevant specialist consultants have approved the layout plan and therefore no alternative layout plan is included for assessment.

7.5 The No-Go Option

In essence, the No-Go Alternative would ultimately mean that the state of the environment would be retained as it is presently, with obvious advantages and disadvantages to the natural environment. An objective and unbiased comparative assessment is provided below between the No-Go Option and the environmental costs of the proposed project, should the development not take place. The environmental costs are portrayed in terms of the impact on the land over the short to long term.

Table 9: Comparative Assessment between the No-Go Option and the Environmental Costs of the proposed project

No-Go Option	Environmental Costs
Alteration of topography due to development	The minor topographical changes to the land are not considered to be of any significance. Changes will be positive and will improve drainage patterns.
Physical Features of the Site	The western portion of the site is characterised by a sensitive wetland area and buffer zone. Whilst the central portion of the site is viewed as sensitive in terms of grassland. Therefore the land use proposal and layout plan focuses on

No-Go Option	Environmental Costs
	conserving the sensitive areas and therefore acknowledges the 200m buffer zone enforced by the specialists. The 200m buffer zone protects the wetland area and sensitive vegetation found in the area. The sensitive grassland area was set aside for development by the specialists due to the fact that an additional piece of land on the southern boundary of the site is included within the buffer zone. This area is viewed as sufficient by the specialist. The specialist reports concluded that the sensitive areas will be adequately protected against any potential impacts. Furthermore the development area will be fenced off ensuring that construction activities do not encroach within the 200m buffer zone area. The developable area will remain fenced off during the operational phase off the development, ensuring that human impact is minimised. Should the site be left vacant there would be no control over what happens on the site and activities that may be harmful to the natural environment could increase such as the illegal dumping of household and construction material, destruction of natural habitat by quad bikes and four wheel vehicles, illegal occupation of the land and subsistence farming practices taking place within the flood plain area. The opinion is therefore held that the proposed development would enable the sensitive habitat to be conserved whereas the current status quo would result in the destruction of sensitive vegetation over the long term.
Geology/Soils	The proposed development will over the long term eliminate further disturbance of the vegetation cover and will prevent further soil erosion.
Surface Water	The proposed development will have a positive impact on the surface water in the sense that stormwater will be retained on the property before discharging it into the

No-Go Option	Environmental Costs
	system. Where as currently stormwater is being discharged into the system uncontrolled.
Groundwater	There is currently no data available to assess the quality of groundwater.
Air Quality	Air quality will not be affected.
Noise	Noise levels will increase due to the nature of the proposed activities.
Vegetation	The existing vegetation will be impacted on; however the sensitive portions will not be impacted on and is protected within a 200m buffer zone.
Fauna	If the vacant area is left unprotected the specie diversity may decline due to illegal land use practices.
Socio-Economic Features	The social economic impact is vast with approximately 80 000 jobs that could be created over a period of 15 years. Therefore the proposed development will contribute towards the establishment of social facilities, upliftment of communities, and over the long term, sectors within the regional economy.

The No-Go option is an option but is not seen as a viable or sustainable option for the site. Leaving the site vacant will contribute to environmental degradation, dumping, littering, use of the site as a dirt track for quad bike racing and other illegal activities. This could lead to the loss of sensitive habitat as identified within the specialist reports. Therefore the proposed development provides a unique opportunity to protect the highly sensitive wetland area and buffer zone whilst allowing development on the non-sensitive portion of the site.

8 ENVIRONMENTAL IMPACT ASSESSMENT

The overall aim of an ecologically sound development project is to minimise the negative impacts of the project on the environment, thus limiting the ecological footprint of the project while moving towards greater sustainability over the longer term.

8.1 Cumulative Effects

It is important to assess the natural environment using a systems approach that will consider the cumulative impact of various actions. Cumulative impact refers to the impact on the environment, which results from the incremental impact of the actions when added to other past, present and reasonably foreseeable future actions regardless of what agencies or persons undertake such actions. Cumulative impacts can result from individually minor but collectively significant actions or activities taking place over a period of time. Cumulative effects can take place so frequently in time that the effects cannot be assimilated by the environment.

An assessment of the impact that the proposed development may have on the environment includes evaluating the impact according to a series of assessment criteria. This has been undertaken by considering the effects that may result should the impact occur. This was evaluated according to the inputs received from I & AP's and on the basis of experience gained from similar projects.

8.2 Assessment Criteria for Impacts Identified

As a means of determining the significance of the various impacts that can or may be associated with the proposed project, a series of assessment criteria were used for each impact. These criteria include an examination of the nature, extent, duration, intensity and probability of the impact occurring, and assessing whether the impact will be positive or negative for the natural as well as biophysical environments at, and surrounding, the site. The following criteria have been adapted from those proposed in the EIA Guideline Document (April 1998).

8.2.1 Nature

This is an appraisal of the type of effect the activity would have on the affected environment. This description includes what is being affected and how.

8.2.2 Extent

This indicates the spatial area that may be affected by the impact and further describes the possibility that adjoining areas may be impacted upon. This includes four classes that are listed as follows:

- Local (extending only as far as the site);
- Limited (limited to the site and it's immediate surrounds);
- Regional (extending beyond immediate surrounds to affect a larger area); and
- National or international.

8.2.3 Duration

This refers to the period of time that the impact may be operative for (i.e. the lifetime of the impact). This includes the following four classes that are listed as follows:

- Short (i.e. 0 - 5 years);
- Medium (i.e. 5 - 15 years);
- Long (i.e. > 15 years and/or where natural processes will return following the cessation of the activity or following human intervention);
- Permanent (i.e. where 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).

8.2.4 Intensity

This indicates whether the impact is likely to be destructive or have a lesser effect. Three such classes of intensity are defined and these are listed as:

- Low (i.e. where natural, cultural and social functions and processes are not affected by the development);
- Medium (i.e. where the natural, cultural and/or social functions and processes are affected by the development but can continue in a modified way);
- High (i.e. where natural, cultural and/or social functions or processes are altered to the extent that it will temporarily or permanently cease).

8.2.5 Probability

This refers to the likelihood of the impact actually occurring. The following four classes are used to describe the probability of the impact:

- Improbable (i.e. low possibility of the impact);
- Probable (i.e. a distinct possibility exists that the impact will occur);
- Highly probable (i.e. more than likely that the impact will occur);
- Definite (i.e. the impact will occur regardless of any preventative mitigation/measures).

8.2.6 Significance

The significance of the impact (i.e. whether it will lead to a marked change in the environment or not) is determined though a synthesis of the aspects produced in terms of their nature, duration, intensity, extent and probability. Four classes of significance exist including:

- None (i.e. the impact will not have an influence on the decision and requires no mitigation);
- Low (i.e. the impact will have a limited influence on the decision and requires mitigation to manage the environment);
- Medium (i.e. it is likely to have an influence on the decision and requires mitigation)
- High (i.e. Mitigation is required and this may not be sufficient to ensure that the environment is not detrimentally affected by the proposed development).

9 ASSESSMENT OF POTENTIAL IMPACTS ON THE ENVIRONMENT

Table 10 below indicates the relevance of the various environmental aspects that may be affected by the proposed development. An environmental aspect here refers to a potential environmental impact that may arise as a result of the development. Where it is known or where it has been recorded that such an impact does occur at the site, this has also been included in the table.

Table 10: List of Environmental Impacts with possible relevance to the Project

Environmental Aspect	Relevant
Air Quality	X
Heritage Assessment	√
Cumulative Impacts	√
Ecological Systems	√
Faunal Abundance and Diversity	√
Floral Abundance and diversity	√
Geology	√
Ground water	√
Land Use	√
Mining area	*X*
Open Space	√
Public Response	√
Social & Economic Issues	√
Soils	√
Surface water	√
Topography	√
Visual Impact	√
Traffic	√
Waste management	√

The relevant issues have each been assessed taking into account information obtained from the applicant, I & AP's and specialist's inputs. The issues of significance are discussed in more detail below and mitigation measures are proposed for the meaningful management and monitoring thereof.

9.1 Environmental Impact Assessment

9.1.1 Air Quality

Status Quo Conditions

The quality of air in the specific area is reasonably good and the only localised air pollution occurs with veldt fires. Air quality is most affected during the winter months due to the burning of coal for cooking and heating within the surrounding residential communities.

Impact Assessment for the Development Phases

- **Construction**

The proposed development phase may have a negative impact on the air quality as a result of increased emissions from construction vehicles and equipment as well as the generation of dust during construction activities.

The impact during this phase is likely to be of limited extent, long duration, low intensity and an improbable occurrence

- **Operational**

During this phase the completed development would eliminate the occurrence of dust. The proposed development is regarded as a major traffic generator, with light and heavy vehicular traffic expected and a rail terminal. Pollution by emissions from vehicles, will not increase substantially, the project should therefore not have a significant impact on the surrounding environment.

The proposed impact is likely to be of limited extent, short duration, medium intensity and probable occurrence.

Table 11: Impact Summary Matrix for Air Quality

Nature	**Air Quality**		**Status**	**Low**
Impact source(s)	Dust			
Affected stakeholders	Surrounding landowners			
Magnitude	*Extent*	**Limited**		

Nature	**Air Quality**		**Status**	**Low**
	Intensity	**Medium**		
	Duration	**Short**		
	Probability	**Probable**		
Significance	*Without mitigation*	**Medium**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Option:

- Clear vegetation only from areas where construction will start right away
- Apply water or other dust suppressive methods to temporary road surfaces during construction;
- Lower speed limits on construction site. This can reduce dust emissions by 22%;
- Upgrade entrance and exit roads to be used by construction vehicles by: (1) improving the particle size, shape and mineral types that make up the surface and base materials of the entrance and exit roads and (2) add surface gravel to reduce the source of dust emission;
- Minimise the volume of material tracked-out onto road surfaces by construction vehicles by: (1) filling in muddy areas with gravel or other surface material and (2) stabilising shoulders of roads with gravel/vegetation.
- No open fires should be allowed on the construction site.

9.1.2 Heritage Assessment

Status Quo Conditions

Three sites rated to have significance have been identified in the study area. They are:

• Two old cemeteries, which are rated as having high significance on a local level.

• An old farmstead, which is rated as having high significance on a regional level.

Impact Assessment for the Development Phases

- **Construction**

It is concluded that sites 1 and 3 have a "high" significance rating. These two sites will be impacted on during stage 1 of the development phase. It is therefore necessary that the correct procedures are followed to obtain permission from SAHRA to relocate the graves and to demolish the house (if approved by SAHRA). Site 2 will only be affected during stage two of the development phase. It is recommended that the same procedures are followed

for this site as for the aforementioned sites.

The impact during this phase is likely to be of limited extent, short duration, high intensity and a definite occurrence

- **Operational**

During this phase the impacts on the heritage sites would have been addressed as per SHARA specifications.

The impact during this phase is likely to be of limited extent, short duration, low intensity and a improbable occurrence

Table 12: Impact Summary Matrix for Heritage Assessment

Nature	**Heritage Sites**		**Status**	**High**
Impact source(s)	Construction activities			
Affected stakeholders	Site 1: Small graveyard of the Vermeulen Family Site 2: Larger Cemetery still in use Site 3: The Old Farm Stead			
Magnitude	*Extent*	**Limited**		
	Intensity	**High**		
	Duration	**Short**		
	Probability	**Probable**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium**		

Prevention, Mitigation, and Management Option:

- **Site 1:** S 26.40522; E 28.20902

The specialist recommended that all the graves are relocated to a formal cemetery

  - Mitigation actions recommended: to retain the graves or, alternatively, relocate after following correct procedure ;
  - Legal requirements: Permits, SAHRA permits, police, notification, consultation, relocation.

- **Site 2:** S 26.40973; E 28.22176

The cemetery is a very large feature and is still in use by the local community, and it is therefore recommended that it is retained and formalised by fencing it off, maintaining the site and identifying the authority for looking after it.

- Mitigation actions recommended: to retain the graves or, alternatively, relocate after following correct procedure ;
- Legal requirements: Permits, SAHRA permits, police, notification, consultation, relocation.

❑ **Site 3:** S 26.40992; E 28.21193

This is an old farmstead, consisting of a house, outbuildings, barns, etc. now mostly in ruins.

- Mitigation actions recommended: mapping of the site by a heritage architecture will be necessary;
- Legal requirements: should the building be demolished, a permit from SAHRA has to be issued.

9.1.3 Ecological Systems

Status Quo Conditions

According to Mucina & Rutherford (2006) the site falls within Carltonville Dolomite Grassland and Eastern temperate freshwater wetlands. The authors described the Carltonville Dolomite Grassland as species-rich grassland with shallow soil and slightly undulating plains on dolomite dissected by prominent rocky chert ridges. This grassland falls within a warm-temparate summer-rainfall region with high summer temperatures and severe frequent winter frosts. This vegetation unit is considered vulnerable.

The Eastern temperate freshwater wetlands (Mucina & Rutherford 2006) are a vegetation unit found around water bodies with stagnant water: lakes, pans, periodically flooded vleis and edges of calmly flowing rivers within the Grassland biome. Features flat landscapes or shallow depressions filled with water bodies supporting aquatic and hygrophylous vegetation. Soils are peaty to vertic. Vleis or pans form where flow of water is impeded by impermeable soils or erosion-resistant features such as dolerite intrusions. Found in summer rainfall region with frequent winter frosts. The associated wetland is classified as a floodplain wetland.

Impact Assessment for the Development Phases

❑ **Construction Phase**

Construction activities typically impact negatively on ecological systems owing to the impacts of stormwater runoff, erosion, noise and the general increase in activity, pollution and the like. These impacts are not likely to have a significant impact on the sensitive environment as it will be localised and contained to the proposed development site.

The proposed impact is likely to be of limited extent, short duration, low intensity and a probable occurrence.

- **Operational**

The anticipated improved water management system and proposed rehabilitation of the existing habitat after construction should have a positive impact on the micro ecology of the site. The site will only be partially developed; a large open space area of ±200ha will remain. The sensitive wetland area and applicable buffer zone is included within this protected area and will therefore by protected from development by a 200m buffer zone that is regarded as the line of no development.

The proposed impact is likely to be of limited extent, long duration, high intensity and a probable occurrence.

Table 13: Impact Summary Matrix for Ecological Systems

Nature	**Ecological Systems**		**Status**	**High - Medium**
Impact source(s)	Fauna, Flora, Wetland Area, buffer zone, Avifauna, & Herptofauna			
Affected stakeholders	Site specific			
Magnitude	*Extent*	**Limited**		
	Intensity	**High**		
	Duration	**Permanent**		
	Probability	**Definite**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium**		

Prevention, Mitigation and Management Options:

- The construction area to be fenced off before construction commences.

- No development to be allowed within the 200m buffer zone area as per the layout plan.
- Construction should be limited to daylight hours.
- The ECO and the site manager should determine soil stockpile areas.
- No artificial lighting should be allowed within the ecological sensitive areas.
- Only indigenous plants should be allowed in the gardens and landscaped areas.
- Implement the guidelines of the EMP and the mitigation measures proposed by the specialists.

9.1.4 Faunal Abundance and Diversity

Status Quo Conditions

Mammals: The mammal study found that the open perennial water sources on the site are too modest to allow for the permanent or even infrequent occurrence of spotted-necked or clawless otters. The specialist concluded that otters may occasionally venture onto the site during exceptionally wet spells, but that is regarded as a rare event.

In terms of wetland vegetation the specialist found that the lush semi-aquatic vegetation along streams and marshy areas provide ideal habitat for the rough-haired golden mole, the listed shrews as well as the African marsh rat. This confirms the exclusions of the wetland area from any form of development or side-effects of the construction and operational phases of the development.

The investigation of the terrestrial portion of the site showed that the area is severely disturbed, either by ploughing or overgrazing. The proposed development will displace most of the terrestrial species recorded, but according to the report none of these can be regarded as rare or even sensitive. All species are common and widespread, and their loss will be of little conservation consequence at a national level.

The investigation concluded that with the exclusion of the wetland and the suitable buffer zone superimposed on appropriate management practices, the proposed development should not result in a loss of ecological sensitive and important habitat units, ecosystem function (e.g. reduction in water quality, soil pollution), loss of mammal habitat, nor of loss/displacement of threatened or protected species.

Avifauna: Three Red Data avifaunal species are likely to make use of the wetland habitat on the study site:

- **African Grass-Owl** (*Tyto capensis*): The wetland habitat and more specifically the wetland grass area south of the tributary of the Rietspruit on the southern border of the study site could offer suitable breeding, roosting and foraging habitat for African Grass-Owl if proper veldt management practices are implemented. Currently the wetland vegetation is under severe grazing pressure resulting in any dense wetland grass cover and adjacent grassland being trampled by livestock and African Grass-Owl generally avoids areas that are subjected to intense grazing or burning and this is probably the largest factor why none were observed on the study site. It is likely that African Grass-Owls that breed within the Suikerbosrand Nature Reserve will move up and down the tributary to forage and possibly expand their breeding range when young birds are dispersing from the nests. This is also applicable for the Rietspruit west of the study site.
- **African Marsh-Harrier:** The wetland habitat, especially the *Pragmites australis* and *Typha capensis* vegetation, that flanks the tributary of the Rietspruit offers suitable foraging habitat for this species.
- **Black-winged Pratincole:** Although suitable habitat exits for this species it is unlikely that any development on the study site will have a negative affect on this species due to the generally disturbed and degraded state of the main habitats.
- **Lesser Kestrel:** Lesser Kestrel might on occasion move through the area during migration and might use the area for hunting purposes. The SABAP2 data for the 2628AC q.d.g.c. and for the 2620_2810 pentad indicate that this species was not observed in this region. The SABAP1 data indicate a low reporting rate. There are however no documented records for this species for the area on and surrounding the study site. It is highly likely that this species will forage over the open grassland habitat on site on occasion during their migration periods. It is unlikely that development on the open grassland area will have a negative affect on the population of this species and there are still large areas with suitable open grassland and fallow fields surrounding the study site that will favour this species for foraging purposes.

Herpetological: Of the 48 reptile species which may occur on the study site, three were confirmed during the site visit and of the possible 12 amphibian species which may occur on the study site, one was confirmed during the site visit.

- **Striped harlequin snake:** has been recorded in this quarter degree grid cell (Ditsong National Museum of Natural History or TVL Museum Records), and many moribund termitaria, where this species is most likely to be found, are present on the study site. This species has also been

recorded on the nearby Suikerbosrand Nature Reserve (Koen, 2007). It is very difficult to confirm whether this cryptic snake is present on any study site, but the possibility that it occurs on this particular study site does exist.

- **Giant Bullfrog:** The study site has a few temporary pans next to the stream in the wetland, which is a potential breeding site for giant bullfrogs. These breeding sites are temporary, which bullfrogs prefer in order to avoid predation from fish. If the species occurs on the study site, its breeding habitat should be protected if the wetlands are protected and excluded from any development. The chances are however very slim that any bullfrogs occur on the study site.

Impact Assessment for the Development Phases

- **Construction**

Heavy construction machinery and vehicles will definitely alter the faunal habitat on the portion of the site to be used for development. However this should be a short-term impact that will re-establish itself after construction activities. Where possible sensitive species must be rescued and relocated. The sensitive portion of the site will not be affected as the construction site will be fenced off.

The proposed development phase is likely to be of limited extent, short duration, medium intensity, and probable occurrence.

- **Operational**

The sensitive area within the 200m buffer zone will remain undeveloped and the specie diversity will remain as is.

The proposed operational phase is likely to be of limited extent, long duration, high intensity and definite occurrence.

Table 14: Impact Summary Matrix for Fauna

Nature	**Faunal**		**Status**	**High**
Impact source(s)	Mammals, Avifuana & Herpetofauna			
Affected stakeholders	Site Specific			
Magnitude	*Extent*	**Limited**		
	Intensity	**High**		
	Duration	**Long**		

	Probability	**Definite**
Significance	*Without mitigation*	**High**
	With mitigation	**Medium - Low**

Prevention, Mitigation, and Management Options:

The following mitigation measures were taken from the reports compiled and represent a summary of the mitigation measures proposed:

- The contractor(s) must ensure that no herpetofauna species are disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.
- A study to elucidate the potential for harmful dust and sediment effluent emanating from the development and operational phases of the development that may contaminate the wetland, should be commissioned.
- The open space system should be fenced off prior to construction commencing (including site clearing and pegging). All construction-related impacts (including service roads, temporary housing, temporary ablution, disturbance of natural habitat, storing of equipment/building materials/vehicles or any other activity) should be excluded from the open space system. Access of vehicles to the open space system should be prevented and access of people should be controlled, both during the construction and operational phases. Movement of indigenous fauna should however be allowed (i.e. no solid walls, e.g. through the erection of palisade fencing).
- Outside lighting should be designed to minimize impacts on fauna. 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.
- In order to minimize artificially generated surface storm-water runoff, total sealing of paved areas such as parking lots, driveways, pavements and walkways should be avoided. Permeable material should rather be utilized for these purposes.
- The crossing of natural drainage systems should be minimized and only constructed at the shortest possible route, perpendicular to the natural drainage system. Where possible, bridge crossings should span the entire stretch of the buffer zone.

Furthermore it is recommended that the open space system should be managed in accordance with an EMP that complies with the *Minimum Requirements for Ecological Management Plans* and forms part of the EMP.

9.1.5 Floral Abundance and Diversity

Status Quo Conditions

- Four **vegetation study units** were identified:

  o *Eragrostis – Elionurus* grassland: The habitat of the *Eragrostis – Elionurus* grassland study unit was suitable for one of the Red List species and two of the Orange List species. No Red List species were found in this study unit, but two Orange List species, *Boophone disticha* (Cape poison bulb) and *Hypoxis hemerocallidea* (African potato) were found sparsely scattered over the study unit.

  o Wetland: Connectivity with wetland vegetation existed upstream and downstream of both drainage lines. Of the 174 plant species recorded on the site 63 were recorded in the wetland vegetation study unit. Of these, 52 were indigenous species. The habitat of the Wetland study unit was suitable for four of the Red List species and one Orange List species. One of the Red List species, *Argyrolobium campicola* was found on the flood plain of the Riet Spruit and one Orange List species was found sparsely scattered along the drainage line of both the Riet Spruit and its tributary.

  o Mixed alien and indigenous vegetation: The species diversity of this study unit was low. Of the 174 plant species recorded on the site 30 were recorded in the mixed alien and indigenous vegetation study unit. Of these, 18 were indigenous species. The habitat of this study unit was not suitable for any of the Red List species or Orange List species known to occur in the quarter degree grid square. The vegetation of this study unit was not considered sensitive.

  o Cultivated fields: This study unit consisted of the large formal cultivated fields of surrounding farms and the small patches of informal fields south-east of, and abutting, the railway line. Most of these fields were still lying fallow after the winter. The species diversity of this study unit was low. The habitat of this study unit was not suitable for any of the Red List species or Orange List species known to occur in the quarter degree grid square.

- **Medicinal plants:** of the 174 plant species recorded on the site, 28 species with medicinal properties were found.
- **Alien Plants:** Twenty-one alien plant species, of which four species were Category 1 Declared weeds, three were Category 2 Declared invaders and one was a Category 3 Declared invader, were recorded on the site.
- **Orange listed species:** The habitat was suitable for all three of the Orange List plant species known to occur in the 2628AC quarter degree grid square. All three of these species were found

- **Red listed species:** Twelve Red List plant species are known to occur in the 2628AC quarter degree grid square, three of these within 5 km of the site. The habitat was suitable for these three species, as well as for another two Red List species, one of which was found in the flood plain of the Riet Spruit.

Impact Assessment for the Development Phases

- **Construction**

Construction activities are likely to have definite impact on the *Eragrostis* grassland found over the central portion of the site. The wetland area and associated vegetation will not be impacted on due to it being protected within a 200m buffer zone. Indigenous vegetation must be protected as far a possible. Care must be taken to control the invasion of disturbed areas by alien plants.

The proposed development is likely to be *of limited extent, short duration, high intensity and definite occurrence.*

- **Operational**

There should be no further impact on the remaining natural vegetation during the operational phase of the development. The establishment of indigenous landscaped areas will improve the abundance of diversity of the floral species. The wetland area and 200m buffer zone will remain fenced off.

The potential impact during this phase is likely to be *of limited extent, long duration, high intensity and improbable occurrence.*

Table 15: Impact Summary Matrix for Flora

Nature	**Flora**		**Status**	**Medium**
Impact source(s)	*Eragrostis – Elionurus* grassland Wetland Mixed alien and indigenous vegetation Cultivated fields			
Affected stakeholders	Local Specific			
Magnitude	*Extent*	**Limited - confined to area to be used for development**		
	Intensity	**Medium – confined to area to be used for development**		
	Duration	**Long**		

	Probability	**Probable –** for the *Eragrostis – Elionurus* grassland **Improbable** – for the Wetland, Mixed alien and indigenous vegetation and Cultivated fields
Significance	*Without mitigation*	**High**
	With mitigation	**Medium**

Combined Sensitivity Map and Layout Plan (Composite Map):

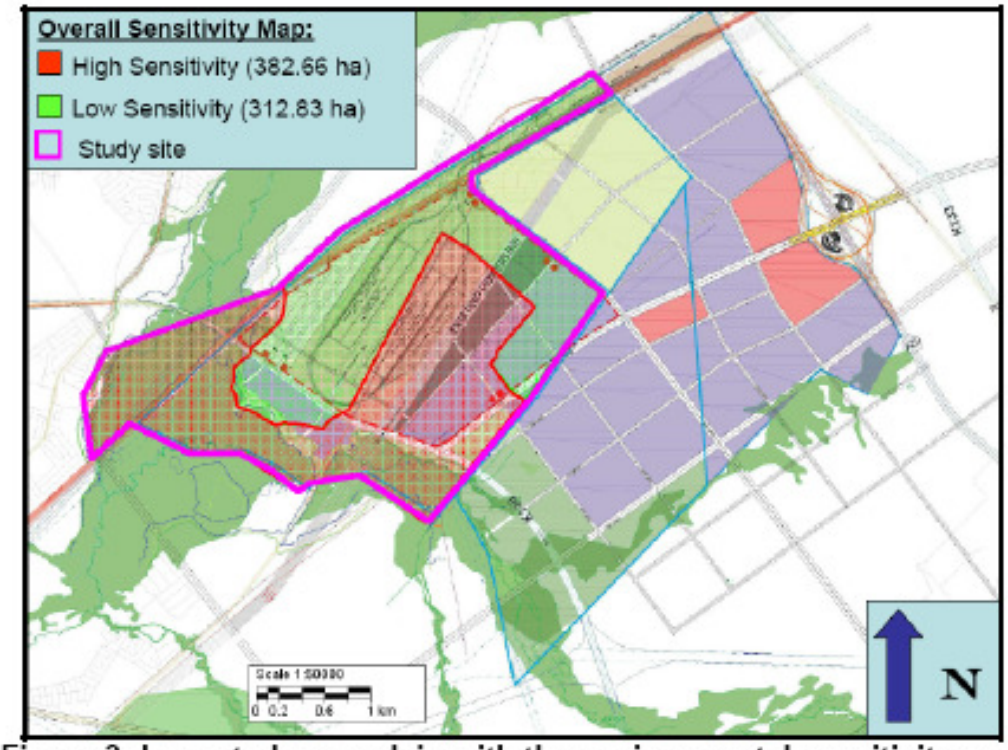


Figure 3: Layout plan overlain with the environmental sensitivity map

The Specialist report concluded that "…*where the layout plan is overlain with the environmental sensitivity map, it is clear that most of the wetland and surrounding buffer areas were excluded from the proposed development. The grassland area to be conserved is however very small, but should be seen together with the open space areas on the layout map for the neighbouring site to the east.*"

Prevention, Mitigation, and Management Options:

The following mitigation measures were proposed by the Specialist Consultants, Galago Environmental:

- An appropriate management authority that must be contractually bound to implement the Environmental Management Plan (EMP) and Record of Decision (ROD) during the

operational phase of the development should be identified and informed of their responsibilities in terms of the EMP and ROD.

- All areas designated as sensitive in a sensitivity mapping exercise should be incorporated into an open space system. Development should be located on the areas of lowest sensitivity.
- The Ecological Management Plan should:
    - include an ongoing monitoring and eradication programme for all non-indigenous species, with specific emphasis on invasive and weedy species
    - include a comprehensive surface runoff and storm water management plan, indicating how all surface runoff generated as a result of the development (during both the construction and operational phases) will be managed (e.g. artificial wetlands or storm water and flood retention ponds) prior to entering any natural drainage system or wetland and how surface runoff will be retained outside of any demarcated buffer or flood zones and subsequently released to simulate natural hydrological conditions
    - ensure the persistence of all Red and Orange List species
    - minimize artificial edge effects (e.g. water runoff from developed areas and application of chemicals)
    - result in a report back to the Directorate of Nature Conservation on an annual basis.
- Where possible, trees naturally growing on the site should be retained as part of the landscaping.
- The sensitive area on site must be fenced off from the proposed development to ensure that the construction activities do not impact on this area. No dogs are allowed in this area.
- Pedestrian routes through the sensitive area should be laid out by the Botanist and be permanent to ensure that none of the red listed plants will be impacted negatively.

9.1.6 Wetland Delineation and Aquatic Assessment

Status Quo Conditions

❑ **Wetland Classification:**

- The hydrological integrity of the wetland, the geomorphic processes of the wetlands and the vegetation communities of the wetland have all been seriously modified and was assigned a D category;
- The direct services provided by the wetland were very low. The indirect services were rated as low for the wetland. The Ecological Importance and Sensitivity was also low.

- **Aquatic Assessment:**

  - DO concentrations were considered to have a limiting effect on aquatic biota at site TF1 and TF2 during the August 2011 survey;
  - TDS values recorded are considered to be high and are considered to have a limiting effect on aquatic biota;
  - Habitat availability at sites TF1 and TF3 during the August 2011 survey was recorded to be adequate / fair and site TF2 was recorded to be poor / inadequate.
  - Based on the IHIA results habitat integrity at all the sites has reached a critical level of impairment;
  - Based on the SASS5 results biotic integrity at site TF1 was classified as 'Moderate' (PES Class C). This can be attributed to the adequate habitat availability at this site. Site TF2 was classified as being "Poor" (PES Class E/F).

Impact Assessment for the Development Phases

- **Construction**

Runoff from the construction areas may result in contamination of wetland soils. The following impacts may result in changes to the soil structure:

- Heavy construction vehicles moving within the wetland;
- Stock piling;
- Construction on the wetland;
- Spills from machinery;
- The mixing of concrete;
- Clearing of vegetation for construction.
- Dust and sediment runoff from construction activities;
- Loss of vegetation due to vegetation clearing during the construction phase;

The proposed development is likely to be *of limited extent, short duration, high intensity and definite occurrence.*

- **Operational**

The following impacts may occur during the operational phase:

- Diesel and oil spills from equipment and machinery; and
- Higher and faster run off from the inland port.
- Sedimentation and runoff from the railway siding; and

- Increase in the velocity of the runoff from the proposed roads and hardened surfaces due to the development.

The proposed development is likely to be of limited extent, long duration, high intensity and probable occurrence.

Table 16: Impact Summary Matrix for Wetland Delineation and Aquatic Assessment

Nature	**Wetland and Aquatic**		**Status**	**Medium**
Impact source(s)	Wetland area and Aquatic Systems			
Affected stakeholders	Local Specific			
Magnitude	*Extent*	**Limited - confined to area to be used for development**		
	Intensity	**Medium – confined to area to be used for development**		
	Duration	**Long**		
	Probability	**Improbable**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium –** for construction phase **Low –** for operational phase		

Prevention, Mitigation, and Management Options:

The following mitigation measures and risks were identified by the Specialist (Prism Environmental):

Risk identified		**Comments**
Compacting of wetland soils	Heavy construction vehicles moving within wetlands	Heavy construction vehicles and transport vehicles will potentially compact wetland soils due to the close proximity to the wetlands. Ingress into wetlands must be kept to a minimum
	Stock piling	Stock piling must be avoided within the delineated wetlands. Stockpiles must be bermed to prevent sedimentation of the wetlands. "First out, last in' method must be practised in terms of the removal of the soil
	Construction on wetlands	Construction activities in close proximity to wetlands and within wetlands will compact soils

Risk identified		**Comments**
Contamination of soils resulting in chemical structure change	Spills from machinery and construction vehicles	Construction vehicles and machinery that aren't maintained and serviced will potentially spill oil, diesel and other contaminants into the wetland
	Mixing of concrete to build the inland port	Mixing must not be done on the ground or near wetlands. The cement needs to be contained
Soil erosion	Clearing of land for construction	Due to the construction covering a large area the erosion potential due to land clearing is high

More specifically the following measures should be implemented:

- *"During construction, traversing the wetland must be kept to a minimum. Construction vehicles must keep to a single path into the construction site and a single path out of the construction site to prevent unnecessary impact to the wetland;*
- *A suitably qualified Environmental Control Officer (ECO) must be appointed during the construction phase to oversee the construction of the proposed development*
- *All construction should be done in the dry season (winter) to prevent surface water runoff and contamination and erosion of the wetlands. In the wet season the soil will be water logged and the construction vehicles will have difficulty getting into the site. This will also have an impact on the wetland soils;*
- *Mixing of cement for the construction of the associated infrastructure must not be done on the bare soil at least 50 m from the edge of the wetland and must be mixed on mixing trays, to prevent the cement contaminating the wetland soils.*
- *During the project, any accidental spills into the wetlands must be contained, cleaned up, and the areas rehabilitated; and*
- *Where soils have been compacted, these should be loosened by labourers on foot (for small sections) or ripped by tractor (in large areas).*
- *Silt nets and geo-fibres should be put in place to avoid erosion in areas cleared for construction;*
- *A maintenance monitoring programme of all components of the proposed inland port and associated infrastructure must be developed for the duration of operation. This programme should be audited and checked annually."* (Prism Environmental, 2012:49-50).

9.1.7 Geology

Status Quo Conditions

The geotechnical report concluded that the site the site is located on chert-rich dolomite of the Malmani Subgroup, Chunispoort Group, of the Transvaal Supergroup. Dolerite occurs in large areas of the site. Shallow dolomite bedrock conditions are also confirmed in scattered locations. The Inherent Hazard Zonation of the site, which is also shown on the layout plan, provides guidance for land use planning of the site. The majority of the site with the exception of Dolomite Hazard Zone 4 is suitable for an inland port.

Impact Assessment for the Development Phases

- **Construction**

Excavations for foundations should be inspected to ensure that the founding medium meets the design criteria. Test holes should be drilled where deemed necessary. Foundations should be constructed in terms of the NHBRC Standards and Guidelines of 1995 in order to mitigate the prevailing geological conditions. Further a recognised professional civil engineer should monitor all excavation work and installation.

The potential impact during this phase is likely to be of limited extent, long duration, high intensity and definite occurrence.

- **Operational**

There should be no further impact on the geological conditions during the operation phase of the development.

The potential impact during this phase is likely to be of limited extent, long duration, high intensity and definite occurrence.

Table 17: Impact Summary Matrix for Geological Conditions

Nature	**Geotechnical conditions**		**Status**	**Medium**
Impact source(s)	Underlying strata			
Affected stakeholders	Site Specific			
Magnitude	*Extent*	**Limited**		

	Intensity	**Medium**
	Duration	**Long**
	Probability	**Probable**
Significance	*Without mitigation*	**Medium**
	With mitigation	**Low**

Prevention, Mitigation, and Management Options:

- Test holes should be drilled for every proposed development and foundations must be inspected by an Engineer;
- Appropriate foundation design and water precautionary measures are prescribed together with recommendations aimed at the adoption of a pro-active water bearing services maintenance strategy. Particular emphasis is placed on the need to manage storm water falling onto, moving across and exiting the site. Storm water should be effectively and efficiently removed from the immediate area around structures, into the municipal storm water system
- Rationally designed foundation solutions will be required for all structures. For more details of foundation design and water precautionary measures see Intraconsult's report IR1067R dated 12 October 2011.
- The Council for Geoscience is supporting the recommendations of Intraconsult's report.

