ENVIRONMENTAL IMPACT ASSESSMENT REPORT

PROPOSED MAGARENG GRAIN SILO STORAGE AND COLLECTION FACILITY

PREPARED FOR:

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BPC
CAPITAL AND COMMODITIES TRADING
BUSINESS PROFITS COMMUNITIES

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VOLUME 1: MAIN REPORT

NOVEMBER 2015

PROJECT INFORMATION

TITLE	Establishment of a 72000 ton long term grain silo storage facility and collection site in the Northern Cape
APPLICANT	BPC (Capital and Commodities Trading)
ENVIRONMENTAL CONSULTANTS	Naledzi Environmental Consultants (NEC) aka Naledzi Group Pty Ltd
REPORT DATE	OCTOBER 2015

REPORT COMPILED BY: Mapholi L.V/ Ncube S

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Mapholi L. V Ncube S

Environmental Assessment Practitioners

EXPERTISE AND QUALIFICATIONS

Mapholi Lutendo Vincent is an Environmental Practitioner. He has approximately six (6) years of experience in the field of Integrated Environmental Management, at project management level. Mr Mapholi holds a Bachelor of Environmental Science Degree from the University of Venda. He has reasonable experience in Environmental Impact Assessments, development and implementation of Environmental Management Programmes for construction, and facilitation of public consultation processes.

Sithabisiwe Ncube is trainee Environmental Practitioner. She has just over one (1) year of experience in the field of Integrated Environmental Management holds a Bachelor of Arts in Environmental Management Degree from the University of South Africa. She has basic experience in Environmental Impact Assessments and facilitation of public consultation processes.

The two practitioners were responsible for undertaking the EIA process.

EXECUTIVE SUMMARY

INTRODUCTION

Naledzi Environmental Consultants (NEC) was appointed by BPC Capital (herein referred to as the applicant) to conduct an Environmental Impact Assessment (EIA) for the proposed establishment of a 72000 ton long term grain silo storage facility and collection site in the Northern Cape. This project/development is considered an Agro-Processing facility and entails primarily 12 grain storage silos and a Maize Roller Mill with associated infrastructure. The applicant will be undertaking a listed activity that requires Environmental Authorisation through an EIA Process/study in terms of the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998), as amended and the EIA Regulations of 2014 (GNR. 982). The project triggers an activity listed under Listing Notice 2 and is subject to a Scoping and EIA process.

This EIR details the process followed from the beginning (scoping) to conclusions of the second stage of the EIA process, which entails a number of specialist studies aimed at assessing the potential impacts identified during the process.

BACKGROUND AND THE NEED FOR THE PROJECT

BPC Capital and Commodities Trading is a local company with interest in developing local based agricultural products. It is focused on creating access to local and global markets for emerging farmers in Africa by providing hassle-free, efficient and value-adding agricultural trading including capital-raising. One of BPC's services includes capital infrastructure investments. The company established that there is a shortage of grain storage facilities/infrastructure in the Northern Cape and have approached the Department of Trade and Industry years ago by submitting a proposal to raise funding for a Grain Silo Project.

BPC's mandate is to establish and expand its current infrastructure to meet the needs of the end user by supplying basic food stuff in rural areas. It is anticipated that food imports must more than doubled in SA to meet the increasing demand and population growth. In consultation with various stakeholders, a need was identified in the Northern Cape for a project that could unlock local economic development.

Portion 6 of the farm Fourstreams 311 (Registration Division Barkley Wes RD) was presented to BPC by Magareng Local Municipality as a suitable location to develop the project. The property was a former dairy farm and cheese factory operated by Diarybelle (Pty) Ltd. It has existing water infrastructure, located close to existing roads, railway line and electricity distribution lines. It is located just 5km northeast of Warrenton CBD along the N12 National Road between Barkley West and Christiana. BPC agreed to the site and would therefore lease the property from Magareng Local Municipality. The Grain Silo Project was thereafter dubbed the "Magareng Grain Silo Storage Project".

The project would entail primarily 12 steel storage silos with an overall capacity to store 72 000 tons of grain ranging from Wheat, Barley, Sunflower, Maize and occasionally Soya, as soya is not generally planted in the Northern Cape. The facility will include a Maize Roller Mill with associated Maize School/Training Facility. The estimated cost to develop the facility is R 100 billion. The funding would be spent in phases as follows:

- Phase 1: Development of 6 Silos and facility infrastructure;
- Phase 2: Completion of the Silo storage facility to 12 Silos (adding 6 more silos);
- Phase 3/Final Phase: Development of the Maize Roller Mill and Training Facility

It would take up to 4-5 years to complete all the phases of the development. BPC anticipates starting with construction of the project on 1 May 2016. The first phase of the project would take 18 months – 2 years to complete. The operation of the facility is anticipated to start in July 2017.

Many people in the Magareng Local Municipal area live under very poor living conditions. It is anticipated that this initiative will help in the alleviation of poverty as well as job creation for the Moleko community.

The proposed grain silo storage project will further open gates for the black minority famers to enter into the agricultural industry. A development of this nature could be the catalyst for some economic activity, especially for predominantly previous disadvantaged farming communities.

The introduction of the proposed project will unlock inaccessible markets for small-scale black grain farmers in the Northern Cape. It is anticipated that the project would create 197 skilled employment opportunities during the construction phase, 5 people during operational phase, 13 unskilled employment opportunities during construction and 4 during operational phase.

In line with the National Environment Management Act, 1998, the proponent, BPC, has appointed Naledzi Environmental Consultants cc (NEC) to undertake the EIA for this proposed project. NEC is experienced in environmental management and Impact assessment, familiar with the NEMA regulations and rehabilitation projects.

The initial phase of the EIA was a scoping exercise. This defined the nature and extent of the impact assessment required. A Draft Scoping Report and Final Scoping Report were circulated to key stakeholders and authorities during the months of May to June 2015. The Final Scoping Report was submitted to the Department Environment and Nature Conservation (DENC) Northern Cape the lead authority for the EIA during July 2015 and was approved on 29 September 2015. The EIA phase started in October 2015 at which specialist studies were conducted and this Environmental Impact Report (EIR) was prepared. The findings of the Specialist Studies are presented in this document. The lead authority expected to take decision on whether to approve this development or not based on this final report.

BACKGROUND ON THE PROJECT SITE

The project site is approximately 30 hectares in extent and was formerly owned, prior to MLM, by Dairybelle Pty Ltd who operated a dairy farm and cheese factory on site in the 1990.

This previous economic use has been discontinued some years ago and the structures are dilapidated. There is however electrical services and water infrastructure available on the farm, which are functional, and makes it favourable for BPC Capital to reutilise/develop the site. BPC would however only require 50-60% of the project site for the silo project. Development would be focussed to the northern extent of the site corresponding to the former cheese factory and some old fields.

The vast area of the site has been disturbed by access gravel roads, cultivating activities, buildings and excavations. Refer to Figure 1 below.

Figure 1: Aerial image of project site indicating existing disturbances and surrounding infrastructure

The project site is located along the N12 between Warrenton and Christiana. The site is approximately 5km northeast of Warrenton CBD, Magareng Local Municipality of the Frances Baard District, Northern Cape Province. Warrenton town is approximately 70km north of Kimberley.

According to the specialist findings the land is degraded and proof was obtained on site that the land had been a residential area back in the years. It has been occupied for at least a century (a gravestone on site near the entrance gate records the death of a 19-year old man in 1917), and possibly even degraded and or transformed ever since diamonds were discovered in the area in 1888. A graveyard in the southeast corner with 30-40 graves also indicates occupation by a local community until the late 1960s. The evidence of an old canal, originating upstream of the Vaal harts Weir, heading to the site, and then bypassing Warrenton back into the Vaal River, also suggests early development before completion of the Vaal harts Weir in 1938. The canal leads to a concrete storage dam in the northeast corner of the site, with a quarry/dam at the southeast corner and overflow/waste dams just below and southwest of the factory.

Geotechnical studies also revealed that the site is also degraded due to the excavation of soils (borrow pits). The site is enclosed on its western and northern side by the servitudes and tracks of both old and new railway lines. The borderline of the site is however well east of these tracks. There are only two ecological features of note between the site borderline and the rail tracks, this includes some large trees and a deep borrow pit/quarry.

There is some old labourer's accommodation which lies south of the central old field, with a water tower alongside, and the old cheese factory has a tall chimney, still standing. The southern half of the site has partially recovered through colonisation by some woody species, but throughout even this semi-natural habitat holds patches of gravel, foundations of old structures, pits and piles of rocks, and small bare or cleared areas. Two long ridges built of stone flakes run down from the factory almost to the N12 road. This ridge feature runs alongside the eastern old field recognizable by the larger trees that have established themselves along this embankment.

The study site is set amongst major transport features such as the N12 national road and the Cape Town – Johannesburg railway line. The facility will depend on such transport nodes to move its commodity to and from the storage facility. Grain can be hauled by large interlink trucks to and from the facility along the national road. Grain can be moved for export and or transferred between silo storage facilities via the railway line.

THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

Building the above mentioned 72 000 ton storage silos on the 30 hectare piece of land falls within ‘listed activities’, as defined by the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998), as amended, and the EIA Regulations of 2014. Listed activities are activities, which may have potentially detrimental impacts on the environment and therefore require environmental authorization from the competent authority

Listing Notice 2 (Government Notice R984, 04 December 2014)

Activity 15: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for:

i. The undertaking of a linear activity; or;

ii. Maintenance purposes undertaken in accordance with a maintenance management plan

In terms of the EIA regulations sufficient provision should be made for the on-going supervision and monitoring of the impacts of the activity on the environment throughout the life cycle of the activity. This condition places further emphasis on the EIR to translate the results of the EIA into clear provisions to be contained in the Environmental Management Plan or environmental management system.

In this case, the primary listed activity is the clearance of indigenous vegetation from the project site for the establishment of the grain silo storage facility, maize mill and its ancillary uses. It is anticipated that approximately 30 hectares of indigenous vegetation would be removed. Although, the vegetation on site is highly disturbed and transformed it is still regarded as indigenous according to the EIA Regulations of 2014 definition for Indigenous Vegetation.

"Indigenous Vegetation" refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless the level of alien infestation, where the topsoil has not been lawfully disturbed during the preceding ten years"

Department of Environment and Nature Conservation (DENC) Northern Cape is the lead authority for EIA processes in the province. Environmental Impact Assessment is a two phased process (Scoping Phase and Environmental Impact Reporting Phase). This report is the result of the second phase, although it considers the inputs from the scoping phase as well.

In the Scoping Phase, information was gathered, and together with specialist and technical input, used to identify potential impacts associated with the proposed project, and to highlight areas, which should be avoided in order to minimize these biophysical and social impacts.

PUBLIC PARTICIPATION PROCESS

The social settings and land ownership of a project site determine the public participation process to be followed for an EIA process. In this case, the project site is owned by Magareng Local Municipality. The property will be leased by BPC for the development and operation of the Silo Project. There is a local community known as Moleko's Farm opposite the project site. Moleko's Farm is a poor community with little to no employment levels in the rural area of Magareng.

This community is considered a laboring community in proximity of the site which may directly benefit from it development and economic spin-offs. A public participation process was undertaken to identify issues and concerns of key stakeholders and interested and affected parties, such as the Moleko's community. The results were documented in the Scoping Report. The public participation process included consultation with the municipalities, government departments, non-governmental organizations and environmental groups as well as an extensive effort to identify potentially affected individuals and the general public. This included the distribution of documents by mail, e-mail, use of printed media, telephonic conversations, one-on-one meetings, focus group meetings and public meetings.

The public participation process for the EIA does not include the negotiation and final terms for any lease agreement between BPC Capital and Magareng Local Municipality, nor does it include recruitment meetings or labour sourcing negotiations with the local community. BPC and its appointed contractors (engieers etc) is responsible once an authorization has been received from the Department of Environment and Nature Conservation (DENC) Northern Cape to secure its lease agreement with the local municipality and facilitate recruitment meetings and labouring sourcing negotiations with the community of Moleko's Farm.

BPC representatives have been involved in the public participation process of the EIA process and in discussions and meetings which were aimed at identifying different views and comments from the interested and affected parties of the Moleko's community. Issues raised by stakeholders and an indication of how they were addressed have been recorded in an Issues and Response Report.

BASELINE ENVIRONMENT AND ANTICIPATED IMPACTS

The vast area is slightly flat with manmade ridges or contour bunds created by top soil clearings as well as construction of earth dams and gravel extraction from an existing excavations (borrow pits).

Geographical Position of the project site:					
Latitude (S) (DDMMSS)			Longitude (E) (DDMMSS)		
28	04	23.96	24	52	49.15
28	04	39.94	24	52	54.94
28	04	44.85	24	52	37.36
28	04	35.85	24	52	35.57

The study area is characterized by Kimberly Thornveld (SVK4) vegetation. This vegetation is distributed in substantial parts of Warrenton and Christiana and some extent of Barkley west. It is due to the presence of landscape features often dominated by plains often irregular with well-developed tree layers dominated by *Acacia erioloba, Acacia tortilis, acacia Karroo* and *Boscia albitrunca* and well developed shrub layers with occasional dense stands of *Tarchonanthus camphoratus and A. mellifera*, grass layer open with much uncovered soil. This type of vegetation has been influenced by the presence of andesitic lavas of the Allan ridge formation in the north and west and the fine grained sediments of the Karoo super group in the south and east.

The area consist of Andesitic lavas of the Allan ridge formation in the north and west and fine-grained sediments of the Karoo super group in the south and east. Deep (0.6-1.2m) sandy to loamy soils of the Hutton soil form (Ae and Ah land types) is present on slightly undulating sandy plains.

The area receives summer and autumn rainfall and experiences very dry winters. Its MAP is from about 300mm in the south west to about 500mm in the northeast. Frost is frequent during winter. The Mean monthly maximum and minimum temperatures for Kimberly is 37.5 C and -4.1 C for January and July, respectively.

The vegetation is Least threatened. The target is 16% and only 2% is statutorily conserved in Vaalbos National Park as well as in Sandveld, Bloemhof Dam and S.A Lombard Nature Reserves. Some 18% is already transformed, mostly by cultivation and erosion is very low. Area is mostly used for cattle farming or game ranching.

On a broader scale, the area under study was used mostly for producing cheese in the previous years and also for farming purposes. There are existing old buildings which have been vandalised. There are open spaces within the northern section of the study area which opens the possibility for putting silos

The scoping process identified numerous potential environmental impacts anticipated during the implementation of the 72000 tons of grain silo storage and maize milling facility. It is important to highlight that the significant impacts are chosen from a pool of this vast number of identified impacts. It is also vital to point out that the impacts were identified through site visits, internal workshops by the project team and the public participation process.

The following key issues and/or potential impacts were identified for the project as areas that could warrant further investigations:

- Impact on ecological processes
- Impact on soils and geology (including agricultural potential)
- Impacts on heritage and archaeological resources
- Impacts on visual conditions and aesthetics (visual impacts)
- Impacts on current and future developments (social environment)
- Impact on safety (Potential explosion risks relevant to grain dust in contact with oxygen)
- Impacts on health due to inhalation of dust and other hazardous gases (when grain ferments it releases dangerous gases hazardous to health)

It became obvious during further site visits that the area had already been disturbed, and that most of the investigations would actually be a waste of time. The following specialist studies were undertaken to further assess the key issues and find mitigation measures to alleviate such anticipated impacts:

- Heritage Impact Assessment
- Ecological Impact Assessment
- Visual Impact Assessment
- Geotechnical Investigation

ALTERNATIVES CONSIDERED

Only technical alternatives were considered for the type of infrastructure to be built as part of the facility. The facility would include a weighbridge for which the considerations were to either build a pit mount weighbridge or an above ground weighbridge. The latter was chosen as it guarantees accurate readings.

There were no other alternatives considered for the proposed project. The archaeological studies discovered important graves within the site which are to be marked as NO-GO areas. These graves are located in the south-eastern extent of the project site. Seeing that the development would only correspond to the northern extent of the project site these areas of cultural significance to the local Moleko's community would not be affected by the development.

It is therefore not necessary for exhumation and relocation of any graves on the project site. The burial site will remain intact. But, if for any reason such recommendations cannot be implemented then thorough public consultation should be implemented to eliminate uprisings from the local communities and to avoid disturbance of the environment. Where the graves have to be exhumed an excavation should be applied for in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999).

The archaeologist also makes reference to identified historical structures and **ruins** which form the cultural landscape of the farm/project site. The specialist's sentiment is that these structures should be not be disturbed. Yet the development cannot avoid these structures as it requires the northern extent of the project site to operate and construct the facility.

BPC would need to appoint an HIA specialist to apply for permits to destroy such structures. The ruins are subject to a Phase 2 HIA investigation. Excavation permits for historical ruins is required from SAHRA. The Historical structures would need permits from Northern Cape PHRA for the intention to destruct historical houses. The HIA specialist would also need to prepare a Historical Structure Report in support of these applications.

KEY FINDINGS OF THE EIA

The layout plan for the proposed grain storage silos and maize mill was developed as part of the environmental investigations, to the northern extent of the project site which corresponds with the old cheese factory site, old fields and disturbed areas mostly rated of low ecological sensitivity. The development would not impact on the historical ruins or burial site of cultural significance to the Moleko's community in the south eastern corner of the site.

In terms of it visual impact the facility would not be developed directly adjacent to the N12 or the Moleko's Farm allowing a "veld buffer" between the facility and visual receptors. The receptors that would mostly be affected are residents within 2km distance from the site. Visual impacts would be moderate during the construction phase due to unsightly views of the construction equipment, material stockpiles and exposed soils. The implementation of mitigations measures in terms of building finishes, lighting, operation and maintenance of construction sites, camps and dust suppression along with long-term maintenance of landscaped areas would alleviate most of the impact to low levels.

The facility would bring forth much needed job opportunities to the local area/community. The project is supported and the project site is considered feasible for the development of the Magareng Silo Project with the implementation of stipulated mitigation measures in the EIR and EMPr. The involvement of the public, with a number of issues raised also influenced the final decision. The following particular aspects should receive attention in the implementation of the 72000 ton grain silo storage facility and collection project

- Graves and the historical ruins should be treated as No-go areas on the southern and south-eastern portion of the project site;
- A permit is to be obtained from the Northern Cape Provincial Heritage Resources Agency for the destruction of the 3 historical houses in the northern extent of the project site;
- The existing access gravel road to the project site should be used to access the new facility;

- The clearance of any indigenous vegetation in the southern portion of the project site should be kept to a minimum (activities should be focused to the northern extent);
- Dust suppression measures must be implemented during the construction phase of the project to reduce dust fallout on surrounding properties and the Moleko's Community;
- Focus on controlling grain dust emissions during the operation of grain storage facility. Preventative measures include continuous housekeeping, sanitation, and regularly scheduled maintenance. Implement a housekeeping or sanitation program to decrease grain dust in all work areas.
- Strict preventative measures must be implemented at the grain storage facility to prevent grain dust explosions;
- The Moleko's community should receive preference in terms of job opportunities during sourcing of semi-skilled and unskilled labour for the construction phase and operation phase of the facility.

The findings of the Ecological specialist indicate that the vegetation type on site is not rare and occurs quite widespread. The vegetation of the plant communities on the site are quite disturbed, degraded and transformed and have low conservation value and low sensitivity. No threatened, rare or protected plant species occur on the site. It is suggested that the development be supported.

CONCLUSION

The EIA team believes that the EIA for the proposed 72 000 tons of grain silo storage fulfilled the process requirements of current environmental legislation. Issues and associated impacts have been investigated by a team of qualified specialists who have reported on their findings without reservations. The development of the project on Portion 6 of the Farm Fourteen Streams 311 (Barkley West RD) is recommended by the specialists. Extensive efforts were also made to identify and involve potentially affected parties during the public participation process. The public has been afforded opportunities to participate in the EIA. The recommendations set out in the findings section of the EIA are therefore presented for project implementation and the EIR is hereby presented to the relevant authorities (DENC) for decision making.

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LIST OF ABREVIATIONS

CLF: Community Liaison Officer

DENC: Department of Environment and Nature Conservation

DSR: Draft Scoping Report

DEIAR: Draft Environmental Impact Assessment Report

DWS: Department of Water and Sanitation

ECO: Environmental Control Officer

EAP: Environmental Assessment Practitioner

EIA: Environmental Impact Assessment

EIR: Environmental Impact Report

EMP: Environmental Management Plan

FEIAR; Final Environmental Impact Assessment Report

I&APs: Interested and Affected Parties

IEM: Integrated Environmental Management

NEC: Naledzi Environmental Consultants

NEMA: National Environmental Management Act, 1998 (Act No.107 of 1998)

NHRA: National Heritage Resources Act, 1999 (Act No. 25 of 1999)

NWA: National Water Act, 1998 (Act No.36 of 1998)

PS: Plan of Study

RSA: Republic of South Africa

SAHRA: South African Heritage Resources Agency

SR: Scoping Report

IDP: Integrated Development Plan

DEFINITIONS

Affected Environment: Those parts of the socio-economic and biophysical environment impacted on by the development.

