Proposed development of Granor Passi Evaporation Ponds, Louterwater, Eastern Cape

Draft Environmental Management Programme

Report Prepared for

Granor Passi Langkloof (Pty) Ltd.

Report Number 501573/3

Report Prepared by

srk consulting

October 2016

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Draft Environmental Management Programme (EMPr)

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Granor Passi Langkloof (Pty) Ltd.

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SRK Project Number 501573/3

October 2016

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Acronyms

CBA: Critical Biodiversity Area

DEA: Department of Environmental Affairs (National)

DEDEAT: Department of Economic Development, Environmental Affairs and Tourism

EAP: Environmental Assessment Practioner

ECPHRA: Eastern Cape Provincial Heritage Resources Authority

ECO: Environmental Control Officer

EIA: Environmental Impact Assessment

EMPr: Environmental Management Programme

NEMA: National Environmental Management Act

RP: Representative Person (developer) who is responsible for the implementation of the EMPr.

1 Introduction

SRK Consulting (SRK) has been appointed by Granor Passi Langkloof (Pty) Ltd. to undertake an environmental assessment process for the construction of effluent evaporation ponds for their plant at Louterwater, where juice concentrate is extracted. SRK's appointment includes the compilation of this Environmental Management Programme (EMPr) to be included in the Basic Assessment Report. The proposed site is located on Portion 3 and Portion 10 of the Farm Grootkloof No. 301 to the north-east of Louterwater, which is situated along the R62 (refer to Figure 1).

2 Scope of Report

The environmental management measures recorded in this EMPr are based on information supplied to SRK during the compilation of the Basic Assessment Report, including information from the applicant and the recommendations from specialists. This EMPr has been compiled to comply with the specific requirements of the National Environmental Management Act (No. 107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations (2014).

It should be noted that the EMPr is written as if the project has been authorised. This approach in no way presupposes that the project will be authorised, rather, the style of writing is aimed at making the EMPr easier to read and more easily converted into a practical management tool should the application be approved.

SRK has exercised all due care in reviewing the supplied information provided during the course of the environmental assessment process and has included the requirements of commenting authorities. The appropriateness and practicality of the management measures presented in this EMPr has been considered in terms of comments received and discussed with the applicant as necessary. Granor Passi Langkloof (Pty) Ltd. is fully responsible for the implementation of the EMPr.

The EMPr has been provided to Granor Passi Langkloof (Pty) Ltd. for review, prior to submission, to determine whether the EMPr is implementable and accurate. SRK cannot be held responsible for failure of Granor Passi Langkloof (Pty) Ltd. to comply with the EMPr. The EMPr is by nature a dynamic document and NEMA provides for continual updating of the EMPr, with approval from the Competent Authority.

The aim of this EMPr is to ensure that construction, operation, and maintenance activities are conducted such that potential negative environmental impacts are minimised and positive impacts are enhanced. This EMPr is not a health and safety plan and this EMPr makes no attempt to satisfy the requirements of the Occupational Health and Safety Act.

2.1 Environmental Assessment Practitioner (EAP)

2.1.1 Expertise of EAP

This EMPr was prepared by Tanya Speyers under the technical guidance of Karissa Nel, and reviewed by Rob Gardiner.

Tanya Speyers (BSc Hons.) is an Environmental Scientist in the SRK Port Elizabeth office. Tanya has been involved in Environmental Management for the last four years. Her expertise includes Basic Assessments, Environmental Impact Assessments, Environmental Management Plans, Environmental Compliance Auditing, Waste Licence Applications and Water Use License Applications.