9.1.8 Ground Water

Status Quo Conditions

During the rainy season a shallow water table may be present on the site. No seepages were encountered in the test pits. There are no known boreholes on the site.

Impact Assessment for the Development Phases

- **Construction**

The construction of the proposed township will not impact on the ground water quality or quantity.

The proposed development phase is likely to be of limited extent, short duration, low intensity and probable occurrence.

- **Operational**

The development will not have an effect on the quality of the ground water.

This phase is likely to be of limited extent, long duration, low intensity and probable occurrence.

Table 18: Impact Summary Matrix for Ground Water

Nature	**Ground Water Table**		**Status**	**Low**
Impact source(s)	Under ground water table			
Affected stakeholders	Site Specific			
Magnitude	*Extent*	**Limited**		
	Intensity	**Low**		
	Duration	**N/A**		
	Probability	**Improbable**		
Significance	*Without mitigation*	**Low**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Options:

- The necessary damp proofing precautions should be taken underneath structures;
- Provision must be made to prevent an ingress of water onto subsurface structures or beneath foundations;
- Non-ferrous metal pipes or plastic pipes are recommended for wet services;
- Implement the recommendations of the EMP for construction activities; and
- Wastes and rubble on the site must be removed on a regular basis.

9.1.9 Land Use - Proposal

Status Quo Conditions

The site is zoned 'Undetermined' in terms of the Germiston Town Planning Scheme. The site is mostly vacant. However the community of Thulasizwe is located on a small portion of the site. The community practices subsistence agricultural over portions of the site especially the flood plain area.

Impact Assessment for the Development Phases

- **Construction**

During the first phase, township services will be installed. This is a normal process of any

development and the surrounding area will not be significantly impacted on, as the construction activities will take place on the site itself. There may be an increase in the number of construction vehicles in the area. The second phase will comprise of the construction of top structures, railway terminal and roads. An increase in the number of construction vehicles, people and construction material will be experienced during this phase.

The proposed development phase is likely to be of local extent, short duration, medium intensity and definite occurrence.

- **Operational**

The land use during this phase will be as follow:

Proposed Land Use	Area Hectare
Industrial/Warehousing	114.1479
Intermodal yard	32.0171
Logistics	176.4498
Non Developable land	14.4376
Roads	59
Trucking Intermodal yard	42.8174
Wetland Area/Open Space	111.1059
Servitude Power Line	28.0157
Servitude Rail	47.5307
TOTAL	**626.669**

The proposed development will be spread out over the entire site except the wetland area and 200m buffer zone. The development will take place in two stages and will be phase 1 of a larger development concept that once fully developed will constitute 1000ha in extent. In light of the above it can be concluded that:

The operational phase is likely to be of local extent, long duration, low intensity and definite occurrence.

Table 19: Impact Summary Matrix for Land Use

Nature	**Proposed Land Use**		**Status**	**Medium**
Impact source(s)	Site Specific			
Affected stakeholders	Site Specific			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**Medium**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Options:

- The construction activities should be controlled and managed through an EMP;
- Each subsequent land use, developed within the township, must be monitored, and controlled through a site development plan, and the conditions of establishment formulated during the township establishment process.

9.1.10 Land Use - Alternative

No alternative density proposals were investigated. The Council is willing to support the proposed development. Different Architectural designs will be investigated by the developer and submitted to the Council for approval.

9.1.11 Mining Area

Status Quo Conditions

No mining activities are currently taking place on the site.

9.1.12 Open Space

Status Quo Conditions

The specialist reports concluded that the wetland area system can be regarded as highly sensitive in terms of connectivity. Furthermore the report indicated that the buffer of 200m for the near threatened plant species should be sufficient for the conservation of the wetland system and sensitive vegetation. Development of the sensitive *Eragostis* grassland area is

allowed as a portion of land toward the southern side of the site is being conserved to ensure connectivity and conservation of the species identified.

The report concluded that there is a need for conservation planning and actions which address the larger wetland area.

Impact Assessment for the Development Phases

- **Construction**

All construction activities will be confined to the proposed development footprint. The open space area will not be impacted on as the portion to be used for development will be fenced off.

The proposed development phase is likely to be of limited extent, short duration, low intensity, and improbable occurrence.

- **Operational**

The proposed township development will not intrude in to the sensitive areas as it will be fenced off.

The proposed operational phase is likely to be of limited extent, long duration, low intensity and improbable occurrence.

Table 20: Impact Summary Matrix for Open Space

Nature	**Open Space Area**		**Status**	**Low**
Impact source(s)	Wetland area and buffer zone			
Affected stakeholders	Site and surrounding open space areas			
Magnitude	*Extent*	**Limited**		
	Intensity	**Low**		
	Duration	**Permanent**		
	Probability	**Improbable**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Options:

The following mitigation measures were proposed by Galago Environmental Cc:

- *"Invasive vegetation to be eradicated.*
- *The wetland and buffer zone area to be managed through an appropriate management authority (e.g. the body corporate) that must be contractually bound to implement the Environmental Management Plan (EMP) and Record of Decision (ROD) during the operational phase of the development should be identified and informed of their responsibilities in terms of the EMP and ROD.*
- *The open space system should be managed in accordance with an EMP that complies with the Minimum Requirements for Ecological Management Plans and forms part of the EMP.*
- *The open space system should be fenced off prior to construction commencing (including site clearing and pegging). All construction-related impacts (including service roads, temporary housing, temporary ablution, disturbance of natural habitat, storing of equipment/building materials/vehicles or any other activity) should be excluded from the open space system. Access of vehicles to the open space system should be prevented and access of people should be controlled, both during the construction and operational phases. Movement of indigenous fauna should however be allowed (i.e. no solid walls, e.g. through the erection of palisade fencing)"* (Galago Environmental, 2012:70.

9.1.13 Public Response

Status Quo Conditions

No Negative responses were received for the Scoping phase of the EIA process.

Impact Assessment for the Development Phases

- **Construction**

Construction activities are likely to generate an increased amount of public response and issues. The public should be kept informed of progress and activities that may affect them.

The impact is likely to be of limited extent, short duration, low intensity and probable occurrence.

- **Operational**

During this phase all the concerns and issues should have been addressed and the public response should be minimal.

The potential impact on the air quality is likely to be of local extent, long duration, low intensity and probable occurrence.

Table 21: Impact Summary Matrix for Public Response

Nature	**Surrounding community and stake holders**		**Status**	**Medium**
Impact source(s)	All interested and affected parties			
Affected stakeholders	Regional			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**Medium**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Options:

- Establish a communication link between the developer and I& AP's, and
- Respond to public issues fast and effectively.

9.1.14 Social Issues

Status Quo Conditions

The SEIA done by Blue IQ indicated that the Thulasizwe community was established before 1965 for the farm labourers that worked on nearby farms. The number of households found within this informal settlement is 97 (2011). There are however, reports that there are other people that have settled within Thulasizwe, but who do not hold South African identification documentation or any country identification and are considered illegal immigrants. There are approximately 10-15 families with this profile. The social specialist team were told that the unidentified residents are not very approachable. The Thulasizwe community is situated at the junction of the Magagula Heights road (D817) and the road to Katlehong (Rivett-Carnett), across the road from the old farmhouse.

The community have been consulted by the Applicant (Inframax) on a number of occasions, also in the company of the local Ward Councillor. The study indicated that the community seems happy to move off the area as they have been informed that they will be shifted across the road (between the Katlehong road (Rivett-Carnett), Magagula Heights road (D817), and the railway line), and provided with proper housing units with water and electricity. This arrangement is proposed by the Applicant (Inframax).

Impact Assessment for the Development Phases

- **Pre – Construction**

The report by Bue IQ indicated that compensation should be provided in cases of economic displacement stemming from the clearance of land. This should be done before construction begins and will be once-off. Furthermore disclosure regarding the development must emphasize that only the Thulasizwe community has been deemed the affected community, no other resettlement or land claims will be entertained. A full asset inventory (part of the Resettlement Action Plan) of the Thulasizwe community must be undertaken prior to the announcement of the project, thus avoiding opportunistic settler claims (Blue IQ, 2011:88)

The impact of the proposed development on the social issues is likely to be of local extent, short duration, high intensity and definite occurrence.

- **Operational**

The proposed township and the development of various land use activities on the site will contribute to job creation within the area, and attract investment to the area. Local communities will benefit directly from the proposed developments, resulting in social upliftment, and skills development.

The proposed township will combat the development of illegal land uses. In addition the propose development will contribute to the rehabilitation of the natural environment. This will be achieved through the introduction of indigenous vegetation, which will improve the visual quality of the land. The result will be a specific sense of place that will be to the advantage of the surrounding environment.

The impact of the proposed development during this phase is likely to be of local extent, long duration, medium intensity and probable occurrence.

Table 22: Impact Summary Matrix for Social Issues

Nature	**Surrounding community and stake holders**		**Status**	**Medium**
Impact source(s)	Thulasizwe Community			
Affected stakeholders	Local and Regional			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium**		

Prevention, Mitigation, and Management Options

A Land Acquisition and Compensation Plan (LACP) will be developed to structure and manage compensation and economic displacement (loss of cultivated lands). This will identify cases of legitimate entitlement. A Compensation Committee with extensive knowledge and understanding of the claimant's background, and what constitutes fair and equitable compensation, will be put together as the decision-making body for compensation issues. All compensation issues will need to be addressed before the construction phase.

Local government should be involved in the implementation of the LACP, through a carefully structured Compensation Committee. Key roles will be; participation in agreeing fair compensation, and in the identification and securing of replacement land. Interaction around issues of compensation will be implemented via the LACP. By the end of pre-construction, it is expected that there will be no outstanding land and compensation issues to address. There will no longer be a need for the Compensation Committee by the Operations phase.

9.1.15 Traffic and Infrastructure

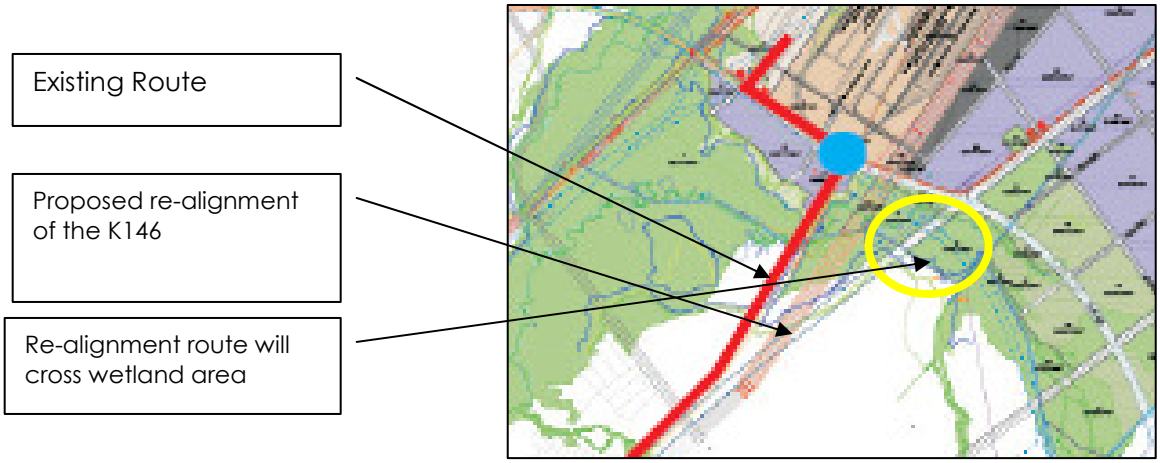
Status Quo Conditions

The PWV13/15, K146 and D817 are affected by the development. The PWV13 will need to be realigned to accommodate planned truck and intermodal yard on the northern boundary of the development along the existing alignment and K146 is also affected by the wetland areas on the south of the development.

Impact Assessment for the Development Phases

- **Construction**

The most significant impact during the construction phase will be the re-alignment of the K146:



The proposed development phase is likely to be of limited extent, short duration, high intensity and a definite occurrence.

- **Operational**

During the operational phase all roads will be constructed as per design specifications and mitigation measures will be implemented. Affected areas will be rehabilitated.

The proposed development phase is likely to be of limited extent, long duration, low intensity and definite occurrence.

Table 23: Impact Summary Matrix for Traffic and Infrastructure

Nature	**Surrounding community and stake holders**		**Status**	**High**
Impact source(s)	Existing roads and proposed re-alignment of the K146			
Affected stakeholders	Local and Regional			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Definite**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium**		

Prevention, Mitigation, and Management Options

- Building of the proposed access roads to be to the satisfaction of the Council;
- All internal roads to be developed according to the site development plan to the satisfaction of the Council;
- All the necessary WULA applications to be submitted to DWAF for the proposed re-alignment of the K146 where it traverses the wetland area.

9.1.16 Surface Water

Status Quo Conditions

The site in its present state with the existing activities on it, does not impact on the drainage and natural water regime. No formal stormwater system is present in the area.

Impact Assessment of the Development Phases

- **Construction**

During the development of the township, pollution of the surface water resources as a result of erosion by rainwater could occur. This will require that stormwater runoff from the construction site is adequately controlled in such ways that impacts like siltation, erosion, and sedimentation do not occur.

The proposed development phase is likely to be of limited extent, short duration, high intensity and probable occurrence.

- **Operational**

Once the proposed township is operation, there will be an increase in run-off from buildings and paved surfaces. Preventative measures should be put into place to prevent soil erosion and no water to enter the wetland area uncontrolled.

The proposed operational phase is likely to be of limited extent, long duration, low intensity and a improbable occurrence.

Table 24: Impact Summary Matrix for Surface Water

Nature	**Surface Water**	**Status**	**High**
Impact source(s)	Existing flow towards the low point of the site and the wetland area		

Affected stakeholders	Limited	
Magnitude	*Extent*	**Limited**
	Intensity	**High**
	Duration	**Permanent**
	Probability	**Highly probable**
Significance	*Without mitigation*	**High**
	With mitigation	**Medium**

Prevention, Mitigation, and Management Options:

- The careful position of soil piles, and runoff control, during all phases of development, and planting of some vegetative cover after completion (indigenous groundcover, grasses etc.) will limit the extent of erosion occurring on the site.
- Sufficient measures must be implemented to prevent the possible contamination of surrounding surface water and groundwater.
- Provision of adequate toilet facilities must be implemented to prevent the possible contamination of surface and ground (borehole) water close to the construction area.
- Heavy construction machinery must be regularly serviced and checked for oil and fuel leaks.
- The timing of clearing activities is of vital importance. Clearing activities and earth scraping should preferably be restricted to the dry season in order to prevent erosion and siltation. The dry months are also the period when the majority of species are either dormant or finished with their breeding activities.
- Preventative measures should be put into place in order to prevent excessive stormwater run-off from the developed areas from entering the external roads.
- All mitigation measures proposed in the Wetland report and Fauna and Flora reports to be implemented.

9.1.17 Topography

The proposed development will not impact on the topography of the area. The water flow patterns will be maintained and no major alterations will be made to the current ground levels.

9.1.18 Visual Impacts

Status Quo Conditions

The visual character of the area is that of a rural landscape. The existing open space area

dominates the landscape. The existing vacant land forms a focal point along the R550 and the D817.

Taking the above into account, potentially negative impacts can still be expected in terms of the aesthetic quality of the surrounding area as a result of the proposed development. The Visual Impact Assessment has confirmed this. However, the impact of the development will be positive in the light of the proposed quality of the development as well as the proposed landscaping programme.

The visual impact of the proposed development is likely to be of limited extent, long duration, low intensity and definite occurrence.

Table 25: Impact Summary matrix for Potential Visual Impacts

Nature	**Surrounding community**		**Status**	**High**
Impact source(s)	All surrounding landowners			
Affected stakeholders	Regional			
Magnitude	*Extent*	**Regional**		
	Intensity	**High**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium**		

Prevention, Mitigation and Management Options

- The specific foundation design criteria recommended in the geotechnical report should be adhere to.
- Construction site to be clearly demarcated and secured;
- No individuals to be allowed on construction site without the permission of the project manager;
- All waste material to be collected on a daily basis and stored within designated containers;
- Area where equipment would be stored to be fenced off and secured;
- An adequate number of toilets shall be supplied and maintained for the use of the Contractor's personnel. The Contractor shall at all times during construction provide

adequate sanitary facilities on site so that all employees are within easy reach of sanitary facilities.

- Regular inspections shall be carried out to ensure toilets are kept in a hygienic state. Toilet paper shall be supplied to all toilets. Staff shall be advised to the fact that they should use these toilets at all times.
- Cement mixing shall only be done at specific areas allocated by the ECO. Cleaning of cement mixing and handling equipment shall only be done using proper cleaning trays. All empty bags shall be removed from the site for appropriate disposal at an approved waste disposal site. Any spillage, which may occur, will be investigated and immediate action shall be taken.

9.1.19 Waste Management

Status Quo Conditions

The waste generated by the proposed project, will be removed as part of the municipal service in the area.

Impact Assessment for the Development Phases

- **Construction**

Construction activities are likely to generate wastes. All wastes should be removed to an approved waste disposal site.

The impact is likely to be of local extent, short duration, low intensity and highly probable occurrence

- **Operational**

Waste during this phase will be removed as part of the municipal services.

The potential impact on the air quality is likely to be of limited extent, long duration, low intensity and highly probable occurrence

Table 26: Impact Summary Matrix for Waste Generation

Nature	**Waste Generation**		**Status**	**Medium**
Impact source(s)	Waste generated during construction and operational phase			
Affected stakeholders	Limited			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**Medium**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Options:

- Provide litter traps where the stormwater enter the municipal system, and
- Incorporate a waste management plan to remove litter from the site.

9.1.20 Cumulative Impacts

Status Quo Conditions

Cumulative impacts refer to the combined interaction of impacts that on their own may not be significant, but when these impacts occur together, then their impact is manifested. Impacts could interact together to contribute a more significant impact.

The anticipated impacts resulting from construction and implementation of this development could potentially result in cumulative negative effects by also considering the following:

- Surface water pollution;
- Increased runoff;
- Ground water pollution;
- Traffic Impact;

The cumulative long-term impact of the project on the surrounding environment is considered to be medium to low, when the mitigation measures and the EMP are applied properly.

Currently the cumulative impacts mentioned above are relevant to the existing developments located adjacent to the site. It must be noted that landscaping and re-vegetation as well as the establishment of urban gardens will help to reduce the velocity of stormwater runoff and

increase the infiltration of water. Surface water pollution will be contained as the area has comprehensive stormwater infrastructure systems to which the site will connect.

Table 27: Impact Summary Matrix for Cumulative Impacts

Nature	**Surrounding community and open space areas**		**Status**	**Medium**
Impact source(s)	Surrounding community and open space areas			
Affected stakeholders	Regional			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**Medium**		
	With mitigation	**Low**		

9.1.21 Residual Impacts

Residual impacts are those impacts that will remain notwithstanding the implementation of mitigation measures. Potential residual impacts are those associated with the following:

- Loss of natural vegetation cover;
- Light pollution;
- Increased surface runoff;
- Increased illumination;
- Increase in traffic volumes.

10 ENVIRONMENTAL IMPACT STATEMENT AND CONCLUSIONS

The purpose of this report is to provide the relevant authority with sufficient information on the potential impacts of the proposed development, to make an informed decision. Potential impacts were identified in consultation with specialists and through the technical expertise and experience of W & L Consultants. The report sought to ascertain the impact of the proposed development on the environment, which included the social environment, and the probability of impacts occurring.

The construction and operational phase of the proposed development can pose various significant risks to the environment. The issues related to the development were identified, discussed and assessed in terms of various criteria such as extent, duration, intensity and significance. Mitigation measures were listed during all phases of the project and the possible alternatives were reviewed and assessed. In addition an Environmental Management Plan (EMP) is included that outlines all mitigation measures to be implemented during the construction phase of the development (**Annexure F**).

10.1 KEY ISSUES

Risks and Key issues were identified and addressed in consultation with Interested and Affected Parties, through an internal process based on similar developments, an environmental impact assessment and a site visit. The following key issues were identified:

- Contamination of ground and surface water;
- Increased surface water runoff;
- Impacts on air quality;
- Increased erosion;
- Floral destruction;
- Faunal displacement and destruction;
- Visual intrusion;
- Traffic Impacts;
- Increased ambient noise levels;
- Crime, Safety & Security risks;
- Noise pollution and
- Social and Economic issues

Each issue was assessed and mitigatory measures proposed to such an extent that impacts were minimised or negated.

10.2 IMPACT EVALUATION

Each issued identified was evaluated in terms of the most important parameters applicable to environmental management. These include the: *nature, extent, duration, intensity, probability* and *significance* of the potential impact on the environment.

Potential Negative Impacts include:

- *Contamination of ground and surface water* may result due to the deposition of contaminants during the construction phase and the possibility of sewage leaks during the operational phase. Mitigation measures proposed reduce the significance to "low".
- *Increased surface water runoff* and *erosion* as a result of vegetation clearance and the disturbance of soil during the construction phase. The implementation of mitigation measures reduces the significance rating to "low".
- *Impacts on air quality* are related to a direct increase in vehicular activity in the area. Due to the proposed activities the significance rating is "medium to low".
- *Floral destruction and Faunal displacement and destruction*. Biodiversity is considered to be medium - low. The implementation of mitigation measures reduces the significance rating to "medium".
- *Visual intrusion & Aesthetic impacts* as a result of construction activities, would impact most on the adjacent areas. The implementation of mitigation measures reduces the significance rating to "medium" during the construction phase. The significance rating for the operational phase is viewed as "low" with the implementation of all design criteria,
- *Noise impact* from construction vehicles and construction activities. Mitigation measures including a restriction of the times within which construction activities may take place will reduce the significance to "low".
- *Traffic impacts* as a result of construction vehicles accessing the site. This impact will have a "medium" significance due to, firstly, the increase in the number of vehicles due to the delivering of construction material to the site and secondly, the expected increase in of traffic on the road network during the operational phase.

- *Social impacts* resulting from the relocation of the community currently found on the site is considered to be "high" during the pre-construction phase and "low" during the operational phase.

Potential Positive Impacts include:

- *The site is a sensitive ecological area*. However if not developed, the site would remain derelict and would be subject to illegal land use practices such as dumping of solid waste, subsistence agricultural farming and uncontrolled storm water practices. Therefore the proposed development would ensure that the sensitive wetland area is protected and rehabilitated.
- *The proposed development is inline with the Regional Spatial Development Framework* formulated for the Region.
- *As a result of the resource constraints facing Municipalities*, it has been recognised that development driven by the private sector can help support and secure isolated areas such as the site for conservation and sustainable economic development.
- *Job provision* to the local and regional communities and contractors as a result of the construction activities.
- *Upgrade and improve* the existing municipal infrastructure.
- *Investment* in an area isolated from economic development.
- *Contributing to the growth and development* of the construction Industry in Gauteng.
- *Property rates and taxes* - Based on current municipal property rates, it is estimated that R150 million could be generated in property rates and taxes to the Ekurhuleni Metropolitan Municipality emanating from the Tambo Springs Inland Port development. This results in a 5% increase on the current property rates and taxes income of the municipality.

11 CONCLUSION

It is recognised from the EIA process that an environmental investigation needs to consider feasible alternatives, including the No-Go option for any proposed development. Accordingly, it is submitted that the nature and extent of the potential environmental impacts associated with the proposed township development are generally medium in both extent and severity. The impacts that may have significance, are manageable, and in most cases, positive in nature and direction.

The cumulative impact of the issues presented could be reduced to acceptable levels by means of mitigation measures over and above those prescribed within the direct impact assessment. The mitigation and management measures outlined in this Environmental Impact Assessment Report with respect to potential impacts or issues should result in limited negative impacts on the natural environment.

It is further concluded that the potential environmental impacts recorded for the development proposal, could be managed in terms of an Environmental Management Plan, which should be an integral part of the construction contract. It is therefore submitted that the project may be authorised by the Department of Agriculture, Conservation and Environment, in terms of the conditions and requirements of this report and that the construction of the various activities, be managed in terms of an Environmental Management Plan (**Annexure F**).

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Environmental Assessment Practitioner:

As per the requirements of the National Environmental Management Act: NEMA, 1998 (Act No.107 of 1998), (NEMA) and the Environmental Impact Assessment Regulations, 2010 (Government Notice No's R544, 545 and 546 of 2010), the following information is pertinent with regards to the Environmental Assessment Practitioner (EAP) that has been appointed for the Scoping and Environmental assessments for the establishment of a residential township on the remaining extent of Portion 37 of the Farm Tamboekiesfontein 173 IR, Germiston, Gauteng.

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Qualifications and Relevant Expertise:

- M Sc Environmental Management (RAU)
- B Art. et Scientae (Town and Regional Planning) (PU for CHE)
- Registration as Member of IAIA – in process
- Relevant Expertise – see attached company profile

TABLE OF CONTENTS

E EXECUTIVE SUMMARY

E1 INTRODUCTION

Inframax Holdings (Pty) Ltd instructed W & L Consultants cc, independent consultants, to proceed with the appropriate Environmental Impact Assessment (EIA) Process for the proposed development of mixed income housing situated on the remaining extent of Portion 37 of the Farm Tamboekiesfontein, 173 IR, Germiston.

E2 GENRAL PROJECT DESCRIPTION

The site is located within service delivery area of Germiston and falls under the jurisdiction of the Ekurhuleni Metropolitan Municipality. The site is zoned 'Undetermined' and it is the intension of the applicant to develop an inland port on the site. The site is located within the jurisdiction of Ekurhuleni Metropolitan Municipality, Germiston Service Center. More specifically the site is located west of the N3, directly east and adjacent to Magagula Heights. The residential area of Zonkizizwe is located north west of the site with Katlehong South directly north of the site. The proposed township will consist of, (1) the upgrading of the engineering infrastructure to accommodate the proposed development, (2) The development will comprise of erven zoned "Special" to accommodate the following land uses (a) manufacturing, warehousing, distribution, business and retail, an intermodal yard, which will include a rail siding, storage facilities, bonded logistics and other such uses associated with an inland port, logistics hub and rail terminal. More specifically the land composition will be as follow:

Proposed Land Use	Area Hectare
Industrial/Warehousing	114.1479
Intermodal yard	32.0171
Logistics	176.4498
Non Developable land	14.4376
Roads	59
Trucking Intermodal yard	42.8174
Wetland Area/Open Space	111.1059
Servitude Power Line	28.0157
Servitude Rail	47.5307
TOTAL	**626.669**

The development will take place over a period of 8 years will be in extent of ±627.485ha for the Inframax Landholding site. The proposed development forms part of a master plan for the larger area where the Inframax Landholding site is seen as phase 1 of the larger development. The land distribution across the total developable area is as follow:

Landholding	Gross Area (ha)
Land A: Inframax Landholding *(Phase 1)*	627.485
Land B: Possible Expansion Area	420.732
Land C: Cemetery	154.250
Land D: Adv. Du Plessis Landholding	401.948
TOTALS	1 604.415

Phase 1 (Inframax Land Holding) will be developed in two stages:

- Stage 1: year 1 to year 5 - this stage will include the development of the truck and Intermodal yard and expected TEU's for container terminal, i.e. 1, 000,000TEU's and the expected pallets, i.e. 4, 500,000 pallets. The estimated development size is 406,754.10m²
- Stage 2: year 6 – year 8 – this stage will consist of the Development of industrial / warehousing. The estimated development size is 737,879.86m².

The total development is planned on a 1000 hectare site and projected on a 15 year timeframe (to completion). This report only assessed the activities to be developed on the Inframax Land Holding that constitutes phase 1 of the total development.

The proposed activities and infrastructure will be developed and constructed in terms of the land use controls formulated specifically for the project. The sensitive nature of portions of the site was taken into consideration from the inception of the project and the layout plan takes into account the sensitive areas identified within the various ecological studies undertaken.

E3 KEY ISSUES

Risks and Key issues were identified and addressed in consultation with Interested and Affected Parties, through an internal process based on similar developments, an environmental impact assessment and a site visit. The following key issues were identified:

- Contamination of ground and surface water;
- Increased surface water runoff;
- Impacts on air quality;
- Increased erosion;
- Floral destruction;
- Faunal displacement and destruction;
- Impact on the sensitive wetland system;
- Economic and Social Impact on existing communities located on a portion of the site and within the larger area;
- Impact on sites of Heritage Value
- Visual intrusion;
- Increase in Traffic Volume;
- Increase in ambient noise levels;
- Crime, Safety & Security risks; and
- Noise pollution

Each issue was assessed and mitigatory measures proposed to such an extent that impacts were minimised or negated.

E4 IMPACT EVALUATION

Each issued identified was evaluated in terms of the most important parameters applicable to environmental management. These include the: *nature, extent, duration, intensity, probability* and *significance* of the potential impact on the environment.

Potential Negative Impacts include:

- *Contamination of ground and surface water* may result due to the deposition of contaminants during the construction phase and the possibility of sewerage leaks, diesel/oil spills during the operational phase. Mitigation measures proposed reduce the significance to "low".
- *Increased surface water runoff* and *erosion* as a result of vegetation clearance and the disturbance of soil during the construction phase. The implementation of mitigation measures reduces the significance rating to "medium to low".

  However potential increase in surface runoff during operation phase due to the lack of vegetation and the presence of hard open spaces is considered to be "high". The implementation of mitigation measures reduces the significance rating to "medium".

- *Impacts on air quality* are related to a direct increase in vehicular and rail activity in the area. The significance rating is "medium".
- *Floral destruction and Faunal displacement and destruction*. Specialist studies conducted indicated that:

  A large section of the site is sensitive. It is recommended that the wetland and its 200m buffer for red listed avifauna, the red listed plant and its 200m buffer as well as a large portion of the natural grassland must be conserved in an open space system. The area to be conserved is depicted in the overall sensitivity map above that includes sensitive areas for African Grass owls, African Marsh Harriers, Harlequin snakes, wetland reliant mammals and the red listed plant species.

  Conclusion: When the layout plan is overlain with the environmental sensitivity map, it is clear that most of the wetland and surrounding buffer areas were excluded from the proposed development. The grassland area to be conserved is however small, but should be seen together with the open space areas on the layout map for the neighbouring site to the east. Therefore the significance rating is "medium".

- *Visual intrusion & Aesthetic impacts* as a result of construction activities, would impact mostly on the adjacent residential areas and agricultural holdings. The implementation of mitigation measures reduces the significance rating to "low" during the construction phase. During the operational phase the buildings will adhere to all design criteria and

therefore the significance rating for the operational phase is viewed as "low".

- *Noise impact* from construction vehicles and construction activities. Mitigation measures including a restriction of the times within which construction activities may take place will reduce the significance to "low".
- *Traffic impacts* as a result of construction vehicles accessing the site. This impact will have a "medium" significance due to, firstly, the increase in the number of vehicles due to the delivering of construction material to the site and secondly, the expected increase in of traffic on the road network during the operational phase.
- *Noise pollution* the expected rise in the ambient noise levels are minimal and will not have a significant impact on noise levels within the area.
- *Three Sites of Heritage Value* was identified namely: Two old cemeteries, which are rated as having high significance on a local level and an old farmstead, which is rated as having high significance on a regional level. Mitigation measures proposed: (1) The graves of the Vermeulen Family (Cemetery nr 1) should be relocated to a formal cemetery due to the level of neglect and disturbance found during the survey. (2) The large informal cemetery (Cemetery nr 3) should be retained as it is still used or the graves could be relocated with permission from SAHRA. (3) The old farm stead should be mapped and formally documented by a Heritage Architect. Permission for demolish to be obtained from SHARA. The significance rating for cemetery nr 1 and the farmstead for the construction phase is viewed as "high" as it falls within the area to be developed during stage 1 of the development phase. The significance rating for cemetery nr 2 is "medium" as it is located within the area to be developed during stage 2 of the development phase. The significance rating for the heritage features during the operation phase is "low" – issues will be resolved and the necessary mitigatory measures would have been implemented.
- *Social Impact study* indicated that the anticipated negative impacts during pre-construction relate to the possible movement of work-seekers into the area and the physical and economic displacement of the Thulasizwe community. The significance rating for the pre-construction phase is "high".

Negative impacts identified during the construction phase are mainly (1) health and safety issues (road, pedestrian safety and the potential increase in HIV/AIDs and STDs); (2) community

disruption (as a result of work seekers in migrating from other parts of the country) and (3) the existing community's perception of having non-local workers in the area. The significance rating for the construction phase is "medium" and mitigation measures will be proposed and implemented.

Potential Positive Impacts include:

- *Vacant land poses a threat to safety and security within the area*. The proposed development will contribute to the prevention of crime and ensure a more safe and secure neighbourhood.
- *The proposed development is inline with the Regional Spatial Development Framework* formulated for the Region. The site is located within the provincial and local urban development boundary.
- *As a result of the resource constraints facing Municipalities*, it has been recognised that development driven by the private sector can help support and secure isolated areas such as the site for conservation and sustainable economic development.
- *Job provision* – the economic feasibility study indicated that the construction phases create ± 81 000 jobs (still to be verified) and against the three million formal jobs in Gauteng, 5 400 jobs secured per annum amounts to 0.18% jobs retained/secured. However, over a 15 year period, this would amount to a total of 2.7% jobs retained/secured against the Gauteng employment base within the first year of the Inland Port's operation.
- *The projected increase in Gauteng's GGP* is estimated to be 6.4% as an indication of the actual quantity of the economic value added over the period.
- *Impact on the Construction Industry* – the R 7.5billion investment over a period of 15 years will contribute to a 2% increase in out put of this sector and is viewed as extremely positive.
- *Property rates and taxes* - Based on current municipal property rates, it is estimated that R150 million could be generated in property rates and taxes to the Ekurhuleni Metropolitan Municipality emanating from the Tambo Springs Inland Port development. This results in a 5% increase on the current property rates and taxes income of the municipality and is rated as significantly positive;
- *Upgrade and improve* the existing municipal infrastructure and ensure effective stormwater management within an area that is lacking in services.
- According to reports written by the Centre for Scientific and Industrial

Research (CSIR) this development will enhance SA‟s logistics competitiveness significantly.

E5 CONCLUSIONS

The "No-Go" scenario is not regarded as an option as the site will be further disturbed and, if left in its current state, the environmental quality of the site will deteriorate.

The opinion is held that the proposed township establishment and resulting planned development of the site, should be viewed as the mechanism that will ensure the quality of the surrounding natural environment is upgraded and protected. The challenge for the developer is therefore to achieve an acceptable balance between appropriate, environmentally responsible development and financial return.

The conclusion and recommendations of this environmental impact assessment study is therefore made in terms of the existing status quo of the site as well as the perceived uses allocated to the site through the township establishment application. The potential environmental impacts associated with the proposed development, are summarised in Table 11 through the Table 27 in terms of extent, duration, intensity, probability, significance and status. Mitigatory measures have been identified, and discussed per potential impact identified.

In summary it is clear that there are potential impacts associated with the proposed development. Taking into account the current state of the natural environment, and mitigation methods proposed, it is concluded that the potential impacts associated with the proposed development can be mitigated successfully.

It can therefore be concluded that (a) the proposed development will have potential impact on the environment and all potential impacts can be mitigated to an acceptable level, (b) from a socio-economic point of view the proposed development will be economically viable and sustainable, (c) the proposed land uses will stimulate much needed job creation and investment in an area currently isolated from the major sectors of employment. The development option is therefore considered to be the most suitable option for the site and (d) it adheres to the policy of infill development and the creation of a small compact urban form.