Affected public: Groups, organizations, and/or individuals who believe that an action might affect them

Alien species: Plant taxa in a given area, whose presence there, is due to the intentional or accidental introduction as a result of human activity

Alternative proposal: A possible course of action, in place of another, that would meet the same purpose and need. Alternative proposals can refer to any of the following but are not necessarily limited thereto:

* Alternative sites for development

* Alternative projects for a particular site

* Alternative site layouts

* Alternative designs

* Alternative processes

Applicant: Any person who applies for an authorization to undertake a listed activity or to cause such activity in terms of the relevant environmental legislation. In this case, BPC is the applicant

Authorities: The national, provincial or local authorities, which have a decision-making role or interest in the proposal or activity, in this project, the competent authority is the Department of Environmental and Nature Conservation Northern Cape. The term includes the competent authority as well as other authorities.

Biodiversity: the variability among living organisms from all sources including *inter alia* terrestrial, marine and other aquatic ecosystems and ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

Biome: A major biotic unit, consisting of plant and animal communities, having similarities in form and environmental conditions, but not including the abiotic portion of the environment

Decision-making: The sequence of steps, actions or procedures that result in decisions, at any stage of a proposal.

Ecology: the study of the inter relationships between organisms and their environments.

Ecosystem: organisms together with their abiotic environment, forming an interacting system, inhabiting an identifiable space.

Endangered: a taxon is endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future

Environment: NEMA defines "environment" as "the surroundings within which humans exist and that are made up of the land, water and atmosphere of the earth; microorganisms, plant and animal life; any interrelationships among and between them and the physical, chemical aesthetic and cultural properties and conditions that influence human health and well-being''.

Environmental Control Officer: Independent officer employed by the applicant to ensure the implementation of the Environmental Management Programme (EMPr) and manage any further environmental issues that may arise.

Environmental Impact Assessment: An assessment of the positive and negative environmental consequences of the development of the proposed project. The primary objective of the EIA is to aid decision-making by providing factual information on the assessment of the impacts and determining their significance and on which to base valued judgments in choosing one alternative over another.

Hillslope Units: Configuration of the landform consisting of crest, scarp, midslope, foot slope and valley bottom

Horizon contour: A line that encircles a development site and that follows ridgelines where the sky forms the backdrop and no landform is visible as a background. This is essentially the skyline that when followed through the full 360-degree arc as viewed from a representative point on the site defines the visual envelope of the development. This defines the boundary outside which the development would not be visible.

Impact: The positive or negative effects on human well-being and/or on the environment

Interested and affected parties (I&APs): Individuals, communities or groups, other than the proponent or the authorities, whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. These may include local communities, investors, business associations, trade unions, customers, consumers and environmental interest groups. The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

Landscape condition: Refers to the state of the landscape of the area making up the site and that of the study area in general. Factors affecting the condition of the landscape can include the level maintenance and management of individual landscape elements such as buildings, woodlands etc. and the degree of disturbance of landscape elements by non-characteristics elements.

Landscape impact: Changes to the physical landscape resulting from the development that include; the removal of existing landscape elements and features, the addition of new elements associated with the development and altering of existing landscape elements or features in such a way as to have a detrimental effect on the value of the landscape.

Lead authority: The environmental authority at the national, provincial or local level entrusted in terms of legislation, with the responsibility for granting approval to a proposal or allocating resources and for directing or coordinating the assessment of a proposal that affects a number of authorities. In this project, the lead authority is the Department of Environment and Nature Conservation of Northern Cape

Magnitude of Impact: the combination of the intensity, duration and extent of an impact occurring.

Mitigate: The implementation of practical measures to reduce adverse impacts.

Monitoring: The repetitive and continued observation, measurement and evaluation of environmental data to follow changes over a period of time to assess the efficiency of control measures.

Preferred (option): The preferred option, whether in terms of camp siting, road alignment, service alternative etc., refers to the concessionaire's preferred alternative and/or the alternative proposed in the concessionaire's environmental proposal which formed part of the bid process. It does not necessarily refer to the recommended alternative discussed in the Scoping Report.

Proponent: Any individual, government department, authority, industry or association proposing an activity (e.g. project, programme or policy). In this project, BPC limited is the proponent

Public: Ordinary citizens who have diverse cultural, educational, political and socio-economic characteristics. The public is not a homogeneous and unified group of people with a set of agreed common interests and aims. There is no single public. There are a number of publics, some of whom may emerge at any time during the process depending on their particular concerns and the issues involved.

Role-players: The stakeholders who play a role in the environmental decision-making process. This role is determined by the level of engagement and the objectives set at the outset of the process.

Red Data: A list of species, fauna and flora that require environmental protection, based on the IUCN definitions

Scoping: The process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an environmental assessment process. The main purpose of scoping is to focus the environmental assessment on a manageable number of important questions. Scoping should also ensure that only significant issues and reasonable alternatives are examined.

Sensitive area: a sensitive area or environment can be described as an area or environment where a unique ecosystem, habitat for plant and animal life, wetlands or conservation activity exists or where there is a high potential for ecotourism.

Significant/significance: Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of significance and acceptability). It is an anthropocentric concept, which makes use of value judgments and science-based criteria (i.e. biophysical, social and economic). Such judgment reflects the political reality of impact assessment in which significance is translated into public acceptability of impacts.

Species diversity: a measure of the number and relative abundance of species (see biodiversity).

Stakeholders: A sub-group of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term therefore includes the proponent, authorities (both the lead authority and other authorities) and all interested and affected parties (I&APs). The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

Stakeholder engagement: The process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities. The level of stakeholder engagement varies depending on the nature of the proposal or activity as well as the level of commitment by stakeholders to the process. Stakeholder engagement can therefore be described by a spectrum or continuum of increasing levels of engagement in the decision making process. The term is considered to be more appropriate than the term "public participation

Study area: Refers to the entire study area encompassing all the alternative alignments as indicated on the study area map.

Threatened species: Species, which have naturally small populations, and those, which have been reduced to small (often unstable) populations by man's activities

Viewer exposure: the extent to which viewers are exposed to views of the landscape in the affected area. Viewer exposure considers the visibility of the site, the viewing conditions, the viewing distance, the number of viewers affected the activity of the viewers (tourists or workers) and the duration of the views.

Viewer sensitivity: the assessment of the receptivity of viewer groups to the visible landscape elements, visual character and their perception of visual quality and value. The sensitivity of viewer groups depends on their activity and awareness within the affected landscape, their preferences, preconceptions and their opinions.

Visual absorption capacity (VAC): the inherent ability of a landscape to accept change or modification to the landscape character and/or visual character without diminishment of the visual quality or value, or the loss of visual amenity. A high VAC rating implies a high ability to absorb visual impacts while a low VAC implies a low ability to absorb or conceal visual impacts.

Visual amenity: the notable features such as hills or mountains or distinctive vegetation cover such as forests and fields of color that can be identified in the landscape and described. Also included are recognised views and viewpoints, vistas, areas of scenic beauty and areas that are protected in part for their visual value.

Visual character: this addresses the viewer response to the landscape elements and the relationship between these elements that can be interpreted in terms of aesthetic characteristics such as pattern, scale, diversity, continuity and dominance.

Visual contour: the outer perimeter of the visual envelope determined from the site of the development. The two dimensional representation on plan of the horizon contour

Visual contrast: the degree to which the physical characteristics of the proposed development differ from that of the landscape elements and the visual character.

Visual impact assessment: a specialist study to determine the visual effects of a proposed development on the surrounding environment. The primary goal of this specialist study is to identify potential risk sources resulting from the project that may impact on the visual environment of the study area, and to assess their significance. These impacts include landscape impacts and visual impacts.

Visual impact: Changes to the visual character of available views resulting from the development that include: obstruction of existing views; removal of screening elements thereby exposing viewers to unsightly views; the introduction of new elements into the view shed experienced by visual receptors and intrusion of foreign elements into the view shed of landscape features thereby detracting from the visual amenity of the area.

Visual magnitude: Product of the vertical and horizontal angles of an object to describe quantitatively the visual dimension of an object (Iverson, 1985). The visual magnitude is best described in terms of visual arcs with a one minute arc usually considered as being the minimum resolution detectable by the human eye (equivalent to observing a 29 mm ball at a distance of one hundred meters).

Visual quality: an assessment of the aesthetic excellence of the visual resources of an area. This should not be confused with the value of these resources where an area of low visual quality may still be accorded a high value. Typical indicators used to assess visual quality are vividness, intactness and unity. For more descriptive assessments of visual quality, attributes such as variety, coherence, uniqueness, harmony, and pattern can be referred to.

Zone of visual influence: the extent of the area from which the most elevated structures of the proposed development could be seen and may be considered to be of interest.

1. INTRODUCTION

Naledzi Environmental Consultants CC (NEC) was appointed by BPC to conduct an Environmental Impact Assessment (EIA) for the proposed Magareng grain silo storage facility and collection project. The project entails the clearance of approximately 30ha of land to build a 72 000 ton grain silo storage facility and collection site. It is considered an Agro-Processing facility and entails primarily 12 steel grain storage silos and a Maize Roller Mill with associated infrastructure.

The proposed project site is located along the N12 between Warrenton and Christiana. It is approximately 5km north-east of Warrenton CBD, Magareng Local Municipality of the Frances Baard District, Northern Cape Province. Warrenton town is approximately 70km north of Kimberley. The vast area is slightly flat with manmade ridges or contour bunds created by top soil clearings as well as construction of earth dams and gravel extraction from an existing excavations (borrow pits). The project site is located on Portion 6 of the farm Fourteen Streams 311, Registration Division Barkly WES RD.

BPC will be undertaking a listed activity that requires Environmental Authorisation through an EIA Process/study in terms of the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998), as amended and the EIA Regulations of 2014 (GNR. 982). An Application for Environmental Authorisation was submitted to the Department of Environment and Nature Conservation (DENC) Northern Cape by NEC on 12 June 2015. DENC issued a reference number for the project, NC/EIA/02/FB/MAG/WAR1/2015. (**Volume 1-Appendix 1A: Application Form Acknowledgement of Receipt letter– DENC)**

Published under the 2014 Regulations are three categories/listings of activities which determine the EIA process to be followed. These include GNR 983 (Listing Notice 1), GNR 984 (Listing Notice 2) and GNR 985 (Listing Notice 3). The project triggers an activity listed under Listing Notice 2 and is subject to a Scoping and EIA process.

The scoping phase was completed with the submission of the Scoping Report to DENC during July 2015, detailing the potential impacts and issues around the proposed agricultural/agro-processing project. This marked the end of the first phase of the EIA process; the application procedure then required the project to proceed into the second phase namely, the EIA phase.

This Environmental Impact Report (EIR) documents the entire EIA process and is hereby submitted to the Department of Environment and Nature Conservation (DENC) Northern Cape, as the competent decision making authority, for review and possible authorization. The EIR has been prepared on the strengths of the information available to the investigation team at the time of the assessment, and in accordance with the principles of Integrated Environmental Management (IEM), inputs from specialists and the public participation process. Care has been taken to provide an objective document, which will ensure that DENC will be in a position to make an informed decision.

The understanding of the connections between human life and other elements of nature is limited. At the same time, human activities destroy the natural systems that sustain life. This is illustrated through the extinction of many species, and mass deforestation and associated desertification. These are the basis that warrants environmental investigations when development projects are mooted. It is exactly for these reasons that an environmental assessment had to be carried out for this project.

1.1 DEVELOPMENT SCOPE OF WORKS

In light of the above, NEC committed itself to implement the EIA process as per the requirements of the NEMA EIA Regulations of 2014. The following Scope of Work or Terms of Reference, as extracted from the regulations was applicable to the environmental impact assessment process and related reports:

"***If a competent authority accepts a scoping report and advises the EAP in terms of regulation 20 (a) to proceed with the tasks contemplated in the plan of study for environmental impact assessment, the EAP must proceed with those tasks, including the public participation process for environmental impact assessment and prepare an environmental impact assessment report in respect of the proposed activity***"

The competent authority, DENC Northern Cape, gave the EAPs a go ahead on 29 September 2015 (**Volume 1 - Appendix 1B: Scoping Report Approval Letter**) with the tasks contemplated in the plan of study for environmental impact assessment, which formed part of the Final Scoping Report. The process followed was as per the requirements of the NEMA EIA Regulations.

1.2 ASSUMPTIONS, LIMITATIONS AND CONFIDENTIALITY

It is important to note that this EIR was compiled during the conceptual stages of the proposed development, with the primary aim of assisting BPC to plan and possibly secure the environmental authorization. Site selection was based on a careful examination of the pros and cons of various factors that BPC considered. The considerations included the following:

- area in need of economic development within the Northern Cape
- the municipal area in which economic development is needed desperately
- the availability of basic services such as water, electricity, transport infrastructure required for the operation of the facility,
- accessibility of the facility for receiving of grain from local farmers and shipment for export;
- Securing tenure of land via a potential lease agreement with the Magareng Local Municipality.

NEC has prepared this Environmental Impact Assessment Report (EIR) for the sole use of BPC and the appointed development consultants/contractors to this project, in accordance with generally accepted consulting practices and for the intended purposes, as stated in the agreement under which this work was prepared. The report is also intended for review by the relevant competent authorities. Interested & Affected Parties are also privy to the review of the report to provide input to the EIA process.

This report may not be relied upon by any other party without the explicit written agreement of BPC and NEC. No other warranty, expressed or implied, is made as to the professional advice included in this report. The EIA was conducted in as transparent a manner as possible, with emphasis on making the EIA understandable enough for the affected communities to participate, for the competent authorities to make an informed decision, and for BPC to follow certain procedures during both construction and operation of the facility, if a positive environmental authorisation is issued for the development..

2. ENVIRONMENTAL ASSESSMENT PRACTITIONER

2.1 BACKGROUND

The Environmental Regulations specifically calls for practitioners involved in Environmental Assessment Work to list their qualifications and expertise in the report. The Regulations also indicates that the role of the Environmental Consultant or Environmental Assessment Practitioner (EAP) is to conduct the environmental impact assessment process in an independent fashion. Independence was at the core of the EIA process.

An Environmental Assessment Practitioner appointed in terms of regulation 12 (1) is required to comply with Regulation 13 (1), and specifically –

(a) be independent;

(b) have expertise in conducting environmental impact assessments, including knowledge of the Act, the Regulations and any guidelines that have relevance to the proposed activity;

(c) ensure compliance with the regulations

(d) perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the application

NEC on its own is an independent Environmental Consulting Company which performs environmental assessments objectively. The team outlined below abide by the company's best practices in the consulting industry and in line with the NEMA EIA Regulations, 2014.

2.2 THE STUDY TEAM

A team of qualified and experienced consultants was assembled for this project. The following consultants are involved in this project:

Table 1: Naledzi Environmental Consultants Project Team

Name	Qualifications	Roles and Responsibility
Mr. Musetsho K.D	M.EnvM (Hons)	EAP and Project Management
Mr. Mapholi LV	B.EnvSc	EAP and Public Participation

Ms. Ncube S	BA EnvM	EAP and Public Participation

All these individuals are permanent employees of NEC. Individuals from other companies were roped in to serve as specialists, their names and the organisations they represented are highlighted throughout the Environmental Impact Assessment Report and reference would be made to their findings and conclusions.

The Environmental Assessment Practitioner responsible for the overall management of the environmental assessment process is as reflected above.

Table 2: Environmental Impact Assessment Practitioners Contact Details

Environmental Consultants	Naledzi Environmental Consultants	
Contact Person	Mr. K.D. Musetsho Mr. Mapholi L.V Ms. Sithabisiwe Ncube	
Postal Address	Suite #320 Postnet, P/Bag X9307 Polokwane, 0700	
Tel, Fax and Cell	Tel	+2715 296 3988
	Fax	+2715 296 4021
	Cell	+2783 410 1477 (Desmond) +2778 7241320 (Lutendo) +2773 713 8867(Sithabisiwe)

(Refer to Volume 1 - Appendix 4A for the Curriculum Vitae of the EAP and also Appendix 4B for the Declaration by the EAP).

3. NATURE OF THE DEVELOPMENT

3.1 BACKGROUND

Agriculture in South Africa remains an important sector despite its relatively small contribution to the gross domestic product (GDP). The sector plays an important role in terms of job creation, especially in rural areas, but is also a foremost earner of foreign exchange.

South Africa's population is growing at almost 2% a year. The population of 51 million in 2015 is expected to grow to 82 million by the year 2035. Food production or imports must more than double to feed the expanding population. If BPC is to honour its mandate and commitment to meet the increasing needs of end-users, it has to establish and expand its infrastructure of Grain silo storages.

BPC has a mandate to satisfy potential customer needs, which implies certain responsibilities. One of the most significant of these is to find and maintain the balance between satisfying the needs of society and balance these with environmental constraints.

In order to achieve this, BPC continually re-assesses its present infrastructure and take into account new developments to ensure that there is a continued supply of basic food stuff in rural areas, without significantly impacting on the environment. There are possible environmental impacts that arise from the proposed development; hence this environmental impact assessment process had to be conducted.

3.2 NEED AND DESIRABILITY OF THE PROJECT

In line with the above statement, BPC Capital and Commodities Trading is focused on creating access to local and global markets for emerging farmers in Africa by providing hassle-free, efficient and value-adding Agricultural Trading including Capital-raising. One of BPC's services includes Capital Infrastructure investments. They have identified that there is a shortage of grain storage facilities/infrastructure in the Northern Cape and have approached the Department of Trade and Industry by submitting a proposal to raise funding for a Grain Silo Project, which was accepted and granted.

The development of grain storage silos is important as it plays a key role in agriculture and it fulfils three main functions:

- Post-harvest and storing of grains and oilseeds;
- Conditioning and preservation of grain
- Facilitating the delivery of grain to domestic feeding and processing, as well as export, end use destinations

Grain silos therefore represent a key intersection in South Africa's food production chain.

Magareng Local Municipality was identified as one of those municipal areas with very minimal economic development resulting in many of its people living in abject poverty. The location for the facility was therefore identified within Magareng's municipal jurisdiction. The project was dubbed the "Magareng Silo Project".

Magareng (and broadly described as Magareng Municipality), is situated in the Northern Cape Province and lies within the boundaries of the Frances Baard District Municipality. It constitutes one of the five local municipal areas within the district and accommodates almost 8% of the district population as stated in the 2015-16 IDP.

Many people in Magareng still live in abject poverty without adequate access to engineering and social infrastructure. The creation and promotion of sustainable development projects is therefore an important priority. The introduction of the proposed project will unlock inaccessible markets for small-scale black grain farmers in the Northern Cape. The proposed project will help in the infrastructural development in the area, which will in turn help in meeting the aims of the IDP in the area. Job creation and poverty alleviation are also major concerns of the municipality as stated in the IDP hence the proposed project will address these issues through job creation for the community. It is anticipated that the project would create 197 skilled employment opportunities during the construction phase, 5 people during operational phase, 13 unskilled employment opportunities during construction and 4 during operational phase.

An Environmental Impact Assessment study was commissioned to establish if it would be feasible to build the anticipated 72 000 ton grain silo storage facility with its ancillary uses on the 30ha study area. It is envisaged that should it be feasible, the continuation of the project would be a catalyst for economic activity in the area.

3.3 STRATEGIC ALTERNATIVES/OPTIONS CONSIDERED

Before a decision was made to commit to the development and associated environmental impact assessment on the proposed Magareng Silo project site, alternatives were considered at a strategic level to address the situation as per the need and desirability raised. The following paragraphs outlines the options investigated.

3.3.1 OPTION 1: DO NOTHING

The very first option was to do nothing about the current infrastructural challenges and lack of local economic growth in the Magareng municipal area. This option was found not feasible for the following reasons: Magareng and the Northern Cape Province as a whole constitute one of the poorest areas in South Africa. There are communities in the area like those on Moleko's Farm, opposite the project site, which are very poor and with very low infrastructural development, high levels of poverty which continues to escalate. The level of education in these areas is also below standard and the proposed project will contribute positively in changing this situation. The training facility would be considered a "Maize School" at which unskilled labour can be trained. The training would pertain to operation and management aspects of a Maize Mill. Such training would be provided free of charge to labours sourced from the community. Local small scale farmers would get an opportunity to engage in meaningful trading activities.

3.3.2 OPTION 2: GO AHEAD WITH THE PROPOSED DEVELOPMENT

Though rural in nature, the Northern Cape Province is endowed with perfect climatic conditions and transportation infrastructure that is perfect for agricultural purposes. The area has vast tracts of land that has remained fallow for many years. Communities have claimed their land back, but are unable to develop on the land due to lack of funding and the requisite skills. BPC, as a leader in the agricultural sector and agro-processing facilities, considered all the spin-offs from proceeding with this development, and a decision stood. The area selected for the proposal had been used for dairy farming and cheese production in the past

The following advantages were identified:

- The alternative will bring about much needed job opportunities, specifically during the construction phase
- It will contribute to economic and infrastructural development

- It will increase the agricultural industry and promote its growth since vast of the areas are agricultural farm lands
- It will provide a facility where farmers can sell their produce and improve their livelihoods
- The chosen alternative is located near a railway line which joins Johannesburg and Cape Town; this location will make it easy for storage and the transportation of maize from Kimberly which is mostly an agricultural area to Johannesburg which has a huge population and in great demand of food products.