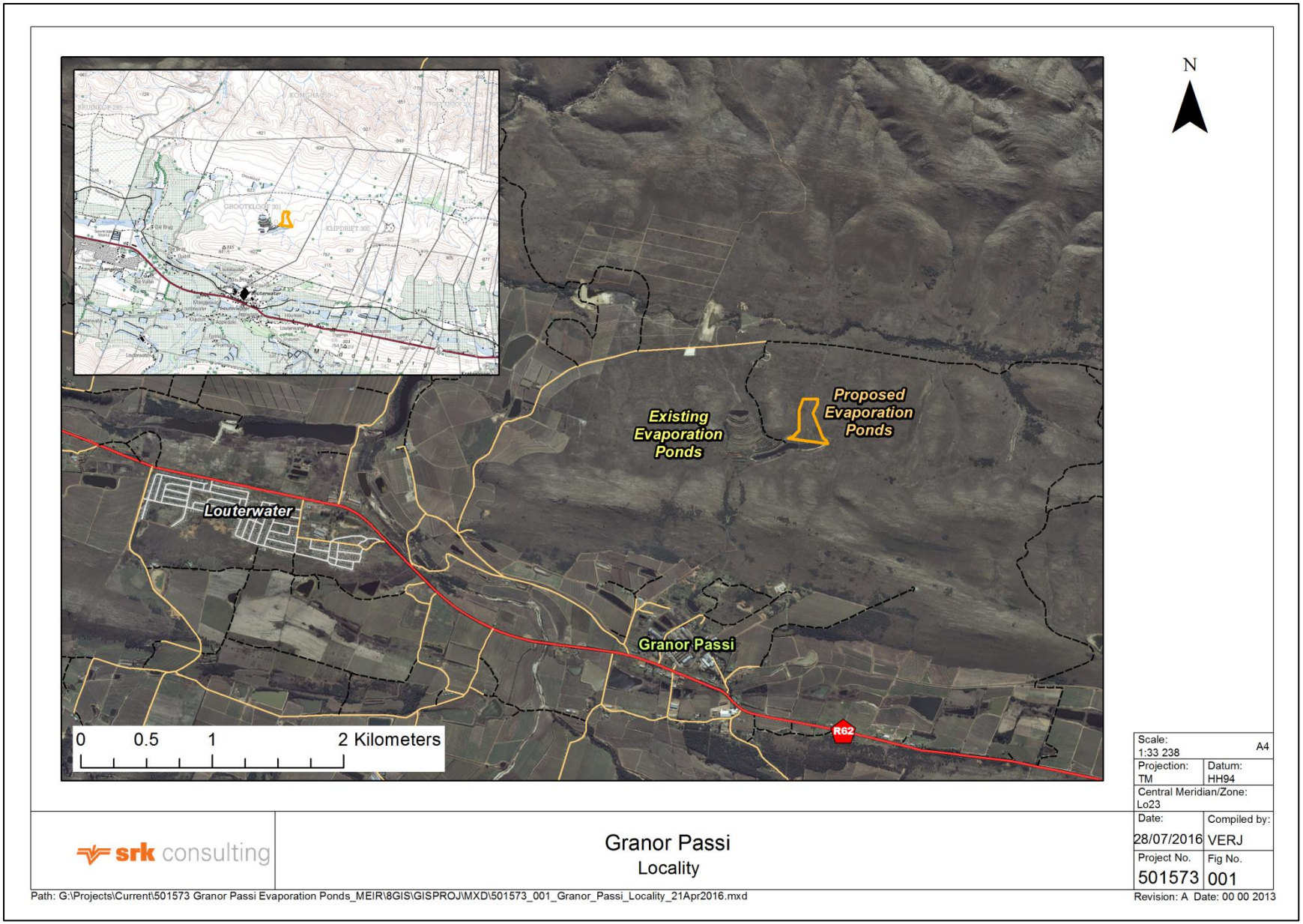

Figure 1: Site locality map for proposed evaporation ponds

Karissa Nel (MEM, CEAPSA) is a Senior Environmental Scientist, with more than 10 years environmental consulting experience in Environmental Impact Assessments (EIA), Environmental Management Programmes (EMPr), environmental auditing and licensing. Her training is in zoology, microbiology, aquatic ecosystems, wetland assessment and environmental management. Karissa's CV is attached as Appendix A.

Rob Gardiner (MSc, MBA, Pr Sci Nat) is a Principal Environmental Scientist and head of SRK's Environmental Department in Port Elizabeth. He has more than 20 years environmental consulting experience covering a broad range of projects, including Environmental Impact Assessments (EIA), Environmental Management Systems (EMS), Environmental Management Programmes (EMPr), and environmental auditing. His experience in the development, manufacturing, mining and public sectors has been gained in projects within South Africa, Lesotho, Botswana, Angola, Zimbabwe, Suriname and Argentina.