Table E1: Summary of Construction Impact Ranking

Impact Indicator	Spatial Scale	Duration	Intensity	Cumulative Effects	Probability of Occurrence	Significance without Mitigation	Significance with Mitigation
Air Quality	Local	Short term	High	Medium to high	Definite	Medium	Low
Stormwater	Local	Short term	High	Medium	Definite	Medium	Low
Traffic	Local	Short term	High	High	Definite	Medium	Medium
Socio Economic	National	Short term	High	Medium - Low	Definite	High	High
Ecological	Local	Short term	High	High	Definite	Medium	Medium - Low
Wetland System	Local	None	Low	None	Probable	High	Medium

Shaded impacts require mitigation

Table E2: Summary of Operational Impact Ranking

Impact Indicator	Spatial Scale	Duration	Intensity	Cumulative Effects	Probability of Occurrence	Significance without Mitigation	Significance with Mitigation
Air Quality	Local	Long term	High	Medium to high	Definite	Low	Low
Stormwater	Local	Long term	High	Medium	Definite	Medium	Medium
Traffic	Local	Long term	High	High	Definite	Medium	Medium
Socio Economic	National	Long term	High	Medium - Low	Definite	Medium	Low
Ecological	Local	Long Term	Medium	Medium	Definite	Low	Low
Wetland System	Local	None	Low	None	Improbable	Medium	Low

Shaded impacts require mitigation

TABLE OF CONTENTS

1 INTRODUCTION 6
1.1 Introduction 6
1.2 Overall Approach 8
1.3 Terms of Reference 9
1.4 Study Approach 10
1.5 Purpose of the Environmental Impact Assessment Report 10
1.6 Assumptions & Limitations 11
2 PROJECT DESCRIPTION 12
2.1 Location of Site 12
2.1.1 Regional Setting 12
2.1.2 Local Setting 13
2.2 Property Particulars 14
2.2.1 Description 14
2.2.2 Registered Owner 14
2.3 Activity to be Undertaken 14
2.3.1 Description of Phase of proposed Development 15
2.3.2 Town Planning 16
2.3.3 Estimated Time Frames for Construction 17
3 PUBLIC PARTICIPATION PROCESS 19
3.1 Description of Public Participation Process 19
3.2 Interested and Affected Parties 20
3.3 Conclusions 25
4 BIOPHYSICAL DESCRIPTION OF THE SITE 26
4.1 Physical Features and Characteristics 26
4.1.1 Regional Climate 26
4.1.2 Rainfall 26
4.1.3 Temperature 27
4.1.4 Wind 27
4.2 Natural Ecosystems and Habitats 27
4.2.1 Topography 27
4.2.2 Geology and Soils 27
4.2.3 Surface Water 29
4.2.4 Groundwater and Water Table 30
4.2.5 Air Quality 30
4.2.6 Noise 30
4.2.7 Conservation Areas 30
5 BIOLOGICAL FEATURES AND CHARACTERISTICS 32
5.1 Flora & Fauna 32

5.2 Wetland Delineation and Aquatic Assessment 39
5.5 Cultural Features & Characteristics 41
6 SOCIO-ECONOMIC FEATURES AND CHARACTERISTICS 43
6.1 Town Planning Assessment 43
6.2 Socio-Economic Impact Analysis 49
6.3 Engineering Services 52
6.4 Sense of Place 59
6.5 Traffic & Accessibility 61
6.6 Sensitivity Analyses 62
6.7 Visual Environment 64
6.7.1 Visibility 644
6.7.2 Design 66
6.8 The Advantages of the Proposed Development 66
6.9 Sustainability 68
6.10 Agricultural Potential 68
7 CONSIDERATION OF PROJECT ALTERNATIVES 69
7.1 Localtional Alternatives 69
7.2 Temporal Alternatives 69
7.3 Construction Alternatives 70
7.4 Layout Alternative 70
7.5 No-Go Option 70
8 ENVIRONMENTAL IMPACT ASSESSMENT 73
8.1 Cumulative Effects 73
8.2 Assessment Criteria for Impacts Identified 73
8.2.1 Nature 73
8.2.2 Extent 74
8.2.3 Duration 74
8.2.4 Intensity 74
8.2.5 Probability 75
8.2.6 Significance 75
9 ASSESSMENT OF POTENTIAL IMPACTS ON THE ENVIRONMENT 76
9.1 Environmental Impact Assessment 77
9.1.1 Air Quality 77
9.1.2 Heritage Assessment 78
9.1.3 Ecological Systems 80
9.1.4 Faunal Abundance & Diversity 82
9.1.5 Floral Abundance & Diversity 86
9.1.6 Wetland Delineation & Aquatic Assessment 89

9.1.7 Geology 93
9.1.8 Ground Water 94
9.1.9 Land Use 95
9.1.10 Land Use Alternative 97
9.1.11 Mining Area 97
9.1.12 Open Space 97
9.1.13 Public Response 99
9.1.14 Social Issues 100
9.1.15 Traffic & Infrastructure 102
9.1.16 Surface Water 104
9.1.17 Topography 105
9.1.18 Visual Imapcts 105
9.1.19 Waste Management 107
9.1.20 Cumulative Impacts 108
9.1.21 Residual Impacts 109

10 ENVIRONMENTAL IMPACT STATEMENT 110

11 CONCLUSION 113

LIST OF TABLES

Table 1:	List of Professional Team Members
Table 2:	Proposed Activities
Table 3:	Total Area of Proposed Development
Table 4:	Interested and Affected Parties Identified
Table 5:	Climate of the Germiston
Table 6:	Specialists used
Table 7:	Expected Terminal Capacity
Table 8:	Visual Impact Assessment
Table 9:	Comparative Assessment: No-Go Option and Environmental Costs
Table 10:	List of Environmental Impacts with possible relevance to the Project
Table 11:	Impact Summary Matrix for Air Quality
Table 12:	Impact Summary Matrix for Heritage Assessment
Table 13:	Impact Summary Matrix for Ecological Systems
Table 14:	Impact Summary Matrix for Fauna
Table 15:	Impact Summary Matrix for Flora
Table 16:	Impact Summary Matrix for Wetland Delineation & Aquatic Assessment
Table 17:	Impact Summary Matrix for Geological Conditions
Table 18:	Impact Summary Matrix for Ground Water
Table 19:	Impact Summary Matrix for Land Use

Table 20:	Impact Summary Matrix for Open Space
Table 21:	Impact Summary Matrix for Public Response
Table 22:	Impact Summary Matrix for Social Issues
Table 23:	Impact Summary Matrix for Traffic and Infrastructure
Table 24:	Impact Summary Matrix for Surface Water
Table 25:	Impact Summary Matrix for Potential Visual Impact
Table 26:	Impact Summary Matrix for Waste Generation
Table 27:	Impact Summary Matrix for Cumulative Impacts
LIST OF ANNEXURES	
Annexure A:	MAPS Locality Map Aerial Photographs
Annexure B:	Correspondence with GDARD
Annexure C:	Specialist Report - Geotechnical Report Specialist Report - Engineering Services Report Specialist Report - Fauna & Flora Wetland Delineation & Aquatic Assessment Specialist Report - Heritage Assessment Specialist Report - Socio-Economic Impact Analysis Specialist Report - Traffic Impact Study
Annexure D:	Public Participation
Annexure E:	Correspondence received from Government Departments & Stakeholders
Annexure F:	Township Layout Plan
Annexure G:	EMP

1 INTRODUCTION

1.1 Introduction

Inframax Strategic Properties (Pty) Ltd appointed W & L Consultants cc to obtain authorisation in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) as per Regulation 21(3) of Environmental Impact Assessment Regulations, 2010. The proposed activity is situated on the remaining extent of Portion 37 of the Farm Tamboekiesfontein 173 IR, Germiston, Ekurhuleni Metropolitan Municipality, hereafter referred to as the site. The site is zoned 'Undetermined' and it is the intension of the applicant to develop an inland port on the site.

More specifically the project is a freight transport and logistics focused development including:

- An intermodal yard with rail access;
- A value added logistics park as an economic development zone forming part of a sea, air, road, rail logistics gateway, with a focus on accommodating businesses involved in the transportation, processing, manufacture, warehousing and distribution functions;
- An ancillary business park accommodating a commercial development component; and
- The development of a retail support component for the above.

The aim of the proposed Logistics Hub and Inland Port is to increase freight handling efficiency and to create an international competitive environment. To achieve this, a requirement is that the most advanced telecommunications backup is available, including high speed broadband and sophisticated IT systems; and supporting bulk infrastructure including water, electricity, roads, rail, etc.

The site is located within a sensitive environment and various environmental, social and heritage constraints were identified. It is therefore the intension of the applicant to proactively plan for the utilisation of the site ensuring the protection of the various sensitive systems and the effective utilisation of the site.

The site is located within the Germiston service delivery area of Ekurhuleni Metropolitan Municipality.

The proposed development will take place in the form of a township establishment application. The establishment of a township will allow the zoning of the site to change from 'Undetermined'

to accommodate the following activities on the site:

Proposed Land Use	Area Hectare
Industrial/Warehousing	114.1479
Intermodal yard	32.0171
Logistics	176.4498
Non Developable land	14.4376
Roads	59
Trucking Intermodal yard	42.8174
Wetland Area/Open Space	111.1059
Servitude Power Line	28.0157
Servitude Rail	47.5307
TOTAL	**626.669**

Wary of the sensitivities associated with these types of developments it is the intension to support the overall conservation aims of Gauteng Department of Agriculture and Rural Development (GDARD) and the local authority, whilst strengthening the economic value of the area.

W & L Consultants was appointed to undertake an Environmental Impact Assessment Study for the proposed Tambo Springs Inland Port development. The environmental assessment was done by means of an independent investigation of all the environmental issues associated with the project. The aim of the investigation was to identify and evaluate the opportunities that the natural environment offers to the development and the constraints that it imposes. The Environmental Impact Assessment Process is seen as a structured proactive process that strengthens the role of the environmental issues in strategic decision-making, and recognises the need to integrate environmental considerations into the early stages of the planning process.

The EIA procedure followed to date is in terms of the provisions of the Environmental Impact Assessment (EIA) process as per the National Environmental Management Act: NEMA, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations of 2010 (Government Notice No's R544, 545 and 546 of 2010), governed by the Gauteng Department of Agriculture and Rural Development (GDARD). The process entailed the submission of a Scoping Report and a Plan of Study for Environmental Impact Assessment on 20 October 2011. The documents were reviewed by GDARD (**Annexure B**) and subsequently approved on 31 October

2011. The various issues identified in the Plan of Study for full Environmental Impact Assessment will be addressed in the Environmental Impact Assessment Report.

1.2 Overall approach

The overall approach included the use of a multi-disciplinary team of experts, including relevant specialists. The project team, including specialists comprised of the following:

Table 1: List of Professional Team Members

Name	Organisation	Area of Expertise
Liselle van Niekerk	W and L Consultants cc	Environmental Management
Leon Boshoff	Bigen Africa Engineering Solutions	Engineering Services
Alex van der Schyff	Aeterno Town Planning	Town Planning
Philemon Namane	Mpotseng Infrastructure	Traffic Impact Study & Electrical Report
Vanessa Marais	Galago Environmental	Fauna and Floral Specialists
A Koning & D Botha	Prism Environmental	Wetland Delineation, Classification, Aquatic Study & Impact Assessment
	Intraconsult Cc	Geotechnical Investigation
Kim Moonsamy	Blue IQ Investment Holdings	Socio Economic Impact Analysis
J van Schalkwyk		Heritage Survey

The project team focused on understanding the biophysical, social and economic environment and the values thereof.

Opportunities, constraints and values of the study area were included in the assessment. This was formulated into a vision or desired state of the environment that recognises appropriated development alternatives and control zones.

The abovementioned was used to guide the proposed development and to ensure a sustainable development that is economically viable and sensitive to the existing ecological landscape.

1.3 Terms of Reference

Gauteng Department of Agriculture and Rural Development (GDARD) requested that an Environmental Impact Assessment (EIA) for the proposed township be carried out. The Environmental Impact Assessment together with the public consultation will be undertaken in accordance with the following activities as listed within the EIA Regulations, 2 August 2010:

Indicate the number and date of the relevant Government Notice:	**Activity No (s) (in terms of the relevant notice): e.g. Listing notices 1, 2 or 3**	**Describe each listed activity as per the wording in the relevant listing notice:**
GNR 545, 18 June 2010	15	*"Physical alteration of undeveloped vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use, where the total area to be transformed is 20 hectares or more."*
GNR 544, 18 June 2010	9	*"The construction of facilities or infrastructure exceeding 1000m in length for the bulk transportation of water, sewer, or stormwater –* *(i) with an internal diameter of 0,36m or more, or* *(ii) with a peak throughput of 120 liters per second or more*
GNR 544, 18 June 2010	10	*The construction of facilities or infrastructure for the transmission and distribution of electricity –* *(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts, or* *(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more*
GNR 544, 18 June 2010	11	*The construction of:* *(i) canals;* *(ii) Channels;* *(iii) Dams;* *(iv) Weirs;* *(v) Bulk stormwater outlet structures* *Where such construction occurs within a watercourse or within 32 meters of a watercourse measured from the edge of the watercourse, excluding where such construction will occur behind the development setback line.*

Various factors play a role for the execution of the environmental investigation at this point in time. The terms of reference for this report are to:

1 Register the project with the relevant environmental authorities;
2 Follow the public participation process as set out in Chapter 6 of GNR 543 of 18 June 2010;
3 Compile a Scoping Report and Plan of study for Environmental Impact Assessment (EIA);
4 Conducting Specialist Studies deemed necessary/required;
5 Assessing the issues, impacts and alternatives and
6 Compiling a detailed EIA Report.

The EIA Report is to include a description of the environment as well as the possible issues

that may result from the proposed development. The following issues were addressed:

1 Ecological Impacts including flora, avifauna, mammals, and herpetofauna;
2 Sensitive Wetland area and Aquatic systems;
3 Socio - Economic Impacts;
4 Heritage features;
5 Service infrastructure and
6 Cumulative Impacts.

1.4 Study Approach

The EIA regulations stipulate that an Environmental Impact Assessment (EIA) should be undertaken as the first step in applying for authorisation to proceed with the proposed activity. The objectives of the EIA Report are to:

- Identify Interested and Affected Parties (I & AP's) and inform them of the proposed project;
- Identify any issues and concerns associated with the proposed project;
- Identify alternatives to the proposed project;
- Identify areas of likely impact and relevant environmental issues that will require specific environmental management procedures.
- Provide measures to mitigate the significant impact identified.

1.5 Purpose of the Environmental Impact Assessment Report

The purpose of the Environmental Impact Assessment Report is:

- To provide a detailed biophysical (fauna, flora, soils, geology, storm water, typography, etc.) assessment and ground truth of the site to identify opportunities and constraints for conservation management, spatial, social and economic development;
- Provide a detailed assessment of the context in which the site occurs (existing land uses, roads, and other service infrastructure);
- To consider the functional role of the site in terms of storm water management, ecology, and socially in relation to the City's RSDF strategies on densification, and economic development;
- To ensure that the environmentally sensitive areas are protected and areas for

development are identified;

- To present the results of the scoping phase of the EIA process to the Interested and Affected Parties (I & AP's). The Environmental Impact Assessment Report documents the main issues associated with the proposed development of that require attention, management, and mitigation;
- To allow I & AP's the opportunity of confirming that the concerns and suggestions raised have been adequately documented and addressed in the assessment of the potential environmental impacts.
- To evaluate the layout for the proposed development and
- To document the results of the EIA exercise and present it to GDARD so that they can consider the findings and authorise the project.

1.6 Assumptions and Limitations

1.6.1 Stage of Project

Adequate timing has been allowed for the EIA exercise. Particular note should however be made of the fact that the EIA Report was compiled during the conceptual stages of development. Site selection had already been established and the preferred site is the site evaluated. In addition the layout and design components were established in the conceptual phase and used during the EIA evaluation of the site and proposal.

1.6.2 Availability of Baseline Information

The majority of baseline information was readily available.

1.6.3 Time Constraints

Sufficient time was allowed for the EIA process.

2 PROJECT DESCRIPTION

2.1 Location of Site

2.1.1 Regional Setting

The project is located in Gauteng Province within the City of Germiston Metropolitan Municipality (**Annexure A - Locality Map**). The site is well positioned as it is located in the southern periphery of Johannesburg and within the Johannesburg/Durban road freight and rail corridor.

The site has access to the N3 freeway to Durban which is South Africa‟s major freight transport route, to the N1 to Cape Town, to Port Elizabeth and East London and via the R390, as well as to other freeways to the industrial centres in the Johannesburg and Ekurhuleni Municipalities.

An operational freight railway line, that crosses the N3 on the site, traverses the site. This railway line is capable of linking the main railway lines from Johannesburg to Durban and from Johannesburg to Cape Town, respectively.

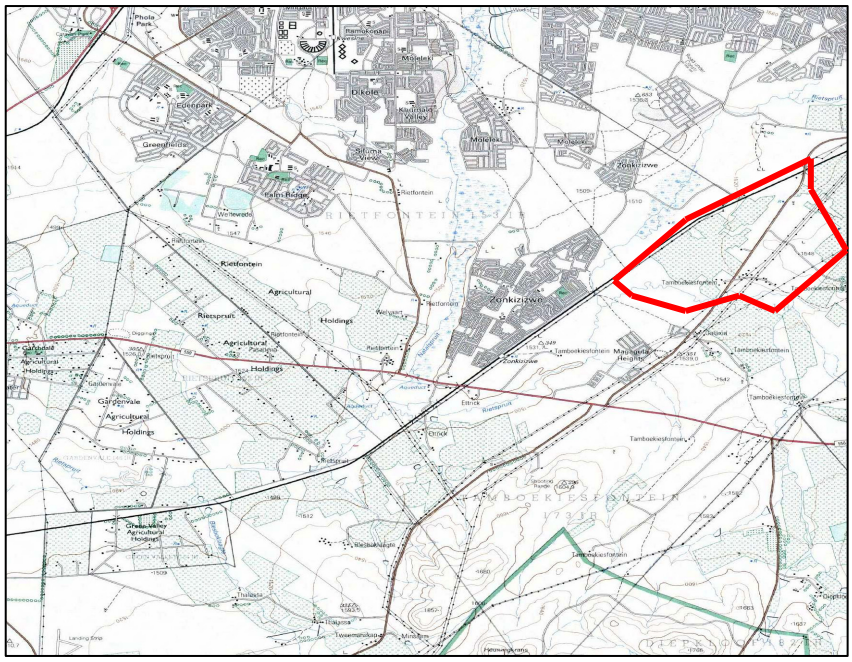


Figure 1: Topographical Map – Re/Ptn 37 Tamboekiesfontein, 173 IR (Thick Red Set)

In terms of road freight, the site is 22 kilometres (kms) from the City Deep Terminal in Johannesburg, and 25 km's from the OR Tambo Air Freight Terminal. The existing road linkages will allow the site to accommodate both full truck load long distance road freight and less than truck load regional distribution. The site has been identified within the spatial development frameworks the Ekurhuleni Metropolitan Municipality and the Municipality have accommodated the proposed development by re-aligning the urban edge to include the site within the urban edge.

2.1.2 Local Setting

The site is located west of the N3, directly east and adjacent to Magagula Heights. The residential area of Zonkizizwe is located north west of the site with Katlehong South directly north of the site. The area identified as the proposed development area for phase 1, namely the site, is largely uninhabited and a portion of the site is farmed. The Thulasizwe community has taken up residence on a portion of the site. They practice subsistence agriculture on a small scale. The site is zoned 'Undetermined'.

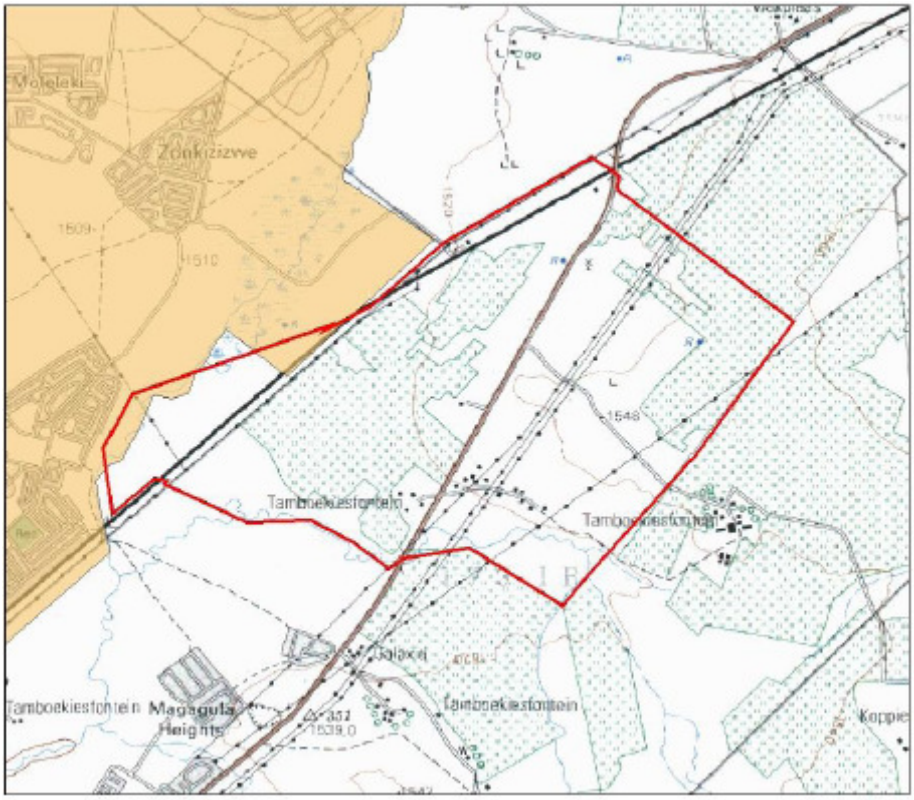


Figure 2: Topographical Map – Re/Ptn 37 Tamboekiesfontein, 173 IR (Thick Red Set)

2.2 Property Particulars

2.2.1 Description

The current property description is: the remaining extent of Portion 37 of the Farm Tamboekiesfontein, 173 IR, Germiston. A Mix Use Township will be established on the site in terms of Section 96 of the Town planning and townships Ordinance, 1986.

2.2.2 Registered Owner

The subject farm portion is registered in favour of:

Project applicant:	Inframax Strategic Properties (Pty) Ltd		
Trading name (if any):	Inframax Holdings(Pty) Ltd		
Contact person:	Mr Tumi Mohulatsi		
Physical address:	113 Mercy Avenue, Waterkloof Glen		
Postal address:	P.O Box 36708, Menlo Park		
Postal code:	0102	**Cell:**	082 826 4246
Telephone:	012 361 0906	**Fax:**	012 348 9808
E-mail:	tmohulatsi@inframax.co.za		

2.3 Activity to be Undertaken

A mix use development is proposed for the site. The site is currently zoned 'Undetermined'. The township establishment application will allow the rezoning of the site from 'Undetermined' to:

Table 2: Proposed Activities

Proposed Land Use	Area Hectare
Industrial/Warehousing	114.1479
Intermodal yard	32.0171
Logistics	176.4498
Non Developable land	14.4376
Roads	59
Trucking Intermodal yard	42.8174
Wetland Area/Open Space	111.1059
Servitude Power Line	28.0157
Servitude Rail	47.5307
TOTAL	**626.669**

The Applicant, Inframax Strategic Properties (Pty) Ltd sees this as the first phase of a 10 - 15 year project and plans to add at least a further 600ha to the identified site over time, which would enable the proposed project to be developed as a world class inland port and logistics facility.

2.3.1 Description of the Phases of the proposed Development

The development will take place over a period of 8 years will be in extent of ±627.485ha for the Inframax Landholding site. The proposed development forms part of a master plan for the larger area where the Inframax Landholding site is seen as phase 1 of the larger development. The land distribution across the total developable area is as follow:

Landholding	Gross Area (ha)
Land A: Inframax Landholding *(Phase 1)*	**627.485**
Land B: Possible Expansion Area	420.732
Land C: Cemetery	154.250
Land D: Adv. Du Plessis Landholding	401.948
TOTALS	**1 604.415**

Phase 1 (Inframax Land Holding) will be developed in two stages:

- Stage 1: year 1 to year 5 - this stage will include the development of the truck and Intermodal yard and expected TEU's for container terminal, i.e. 1, 000,000TEU's and the expected pallets, i.e. 4, 500,000 pallets. The estimated development size is 406,754.10m²
- Stage 2: year 6 – year 8 – this stage will consist of the Development of industrial / warehousing. The estimated development size is 737,879.86m².

The total development is planned on a 1000 hectare site and projected on a 15 year timeframe (to completion). This report only assessed the activities to be developed on the Inframax Land Holding that constitutes phase 1 of the total development. The specific development phases for phase 1 will be:

- **Pre-Construction:**

During the pre-construction phase, the environmental and town planning processes will be completed. The activities that will take place involve the legal and administrative activities

related to the Environmental Authorisation of the project. The establishment of the township and the registration of individual erven are subject to the granting of the Environmental Authorisation.

- **Construction**

The construction phase entails the development of the erven and the construction of the top structures and related infrastructure. Site clearance and the construction of the railway siding internal street and essential township services are but a few of the activities that can take place immediately. The buffer zones to protect the wetland area will be implemented and the area will be fenced off. The mitigation measures, EMP and landscape plan will be implemented and environmental monitoring will be crucial in this phase of the proposed development.

- **Operational**

During the operational phase the erven will be fully developed and functional. The wetland area will be fenced off. The mitigation measures that have been introduced and the stormwater management system and landscape plan will be monitored for effectiveness through an EMP.

2.3.2 Town Planning

The land is a farm portion and it will therefore be required to follow the township establishment route to create individual erven. The main aim of the criteria used in the town planning process will be to design a township that will accommodate various land uses proposed (**Annexure E - Layout Plan**).

Table 3: Total Area of the Proposed Development

Proposed Land Use	Area Hectare
Industrial/Warehousing	114.1479
Intermodal yard	32.0171
Logistics	176.4498
Non Developable land	14.4376
Roads	59
Trucking Intermodal yard	42.8174
Wetland Area/Open Space	111.1059
Servitude Power Line	28.0157
Servitude Rail	47.5307
TOTAL	**626.669**

The size of the property is 626.669ha in extent. The township application was submitted to the City of Germiston Metropolitan Municipality. The application is subject to the granting of the Environmental Authorisation.

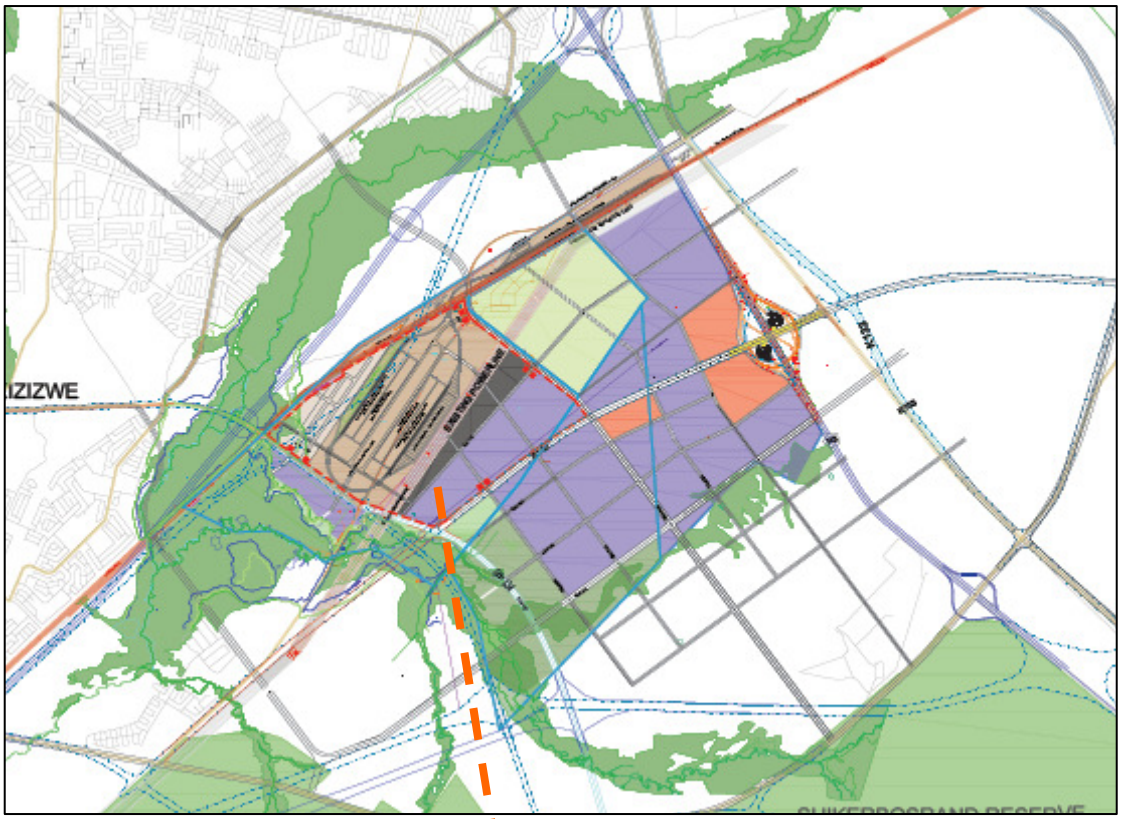


Figure 3: Tambo Springs Master Plan – The site in Thick Red Set (GAPP Architects, February 2012)

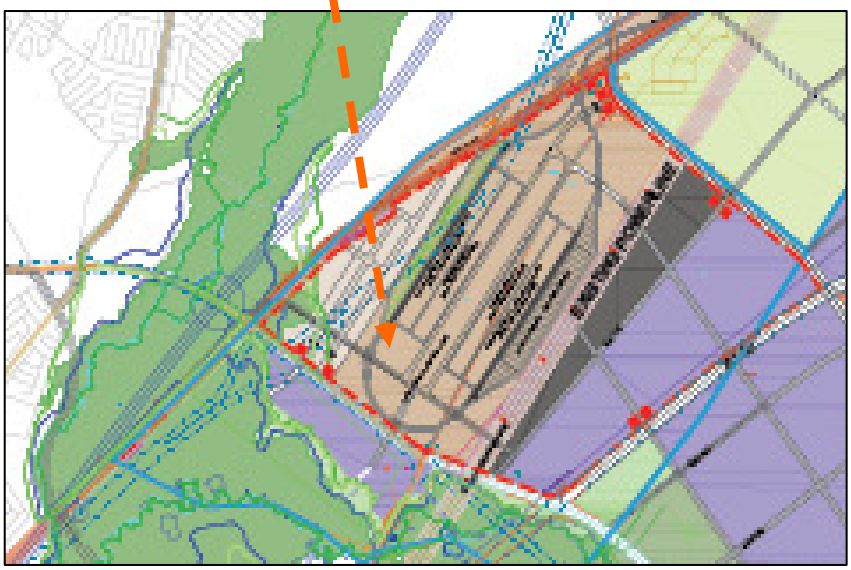


Figure 4: Phase 1(Inframax Land Holding) – The developable area in Thick Red Set. The site in Blue (GAPP Architects, February 2012)

2.3.3 Estimated Time Frames for Construction

As the township establishment process is subject to the Environmental Authorisation, the proclamation of the Township can only start once the environmental process has been finalised. Once completed the, township would be proclaimed. This process can take between six months and a year.

The development of the township is subject to the prevailing economic climate. The site will be developed in two stages and the development will take up to 8 years.

3 PUBLIC PARTICIPATION PROCESS

3.1 Description of Public Participation Process

Public Participation is a cornerstone of any Environmental Impact Assessment. The principles of NEMA (Act No. 107 of 1998) govern many aspects of environmental impact assessments, including public participation. These include provision of sufficient and transparent information on an ongoing basis to stakeholders to allow them to comment and ensuring the participation of previously disadvantaged people, women and youth.

Effective public involvement is an essential component of many decision-making structures, and effective community involvement is the only way in which the power given to communities can be used efficiently. The public participation process is designed to provide sufficient and accessible information to interested and affected parties (I & AP's) in an objective manner to assist them to:

- Raise issues of concern and suggestions for enhanced benefits;
- Verify that their issues have been captured;
- Verify that their issues have been considered by the technical investigations; and
- Comment on the findings of the EIA.

Potential I & AP's were informed of the project during the Scoping Phase as well as during the EIA Phase via the following media:

1 **Scoping Phase**: The project was made public via the following measures: Publication of media advertisements in the following media: Local and regional newspaper. Adverts were placed in The Star Newspaper on the 31 August 2011 and ran until 14 October 2011.

- Highly visible site notices advertising the EIA process were placed on site
- Registered letter were sent to all identified I & AP's on 31 August 2011. Included were: a Letter of Notification, a draft Scoping Document, a Locality Map and a Layout Plan.
- Emailing the draft Scoping Report and its Appendices to all registered IAP's.
- Submission of Scoping Report to various Government Departments and GDARD.
- Posting of Scoping Report to Interested and affected Parties.
- Submission of Scoping Report per hand to Interested and affected parties.

2 **EIA Phase:** Advertisements notifying the public of EIA process and requesting all I & AP's to register their comments, issues and concerns were placed in the Star Newspaper on 27 March 2012. All I & AP's were given until 4 May 2012 to respond.

- Highly visible site notices advertising the EIA process were placed on site
- Registered letter were sent to all identified I & AP's on 31 August 2011. Included were: a Letter of Notification.
- Emailing the draft EIA Report and its Appendices to all registered IAP's requesting the documents.
- Submission of the draft EIA Report to various Government Departments and GDARD.
- Posting of the draft EIA Report to Interested and affected Parties requesting the documents.
- Submission of the Draft EIA Report per hand to Interested and affected parties.

3.2 Interested and Affected Parties

Consultation with the relevant authorities and key interested parties at an early stage in identifying the broad range of issues and alternatives is essential. The following I & AP's were identified:

Table 4: I & AP's identified and informed of the proposed activity

Government Department		
Department/Organisation	**Contact Person**	**Postal Address**
Head of Department Department of Transport and Public Roads	Denis Emett	Private Bag X83 Marshalltown 2107
Department of Health	Dr Mohammed Bismilla	Private Bag X085, Marshalltown 2107
Rand Water: Corporate Environmental Officer	Mr Motloung	Private Bag X 015, Mondeor 2110
Department of Minerals and Energy	Mr JL Ndimande	Private Bag X 5 Braamfontein 2017
ESKOM	Corporate Environmental Officer	P.O Box 1091 Johannesburg 2000
DWAF	Ms B Ngoasheng	Private Bag X995 Germiston 0001
SAHRA	N January	P.O Box 87552 Houghton 2041
SASOL GAS	Shailendra Komal	P.O Box 1234, Randburg 2125

Council for GeoScience	Abraham Thomas	Private Bag X12 Germiston 0001
Municipality		
Director: Development Planning. Ehurhuleni Metropolitan Municipality	Cliff Patterson	P.O Box 145 Germiston 1400
Director: Roads & Transport. Ehurhuleni Metropolitan Municipality	Mr Gideon Beetge	Private Bag X 014 Benoni 1500
Director: Environmental Impact Management Section	Mrs Elsabeth van der Merwe	P.O Box 25 Edenvale 1610
Ekurhuleni Metro: Department of Housing	Mr D Morema	P.O Box 25263 Benoni North 1527
Ward Councillor: Ward 64	Thandile Cynthia Luthuli	079 959 1606

Adjacent Landowners	
1. **Ptn 36 Tamboekiesfontein 173 iR** **Emontic In (Pty) Ltd** CEO – Mr Karl Kebert P.O Box 448 Kliprivier 1871	**2.** **Ptn 36 Tamboekiesfontein 173 IR** **Starlite Aviation** Chairman – Mr Slade Thomas P.O Box 448 Kliprivier 1871
3. **Ptn 53 Tamboekiesfontein 173 IR** Eastern Services Council Andrias Hlongwane Andrias.hlongwane@ekurhuleni.gov.za	**4.** **Ptn 34 Tamboekiesfontein 173 IR** H Hoogenboezem & Seun (Pty) Ltd Roly Pelser rpelser@deloitte.co.za P.O Box 17604 Sunward Park 1470
5. **Advocate Du Plessis** Debbie@steinhoff.co.za P.O Box 122 Stellenbosch 7599	

Comments received from I&AP's on the Scoping Report & Plan of Study for EIA:

- **Transport and Development Facilitation, Gauteng (GAUTRANS):** indicated that the department will not participate in the EIA process however provincial roads are affected and a traffic impact assessment report must be submitted to GAUTRANS for approval.
- **Ekurhuleni Metro – Infrastructure Services: Regional Office - South** indicated that Roets Drive and Moagi road is affected and will have to be extended across the spruit.
- **Department of Mineral Resources (DMR):** there is interest in mining activities in the area

and the applicant needs to contact the relevant Company be fore any development may commence.