At the end, option two was found to be the most preferred one from a strategic point of view, hence the commencement of the environmental impact assessment to investigate further on the practicality of proceeding with the agricultural/agro-processing activities, taking into consideration all the environmental issues.

3.4 ALTERNATIVE SITES IDENTIFIED

Site identification took place prior to the commencement of the Scoping and EIA Study between the Magareng Local Municipality and BPC Capital. It was a calculated decision based on areas in need of economic development, areas experiencing poverty which require job opportunities, available service infrastructure to transport grain to domestic feeding and processing facilities as well as for export and end use destinations.

BPC consulted various stakeholders, including Magareng Local Municipality, to identify a suitable location for the project within the Northern Cape Province. It was decided that the silo project be developed in Magareng based on the rising poverty levels within it municipal jurisdiction, need for economic development and a dire need for job creation in the area. Portion 6 of the farm Fourteen streams 311 (Registration Division Barkley Wes RD) was presented to BPC by Magareng as a suitable location to develop the project.

The property was a former dairy farm and cheese factory operated by Dairy-belle Pty Ltd. It has existing water infrastructure and electricity is available on site. It is located 5km northeast of Warrenton CBD along the N12 National Road between Barkley West and Christiana. BPC agreed to the site and would therefore lease the property from Magareng Local Municipality. No other feasible sites were considered for the facility, for the EIA process as well. Only one site.

3.5 THE ENVIRONMENTAL INVESTIGATION PROCESS

The scoping exercise undertaken for this project was aimed at gathering baseline environmental information, to assist during the selection of final project options with minimal environmental impacts. For the identification of an alternative with minimal environmental impacts, different role players had to play different roles. The following (not exhaustive) are some of the roles that the various stakeholders played.

3.5.1 ROLE OF ENVIRONMENTAL PRACTITIONERS

The environmental practitioners were required to:

- Encourage the proponent to consider all feasible alternatives
- Provide opportunities for stakeholder input to the identification and evaluation of alternatives
- Document the process of identification and selection of alternatives
- Provide a comprehensive consideration of impacts of each alternatives
- Document the process of evaluation of alternatives

The public participation process carried out for the scoping process tried to achieve the above, by giving stakeholders a chance to have inputs into the whole process.

3.5.2 ROLE OF THE PROPONENT

The proponent came into the picture by:

- Assisting in the identification of alternatives, particularly where these may be of technical nature
- Disclosing all information relevant to the identification and evaluation of the alternatives
- Being open to the consideration of all reasonable alternatives, and
- Being prepared for possible modifications to the project proposal before setting on a preferred option.

3.5.3 ROLE OF THE PUBLIC

The role of the public was to:

- Assist in the identification of alternatives, particularly where local knowledge is required
- Be open to the consideration of all reasonable alternatives
- Recognize that there is rarely one favored alternative that suits all stakeholders and that alternatives were to be evaluated across a broad range of criteria, including environmental, social and economic aspects.

The combination of the three role players culminated into the identification of the best options for this development.

Alternatives were discussed further in the EIR, subsequent to the specialist findings and input from the affected landowners. The preferred alternative was one that was found to minimize the environmental impact of the proposed development.

The preferred option was determined based on:

- The opinion of the public, ascertained through the public consultation process;
- Specialists' recommendations;
- Environmental constraints

At the stage of the scoping exercise, which was based on a preliminary identification of physical, biological and social constraints (captured through the public participation process) there was clear indication that the preferred option would be to continue with the proposed project. It was however noted that the comprehensive impact assessment phase specifically assessed the likely impacts of the alternative of developing the facility. The proposed project was supported by the community as well as the specialist studies because of the job opportunities it would create, the economic development that will be associated with it and the low negative impacts it would have on the environment (the environment is already degraded the project will prevent further degradation as there will be continuous monitoring).

3.6 TECHNICAL/DESIGN ALTERNATIVES

A weighbridge is required as part of the facility infrastructure to accurately weigh the grain loads delivered/sold to BPC Capital. Two types of weighbridges were considered which included a pit mount weighbridge or an above ground weighbridge. The latter was chosen as it guarantees accurate readings.

3.7 LAYOUT ALTERNATIVES

The project site comprises 30 hectares of land. The facility would only occupy 60% of the property and would comprise the northern extent of the property where services have already been established at the old cheese processing factory. It is also feasible from a cultural and historical impact point of view that the site plan is set in the northern extent to avoid historical ruins and a burial site in the south-eastern corner of the site which are of value to the community and had archaeological value to the community as a whole.

The archaeological studies discovered important graves within the site which are to be marked as NO-GO areas. These graves are located in the south-eastern extent of the project site. Seeing that the development would only correspond to the northern extent of the project site these areas of cultural significance to the local Moleko community would not be affected by the development.

It is therefore not necessary for exhumation and relocation of any graves on the project site. The burial site will remain intact. But, if for any reason such recommendations cannot be implemented then thorough public consultation should be implemented to eliminate uprisings from the local communities and to avoid disturbance of the environment. Where the graves have to be exhumed an excavation should be applied for in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999).

The archaeologist also makes reference to identified historical structures and **ruins** which form the cultural landscape of the farm/project site. The specialist's sentiment is that these structures should be not be disturbed. Yet the development cannot avoid these structures as it requires the northern extent of the project site to operate and construct the facility.

BPC would need to appoint an HIA specialist to apply for permits to destroy such structures. The ruins are subject to a Phase 2 HIA investigation. Excavation permits for historical ruins is required from SAHRA. The Historical structures would need permits from Northern Cape PHRA for the intention to destruct historical houses since they are older than 60 years. The HIA specialist would also need to prepare a Historical Structure Report in support of these applications.

3.8 TECHNICAL DETAILS OF THE PROJECT

3.8.1 OVERALL SCOPE OF THE PROJECT

The project would entail primarily 12 steel storage silos with an overall capacity to store 72 000 tons of grain. The type of grain to be stored includes Wheat, Barley, Sunflower, Maize and *occasionally* Soya, as soya is not generally planted in the Northern Cape. The facility will include a Maize Roller Mill with associated Maize School/Training Facility. The maize mill will produce different grades of maize meal and animal feed/chop. The development will be constructed in three phases. The phases are as follows:

- Phase 1: Development of 6 Silos and facility infrastructure;
- Phase 2: Completion of the Silo storage facility to 12 Silos (adding 6 more silos);
- Phase 3/Final Phase: Development of the Maize Roller Mill and Training Facility

3.8.2 EXTENT OF THE PROJECT

The project site is approximately 30 hectares in extent (29.71ha). The land required for the development would be more than 20 hectares. This land will be cleared for the building and erection of 72 000 ton of grain silo storage facility and collection site.

3.8.3 TYPES OF INFRASTRUCTURE TO BE BUILT

(**Refer to Volume 1 - Appendix 1C for the layout plan for the Grain Storage Silo facility and Collection Site**)

The development will comprise basic components which are as follows:

- Entrance gate with a guard house
- Weighbridge
- Grain receiving pit;
- Main silo building (Machine tower)
- 12 Steel Storage Silos;
- 1 Buffer Silo
- 2 truck out loading silos
- Maize Roller Mill and intake bins and an associated Training Facility
- Facility offices and visitors parking
- Rail siding

The details of the infrastructure are as follows:

(a) Weighbridge

The options and alternatives considered were a pit mount weighbridge and an above-ground weighbridge. The latter was chosen because it guarantees accurate readings. The weighbridge will be 24.5m x 3m in size with a maximum load carry capacity of 120 metric tons.

Weighbridge Software will be used to keep a complete data-base of all the vehicles that have weighed in and out. The system generates a weighbridge ticket and or invoice which includes information such as gross, tare, net, product price, vat, total, registration no, product description, customer etc.

(b) Receiving Pit

The pit will be set up to automatically move all the grain from the pit into a holding facility (the buffer silo) which feeds into the dryer. The pit empties in minutes to be ready for the next full truckload.

(c) Plant components

- Grain Silo Intake components
- Grain Drying
- Bulk Grain Load-out components
- Auxiliaries

(d) Plant Automation

- Plant Control (Software Engineering and Hardware)
- Electrical Installation
- Electrical Integration of Silos

(e) Engineering Services

- Advisory Services (technical and technological)
- Documentation (drawings, diagrams and tables)

(f) Silo Structures

- 1 x 500t Buffer silo
- 12 x 6000t Flat-bottom steel silos
- 12 x extraction Augers
- 2 x Mobile Aeration Fans
- 12 x Temperature monitoring units/system
- 2 x 30t Truck out-loading silos
- Machine Tower

(g) Maize Milling Equipment for Incubation

The mills each have the capacity to produce up to 12 000 metric tons of maize meal per annum. In terms of final product, the mills produce super maize meal, special maize meal and Chop / offal (animal feed).

(h) Civil Construction

- Earthworks and Excavation
- Concrete Work, Material and Labour
- Reinforcing

- Formwork
- Brickwork
- Sealing
- Offices
- Training facilities
- Rail Siding

Modern farmers efficiently produce commodities because they utilize modern technology, such as chemicals and fertilizers, mechanization, and hybrid seeds. Another advantage that South African grain producers have is an extensive merchandising and transportation system that links, agri-industrial sectors together across the country. One locus of this system consists of grain Elevators, which are used to store the majority of cereal grain and oilseed crops produced in the country. These are connected by an intricate network of rail lines and highways.

After harvest, many farmers utilize their grain on their own operations to feed their livestock herds. Depending on a given farmer's storage and financial decisions and constraints, surplus grain is typically transported and sold to a local people or terminal grain elevator. These facilities are thus the primary means by which grain is merchandized in South Africa.

Modern grain elevators do, however, differ from their predecessors in many key respects. Today's grain elevators are much larger, have higher yearly throughputs, greater equipment capacities, improved safety measures and dust control systems, and utilize electronic Instrumentation and control systems.

3.8.4 SERVICES REQUIRED FOR THE DEVELOPMENT

(a) Access Roads:

The site is bordered at its southern boundary by the N12 National Road heading towards Barkely West / Christiana. There is an existing gravel access road to the proposed project site which will be utilised for the Grain Storage Silo facility. It was the former Cheese Factory entry road.

(b) Rail infrastructure

The Cape Town / Johannesburg railway line is circumnavigate the project site from north, west to south. The Grain Silo Project would utilise the rail network for transportation of grain between different storage silos and or for export purposes. A rail siding would be constructed as part of the facility infrastructure.

(c) Water Requirements

The project site, as indicated, already has water infrastructure. Water for the facility will be obtained from the existing borehole. This water would be used mainly for consumption by employees as the grain facility does not require a large water input to operate.

(d) Electricity

The development would require electricity. The facility is mostly automated. There is existing Eskom infrastructure on the project site which provided the former Cheese Factory with power. BPC will utilise the existing connections points for the facility.

(e) Sewage

Some of the old infrastructure on site would still be used by the proposed grain project. This includes the cheese factory used septic tanks for sewage disposal. The Grain Storage Facility will also make use of the existing system (and just upgrade and repair it where necessary).

(f) Solid Waste Management

It is anticipated that the facility would have skips on site to which general household solid waste will be collected and contained for later disposal at the municipal landfill site. The Maize Mill facility would not have any waste stream in terms of its product lines. The maize is milled from super to special maize meal. All the coarse particles left on the grid of the roller mill post sifting of the ground maize will be bagged as chop/animal feed and sold off. Water used during the wetting of maize for the milling process would be continuously recycled and reused in the process.

(g) Stormwater management

A Storm Water Management Plan will be prepared by the appointed consulting engineer for the project. The system would comprise channelling storm water towards the internal roads in the facility which would then channel storm water towards the old canal east of the project site.

3.8.5 ESTIMATED PROJECT COST

The estimated cost to develop the facility is R 100 billion. The funding would be spent in 3 phases. Phase 1 would entail constructing 6 silos, Phase 2 would entail completing the storage facility to 12 silos and Phase 3 would include developing the Maize Mill and associated Maize School/training facility.

3.8.6 TIMEFRAMES FOR THE PROJECT

It would take up to 4-5 years to complete all the three phases of the development. BPC anticipates starting with construction of the project on 1 May 2016. The first phase of the project would take 18 months – 2 years to complete. The operation of the facility is anticipated to start in July 2017

3.9 LAND TENURE

Magareng Local Municipality is the owner of the project site. BPC will lease the property from Magareng Local Municipality.

3.10 PHASES OF THE DEVELOPMENT

Establishment of 72 000 ton grain silo storage facilities project like this one is a long process that starts with the identification of a need, system planning, environmental impact assessment, surveying, the actual construction, operation and maintenance and end with the decommissioning of the infrastructure. The whole process completes the life cycle of the development. Other things being equal, the environmental impact assessment, although related to most of the listed aspects of the planning process, focuses more or identifies environmental issues related to the construction phase, operation and maintenance of the grain silo facilities.

3.10.1 CONSTRUCTION PHASE

This phase basically entails the establishment of construction camp sites, equipment yards and lay-down areas, building of site fences, installation of gates, clearance of vegetation, excavation of pits for foundations, casting of foundation for structures, movement of construction workforce, equipment and materials, installation of services. The construction phase will entail clearing the site, establishing roads, a weighbridge, receiving pit, maize milling structures, offices and training facility.

3.10.2 OPERATIONAL DEFINITIONS

The phase mainly involves the day to day running of the grain silo storage facilities and collection site. It also includes the inspections and maintenance of the silo infrastructure, all areas disturbed during construction. Rehabilitation measures like replanting of vegetation that would have been disturbed during the construction phase will also take place during this phase.

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

4.1 BACKGROUND

The project site is located along the N12 between Warrenton and Christiana. The site is approximately 5km northeast of Warrenton CBD, Magareng Local Municipality of the Frances Baard District, Northern Cape Province. Warrenton town is approximately 70km north of Kimberley. The vast area is slightly flat with manmade ridges or contour bunds created by top soil clearings as well as construction of earth dams and gravel extraction from an existing excavations (borrow pits).

The proposed project site is located on Portion 6 of the farm Fourteen Streams 311 Registration Division - Barkly WES RD. **(Refer to Appendix 1D: Topographical Locality Map)**

Table 3: Geographical coordinates of the site

Latitude (S) (DDMMSS)			Longitude (E) (DDMMSS)		
28	04	23.96	24	52	49.15
28	04	39.94	24	52	54.94
28	04	44.85	24	52	37.36
28	04	35.85	24	52	35.57

Table 4: SG 21 Digit Code

C	0	0	7	0	0	0	0	0	0	0	0	0	3	1	1	0	0	0	0	6
1	**2**			**3**				**4**								**5**				

4.2 BIOPHYSICAL ENVIRONMENT

4.2.1 CLIMATE

The climate in the area understudy is characteristic of the Highveld. The area experiences summer and autumn rainfall and very dry winters. Its mean average precipitation (MAP) is from about 300mm in the south west to about 500mm in the northeast. Frost is frequent during winter. The Mean monthly maximum and minimum temperatures for Kimberly and surrounding areas such as Warrenton is 37.5 C and -4.1 C for January and July, respectively.

4.2.2 TOPOGRAPHY AND MAJOR LAND FEATURES

The area is flat and the site is at an altitude of ~1209 m.a.s.l. The site elevation decreases from 1209 mabsl in the northern extent to 1204 mabsl in the most southern extent. The general slope of the broader area is toward the Vaalriver in the south some 1.1km away.

Warrenton area, together with other hinterlands such as Kimberly has Andesitic lavas of the Allan ridge formation in the north and west and fine-grained sediments of the Karoo super group in the south and east. Deep (0.6-1.2m) sandy to loamy soils of the Hutton soil form (Ae and Ah land types) is present on slightly undulating sandy plains.

The site generally consists of dry slightly moist, dark grey black, very loose, massive, fine to medium grained silty sand and fine grained gravel in an even matrix. Ash fills also occur vastly onsite and also where the borrow pits exists. The Ash occurs from NGL to between 0.1m-0.5m below NGL. The site is underlain by Andesite of the Allanridge Formation, Platberg Group, and Venterdorp super group.

Reworked residual andesite including an abundant occurrence of core stones (0.15m-1.5m diameter) together with andesite bedrock with a variable degree of weathering and rock hardness was encountered in some parts of the site during drilling and testing. Andesitic core stones occur randomly at ground surface level across the site, predominantly the site is underlain by manmade fill, potentially collapsible fine grained silty sand. Aeolian transported, a peblemarker transported layer which in turn is underlain by remarked residual and residual sandy silts with/ without abundant scattered core stones in profile and ultimately bedrock as indicated above.

The slope is gently 1.2% from the North to the South. The climatic N value of the site is 8.2, therefore mechanical disintegration is dominant as opposed to chemical decomposition of the parent rocks hence it is the principle type of weathering. Since the N value of the site is generally rated as below corrosive rates not much impact are anticipated on the structures.

4.2.3 LAND USES

The main land use immediately surrounding the site is grazing by livestock, mainly cattle and game.

4.2.4 FLORA AND FAUNA

The site looks degraded from the onset. As it is an old cheese factory plant, the site has been cleared, and very little of its original state remains. The site does not have tangible flora and fauna species of conservation value at all. Some of these observations were shared also by the ecologists who undertook the ecological assessment. **(Volume 3 – Appendix 3A: Ecological Impact Assessment).**

The vegetation unit at the site is classified as Kimberley Thornveld (SVk 4 of Mucina & Rutherford 2006), within the Eastern Kalahari Bushveld of the Savanna Biome. Kimberley Thornveld is nationally a Least Threatened vegetation unit, with a 16% conservation target but only 2% currently formally conserved.

The particular study site area is disturbed with patches of disturbed bushveld remaining in a mosaic of current and old cultivated fields. Historically it would have been mainly scattered bushes over a sparse grass layer with bare areas between tufts, above which emerged a few large thorn trees.

Five plant communities (mapping units, ecosystems) were identified on the study site:

- **Disturbed thornveld:** This thornveld consists mostly of a woody layer dominated by Vachellia tortillis. No plans species of conservation concern occur in this area.
- **Old fields:** A large section of the site was transformed by agriculture. The old fields are now covered with secondary vegetation dominated by pioneer grasses and weeds.
- **Other highly disturbed areas:** Within the Thornveld is patches that are highly disturbed. These include bare areas, area where structures were demolished, rubble areas, old borrow pit/quarry, cemetery, waste area. The vegetation cover of both the woody and herbaceous layers in these areas is quite low, though the plant species composition is fairly similar to that of the Disturbed Thornveld.
- **Secondary woodland on berm:** A long north-south stretching duct was constructed long ago from the cheese factory southwards, along the length of the site. This was covered by soil to form a long berm, on which

vegetation became established. Vachellia tortilis is the most prominent tree , and the herbaceous layer consists of scanty pioneer grasses and weedy species.

- **Old cheese factory site:** From a vegetation perspective this area is totally transformed. A few indigenous trees remained in the area, while a few exotic (alien) tree species were planted, or became established in the area.

The study site is small and as such not rated as important from a conservation perspective. The species richness on site is low. Only 3 mammal species were confirmed to occur on site nl.

- Scrub hare (L. saxatilis) – in disturbed thornveld
- Bushveld gerbil (G.leucogaster) – in the sandy terrain
- Springhare (P. capensis) – in the sandy terrain

There are 3 avian habitats, of low sensitivity, available on the project site nl.

- Thornveld;
- Fallow Land
- Old structures

No threatened species are expected to be regular residents or frequent visitors, with only three as erratic visitors (Abdim's Stork, Secretarybird, Lanner Falcon) although only the stork, a non-breeding summer migrant, has been reported. The roller, Double-banded Courser, Kori Bustard and Secretarybird might pass through the site, since patches of preferred habitat occur in the general area, while White-backed Vulture and Tawny and Martial Eagles might pass overhead even though the chance of carrion or live prey being available on site is low.

Only the white backed vulture has been reported for the site since 2007 which is an endangered species in terms of the Threatened or Protected Species (TOPS list which is protected in terms of the Biodiversity Act No 10 of 2004.

Species which are protected by regulations of the provincial authority, under the Northern Cape Nature Conservation Act of 2009 which may frequent the site include Secretary bird, Lanner Falcon, White-backed Vulture and Tawny and Martial Eagles of the now-threatened species, among several others expected for the site.

Due to the limited available habitat, it is estimated that the reptile and especially amphibian population density for the study site is very low. Several moribund territorial, which are the preferred habitat for many herpetofauna species, could be seen.

Thirty-two reptile species may occur on the study site, though none were confirmed during the site visit and of the possible 10 amphibian species which may occur on the study site; none were confirmed during the site visit.

Frogs that have a high probability of occurring on site include: *Southern Pygmy Toad, Karoo Toad, Bubbling Kassina, Common Platanna and Boettger's Caco*. Reptiles that have a high probability of occurring on site include: *Leopard Tortoise, Cape and Bibron's Gecko, Spotted and Namaqua Sandveld Lizard, Southern Karusa Lizard, Cape and Variegated Skink, Southern Rock and Western ground Agama, Puff Adder, Common House Snake, Karoo Sand Snake, Mole Snake and Cape Cobra*.