2.1.2 Environmental Assessment Practitioner Details

EAP	Karissa Nel
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3 Project Description and Environmental Objectives

3.1 Existing Works

At present, effluent from the various processes is collected and pumped via a 1.7 km pipeline to the existing effluent evaporation ponds located north-east of the plant. The evaporation ponds consist of three primary ponds, a secondary pond system consisting of approximately 25 channels of varying lengths and an emergency, or tertiary pond. The ponds cover a combined area of approximately 58,000 m².

The existing effluent evaporation ponds are operational, however routine maintenance cannot be carried out as no alternative system to dispose of effluent is in place. The construction of additional effluent evaporation ponds is proposed to function in a duty/ standby configuration to allow for maintenance to be carried out when required.

The existing site is located on Portion 8 of the Farm Grootkloof No. 301, west of the proposed ponds.

3.2 Proposed Works

The proposed evaporation ponds will be located in a shallow valley to the east of the existing ponds and will be constructed immediately downstream of the exiting primary ponds. The proposed evaporation ponds will only consist of secondary and tertiary ponds as the existing primary ponds will be utilised for both the new and proposed evaporation ponds.

Secondary Ponds

The Secondary ponds will be constructed downstream of the existing primary ponds. A clay lined effluent channel will be constructed to connect the existing primary pond to the head of the new secondary ponds.

The new secondary ponds will be similar in operation to the existing evaporation ponds and consist of a series of channels connected with overflow weirs. They will be constructed down valley with one below the other. The flow will cascade down into the channels, only flowing from one to the next when the preceding channel is full. The channel will extend almost the full width of the valley.

The channels will be constructed using a cut to fill operation with selected excavated clay material from the upstream channel being used to construct the downstream channel embankment. The in situ clay material will be ripped and compacted to form a clay liner.

The channel will have a trapezoidal shape with upstream and downstream embankment slope of 1V:1H and a crest width of 1,5 m. The channel will be 2 m wide (invert) and have a maximum water depth of 1 m with a 300 mm free board. The area of the embankments above the water level will be grassed.

Effluent will flow from one channel to the next via a 1 m wide stone pitched (light stone pitching 200 mm thick in accordance with of SANS 1,200 DK). The overflow velocity during peak flow rates will be less than 1 m/s, thus not contributing to scouring and erosion.

The secondary ponds will have a surface area of 10,200 m^2

Tertiary (Emergency) pond

The tertiary or emergency pond will be constructed downstream of the secondary ponds. If required, effluent will flow via a clay lined effluent channel from the secondary ponds to the inlet of the tertiary pond.

The pond will be constructed using a cut to fill operation. Selected excavated clay material will be used to construct the embankment. The in situ clay material will be ripped and compacted to form a clay liner.

The upstream and downstream slope of the embankment will be 1V:3H and have a crest width of 2 m. The height of the embankment measured from the lowest point downstream is 3 m. The upstream and downstream embankments will be grassed.

The pond will have a capacity to store 2,800 m^3 of effluent, which is more than one month's discharge from the plant during the peak season. This should provide sufficient storage for effluent while providing enough time to take remedial action to prevent effluent from being discharged into the downstream environment.

The tertiary pond will have a freeboard of 500 mm and provision has been made for the controlled released of effluent in emergencies through a scour valve controlled 110 mm diameter pipeline, should this be required to protect the integrity of the pond wall.

Effluent Channels

The effluent channels will be lined with clay and be trapezoidal in shape. The channels will have side slopes of 1V:1H and will be a minimum of 500 mm deep. The gradient of the channel will be limited to 10% to ensure that the maximum velocity does not exceed 2.0 m/s to prevent scouring and erosion.

3.3 Environmental Objectives

This section specifies the impact management objectives and outcomes used to determine the extent of management action(s) required to mitigate the impacts identified during the impact assessment process.

3.3.1 Planning and Design

There were no impacts identified for this phase, however a number of the mitigation measures proposed in the subsequent phases are relevant to the design phase and influences design considerations (see Table 1 and Table 2).

The objective of this phase is to design the proposed effluent ponds with minimal environmental impacts during the subsequent phases.