- **Department of Water Affairs (DWAF):** The Applicant must apply for all the relevant Water Usage Licenses and the relevant mitigation measure to protect the wetland must be implemented.

Response to Comments received on the Scoping Report & Plan of Study for EIA:

- **Transport and Development Facilitation, Gauteng (GAUTRANS):** A traffic Impact Study will be submitted to the the department as part of the Application.
- **Ekurhuleni Metro – Infrastructure Services: Regional Office – South:** The extension of Moagi Drive and Roets Road doe not form part of the proposed infrastructure development for phase 1 and is therefore no assessed in this application.
- **Department of Mineral Resources (DMR):** The matter will be addressed by the Applicant.
- **Department of Water Affairs (DWAF):** A site meeting was held with the official from DWAF on 22 February 2012. All issues were discussed with the official and the relevant WULA applications will be submitted to the Department by the Wetland Specialist.

Comments received from I&AP's on the EIA Report:

- **Emontic:** the Draft EIAR was submitted to Montic Dairy for comment. The CEO of Montic Dairy, Mr Karl Kebert, requested a meeting to discussion the contents of the document with specific reference to the roads affected by the proposed development and the affect thereof on Montic Dairy. A meeting between the Applicant and the Interested and affected Party was held on 23 April 2012. The attendance register is attached as proof (Annexure D). As confirmation of what was discussed in the meeting a letter was received from MM Town Planning Services on behalf of Montic Dairy. The following issues were identified:
    - Access to the site will be from D817. Montic Dairy operational activities should not be adversely affected during the construction phase of the whole development, as this road is used for distribution.
    - Any possible diversions should make use of reliable roads and detours around the N3 are not acceptable.
    - The K148 route dissects the property of Montic Dairy and the construction thereof will significantly impact on the property of Montic Dairy.
    - An acceptable road surface must be put in place before the proposed portion of the D817 is re-aligned.

- The proposed development should not at any time impact or affect the operations of Montic Dairy.

- **Ekurhuleni Environmental Resource Management:**
  - Potential impact on the Wetland Area: The wetland study submitted is accepted and the recommendations in the study should be adhered to.
  - Biodiversity and Open Space Strategy: The current open space function is that of a natural open space. The municipality is satisfied that the sensitive areas have been left out from the open space node.
  - Enhancement of Natural environment;
  - Sustainable Development Practices;
  - Potential reduction of CO^2 levels;
  - Protection of Ecosystems and biodiversity;
  - Pollution control measures; and
  - Impact on high potential agricultural land within the area;
- **Department of Water Affairs:** No activities to take place within the 1:100 year floodline or within 100m from water resources without Authorisation from the Department.
  - Appropriate measures to be taken to prevent spillages or environmental pollution.
  - No channelling or impediment of water flow shall be allowed within the wetland area;
  - Stormwater control measure to be put into place;
  - Erosion measures to be implemented;
  - Concerns from I & AP's to be considered;
  - DWA to be notified of pollution incidents.
- **GDARD:** confirmation from the Local Authority or relevant service provider that bulk services (e.g. water supply, sewerage and waste disposal, energy, storm water) and related services such as road infrastructure will be provided to the proposed development;
  - Inclusion of a Storm Water Management Plan;
  - Proof of Notification of all relevant I & AP's
  - Shape files and composite map.

Response to comments received on the EIA Report:

- **Emontic:** Response was submitted to MM Town Planning services on 9 May 2012 addressing all issues and concerns identified. The response was draft by W & L Consultants on behalf of the Applicant – Inframax. The response is as follow:

- The D817 is a public road and falls within the control of the Transport Department. As such, any closure, deviations or disruptions to the road and its traffic must be approved by the Transport Department. The Applicant as responsible developers will adhere to the recommendations of the Transport Department when implementing the proposed Tambo Springs Master Plan. The Transport Department must approve the diverted road before they allow the existing D817 to be closed. They will set the specifications and control the process.
- The K148 is a provincial road planned by the Gauteng Department of Roads and Transport and the issue regarding the impact of this road must be taken up with them. The Applicant (Inframax) was not involved in the design and planning of this road. Should this road be constructed it would be the responsibility of the Gauteng Department of Roads and Transport, and the entire process would be driven by the Gauteng Department of Roads and Transport.

It is therefore clear that it is not the intent of Inframax to disrupt the operations of Montic Dairy. The consultation that Inframax has initiated with Montic Dairy from the start of the process will continue during the implementation phase of the Tambo Springs Inland Port development to avoid disruptions to Montic Dairy's operations and to ensure that all parties benefit from development and investment within the area.

The letter is attached as proof of communication (Annexure E).

- **Ekurhuleni Environmental Resource Management:**
  - Enhancement of Natural environment: Sensitive areas identified are excluded from the development as indicated in the specialist studies. The natural flow of water will be maintained and monitored as per the wetland study. Water quality test have been done by the wetland specialist and was submitted to DWA as part of the WULA application. The water quality test include a dry month test (winter) and a wet season test (summer).
  - Sustainable Development Practices: The project will be developed in phases. Phase 1 included the development of the railway siding and upgrade of roads and installation of relevant services. Therefore sustainability and the potential of the implementation of sustainable development practices will be discussed and implemented during the following phases where the possibility of implementing green building practices could be investigated by the architects and urban designers.
  - Potential reduction of CO^2 levels: The aim of the project is to contribute to the reduction of road transport by establishing a world class inland pot and logistics hub. The switch from road transport to railway will contribute to the reduction of CO^2 levels

locally and regionally. Although it would be minimal at first, the contribution will increase as the various phases of the project is rolled out over the 10 year period.

- Protection of Ecosystems and biodiversity: All sensitive areas will be protected within the applicable bufferzones.
- Pollution control measures: The area where pollution could occur would be the inter modal yard. Developments within the yard would adhere to the relevant health and safety regulations.
- Impact on high potential agricultural land within the area: The site itself is not identified as high agricultural land and the proposed activities would be contained with the boundaries of the project site.

- **GDARD:** confirmation from the Local Authority or relevant service provider that bulk services (e.g. water supply, sewerage and waste disposal, energy, storm water) and related services such as road infrastructure will be provided to the proposed development: The Applicant will upgrade and install all relevant engineering services as required for the project. The engineering services report is attached in Annexure C.
    - Inclusion of a Storm Water Management Plan: Stormwater Management Plan is attached in Annexure C;
    - Proof of Notification of all relevant I & AP's: Proof of notification is attached in Annexure D. Correspondence received from all I & AP's is attached in Annexure E;
    - Shape files and composite map: Shape files are on the accompanying CD and the composite map is attached in Annexure F.

3.3 CONCLUSIONS

- Site notices were placed on the site for all to see.
- Interested and Affected parties were notified during the scoping phase as well as during the EIA phase and as a result comments were received from Stakeholders, surrounding land owners as well as Government Departments. Their letters are included for perusal in **Annexure E**.
- All issues and concerns identified were addressed.

4 BIOPHYSICAL DESCRIPTION OF THE SITE

4.1 Physical Features and Characteristics

4.1.1 Regional Climate

Table 5: Climate of Germiston

CLIMATE OF SOUTH AFRICA WB 42 CLIMATE STATISTICS 1961 - 1990

Number: 0476399 0 Name: **JAN SMUTS - WO ϕ = 26° 8' S λ = 28° 14' E HT: 1694 m Period: 1961-1990

AIR TEMPERATURE IN DEGREES CELSIUS

	AVERAGE OF DAILY				MAXIMUM (TX) P = 29 Years									MINIMUM (TN) P = 29 Years												
	MAX	MIN	MEAN	RANGE	HIGHEST (TXX)			AVERAGE NUMBER OF DAYS WITH TX					LOWEST (TXN)			HIGHEST (TNX)			AVERAGE NUMBER OF DAYS WITH TN					LOWEST (TNN)			
	$\overline{TX}$	$\overline{TN}$	$(\overline{TX}+\overline{TN})/2$	$\overline{TX}-\overline{TN}$	MAX	YY/DD	MEAN	>=35	>=30	>=25	>=20	>=15	<10	MEAN	MIN	YY/DD	MAX	YY/DD	MEAN	>=20	<15	<10	<5	<0	<-5	MEAN	MIN	YY/DD	
J	25,6	14,7	20,1	11,0	35,4	73/19	30,2	0,0	2,1	18,6	29,9	30,9	0,0	19,3	13,8	80/08	20,3	83/29	18,1	0,1	16,7	0,5	0,0	0,0	0,0	11,0	7,2	77/02	J
F	25,1	14,1	19,6	10,9	33,5	83/25	29,1	0,0	0,9	15,0	26,7	28,2	0,0	19,4	14,8	88/10	20,4	87/20	17,4	0,0	17,7	0,8	0,0	0,0	0,0	10,3	6,0	90/24	F
M	24,0	13,1	18,6	10,9	31,9	73/15	28,0	0,0	0,3	12,8	28,3	30,8	0,0	17,5	12,7	75/18	21,2	84/02	16,9	0,0	25,2	2,3	0,0	0,0	0,0	8,5	2,1	74/19	M
A	21,1	10,3	15,7	10,8	29,3	87/02	25,5	0,0	0,0	3,0	20,5	28,9	0,0	14,6	7,4	72/30	19,0	87/07	14,7	0,0	29,0	12,5	0,9	0,0	0,0	4,7	0,5	65/26	A
M	18,9	7,2	13,1	11,6	26,4	83/01	23,0	0,0	0,0	0,3	11,5	28,7	0,1	13,0	9,1	69/21	17,5	79/01	12,3	0,0	30,8	25,6	6,7	0,3	0,0	1,6	-2,5	73/31	M
J	16,0	4,1	10,1	12,0	23,1	88/04	20,4	0,0	0,0	0,0	1,8	21,0	1,1	9,5	1,5	64/20	12,6	79/06	9,3	0,0	30,0	29,6	17,0	3,0	0,0	-1,9	-8,2	79/13	J
J	16,7	4,1	10,4	12,5	24,4	88/17	21,1	0,0	0,0	0,0	2,6	24,1	0,7	10,4	6,7	89/18	12,0	78/29	8,8	0,0	31,0	30,7	18,5	2,3	0,0	-1,9	-5,1	90/14	J
A	19,4	6,2	12,8	13,1	26,2	86/27	24,4	0,0	0,0	0,8	14,6	28,1	0,3	11,8	6,9	83/08	14,8	78/12	12,0	0,0	31,0	27,4	9,7	1,6	0,0	-0,6	-5,0	72/02	A
S	22,8	9,3	16,1	13,5	31,1	83/29	28,4	0,0	0,1	10,6	23,5	28,6	0,3	13,4	6,1	74/05	18,0	78/28	15,2	0,0	29,0	15,5	3,4	0,5	0,0	1,8	-3,3	89/08	S
O	23,8	11,2	17,5	12,6	32,2	65/31	29,4	0,0	1,1	13,3	26,1	30,0	0,1	14,5	9,3	73/16	20,3	61/24	16,6	0,0	27,5	9,2	1,4	0,0	0,0	4,7	0,2	65/20	O
N	24,2	12,7	18,4	11,5	32,9	90/14	29,5	0,0	0,9	13,3	26,7	29,3	0,1	15,9	7,6	68/11	20,7	81/06	17,1	0,1	24,7	3,3	0,2	0,0	0,0	7,3	1,5	76/26	N
D	25,2	13,9	19,6	11,3	32,4	84/29	29,8	0,0	0,0	17,7	29,3	30,9	0,0	18,1	12,6	75/16	20,3	82/23	17,6	0,1	21,2	1,0	0,1	0,0	0,0	9,6	3,5	70/07	D
YR	21,9	10,1	16,0	11,8	35,4	73/19	31,4	0	6	105	242	340	3	7,7	1,5	64/20	21,2	84/02	19,1	0	314	158	58	8	0	-3,0	-8,2	79/13	YR

PRECIPITATION (and FOG). DRY- AND WETBULB TEMPERATURES. RELATIVE HUMIDITY and CLOUD COVER

	PRECIPITATION (R mm) P = 29 Years													P = 26 Years				TEMPERATURE (° C)						REL. HUM. (%)					CLOUD			
	MONTH	24 HOUR MAX		TOTAL PER MONTH / YEAR				AVERAGE NO. OF DAYS WITH R (mm) >=						AVE NO. OF DAYS WITH				DRY BULB P = 29 Years			WET BULB P = 29 Years			P = 29 Years				IN EIGHTHS P = 29			
	$\overline{TOT}$	RXX	YY/DD	MAX	YEAR	MIN	YEAR	0,1 AVE	0,1 MAX	0,1 MIN	1	5	10	30	TH	HA	SN	FOG	$\overline{08}$	$\overline{14}$	$\overline{20}$	$\overline{08}$	$\overline{14}$	$\overline{20}$	$\overline{08}$	$\overline{14}$	$\overline{20}$	MAX	MIN	$\overline{08}$	$\overline{14}$	$\overline{20}$	
J	125	188	72/20	338	1972	56	1974	15,9	22	10	11,8	6,8	3,8	0,6	2,4	0,4	0,0	2,1	17,9	24,1	19,9	15,4	17,3	15,8	78	50	65	97	24	4,4	5,0	4,7	J
F	90	56	90/13	191	1976	13	1984	11,2	17	5	8,2	5,0	3,2	0,5	2,1	0,1	0,0	2,1	17,1	23,6	19,4	14,9	16,9	15,4	80	50	65	96	25	4,1	4,8	4,1	F
M	91	92	67/20	219	1987	16	1965	11,9	19	2	8,5	5,0	2,9	0,7	2,0	0,1	0,0	4,1	16,0	22,8	18,3	13,9	15,9	14,3	80	48	63	96	27	3,8	4,7	3,6	M
A	54	50	90/28	130	1971	4	1985	8,6	16	2	6,5	3,2	1,8	0,2	1,4	0,1	0,0	4,6	13,3	20,1	15,3	11,1	13,5	11,5	79	46	61	97	22	3,3	4,0	2,8	A
M	13	70	76/03	80	1976	0	1987	2,9	12	0	1,9	0,8	0,4	0,0	1,5	0,0	0,0	4,6	10,3	18,1	12,4	7,6	10,6	8,1	71	37	51	97	19	2,0	2,3	1,3	M
J	9	31	63/12	59	1963	0	1985	2,0	7	0	1,1	0,6	0,3	0,0	0,4	0,1	0,0	3,3	6,7	15,3	9,4	4,3	8,1	5,3	70	34	47	97	16	1,6	1,6	1,0	J
J	4	17	70/16	22	1985	0	1989	1,0	4	0	0,6	0,3	0,1	0,0	0,7	0,1	0,1	3,3	6,8	15,9	9,9	4,2	8,2	5,2	68	31	42	97	13	1,3	1,3	0,8	J
A	6	21	79/19	47	1979	0	1980	2,1	10	0	1,2	0,4	0,1	0,0	1,2	0,0	0,1	2,2	9,5	18,5	12,7	6,1	9,7	7,0	64	28	38	97	10	1,6	1,5	1,0	A
S	27	62	87/27	175	1987	0	1989	3,7	14	0	2,6	1,4	0,8	0,2	2,6	0,1	0,1	2,4	13,3	21,9	16,4	9,2	12,1	9,8	62	29	38	96	10	2,1	2,2	1,9	S
O	72	110	85/30	198	1964	12	1980	9,8	18	4	6,8	4,1	2,2	0,3	3,8	0,7	0,0	2,5	15,4	22,6	17,6	11,5	13,9	11,8	67	38	50	97	12	3,4	3,9	3,4	O
N	117	65	62/06	230	1962	39	1990	15,2	24	9	11,3	6,6	4,1	0,8	2,1	0,3	0,0	2,4	16,7	22,8	18,0	13,4	15,4	13,6	73	46	62	97	19	4,3	4,8	4,3	N
D	105	102	78/22	181	1986	38	1980	14,9	21	10	11,4	6,8	3,6	0,3	2,6	0,1	0,0	1,6	17,7	23,8	19,2	14,6	16,5	14,8	74	47	61	97	23	4,3	4,9	4,6	D
YR	713	188	72/20	1019	1987	443	1984	99	120	76	72	41	23	4	73	3	0	35	13,4	20,8	15,7	10,5	13,2	11,1	73	41	54	98	8	3,0	3,4	2,8	YR

Period = years covering the data for all the columns of both tables. P = Average number of years covering the data in the columns concerned. $\overline{TX}$ = Average maximum, $\overline{TN}$ = Average minimum air temperature
TXX = Highest maximum, MAX = highest in P years. TXN = Lowest maximum, MIN = lowest in P years. TNX = Highest minimum, MAX = highest in P years. TNN = Lowest minimum, MIN = lowest in P years.
$\overline{\ }$ = MEAN = AVE = AVERAGE e.g. $\overline{08}$, $\overline{14}$, $\overline{20}$ = MEANS of observations which were made on these hours (SAST). YY/DD = Year/Day of occurrence of the extreme in the previous column.
(Number of days (NOD) with TX >= 10) = (NOD in the month - NOD with TX < 10). TH = Thunder, HA = Hail, SN = Snow, FOG = fog. > signifies greater than, >= signifies greater than or equal to.
(Number of days (NOD) with TN < 20) = (NOD in the month - NOD with TN >= 20). < signifies less than, <= signifies less than or equal to.

4.1.2 Rainfall

Rain falls mostly between October and April, usually in the form of thundershowers. The area receives an average annual rainfall of 713 mm. On average approximately 99 rainy days occur per year. With the extensive surface areas of concrete and tar now present as a result of the urban development, the runoff into the streams often reach flood proportions after heavy downpours.

4.1.3 Temperature

Temperatures range between an average monthly high of 25.60C in January and an average minimum of 4.10C in June. Germiston has an enviable climate; warm to hot summers with fairly high rainfall, and cool to cold winters with little or no rain. Midwinter temperatures often drop below freezing and the regular frost may be severe. Cycles of prolonged drought are a natural phenomenon.

4.1.4 Wind

The dominant wind direction between November and February is a northwesterly wind. This pattern is directly associated with the Highveld storm system that build up during the day and bring rain typically in the afternoon. Moisture laden air is brought from the Northwest sector along the axis of the tropical temperate trough. As storms build up to the southwest a wind reversal occurs. The wind changes to a south westerly direction in line with the storm movement. Wind reversal occurs after the storms have passed and come from the northeast.

4.2 Natural Ecosystems and Habitats

4.2.1 Topography

The topography of this area is a function of the geology, the ground slopes from 1557m AMSL in the south eastern corner of the site to 1515m AMSL at the upper reaches of the floodplain of the spruit in the north western sector of the site.

4.2.2 Geology and Soils

Intraconsult conducted a geotechnical investigation for the site (**Annexure C - Geotechnical Report**). The work included field work, review of existing data, a gravity survey, borehole drilling, sampling, borehole logging, test pit profiling, analysis and a report. The result of this investigation is included in the report attached.

The site is located on chert-rich dolomite of the Malmani Subgroup, Chuniespoort Group of the Transvaal Super Group. Dolerite occurs in large areas of the site. Shallow dolomite bedrock conditions were confirmed in scattered locations. Furthermore the site is located in the Natalspruit West Dolomite Groundwater Sub-Compartment. The dolomite groundwater is anticipated between a depth of 32m and 5m within the bedrock.

Based on the geohydrological data and the geological information the dolomite stability of the site is classified in terms of the following Dolomite Hazard Zones:

Dolomite Hazard Zone 1:	An area characterised as reflecting a medium inherent suceptibility of medium to large size sinkhole and subsidence formation (with small sub-areas of low susceptibility of all size sinkhole and subidence formation and small sub-areas of high susceptibility for small size sinkhole and subsidence formation) with respect to ingress of water and a low susceptibility with respect to groundwater level drawdown. In the event of groundwater level drawdown the susceptibility of the subsurface profile remains unchanged from an ingress of water perspective. **Composite characterisation: Inherent Hazard Class 3/4(1)(5)1//1.**
Dolomite Hazard Zone 2:	Area characterised as reflecting a medium to high inherent susceptibility of medium (with sub-areas of high for small) size sinkhole and subsidence formation with respect to ingress of water and a low inherent susceptibility of all-size sinkhole and subsidence formation with respect to groundwater level drawdown. In the event of groundwater level drawdown the susceptibility of the subsurface profile remains unchanged from an ingress of water perspective**. Composite characterisation: Inherent Hazard Class 3/6(5)//1.**
Dolomite Hazard Zone 3:	Area characterised as reflecting a high inherent susceptibility of medium to large size sinkhole and subsidence formation with respect to ingress of water and a high inherent susceptibility of all-size sinkhole and subsidence formation with respect to groundwater level drawdown. In the event of groundwater level drawdown the susceptibility of the subsurface profile remains unchanged from an ingress of water perspective. **Composite characterisation: Inherent Hazard Class 6/7//7.**
Dolomite Hazard Zone 4:	Area characterised as reflecting a high inherent susceptibility of large to very large size sinkhole and subsidence formation with respect to ingress of water and a high inherent susceptibility of very large size sinkhole and subsidence formation with respect to groundwater level drawdown. In the event of groundwater level drawdown the susceptibility of the subsurface profile remains unchanged from an ingress of water perspective. **Composite characterisation: Inherent Hazard Class 7/8//8.**

(Intraconsult, Volume 1: October 2011)

Based on the above the site was classified as: ***H, C & S***. The Report concluded that:

Appropriate foundation design and water precautionary measures are provided together with recommendations aimed at the adoption of a pro-active water bearing services maintenance strategy. Particular emphasis is placed on the need to manage storm water falling onto, moving across and exiting the site. Storm water should be effectively and efficiently removed from the immediate area around structures, into the municipal storm water system.

Based on this detailed field work, the borehole and soil profiles and analyses of the laboratory soil test results, the site area has been further sub-divided into (preliminary) Soil Site Class Sub-Areas in terms of the Code of Practice composite Site Classes (H,C & S). Soil Maps are provided with our interpretation of the near surface conditions as an overlay to the dolomite stability zones. This composite drawing is intended to assist with the future planning and development of the site. Rationally designed foundation solutions will be required for all structures potentially to be developed in these dolomitic sub-areas.

(Intraconsult, Volume 1: October 2011)

The following map indicates the dolomite zones:

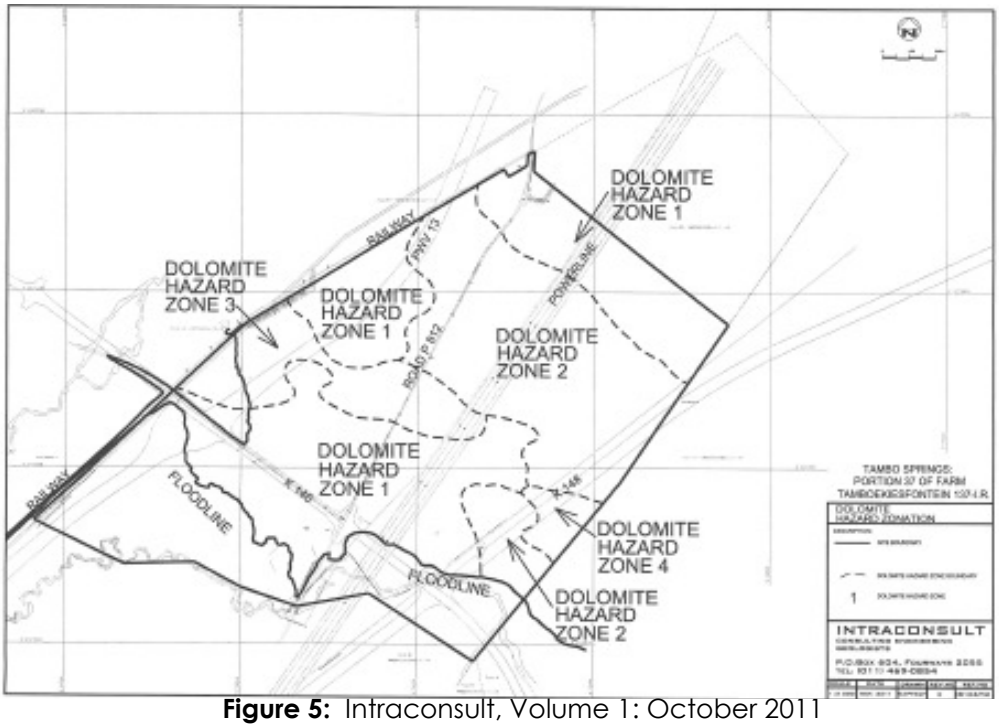


Figure 5: Intraconsult, Volume 1: October 2011

The geotechnical investigation is attached in **Annexure C** – **Geotechnical Report**.

4.2.3 Surface Water

Drainage takes place in a south westerly direction into a drainage valley that forms the western boundary of the site. The site is affected by a floodline and wetland.

4.2.4 Groundwater and Water Table

The ground slopes from 1557m AMSL in the south eastern corner of the site to 1515m AMSL at the upper reaches of the floodplain of the spruit in the north western sector of the site. The data indicated that the groundwater level can be expected at a depth of 22m in the south eastern corner to 5m and ground surface on the floodplain of the spruit. The spruit and aquifer appears to be hydraulically connected according to the geotechnical report.

A shallow or perched water table should be anticipated in sub-areas underlain by dolerite. Furthermore pedocrete materials and harder ferricrete have developed in the near surface soil horizons in sectors of the site indicating variable to poor internal drainage conditions.

4.2.5 Air Quality

No readily available data exist on air quality in the area. The air quality can be said to be typical of a peri-urban situation. The air quality is impacted upon by: veldt fires, vehicular emissions and the adjacent residential and commercial areas.

4.2.6 Noise

The proposed high-density residential development will most likely bring about additional vehicular traffic on the roads in the immediate vicinity of the development. The morning and afternoon peak period traffic volumes, in particular, will increase tangibly.

The proposed development should not have a negative impact on noise levels within the area.

4.2.7 Conservation Areas

According to the Ecological Assessment Mucina & Rutherford (2006) indicates that the site falls within Carltonville Dolomite Grassland and Eastern temperate freshwater wetlands. The authors described the Carltonville Dolomite Grassland as species-rich grassland with shallow soil and slightly undulating plains on dolomite dissected by prominent rocky chert ridges. This grassland falls within a warm-temparate summer-rainfall region with high summer temperatures and severe frequent winter frosts. This vegetation unit is considered vulnerable.

The site is in close proximity to the boundary of the Suikerbos Nature Reserve and the Platkoppie Landfill site.

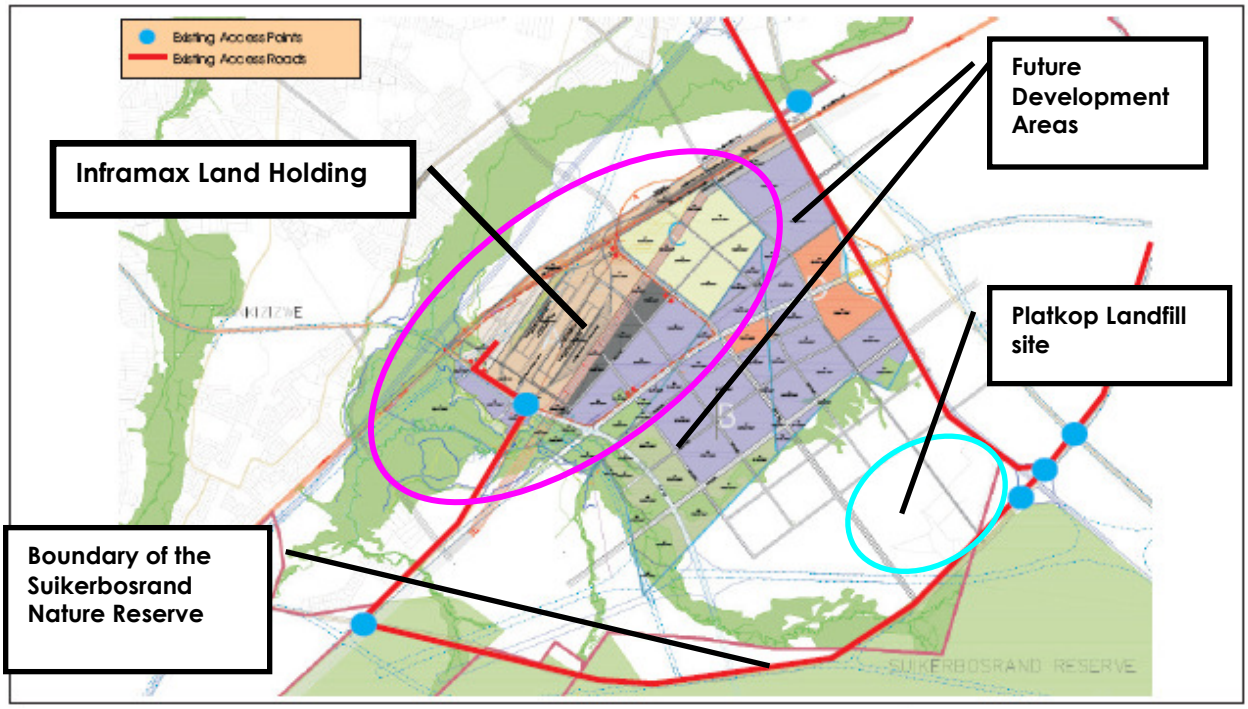


Figure 6: Location of Site in relation to Suikerbosrand Nature Reserve

5 BIOLOGICAL FEATURES AND CHARACTERISTICS

5.1 Fauna & Flora

Galago Environmental Consultants under took the following studies: Flora, Fauna, Mammals, and Herpetofauna (**Annexure C**).

- **Methodology:**
  - Information about the Red List and Orange List plant species that occur in the area was obtained from GDARD. The Guidelines issued by GDARD to specialists as well as various publications were consulted about the habitat preferences of the Red- and Orange List species concerned.
  - The SANBI list of plants recorded in the 2628AC quarter degree grid square was obtained and consulted to verify the record of occurrence of the plant species seen on the site.
  - A desktop study of the habitats of the Red List and Orange List species known to occur in the area was done before the site visit.
  - The study site was visited on 22 October 2011 and 8 November 2011.
  - One or more plots, depending on the size and composition of the vegetation, were selected at random from each study unit for detailed study. Each plot, which measured about 10m x 10m, was surveyed in a random crisscross fashion and the plant species recorded. Areas where the habitat was suitable for the Red List species known to occur in the quarter degree grid square were examined in detail.
  - Areas on the site and accessible areas on the neighbouring properties within 200 meters of the boundaries of the site where the habitat was suitable for the Red List species known to occur in the quarter degree grid were examined in detail. The site visits were done by the following specialists:

Table 6: Specialists used (Galago, Executive Summary, 2012:3):

This investigation was conducted by the following specialists:

Specialists	Aspect Investigated	Qualifications	Prof. Registration	Date of Field Survey
Rautenbach, I.L.	Mammalogy	Ph.D., T.H.E.D.	Pr. Nat. Sci.	22 October 2011
Van Wyk, J.C.P.	Herpetology	M.Sc. (Zoology)	Pr. Nat. Sci.	22 October 2011
Lemmer, P	Botany	B. Sc	Cert. Sci. Nat	8 November 2011
Geyser, R.	Avifauna		Pending	22 October 2011
Coetzer, L.A.	Botany review	D.Sc.	Pr. Nat. Sci.	
Kemp, A.C.	Avifauna review	Ph.D.	Pr. Nat. Sci.	
Marais, V.	Environmental Impacts and maps	BL Landscape Architecture		

The following represents a summary of their findings:

- **Flora:**

Four vegetation study units were identified on the study site:

- *Eragrostis – Elionurus* grassland;
- Wetland;
- Mixed alien and indigenous vegetation; and
- Cultivated fields.

The *Eragrostis – Elionurus* grassland and the Wetland were considered sensitive. One Red List species was found in the wetland opposite Zonkizizwe township. Two Orange List species were found in the *Eragrostis – Elionurus* grassland and one in the Wetland. Mitigation measures proposed: A 200 meter buffer must be maintained around the Red List species as any development within the recommended buffer zone might destroy the population of this species.

Suitable habitat for four of the Red List species existed in the wetland and for one species in the *Eragrostis – Elionurus* grassland within 200 meters of the boundary of the site. Mitigation measures proposed: A monitoring programme for the relevant Red List and Orange List species should be maintained for the study site and also for the areas within 200 meters of the boundaries of the site.

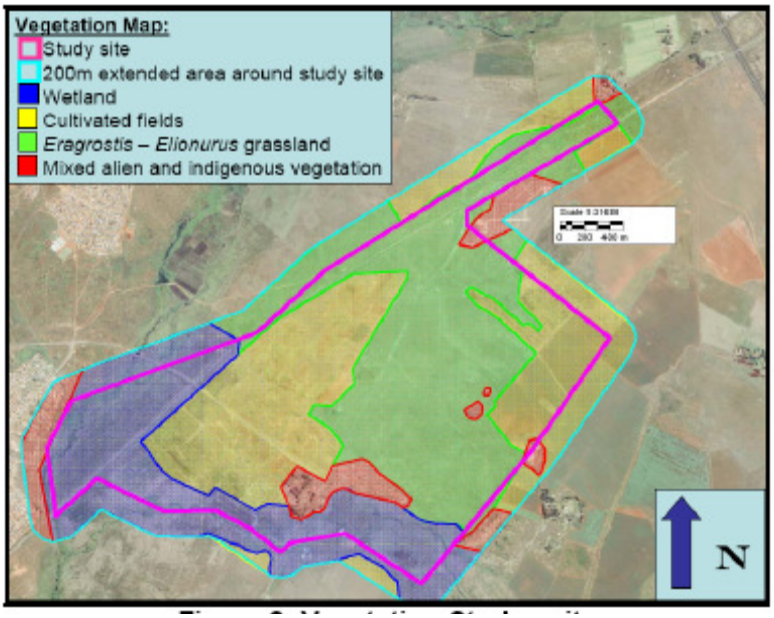


Figure 7: Vegetation Study units (Galago Environmental, November 2011:6)

- **Mammal:**

The mammal study found that the open perennial water sources on the site are too modest to allow for the permanent or even infrequent occurrence of spotted-necked or clawless otters.

The specialist concluded that otters may occasionally venture onto the site during exceptionally wet spells, but that is regarded as a rare event.