4.2.5 CONSERVATION AREAS

There are no areas of conservation value or protected areas on the project site; neither do any such areas border the development property. The vegetation is Least threatened. The target of 16% and only 2% is statutorily conserved in Vaalbos National Park as well as in Sandveld, Bloemhof Dam and S.A Lombard Nature Reserves. Some 18% is already transformed, mostly by cultivation and erosion is very low. Area is mostly used for cattle farming or game ranching. Overgrazing leads to encroachment of *Acacia mellifera*.

4.2.6 SOILS

The area consist of Andesitic lavas of the Allan ridge formation in the north and west and fine-grained sediments of the karoo super group in the south and east. Deep (0.6-1.2m) sandy to loamy soils of the Hutton soil form (Ae and Ah land types) is present on slightly undulating sandy plains.

4.2.7 GEOLOGY AND GEOMORPHOLOGY

A Geotechnical Investigation was conducted for the project site to determine the soils strata and suitability of the site for development of the Grain Silo facility. The investigation was conducted by Geo Simplicity Geotechnical Engineering (PTY) Ltd (P F van Straten) and is dated August 2015. **(Volume 3 – Appendix 3B – Geotechnical Investigation)**

The area understudy, just like Kimberly mainly consists of Andelistic lavas of the Allanridge Formation in the North and West and fine-grained sediments of the Karoo super group in the south and east. Deep (0.6-1.2m) sandy to loamy soils of the Hutton soil form (Ae and Ah land types) on slightly undulating sandy plains.

Ae
Ae land type refers to red, high base status soils that are more than 300mm deep with no dunes. Soils or land classes found in this land type are rocks, soil series of Mispah form, Hutton form, Oak leaf form, and Clovelly form including stream beds.
Ah
Ah land types refers yellow and red soils without water tables, belonging in one or more of the following forms; Inanda, Kranskop, Magwa, Hutton, Griffin and Clovelly.

4.2.8 GEOHYDROLOGY

There are no drainage features or wetlands on the project site. There are no drainage or wetland features within a 500m radius of the site. The project site is located within the Lower Vaal Water Catchment Management Area. The site falls in quaternary drainage region C91D. The nearest drainage feature to site is some 800m east. It drains towards the lower Vaal River some 1km south of the site.

4.3 SOCIO-ECONOMIC ENVIRONMENT

4.3.1 SOCIAL AND POPULATION CHARACTERISTICS

Magareng Municipality which has a population of 24 205 is situated in the Northern Cape Province and lies within the boundaries of the Frances Baard District Municipality. It constitutes one of five local municipal areas within the district and accommodates almost 7% of the district population *(Census 2001).* Warrenton, the

administrative centre of Magareng Municipality, is situated approximately 75 km north of Kimberley on the banks of the Vaal River.

The N12 national road between Kimberley and Christiana as well as the N18 route to Vryburg passes through the centre of Warrenton. The urban node consists of Warrenton, Warrenvale and Ikhutseng while small agricultural villages have been establish throughout the municipal area of which Bullhill, Fourteen Streams, Sydney's Hope, Windsorton Station, Moleko's Farm, Nazareth and Hartsvallei Farms are the most prominent. The rest of the area comprises mainly mixed farming. The area of jurisdiction is approximately 1542 km² in extent and accommodates approximately 24,042 people (*Stats' –2011*). 72% of the total population is Black, 17, 5% Coloured while the White population represents only 10% of the total population. The Indian and Asian population is insignificantly small to impact on the proportional representation.

The municipal area is divided into 5 wards. Wards 1 to 3 constitute Ikhutseng, the former Black residential area, while Warrenvale, the former Coloured residential area constitutes Ward 4. Ward 5 is made up of Warrenton town, which was previously a predominantly White area, and the surrounding rural areas.

Table 5: Demographic profile of Magareng Settlements (Stats SA 2011)

	Ikhutseng	Warrenvale	Warrenton	Total
0-4	1099	329	816	2269
5-9	1142	330	813	2321
10-14	1274	404	965	2559
15-19	1062	345	867	2269
20-24	909	217	614	1843
25-29	739	161	492	1550
30-34	610	187	523	1404
35-39	615	194	542	1403
40-44	517	183	511	1296
45-49	486	111	421	1124
50-54	384	93	333	891
55-59	377	84	280	782
60-64	362	82	261	704
65-69	235	67	198	491
70-74	155	50	136	347
75-79	109	18	101	235
80-84	69	18	60	133
85 and above	76	9	27	112

Magareng Local Municipality has a total of 6120 households with an average size of 4.0.This indicates that there is an average of 4 people per household. The majority of the household are headed by females, representing 41.7% of the population. Below is

a table indicating the type and number of dwellings that exist in municipality (*Statistics SA: Municipal Fact Sheet, 2011*)

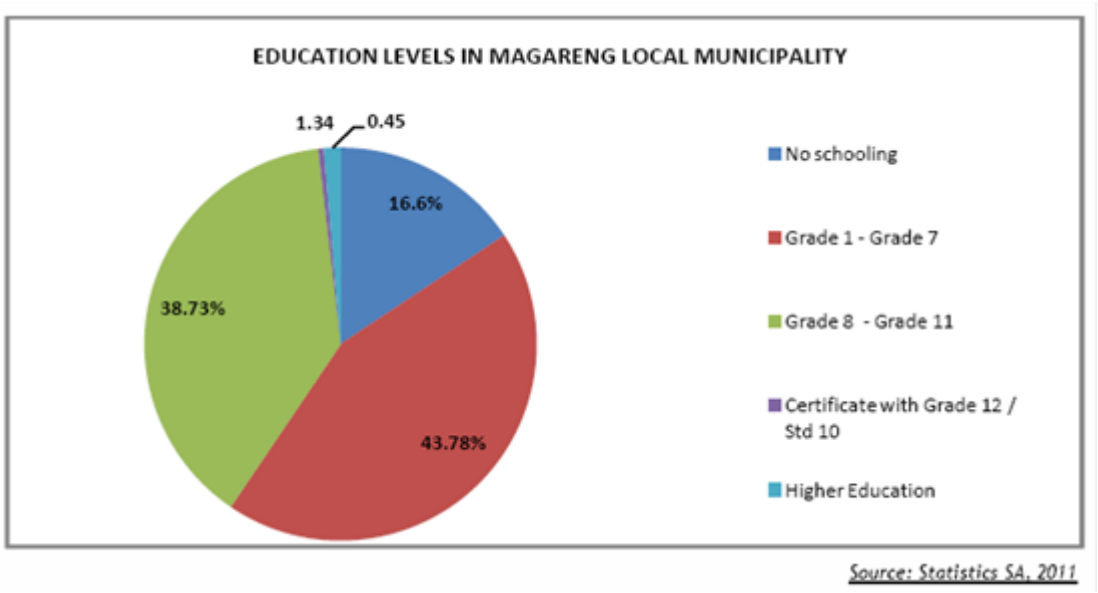
Table 6: House hold composition for Marageng

DWELLING TYPE	MAGARENG	DIKGATLONG	PHOKWANE	SOLPLAATJIE	FRANCESBAARD	GRAND TOTAL
House or brick/concrete block structure on a separate stand or yard or on a farm	5061	9193	13938	44414	72607	145213
Flat or apartment in a block of flats	30	52	262	1569	1912	3824
Traditional dwelling/hut/structure made of traditional materials	36	169	211	184	599	1197
House/flat/room in backyard	44	50	261	940	1296	2591
Informal dwelling (shack; in backyard)	117	536	395	2532	3580	7160
Informal dwelling (shack; not in backyard; e.g. in an informal/squatter settlement or on a farm)	626	1482	2029	7845	11982	23964
Room/flat on a property or larger dwelling/servants quarters/granny flat	7	8	21	317	354	707
Caravan/tent	1	15	27	77	120	241
Other	10	375	187	445	1019	2037
Grand Total	**5932**	**11881**	**17330**	**58325**	**93468**	**186935**

Magareng Local Municipality had only 5061 housing structures in 2011 which increased to 6120 in the year 2014 (ISSUU Government hand book 2014), which is the lowest as compared to the other local municipalities in the district.

In addition the eradication of informal dwelling is the lowest in the district compared to other local municipalities. It is alarming to note that the municipal area is performing poorer than the average of the municipalities in the district in terms of literacy levels. In the municipal area only 17% of persons aged 20 years and older has no formal education while 18% has some primary education. 32% of this segment of the population in the municipality had some secondary qualification while 18% completed Grade 12. 7% of this proportion of the population had some higher education qualification.

Figure 1: Education Levels in Magareng Local Municipality



The graph indicates the dire situation that the municipality is facing in terms of education levels. Attention should be given to the standard and access to education in the municipal area in order to bring it on par with the rest of the district. The high rate of non-attendance can be prescribed to the poverty level in the area, inaccessibility of some schools to communities while farming communities also experience difficulty in sending their children to school in towns.

Many people in Magareng still live in abject poverty without adequate access to engineering and social infrastructure with an unemployment ratio of 41.20% (ISSUU Government hand book, 2014). It is anticipated that the project would create 197 skilled employment opportunities during the construction phase, 5 people during operational phase, 13 unskilled employment opportunities during construction and 4 during operational phase.

The Local Municipality is strategically located on the north- eastern side of the Northern Cape Province. It is a Category C municipality which is made up of five Wards. According to Census 2011 the population of Magareng Local Municipality is estimated to be 24042. This is approximately 8% of the total population of the District. The majority of the area can be classified as peri-urban with very low densities that makes the provision of basic services very difficult and expensive. On a

broader scale, the area under study was used mostly for dairy farming and producing cheese in the previous years.
The majority of the population reside in rural areas. The rural areas are the most underdeveloped with large open spaces. Large sections of the open spaces are used for farming purposes with approximately 10 478 farms in the Municipal area.

Most of the areas in-between settlements are utilised for farming purposes resulting in these areas being under constant threat of environmental degradation. The physical development in these areas largely takes place in reaction to new needs that manifest over time. Large disparities exist between the different communities with regard to their respective levels of development. The size of the Municipality has brought about a situation where there are villages that are fairly well developed in contrast with other rural areas, which have developed very slowly. In addition to this, there are villages which have over time proven themselves as natural growth centres (villages that have larger populations with better infrastructure but not proclaimed). Due to continued urbanisation, there is an urgent need to provide housing in order to avert uncontrolled settlement.

Land in the rural areas is held in trust by government for the traditional authorities. The relevant legislations make private land ownership impossible. In such cases, the individual has to get the necessary approval from the traditional council, the site has to be properly surveyed, and the diagram submitted to the offices of the Land Surveyor General in Pretoria for approval. In practice there are few examples of people getting private land ownership in this manner, as traditional councils are in general very hesitant to part with their land. At present the dominant form of land ownership in the rural areas is the Permission to Occupy (PTO). A PTO does not constitute full private ownership and can therefore not be used as collateral at any of the commercial banks.

Some of the current land development legislation is applicable to certain areas, which complicates development within the municipality. Some of the legislations have been delegated to the Municipality, but most of the former homelands legislations are still vested with the province. This makes it almost impossible for the Municipality to have thorough control over its area of jurisdiction in terms of land uses and the payments of rates and taxes. Apart from the variety of legislations applicable in

certain areas, a numbers of stakeholders are also involved in the allocation and use of land. These are Traditional councils, the Municipality and the department of Cooperative Governance, Human Settlement and Traditional Affairs, this situation further contributes to a lack of development, specifically in the rural areas.

On a macro scale the majority of prevailing land uses within the Municipality include, commercial, conservation, cultivated land, forestry, mining, residential, subsistence farming and large pockets of unspecified land parcels, fundamentally zoned agricultural.

Informal housing: A vast number of informal houses occur in Magareng. The drastic increase in urban population contributes to this problem. People cannot build permanent houses because of a lack of properly planned sites with infrastructure.

Too few housing subsidies allocated: The housing backlog requires more subsidies to be allocated in order to eradicate the housing backlog. Housing subsidies are also not provided for differently abled persons. The differently abled people feel that they are discriminated against and are not taken into consideration. The rest of the community thinks that they are incapable to have their own house and running a normal household. This is now giving an indication that the consumer education has to be strengthened and awareness on different housing programme be implemented.

Table 7: Housing profile in each ward

Ward 1	Ward 2	Ward 3	Ward 4	Ward 5
40% informal houses	10% informal houses	30% informal houses	40% informal houses	30% informal houses
60% formal houses 10% old structures	80% stay in formal housing ○ 47% RDP houses ○ 18% old houses	80% formal houses	60% formal houses	70% formal houses

Table 8: Housing backlog in Magareng's respective Wards

Ward 1	Ward 2	Ward 3	Ward 4	Ward 5
1298	200	400	558	800

The levels of service are generally above RDP standards in the urban (Warrenton town), Warrenville as well as Ikhutseng township area, although they may be below RDP standards in certain areas such as informal and rural settlements. The service level profile for Magareng LM is summarised in the following table.

Table 9: Services Level Profile for Magareng LM

Item	House Connection	Yard Connection	Stand Pipe	Temporary Services	Total
Population Served	839	22589	0	1891	23617
Household Served	222	5976	0	506	6704

Source: Water Services Development Plan - 2011-2012

4.3.2 HERITAGE AND CULTURAL RESOURCES

The site previously housed a factory processing milk products (since relocated to Bloemhof and of which only the ruins remain), while graves on the site indicate that it has been occupied since at least the beginning of the 20th Century, if not since the advent of diamond mining in the area from 1888 to 1926.

To adequately address and describe the heritage and cultural resources associated with the proposed project site NEC commissioned a Phase 1 Heritage Impact Assessment. The assessment was conducted by Millennium Heritage Group, Archaeologist Mr. Eric Mathotho. (**Volume 3: Appendix 3C: Heritage Impact Assessment**)

Table 10: Heritage and Cultural Finds of the project site

Sites	GPS co-ordinates	Sensitivity
1. House 1	GPS S28°.04',30.5"& E 24°.52'.42. 08"	Medium
2. House 2	GPS S28°.04',31.5"& E 24°.52'.42. 0"	Medium
3. House 3 (associated pit latrine)	GPS S28°.04',32.8"& E 24°.52'.42. 2"	Medium
4. Concentration of historical ruins	GPS S28°.04',43.8"& E 24°.52'.47. 0"	Medium
5. Possible Grave	GPS S28°.04',49.7"& E 24°.52'.45. 4"	High
6. Single grave	GPS S28°.04',49.4"& E 24°.52'.54. 9"	High
7. Burial ground-Cemetery (104 graves)	GPS S28°.04',49.0"& E 24°.52'.52. 0"	High

There is a cluster of 3 historical houses comprising wooden window and door frames which represent a historical era of the site. There is a historical ruins complex in the southern section of the site along the N12 National Road. The ruins are characterised by several pit latrines, exposed concrete slabs, stone house foundations, rubble, and ash midden with pieces of broken glass, earthen wares, porcelain, and rusted iron objects.

There is a possible grave indicated by parked oval shaped stones as grave dressing in association with an acacia tree. There is also a single grave located in close proximity to Eucalyptus trees and excavated area (borrow pit site) the area has been indicated by parked rectangular stones as grave dressings, the area has been fenced. Within the area a concrete cross memorials has been placed at a distance from the original grave site in scripted: Thomas Charles Williams, Born Oct 29th1898, Died March 7th1917, Jesus is mercy.

There is a Cemetery represented by 104 graves most indicated by parked stones as grave dressing, while others are represented by cement head rest and granite tombstones as grave dressings.

The development would be set to the northern extent of the project site and therefore would not affect the graves, historical ruins and burial site. There would be/ may be need to apply for permits to demolish/destruct the cluster of historical houses to make way for the Grain Silo Storage Facility.

5. LEGAL CONSIDERATIONS

The proposed development triggers listed activities in line with the prevailing environmental regulations. These regulations are listed below, with the current NEMA EIA Regulations of 2014 being in the forefront.

Table 11: Triggered Listed Activities in terms of Listing Notice 2 under NEMA EIA Regulations 2014

Detailed description of listed activities associated with the project	
Listed activity as described in GN R.983, 984 and 985	**Description of project activity that triggers listed activity**
GN R984 item 15: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for - (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan	The project entails the establishment of a 72 000 ton long-term grain silo storage facility and collection site. This would be on a 30ha piece of land. It is anticipated that more than 20 hectares of indigenous vegetation will be cleared for the facility.

As a result, the proposed development has undergone a Scoping Study and a Full Environmental Impact Assessment. In addition to the requirement for an authorization in terms of NEMA there may be additional legislative requirements which need to be considered prior to commencing with the activity, for example: The Environmental Conservation Act (Act 73 of 1989); National Heritage Resources Act (Act 25 of 1999), National Forest Act (Section 7) etc. Naledzi Environmental Consultants was commissioned by the applicant, BPC, to provide an environmental impact assessment report that seeks to comply with the EIA regulations above.

5.1 NEMA ACT, 1998 (ACT NO. 107 OF 1998)

It is the single most Important Environmental Statute as it is an enabling Act, which gives the ultimate control of environmental issues to the Northern Cape Department of Environment and Nature Conservation amongst other competent authorities. It also orchestrates the administration of DENC by the multitude of government departments and relevant authorities.

People's right to an environment that is not harmful to health and well-being is fundamental. The Constitution refers to your right and that of future generations to a healthy environment (clause 32 of the bill of rights). Clause 32 of the same bill refers to your right to information held by the state or others where this affects the exercising of your other rights. Other laws that compromise this can be overruled by NEMA. The environment is defined as the natural environment and the physical chemical, aesthetic and cultural properties of it that influence human health and well-being.

The proposed development of establishment of a 72 000 ton long-term grain silo storage facility and collection site that will unlock hitherto inaccessible markets for small-scale black grain farmers in the Northern Cape in the above-mentioned act as a result of the previously discussed activities.

A Scoping Report and Plan of Study for EIA were compiled and submitted to DENC for review and for approval of the proposed approach to the detailed investigation required in the next phase. These potential impacts were scoped on the basis of baseline site investigations, desktop analysis and use of tools such as Geographical Information Systems, as well as information gathered from the public and I&AP's.

The Environmental Impact Report has now been prepared which contains the findings of specialists, assessment of anticipated impacts as well as comments and issues solicited from I&APs. The information contained within the EIR is sufficient to assist the DENC to make an informed decision to issue a positive or negative Environmental Authorisation in terms of NEMA.

5.2 ECA ACT 73 OF 1998 (ECA)

The promulgation of the Environmental Conservation Act 73 of 1989 resulted in a legislation which governs the holistic Environmental concerns. Of significance is that it enables the authoritative determination of an environmental policy with which all Administrative bodies comply. Naledzi Environmental consultants provides for the effective protection and controlled utilisation of the environment.

The Environment Conservation Act requires that facilities for grain silo storage and collection site be approved by the relevant environmental authorities and be referred to the DENC when it has implications for national policy or international commitments. Bilateral agreements with other national sector departments are required to agree on roles and responsibilities and agree on the lead authority, to ensure early notification and co-operative evaluation of projects.

5.3 MUNICIPAL SYSTEMS BILL

Municipalities are required to produce integrated development plans (IDPs) for the medium term (up to 5 year) development of their municipal areas. The IDPs give priority to basic needs, promote social and economic development and include the land development objectives (LDOs) of the municipality. The Municipal Systems Bill directs municipalities to provide sustainable services to their communities. The use of municipal service partnerships is encouraged. This allows a contractual arrangement with other bodies for the delivery and performance of any municipal service.

The proposed project will help to address some of the economic and poverty issues in the Moleko farm area as identified in the IDP of Magareng Local Municipality. MLM has been involved in the site selection process for the proposed Grain Storage Silo Project and is therefore supported and in line with the objectives of the IDP and aims for the local areas.

5.4 NEMA: BIODIVERSITY ACT, 2004 (ACT NO.10 OF 2004)

The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa's biodiversity within the framework of NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed.

The National Spatial Biodiversity Assessment (NSBA) classifies areas as worthy of protection based on their biophysical characteristics, which are ranked according to priority levels.

No NEMBA plant species occur in the project site or surrounding area (National Environmental Management: Biodiversity Act, 2004 (Act 10 Of 2004): Notice 2007, Notice 388 of 2013 and Notice 256 of 2015).

The Fauna species listed and protected under NEMBA were also consulted. No mammals protected under NEMA occur on site. There is however bird species which are protected under NEMBA which may potentially occur on site such as the Endangered White-backed Vulture Bird.

The habitat which is most likely to support the bulk of bird species, mammals, herpeto fauna are within the secondary thornveld in the southern portion of the site which would not be affected by the development footprint.

NEMBA is also the most recent legislation pertaining to alien invasive plant species. In August 2014 the list of Alien Invasive Species was published in terms of the act (Government Gazette No 78 of 2014). The Alien and Invasive Species Regulations were published in the Government Gazette No. 37886, 1 August 2014. The legislation calls for the removal and / or control of alien invasive plant species (Category 1 species).

5.5 CARA ACT 43 OF 1983

The objectives of this Act are to provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land, by the combating and prevention of erosion and weakening or destruction of water sources, and by the protection of the vegetation and the combating of weeds and invader plants.