3.3.2 Construction phase

Impacts on Surface Water

The proposed site is located in a drainage line within a shallow valley that flows in a northerly direction which connects to a non-perennial river approximately 450 m downstream of the site. A large farm dam occurs in this stream approximately one kilometre downstream of the site. No wetlands were identified within 500 m of the study area. Figure 2 illustrates the aquatic resources surrounding the Granor Passi site.

The clearing of vegetation and excavation of the effluent ponds might lead to increased sedimentation of the drainage line which could in turn affect other downstream natural aquatic resources as well as the farm dam. Increased sedimentation in runoff could impact on vegetation and biota of downstream systems, but could also influence the geomorphology and overall functioning, in severe circumstances, of downstream dams and watercourses.

In addition, construction activities could cause contamination of streams and rivers if proper management is not practiced. Accidental spills of hydrocarbons (oils, diesel, etc.) or leakage of such substances from construction machinery may enter the aquatic systems directly, through surface runoff during rainfall events or subsurface movement and then migrate to downstream systems. Such chemicals, fuels or pollutants would alter the water quality, having an effect on aquatic ecology in the form of biodiversity loss, i.e. the loss of vegetation and fauna that are sensitive to changes in water quality (especially from toxicant inputs). Solid waste in the form of general litter left by labourers such as construction materials (gloves, excess materials, cement, etc.) can also affect the watercourses downstream. It can provide a barrier to water movement and may also alter the quality of water within the resource negatively.

The impact management objectives for this impact are:

- Minimise impacts to aquatic ecosystems and biota; and
- Minimise potential for increased erosion.

Impacts on Groundwater

The storage and handling of environmentally hazardous materials during the construction phase (e.g. cement, oils and fuels) has the potential to impact on groundwater resources if not correctly managed.

The impact management objective for this impact is:

- Prevent groundwater impacts due to construction related activities.

Impacts on Ecology

The site is made up of Kouga Grassy Sandstone Fynbos which is classified as a least threatened vegetation type. The site falls within the CBA 3 network of the Eastern Cape Biodiversity Conservation Plan (2007) and is classified as "Other Natural Areas" (ONA T3). Although CBA 3 areas are defined as vulnerable vegetation types, certain land uses are permitted and others are permitted under specific conditions. Note however that Kouga Grassy Sandstone Fynbos is classified as a least threatened as mentioned above. The site does not fall within any Endangered Ecosystem types in terms of Section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). No protected plant and animal species were observed during SRK's site visit, however, these might still occur on the site.

Clearing of vegetation on the site will however result in the loss of flora and would result in the area becoming more susceptible to invasive alien plant invasion and erosion if these impacts are not mitigated.

The impact management objectives for this impact are:

- Minimise impacts to natural habitats;
- Prevent potential disturbance to protected flora and fauna;
- Rehabilitate disturbed areas of the site as soon as possible;
- Minimise wildlife disturbance; and
- Minimise the growth of alien vegetation.

Impacts on Air Quality:

Windblown dust from material stockpiles and excavated or cleared areas, and vehicle entrainment on dirt access roads might create a nuisance affect in the surrounding area during days when there are strong winds. However, there are no receptors (nearby residencies) in close proximity to the study area.

The impact management objective for this impact is:

- Minimise air pollution.

Noise Impacts

Construction activities will generate noise due to the operation of machinery and vehicles, potentially causing a nuisance in the surrounding area, however this impact is not considered to be significant as there are no receptors (nearby residencies) in close proximity to the site.

The management objectives for this impact are:

- Minimise noise impacts; and
- Legal compliance with regard to noise generation.

Waste Management:

General construction waste will be generated during the construction period. Lack of proper management of the waste on the site may lead to dumping and wind-blown litter creating a negative visual impact as well as impacting on the surrounding natural ecosystems as described above.

The impact management objectives for this impact are:

- Comply to general good practice standards regarding waste management;
- Rehabilitate any spills or contamination that occurred; and

- Legally compliant management of solid waste.

Impacts on Palaeontological Resources:

According to the Heritage Screener (included in Appendix D of DBAR) the proposed effluent evaporation ponds are underlain by the Goudini Formation which is of low fossil significance according to the SAHRIS palaeosensitivity map. This is supported by the Eastern Cape Palaeotechnical report by Almond, De Klerk & Gess (2009). Sparse marine or estuarine fossil assemblages are recorded within the more mudrock-rich part of the succession but only in the Western Cape. Therefore no palaeontological impact assessment was recommended for this development; however there is still a possibility that damage or destruction to paleontological resources may occur due to earthworks and excavations during construction, should anything be found on site.