In terms of wetland vegetation the specialist found that the lush semi-aquatic vegetation along streams and marshy areas provide ideal habitat for the rough-haired golden mole, the listed shrews as well as the African marsh rat. This confirms the exclusions of the wetland area from any form of development or side-effects of the construction and operational phases of the development.

The investigation of the terrestrial portion of the site showed that the area is severely disturbed, either by ploughing or overgrazing. The proposed development will displace most of the terrestrial species recorded, but according to the report none of these can be regarded as rare or even sensitive. All species are common and widespread, and their loss will be of little conservation consequence at a national level.

The investigation concluded that with the exclusion of the wetland and the suitable buffer zone superimposed on appropriate management practices, the proposed development should not result in a loss of ecological sensitive and important habitat units, ecosystem function (e.g. reduction in water quality, soil pollution), loss of mammal habitat, nor of loss/displacement of threatened or protected species.

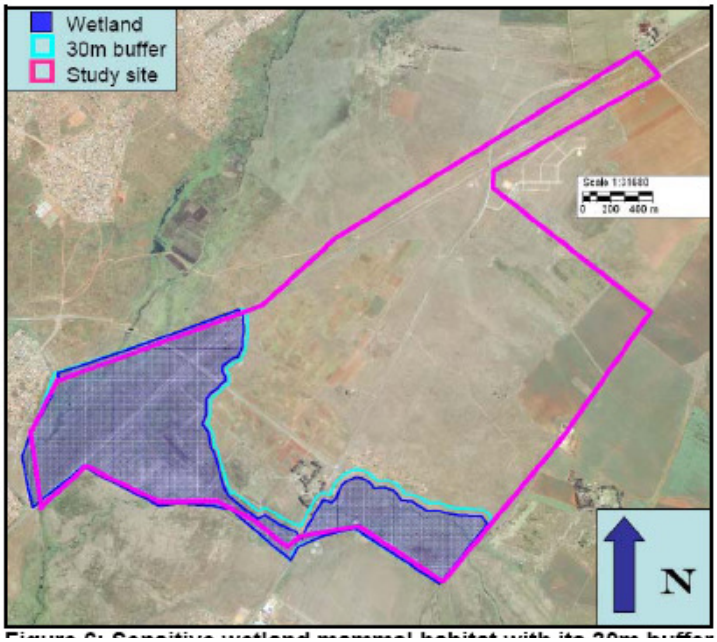


Figure 8: Sensitive wetland mammal habitat with its 30m buffer (Galago Environmental, November 2012:11)

- **Avifuana:**

The Avifuana study concluded that three Red Data avifaunal species (African Grass-Owl, Black-winged Pratincole and African Marsh-Harrier) are likely to make use of the wetland habitat on the study site and one Red Data avifaunal species (Lesser Kestrel) is likely to make use of the **open grassland habitat** on the study site.

The wetland habitat is therefore deemed highly sensitive for Avifaunal Red Data Species and other avifaunal species that occur or that are likely to occur within the wetland habitat system. They are depended of this habitat system for foraging, roosting and breeding purposes. This also includes a terrestrial buffer zone of 200 m from the wetland edge of the Rietspruit and its tributaries.

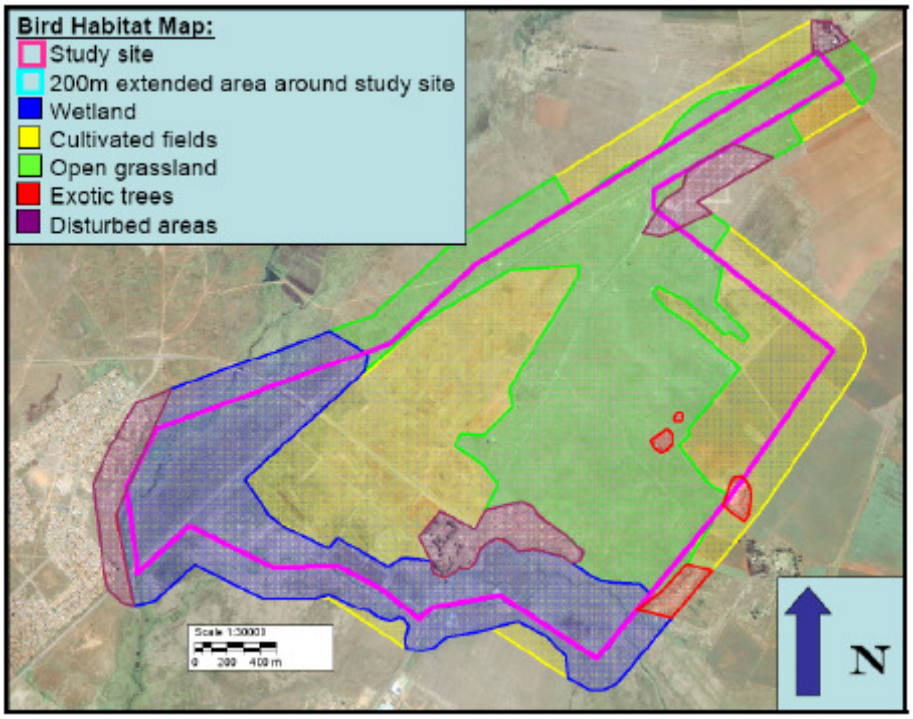


Figure 9: Bird habitat systems identified from the study site (Galago Environmental, November 2011:8)

The following mitigation measures are proposed: (1) No development should be allowed within the wetland habitat systems on the study site as well as within 200 m from the wetland on both sides of the wetland system and the entire length of the Rietspruit and its tributaries. This 200 m will act as a minimum terrestrial buffer for African Grass-Owls and African March Harriers. Secondly grazing by livestock should be limited within the wetland and adjacent grassland. This will allow the wetland to recover and become more favourable for Red Data avifaunal species. The following map shows the 200m buffer zone applicable:

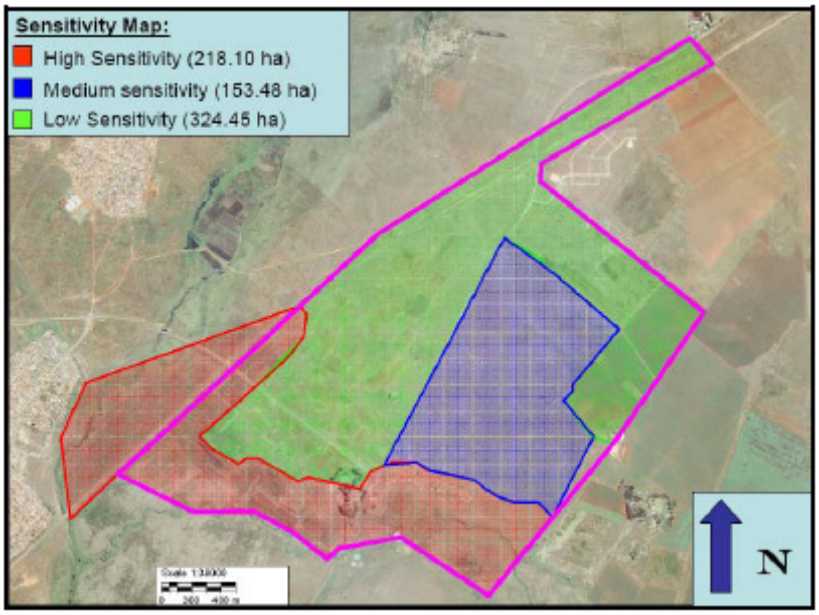


Figure 10: Avifaunal sensitivity map including the 200m buffer area around the wetland (Galago Environmental, November 2011:27)

- **Herpetelogical:**

The herpetological report found that firstly, the water and associated wetlands support narrowly adapted moisture-reliant herpetofauna and their life-support mechanisms. This justifies excluding the wetland area from any form of development or side-effects of the construction and operational phases of the development. Secondly, in the natural veldt areas there are numerous moribund termite mounds, the ideal habitat for the striped harlequin snake. The snake is known to occur in the nearby Suikerbosrand Nature Reserve. The report therefore recommended that the natural grassland that borders the wetland be excluded from any development. The report indicated that the terrestrial habitat is spatially by far the most prominent, although large tracts of land have been ploughed and is therefore classified as ecologically non-functional.

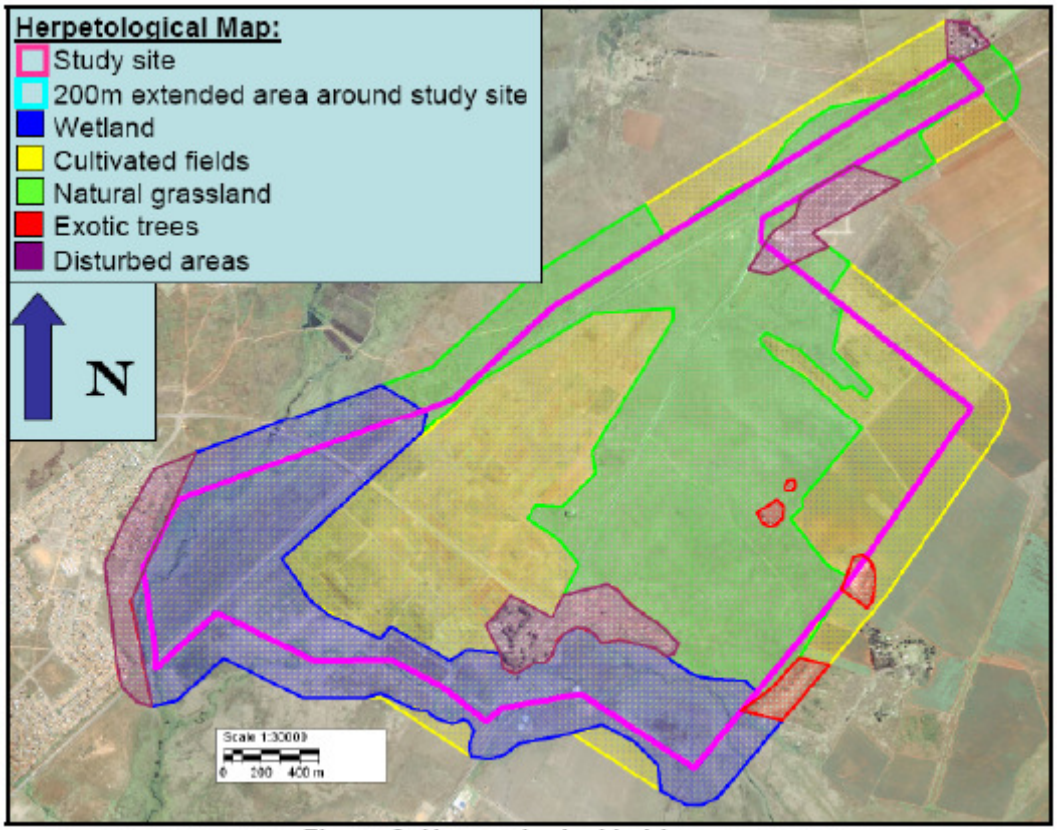


Figure 11: Herpetological Habitat Map (Galago Environmental, November 2011:7)

The sensitivity map for the herpetological assessment is as follow:

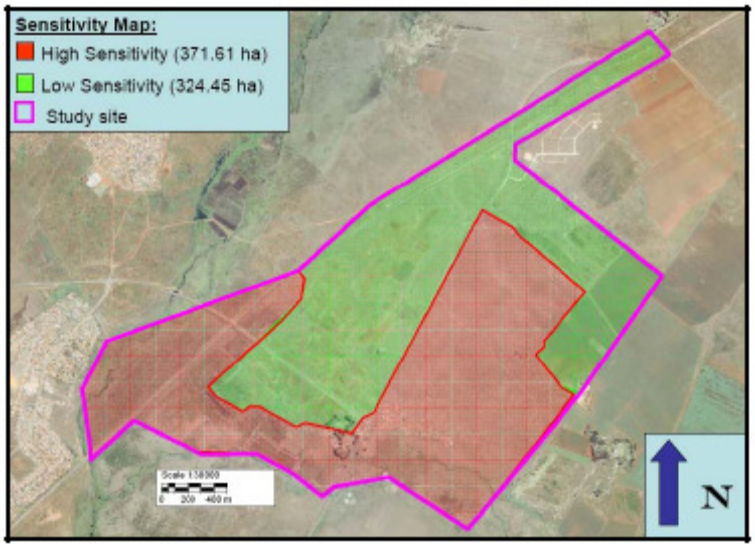


Figure 12: Herpetological Sensitivity Map (Galago Environmental, November 2011:

Various mitigation measures were proposed by the specialist consultants. The most important being that no development should be allowed within the wetland habitat systems on the study site as well as within 200 m from the wetland on both sides of the wetland system and the entire length of the Rietspuit and its tributaries. The 200 m buffer will act as a minimum terrestrial buffer for African Grass-Owls and African March Harriers.

Furthermore an appropriate management authority (e.g. the body corporate) that must be contractually bound to implement the Environmental Management Plan (EMP) and Record of Decision (ROD) during the operational phase of the development should be identified and informed of their responsibilities in terms of the EMP and ROD. All areas designated as sensitive (i.e the wetland) in a sensitivity mapping exercise should be incorporated into an open space system. Development should be located on the areas of lowest sensitivity.

The following composite map shows the sensitivity map overlain with the proposed layout plan:

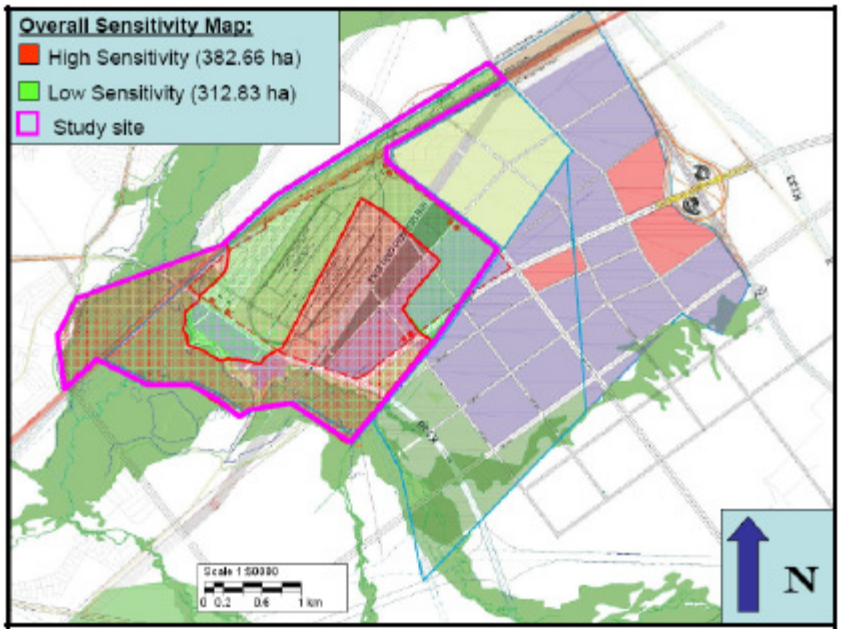


Figure 13: Composite Map - Layout plan overlain with the Environmental Sensitivity Map

The report concluded that where the layout plan is overlain with the environmental sensitivity map (Figure 13), it is clear that most of the wetland and surrounding buffer areas were excluded from the proposed development. The grassland area to be conserved is however very small, but should be seen together with the open space areas on the layout map for the neighbouring site to the east.

5.2 Wetland Delineation and Aquatic Assessment

Prism Environmental Cc undertook the wetland delineation and aquatic assessment. The site Investigation was conducted in August 2011. The specialists involved are:

- Report Author: Mr A Koning *(B-Tech Nature Conservation)*
- Report Co-Authors: Mr D Botha (*M.A Environmental Management; PHED)*
  Prof L R Brown *(Pri.Sci.Nat)*

The following represent a summary of the findings of the report:

- **General:**

The wetland and aquatic areas are located in the quaternary catchment C22C of the Upper Vaal Water Management Area (WMA8). The study area is located within the Grassland Biome (Biome 6) of the Highveld.

- **Findings – Wetland Assessment**
  - The wetland is classified as a flood plain wetland;
  - The hydrological integrity is rated as a Category D – meaning approximately 505 of the hydrological integrity has been lost;
  - The geomorphic processes of the wetland was classified as a Category D – meaning a large change in the geomorphic process occurred and the is appreciably altered;
  - The vegetation community has been disturbed and is classified as a Category D – meaning the vegetation community has been largely altered and alien/ruderal species are found in equal abundance to indigenous wetland vegetation;
  - The direct and indirect service of the wetland was rate "low";
  - The ecological importance and sensitivity was rated "low".
- **Findings – Aquatic Assessment**
  - The Dissolved Oxygen (DO) concentrations have a limiting effect on the aquatic biota at the site during the august survey;
  - The Total Dissolved Salt (TDS) values recorded for the test sites were considered to be high and have a limiting effect on the aquatic biota;
  - The habitat availability of test sites 1 and 3 were classified as fair/adequate and for test site 2 it was rated as poor/inadequate;
  - The results for the invertebrate habitat integrity assessment system (IHIAS) showed that the sites have reached a critical level of impairment;
  - Based on the SASS5 results the biotic integrity at site 1 was classified as "moderate" and at site 2 as being "poor".

The following map indicates the hydrology for the area:

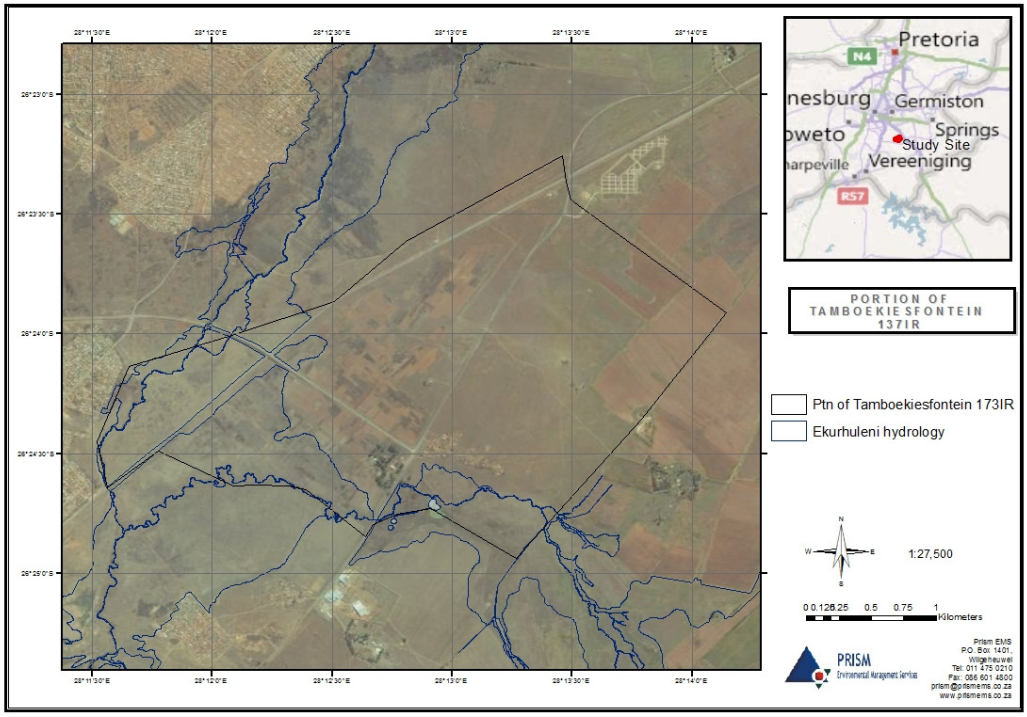


Figure 14: Hydrology for the site and surrounding area (Prism Environmental, March 2012)

The wetland and associated buffer as delineated by Prism Environmental is as follow:

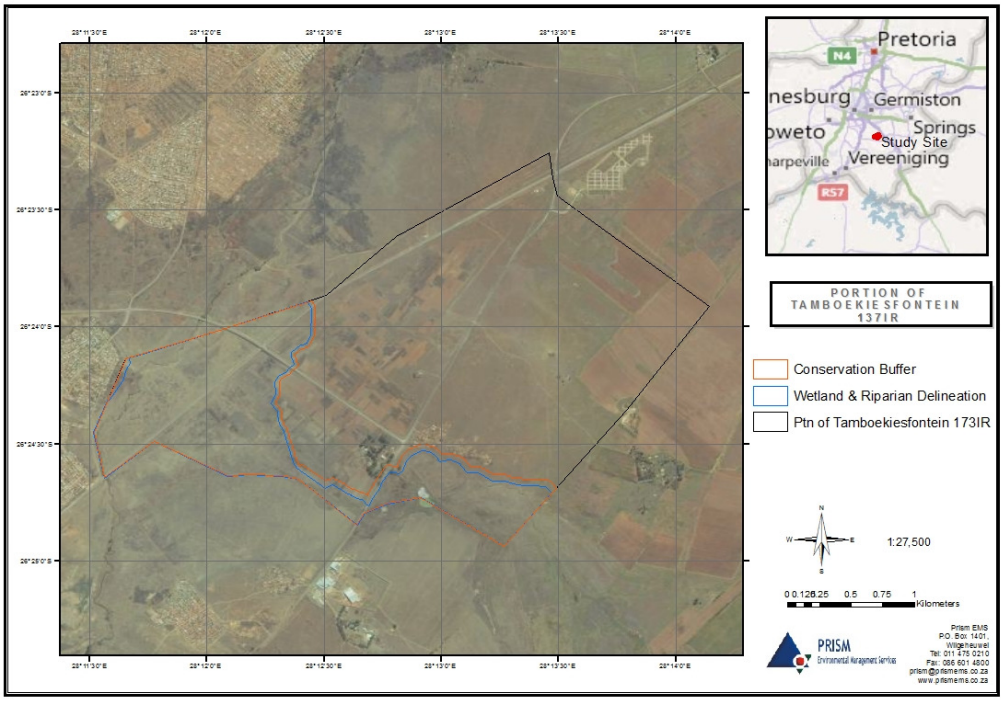


Figure 15: Conservation Buffer – Wetland (Prism Environmental, August 20110

It is concluded that the proposed site layout plan has taken into consideration the findings of the wetland assessment and aquatic study and ensured that the wetland and buffer zone is conserved. No development will take place in the wetland and applicable buffer zone.

5.3 Cultural Features and Characteristics

Heritage sites were found on the site. Therefore a Heritage Survey was commissioned. The Heritage survey was under taken by Dr J van Schalkwyk (D Litt et Phil). The findings of the report are as follow:

❑ **General:**

Three sites rated to have significance have been identified in the study area. They are:

• Two old cemeteries, which are rated as having high significance on a local level.

• An old farmstead, which is rated as having high significance on a regional level.

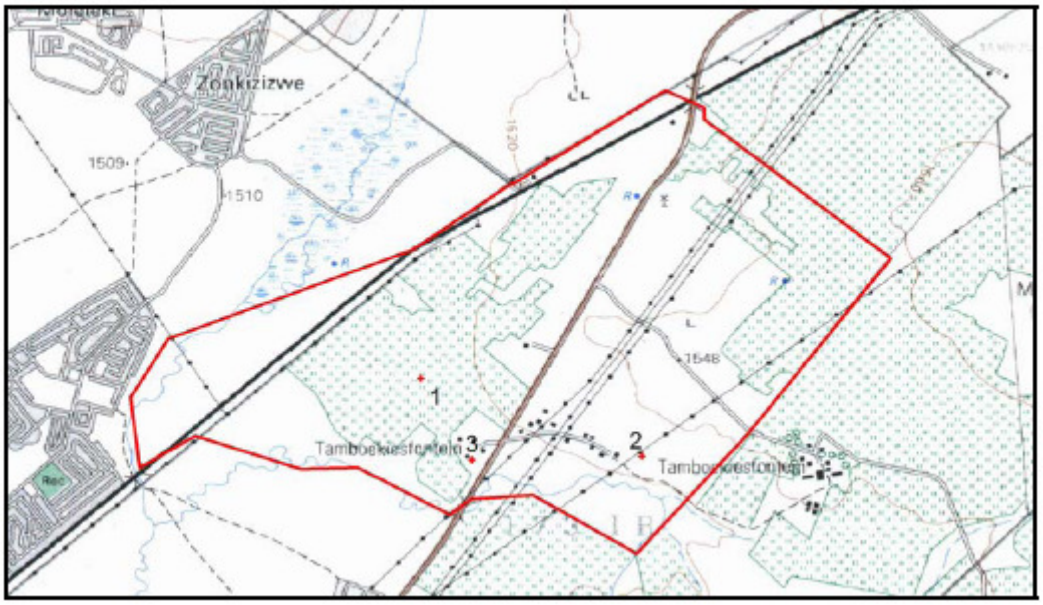


Figure 16: The study area, showing the location of the identified sites (Van Schalkwyk, 2007:11)

❑ **Site 1:** S 26.40522; E 28.20902

This was identified as a small farm cemetery with graves of the Vermeulen family as well as other people. The grave yard has been disturbed with most of the headstones have been pushed over, and the contents of two to the graves have been exhumed. The specialist recommended that all the graves are relocated to a formal cemetery

- Significance rating is: High ;

- Mitigation actions recommended: to retain the graves or, alternatively, relocate after following correct procedure ;
- Legal requirements: Permits, SAHRA permits, police, notification, consultation, relocation.

❑ **Site 2:** S 26.40973; E 28.22176

This is a very large informal cemetery, with approximately 200 graves. The cemetery is a very large feature and is still in use by the local community, and it is therefore recommended that it is retained and formalised by fencing it off, maintaining the site and identifying the authority for looking after it.

- Significance Rating: High on a local level ;
- Mitigation actions recommended: to retain the graves or, alternatively, relocate after following correct procedure ;
- Legal requirements: Permits, SAHRA permits, police, notification, consultation, relocation.

❑ **Site 3:** S 26.40992; E 28.21193

This is an old farmstead, consisting of a house, outbuildings, barns, etc. now mostly in ruins. It was found that based on style and material used, some elements seem to be older than 60 years

- Significance rating: High on a regional level
- Mitigation actions recommended: mapping of the site by a heritage architecture will be necessary;
- Legal requirements: should the building be demolished, a permit from SAHRA has to be issued.

It is concluded that sites 1 and 3 have a "high" significance rating. These two sites will be impacted on during stage 1 of the development phase. It is therefore necessary that the correct procedures are followed to obtain permission from SAHRA to relocate the graves and to demolish the house (if approved by SAHRA). Site 2 will only be affected during stage two of the development phase. It is recommended that the same procedures are followed for this site as for the aforementioned sites.

6 SOCIO-ECONOMIC FEATURES AND CHARACTERISTICS

6.1 Town Planning Assessment

In terms of the Peri-Urban Town Planning Scheme of 1975, the site is zoned "Undetermined". To accommodate the proposed development, the site has recently been incorporated into the Urban Development Boundary of the Ekurhuleni Metropolitan Municipality and is earmarked for an Inland Port in terms of the revision of the Metropolitan Spatial Development Framework (MSDF) 2010/2011.

6.1.1 Land Use Assessment

The town planning application done by Aeteron Town Planners will apply for the following land uses to accommodate the proposed inland port development:

- Erven 1 to 4

Proposed zoning: "Special" for railway purposes including rail siding, arrivals and departures yard, maintenance depot and other related and subservient uses.

The erven are earmarked as the arrival and departure yard for the terminal. It is located off the mainline so that it does not impact on the current mainline operations. Provision has also been made on the erven for a locomotive and wagon maintenance facility. The aforementioned erven will be transferred to Transnet after promulgation of the township.

- Erf 5

Proposed zoning: "Special" for transportation centre including railway facilities, container depot, inland port, logistics hub, intermodal terminus, truck staging, security, access control, ablution facilities, administration and offices, stacking space for containers, customs clearance equipment maintenance and repair area as well as other related and subservient uses.

The layout plan shows an area of ± 46ha for a trucking and intermodal yard/staking area and logistics space. The position of the stacking area relative to the terminal blocks and warehousing area ensure undisturbed and secure operations. It will have a dedicated and secure access point from Road K146.

Erf 5 will accommodate the truck staging area, ablution facilities, administrative facilities, access control areas, equipment maintenance and repair area as well as empty container storage

space. Although this erf is presently shown as one erf the intention is to subdivide this erf into smaller erven with a private road system. The entire area will be secured and controlled.

- Erven 6 to 9, 12 and 15

Proposed zoning: "Special" for transportation centre including railway facilities, container depot, inland port, logistics hub, intermodal terminus, truck staging, security, access control, ablution facilities, administration and offices, stacking space for containers, customs clearance, equipment maintenance and repair area as well as other related and subservient uses.

The abovementioned erven will primarily accommodate the intermodal terminal i.e. railway network designed as a loop, the road to road terminal and road to rail container stacking area. The proposed terminal will be able to handle road to road and road to rail containers as well as palletised goods. The terminals are positioned parallel to the road and stacking area and terminal blocks are adjacent or parallel to one another.

The exchange yard design is based on a 100 wagon train(2400m in length). When operating at full capacity it will be able to handle 1 million containers TEU's. The rail network has a curve radius of 300m and a gradient of 1:800 which conforms to the acceptable design criteria. It comprises of 10 lines (5 lines for arrivals and 5 lines for departures). The terminal operations will also be in a secure and controlled area.

- Erven 10, 11, 13 and 14

Proposed zoning: "Special" for transportation centre including railways facilities, container depot, inland port, logistics hub, intermodal terminus, truck staging, security, access control, ablution facilities, administration and offices, stacking space for containers, customs clearance, equipment maintenance and repair area, Industrial 1 uses as well as other related and subservient uses.

The above erven are earmarked for Industrial 1 uses as well as for a trucking and intermodal yard and storage space. Should erf 6 reach full capacity erven 10, 11 13 and 14 could also be used for this purpose.

- Erven 16-22

Proposed zoning: "Industrial 1" purposes for industries, offices, commercial purposes, showrooms, motor dealers, panel beaters, builder's yard, service industries, fitment centre, motor workshop as well as other related and subservient uses.

The planned use for the erven is "Industrial 1" to accommodate industrial uses and warehousing associated with the inland port. Noxious industries are not accommodated within the zoning of "Industrial 1".

- Erven 24-26

Proposed zoning: "Private Open Space" for parks, gardens, nature reserves, botanical gardens, conservation, heritage sites, monuments, historical buildings, play parks, open spaces, squares and buildings used in conjunction with municipal purposes and cemetery.

The above erven are zoned private open space as requested by the town planner at Ekurhuleni Metropolitan Municipality. The 1:100 year flood line, wetland area, and environmental sensitive areas as well as community graves are all accommodated within this private open space.

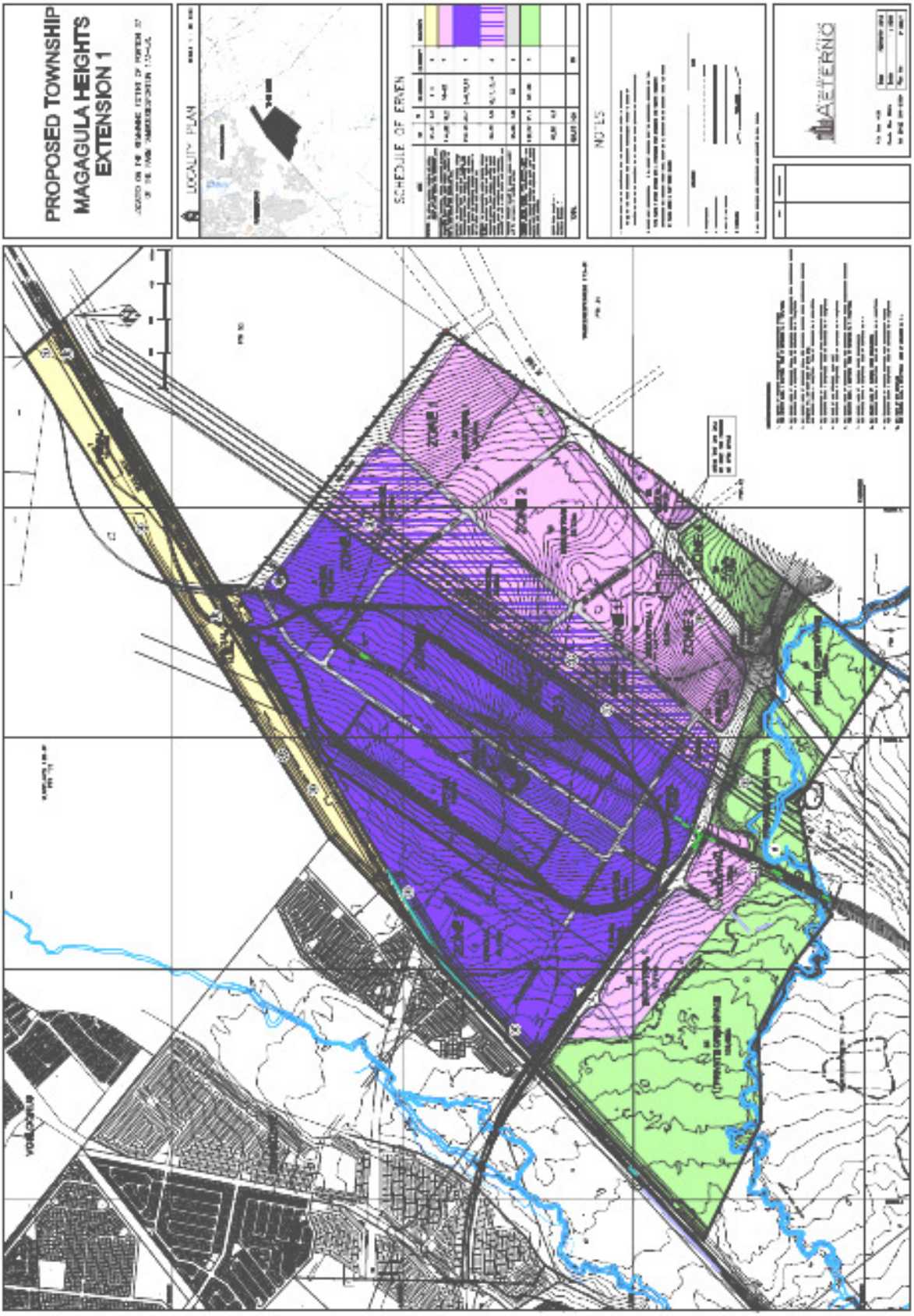
- Erf 23

Proposed zoning" "Special" for access, access control and the conveyance of municipal services.