Some alien plant species are listed as declared invasive plants (Henderson 2001) and they should be removed and controlled (Conservation of Agricultural Resources Act (Act 43 of 1983), CARA.

The Invader Categories are basically described as follows:

- Category 1: Declared weeds that are prohibited on any land or water surface in South Africa. These species must be controlled, or eradicated where possible.
- Category 2: Declared invader species that are only allowed in demarcated areas under controlled conditions and prohibited within 30 m of the 1:50 year floodline of any watercourse or wetland.
- Category 3: Declared invader species that may remain, but must be prevented from spreading. No further planting of these species are allowed.

In terms of the amendments to the regulations under the Conservation of Agriculture Resources Act, 1983 (Act No. 43 of 1983) and Regulation 598, Government Gazette 37885, August 2014) (Alien and Invasive Species Regulations), landowners are legally responsible for the control of alien species on their properties.

Some declared invasive plants (Henderson 2001) that occur on the site and should be removed and controlled (Conservation of Agricultural Resources Act (Act 43 of 1983) include:

Cereus jamacaru	Category 1
Echinopsis spachiana	Category 1
Eucalyptus sp	Category 2
Melia azedarach	Category 3
Prosopis sp	Category 2
Schinus molle	Category 3

Some weedy herbaceous species occur on the site, but they are not listed in terms of the above-mentioned legislation. The following Impacts are all subject to the control measures prescribed in terms of the CARA:

- Soil Surface erosion and deterioration of soil quality and productivity
- Flooding Potential, Soil pollution
- Subsidence, waterlogging and mass movements such as landslides and rock falls
- Degradation, destruction or elimination of ecosystems
- Introduction of elements that are uncharacteristic with the aesthetics and landscape character of the area

5.6 NATIONAL WATER ACT 36 OF 1998

National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, a person can only be entitled to use water if the use is permissible under the Act.

The protection of water resources is fundamentally related to use, development, conservation, management and control. The purpose of the resource quality objectives of this act is to establish clear goals relating to the quality of the relevant water resources. In determining resource quality objectives a balance must be sought between the need to protect and sustain water resources on the one hand, and the need to develop and use them on the other. The resource quality objectives have been determined in the act they are binding on all authorities and institutions.

This act governs the abstraction, use and return of wastewater back to a water resource. It legislate protection measures for water resources and the way they are developed and controlled. Section 22.2 of the water Act states that a person who uses water (a) must use the water subject to any condition of the relevant authorization of that use; (b) is subject to any limitation, restriction or prohibition in terms of this act or any other applicable law and (c) in the case of the discharge or disposal of water containing waste contemplated in section 21 must comply with the waste standards or management practices prescribed under section 26 unless the conditions of the relevant authority provide otherwise.

- ❖ The applicant shall provide the Department with the source of that water
- ❖ The exact distance of the proposed project from a water resource. Indicate to the department the existence of any boreholes within 1km radius of the proposed project and the use of those boreholes
- ❖ Proper storm water management must be in place during the construction phase
- ❖ Domestic solid waste generated during the construction phase shall be stored, handled and transported to a permitted waste disposal site in such a manner that does not cause related problems in surrounding areas.

Other aspects of the National Water Act that will be relevant include;

- ❖ Pollution of Water (section 19)
- ❖ Water uses (section 21a&g)
- ❖ General authorizations (GN R1191 of 8/10/1999)

In terms of Section 22 of the National Water Act a water use must be authorized. In section 21 "water use" is defined to include: impeding or diverting the flow of water in a watercourse or altering the bed, banks, course or characteristics of a watercourse.

The Act implies that the developers are responsible for taking reasonable measures to prevent pollution of water resources that they own, control, occupy or uses on the proposed study area in question. The developers are required to remedy situation where pollution of a water resource occurs following emergency incident and where it is responsible for the incident or owns or is in control of the substance involved. The developers must take all reasonable measures to minimize the impacts of the incident, undertake cleanup procedures, remedy the effects of the incident and take measures as directed by the catchment agency.

The proposed Grain Storage Silo Project will not be located within a 500m radius of wetland or drainage line and therefore does not require a General Authorization or application for such uses under Section 21 of the NWA.

It is however anticipated that the facility will abstract water from an existing borehole mainly for drinking purposes as the grain storage and its processes does not require huge amount of water. The facility being located in a rural area will also use existing septic tanks and french drains to dispose of sewage.

5.7 NATIONAL HERITAGE RESOURCES ACT 25 OF 1999

The Act was created to establish an integrated and interactive structure for the administration of the national heritage resources and empower civil society to nurture and conserve their heritage resources so that they may be bequeathed to future generations.

The act seeks to lay down general principles for governing heritage resources management throughout the Republic, to introduce an integrated system for the identification, assessment and management of the heritage resources of South Africa and to establish the South African Heritage Resources Agency together with its Council to co-ordinate and promote the management of heritage resources at national level. The act looks to enable the provinces to establish heritage authorities which must adopt powers to protect and manage certain categories of heritage resources and to provide for the protection and management of conservation-worthy places and areas by local authorities; and to provide for matters connected therewith.

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

(a) The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(c) Any development or other activity which will change the character of a site—

(i) Exceeding 5 000 m2 in extent; or

(ii) Involving three or more existing even or subdivisions thereof; or

(iii). Involving three or more even or divisions thereof which have been consolidated within the past five years; or

(iv). The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) The re-zoning of a site exceeding 10 000 m2 in extent; or

(e) Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources

authority and furnish it with details regarding the location, nature and extent of the proposed development.

(2) The responsible heritage resources authority must, within 14 days of receipt of a notification in terms of subsection (1)—

(a) If there is reason to believe that heritage resources will be affected by such development, notify the person who intends to undertake the development to submit an impact assessment report. Such report must be compiled at the cost of the person proposing the development, by a person or persons approved by the responsible heritage resources authority with relevant qualifications and experience and professional standing in heritage resources management;

(b) Notify the person concerned that this section does not apply.

The Act implies that no person may alter or demolish any structure or part of a structure, which is older than 60 years or disturb any archaeological or paleontological site or grave older than 60 years without a permit issued by the relevant provincial heritage resources authority. No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise.

The National Heritage Resources Act, 1999 (NHRA) protects all structures and features older than 60 years (Section 24), archaeological sites and material (Section 35) and graves and burial sites (Section 36). Potential impacts on heritage and archaeological resources during the construction phase include the likelihood of unearthing of heritage and archaeological resources especially during the construction phase of the project. The NHRA thus protects:

- Burial sites
- Buildings of more than 60 years
- Paleontological objects
- Special geological features (fossil prints, bushman rock art)

A Phase 1 Heritage Impact Assessments (HIA) was conducted for the study site which identified several sites of cultural and heritage significance pertaining to graves, burial sites and historical structures. The development footprint would correspond to the old cheese factory in the northern extent of the project site and 3 historical houses. Permits for the destruction and demolish of the 3 historical houses would be required.

BPC would need to appoint an HIA specialist to apply for permits to destroy such structures. The Historical structures would need permits from Northern Cape PHRA for the intention to destruct historical houses. The HIA specialist would also need to prepare a Historical Structure Report in support of these applications in terms of NHRA.

5.8 OCCUPATIONAL HEALTH AND SAFETY ACT NO 85 OF 1993

To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith. This act will regulate the activities and limits of the contracted labour force as per requirements of BPC policy. The labour force must significantly be composed of local people hence these provisions have to be complied with.

5.9 NEMA: PROTECTED AREAS ACT, 2003 (ACT 57 OF 2003)

The purpose of this Act is to provide for the protection, conservation and management of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes.

6. AUTHORITY CONSULTATION AND PUBLIC PARTICIPATION

6.1 APPLICATION TO THE AUTHORITIES

The Northern Cape Department of Environmental Nature and Conservation was identified as the relevant competent authority for this project. A pre-application meeting was held with DENC on 30 April 2015 to discuss the EIA Process, and to see if the process could be downscaled to a Basic Assessment on the basis of the project footprint having been disturbed already. A decision was made to proceed with the full EIA process. An Environmental Authorization Application Form was subsequently submitted to DENC on 12 June 2015. Subsequent to the submission of the application form, an acknowledgement letter (Volume 1-Appendix 1B) with a Reference Number NC/EIA/02/FB/MAG/WAR1/2015 was received on 15th of June 2015. The letter called for the environmental assessment practitioners to proceed with the EIA process.

6.2 EIA COMMENCEMENT PRESS ADVERTISEMENTS

Advertisements **(refer to Volume 2-Appendix 2A of this report)** were placed in the local newspapers to notify people of the commencement of the environmental impact assessment process. The adverts were placed on the following newspaper:

Table 12: List of newspaper where the EIA commencement was announced

Name of the newspaper	Date of placement
Diamond Fields Advertiser	Friday 29 May 2015

6.3 EIA COMMENCEMENT ON-SITE ADVERTISEMENTS

On-site advertisements **(refer to Volume 2-Appendix 2B Onsite Advertisements of this report)** were placed at Magareng Local Municipality offices and throughout the study area at the same time when newspaper advertisements were released. A3 size on-site advertisements were used to enhance their visibility. A map clearly showing the study area was placed next to the EIA advertisement site notice. Both the newspaper and site advertisements called for Interested and Affected Parties (I&APs) to register their names, organizations as I&APs so that they could receive project information or invited to public meetings.

6.4 IDENTIFICATION OF KEY STAKEHOLDERS AND I&APS

Immediately after both the newspaper and on-site advertisements, the project team started identifying individuals, organizations and/or their representatives who could potentially be interested and/or affected by the development. This included authorities in whose jurisdiction the project study area falls. A database **(refer to Volume 2-Appendix 2C: I&AP Database of this report)** of interested and affected parties, including key stakeholders was created and is being updated on regular bases.

6.5 FOCUS GROUP MEETINGS

Focus Group meeting was held on Saturday 17 October 2015 by the EAP (NEC), Mr. Xolani Nhlapo BPC Capital (Applicant) and I&APs. No stakeholder workshops were held for the project. Organs of state with jurisdiction in matters pertaining to the project were consulted by submission of draft reports for public review and official inputs.

6.6 PROJECT PUBLIC MEETINGS ADVERTISEMENTS

The schedule for public meetings was advertised on the Diamond Fields Advertiser on Friday 2nd of October 2015. The combination of all the above approaches were aimed at notifying potential interested and affected parties, government departments and other organizations about the project and an opportunity for them to get involved. Background information documents were prepared in English (**refer to Volume 2-Appendix 2D: Background Information Document of this report)** and distributed to those who showed interest on the project and to those identified as potential I&APs including key stakeholders.

Comment and registration form **(refer to Volume 2-Appendix2E: Comment Forms from I&APs of this report)**, with spaces provided for comments were also distributed along with the BIDs. Personalized letter were also sent to those who requested to be registered as I&APs in the project. Issues were raised and discussed throughout the public participation process. A Comment and Issues Response Report **(refer to Volume 2-Appendix 2F: Issues and Response Report of this EIR)** was prepared. It should be noted that both I&APs identification and engagement were ongoing processes that continued throughout the environmental impact assessment.

A draft scoping report (DSR) was prepared and made available to the public and key stakeholders through newspaper advertisements and placed in public places. Interested & Affected Parties, key stakeholders and authorities were invited to review the draft scoping report and comment. Issues raised were considered and the Comment and Issues Response Report was updated accordingly. Draft Scoping Report availability was advertised in the following newspapers:

Table 13: Newspaper where DSR availability was advertised

Name of the newspaper	Advertisement date
Diamond Fields Advertiser	29 May 2015

Draft Scoping Reports were placed in the following areas"

Table 14: Public Places where the DSR were placed for public review and comments

Place	Placement date
Magareng Local Municipality Library	29 May 2015

Information about the availability of the draft scoping report was also sent to Interested & Affected Parties and Stakeholders in the project database through e-mails and personalized letters.

6.7 ANNOUNCEMENT OF DRAFT REPORTS AVAILABILITY

This was the first official approach to I&APs and organs of state and information submission during the Environmental Impact Phase. It was considered the root for consultation in this phase. The EIR contains all the issues raised throughout the EIA process, findings of the specialist investigations and outcome of the assessment.

The EIR was made available for public review for a period of 30 calendar days from 2 October – 12 November 2015. Copies of the report were made available at the Magareng Local Municipality Public Library.

The availability of the report was announced in the Diamond Field Advertiser newspaper on Friday 2 October 2015. **(Volume 2 – Appendix 2G: Draft EIR & Public Meeting Newspaper Advertisement).** The advertisement informed I&APs of an EIA Phase Public Meeting on 17 October 2015 scheduled to discuss the project and facilitate comments on the Draft EIR. Soft copies of the Draft EIR were also distributed to the I&APs. Draft EIR and EMPr were also emailed to the state organs in order to solicit comments.

Attach and describe any further proof of notifications to I&APs and to organs of state of the EIR. (**Volume 2 - Appendix 2H: Proof of distribution/notification of Draft EIR**)

6.8 PUBLIC MEETINGS/OPEN DAYS DURING IMPACT PHASE

The conduct of a public Meeting during the Draft EIR public review period was considered a good communication tool to convey the findings of the EIR. It allows the public to interact with the EAP and project team to seek clarity on information contained in this report.

The public meeting took place 17 October 2015 from 10h00 – 12h00 at the Moleko Farm opposite the project site, 5km north east of Warrenton. The community of Moleko attended the meeting and received project maps, locality maps and gained a better understanding of the project details, impacts and benefits to the community. An attendance register was completed by each attendee.

The minutes of the meeting were compiled and are enclosed along with the public meeting attendance register under **Volume 2: Appendix 2I: Minutes of Public Meeting & Attendance Register.**

Attendees at the public meeting also completed comment forms to confirm their sentiments on the proposed project and convey any further comments to the project team. (**Volume 2: Appendix 2J: Public Meeting completed comment forms).** The overall feedback is that the information provided at the public meeting was clear and understandable, and in a nutshell the community members support the development based on the job opportunities that will be created from the development.

6.9 COMMENTS ON THE DRAFT EIR

Comments received during the public review period of the EIR from organs of state and I&APs have been recorded and included in this document (EIR) for submission to DENC. **(Volume 2: Appendix 2K: Comments from organs of state &I&APs on draft EIR).**

6.10 PUBLIC CONSULTATION DURING DECISION MAKING PHASE

During this phase DENC will review the EIR and consult with any other key organs of state e.g. the Department of Water & Sanitation (DWS), Northern Cape Provincial Heritage Resources Authority before granting or refusing an environmental authorisation.

The environmental authorisation will be made available for public review for a period of 20 consecutive calendar days. This provides I &AP's with an opportunity to verify that the decision taken have considered their comments and concerns raised. I&APs are also then informed of the appeal procedure, should they have a reason to appeal.

7. GRAIN SILO SPECIFIC ENVIRONMENTAL IMPACT ASSESSMENT

During the Scoping Phase of the project, information was gathered, and together with specialist and technical input, used to identify potential impacts associated with the proposed project, and to highlight areas, which should be avoided in order to minimise these impacts. A public participation process was undertaken to identify issues and concerns of key stakeholders and Interested and Affected Parties (I&APs). The results were documented in the Final Scoping Report dated July 2015 and submitted to DENC. DENC approved the Scoping Report on 29 September 2015.

A number of potentially significant issues were highlighted and further investigated in the Impact Assessment phase in order to assess their significance, and to determine the need for the implementation of measures in order for the overall project to be environmentally sustainable. The following key issues were identified in the scoping phase:

- Visual impacts
- Ecology and ecological sensitivity impacts
- Archaeology and/or heritage resources impacts
- Geotechnical Investigations

7.1 SUMMARY OF FINDINGS FROM THE SPECIALIST INVESTIGATIONS

Specialists were appointed to form part of the EIA project team. The team of specialists competent in the following areas has been included:

Organization	**Name of Specialist**	**Specialist Study**
Axis Landscape Architects (cc)	Gerhard Griesel	Visual Impact Assessment
Millennium Heritage Group a division of KPRM Holdings (PTY) LTD	Mathoho Eric	Heritage Impact Assessment
Eco Agent cc	Bredenkamp G	Ecological Impact Assessment
Geo Simplicity Geotechnical Engineering (PTY) Ltd	P F van Straten	Geotechnical Investigation

Table 15: List of Specialists involved in the project

7.1.1 VISUAL IMPACT ASSESSMENT STUDY FINDINGS

NEC commissioned a Visual Impact Assessment (VIA) for the project to determine the visual impact on the development on the visual receptors of the area which motorists, surrounding farms and communities. The area is rural in nature and any development within its midst would have some form of impact on the aesthetic quality of the area.

NEC appointed Axis Landscape Architecture CC to conduct the VIA for the project **(Volume 3-Appendix 3D: Visual Impact Assessment).** Gerhard Griesel, the principal Landscape Architect and Visual Specialist from Axis Landscape Architecture cc undertook the VIA. He is a registered Professional Landscape Architect at the South African Council of Landscape Architects, SACLAP no 20161.

Visual Resource

The extent of the assessment included the proposed project site and an approximate 5km buffer area around the project site. The site is surrounded by residential, farms and undeveloped areas. Residential areas are located more to the southern side of the study area and agricultural activities to the north. Human settlements are scattered around the study area and the landscape are degraded around these settlements.

Landscape Character

Factors which make up the landscape character include:

- Topography- the area consist gentle undulating landscape with relatively little topographic variation.
- Vegetation- the site consist mixed grass and moderate shrub component with a very open medium shrubveld layer
- Land use- mixed grasslands and stock farming. Isolated farmsteads are scattered across the landscape and are usually associated with a group of large trees.

Visual Character: the character of the landscape is exclusively rural.

Visual Quality of Landscape: Moderately Low

Visual Absorption Capacity: Moderately Low. The landscape may provide some visual screening to the project.

The findings of the study indicate that the assessment of the various landscape impacts have indicated that the most significant impacts will occur during the construction phase of the development. This will come about when bushveld areas are cleared to make way for silo's, parking areas, roads and buildings. The change in surface cover from bushveld to exposed soil will diminish the bushveld character of the area and cause a moderate visual impact. The impacts will abate as the development reaches final completion and the disturbed areas are landscaped. In time the maturing of the landscaped areas will increase the VAC of the site and reduce the visual contrasts that are associated with the new facilities.

The visual receptors of the area include:

- Residents of surrounding farms and Warrenton;
- Residents outside a 2km radius from the site;
- Recreational users and Tourists;
- Motorists

The visual receptors that will be mostly affected are the residents within a 2 km distance from the site. The visual impact will be moderate during the construction of the developments when unsightly views of the construction activity will be visible. The residents will experience a moderate level of visual exposure due to their proximity and the exposed soil, construction equipment and material stockpiles will cause severe visual intrusion.

Mitigation is proposed to lower the significance of the impacts to acceptable standards. Mitigation addresses predictable impacts that should be addressed in the design phase as well as potential impacts during the construction and operational phase of the development. The mitigation measures proposed are focused on the following:

- building finishes;
- Outdoor lighting;
- Operation and maintenance of the construction site;
- Positioning of construction camps and material stockpiles;
- Dust suppression; and
- Long term maintenance of the landscaped areas

7.2 ECOLOGICAL IMPACT ASSESSMENT FINDINGS

NEC commissioned an Ecological Impact Assessment for the project based on the primary activity for the application, being removal of indigenous vegetation. The broad area is defined as Kalahari Thornveld, indigenous in nature. The study focused on both flora and fauna (birds, mammals, Herpetofauna). The instructions were also to verify if there were any wetlands on the project site.

The study was conducted by EcoAgent Ecology and Biodiversity Consultants CC. The ecologists who conducted the investigation included Prof. George Bredenkamp (ecologist, botanist) and Dr. Alan Kemp (zoologist, botanist). Both specialists are SACNASP registered. Prof GJ Bredenkamp (SACNASP Reg No 400086/83) and Dr AC Kemp (SACNSP Reg No 400059/09). The outcome of their assessment is discussed in the following text.

The study area is characterized by Kimberly Thornveld (SVK4) vegetation. This vegetation is distributed in substantial parts of Warrenton and Christiana and some extent of Barkley west. It is due to the presence of land scape features often dominated by plains often irregular with well-developed tree layers dominated by *Acacia erioloba, Acacia tortilis, acacia Karroo* and *Boscia albitrunca* and well developed shrub layers with occasional dense stands of *Tarchonanthus* camphoratus and *A. mellifera,* grass layer open with much uncovered soil. This type of vegetation has been influenced by the presence of andesitic lavas of the Allan ridge formation in the north and west and the fine grained sediments of the Karroo super group in the south and east.

The vegetation is Least threatened. The target is 16% and only 2% is statutorily conserved in Vaalbos National Park as well as in Sandveld, Bloemhof Dam and S.A Lombard Nature Reserves. Some 18% is already transformed, mostly by cultivation and erosion is very low. Area is mostly used for cattle farming or game ranching. Overgrazing leads to encroachment of Acacia mellifera

Identified Wetlands: No wetlands were identified on site.

Overall conservation value of the site: The conservation value of the site is rated as "Low, i.e. Land that has little conservation value and that could be considered for developed with little to no impact on the vegetation".

Overall sensitivity of the site: The site is of low sensitivity.