The impact management objective for this impact is:

- Preservation of palaeontological resources.

Impacts on Archaeological Resources:

During the specialist study (see Appendix D of DBAR) a few isolated Middle Stone Age stone artefacts were documented and it is therefore possible that similar stone artefacts will be uncovered during the excavation and construction activities. The proposed development could have a negative impact on the archaeological heritage remains documented and occurring below the vegetation. This includes the destruction of the possible in situ or collections of stone artefacts and/ or other associated material below ground that are not immediately visible on the surface. However, according to the specialist report, it is unlikely that the artefacts documented and those that may possibly be uncovered occur in situ. The artefacts have been graded as a having a low cultural significance.

The impact management objective for this impact is:

- Preservation of archaeological resources.

Socio-Economic Impacts:

The development will result in the creation of temporary job opportunities for the local labour force. This will also involve transfer of skills and the improvement of the quality of life for families of individuals employed.

The impact management objective for this impact is:

- Maximise employment of local labour; and
- Maximise skills transfer.

3.3.3 Operational phase

Groundwater Impacts

The potential impact that was identified for the site and surrounding area is pollution of the groundwater resource by the effluent from the ponds. The pathway of effluent to the groundwater is via the clay/ an inconsistency in the clay layer, to the fractures of the fractured bedrock and the groundwater. The project engineer has designed the ponds to be founded in the clay layer underlying the site. The clays are practically impermeable and, should the layer be laterally consistent, will create a barrier to prevent the effluent from seeping into the groundwater. However, should the clay layer not be laterally present across the site, then contaminants from the effluent may reach the groundwater.

According to the design information, the ponds will not be deeper than 1 m bgl, and are planned to be founded in the clay material, which was found to be practically impermeable. If the clay layer is laterally consistent/ continuous (it is assumed that this is the case from the geotechnical investigation), the potential for contaminants from the ponds to reach the groundwater is regarded slim.

The management objectives for this impact are:

- Prevent groundwater contamination and contamination of downstream systems to make these resources available for other users including maintaining biodiversity.

Stormwater, erosion and surface water impacts

Stormwater berms and channels shall be constructed upstream and next to the evaporation ponds to divert stormwater runoff around the ponds. The berms shall be constructed with selected excavated clay material.

The berm and channel will prevent stormwater runoff from entering the evaporation ponds. Due to the large volume of runoff and coupled with the fairly steep slope of the channel, velocities in excess of 3.0 m/s is expected. This will lead to scouring/ erosion of the channel which could also have indirect impacts such as sedimentation of downstream watercourses and dams.

The tertiary pond will have a clay liner and will have a capacity of more than one month's discharge from the Granor Passi plant during the peak season. This should provide sufficient storage for effluent while providing enough time to take remedial action to prevent effluent from being discharged into the downstream environment. However, provision has been made for the controlled released of effluent in emergencies through a scour valve controlled 110 mm diameter pipeline, should this be required to protect the integrity of the pond wall. During normal circumstances, no impacts are expected to downstream watercourses from these ponds.

The management objectives for this impact are:

- Minimise impacts on aquatic ecosystems and biota;
- Minimise impacts to water resources for downstream water users;
- Implement stormwater management measures minimise potential for increased erosion.

Air Quality

Air quality levels at the evaporation ponds are more or less consistent with the agricultural land use in the area. The evaporation ponds would result in odours associated with waste produced from the fermentation process of fruit concentrate. The prevalent wind direction for the area is from the southeast in November to April, and west-northwest in May to October.

However, there are currently no receptors (nearby residencies) in close proximity to the site that could be influenced by the odours.

No management measures were recommended.

Socio-Economic Impacts

Upgrading the evaporation ponds will result in the plant being able to process more fruit, be more profitable, and thereby making it possible to increase the labour force and transfer of skills.

The management objectives for this impact are:

- Maximise employment of local labour.

3.3.4 Closure phase

Not applicable to this project.