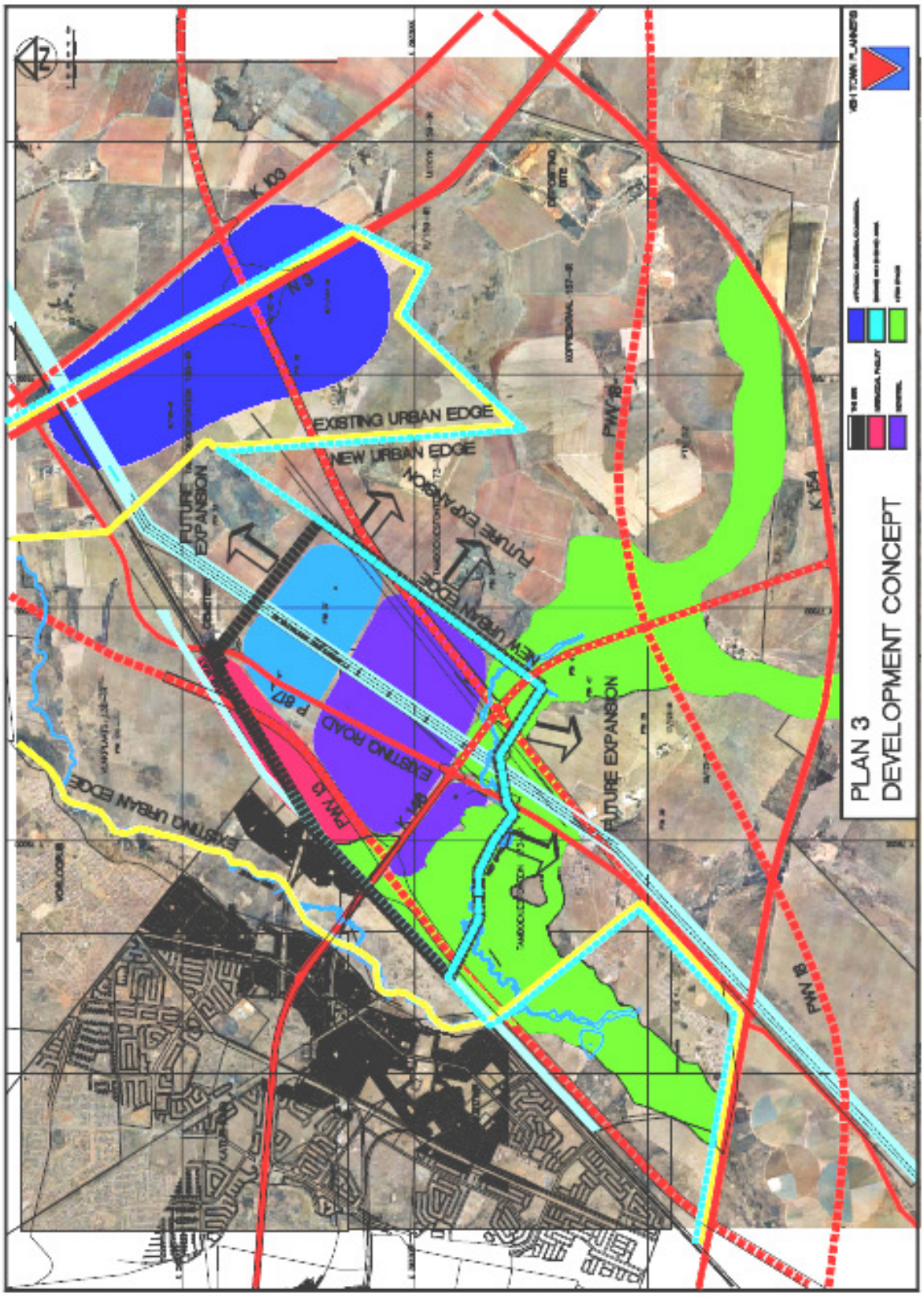
As a high degree of security is required for the proposed operation all the roads (with the exception of the K- Roads and Road D817) which are to be realigned shall be private roads.

This would enable the developer to impose access control points on these roads so that the entire area, bounded by the Provincial K Roads, becomes a secure and controlled area.

The proposed land use and layout plan as discussed above is as follow:


PROPOSED TOWNSHIP
MAGAGULA HEIGHTS
EXTENSION 1
LOCALITY PLAN
SCHEDULE OF ERVEN
NOTES
AETERNO

To illustrate the aforementioned land use proposal a development proposal was formulated:



6.1.2 Regional Spatial Development Framework

The "Ekurhuleni Metropolitan Municipality Spatial Development Framework Review, 2010 - 2011" (MSDF) looked at Inland Ports/Logistic Hubs and referred to the study commissioned by Transnet, namely the "Sentrarand Pre Feasibility Study" completed in 2007. This study concluded that "…the option of citing an intermodal terminal in Gauteng, capable of accommodating the intermodal traffic entering the Province and its capture area will provide a positive solution to reduce volumes in already congested areas." (MSDF Review, 2010/2011, Report 2: 68).

Furthermore the MSDF specifically refers to the Tambo Springs Inland Port (MSDF Review, 2010/2011, Report 2: 38-39). The MSDF states that although currently the site is located outside of the urban edge the Municipality decided that "Based on the merit of the submission it is recommended that the application or the extension of the Urban Edge be supported, on condition that the land to be included into the urban edge be utilised only for the purpose of an inland port (freight hub).

Therefore the main structuring elements of the region are:

- **Proximity to Major Markets:** The proposed inland port located 30 kilometers south of the Johannesburg CBD would have easy access to the Johannesburg and Tshwane markets and further north into Africa. Other important markets in the Gauteng area including Nigel/Springs, Vereeniging, Sasolburg and Heidelberg are also well linked to the site.

- **Accessibility:** The site is accessible from the N3 highway (main route to Durban) as well as the possibility of a regional link across the southern fringe of the Ekurhuleni/Johannesburg urban area to the N1 Highway (main route to Cape Town and Port Elizabeth). Access to the site from the N3 is obtained via the K154 (R550) interchange at Glenroy.
  The K154 (R550) extends westwards to link with Road R59, the highway linking Johannesburg and Vereeniging.

  Proposed future roads are: the proposed road K146 will provide an additional link to the N3 highway at the Petroport. The proposed PWV 18 will provide a link between the R59 and the N1 highway which is the main road link to Cape Town. The proposed road PWV 13/15 will provide a link to OR Tambo International Airport, to the north.

Furthermore the site is linked to OR Tambo International Airport (± 25 kilometres to the north) via several main roads.

- **Railway:** The Glenroy railway line that runs along the northern boundary of the site is a dual directional freight line between Johannesburg/Alberton/Vereeniging/Cape Town line some 15 kilometers west of the site and the Johannesburg/ Germiston/ Durban line about 7 kilometers east of the site. In the future a passenger rail link from Kwesine Station in Katlehong is proposed to link into the site. This will provide the opportunity for overnight freight delivery to the city.

  As mentioned in a previous section the proposed development of an inland port and logistics hub requires an area of at least 1000ha. The site in question is approximately 600 hectares of which about 450 hectares will be suitable for development. In addition, the two adjoining farm portions are available for development. This would ensure that the required 1000 hectares can be relatively easily assembled.

Conclusion:

It is therefore clear that the proposed development fulfils all of the above requirements and that this development has specifically been included in the spatial development framework and is therefore in line with all policies and objectives drafted for the area.

6.2 Socio Economic Impact Analysis

The socio-economic impact analysis was completed by Blue IQ investment Holdings (Pty) Ltd in October 2011. It is a comprehensive document that assesses the following:

- *Adjacent Properties*
- *Existing Road and Rail Networks*
- *Technical description of the Project*
- *Economic Analysis*
- *Socio economic Baseline and*
- *Social and Economic Impact Analysis*

The following represents a short summary of the results as documented in the executive summary of the document (Blue IQ, October 2011:3-4):

- *"Employment statistics reflect the employed populations in the focus areas as : Magagula (19%), Zonkizizwe (17.5%), Zonkizizwe Extension (16.6%) and Zonkizizwe Extension 2 (18%. Unemployed and „not economically active" populations in the Focus Areas can be deemed „high" as statistics show that Magagula, Zonkizizwe, Zonkizizwe Extension and Zonkizizwe Extension 2 have 46.3%, 49%, 50.8% and 48% of such populations, respectively;*
- *Anticipated negative impacts during pre-construction relate to the possible movement of work-seekers into the area and the physical and economic displacement of the Thulasizwe community5;*
- *Negative impacts during construction focus on health and safety issues (road, pedestrian safety and the potential increase in HIV/AIDs and STDs); community disruption (as a result of work seekers in migrating from other parts of the country) and the existing community's perception of having non-local workers in the area;*
- *The operations phase of the proposed development will show differing negative impacts, but specifically related to the industry competition that would be created and the potential effect it may have on the local price of goods and services; the health and safety of all in the proximate communities (related to the increased traffic and an expanding population); the anticipated pressure on municipal-provided services such as electricity, sanitation, water, schools and health facilities; and the local community's perceived preferential access to job opportunities;*
- *The estimated investment in the development equates to a 0.8% increase annually in Gauteng's GGP over fifteen years or a 12% increase relative to the initial GGP base;*
- *The construction phases may see an increase of 81 000 jobs (still to be verified) and against the three million formal jobs in Gauteng, 5 400 jobs secured per annum amounts to 0.18% jobs retained/secured. However, over a 15 year period, this would amount to a total of 2.7% jobs retained/secured against the Gauteng employment base (when considering only the first year of the Inland Port's operation);*
- *The total increase of the NPV of the GGP value added by Tambo Springs Inland Port on the Gauteng economy (direct, indirect and induced) is estimated on an annual basis at 0.7% pa and 1.1% for Johannesburg and Ekurhuleni combined. The total economic value added (thus all the individual years added together over 15 years) relative to the initial base, will increase the Gauteng GGP by 6.4% - as an indication of the actual quantity of the economic value added over the period;*
- *The impact on the construction industry with an estimated R7.5 billion investment over a 15 year period amounts to a 2% increase in output in this sector and this is significantly positive;*

- *The impact on employment, over a 15 year period, is a total increase in employment in Gauteng of 3.5%, relative to the initial base. However, the year on year additional employment is 0.2% on average;*
- *Based on current municipal property rates published by Ekurhuleni Metropolitan Municipality, it is estimated that R150 million could be generated in property rates and taxes to the municipality emanating from the Tambo Springs Inland Port development. This is a 5% increase on the current property rates and taxes income of the municipality and is rated as significantly positive;*
- *The potential impact on Government revenue is also significantly large. The increased GGP emanating from this proposed project, under many assumptions, has the potential of increasing the national revenue income over a 15 year period by R21 billion (or R1.4 billion per annum on average). This excludes local rates and taxes calculated above. What makes this statistic significant, assuming the project is economically "* (Blue IQ, 2011:3-4)

The report concluded that the proposed development will greatly contribute to the competitiveness of South Africa's logistics sector.

Meetings had with the local communities indicated that:

- During the construction phase of the development A Community Health and Safety Plan should be drafted to identify risks and appropriate risk management activities, including appropriate ways to secure the Inland Port site. Furthermore a Resident's Forum and the local existing Community Policing Forum must be used as vehicles to convey appropriate health and safety information to affected communities. On-going Grievance management procedures must be implemented. It is important that safe pedestrian crossings be implemented to reduce health and safety concerns and increase efficiency of mobility.
- During the operational phase the current municipal and provincially provided services such as educational and health facilities, libraries and community facilities will endure added pressure due to the increased population of workers (and their families) in the area.

Furthermore the report recommended that the social impact on the Thulasizwe community be assessed. Specific recommendations with regard to the Thulasizwe community are as follow:

- *"A full scale SEIA that focuses solely on the Thulasizwe community, with livelihoods restoration as a central theme to be addressed;*
- *The SEIA should include a full household survey and asset inventory so that the recommendations towards a RAP (with a resettlement budget) could be made;*

- *Ensure that the SEIA focuses on the host land. Impacts relating to host communities or the movement of people into the area must be assessed. For example, the indication at present is that the Thulasizwe community will be moved across the Magagula Heights road. The proposed resettlement land is surrounded by two roads (the road Katlehong and the Magagula Heights road (D817)), a rail line which is still operational, and potentially the new housing development (to be constructed by Deenin Property Developers). This is hugely contrasting to their present location, where they have access to only the Magagula Heights road. Specific safety concerns (for community members and free roaming livestock) may be raised based on the amount of vehicle, rail and people traffic that will surround them; and*
- *Negotiate all aspects of resettlement with the community (agreement on type of housing, location, whether land/ housing entitlements are offered, whether a phased approach to resettlement is to be undertaken, when will the resettlement start, will there be interim livelihoods support or assistance in agricultural food production, how will vulnerable people within the community be supported during the move, is there a moving allowance provided, etc)* " (Blue IQ, 2011:79-80)

It is concluded that the above findings be assessed by the developer and all recommendations be implemented with the help of the relevant Specialist Consultants.

6.3 Engineering Services

Reports for the various services were compiled by the following participating consulting firms:

Name	Organisation	Area of Expertise
Leon Boshoff	Bigen Africa Engineering Solutions	Engineering Services
Philemon Namane	Mpotseng Infrastructure	Traffic Impact Study & Electrical Report

6.3.1 Water

- **Water Supply:**

The Ekurhuleni Metropolitan Municipality (EMM) is the Water Service Authority for the Tambo Springs development in terms of the Water Services Act (Act No. 108 of 1997). The Tambo Springs development site does not fall within any of the current EMM water distribution zones. Various options for the supply of water to the development was assessed and the findings of the investigation showed that the most cost effective supply alternative for the total development will be to supply water from a new proposed Tambo Springs reservoir system. This will entail the

construction of a new reservoir, water tower and pump station at the highest point on the development site.

The final reservoir system for the complete future development will consist of a lower lying area that will be supplied directly from the reservoir and a higher lying area that will be supplied via the water tower. Two pump stations will be required – one to fill the water tower from the reservoir (Tambo Springs pump station) and one to supply water from the Rand Water system to the reservoir (Mahoodisa Road pump station). (**Annexure C** – Bigen Africa Report). The following represents an extract from Figure A of the engineering report indicating the proposed location for the water reservoir:

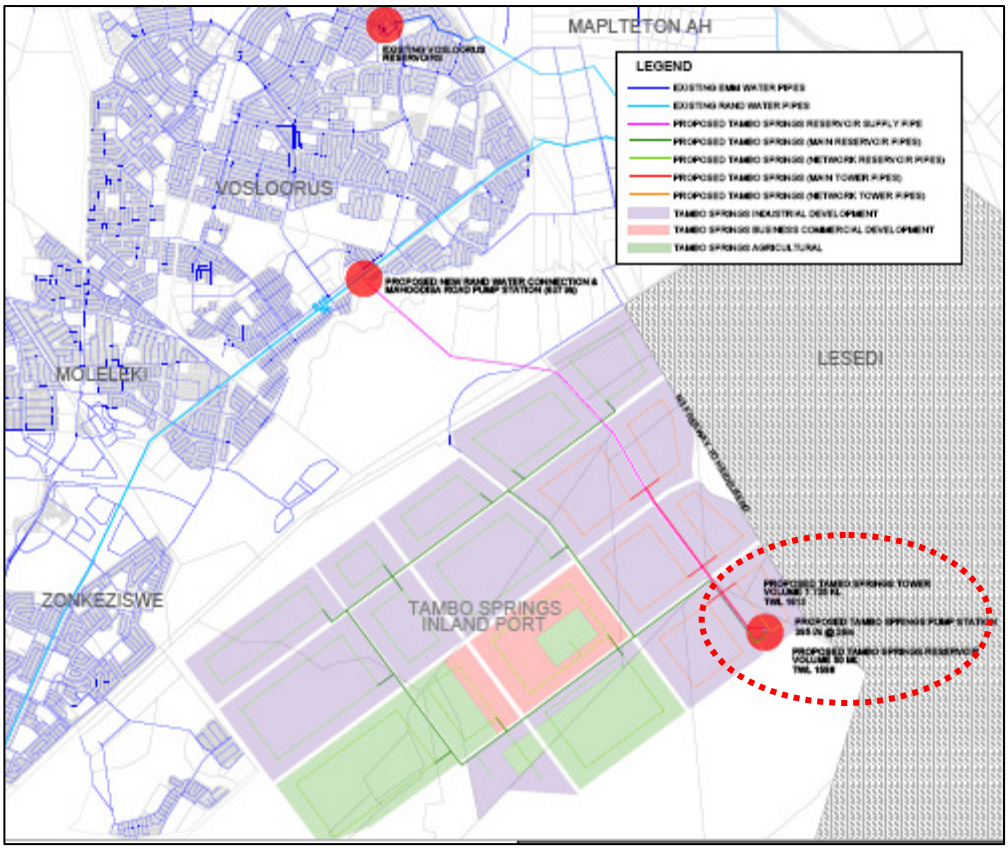


Figure 17: Extract - Proposed Water Reservoir (Bigen Africa: Figure A)

❑ **Water Demand:**

Meetings with Rand Water confirmed that even Phase 1 of the development cannot be supplied directly from Rand Water's B8/B16 pipeline without supplying storage volume. It is therefore recommended that the first reservoir be constructed on the highest portion of the Inframax Land Holdings to enable Phase 1 of the development to proceed.

This position will provide a static water pressure of between 30 m and 60 m, which is on the low side and depending on the position of the buildings an elevated tank or reservoir may be required. (Need min 25 m pressure during peak flow). The required 48h reservoir storage capacity for phase 1 is 7.2 Ml.

The existing Mahoodisa Road pump station will be able too supply the Phase 1 reservoir. The pump station will be able to deliver 250.5 l/s, however the pumping requirement for the proceeding of phase one only is calculated to be 62 l/s (based on 1.3 x AADD) which is less than what the station can deliver.

A supply pipe between the Mahoodisa Road pump station and the new 10 Ml reservoir will be required. The diameter for the ultimate reservoir supply pipe from the Mahoodisa Road pump station to the final reservoir is 250 mmØ. The recommendation is to construct the 450Ø ultimate reservoir supply pipe. The water supply from the reservoir to the Phase 1 consumption points can be done via a temporary connection to the pump line between the Mahoodisa Road pump station and the reservoir. This is a temporary connection and will be closed off when the rest of the network to and from the final reservoirs is implemented.

6.3.2 Sewerage

The proposed development site does not fall within any of the existing Ekurhuleni sewer drainage areas, but can be incorporated into the area that drains directly under gravity to the Waterval WWTP. However, depending on the outcome of some further surveys required the development may fall within the sub-drainage area of a new sewage pump station being planned by ERWAT. This pump station, if implemented, will pump into the area that drains directly under gravity to the Waterval WWTP (**Annexure C** – GLS Report).

Currently neither the existing 600Ø outfall sewer at the downstream end of the proposed development site nor the existing 1500Ø main Waterval outfall sewer has sufficient capacity to accommodate any additional flow. Both of these pipes are already flowing at more than full capacity. Therefore extensive upgrading to these pipes was recommended in the ERWAT master plan.

Therefore the proposal put forward for phase 1 in the engineering report is as follow:

- A temporary Sewage Treatment Package plant or the upgrading of the affected main outfall sewers will be required. The upgrading requirements, depending on the position where the connection to the existing system will be made, are still to be done in accordance with the ERWAT master plan. The requirements of such a pump station can be calculated as follows:

  Pumping requirement = Maximum dry weather inflow / 0.7

  = 40.3 / 0.7

  = 57.5 l/s

The report indicated that the proposed Sewage Treatment Package plant will suffice for the Phase 1 outflow treatment and can be bypassed and removed once the rest of the development proceeds and when the ERWAT outfall sewers have been upgraded.

Prism Environmental Cc was appointed by the Applicant to obtain the relevant waste license as per the procedures stipulated in the Waste Management Act. Separate applications will be submitted for the license as per the Act.

6.3.3 Stormwater Management

There is no existing stormwater reticulation system within the catchment area of the proposed development. A stormwater management plan was commissioned and will be submitted to city of Germiston Metropolitan Municipality for Approval (**Annexure C** – Bigen Africa Report). Calculations showed that of the entire 627 ha of Area A (Inframax Land Holdings), Phase 1, approximately 430 ha will contain buildings or be paved or partly paved. In light of the aforementioned the purpose of the Stormwater Management Plan for Phase 1 of the proposed development is to ensure that the regulations and precautionary measures are applied in so far as stormwater management is concerned and to minimize the possibility of subsidence as well as flooding and pollution of the existing streams.

The management responsibilities for the management of stormwater will be as follow:

- The Developer, Inframax Strategic Properties, will be responsible for managing the stormwater related activities on site during the implementation phases of the development.
- During the implementation stage the developer may delegate certain of the responsibilities to the appointed professional team and contractors to implement the stormwater management plan, but will retain overall responsibility. Once the handover of the

development is complete, the Ekurhuleni Metropolitan Municipality will be responsible for the management, operation and maintenance of the stormwater system outside secure areas.

- Inside the secure areas it will be the responsibility of the governing bodies of the secure areas.

The main objective of the stormwater management plan for phase 1 is to restrict development within the floodplains so as to be consistent with the objectives of protecting life and property against major floods and preserving the natural environment. Areas within the project area affected by major floods (floodlines) have been excluded from the layout as stipulated in Chapter 14 of the National Water Act, Act No.36, 1998. The 1:100 year floodline (area which will be affected during the occurrence of the greatest storm in 100 years) have been calculated. These flood planes will be zoned as public open space and will not be utilised for any development or cemetery sites.

The following represents as summary of the mitigation measures pertaining to internal drainage facilities as discussed on pages 8 -10 of the Stormwater Management Plan drafted by Bigen Africa and attached in Annexure C of this report:

- *"The internal stormwater drainage system will be designed to convey stormwater generated internally (within the development boundaries) in a subsurface system that will not have a negative impact on upstream and downstream areas.*
- *Due to the area being dolomitic special care will be taken to minimise or avoid the ponding and ingress of water.*
- *Minor floods (low severity, occurring more frequently) will be accommodated in subsurface stormwater systems which consist of kerb inlets, manholes and pipe culverts that will drain the water from paved areas and roof drainage.*
- *During major floods (high severity, occur less frequently) the excess water will be conveyed by the road system and paved areas to suitable points of discharge. The conveyance of water on road surfaces will be done in accordance with the stipulations in the Ekurhuleni Metropolitan Municipality Design Standards.*
- *Any natural pond or water feature shall be rendered impervious with a permanent reinforced concrete lining without joints and be monitored for any loss of water.*
- *Rainwater down pipes shall discharge into concrete lined drainage channels (with sealed joints), which discharge the storm water at least 1.5 m away from the buildings.*
- *If no gutters with rainwater down pipes are provided for the buildings, a 1.5 m wide concrete*

apron (minimum) shall be provided.

- *Retaining walls shall either have weep holes if exposed to the outside or if this is not possible a subsurface drainage system must be installed to prevent the built-up of groundwater, and must be connected into the sewerage reticulation where no underground storm water system exists.*
- *All storm water channels within 10 m of a building shall be lined with a permanent impervious membrane such as an engineered Bentonite clay lining or any other approved alternative method. This is specifically applicable to the natural drainage course of the proposed development."* (Bigen Africa, Stormwate Management Report, 8-10:2012)

In addition the report includes erosion control measures the proposed stormwater design methodology. The report concludes that within the development of the site the developer and his professional team, including the contractor, shall be responsible for ensuring that the requirements of this Stormwater Management Plan are met.

6.3.4 Internal and external roads

The design guidelines of Gautrans and Ekurhuleni Metropolitan Municipality, supplemented by the Guidelines for Human Settlement Planning and Design (Red Book) were used to establish the criteria. The criteria are given for various road classes on relevant road reserve widths. This design will be finalised after the rezoning, the final development layout is approved, and before construction drawings are submitted for approval. A structural design period of 20 years will be adopted. A more detailed discussion of the roads will follow in Section 6.5 – Traffic Impact Assessment.

6.3.5 Refuse removal

All access points and road reserves will be designed to accommodate the municipal refuse removal services. The service is fully operational throughout the City of Germiston, and no problems are envisaged with regards to capacity.

6.3.6 Electricity

The proposed development falls within the boundaries Ekurhuleni Municipality which is also the electrical supply authority for the area. Any large electrical bulk supplies must therefore be arranged with the Municipality. The Municipality will then lodge the applications with ESKOM. Presently there are no large consumers in the proposed development area.

None of the substations in the area have the capacity to cater fully for the additional load of the proposed development. Only limited capacity is available and indications are that the initial load could be catered for in the short term via a switching station on the edge of the first phase of the development at the intersection of route K149 and the railway line. This switching station will be supplied by means of an overhead line from the existing Zonkizizwe substation of ESKOM to the west of the proposed development.

The loads for the various land uses for Phase 1 were calculated and are shown in the table below:

Inframax's Landholding	
Industrial/warehousing	18 447kVA
Intermodal yard area (additional)	1 239kVA
Logistics	11 322kVA
Trucking intermodal yard	1 395kVA
Total: Phase 1	**32 403kVA**

ESKOM planned an 88kV line along the eastern side of the Railway line running past the development. The position of this line is on the proposed development. The route was discussed with ESKOM and ESKOM indicated that they will investigate an alternative route for this line. This line will possibly be on the western side of the railway line. This proposed line will be the source from which the proposed substation/s for future developments obtains their power.

It is therefore concluded that for phase 1 the switching station proposed above must be built in such fashion that it can be converted with minimum cost to a proper substation.

6.3.7 Rail

The focus of the proposed transportation framework is to create linkages to the west, east, and south of the study area, with rail access point on the south, area to open it up and achieve integration with the surrounding areas. The expected terminal capacity that the development will operate at when fully developed is calculated as follow:

Table 7: Expected Terminal Capacity (Mpotseng, 2012:11)

Terminal Type	Expected Capacity
Container Terminal	• 1, 000, 000 TEU's/pa • 32 trains per day (50 wagon trains)
Palletised Terminal	• 4, 500, 000 pallets per annum • 12 trains per day

The rail terminal was designed in conjunction with Transnet and is included in the layout plan for Phase 1 – Inframax Land Holdings. The rail terminal will be developed in stage 1 of phase 1 of the proposed development. The development of the rail terminal is critical and is seen as the most critical design element of phase 1.

6.3.8 Conclusions

The previous paragraphs dealt exclusively with various engineering service items and it was shown that the installation and construction of service infrastructure is critical to the successful implementation of the proposed land use activities planned for phase 1, the Inframax Land Holdings area (i.e the site).

From a services point of view, there are sustainable solutions for all municipal services necessary for the proposed development. A Services Agreement will be drafted that will govern the phased implementation of the relevant services necessary for the development of the proposed activities.

6.4 Sense of Place

The concept of "a sense of place" does not equate simply to the creation of picturesque landscapes or pretty buildings, but to recognise the importance of a sense of belonging. Embracing the uniqueness of a place as opposed to standardisation attains the quality of the place. In terms of the natural environment it requires the identification, a response to and the emphasis of the distinguishing features and characteristics of landscapes. Different natural landscapes suggest different responses. Accordingly, the proposed residential development project should respond to the natural environment and features of importance.

The current "sense of place" of the specific site provides a perception of a vacant, open space area with pockets of subsistence farming scattered throughout the area.

It is very important that the site should be seen within the context of the future developments planned for the site and adjacent pockets of land. One should take cognisance of the fact that the site and surrounding pockets of land have been earmarked for the inland port development and associated land uses. Furthermore one must take cognisance of the fact that once completed the proposed inland port development would encompass 1000hectares of land covering the remaining vacant portions of land as illustrated in the layout plan below:

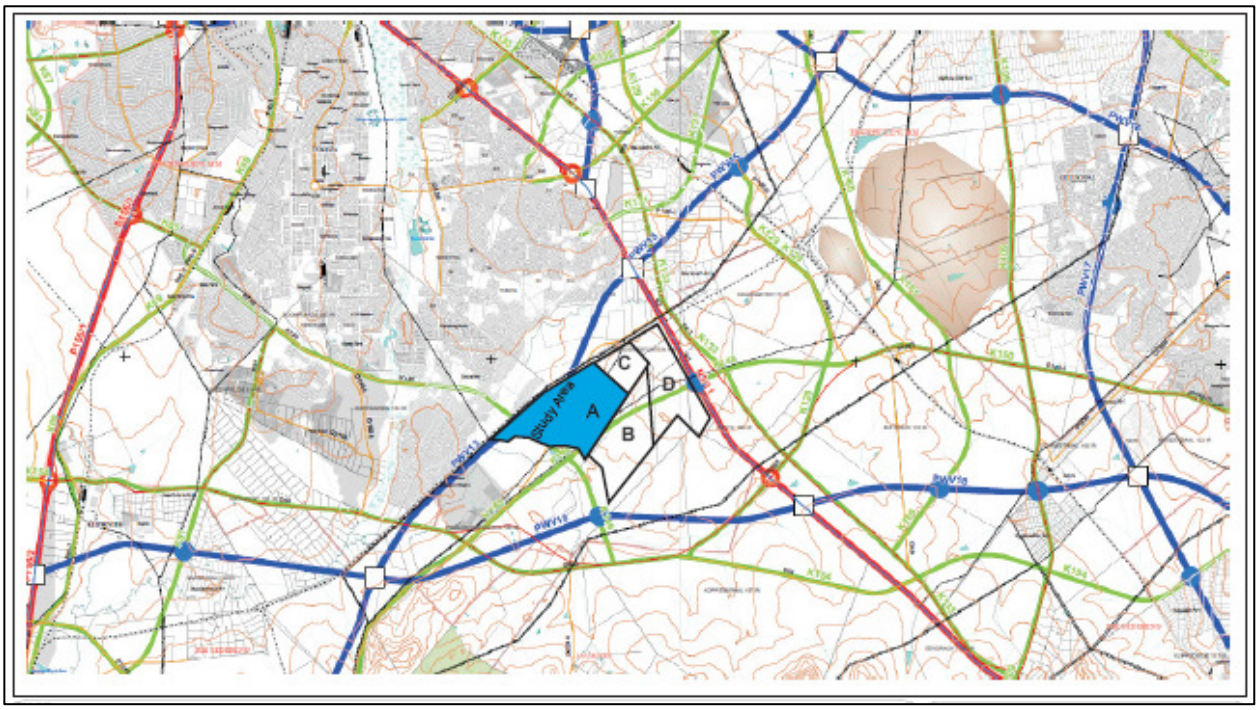


Figure 18: The site and adjacent land portions (Mpotseng, 2012: Fig 3-1)

It is therefore concluded that although the current sense of place may be that of a rural area located adjacent to an urban area, one can not ignore that this area is (1) included within the urban development boundary, and earmarked specifically for the proposed inland port development and (2) the proposed development although characterised by several developmental and environmental constraints have managed to mitigate these constraints to an acceptable level. The implication is therefore that, should all the mitigation measures and design measures be implemented the site and the adjacent land holdings could successfully be developed whilst conserving the sensitive environment in which it is located.

It is therefore the intention of the applicant to change the current sense of place to such an

extent that it conserves the sensitive environmental landscape whilst opening up the area to investment and creating job opportunities within an area currently isolated from economic growth and development opportunities.

6.5 Traffic and Accessibility

A comprehensive traffic impact study was compiled and is included in **Annexure C** of this document. The findings of the document are as follow:

- *"Phase 1 of the development stages includes development of a trucking and intermodal yard is on Inframax Land Holdings (the site) property. Warehousing and/or light industrial developments are also planned. The speed at which these developments will occur will depend on economic factors affecting the development.*
- *The PWV13/15, K146 and D817 are affected by the development. The PWV13 will need to be realigned to accommodate planned truck and intermodal yard on the northern boundary of the development along the existing alignment and K146 is also affected by the wetland areas on the south of the development.*
- *The construction of access intersections can be phased in as the various parts of Tambo Springs are developed. It is however, essential to ensure that adequate access capacity is provided at various stages of development phasing."* (Mpotseng, 2012:48)

Phase 1(the site) development traffic will have minimal impact on most of the intersection analysed. The most significant impacts will be experienced on the following roads:

- Barry Marais Road (M43) and Nederveen Highway (R103)
- Nederveen Highway (R103) and Kliprivier Road (R550)
- Kliprivier Road (R550) and N3 West Ramp
- Kliprivier Road (R550) and N3 East Ramp
- Kliprivier Road (R550) and Magagula Heights Road (D817)

The report indicated that there are 6 existing access points whilst a total five new access points are planned around the development, two on the western boundary along K146 (one for heavy vehicles and one for light vehicles), one along the K148 on the southern boundary for light vehicles and two on the eastern boundary along proposed extension of Mnganu Street which is expected to give access to local traffic, i.e. public transport, etc.

From the report it is clear that the construction of access intersections can be phased in as the various parts of Tambo Springs are developed. It is however, essential to ensure that adequate access capacity is provided at various stages of development phasing. The report assumed that they will be implemented as follows:

- Year 1 to Year 3 – Intersection upgrades
- Year 4 to Year 5 – Design and construction of K148
- Year 6 to Year 8 – Design and construction of K146

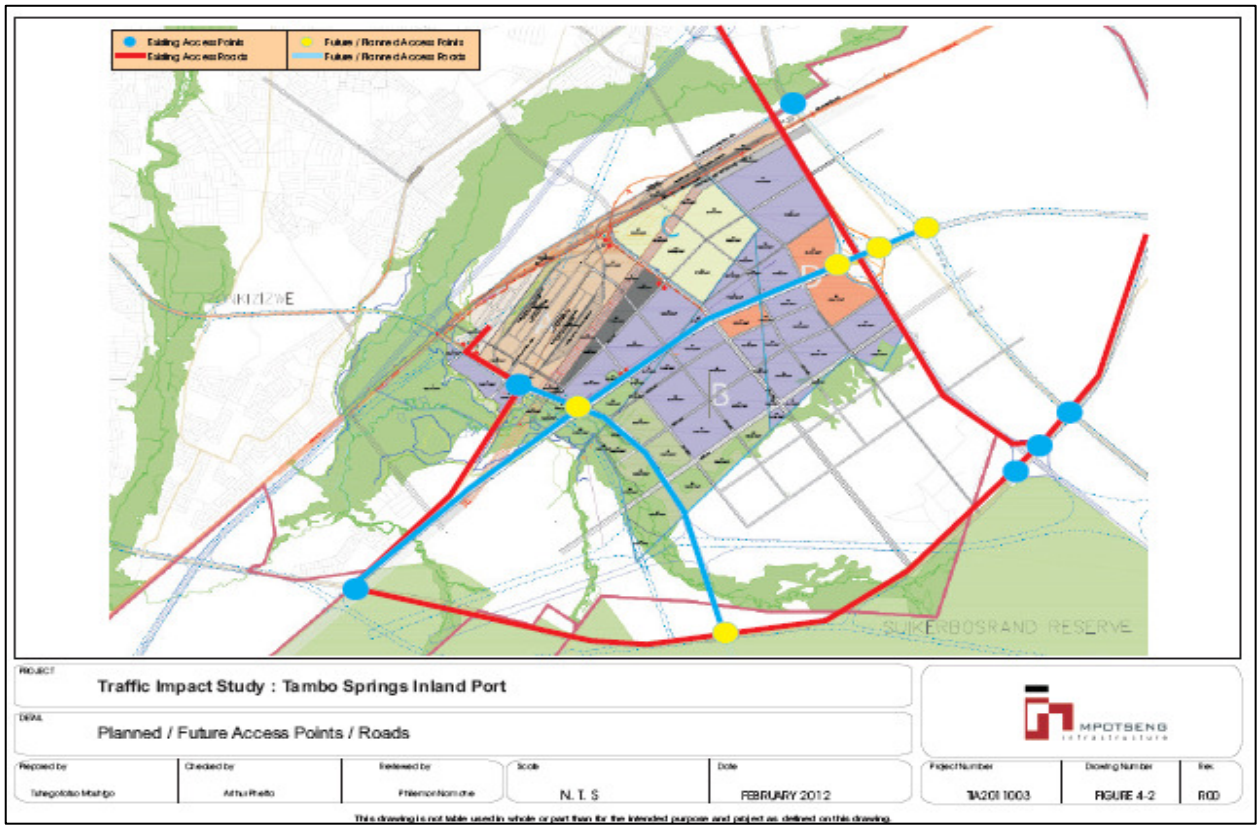


Figure 19: Existing and Future Access Points (Mpotseng, 2012: Fig 4-2)

The report concluded that with the implementation of the proposed road and intersection upgrades, the proposed infrastructure could accommodate the development.