Overall finding: It was concluded in the study that the development will not affect biodiversity of the general area much. From a biodiversity point of view it is suggested that the development be supported.

Based on:

The site area is disturbed with patches of disturbed bushveld remaining in a mosaic of current and old cultivated fields. Historically it would have been mainly scattered bushes over a sparse grass layer with bare areas between tufts, above which emerged a few large thorn trees.

The plant communities identified on site are highly disturbed, degraded and transformed. No red data threatened or protected plant species occur on the site.

The site is small and as such not rated as important from a conservation perspective. It is in the midst of an extensive rural area but the old cheese factory and road infrastructure are low-key limiting factors for mammal distribution and occurrence. Connectivity is high and it is argued that there is a constant immigration of species from the adjacent areas. It is concluded that none of the terrestrial or arboreal mammal species will be entirely displaced, and it is even possible that the development will result in a qualitative improvement which may favour small mammals.

Although ten red data avifauna species that were previously recorded from this particular grid, no threatened species are expected to be regular residents or frequent visitors. Herpetofauna species richness was very low, with no red data species was recorded from the site area.

The species lists for birds, mammals, reptiles and flora which were consulted and considered in the assessment are contained in the Ecological Assessment attached under Volume 3: Appendix 3A.

The only management measures proposed in the ecological assessment include:

- Save and protect as many trees as possible, - this will enhance the pleasurable atmosphere of the developed area.
- Control waste dumping and avoid pollution at all times, these activities should be controlled and managed.
- Use indigenous tree species for any planned gardens. Avoid the planting of exotic plant species and control weeds.

The Ecological Impact Assessment also focussed on Avi-Fauna and the availability of suitable habitat for them on the project site. The following text elaborates on the findings.

7.2.1 BIRDS (AVI-FAUNA) AND THEIR HABITATS

Due to the size of the proposed project no negative impacts are anticipated on the birds, the area is disturbed with some parts degraded. The habitats at the site as identified for bird community distributions occur within the Arid Woodland of the Woodland (savanna) Biome (Allan et al. in Harrison et al. 1997) and more specifically the Kimberley Thornveld vegetation unit within the Eastern Kalahari Bushveld of the Savanna Biome (SVk 4 of Mucina & Rutherford 2006). Much of the study site and surrounding area to the south has been degraded and/or developed for residential, mining and industrial activities, with livestock and game farming more to the north, west and east.

The aerial mobility of birds also demands attention to the principal habitats surrounding the study site and their conservation status, not just those along the immediate borders but also more distant habitats that might provide sources for species visiting the site and sinks for those breeding on site. In this context, the aquatic habitats of the nearby Vaal River and, upstream, the Vaalharts Weir and larger Bloemhof Dam and their reserves are important to note, even though no such aquatic habitat is available on the site. Further west, the Harts River with its Spitzkop and Taung Dams, and Barberspan, are within flying distance, as is the Gariep River and its tributaries to the south. For habitats more similar to the site, Dronfield Nature Reserve and Mokala National Park to the south near Kimberley are most obvious, besides several smaller private reserves in the general area.

On-site Bird Habitat Assessment

The broader habitats adjacent to the study site are mainly extensions of those present on site, or mentioned specifically in the habitat types described below. Generally, three principal habitat types distinguished on and/or adjacent to the site were distinguished and considered most relevant to bird ecology and community structure.

Thornveld- Most of the site could be classified as this habitat, albeit a poor-quality secondary example of the type. All but a few trees found around old dwelling or industrial ruins were at best small trees or low shrubs of only a few species.

Umbrella thorn *Vachellia tortilis* was the dominant species throughout, with candle-pod thorn *V. hebeclada* scattered among lower bushes. Least abundant were a few scattered *Lycium* and *Tarconanthus bushes*, and *Zizyphus, Ehretia* and *Searsia bushes* and small trees. There were larger indigenous and alien trees around old dwellings, factory ruins and along embankments, including *Eucalyptus, Prosopis, Melia* and various *cacti* and *agaves*.

On surrounding properties, larger trees emerged above the denser bushveld, much of it camphor bush *Tarconanthus camphoratus*, especially to the north and east. Properties to the south of the N12 appeared to be partially transformed smallholdings, while obviously larger trees were in and along the more broken ground of the railway servitudes. The grass cover comprised only a few species and was generally sparse, with bare gravelly or sandy ground between tufts and patches. Where disturbance was oldest large termite mounds had returned, and where it was sandiest burrows of gerbils and springhares were evident.

Clumps of the underlying andesite rocks had been formed near areas cleared for cropland or construction, but some of the more scattered patches of rocks in the south of the site might have been small natural outcrops. The thornveld attracted a variety of typical bushveld faunivorous bird species, but a minority of frugivorous species.

Fallow Land- This habitat was most obvious in the weed-infested and sparse grassland on old fields down the east side and in the adjacent centre of the site, but were also matched by much smaller and irregular patches further south and west where past habitations had altered the substrate by trampling, ash or clearance. The pioneer weed and grass species in these areas seemed to provide an abundance of seeds, on the plants or the ground, which attracted numbers of birds and species, and probably some rodents.

Old Structures- The remains of old buildings formed the equivalent of rocky substrates where they had been broken down into slabs and/or rubble, while the standing roofless structures provided the equivalent of high cliffs and ledges, especially within the low general cover of the terrain. These structures provided roost and nest sites for species that would otherwise not be drawn to the thornveld, but where some of their foods are available even on the disturbed and/or fallow ground.

Expected and Observed Bird Species Diversity

The site falls at the northeast corner of a QDGC (2824BB WARRENTON) and over two pentads (2800_2450 and 2805_2450). Out of the maximum of 230 species expected for the site during 1987-1991 based on the QDGC (SABAP 1), and including the 212 species so far reported since 2007 for QDGC within which the pentads fell (SABAP2), It was assessed that 140 bird species have a high, medium or low probability to occur on site, based on the habitats available. Of these, the presence of 37 species (26%) was confirmed, which offers a reasonable winter sample in support of general species: habitat correlations (Table 2 of the specialist report).

The number would surely have been higher if we had spent more days/seasons in search of species, if the surveys had started earlier and extended later in the day/night, and if we had covered every sector in more detail. It was assessed that 65 species (46%) as having a high probability of occurrence, but 40 species (29%) a medium probability and 35 species (25%) a low probability, and of these the presence of 30, 3 and 4 species, respectively was confirmed. The total number of species expected would be much larger if other unlikely species that are only recorded as rare vagrants to the area were not excluded from this analysis due to inadequate availability of their preferred habitat(s).

The three different habitat types that were distinguished either supported or are expected to support somewhat different species of birds. Nineteen generalist species (14%) are expected to use all three overlapping habitat-types, plus the 14 species (10%) classed as aerial feeders and expected to range across all habitats when feeding. For the 126 non-aerial species, while 19 species (15%) preferred three habitats, 62 (49%) the majority, preferred two (thornveld and fallow or thornveld and structures), and 45 (36%) only a single habitat type.

Based on a total of 266 assessments of predicted habitat preference, thornveld was potentially the richest and most distinctive habitat, predicted to be chosen by 108 (41%) of the expected species. Structures are preferred by an estimated 80 species (30%), with a similar 78 species (29%) in the fallow land. The 14 aerial-feeding species are included within the above analysis, not only for all the habitats they range across when feeding, but also if there are terrestrial habitats that some might use for breeding. Overall, thornveld supported the highest diversity, with structures the next highest and fallow land the lowest.

Threatened and Red-Listed Bird Species

Based on the most recent assessment of the threatened status of South Africa's avifauna (Taylor 2015), a total of ten Red Data avifaunal species are expected possibly to use the site and its surroundings, based on SABAP1 and given the habitats available (Table 2). Three of these species have already been reported for the two pentads within which the site falls during the period of the ongoing Southern African bird atlas project started in 2007 (SABAP2).

A further seven Red Data species were reported in the previous SABAP1 QDGC for the site and, although now considered unlikely to visit the site since they occur only far from the site, are included under the Precautionary Principle. Estimated suitability of favoured habitats to support requirements of threatened bird species on and around the proposed Magareng silo development, near Warrenton, Northern Cape, based on the quantity and quality of habitats available and assessed as Good (G), Mediocre (M), Poor (P), Absent (A) or Not Applicable (NA). [1+2] indicates species reported previously for site's grid cell(s) in SABAP1 and/or SABAP2.

Threatened Status	Species	Potential support for:			
		Movement	Feeding	Roosting	Breeding
Least Concern	Double-banded Courser[1+2]	M	M	M	P
Near Threatened	European Roller[1]	P	P	P	NA
	Kori Bustard[1]	P	P	P	P
	Blue Crane[1]	P	P	A	A
	Abdim's Stork[1+2]	M	P	A	NA
Vulnerable	Secretarybird[1]	P	P	P	P
	Lanner Falcon[1]	M	M	P	A
Endangered	White-backed Vulture[2]	P	P	A	A
	Tawny Eagle[1]	P	P	A	A
	Martial Eagle[1]	P	P	A	A
TOTALS	**10**	**M3;P7**	**M2;P8**	**M1;P4;A5**	**P2;A6;NA2**

These analyses indicate that by far the most important habitat to conserve for nationally threatened bird species is the thornveld and adjacent fallow land (Table 3), although both habitats are so degraded that they offer only marginal habitat for all species listed.

Similar vegetation and of a better quality is available and extensive in the surrounding areas, especially north and west of the site, although near the site it appears to have become somewhat densified by camphor-bush domination. Although the Vaal River runs so near to the south that various species were seen overhead or heard from the site, the site itself offers no supporting wetland habitats of any significance and so any threatened species for that aquatic habitat were not included. The only water-related habitats on site stem from storage of and runoff from the old canal system, which is now defunct, and there are no obvious natural drainage lines to provide dispersal corridors to and from the site.

No threatened species are expected to be regular residents or frequent visitors, with only three as erratic visitors (**Abdim's Stork, Secretarybird, Lanner Falcon**) although only the stork, a non-breeding summer migrant, has been reported during SABAP2 (Table 4). European Roller is another non-breeding summer migrant but, like the remaining six species is expected only as an infrequent vagrant. The roller, Double-banded Courser, Kori Bustard and Secretary bird might pass through the site, since patches of preferred habitat occur in the general area, while White-backed Vulture and Tawny and Martial Eagles might pass overhead even though the chance of carrion or live prey being available on site is low. Only the courser and vulture have been reported for the area's pentads since the start of SABAP2 in 2007.

Overall, the habitats on site are marginal for these threatened species to pass through, but mostly poor to unsuitable in supplying significant quantities and qualities of food, roost and nest sites to spend any useful time on the site (Table 5). This means that the probability of any of these threatened species visiting, residing on or being sustained by the site is low, and so development of the site will have insignificant effects on their population dynamics.

In terms of the Biodiversity Act No 10 of 2004, the following species expected on the Magareng silo site are listed as Threatened or Protected Species (ToPS) within Government Notice 2007 under the NEMBA Act 10 of 2004:

Endangered: Blue Crane, White-backed Vulture.
Vulnerable: Tawny Eagle, Kori Bustard, Lesser Kestrel, Martial Eagle.
These species were presumably selected from the 2000 Red Data book for South African birds (Barnes 2000), but have been superseded by the latest 2015 revision (Taylor 2015). Only the White-backed Vulture has been reported for the site's pentads since 2007.

By the Regulations of the Provincial Authority

The Northern Cape Nature Conservation Act of 2009 lists "all indigenous species except those in Schedules 1, 3 and 6" as Protected, specifically mentioning Double-banded Courser, European Roller and Abdim's Stork but including many other expected species not now considered threatened (Taylor 2015). Specially Protected Species list Secretary bird, Lanner Falcon, White-backed Vulture and Tawny and Martial Eagles of the now-threatened species, among several others expected for the site. Many of these species were presumably selected from the 2000 Red Data book for South African birds (Barnes 2000), but will have been superseded by the latest 2015 revision (Taylor 2015).

General Conclusions: birds

The study site has minimal ecological importance given the degradation and transformation it has experienced for at least a century, and the extent of the similar but better quality habitats that surround it. The exact location, extent and design within the site of the proposed silo project, and its associated power, water and waste infrastructure were not available, so further detailed comment is not possible. The site includes no significant ecological systems, such as wetlands, drainage lines or rocky outcrops, so development would be possible anywhere within its boundaries. However, by placing the silo development over the footprint of the transformed habitats of the old factory and its adjacent fallow lands, and as close as possible to the existing access road and rail transport systems, would have the least ecological impact. It would also allow the southern section of the site, with the most near-natural thornveld habitat and the main cultural features, to be managed as an ecological offset and cultural asset, which could, inter alia, lead to improvement of the quality of these remaining natural habitats.

Disturbance & habitat destruction:

The site is relatively small and disturbed, degraded and transformed. The vegetation is quite disturbed and considered to be secondary, due to a long period of disturbance. Although the vegetation provides limited habitat to some fauna species, especially birds, the small area and disturbed nature of the site are limiting factors. It is suggested that the impact of the proposed development will have a limited effect of low significance on the biodiversity of the general area.

7.3 AGRICULTURAL POTENTIAL OF THE SITE

NEC did not purposefully commission an agricultural viability investigation for the project site. The ecological impact assessment specialist/botanist provided the detail on agricultural potential of the site based on each vegetation unit identified, it soil types and vegetation condition.

It was highlighted that the current and old fields on site are considered of Moderate Agricultural Potential. The disturbed thornveld would be considered of moderate-low agricultural potential. The other highly disturbed areas, secondary vegetation on the berm and old cheese factory site are considered of low agricultural potential.

Agricultural land is considered to be of high potential if it may be cultivated in terms of Part 1 of the regulations of Conservation of Agricultural Resources Act 43 of 1983, and is-

- under permanent irrigation, or
- can be classified into one of the soil forms listed in the table below, and
- the effective soil depth is equal to or greater than the minimum as stated in the table below, and
- the average topsoil clay content falls within the limits as stated in the table below.

Qualifying Soil Forms	Mini Effective soil depth	Topsoil Clay content
Avalon, Bainsvlei, Bloemdal, Clovelly, Glencoe, Hutton, Oakleaf, Pinedene, Shortlands, Tukulu	900 mm	10 – 35%

Table 16: Characteristics of site for high agricultural potential

7.4 HERITAGE IMPACT ASSESSMENT STUDY FINDINGS

Just to recap the past land use of the project site; the property was used and owned by Dairybelle Pty Ltd in the 1990 as a dairy farm and cheese factory. The operation moved to Bloemhof dam some years ago. The structures are mostly on the northern extent of the site and have become dilapidated. There is also evidence of some yesteryear community activities to the southern extent of the site, maybe a former settlement.

To adequately address and describe the heritage and cultural resources associated with the proposed project site NEC commissioned a Phase 1 Heritage Impact Assessment. The assessment was conducted by Millennium Heritage Group, Heritage and Archaeological specialist, Mr. Eric Mathotho. He is an ASAPA Accredited Archaeologist, member number 312. The findings are described below.

The following cultural and heritage resources were found on site by the archaeologist:

- 3 historical structures (houses considered from a historical era of the site);
- Historical ruins complex in the southern extent of the site alongside the N12 National Road;
- Possible grave indicated by parked oval shaped stones as grave dressing in association with an acacia tree;
- A single grave located in close proximity to Eucalyptus trees and excavated area (borrow pit site) the area has been indicated by parked rectangular stones as grave dressings, the area has been fenced;
- Cemetery represented by 104 graves

Identified Sites Significance:

Informal graves and Formal Burial Ground (Cemeteries): Considered to be of high significance and are protected by various laws.

Historical structures, and ruins sites: Old structures can be considered to be of Historical significance and are protected by section 34(1) of the National Heritage Resources Act (no 25 of 1999). Section 34(1) No person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

Recommendation:

The identified historical structures, and associated ruins form the cultural landscape of the farm, and can in some instances be avoided by means of shifting the proposed silos development towards the disturbed open plains. All new activities (Engineering aspects such as access routes, water, and sewage and electricity lines should be designed not to disturb these structures.

Should above recommendations became unavoidable and these structures, or historical ruins have to be destroyed to make ways for the proposed Grain silos and associated infrastructures, these historical structures or ruins sites must be subjected to Phase 2 investigations. These investigations require an excavation permit for historical ruins with the South African Heritage Resources Agency.

In case of the Historical structures an application should be lodge with the Northern Cape Provincial Heritage Resources Authority- for the intention to destruct historical structures, before the destruction permit is issued, a Historical Structure Report should be produced and approved by Provincial Heritage Authority, these investigations should be done on condition that:

- All historical buildings need to be recorded prior to destruction: recording implies (I) photographic recording of each building with caption in standard architectural terminology (II) measure drawings of each building‘ s floor plan, elevation, section and architectural detailing to an appropriate scale (usually 1:100cm scale) and (III) a compilation of all recordings in a single historical structure report.
- Preparation of the above documents in a format that can be submitted to Provisional Heritage Resource Authority Northern Cape or South African Heritage Resources Agency (SAHRA) for approval, as well as to any official repository (Archive, Library or McGregor Museum);

Grave and Graveyards can be mitigated by one of the following strategies, Namely:

- Graveyards can be considered as a ‘ NO GO’ area and be conserved insitu within the property, the area could be fenced to mitigate future damage and vandalism;
- Grave yards can also be exhumed and relocated. The exhumation process is regulated by various legislations, regulations and administrative procedures. This task is undertaken by Forensic archaeologist and reputed undertakers who are acquainted with all administrative procedures and relevant legislation that have to be adhered to whenever human remains are exhumed and relocated.

- This process also include social facilitations process with 60 days statutory notice period for grave older than sixty years. Permission of exhumations and relocation have to be obtained from the decedents of the deceased, the National Department of Health, the provincial department of Health, The Premier of the Province and the Local Police.

Should the recommendations be viable to the developer there are no objections to the proposed project and the HIA specialist can recommend to the Provincial Heritage Resources or South African Heritage Resource Agency to approve the project as planned.

7.5 GEOTECHNICAL INVESTIGATION FINDINGS

The proposed project site is mainly underlain by Andesitic rocks of the Allanridge formation, Platberg Group and Ventersdorp super group land forms. A Geotechnical survey was commissioned by Mr P F van Straten of Geo Simplicity Geotechnical Engineering (Pty) Ltd on behalf of Mr Johan du Preez of Silo Warehouse (Pty) Ltd. The survey was conducted in August 2015.

The purpose of the study was to ascertain the soil structure that occurs on the project site, to identify potential problematic soils which could have a negative impact on the proposed project, to determine the allowable bearing capacity and settlement characteristics of the in-situ soils and or rock, determine excavability within the in-situ materials, to assess and provide recommendations with regards to slope stability, to conduct soil surveying and testing in order to give recommendations with regards to potential soil aggressiveness and to identify the possible treatment measures, to indicate the existence of borrow pits and to provide recommendations pertaining to the proposed project.

The investigation was conducted by the following means:

(a) digging of test holes and soil profiling (11 holes)
(b) drilling and logging of diamond borehole (4holes) the depth of the boreholes was ranging from 11.7m-14.5m below NGL to 3m in hard andesite rocks
(c) Standard Penetration Tests were done inside the boreholes at 1.5m intervals. This was only done once due to the difficulties encountered within the soil structure mainly caused by hard andesite rocks
(d) Sampling and laboratory tests

The studies were conducted mainly on two parts of the site i.e. where the borrow pits exist and where the grain silos will be built (Northern part of the site). A total of 8 samples were taken for testing. The laboratory tests done include (i) foundation and road indicator testing, (ii) MOD and CBR testing, and (iii) chemical aggressiveness testing. The results of the findings are found on **Volume 3 Appendix 3B: Geotechnical Studies.**

Recommendations

It was deduced that the site is mainly underlain by manmade fill potentially collapsible fine grained silty sand Aeolian transported, a pebble marker transported layer which is also underlain by re worked residual sandy silts with/without abundant scattered core stones in profile and ultimately the bedrock (andesitic). The rocks also occur haphazardly on the surface across the site, underneath these were discovered with different degrees of weathering at diameters of 0.15m-1.5m.

The slope of the site is gently at 1.2% from the North to the South. The chemical content of the soils and rock structure was discovered to be lower than the corrosive levels at 8.2 hence the mechanical weathering is dominant as compared to chemical weathering. Due to the less chemical content in the rocks and soil structure the impacts like corrosion of metal silos is not anticipated hence the project is supported from the geotechnical aspect.

7.6 OBSERVATIONS ON SOCIAL AND ECONOMIC IMPACTS

7.6.1 POPULATION IMPACTS (POPULATION CHANGE)

Specialist studies were not conducted for the proposed project but NEC as the EAP of the proposed project did a research and compiled the Social Impacts Studies as part of the EIA process.

Population change refers to any changes in the size and density of the local population as a result of the proposed project. The building of grain silo storages and a milling station is not expected to create a high number of temporary or permanent jobs during the construction and operational phases given the specialist nature of the construction of a grain silo facility.

No immediate changes are thus anticipated during the construction or operational phases in terms of the overall demographic profile of the population. This would therefore not result in an increase in the size and density of the population, even if outsiders were to be sourced for these jobs. This variable is thus rated as neutral for the proposed site.

7.6.2 INTRODUCTION OF PEOPLE DISSIMILAR IN DEMOGRAPHIC PROFILE

At this stage there is no information readily available to determine the age, race, gender or ethnic composition of the outside workers during the construction and operational phases, as well as the number of construction workers and contractors that could be hired from within the communities situated along the three proposed alternative routes.

Given the scope of the project such as the specialised nature of the construction activities, the relative short and intermittent construction period, and the frequency of maintenance, it is anticipated that the construction of silos would not introduce large numbers of "outsiders" into the area and would therefore not impact on the social status and networks of the communities along the alternative routes.

It should, however, be noted that the likelihood of this variable manifesting depends on the following:

- The number of local labour that could be used, specifically during the construction phase of the project;
- Whether there would be a large influx of jobseekers to the areas and if illegal immigrants would form part of the process;
- Whether a construction camp(s) would be erected and the location thereof.

Inflow and outflow of workers

This variable refers to the inflow of temporary workers during the construction phase of the project as well as potential social conflict between locals and outsiders mainly due to:

- Possible perceptions that outsiders are favoured above locals for employment opportunities;
- Social tension between immigrants and locals with regards to the availability of services and infrastructure;

- ❖ Misconduct of workers housed in temporary accommodation facilities and construction camp mismanagement.

Whilst the expected inflow and outflow of workers cannot be quantified at this point, this variable is expected to manifest predominantly during the construction phase. It is anticipate that the proposed project will create about 210 job opportunities during the construction phase but how ever since during the operational phase there is no much activity in terms of job creation because it will be basically the operation of the silos which do not require labour. It is also anticipated that the employment of workers from outside the project area would give rise to discontentment and possibly anger amongst local residents especially in the study area characterised by high unemployment levels.

Given the scope of the project, the number of external job-seekers coming into the area would most probably be small or possibly non-existent even though such outsiders are likely to seek accommodation in surrounding settlements. The presence of construction camps to accommodate the workers could also result in social conflict and associated environmental impacts. The likelihood of this impact negatively impacting on the local residents and environment would depend on whether a construction camp would be erected, the location thereof, as well as on the standard of construction camp maintenance.

Maintenance of the servitudes would have to be undertaken, for the life of project, resulting in an inflow and outflow of workers, although it is not anticipated that there would be any change in the population or social conflict during the operational phases of the proposed project.

7.6.3 RESIDENTIAL PROXIMITY AND RELOCATION

The majority of the land has been used for dairy farming and cheese farming in the previous years, on a large scale the land for the proposed project is vacant land with graves and farm fallows. It also has an abandoned vandalised building on site which was used as a cheese factory.

So no re locations are expected to take place but how ever there are other people who live in close proximity to the proposed site who might be affected by the impacts such as dust erected during the construction phase of the project.

The Magareng area is mainly dominated by farm lands and the proposed site was a farmland in the past which is no longer operational. . There are open spaces within the northern section of the study area which opens the possibility for putting silos. There are access gravel roads that exist within the chosen which can be used during the construction phase.

The vast area is slightly flat with manmade ridges or contour bunds created by top soil clearings as well as construction of earth dams and gravel extraction from an existing excavations (borrow pits). In order for the proposed project to commence the borrow pits have to be re habilitated so that they do not have a negative on the proposed project. The borrow pits can become major sources of erosion if no proper mitigation measures are implemented.

During the construction phase of the project construction activities could have negative intrusion impacts (dust and noise pollution) on dwellings and settlements, depending on the proximity of these to the actual construction site(s).

In terms of residential proximity and relocation, the anticipated impacts during the construction and operational phase of the proposed project are rated similar (based on the information available at this stage) as the intensity of these impacts would depend on the final route alignment and tower positions.

7.6.4 FORMATION OF ATTITUDES AGAINST THE DEVELOPMENT

Although attitude formation is not an impact per se, it serves an important indication of community sentiments toward the project. It could provide important information regarding the feelings and potential actions of I&APs that could become evident during the construction and operational phases of the proposed project and even the negotiation phases.

From the results of the public participation process and particularly the comments received from I&APs, there is, at this stage, no attitude formation or social mobilisation against the proposed development.

Attitudes against the proposed are not perceived to arise from the community members especially when considering the fact that all I&APs said they welcome the project and they were more than willing to make it a success since it will unlock many doors for the poor community members.

However negative attitudes can only arise if the people employed are not from the Local Magareng community because they have high expectations from the project. I&APs, that are not familiar with the functioning of the grain silo storage facilities and milling services could be under the incorrect impression that the proposed project would lead to the upgrading of the local economic levels which in turn could result in direct economic benefits to the communities in the study area. The proposed project is expected to increase the economy of the area but the majority of the people are expecting to be employed during the implementation of the project however the jobs will be limited especially during the operational phase and clarity to the communities needs to be emphasised. If accurate facts are not communicated to these I&APs, they could be left under the impression that they would receive direct benefits in terms of job creation from the proposed project.

7.6.5 EMPLOYMENT OPPORTUNITIES

In terms of employment opportunities, the following aspects should be considered:

- The number of jobs that would be created during the construction and operational phase of the project;
- The extent to which the local skills match the requirements of the project proponent (economic inequity); and
- The extent to which certain groups such as the unemployed, disadvantaged and minority groups (e.g. women, youth) could be employed (employment equity).

Typical of a project of this nature, where highly specialised personnel are required for the construction of grain silos, it is anticipated that during the construction phase close to 200 job opportunities will be created but these will drop significantly during the operational phase but there will be long term jobs during the operation phase. Temporary job opportunities for unskilled or low-skilled labour will occur during the construction and operational phases, although these limited.

Maintenance and operation of the proposed grain silo storage facilities as well as for the mills is expected to result in employment opportunities for the locals. As far as employment-related impacts are concerned, it is also important to consider that jobs are a scarce commodity in the study area and could create competition among the local jobless resulting in social conflict.

It is expected that the proposed project will create both temporal and permanent job opportunities, however it is encouraged that BPC employ members of the local community. If the initiative is implemented correctly it will alleviate the low unemployment rates in the area and it will also uplift the infrastructural development of the area as well as increase the economic benefits of the community.

7.6.6 ECONOMIC BENEFITS

It is anticipated that the proposed project will create economic benefits for the communities. The increased income levels of those locals that would be able to secure jobs would also have a lasting economic impact on local families and/or the community.

If the proposed project is implemented, the growing food demands in the region can be alleviated. The proposed project will also unlock the agricultural industry for the poor black farmers. Since the grain silo storages will have a mill on site this will make easy availability of food to the communities. The local tax base of the local Municipalities in these areas could thus be increased as a result of the economic development in the area.

The Northern Cape Province would, therefore, ultimately benefit from the proposed project although it is not anticipated that there would be any industrial diversification (e.g. utilisation of local equipment and supplies) during the construction or operational phases of the proposed project.

7.6.7 DISRUPTION IN DAILY LIVING AND MOVEMENT PATTERNS

The construction phase of the proposed project is expected to impact on the daily living and movement patterns of residents in the following manner:

- Unwanted social activities (e.g. unruliness, drunkenness, unsustainable sexual relationships with the locals and unwanted after hours socialising) of construction workers living in construction camps could impact on the living patterns of residents, especially if these were located near existing settlements and farm or smallholding dwellings.

During the operational phase the following impacts on the daily living and movement patterns are anticipated:

- Unauthorised entry of maintenance personnel on private properties; and

- ❖ Possible misconduct of maintenance personnel (e.g. stock theft, inadequate bush clearings).
- ❖ The maize delivery trucks should use existing roads and they should be maintained and serviced regularly to reduce soil contamination from oil spillages.
- ❖ Where there are gravel roads these should be graded regularly and where dust roads are present water should be sprinkled to reduce dust emissions and air pollution.

7.6.8 INFRASTRUCTURE, SERVICES AND FARMING

During the construction phase, construction camps with related infrastructure and facilities would have to be set-up and the construction of access roads to specific sites could lead to erosion. BPC, however, keeps the construction of access roads to a minimum and rather use the existing infrastructure, as the construction and maintenance of these roads is very costly and creates another potential for erosion.

Services would also not be interrupted. It should, however, be noted that the size of the property plays an important role in this regard as activities on smaller properties cannot be focused away from the grain silos. If the grain silos would thus be situated along the boundaries it could have a lessened impact on the properties and activities undertaken on the properties. It is anticipated that the proposed grain silo could negatively impact on the heritage resources of the community, hence mitigation measures should be implemented to reduce the anticipated negative impacts especially on the indigenous vegetation and on the graves.

7.6.9 TOWNSHIP DEVELOPMENTS

As mentioned previously, the study area covers one Local Municipality (Magareng Local Municipality) of five local municipal areas within the district and accommodates almost 8% of the district population. The study municipality comprises an urban node, villages and farms. The urban node consists of Warrenton, Warrenvale and Ikhutseng. Small agricultural villages have been established throughout the municipal area of which Bullhill, Fourteen streams, Sydney's hope, Windsorton station, Moleko's Farm, Nazareth and Hartsvallei farms are the most prominent.

The rest of the area comprises mainly of mixed farming. The area of jurisdiction is approximately 24042 people. The municipal area is divided into 5 wards; ward 1-3 constitute Ikhutseng the former Black residential area while Warrenvale the former the former coloured area constitutes ward 4. Ward 5 is made up of Warrenton town which was previously a predominantly White area and the surrounding rural areas. Majeng is currently accommodating 250 families but will be developed in future into a residential area of approximately 800 households and a further 1000 sites are planned for the future.

7.6.10 PERCEPTIONS ON PUBLIC HEALTH AND SAFETY

(a) Health

The social impact regarding health refers to the perception of risks associated with the proposed project.

During the construction phase of the proposed project an influx of outsiders to an area is usually associated with increased health risks due to the spread of sexually transmitted diseases. As the construction activities are located within a singular site, it is anticipated that there would be recurrent contact between the locals and outsiders. This aspect could increase the spread of sexually transmitted diseases. The World Health Organisation (WHO) launched various research initiatives in this regard. At this stage some of the conclusions drawn are: "HIV and AIDS awareness campaigns should be practiced to increase the awareness and measures to combat the spread of diseases. Local community members should be employed onsite so that they can always be close to their family members this will reduce the spread of do diseases incredibly.

Concerns with regards to the outbreak of fires during the construction and operational phase of the proposed project were raised. The emergency services of the local municipalities are not that effective at the moment due to shortages of staff and equipment. The rural character of area and the density of informal settlements, also hamper or delay the response times and effectiveness of fire fighting efforts.

(b) Safety and Security

Concerns have been raised with regards to the safety and security of property owners and communities. This relate to the perceived loss of security during the construction phase of the proposed project due to the influx of an outsider workforce to the area.

Although the numbers of these "outsiders" will be limited, the fears of property owners with regards to an increase in crime should not be disregarded. Additional safety risks include the increased risk of veld fires and the movement of heavy vehicles or machinery through the study area during the construction phase.

Should the grain silo storages be in close proximity to dense settlements, the general safety risks associated with construction sites would be applicable.

During the operational phase of the proposed project unauthorised entry of maintenance personnel on private properties should be avoided as this could pose some security risks for both the owners and the personnel. Due to the high crime rates in the area, these issues should be sensitively dealt with.

7.7 MAPPING OF ENVIRONMENTAL SENSITIVITIES/FINDINGS

NEC has taken into consideration all of the findings of the specialist reports and mapped identified sensitivities. The HIA is the only assessment which sets areas of high significance on site. The inputs from the ecologist and zoologist are also summarised below, albeit they do not specify any areas of conservation value/high significance.

7.7.1 AREAS OF HERITAGE AND CULTURAL IMPORTANCE

- Cluster of historical houses (area of old cheese factory
- Historical ruins & Cemetery area in southern portion (along N12)
- Single grave in southern portion of site

It was indicated that these above sites are no-go areas, specifically the graves and burial site, however mitigation measures are possible if need be, for the relocation of graves or and demolish of structures.

7.7.2 AREAS OF ECOLOGICAL (FLORA AND FAUNA) IMPORTANCE

Flora: The ecologist, in terms of Flora rates the entire project site of low sensitivity and thus has not indicated any areas which need exclusion from the development footprint.

Fauna: The zoologist has indicated that the site includes no significant ecological systems, thus development would be possible anywhere within its boundaries.

Yet, by placing the silo development over the footprint of the transformed habitats of the old factory and its adjacent fallow lands, and as close as possible to the existing access road and rail transport systems, would have the least ecological impact. It would also allow the southern section of the site, with the most near-natural thornveld habitat and the main cultural features, to be managed as an ecological offset and cultural asset, which could, inter alia, lead to improvement of the quality of these remaining natural habitats. Refer to the sensitivity map overleaf.

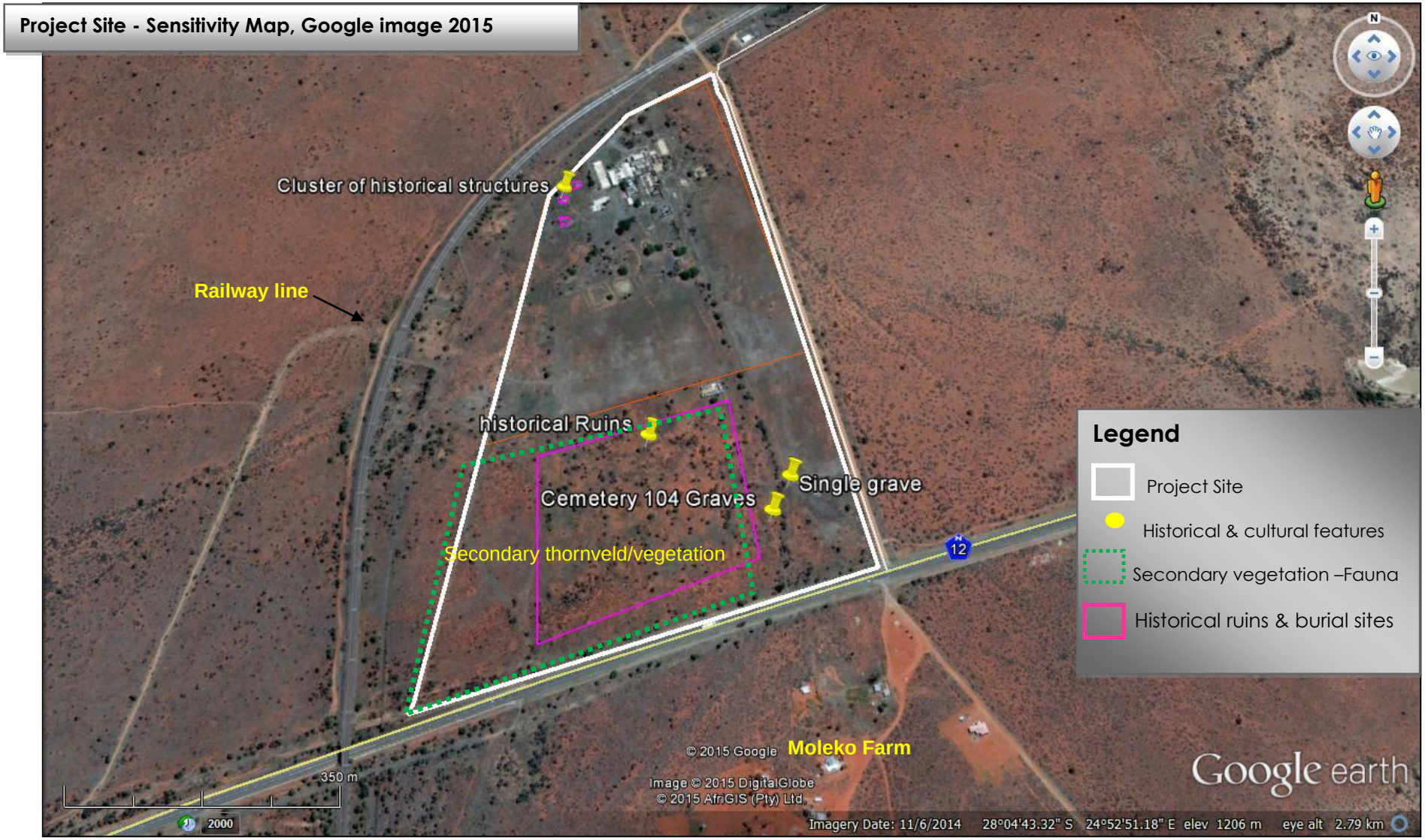
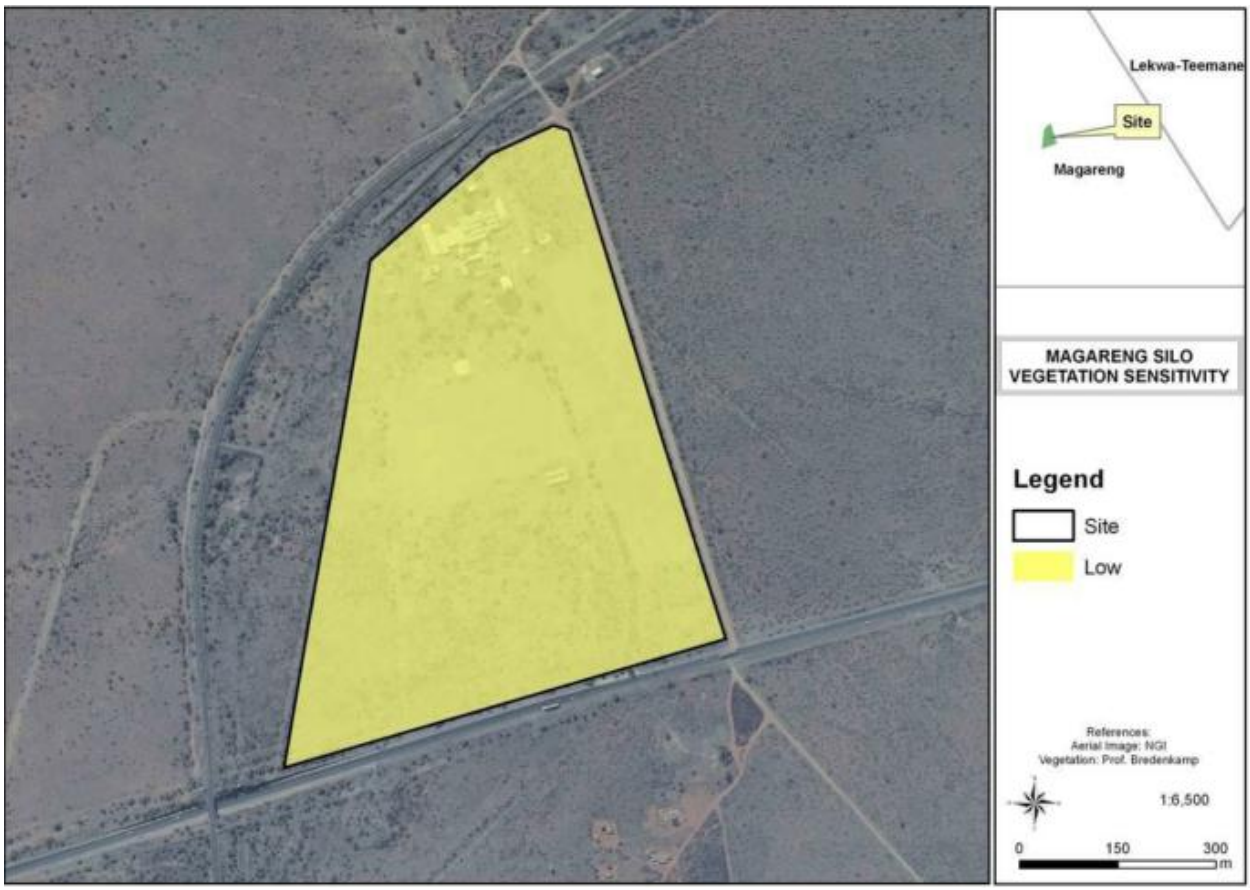


Figure 2: Aerial Map indicating sensitive HIA features on site, secondary thorn veld viable for fauna habitat as per the Zoologists feedback.

Figure 3: Ecological sensitivity map (EcoAgent) - Low Sensitivity



7.8 FACILITY FOOTPRINT IN RELATION TO SENSITIVITIES

The layout plan for the proposed project in relation to sensitive areas of the site is attached as Appendix 1C.