6.6 Sensitivity Analyses

In order to establish where development activities will impact more negatively on the site, a sensitivity analysis was done by making use of a variety of sensitivity parameters. Such parameters were chosen based on the natural resources that would be most sensitive to disturbance of any kind. A set of layers containing information with varying sensitivities were

overlain with each other and a spatial map generated to indicate cumulative sensitivity. The following information layers were used to establish the cumulative sensitivity of the natural resources on the site:

- Ecology;
- Dolomite
- Hydrology
- Gradient;
- Visual sensitivity

- ***Gradient***

The site (Area A) slopes from 1560m AMSL from the south eastern side to 1515m AMSL on the north western side of the proposed development site over a distance of approximately 2800 m. The site has an average slope approximately of 1.6% or 1:60. The topography of the western corner of the phase 1 site is very flat and consists mainly of the Koppies Kraal Spruit flood plain.

The 1:100 year floodline indicated on the portion of land on the southern side of the railway line next to the fill of the link road into Vosloorus, is caused by the man-made road fill. The engineering report indicated that this portion of the site could be raised by approximately 1m up to the existing railway line cutting, to recover the land portion for the intermodal yard. This proposal was discussed with the official from DWAF at the site visit on 22 February. An agreement was reached that this could be possible as it is a man made wet area.

As the development flat areas along the Koppies Kraal Spruit flood plain would be avoided, it is concluded that the overall sensitivity rating of the proposed area to be used for development in terms of gradient is "low".

- ***Hydrology***

This area is drained mainly by means of sheet wash. The site is affected by the 1:100 year floodline. A wetland is found on the western boundary of the site. The overall sensitivity rating of the site in terms of Hydrology is "high".

- ***Dolomite***

The site is underlain by dolomite of the Malmani Subgroup, Chuniespoort Group of the Transvaal Super Group. Dolerite occurs in large areas of the site. Shallow dolomite bedrock conditions were confirmed in scattered locations. Furthermore the site is located in the Natalspruit West

Dolomite Groundwater Sub-Compartment. The dolomite groundwater is anticipated between a depth of 32m and 5m within the bedrock. However due to the proposed land use, the overall sensitivity rating of the site in terms of soil is "low".

- ***Ecology***

According to the attached specialist reports, the wetland area and its buffer zone is considered highly sensitive. Therefore a 200m buffer zone was demarcated to protect the wetland and flood plain. The overall sensitivity rating of the site in terms of vegetation is "high" for the wetland area and buffer zone and "medium - low" for the area set aside for development purposes.

- ***Visual sensitivity***

To be discussed in section 6.7.

6.7 Visual Environment

6.7.1 Visibility

The following visual assessment criteria have been used to determine the impact of the proposed project on the state of the environment - the respective shading of each impact indicates the significance:

Table 8: Visual Impact Assessment

	Impact		
Criteria	**High**	**Medium**	**Low**
1. Visibility	A particularly definite place with an almost tangible dominant ambience or theme	A place which projects a loosely defined theme or ambience	A place having little or no ambience with which it can be associated
2. Visual Quality	A very attractive setting with great variation and interest but no clutter	A setting which has some aesthetic and visual merit	A setting which has little or no aesthetic value
3. Surrounding Landscape Compatibility	Cannot accommodate proposed development without it appearing totally out of place	Can accommodate the proposed development without appearing totally out of place	Ideally suits or matches the proposed development

	Impact		
Criteria	**High**	**Medium**	**Low**
	visually		
4. Character	The site or surrounding area exhibits a definite character	The site or surrounding area exhibits some character	The site or surrounding area exhibits little or no character
5. Scale	A landscape which has horizontal and vertical elements in high contrast to human scale	A landscape with some horizontal and vertical elements in some contrast to human scale	Where vertical variation is limited and most elements are related to the human and horizontal scale
6. Visual Absorption Capacity	The ability of the landscape not to accept a proposed development because of a uniform texture, flat slope and limited vegetation cover	The ability of the landscape to less easily accept visually a particular type of development because of a less diverse landform, vegetation and texture	The ability of the landscape to easily accept visually a particular type of development because of its diverse landform, vegetation and texture
7. View Distance	If uninterrupted view distances to the site are > than 5km	If uninterrupted view distances to the site are < than 5km but > 1km	If uninterrupted view distances to the site are > than 500m and < 1000m
8. Critical Views	Views of the site seen by people from sensitive view sheds, egg. farms, nature areas, hiking trails.	Some views of the site from sensitive view sheds	Limited or partial views to the site from sensitive view sheds

The visual quality and aesthetic appeal of the open space area is an important quality and feature of the site. A large open space area, such as the site, provides a visual relief in an otherwise built up environment.

The visual analysis assessed the visual quality of the site from the major roads around the site, as this is the experience that most people would have of the site. By following this methodology a general understanding of the visual sensitivity and accessibility could be obtained. The findings were as follow:

- The sensitive wetland area is a prominent landscape feature visible from the R550 (Kliprivier Road) and the D817 at the intersection with the R550.
- The proposed development footprint portion of the site is most visible from the areas located along the D817, with the southern corner of the site most visible from the R550.
- The eastern portion of the site is most visible from the N3 highway.
- The north-eastern portion of the site is most visible from Land Portion C, namely the existing cemetery operated by Ekurhuleni Municipality.

Findings:

- The visual sensitivity of the individual landowners bordering the site and the existing community located on the site is considered to be "high".
- Whereas the visibility in terms of traffic is considered to be "high" on the R550, D817 and the intersection of the R550 and the K148 for the area to be used for development.

6.7.2 Design

The proposed development will impact on the surrounding environment by change of land use/activity, building style, an increase in visual building mass and roads. The main objective of the township layout is to minimise the potential impacts created by the change in activity and thus the visual appearance of the proposed development, and to complement the existing developments. In saying that it must be noted that the proposed development will impact on the surrounding areas as the proposed land uses are vastly different from the land uses found in the surrounding area.

It is therefore concluded that the proposed development will have a significant impact on the area and the surrounding communities and therefore the architectural design should strive to soften the visual impact and to reduce the impacts to acceptable levels.

6.8 The Advantages of the Proposed Development

The proposed development will have a number of advantages, not only from a financial point of view for the developer, but also from a social and environmental point of view. The main

advantages are:

- The *sensitive wetland area* and buffer zone will be fenced off and protected from human impacts.
- *Stormwater flow* will be managed in terms of a properly designed and constructed system.
- The security situation in the area will improve as a result of the development. Access to the land will be restricted, which will eliminate illegal occupation of the land, dumping, and destruction of natural habitat by vagrants.
- *Employment* will be created within an area where people have little or no access to places of employment.
- An *integrated sustainable community* is proposed with access to community facilities;
- *Investment* will be brought into an area that has been isolated, economically, due to the lack of infrastructure within the area.
- *Rehabilitation of the natural environment* and eradication of all alien vegetation will be possible through a landscaping plan. This will contribute to improve the quality of the natural environment.
- *Job provision* – the economic feasibility study indicated that the construction phases create ± 81 000 jobs (still to be verified) and against the three million formal jobs in Gauteng, 5 400 jobs secured per annum amounts to 0.18% jobs retained/secured. However, over a 15 year period, this would amount to a total of 2.7% jobs retained/secured against the Gauteng employment base within the first year of the Inland Port' s operation.
- *The projected increase in Gauteng's GGP* is estimated to be 6.4% as an indication of the actual quantity of the economic value added over the period.
- *Impact on the Construction Industry* – the R 7.5billion investment over a period of 15 years will contribute to a 2% increase in out put of this sector and is viewed as extremely positive.
- *Property rates and taxes* - Based on current municipal property rates, it is estimated that R150 million could be generated in property rates and taxes to the Ekurhuleni Metropolitan Municipality emanating from the Tambo Springs Inland Port development. This results in a 5% increase on the current property rates and taxes income of the municipality and is rated as significantly positive;

The above-mentioned is but a few of the anticipated advantages expected. The various reports attached in **Annexure C** discuss the advantages identified as per the various sectors.

6.9 Sustainability

Sustainable development implies the adoption of a holistic view of the interdependent relationship between human society and the natural environment. It acknowledges the link between impact of human activities on the functioning of physical and social environments, and vice versa. In a developing country and especially in a developing urban area, the focus must be on sustainable development, and where possible preservation and conservation.

The socio-economic impact analysis assessed the sustainability of the proposed development of the inland port and associated land uses and concluded that it would contribute immensely to the economic development of Johannesburg and Gauteng Province.

6.10 Agricultural Potential

The provincial urban edge, compiled by the Gauteng Department of Development Planning and Local Government dated 2002, is the primary spatial guideline tool utilised by Germiston to determine the local urban development boundary. In this instance the land is located within the local urban development boundary as well as the provincial boundary.

The site forms a fragmented pocket of agricultural land located adjacent to a residential area. Further more, the soil analysis indicated that the soils are not suitable for agricultural production. Therefore the opinion is held that agricultural production is not viable on the site as the site is too small for dry crop farming and the site is located within the urban development boundary as well as the provincial boundary. This area is earmarked for infill development and specifically that of an inland port.

7 CONSIDERATION OF PROJECT ALTERNATIVES

The potential of Johannesburg's freight logistics have not been fully developed by the public sector authorities and agencies serving the area over the years. As a result, this sector of the economy is characterised by excessive use, and wear, of roads by freight operators, dramatic decline in rail usage, increased congestion and fragmented freight planning. South Africa's freight logistics system is not meeting the country's needs and not keeping up with developments taking place within this sector around the world.

Therefore there is a need for a new inland port and logistics gateway that will contribute significantly to meeting Gauteng's need to increase the current freight logistics capacity/throughput in and out of Johannesburg, to anticipated 3 million TEU's by 2015 and a potential 4 million TEU's by 2020 with the potential to further increases thereafter.

7.1 Locational Alternatives

Tambo Springs Inland Port is exceptionally well positioned in this respect as it is located in the southern periphery of Johannesburg and within the Johannesburg/Durban road freight and rail corridor. It has, therefore, access to the N3 freeway to Durban (South Africa's major freight transport route), to the N1 to Cape Town and via the R390, to Port Elizabeth and East London as well as to other freeways to the industrial centres just south of Johannesburg namely: Heidelberg, Vereeniging, Vanderbijl Park and Sasolburg, all of which are within 20 to 60km radius. Furthermore the site is also only 22km from the City Deep Terminal and 25km from the Oliver Tambo Air Freight Terminal. These excellent road linkages will allow the site to accommodate both FTL (full truck load) long distance road freight and LTL (less than truck load) regional distribution.

Freight rail will be accommodated via the existing dual directional links that already run through the site to all of abovementioned areas. Therefore the Tambo Springs development can contribute significantly to optimising the country's existing infrastructure, particularly that of the Ngqura Deep Water Port near Port Elizabeth. It is therefore clear that no alternative location was investigated as all surveys done indicated that the existing site is the best location for the proposed development.

7.2 Temporal Alternatives

The timing for the development does not play an important role in terms of suitable weather

conditions. Heavy rains may delay construction activities for short periods. The only timing constraint is the availability of the approvals from the controlling authorities, and the market demand for the proposed development.

7.3 Construction Alternatives

Alternative construction methods will not have an impact on the viability of the project due to the nature of it. However, sound construction and founding principles for the development of the perceived activities and especially the filling station, shall be applied at all times.

7.4 Layout Alternative

The proposed layout plan was influenced by the environmental constraints found on the site. All the existing environmental constraints and subsequent recommendations made by the specialist consultants were included in the layout plan discussed in this document. The relevant specialist consultants have approved the layout plan and therefore no alternative layout plan is included for assessment.

7.5 The No-Go Option

In essence, the No-Go Alternative would ultimately mean that the state of the environment would be retained as it is presently, with obvious advantages and disadvantages to the natural environment. An objective and unbiased comparative assessment is provided below between the No-Go Option and the environmental costs of the proposed project, should the development not take place. The environmental costs are portrayed in terms of the impact on the land over the short to long term.

Table 9: Comparative Assessment between the No-Go Option and the Environmental Costs of the proposed project

No-Go Option	Environmental Costs
Alteration of topography due to development	The minor topographical changes to the land are not considered to be of any significance. Changes will be positive and will improve drainage patterns.
Physical Features of the Site	The western portion of the site is characterised by a sensitive wetland area and buffer zone. Whilst the central portion of the site is viewed as sensitive in terms of grassland. Therefore the land use proposal and layout plan focuses on

No-Go Option	Environmental Costs
	conserving the sensitive areas and therefore acknowledges the 200m buffer zone enforced by the specialists. The 200m buffer zone protects the wetland area and sensitive vegetation found in the area. The sensitive grassland area was set aside for development by the specialists due to the fact that an additional piece of land on the southern boundary of the site is included within the buffer zone. This area is viewed as sufficient by the specialist. The specialist reports concluded that the sensitive areas will be adequately protected against any potential impacts. Furthermore the development area will be fenced off ensuring that construction activities do not encroach within the 200m buffer zone area. The developable area will remain fenced off during the operational phase off the development, ensuring that human impact is minimised. Should the site be left vacant there would be no control over what happens on the site and activities that may be harmful to the natural environment could increase such as the illegal dumping of household and construction material, destruction of natural habitat by quad bikes and four wheel vehicles, illegal occupation of the land and subsistence farming practices taking place within the flood plain area. The opinion is therefore held that the proposed development would enable the sensitive habitat to be conserved whereas the current status quo would result in the destruction of sensitive vegetation over the long term.
Geology/Soils	The proposed development will over the long term eliminate further disturbance of the vegetation cover and will prevent further soil erosion.
Surface Water	The proposed development will have a positive impact on the surface water in the sense that stormwater will be retained on the property before discharging it into the

No-Go Option	Environmental Costs
	system. Where as currently stormwater is being discharged into the system uncontrolled.
Groundwater	There is currently no data available to assess the quality of groundwater.
Air Quality	Air quality will not be affected.
Noise	Noise levels will increase due to the nature of the proposed activities.
Vegetation	The existing vegetation will be impacted on; however the sensitive portions will not be impacted on and is protected within a 200m buffer zone.
Fauna	If the vacant area is left unprotected the specie diversity may decline due to illegal land use practices.
Socio-Economic Features	The social economic impact is vast with approximately 80 000 jobs that could be created over a period of 15 years. Therefore the proposed development will contribute towards the establishment of social facilities, upliftment of communities, and over the long term, sectors within the regional economy.

The No-Go option is an option but is not seen as a viable or sustainable option for the site. Leaving the site vacant will contribute to environmental degradation, dumping, littering, use of the site as a dirt track for quad bike racing and other illegal activities. This could lead to the loss of sensitive habitat as identified within the specialist reports. Therefore the proposed development provides a unique opportunity to protect the highly sensitive wetland area and buffer zone whilst allowing development on the non-sensitive portion of the site.

8 ENVIRONMENTAL IMPACT ASSESSMENT

The overall aim of an ecologically sound development project is to minimise the negative impacts of the project on the environment, thus limiting the ecological footprint of the project while moving towards greater sustainability over the longer term.

8.1 Cumulative Effects

It is important to assess the natural environment using a systems approach that will consider the cumulative impact of various actions. Cumulative impact refers to the impact on the environment, which results from the incremental impact of the actions when added to other past, present and reasonably foreseeable future actions regardless of what agencies or persons undertake such actions. Cumulative impacts can result from individually minor but collectively significant actions or activities taking place over a period of time. Cumulative effects can take place so frequently in time that the effects cannot be assimilated by the environment.

An assessment of the impact that the proposed development may have on the environment includes evaluating the impact according to a series of assessment criteria. This has been undertaken by considering the effects that may result should the impact occur. This was evaluated according to the inputs received from I & AP's and on the basis of experience gained from similar projects.

8.2 Assessment Criteria for Impacts Identified

As a means of determining the significance of the various impacts that can or may be associated with the proposed project, a series of assessment criteria were used for each impact. These criteria include an examination of the nature, extent, duration, intensity and probability of the impact occurring, and assessing whether the impact will be positive or negative for the natural as well as biophysical environments at, and surrounding, the site. The following criteria have been adapted from those proposed in the EIA Guideline Document (April 1998).

8.2.1 Nature

This is an appraisal of the type of effect the activity would have on the affected environment. This description includes what is being affected and how.

8.2.2 Extent

This indicates the spatial area that may be affected by the impact and further describes the possibility that adjoining areas may be impacted upon. This includes four classes that are listed as follows:

- Local (extending only as far as the site);
- Limited (limited to the site and it's immediate surrounds);
- Regional (extending beyond immediate surrounds to affect a larger area); and
- National or international.

8.2.3 Duration

This refers to the period of time that the impact may be operative for (i.e. the lifetime of the impact). This includes the following four classes that are listed as follows:

- Short (i.e. 0 - 5 years);
- Medium (i.e. 5 - 15 years);
- Long (i.e. > 15 years and/or where natural processes will return following the cessation of the activity or following human intervention);
- Permanent (i.e. where 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).

8.2.4 Intensity

This indicates whether the impact is likely to be destructive or have a lesser effect. Three such classes of intensity are defined and these are listed as:

- Low (i.e. where natural, cultural and social functions and processes are not affected by the development);
- Medium (i.e. where the natural, cultural and/or social functions and processes are affected by the development but can continue in a modified way);
- High (i.e. where natural, cultural and/or social functions or processes are altered to the extent that it will temporarily or permanently cease).

8.2.5 Probability

This refers to the likelihood of the impact actually occurring. The following four classes are used to describe the probability of the impact:

- Improbable (i.e. low possibility of the impact);
- Probable (i.e. a distinct possibility exists that the impact will occur);
- Highly probable (i.e. more than likely that the impact will occur);
- Definite (i.e. the impact will occur regardless of any preventative mitigation/measures).

8.2.6 Significance

The significance of the impact (i.e. whether it will lead to a marked change in the environment or not) is determined though a synthesis of the aspects produced in terms of their nature, duration, intensity, extent and probability. Four classes of significance exist including:

- None (i.e. the impact will not have an influence on the decision and requires no mitigation);
- Low (i.e. the impact will have a limited influence on the decision and requires mitigation to manage the environment);
- Medium (i.e. it is likely to have an influence on the decision and requires mitigation)
- High (i.e. Mitigation is required and this may not be sufficient to ensure that the environment is not detrimentally affected by the proposed development).

9 ASSESSMENT OF POTENTIAL IMPACTS ON THE ENVIRONMENT

Table 10 below indicates the relevance of the various environmental aspects that may be affected by the proposed development. An environmental aspect here refers to a potential environmental impact that may arise as a result of the development. Where it is known or where it has been recorded that such an impact does occur at the site, this has also been included in the table.

Table 10: List of Environmental Impacts with possible relevance to the Project

Environmental Aspect	Relevant
Air Quality	X
Heritage Assessment	√
Cumulative Impacts	√
Ecological Systems	√
Faunal Abundance and Diversity	√
Floral Abundance and diversity	√
Geology	√
Ground water	√
Land Use	√
Mining area	*X*
Open Space	√
Public Response	√
Social & Economic Issues	√
Soils	√
Surface water	√
Topography	√
Visual Impact	√
Traffic	√
Waste management	√

The relevant issues have each been assessed taking into account information obtained from the applicant, I & AP's and specialist's inputs. The issues of significance are discussed in more detail below and mitigation measures are proposed for the meaningful management and monitoring thereof.

9.1 Environmental Impact Assessment

9.1.1 Air Quality

Status Quo Conditions

The quality of air in the specific area is reasonably good and the only localised air pollution occurs with veldt fires. Air quality is most affected during the winter months due to the burning of coal for cooking and heating within the surrounding residential communities.

Impact Assessment for the Development Phases

- **Construction**

The proposed development phase may have a negative impact on the air quality as a result of increased emissions from construction vehicles and equipment as well as the generation of dust during construction activities.

The impact during this phase is likely to be of limited extent, long duration, low intensity and an improbable occurrence

- **Operational**

During this phase the completed development would eliminate the occurrence of dust. The proposed development is regarded as a major traffic generator, with light and heavy vehicular traffic expected and a rail terminal. Pollution by emissions from vehicles, will not increase substantially, the project should therefore not have a significant impact on the surrounding environment.

The proposed impact is likely to be of limited extent, short duration, medium intensity and probable occurrence.

Table 11: Impact Summary Matrix for Air Quality

Nature	**Air Quality**		**Status**	**Low**
Impact source(s)	Dust			
Affected stakeholders	Surrounding landowners			
Magnitude	*Extent*	**Limited**		

Nature	**Air Quality**		**Status**	**Low**
	Intensity	**Medium**		
	Duration	**Short**		
	Probability	**Probable**		
Significance	*Without mitigation*	**Medium**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Option:

- Clear vegetation only from areas where construction will start right away
- Apply water or other dust suppressive methods to temporary road surfaces during construction;
- Lower speed limits on construction site. This can reduce dust emissions by 22%;
- Upgrade entrance and exit roads to be used by construction vehicles by: (1) improving the particle size, shape and mineral types that make up the surface and base materials of the entrance and exit roads and (2) add surface gravel to reduce the source of dust emission;
- Minimise the volume of material tracked-out onto road surfaces by construction vehicles by: (1) filling in muddy areas with gravel or other surface material and (2) stabilising shoulders of roads with gravel/vegetation.
- No open fires should be allowed on the construction site.

9.1.2 Heritage Assessment

Status Quo Conditions

Three sites rated to have significance have been identified in the study area. They are:

• Two old cemeteries, which are rated as having high significance on a local level.

• An old farmstead, which is rated as having high significance on a regional level.

Impact Assessment for the Development Phases

- **Construction**

It is concluded that sites 1 and 3 have a "high" significance rating. These two sites will be impacted on during stage 1 of the development phase. It is therefore necessary that the correct procedures are followed to obtain permission from SAHRA to relocate the graves and to demolish the house (if approved by SAHRA). Site 2 will only be affected during stage two of the development phase. It is recommended that the same procedures are followed

for this site as for the aforementioned sites.

The impact during this phase is likely to be of limited extent, short duration, high intensity and a definite occurrence

- **Operational**

During this phase the impacts on the heritage sites would have been addressed as per SHARA specifications.

The impact during this phase is likely to be of limited extent, short duration, low intensity and a improbable occurrence

Table 12: Impact Summary Matrix for Heritage Assessment

Nature	**Heritage Sites**		**Status**	**High**
Impact source(s)	Construction activities			
Affected stakeholders	Site 1: Small graveyard of the Vermeulen Family Site 2: Larger Cemetery still in use Site 3: The Old Farm Stead			
Magnitude	*Extent*	**Limited**		
	Intensity	**High**		
	Duration	**Short**		
	Probability	**Probable**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium**		

Prevention, Mitigation, and Management Option:

- **Site 1:** S 26.40522; E 28.20902

The specialist recommended that all the graves are relocated to a formal cemetery

  - Mitigation actions recommended: to retain the graves or, alternatively, relocate after following correct procedure ;
  - Legal requirements: Permits, SAHRA permits, police, notification, consultation, relocation.

- **Site 2:** S 26.40973; E 28.22176

The cemetery is a very large feature and is still in use by the local community, and it is therefore recommended that it is retained and formalised by fencing it off, maintaining the site and identifying the authority for looking after it.

- Mitigation actions recommended: to retain the graves or, alternatively, relocate after following correct procedure ;
- Legal requirements: Permits, SAHRA permits, police, notification, consultation, relocation.

❑ **Site 3:** S 26.40992; E 28.21193

This is an old farmstead, consisting of a house, outbuildings, barns, etc. now mostly in ruins.

- Mitigation actions recommended: mapping of the site by a heritage architecture will be necessary;
- Legal requirements: should the building be demolished, a permit from SAHRA has to be issued.

9.1.3 Ecological Systems

Status Quo Conditions

According to Mucina & Rutherford (2006) the site falls within Carltonville Dolomite Grassland and Eastern temperate freshwater wetlands. The authors described the Carltonville Dolomite Grassland as species-rich grassland with shallow soil and slightly undulating plains on dolomite dissected by prominent rocky chert ridges. This grassland falls within a warm-temparate summer-rainfall region with high summer temperatures and severe frequent winter frosts. This vegetation unit is considered vulnerable.

The Eastern temperate freshwater wetlands (Mucina & Rutherford 2006) are a vegetation unit found around water bodies with stagnant water: lakes, pans, periodically flooded vleis and edges of calmly flowing rivers within the Grassland biome. Features flat landscapes or shallow depressions filled with water bodies supporting aquatic and hygrophylous vegetation. Soils are peaty to vertic. Vleis or pans form where flow of water is impeded by impermeable soils or erosion-resistant features such as dolerite intrusions. Found in summer rainfall region with frequent winter frosts. The associated wetland is classified as a floodplain wetland.

Impact Assessment for the Development Phases

❑ **Construction Phase**

Construction activities typically impact negatively on ecological systems owing to the impacts of stormwater runoff, erosion, noise and the general increase in activity, pollution and the like. These impacts are not likely to have a significant impact on the sensitive environment as it will be localised and contained to the proposed development site.

The proposed impact is likely to be of limited extent, short duration, low intensity and a probable occurrence.

- **Operational**

The anticipated improved water management system and proposed rehabilitation of the existing habitat after construction should have a positive impact on the micro ecology of the site. The site will only be partially developed; a large open space area of ±200ha will remain. The sensitive wetland area and applicable buffer zone is included within this protected area and will therefore by protected from development by a 200m buffer zone that is regarded as the line of no development.

The proposed impact is likely to be of limited extent, long duration, high intensity and a probable occurrence.

Table 13: Impact Summary Matrix for Ecological Systems

Nature	**Ecological Systems**		**Status**	**High - Medium**
Impact source(s)	Fauna, Flora, Wetland Area, buffer zone, Avifauna, & Herptofauna			
Affected stakeholders	Site specific			
Magnitude	*Extent*	**Limited**		
	Intensity	**High**		
	Duration	**Permanent**		
	Probability	**Definite**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium**		

Prevention, Mitigation and Management Options:

- The construction area to be fenced off before construction commences.

- No development to be allowed within the 200m buffer zone area as per the layout plan.
- Construction should be limited to daylight hours.
- The ECO and the site manager should determine soil stockpile areas.
- No artificial lighting should be allowed within the ecological sensitive areas.
- Only indigenous plants should be allowed in the gardens and landscaped areas.
- Implement the guidelines of the EMP and the mitigation measures proposed by the specialists.

9.1.4 Faunal Abundance and Diversity

Status Quo Conditions

Mammals: The mammal study found that the open perennial water sources on the site are too modest to allow for the permanent or even infrequent occurrence of spotted-necked or clawless otters. The specialist concluded that otters may occasionally venture onto the site during exceptionally wet spells, but that is regarded as a rare event.

In terms of wetland vegetation the specialist found that the lush semi-aquatic vegetation along streams and marshy areas provide ideal habitat for the rough-haired golden mole, the listed shrews as well as the African marsh rat. This confirms the exclusions of the wetland area from any form of development or side-effects of the construction and operational phases of the development.

The investigation of the terrestrial portion of the site showed that the area is severely disturbed, either by ploughing or overgrazing. The proposed development will displace most of the terrestrial species recorded, but according to the report none of these can be regarded as rare or even sensitive. All species are common and widespread, and their loss will be of little conservation consequence at a national level.

The investigation concluded that with the exclusion of the wetland and the suitable buffer zone superimposed on appropriate management practices, the proposed development should not result in a loss of ecological sensitive and important habitat units, ecosystem function (e.g. reduction in water quality, soil pollution), loss of mammal habitat, nor of loss/displacement of threatened or protected species.

Avifauna: Three Red Data avifaunal species are likely to make use of the wetland habitat on the study site:

- **African Grass-Owl** (*Tyto capensis*): The wetland habitat and more specifically the wetland grass area south of the tributary of the Rietspruit on the southern border of the study site could offer suitable breeding, roosting and foraging habitat for African Grass-Owl if proper veldt management practices are implemented. Currently the wetland vegetation is under severe grazing pressure resulting in any dense wetland grass cover and adjacent grassland being trampled by livestock and African Grass-Owl generally avoids areas that are subjected to intense grazing or burning and this is probably the largest factor why none were observed on the study site. It is likely that African Grass-Owls that breed within the Suikerbosrand Nature Reserve will move up and down the tributary to forage and possibly expand their breeding range when young birds are dispersing from the nests. This is also applicable for the Rietspruit west of the study site.
- **African Marsh-Harrier:** The wetland habitat, especially the *Pragmites australis* and *Typha capensis* vegetation, that flanks the tributary of the Rietspruit offers suitable foraging habitat for this species.
- **Black-winged Pratincole:** Although suitable habitat exits for this species it is unlikely that any development on the study site will have a negative affect on this species due to the generally disturbed and degraded state of the main habitats.
- **Lesser Kestrel:** Lesser Kestrel might on occasion move through the area during migration and might use the area for hunting purposes. The SABAP2 data for the 2628AC q.d.g.c. and for the 2620_2810 pentad indicate that this species was not observed in this region. The SABAP1 data indicate a low reporting rate. There are however no documented records for this species for the area on and surrounding the study site. It is highly likely that this species will forage over the open grassland habitat on site on occasion during their migration periods. It is unlikely that development on the open grassland area will have a negative affect on the population of this species and there are still large areas with suitable open grassland and fallow fields surrounding the study site that will favour this species for foraging purposes.

Herpetological: Of the 48 reptile species which may occur on the study site, three were confirmed during the site visit and of the possible 12 amphibian species which may occur on the study site, one was confirmed during the site visit.

- **Striped harlequin snake:** has been recorded in this quarter degree grid cell (Ditsong National Museum of Natural History or TVL Museum Records), and many moribund termitaria, where this species is most likely to be found, are present on the study site. This species has also been

recorded on the nearby Suikerbosrand Nature Reserve (Koen, 2007). It is very difficult to confirm whether this cryptic snake is present on any study site, but the possibility that it occurs on this particular study site does exist.

- **Giant Bullfrog:** The study site has a few temporary pans next to the stream in the wetland, which is a potential breeding site for giant bullfrogs. These breeding sites are temporary, which bullfrogs prefer in order to avoid predation from fish. If the species occurs on the study site, its breeding habitat should be protected if the wetlands are protected and excluded from any development. The chances are however very slim that any bullfrogs occur on the study site.

Impact Assessment for the Development Phases

- **Construction**

Heavy construction machinery and vehicles will definitely alter the faunal habitat on the portion of the site to be used for development. However this should be a short-term impact that will re-establish itself after construction activities. Where possible sensitive species must be rescued and relocated. The sensitive portion of the site will not be affected as the construction site will be fenced off.

The proposed development phase is likely to be of limited extent, short duration, medium intensity, and probable occurrence.

- **Operational**

The sensitive area within the 200m buffer zone will remain undeveloped and the specie diversity will remain as is.

The proposed operational phase is likely to be of limited extent, long duration, high intensity and definite occurrence.

Table 14: Impact Summary Matrix for Fauna

Nature	**Faunal**		**Status**	**High**
Impact source(s)	Mammals, Avifuana & Herpetofauna			
Affected stakeholders	Site Specific			
Magnitude	*Extent*	**Limited**		
	Intensity	**High**		
	Duration	**Long**		

	Probability	**Definite**
Significance	*Without mitigation*	**High**
	With mitigation	**Medium - Low**

Prevention, Mitigation, and Management Options:

The following mitigation measures were taken from the reports compiled and represent a summary of the mitigation measures proposed:

- The contractor(s) must ensure that no herpetofauna species are disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.
- A study to elucidate the potential for harmful dust and sediment effluent emanating from the development and operational phases of the development that may contaminate the wetland, should be commissioned.
- The open space system should be fenced off prior to construction commencing (including site clearing and pegging). All construction-related impacts (including service roads, temporary housing, temporary ablution, disturbance of natural habitat, storing of equipment/building materials/vehicles or any other activity) should be excluded from the open space system. Access of vehicles to the open space system should be prevented and access of people should be controlled, both during the construction and operational phases. Movement of indigenous fauna should however be allowed (i.e. no solid walls, e.g. through the erection of palisade fencing).
- Outside lighting should be designed to minimize impacts on fauna. 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.
- In order to minimize artificially generated surface storm-water runoff, total sealing of paved areas such as parking lots, driveways, pavements and walkways should be avoided. Permeable material should rather be utilized for these purposes.
- The crossing of natural drainage systems should be minimized and only constructed at the shortest possible route, perpendicular to the natural drainage system. Where possible, bridge crossings should span the entire stretch of the buffer zone.

Furthermore it is recommended that the open space system should be managed in accordance with an EMP that complies with the *Minimum Requirements for Ecological Management Plans* and forms part of the EMP.

9.1.5 Floral Abundance and Diversity

Status Quo Conditions

- Four **vegetation study units** were identified:

  o *Eragrostis – Elionurus* grassland: The habitat of the *Eragrostis – Elionurus* grassland study unit was suitable for one of the Red List species and two of the Orange List species. No Red List species were found in this study unit, but two Orange List species, *Boophone disticha* (Cape poison bulb) and *Hypoxis hemerocallidea* (African potato) were found sparsely scattered over the study unit.

  o Wetland: Connectivity with wetland vegetation existed upstream and downstream of both drainage lines. Of the 174 plant species recorded on the site 63 were recorded in the wetland vegetation study unit. Of these, 52 were indigenous species. The habitat of the Wetland study unit was suitable for four of the Red List species and one Orange List species. One of the Red List species, *Argyrolobium campicola* was found on the flood plain of the Riet Spruit and one Orange List species was found sparsely scattered along the drainage line of both the Riet Spruit and its tributary.

  o Mixed alien and indigenous vegetation: The species diversity of this study unit was low. Of the 174 plant species recorded on the site 30 were recorded in the mixed alien and indigenous vegetation study unit. Of these, 18 were indigenous species. The habitat of this study unit was not suitable for any of the Red List species or Orange List species known to occur in the quarter degree grid square. The vegetation of this study unit was not considered sensitive.

  o Cultivated fields: This study unit consisted of the large formal cultivated fields of surrounding farms and the small patches of informal fields south-east of, and abutting, the railway line. Most of these fields were still lying fallow after the winter. The species diversity of this study unit was low. The habitat of this study unit was not suitable for any of the Red List species or Orange List species known to occur in the quarter degree grid square.

- **Medicinal plants:** of the 174 plant species recorded on the site, 28 species with medicinal properties were found.
- **Alien Plants:** Twenty-one alien plant species, of which four species were Category 1 Declared weeds, three were Category 2 Declared invaders and one was a Category 3 Declared invader, were recorded on the site.
- **Orange listed species:** The habitat was suitable for all three of the Orange List plant species known to occur in the 2628AC quarter degree grid square. All three of these species were found

- **Red listed species:** Twelve Red List plant species are known to occur in the 2628AC quarter degree grid square, three of these within 5 km of the site. The habitat was suitable for these three species, as well as for another two Red List species, one of which was found in the flood plain of the Riet Spruit.

Impact Assessment for the Development Phases

- **Construction**

Construction activities are likely to have definite impact on the *Eragrostis* grassland found over the central portion of the site. The wetland area and associated vegetation will not be impacted on due to it being protected within a 200m buffer zone. Indigenous vegetation must be protected as far a possible. Care must be taken to control the invasion of disturbed areas by alien plants.

The proposed development is likely to be *of limited extent, short duration, high intensity and definite occurrence.*

- **Operational**

There should be no further impact on the remaining natural vegetation during the operational phase of the development. The establishment of indigenous landscaped areas will improve the abundance of diversity of the floral species. The wetland area and 200m buffer zone will remain fenced off.