7.9 IMPACT ASSESSMENT RANKING AND RATING

Key issues identified during the scoping phase informed the structure of the specialist studies. Each issue consists of components that on their own or in combination with each other give rise to potential impacts, either positive or negative and from the project onto the environment or from the environment onto the project. This chapter assesses these potential impacts for each of the three possible corridors considered, identifies recommended mitigation and provides an indication of the significance of the impacts after mitigation. A description of the assessment criteria was highlighted in the Plan of Study for EIA. The following are the tables illustrating the rating or ranking of impacts:

7.9.1 VISUAL CHARACTER OF THE AREA

(a) Impacts on the landscape

Activity	Nature of impact	Extent of impact	Duration of impact	Severity of impact	Probability of impact	Significance	
						WOM	WM
Removal of bushveld during construction phase.	Negative – Removing landscape elements that are fundamental in establishing a valued landscape character	Regional	Permanent	Low	High probable	Moderate	Low
Completed development in 5 years' time	Negative – Adding additional land uses that alter the bushveld character of the site and cause a loss of open space.	Regional	Permanent	Moderate	Definite	Moderate	Low

Table 17: Impact Rating Table: Landscape

(b) Visual Impacts on Residents

Activity	Nature of impact	Extent of impact	Duration of impact	Severity of impact	Probability of impact	Significance	
						WOM	WM
Construction of development	Negative – Altering the visual character of the site due to the presence of unsightly views of the construction activity.	Regional	Permanent	low	Probable	Low	N/A
Completed development in 5 years' time	Negative – Altering the visual character of the site due to the introduction of new land uses on the site.	Regional	Permanent	Low	Probable	Low	N/A

Table 18: Impact Rating Table: Visual Impacts on Residents

(c) Visual Impacts on Tourists

Activity	Nature of impact	Extent of impact	Duration of impact	Severity of impact	Probability of impact	Significance	
						WOM	WM
Construction of the proposed development	Negative – Causing unsightly views of exposed soil and construction activity.	Local	Temporary	Moderate	definite	moderate	low
Completed development in 5 years' time	Negative – Altering the existing bushveld appearance	Local	Permanent	moderate	definite	moderate	low

Table 19: Impact rating Table: Visual Impacts on Tourist

(d) Impacts on Motorists

Activity	Nature of impact	Extent of impact	Duration of impact	Severity of impact	Probability of impact	Significance	
						WOM	WM
Construction of development	Negative – Causing unsightly views of exposed soil and construction activity	Local	temporary	moderate	definite	low	N/A
Completed development in 5 years' time	Negative – Altering the existing grassveld appearance	Local	permanent	low	definite	low	N/A

Table 20: Impact Rating Table: Visual Impacts on Motorists

7.9.2 SOILS AND GEOLOGY

Activity	Nature of impact	Extent of impact	Duration of impact	Severity of impact	Probability of impact	Significance WOM WM
Mechanical weathering	Breaking of rock structures	Local	Permanent	Low	High	The site is generally underlain by rocks which will be broken down mechanically when exposed to friction.
Mechanical weathering	Formation of finer particles	Local	Permanent	Low	High	Since the chemical content of the soil is low the type of weathering prevailing is mechanical.

Table 21: Impact Rating Table: Soils, Geology and Agriculture

7.9.3 ARCHAEOLOGICAL AND/OR CULTURAL RESOURCES

Activity	Nature of impact	Extent of impact	Duration of impact	Severity of impact	Probability of impact	Significance WOM WM
Destruction of ancient buildings	Disturbance of graves	Local	Permanent	High	High	The development will take place on the Northern part of the site away from graves. The only archaeological features that might be disturbed are the old buildings

Destruction of ancient buildings	Disturbance of graves and other archeologically valuable resources	Local	Permanent	High	High	If the old buildings are to be destroyed in order to pave way for the grain silos an application will be lodged with SAHRA (destruction of buildings older than 60 years)

Table 22: Impact Rating Table: Heritage and Archaeological Resources

7.9.4 ECOLOGY AND ECOLOGICAL SENSITIVITY

(a) Vegetation

Activity	Nature of impact	Extent of impact	Duration of impact	Severity of impact	Probability of impact	Significance WOM	Significance WM
Removal of vegetation	Habitat destruction	Site	Permanent	Low	high	high	low
Removal of vegetation	Habitat destruction	Site	Permanent	Low	High	Low	

Table 23: Impact Rating Table: Ecology and Sensitivity

(b) Faunal Species

Activity	Nature of impact	Extent of impact	Duration of impact	Severity of impact	Probability of impact	Significance WOM	Significance WM
Habitat destruction	Mammals	Site	Permanent	Low	low	Medium	
	Birds	Site	Permanent	Low	Medium	Medium	
	Herpetofaunal	Site	Permanent	Low	Low	Medium	
	Faunal disturbance	Site	Permanent	Low	Low- medium	The negative impacts can be mitigated by avoiding undisturbed habitat structures and proper rehabilitation measures after construction	

Table 27: Impact Rating Table: Faunal Species

(c) Watercourses/rivers

Activity	Nature of impact	Extent of impact	Duration of impact	Severity of impact	Probability of impact	Significance WOM	Significance WM
Oil spillages, soil erosion	River pollution	High	Temporal	High	High	High	Low
Oil spillages	River pollution	High	Permanent	High	High	high	Low

Table 26: Impact Rating Table: Rivers

(d) Overall Ecological (combined)

Impact on	Extent	Duration	Intensity	Probability	Significance	Status	Confidence
Vegetation	Site	Permanent	Low	High	Low	Negative	High
Plant species							
Indigenous species	Site	Permanent	Low	Medium	Low	Neutral	Medium
Alien plant species	Site	Permanent	Low	High	Low	Positive	High
Fauna							
Mammals	Site	Permanent	Low	Low	Low	Neutral	Medium
Birds	Site	Permanent	Low	Medium	Low	Neutral	Medium
Herpetofauna	Site	Permanent	Low	Low	Low	Neutral	Medium

Table32: Impact Rating Table: ecological

7.9.5 TRAFFIC

Activity	Nature of impact	Extent of impact	Duration of impact	Severity of impact	Probability of impact	Significance	
						WOM	WM
Increase in traffic	Traffic congestion	local	Permanent	Medium-high	High	High	Low
Increase in traffic volumes	Traffic congestion	Local	Permanent	Medium -High	High	High	Low

Table 24: Impact Rating Table; Traffic

7.9.6 SOCIAL AND ECONOMIC ASPECTS

(a) Population Change

Activity	Nature of impact	Extent of impact	Duration of impact	Severity of impact	Probability of impact	Significance	
						WOM	WM
Influx of workers	Increase in population numbers employees during this phase will be 210. The impact can be positive if local community members are employed.	Medium	Temporal	Medium	High	medium	Low-employees can be the community members
N/A	The employees during the operational phase will be 9	Neutral	Long term	Low	High	The impact can be reduced through the employment of local community members.	

Table 28: Impact Rating Table: Population Change

(b) Introduction of people dissimilar in demographic profile

Activity	Nature of impact	Extent of impact	Duration of impact	Severity of impact	Probability of impact	Significance without mitigation
Influx of people during the construction phase	Positive	Local	Permanent	Medium	High	The impact can be high if the employees are from other places, this can be mitigated by employing local community members
	Positive	Local	Permanent	Medium	High	The impact can be positive if local people are employed

Table 29: Impact Rating Table: Introduction of new people

(c) Inflow and outflow of workers

Activity	Nature of impact	Extent of impact	Duration of impact	Severity of impact	Probability of impact	Significance WOM WM
Influx of workers	Positive/negative	Local	Temporal	Medium	High	The impact can be negative if mitigation measures are not properly implemented. Mitigation measures can include hiring of local members
Inflow of workers	Positive	Local	Permanent	Medium	High	The number of employees during the operational phase will drop significantly from 210 to 9, the impacts anticipated can be positive if local members are employed.

Table 30: Impact Rating Table: Inflow and Outflow of Workers

(d) Residential proximity

Activity	Nature of impact	Extent of impact	Duration of impact	Severity of impact	Probability of impact	Significance WOM WM
N/A	N/A	N/A	N/A	N/A	N/A	The proposed project will not have a negative impact on the residential proximity since the site is not a residential area hence no people will be moved to implement the project
N/A	N/A	N/A	N/A	N/A	N/A	The site is not a residential area and access roads are already available hence no movement of people will be necessary.

Table31: Impact Rating Table: Residential Proximity and / or relocation

(e) Safety

Activity	Nature of impact	Extent of impact	Duration of impact	Severity of impact	Probability of impact	Significance	
						WOM	WM
Dust	Air pollution	Local	Permanent	High	High	High	Low
Explosions	Death due to explosions	Local	Medium	High	High	High	Low
Health	Sicknesses due to dust inhalation	Local	Medium	High	High	High	Low
	Death by being buried under grains						

Table 25: Impact Rating Table; Safety

8. IMPACTS MITIGATION MEASURES

Please note that detailed measures have been outlined under the environmental management programme/plan prepared for this project as Volume 4. The following is a summary of some measures to be implemented.

8.1 VISUAL IMPACTS

If practically possible, locate construction camps in areas that are already disturbed or where it isn't necessary to remove established vegetation for example, areas with less dense vegetation. Utilize existing screening features such as dense vegetation stands or topographical features to place the construction camps and lay-down yards out of the view of sensitivity visual receptors. Keep the construction sites and camps neat, clean and organized in order to portray a tidy appearance; and screen the construction camp and lay-down yards by enclosing the entire area with a dark green or black shade cloth of no less than 2 m height.

8.2 AGRICULTURAL POTENTIAL, SOILS AND GEOLOGY

The main recommendation would be that the farm and/or property owners be consulted during the negotiation process so that they can have inputs into the value of their properties before decisions are made.

8.3 ARCHAEOLOGY AND HERITAGE RESOURCES

The Heritage Impact Assessment Study (**refer to Volume 3 of this report** found objects and materials of heritage and or archaeological importance in certain parts of the study area. As a result, graves and old buildings in the vicinity should be treated as NO-GO areas. That notwithstanding, some of the archaeological and heritage resources are usually buried beneath the ground, and as such, could only be discovered during construction and maintenance activities.

8.4 ECOLOGY AND ECOLOGICAL SENSITIVITY

The study area is characterized by Kimberly Thornveld (SVK4) vegetation. This vegetation is distributed in substantial parts of Warrenton and Christiana and some extent of Barkley west.

It is due to the presence of land scape features often dominated by plains often irregular with well-developed tree layers dominated by *Acacia erioloba, Acacia tortilis, acacia Karroo* and *Boscia albitrunca* and well developed shrub layers with occasional dense stands of *Tarchonanthus camphoratus* and *A. mellifera*, grass layer open with much uncovered soil.

This type of vegetation has been influenced by the presence of andesitic lavas of the Allan ridge formation in the north and west and the fine grained sediments of the Karroo Super Group in the south and east.

8.5 SOCIAL AND ECONOMIC ENVIRONMENT

8.5.1 POPULATION CHANGE

No mitigation measures are proposed due to the neutral status of the impact.

8.5.2 INTRODUCTION OF PEOPLE DISSIMILAR IN DEMOGRAPHIC PROFILE

The main mitigating strategy would be to limit an influx of people dissimilar in demographics to that of the local populations through maximising the local workforce component as far as possible. If construction camps are introduced, ensure effective construction camp management and implement a system to avoid misconduct of workers living at the construction camp.

8.5.3 INFLOW AND OUTFLOW OF WORKERS

The construction process would have to be carefully managed with emphasis on the following:

- all construction activities would have to be restricted to working areas (if possible, the construction camp should not be located in close vicinity to residential areas or settlements);
- construction workers would be expected to wear name tags and clothing to ensure that they can be readily identified as belonging to the construction workforce;
- Meetings would have to be arranged with affected residents and community policing structures to clarify the contractor's plans, procedures, schedules and possible difficulties and risks.

It is further suggested that BPC should, where practicable, make the appointment of local labour a key requirement in its tender documentation. In so doing, the successful contractors would be obliged to, as far as possible, use local labour during the construction phase.

8.5.4 RESIDENTIAL PROXIMITY AND/OR RELOCATION

Mitigation measures proposed are:

- If any relocation would be necessary, proper land valuations should be undertaken and fair compensation should be negotiated with the affected property owners.
- BPC to negotiate with local and provincial authorities regarding any possible relocation of individuals and the relocation destination to ensure the minimum social disruption and housing of people closer to opportunities and services.
- BPC should ensure that the period of uncertainty regarding possible relocations should be kept as short as possible. Lengthy cumbersome procedures should thus be avoided, although such a process should be undertaken in a sensitive and transparent manner.

8.5.5 FORMATION OF ATTITUDES AGAINST THE PROJECT

- In the case of emergencies, maintenance and emergency personnel from BPC should as far as possible aim to contact the property owners (Magareng Local Municipality) or community representatives to inform them of the emergency.
- The project is well supported by the local communities hence negative attitudes are anticipated.

8.5.6 EMPLOYMENT OPPORTUNITIES

The following mitigation measures are proposed:

- BPC should, give first priority to local communities when it comes to employment.
- BPC or the contractors should source skills required for the construction phase of the project from the local communities as far as possible.
- The skills required should be communicated to the local community leaders and community based organisations.

- ❖ Local recruitment agencies should be contacted to obtain a list of potential jobseekers.
- ❖ An equitable process should be ensured whereby minority groups and previously disadvantaged individuals are taken into account.
- ❖ Skills training should be undertaken aimed at developing portable skills among the local labourers.

8.5.7 DISRUPTION IN DAILY LIVING AND MOVEMENT PATTERNS

Mitigation measures to be implemented are:

- ❖ BPC should not create new access routes during construction activity but should utilise existing paths and roads for the movement of material.
- ❖ The construction will be on the northern part of the site where there are no graves (this part is highly degraded)
- ❖ If possible, construction vehicle movement should be limited. Main roads should only be used during off-peak traffic hours. Vehicular movement should be directed away from areas with a high level of pedestrian movement, notably during peak hour periods.
- ❖ BPC contractors should communicate their work schedules to property owners and the public at large via large, reflective signs posted along routes that would be affected by construction activity.

8.5.8 INFRASTRUCTURE

Mitigation measures include:

Turn off and lock out all powered equipment associated with the bin, including augers used to help move the grain, so that the grain is not being emptied or moving out or into the bin. Standing on moving grain is deadly; the grain can act like "quicksand" and bury a worker in seconds. Moving grain out of a bin while a worker is in the bin creates a suction that can pull the workers into the grain in seconds.

Prohibit walking down grain and similar practices where an employee walks on grain to make it flow. Provide all employees a body harness with a lifeline, or a boatswain's chair, and ensure that it is secured prior to the employee entering the bin. Provide an observer stationed outside the bin or silo being entered by an employee. Ensure the observer is equipped to provide assistance and that their only task is to continuously track the employee in the bin.

Prohibit workers from entry into bins or silos underneath a bridging condition, or where a build-up of grain products on the sides could fall and bury them. Train all workers for the specific hazardous work operations they are to perform when entering and working inside of grain bins.

Test the air within a bin or silo prior to entry for the presence of combustible and toxic gases, and to determine if there is sufficient oxygen. If detected by testing, vent hazardous atmospheres to ensure that combustible and toxic gas levels are reduced to non-hazardous levels, and that sufficient oxygen levels are maintained.

Ensure a permit is issued for each instance a worker enters a bin or silo, certifying that the precautions listed above have been implemented. To prevent dust explosions and fires, employers must (among other things):

Develop and implement a written housekeeping program with instructions to reduce dust accumulations on ledges, floors, equipment and other exposed surfaces.

Identify "priority" housekeeping areas in grain elevators. The "priority" housekeeping areas include floor areas within 35 feet of inside bucket elevators, floors of enclosed areas containing grinding equipment and floors of enclosed areas containing grain dryers located inside the facility. Dust accumulations in these priority housekeeping areas shall not exceed 1/8th inch. Employers should make every effort to minimize dust accumulations on exposed surfaces since dust is the fuel for a fire or explosion, and it is recognized that a 1/8 inch dust accumulation is more than enough to fuel such occurrences.

Inside bucket elevators can undergo primary explosions. Bucket elevators must have an opening to the head pulley section and boot section to allow for inspection, maintenance, and cleaning. Bearings must be mounted externally to the leg casing or the employer must provide vibration, temperature, or other monitoring of the conditions of the bearings if the bearings are mounted inside or partially inside the leg casing. These bucket elevators must be equipped with a motion detection device which will shut-down the elevator when the belt speed is reduced by no more than 20% of the normal operating speed.

Implement a preventative maintenance program with regularly scheduled inspections for mechanical and safety control equipment, which may include heat producing equipment such as motors, bearings, belts etc. Preventive maintenance is critical to controlling ignition sources. The use of vibration detection methods, heat sensitive tape or other heat detection methods can help in the implementation of the program.

Minimize ignition sources through controlling hot work (electric or gas welding, cutting, brazing or similar flame producing operations). Install wiring and electrical equipment suitable for hazardous locations.

Design and properly locate dust collection systems to minimize explosion hazards. All filter collectors installed after March 1988 shall be located outside the facility or located in an area inside the facility protected by an explosion suppression system or located in an area that is separated from other areas by construction having at least a one hour fire resistance rating and which is located next to an exterior wall vented to the outside.

Install an effective means of removing ferrous material from grain streams so that such material does not enter equipment such as hammer mills, grinders and pulverizers

8.5.9 TOWNSHIP DEVELOPMENTS

Mitigation measures in this regard could include the following:

- Once the project has been approved, and during the negotiation phase, BPC should discuss the exact location of the grain silos and tower positions with representatives of the town planning departments of the Magareng Local municipality, BPC should take note of the RDP planning processes and houses that will be built in the next financial years.

8.5.10 PERCEPTIONS REGARDING HEALTH AND SAFETY

Mitigation measures proposed are:

- The proposed 72000 metric tons of grain silos should not, where possible, be located within close vicinity to sensitive establishments such as graves and where red listed vegetation exists.

- BPC should protect public health by complying with international guidelines and national safety standards for electromagnetic fields.
- During the construction phase of the proposed project, HIV/Aids awareness campaigns should be highlighted among the communities in the proposed site, but should be more focused on the contract/construction workers.
- Local labour should be employed during the construction phase where possible.
- The location of construction camps should be dealt with in consultation with the local community representatives and local municipalities.
- Unauthorised practices taking place at construction camps or illegal activities undertaken by contract workers should immediately be reported. A monitoring system should be developed in consultation with the contract workers and affected parties.
- Construction schedules should be communicated to the affected property owners and communities.
- The proposed project and access routes should not, where possible, be located within close vicinity to sensitive establishments such as graves and old buildings of archaeological value
- BPC should ensure that fire hazards are non-existent by adopting high safety standards.
- Construction vehicles should be equipped with adequate fire fighting equipment and no open fires should be allowed on the construction site.
- In terms of attenuating fire-related risks and impacts, it would be vital to develop a fire/emergency management plan in conjunction with the various local municipalities prior to construction.
- General safety measures in terms of construction work should be implemented and relevant regulations be adhered to (Occupational Health and Safety Act).
- BPC workers should inform property owners and representatives of the various communities of their general maintenance tasks prior to undertaking them.

9. IMPACT STATEMENT AND RECOMMENDATIONS

The assessment of potential impacts was carried out above. The mitigation measures were also suggested. The proposed project (establishment of 72 000 metric tons of grain silos) would have minimal environmental (bio-physical, social and economic) impacts, as was observed during the initial stages when a request was made to downgrade the process from a full EIA to a Basic Assessment.

At the same time, the construction of the grain silos would bring about a lot of jobs and open the agricultural market for the poor minority farmers; this will go a long way in addressing the poverty issues and lack of job opportunities being experienced in the area.

Management measures recommended for each impact would mitigate the impacts accordingly such that their impacts are reduced significantly. It is the belief and understanding of the Environmental Impact Assessment team that after taking all the factors into consideration, the chosen site which is already disturbed and degraded might have minimal environmental impacts, hence it is recommended for possible authorization. The table below summarizes the findings of the specialist studies carried out.

SPECIALIST	DECISION
Visual Impacts	✔
Geotechnical Studies	✔
Ecological Impact	✔
Heritage Impacts	✔

✔ = Recommended

Mitigation measures and recommendations for the impacts were based on the findings of the specialist studies. Below are some of the most common tasks that the contactors must take into consideration:

During the construction phase, sprinkle water on the gravel roads to reduce dust emissions from the machinery.

Use roads that already exist in the area to access the site than to grade new access roads.

Minimal vegetation covers to be maintained and re-vegetate the area with indigenous trees after the construction phase

Trucks should be maintained and serviced regularly to avoid oil spillages which can lead to soil pollution.

Grade access roads regularly to reduce dust emissions from the site during both the construction and operation phase.

Employees to be from the local communities, this will alleviate poverty within the area and will eliminate strikes from taking place especially from the unemployed who have been looking forward to getting jobs at the Grain Silo storages.

Where there is lack of necessary skills consideration should be given to on-site training for local communities

Employees at the milling stations to wear protective clothing to prevent dust inhalation which can lead to respiratory diseases.

Re-vegetation or rehabilitation of existing borrow pits to reduce soil erosion and dust emissions.

Graves are of significant value to the community and should be avoided by all possible means (No-Go area). If these graves are to be exhumed, thorough public consultation should be implemented to eliminate uprisings from the local communities. Where the graves have to be exhumed an excavation permit should be applied for in terms of the regulation

10. CONCLUSIONS

The EIA team believes that the EIA for the proposed 72 000 metric tons of grain silo storage facilities fulfills the process requirements of current environmental legislation. Issues and associated impacts have been investigated by a team of qualified specialists who have reported on their findings without reservations. Extensive efforts have been made to identify and involve all potentially affected parties in the public participation process. The public has been afforded opportunities to participate in the EIA. The recommendations set out in the findings section of the EIA are therefore presented for project implementation and the EIR is hereby presented to the relevant authorities for decision making.

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