The potential impact during this phase is likely to be *of limited extent, long duration, high intensity and improbable occurrence.*

Table 15: Impact Summary Matrix for Flora

Nature	**Flora**		**Status**	**Medium**
Impact source(s)	*Eragrostis – Elionurus* grassland Wetland Mixed alien and indigenous vegetation Cultivated fields			
Affected stakeholders	Local Specific			
Magnitude	*Extent*	**Limited - confined to area to be used for development**		
	Intensity	**Medium – confined to area to be used for development**		
	Duration	**Long**		

	Probability	**Probable –** for the *Eragrostis – Elionurus* grassland **Improbable** – for the Wetland, Mixed alien and indigenous vegetation and Cultivated fields
Significance	*Without mitigation*	**High**
	With mitigation	**Medium**

Combined Sensitivity Map and Layout Plan (Composite Map):

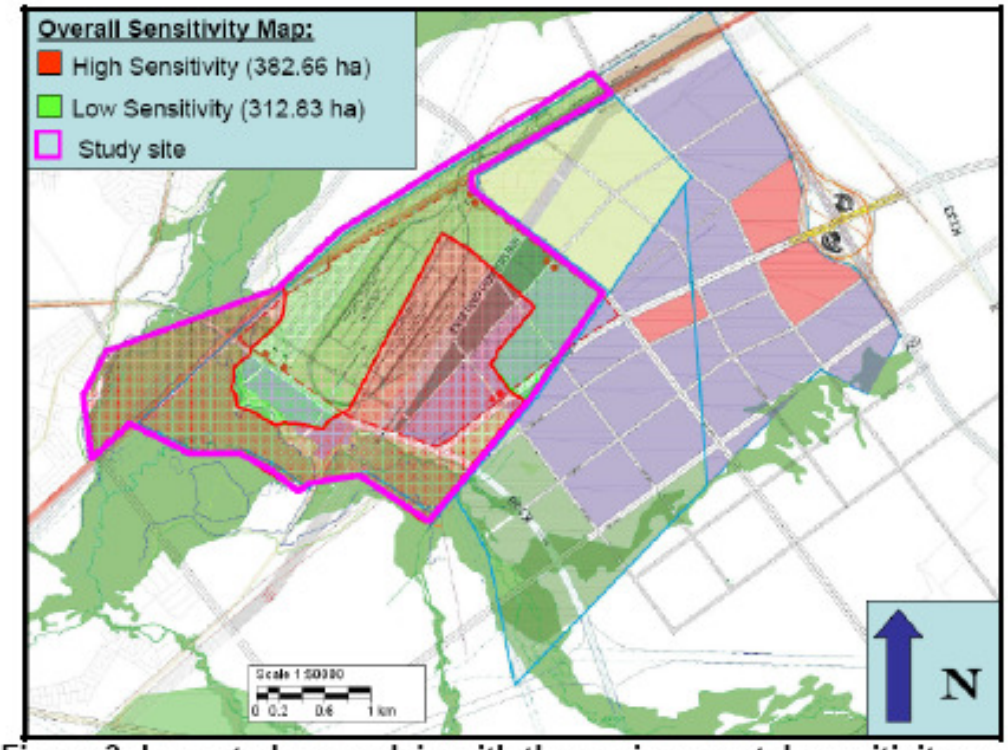


Figure 3: Layout plan overlain with the environmental sensitivity map

The Specialist report concluded that "…*where the layout plan is overlain with the environmental sensitivity map, it is clear that most of the wetland and surrounding buffer areas were excluded from the proposed development. The grassland area to be conserved is however very small, but should be seen together with the open space areas on the layout map for the neighbouring site to the east.*"

Prevention, Mitigation, and Management Options:

The following mitigation measures were proposed by the Specialist Consultants, Galago Environmental:

- An appropriate management authority that must be contractually bound to implement the Environmental Management Plan (EMP) and Record of Decision (ROD) during the

operational phase of the development should be identified and informed of their responsibilities in terms of the EMP and ROD.

- All areas designated as sensitive in a sensitivity mapping exercise should be incorporated into an open space system. Development should be located on the areas of lowest sensitivity.
- The Ecological Management Plan should:
    - include an ongoing monitoring and eradication programme for all non-indigenous species, with specific emphasis on invasive and weedy species
    - include a comprehensive surface runoff and storm water management plan, indicating how all surface runoff generated as a result of the development (during both the construction and operational phases) will be managed (e.g. artificial wetlands or storm water and flood retention ponds) prior to entering any natural drainage system or wetland and how surface runoff will be retained outside of any demarcated buffer or flood zones and subsequently released to simulate natural hydrological conditions
    - ensure the persistence of all Red and Orange List species
    - minimize artificial edge effects (e.g. water runoff from developed areas and application of chemicals)
    - result in a report back to the Directorate of Nature Conservation on an annual basis.
- Where possible, trees naturally growing on the site should be retained as part of the landscaping.
- The sensitive area on site must be fenced off from the proposed development to ensure that the construction activities do not impact on this area. No dogs are allowed in this area.
- Pedestrian routes through the sensitive area should be laid out by the Botanist and be permanent to ensure that none of the red listed plants will be impacted negatively.

9.1.6 Wetland Delineation and Aquatic Assessment

Status Quo Conditions

❑ **Wetland Classification:**

- The hydrological integrity of the wetland, the geomorphic processes of the wetlands and the vegetation communities of the wetland have all been seriously modified and was assigned a D category;
- The direct services provided by the wetland were very low. The indirect services were rated as low for the wetland. The Ecological Importance and Sensitivity was also low.

- **Aquatic Assessment:**

  - DO concentrations were considered to have a limiting effect on aquatic biota at site TF1 and TF2 during the August 2011 survey;
  - TDS values recorded are considered to be high and are considered to have a limiting effect on aquatic biota;
  - Habitat availability at sites TF1 and TF3 during the August 2011 survey was recorded to be adequate / fair and site TF2 was recorded to be poor / inadequate.
  - Based on the IHIA results habitat integrity at all the sites has reached a critical level of impairment;
  - Based on the SASS5 results biotic integrity at site TF1 was classified as 'Moderate' (PES Class C). This can be attributed to the adequate habitat availability at this site. Site TF2 was classified as being "Poor" (PES Class E/F).

Impact Assessment for the Development Phases

- **Construction**

Runoff from the construction areas may result in contamination of wetland soils. The following impacts may result in changes to the soil structure:

- Heavy construction vehicles moving within the wetland;
- Stock piling;
- Construction on the wetland;
- Spills from machinery;
- The mixing of concrete;
- Clearing of vegetation for construction.
- Dust and sediment runoff from construction activities;
- Loss of vegetation due to vegetation clearing during the construction phase;

The proposed development is likely to be *of limited extent, short duration, high intensity and definite occurrence.*

- **Operational**

The following impacts may occur during the operational phase:

- Diesel and oil spills from equipment and machinery; and
- Higher and faster run off from the inland port.
- Sedimentation and runoff from the railway siding; and

- Increase in the velocity of the runoff from the proposed roads and hardened surfaces due to the development.

The proposed development is likely to be of limited extent, long duration, high intensity and probable occurrence.

Table 16: Impact Summary Matrix for Wetland Delineation and Aquatic Assessment

Nature	**Wetland and Aquatic**		**Status**	**Medium**
Impact source(s)	Wetland area and Aquatic Systems			
Affected stakeholders	Local Specific			
Magnitude	*Extent*	**Limited - confined to area to be used for development**		
	Intensity	**Medium – confined to area to be used for development**		
	Duration	**Long**		
	Probability	**Improbable**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium –** for construction phase **Low –** for operational phase		

Prevention, Mitigation, and Management Options:

The following mitigation measures and risks were identified by the Specialist (Prism Environmental):

Risk identified		**Comments**
Compacting of wetland soils	Heavy construction vehicles moving within wetlands	Heavy construction vehicles and transport vehicles will potentially compact wetland soils due to the close proximity to the wetlands. Ingress into wetlands must be kept to a minimum
	Stock piling	Stock piling must be avoided within the delineated wetlands. Stockpiles must be bermed to prevent sedimentation of the wetlands. "First out, last in' method must be practised in terms of the removal of the soil
	Construction on wetlands	Construction activities in close proximity to wetlands and within wetlands will compact soils

Risk identified		**Comments**
Contamination of soils resulting in chemical structure change	Spills from machinery and construction vehicles	Construction vehicles and machinery that aren't maintained and serviced will potentially spill oil, diesel and other contaminants into the wetland
	Mixing of concrete to build the inland port	Mixing must not be done on the ground or near wetlands. The cement needs to be contained
Soil erosion	Clearing of land for construction	Due to the construction covering a large area the erosion potential due to land clearing is high

More specifically the following measures should be implemented:

- *"During construction, traversing the wetland must be kept to a minimum. Construction vehicles must keep to a single path into the construction site and a single path out of the construction site to prevent unnecessary impact to the wetland;*
- *A suitably qualified Environmental Control Officer (ECO) must be appointed during the construction phase to oversee the construction of the proposed development*
- *All construction should be done in the dry season (winter) to prevent surface water runoff and contamination and erosion of the wetlands. In the wet season the soil will be water logged and the construction vehicles will have difficulty getting into the site. This will also have an impact on the wetland soils;*
- *Mixing of cement for the construction of the associated infrastructure must not be done on the bare soil at least 50 m from the edge of the wetland and must be mixed on mixing trays, to prevent the cement contaminating the wetland soils.*
- *During the project, any accidental spills into the wetlands must be contained, cleaned up, and the areas rehabilitated; and*
- *Where soils have been compacted, these should be loosened by labourers on foot (for small sections) or ripped by tractor (in large areas).*
- *Silt nets and geo-fibres should be put in place to avoid erosion in areas cleared for construction;*
- *A maintenance monitoring programme of all components of the proposed inland port and associated infrastructure must be developed for the duration of operation. This programme should be audited and checked annually."* (Prism Environmental, 2012:49-50).

9.1.7 Geology

Status Quo Conditions

The geotechnical report concluded that the site the site is located on chert-rich dolomite of the Malmani Subgroup, Chunispoort Group, of the Transvaal Supergroup. Dolerite occurs in large areas of the site. Shallow dolomite bedrock conditions are also confirmed in scattered locations. The Inherent Hazard Zonation of the site, which is also shown on the layout plan, provides guidance for land use planning of the site. The majority of the site with the exception of Dolomite Hazard Zone 4 is suitable for an inland port.

Impact Assessment for the Development Phases

- **Construction**

Excavations for foundations should be inspected to ensure that the founding medium meets the design criteria. Test holes should be drilled where deemed necessary. Foundations should be constructed in terms of the NHBRC Standards and Guidelines of 1995 in order to mitigate the prevailing geological conditions. Further a recognised professional civil engineer should monitor all excavation work and installation.

The potential impact during this phase is likely to be of limited extent, long duration, high intensity and definite occurrence.

- **Operational**

There should be no further impact on the geological conditions during the operation phase of the development.

The potential impact during this phase is likely to be of limited extent, long duration, high intensity and definite occurrence.

Table 17: Impact Summary Matrix for Geological Conditions

Nature	**Geotechnical conditions**		**Status**	**Medium**
Impact source(s)	Underlying strata			
Affected stakeholders	Site Specific			
Magnitude	*Extent*	**Limited**		

	Intensity	**Medium**
	Duration	**Long**
	Probability	**Probable**
Significance	*Without mitigation*	**Medium**
	With mitigation	**Low**

Prevention, Mitigation, and Management Options:

- Test holes should be drilled for every proposed development and foundations must be inspected by an Engineer;
- Appropriate foundation design and water precautionary measures are prescribed together with recommendations aimed at the adoption of a pro-active water bearing services maintenance strategy. Particular emphasis is placed on the need to manage storm water falling onto, moving across and exiting the site. Storm water should be effectively and efficiently removed from the immediate area around structures, into the municipal storm water system
- Rationally designed foundation solutions will be required for all structures. For more details of foundation design and water precautionary measures see Intraconsult's report IR1067R dated 12 October 2011.
- The Council for Geoscience is supporting the recommendations of Intraconsult's report.

9.1.8 Ground Water

Status Quo Conditions

During the rainy season a shallow water table may be present on the site. No seepages were encountered in the test pits. There are no known boreholes on the site.

Impact Assessment for the Development Phases

- **Construction**

The construction of the proposed township will not impact on the ground water quality or quantity.

The proposed development phase is likely to be of limited extent, short duration, low intensity and probable occurrence.

- **Operational**

The development will not have an effect on the quality of the ground water.

This phase is likely to be of limited extent, long duration, low intensity and probable occurrence.

Table 18: Impact Summary Matrix for Ground Water

Nature	**Ground Water Table**		**Status**	**Low**
Impact source(s)	Under ground water table			
Affected stakeholders	Site Specific			
Magnitude	*Extent*	**Limited**		
	Intensity	**Low**		
	Duration	**N/A**		
	Probability	**Improbable**		
Significance	*Without mitigation*	**Low**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Options:

- The necessary damp proofing precautions should be taken underneath structures;
- Provision must be made to prevent an ingress of water onto subsurface structures or beneath foundations;
- Non-ferrous metal pipes or plastic pipes are recommended for wet services;
- Implement the recommendations of the EMP for construction activities; and
- Wastes and rubble on the site must be removed on a regular basis.

9.1.9 Land Use - Proposal

Status Quo Conditions

The site is zoned 'Undetermined' in terms of the Germiston Town Planning Scheme. The site is mostly vacant. However the community of Thulasizwe is located on a small portion of the site. The community practices subsistence agricultural over portions of the site especially the flood plain area.

Impact Assessment for the Development Phases

- **Construction**

During the first phase, township services will be installed. This is a normal process of any

development and the surrounding area will not be significantly impacted on, as the construction activities will take place on the site itself. There may be an increase in the number of construction vehicles in the area. The second phase will comprise of the construction of top structures, railway terminal and roads. An increase in the number of construction vehicles, people and construction material will be experienced during this phase.

The proposed development phase is likely to be of local extent, short duration, medium intensity and definite occurrence.

- **Operational**

The land use during this phase will be as follow:

Proposed Land Use	Area Hectare
Industrial/Warehousing	114.1479
Intermodal yard	32.0171
Logistics	176.4498
Non Developable land	14.4376
Roads	59
Trucking Intermodal yard	42.8174
Wetland Area/Open Space	111.1059
Servitude Power Line	28.0157
Servitude Rail	47.5307
TOTAL	**626.669**

The proposed development will be spread out over the entire site except the wetland area and 200m buffer zone. The development will take place in two stages and will be phase 1 of a larger development concept that once fully developed will constitute 1000ha in extent. In light of the above it can be concluded that:

The operational phase is likely to be of local extent, long duration, low intensity and definite occurrence.

Table 19: Impact Summary Matrix for Land Use

Nature	**Proposed Land Use**		**Status**	**Medium**
Impact source(s)	Site Specific			
Affected stakeholders	Site Specific			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**Medium**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Options:

- The construction activities should be controlled and managed through an EMP;
- Each subsequent land use, developed within the township, must be monitored, and controlled through a site development plan, and the conditions of establishment formulated during the township establishment process.

9.1.10 Land Use - Alternative

No alternative density proposals were investigated. The Council is willing to support the proposed development. Different Architectural designs will be investigated by the developer and submitted to the Council for approval.

9.1.11 Mining Area

Status Quo Conditions

No mining activities are currently taking place on the site.

9.1.12 Open Space

Status Quo Conditions

The specialist reports concluded that the wetland area system can be regarded as highly sensitive in terms of connectivity. Furthermore the report indicated that the buffer of 200m for the near threatened plant species should be sufficient for the conservation of the wetland system and sensitive vegetation. Development of the sensitive *Eragostis* grassland area is

allowed as a portion of land toward the southern side of the site is being conserved to ensure connectivity and conservation of the species identified.

The report concluded that there is a need for conservation planning and actions which address the larger wetland area.

Impact Assessment for the Development Phases

- **Construction**

All construction activities will be confined to the proposed development footprint. The open space area will not be impacted on as the portion to be used for development will be fenced off.

The proposed development phase is likely to be of limited extent, short duration, low intensity, and improbable occurrence.

- **Operational**

The proposed township development will not intrude in to the sensitive areas as it will be fenced off.

The proposed operational phase is likely to be of limited extent, long duration, low intensity and improbable occurrence.

Table 20: Impact Summary Matrix for Open Space

Nature	**Open Space Area**		**Status**	**Low**
Impact source(s)	Wetland area and buffer zone			
Affected stakeholders	Site and surrounding open space areas			
Magnitude	*Extent*	**Limited**		
	Intensity	**Low**		
	Duration	**Permanent**		
	Probability	**Improbable**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Options:

The following mitigation measures were proposed by Galago Environmental Cc:

- *"Invasive vegetation to be eradicated.*
- *The wetland and buffer zone area to be managed through an appropriate management authority (e.g. the body corporate) that must be contractually bound to implement the Environmental Management Plan (EMP) and Record of Decision (ROD) during the operational phase of the development should be identified and informed of their responsibilities in terms of the EMP and ROD.*
- *The open space system should be managed in accordance with an EMP that complies with the Minimum Requirements for Ecological Management Plans and forms part of the EMP.*
- *The open space system should be fenced off prior to construction commencing (including site clearing and pegging). All construction-related impacts (including service roads, temporary housing, temporary ablution, disturbance of natural habitat, storing of equipment/building materials/vehicles or any other activity) should be excluded from the open space system. Access of vehicles to the open space system should be prevented and access of people should be controlled, both during the construction and operational phases. Movement of indigenous fauna should however be allowed (i.e. no solid walls, e.g. through the erection of palisade fencing)"* (Galago Environmental, 2012:70.

9.1.13 Public Response

Status Quo Conditions

No Negative responses were received for the Scoping phase of the EIA process.

Impact Assessment for the Development Phases

- **Construction**

Construction activities are likely to generate an increased amount of public response and issues. The public should be kept informed of progress and activities that may affect them.

The impact is likely to be of limited extent, short duration, low intensity and probable occurrence.

- **Operational**

During this phase all the concerns and issues should have been addressed and the public response should be minimal.

The potential impact on the air quality is likely to be of local extent, long duration, low intensity and probable occurrence.

Table 21: Impact Summary Matrix for Public Response

Nature	**Surrounding community and stake holders**		**Status**	**Medium**
Impact source(s)	All interested and affected parties			
Affected stakeholders	Regional			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**Medium**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Options:

- Establish a communication link between the developer and I& AP's, and
- Respond to public issues fast and effectively.

9.1.14 Social Issues

Status Quo Conditions

The SEIA done by Blue IQ indicated that the Thulasizwe community was established before 1965 for the farm labourers that worked on nearby farms. The number of households found within this informal settlement is 97 (2011). There are however, reports that there are other people that have settled within Thulasizwe, but who do not hold South African identification documentation or any country identification and are considered illegal immigrants. There are approximately 10-15 families with this profile. The social specialist team were told that the unidentified residents are not very approachable. The Thulasizwe community is situated at the junction of the Magagula Heights road (D817) and the road to Katlehong (Rivett-Carnett), across the road from the old farmhouse.

The community have been consulted by the Applicant (Inframax) on a number of occasions, also in the company of the local Ward Councillor. The study indicated that the community seems happy to move off the area as they have been informed that they will be shifted across the road (between the Katlehong road (Rivett-Carnett), Magagula Heights road (D817), and the railway line), and provided with proper housing units with water and electricity. This arrangement is proposed by the Applicant (Inframax).

Impact Assessment for the Development Phases

- **Pre – Construction**

The report by Bue IQ indicated that compensation should be provided in cases of economic displacement stemming from the clearance of land. This should be done before construction begins and will be once-off. Furthermore disclosure regarding the development must emphasize that only the Thulasizwe community has been deemed the affected community, no other resettlement or land claims will be entertained. A full asset inventory (part of the Resettlement Action Plan) of the Thulasizwe community must be undertaken prior to the announcement of the project, thus avoiding opportunistic settler claims (Blue IQ, 2011:88)

The impact of the proposed development on the social issues is likely to be of local extent, short duration, high intensity and definite occurrence.

- **Operational**

The proposed township and the development of various land use activities on the site will contribute to job creation within the area, and attract investment to the area. Local communities will benefit directly from the proposed developments, resulting in social upliftment, and skills development.

The proposed township will combat the development of illegal land uses. In addition the propose development will contribute to the rehabilitation of the natural environment. This will be achieved through the introduction of indigenous vegetation, which will improve the visual quality of the land. The result will be a specific sense of place that will be to the advantage of the surrounding environment.

The impact of the proposed development during this phase is likely to be of local extent, long duration, medium intensity and probable occurrence.

Table 22: Impact Summary Matrix for Social Issues

Nature	**Surrounding community and stake holders**		**Status**	**Medium**
Impact source(s)	Thulasizwe Community			
Affected stakeholders	Local and Regional			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium**		

Prevention, Mitigation, and Management Options

A Land Acquisition and Compensation Plan (LACP) will be developed to structure and manage compensation and economic displacement (loss of cultivated lands). This will identify cases of legitimate entitlement. A Compensation Committee with extensive knowledge and understanding of the claimant's background, and what constitutes fair and equitable compensation, will be put together as the decision-making body for compensation issues. All compensation issues will need to be addressed before the construction phase.

Local government should be involved in the implementation of the LACP, through a carefully structured Compensation Committee. Key roles will be; participation in agreeing fair compensation, and in the identification and securing of replacement land. Interaction around issues of compensation will be implemented via the LACP. By the end of pre-construction, it is expected that there will be no outstanding land and compensation issues to address. There will no longer be a need for the Compensation Committee by the Operations phase.

9.1.15 Traffic and Infrastructure

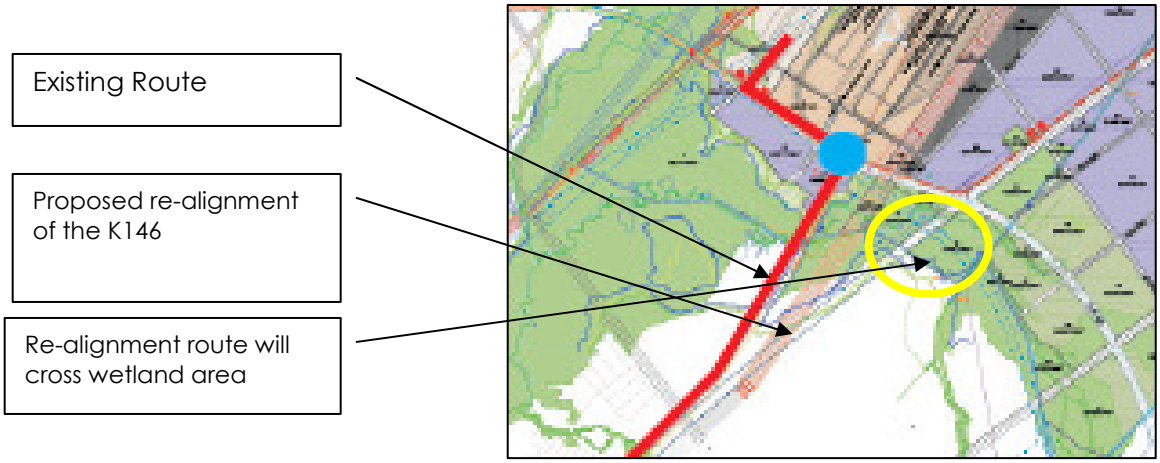
Status Quo Conditions

The PWV13/15, K146 and D817 are affected by the development. The PWV13 will need to be realigned to accommodate planned truck and intermodal yard on the northern boundary of the development along the existing alignment and K146 is also affected by the wetland areas on the south of the development.

Impact Assessment for the Development Phases

- **Construction**

The most significant impact during the construction phase will be the re-alignment of the K146:



The proposed development phase is likely to be of limited extent, short duration, high intensity and a definite occurrence.

- **Operational**

During the operational phase all roads will be constructed as per design specifications and mitigation measures will be implemented. Affected areas will be rehabilitated.

The proposed development phase is likely to be of limited extent, long duration, low intensity and definite occurrence.

Table 23: Impact Summary Matrix for Traffic and Infrastructure

Nature	**Surrounding community and stake holders**		**Status**	**High**
Impact source(s)	Existing roads and proposed re-alignment of the K146			
Affected stakeholders	Local and Regional			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Definite**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium**		

Prevention, Mitigation, and Management Options

- Building of the proposed access roads to be to the satisfaction of the Council;
- All internal roads to be developed according to the site development plan to the satisfaction of the Council;
- All the necessary WULA applications to be submitted to DWAF for the proposed re-alignment of the K146 where it traverses the wetland area.

9.1.16 Surface Water

Status Quo Conditions

The site in its present state with the existing activities on it, does not impact on the drainage and natural water regime. No formal stormwater system is present in the area.

Impact Assessment of the Development Phases

- **Construction**

During the development of the township, pollution of the surface water resources as a result of erosion by rainwater could occur. This will require that stormwater runoff from the construction site is adequately controlled in such ways that impacts like siltation, erosion, and sedimentation do not occur.

The proposed development phase is likely to be of limited extent, short duration, high intensity and probable occurrence.

- **Operational**

Once the proposed township is operation, there will be an increase in run-off from buildings and paved surfaces. Preventative measures should be put into place to prevent soil erosion and no water to enter the wetland area uncontrolled.

The proposed operational phase is likely to be of limited extent, long duration, low intensity and a improbable occurrence.

Table 24: Impact Summary Matrix for Surface Water

Nature	**Surface Water**	**Status**	**High**
Impact source(s)	Existing flow towards the low point of the site and the wetland area		

Affected stakeholders	Limited	
Magnitude	*Extent*	**Limited**
	Intensity	**High**
	Duration	**Permanent**
	Probability	**Highly probable**
Significance	*Without mitigation*	**High**
	With mitigation	**Medium**

Prevention, Mitigation, and Management Options:

- The careful position of soil piles, and runoff control, during all phases of development, and planting of some vegetative cover after completion (indigenous groundcover, grasses etc.) will limit the extent of erosion occurring on the site.
- Sufficient measures must be implemented to prevent the possible contamination of surrounding surface water and groundwater.
- Provision of adequate toilet facilities must be implemented to prevent the possible contamination of surface and ground (borehole) water close to the construction area.
- Heavy construction machinery must be regularly serviced and checked for oil and fuel leaks.
- The timing of clearing activities is of vital importance. Clearing activities and earth scraping should preferably be restricted to the dry season in order to prevent erosion and siltation. The dry months are also the period when the majority of species are either dormant or finished with their breeding activities.
- Preventative measures should be put into place in order to prevent excessive stormwater run-off from the developed areas from entering the external roads.
- All mitigation measures proposed in the Wetland report and Fauna and Flora reports to be implemented.

9.1.17 Topography

The proposed development will not impact on the topography of the area. The water flow patterns will be maintained and no major alterations will be made to the current ground levels.

9.1.18 Visual Impacts

Status Quo Conditions

The visual character of the area is that of a rural landscape. The existing open space area

dominates the landscape. The existing vacant land forms a focal point along the R550 and the D817.

Taking the above into account, potentially negative impacts can still be expected in terms of the aesthetic quality of the surrounding area as a result of the proposed development. The Visual Impact Assessment has confirmed this. However, the impact of the development will be positive in the light of the proposed quality of the development as well as the proposed landscaping programme.

The visual impact of the proposed development is likely to be of limited extent, long duration, low intensity and definite occurrence.

Table 25: Impact Summary matrix for Potential Visual Impacts

Nature	**Surrounding community**		**Status**	**High**
Impact source(s)	All surrounding landowners			
Affected stakeholders	Regional			
Magnitude	*Extent*	**Regional**		
	Intensity	**High**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**High**		
	With mitigation	**Medium**		

Prevention, Mitigation and Management Options

- The specific foundation design criteria recommended in the geotechnical report should be adhere to.
- Construction site to be clearly demarcated and secured;
- No individuals to be allowed on construction site without the permission of the project manager;
- All waste material to be collected on a daily basis and stored within designated containers;
- Area where equipment would be stored to be fenced off and secured;
- An adequate number of toilets shall be supplied and maintained for the use of the Contractor's personnel. The Contractor shall at all times during construction provide

adequate sanitary facilities on site so that all employees are within easy reach of sanitary facilities.

- Regular inspections shall be carried out to ensure toilets are kept in a hygienic state. Toilet paper shall be supplied to all toilets. Staff shall be advised to the fact that they should use these toilets at all times.
- Cement mixing shall only be done at specific areas allocated by the ECO. Cleaning of cement mixing and handling equipment shall only be done using proper cleaning trays. All empty bags shall be removed from the site for appropriate disposal at an approved waste disposal site. Any spillage, which may occur, will be investigated and immediate action shall be taken.

9.1.19 Waste Management

Status Quo Conditions

The waste generated by the proposed project, will be removed as part of the municipal service in the area.

Impact Assessment for the Development Phases

- **Construction**

Construction activities are likely to generate wastes. All wastes should be removed to an approved waste disposal site.

The impact is likely to be of local extent, short duration, low intensity and highly probable occurrence

- **Operational**

Waste during this phase will be removed as part of the municipal services.

The potential impact on the air quality is likely to be of limited extent, long duration, low intensity and highly probable occurrence

Table 26: Impact Summary Matrix for Waste Generation

Nature	**Waste Generation**		**Status**	**Medium**
Impact source(s)	Waste generated during construction and operational phase			
Affected stakeholders	Limited			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**Medium**		
	With mitigation	**Low**		

Prevention, Mitigation, and Management Options:

- Provide litter traps where the stormwater enter the municipal system, and
- Incorporate a waste management plan to remove litter from the site.

9.1.20 Cumulative Impacts

Status Quo Conditions

Cumulative impacts refer to the combined interaction of impacts that on their own may not be significant, but when these impacts occur together, then their impact is manifested. Impacts could interact together to contribute a more significant impact.

The anticipated impacts resulting from construction and implementation of this development could potentially result in cumulative negative effects by also considering the following:

- Surface water pollution;
- Increased runoff;
- Ground water pollution;
- Traffic Impact;

The cumulative long-term impact of the project on the surrounding environment is considered to be medium to low, when the mitigation measures and the EMP are applied properly.

Currently the cumulative impacts mentioned above are relevant to the existing developments located adjacent to the site. It must be noted that landscaping and re-vegetation as well as the establishment of urban gardens will help to reduce the velocity of stormwater runoff and

increase the infiltration of water. Surface water pollution will be contained as the area has comprehensive stormwater infrastructure systems to which the site will connect.

Table 27: Impact Summary Matrix for Cumulative Impacts

Nature	**Surrounding community and open space areas**		**Status**	**Medium**
Impact source(s)	Surrounding community and open space areas			
Affected stakeholders	Regional			
Magnitude	*Extent*	**Limited**		
	Intensity	**Medium**		
	Duration	**Permanent**		
	Probability	**Highly probable**		
Significance	*Without mitigation*	**Medium**		
	With mitigation	**Low**		

9.1.21 Residual Impacts

Residual impacts are those impacts that will remain notwithstanding the implementation of mitigation measures. Potential residual impacts are those associated with the following:

- Loss of natural vegetation cover;
- Light pollution;
- Increased surface runoff;
- Increased illumination;
- Increase in traffic volumes.

10 ENVIRONMENTAL IMPACT STATEMENT AND CONCLUSIONS

The purpose of this report is to provide the relevant authority with sufficient information on the potential impacts of the proposed development, to make an informed decision. Potential impacts were identified in consultation with specialists and through the technical expertise and experience of W & L Consultants. The report sought to ascertain the impact of the proposed development on the environment, which included the social environment, and the probability of impacts occurring.

The construction and operational phase of the proposed development can pose various significant risks to the environment. The issues related to the development were identified, discussed and assessed in terms of various criteria such as extent, duration, intensity and significance. Mitigation measures were listed during all phases of the project and the possible alternatives were reviewed and assessed. In addition an Environmental Management Plan (EMP) is included that outlines all mitigation measures to be implemented during the construction phase of the development (**Annexure F**).

10.1 KEY ISSUES

Risks and Key issues were identified and addressed in consultation with Interested and Affected Parties, through an internal process based on similar developments, an environmental impact assessment and a site visit. The following key issues were identified:

- Contamination of ground and surface water;
- Increased surface water runoff;
- Impacts on air quality;
- Increased erosion;
- Floral destruction;
- Faunal displacement and destruction;
- Visual intrusion;
- Traffic Impacts;
- Increased ambient noise levels;
- Crime, Safety & Security risks;
- Noise pollution and
- Social and Economic issues

Each issue was assessed and mitigatory measures proposed to such an extent that impacts were minimised or negated.

10.2 IMPACT EVALUATION

Each issued identified was evaluated in terms of the most important parameters applicable to environmental management. These include the: *nature, extent, duration, intensity, probability* and *significance* of the potential impact on the environment.

Potential Negative Impacts include:

- *Contamination of ground and surface water* may result due to the deposition of contaminants during the construction phase and the possibility of sewage leaks during the operational phase. Mitigation measures proposed reduce the significance to "low".
- *Increased surface water runoff* and *erosion* as a result of vegetation clearance and the disturbance of soil during the construction phase. The implementation of mitigation measures reduces the significance rating to "low".
- *Impacts on air quality* are related to a direct increase in vehicular activity in the area. Due to the proposed activities the significance rating is "medium to low".
- *Floral destruction and Faunal displacement and destruction*. Biodiversity is considered to be medium - low. The implementation of mitigation measures reduces the significance rating to "medium".
- *Visual intrusion & Aesthetic impacts* as a result of construction activities, would impact most on the adjacent areas. The implementation of mitigation measures reduces the significance rating to "medium" during the construction phase. The significance rating for the operational phase is viewed as "low" with the implementation of all design criteria,
- *Noise impact* from construction vehicles and construction activities. Mitigation measures including a restriction of the times within which construction activities may take place will reduce the significance to "low".
- *Traffic impacts* as a result of construction vehicles accessing the site. This impact will have a "medium" significance due to, firstly, the increase in the number of vehicles due to the delivering of construction material to the site and secondly, the expected increase in of traffic on the road network during the operational phase.

- *Social impacts* resulting from the relocation of the community currently found on the site is considered to be "high" during the pre-construction phase and "low" during the operational phase.

Potential Positive Impacts include:

- *The site is a sensitive ecological area*. However if not developed, the site would remain derelict and would be subject to illegal land use practices such as dumping of solid waste, subsistence agricultural farming and uncontrolled storm water practices. Therefore the proposed development would ensure that the sensitive wetland area is protected and rehabilitated.
- *The proposed development is inline with the Regional Spatial Development Framework* formulated for the Region.
- *As a result of the resource constraints facing Municipalities*, it has been recognised that development driven by the private sector can help support and secure isolated areas such as the site for conservation and sustainable economic development.
- *Job provision* to the local and regional communities and contractors as a result of the construction activities.
- *Upgrade and improve* the existing municipal infrastructure.
- *Investment* in an area isolated from economic development.
- *Contributing to the growth and development* of the construction Industry in Gauteng.
- *Property rates and taxes* - Based on current municipal property rates, it is estimated that R150 million could be generated in property rates and taxes to the Ekurhuleni Metropolitan Municipality emanating from the Tambo Springs Inland Port development. This results in a 5% increase on the current property rates and taxes income of the municipality.

11 CONCLUSION

It is recognised from the EIA process that an environmental investigation needs to consider feasible alternatives, including the No-Go option for any proposed development. Accordingly, it is submitted that the nature and extent of the potential environmental impacts associated with the proposed township development are generally medium in both extent and severity. The impacts that may have significance, are manageable, and in most cases, positive in nature and direction.

The cumulative impact of the issues presented could be reduced to acceptable levels by means of mitigation measures over and above those prescribed within the direct impact assessment. The mitigation and management measures outlined in this Environmental Impact Assessment Report with respect to potential impacts or issues should result in limited negative impacts on the natural environment.

It is further concluded that the potential environmental impacts recorded for the development proposal, could be managed in terms of an Environmental Management Plan, which should be an integral part of the construction contract. It is therefore submitted that the project may be authorised by the Department of Agriculture, Conservation and Environment, in terms of the conditions and requirements of this report and that the construction of the various activities, be managed in terms of an Environmental Management Plan (**Annexure F**).