4 Impact Management

This section specifies the impact management outcomes and impact management actions required for the aspects and potential impacts related to the proposed activities. The manner in which the impact management objectives and outcomes, identified above, will be achieved. Where applicable actions will include activities to:

(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
(ii) comply with any prescribed environmental management standards or practices;
(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and
(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable

The above are detailed in Table 1 and Table 2 for the construction and operational phases respectively.

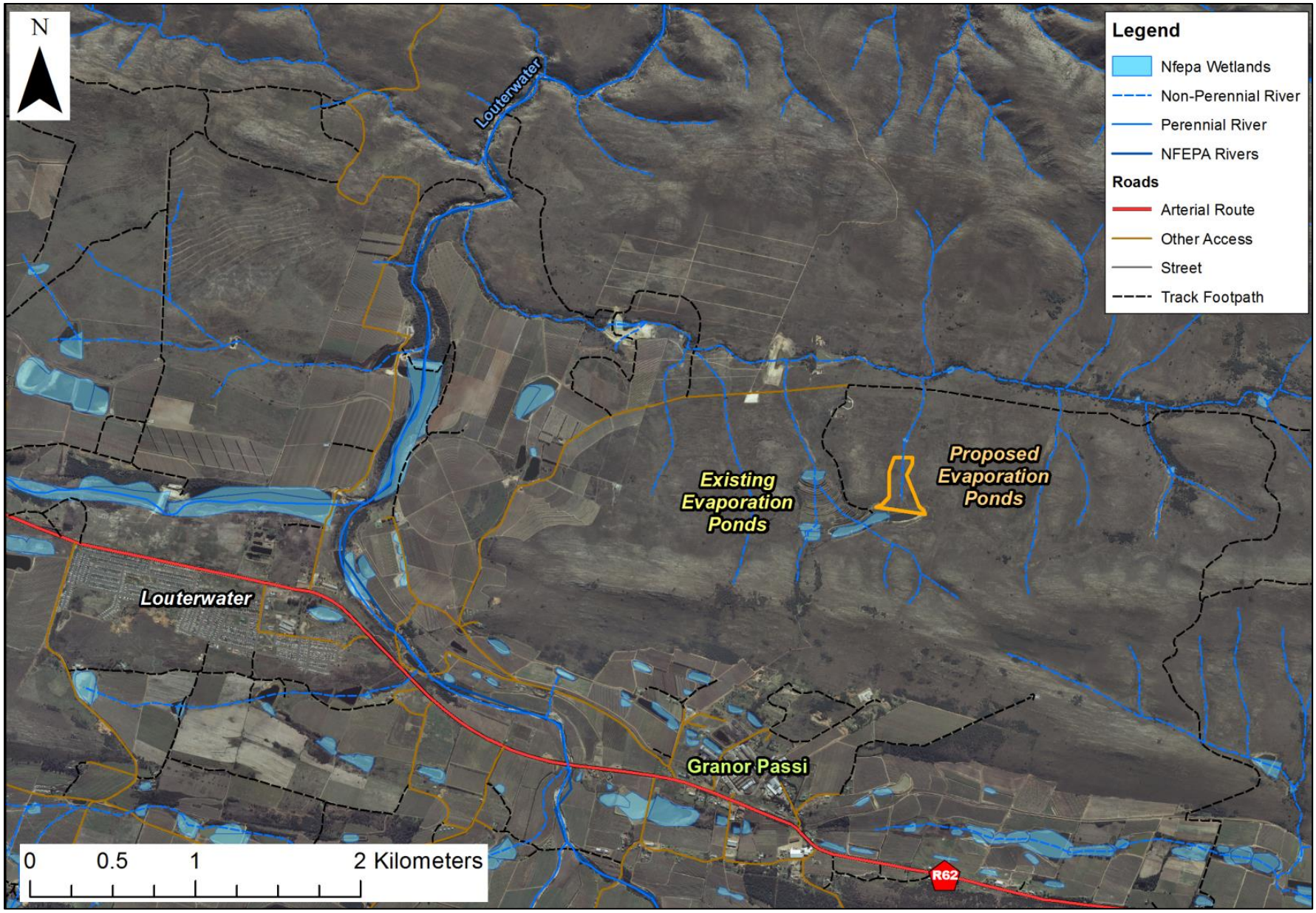

Figure 2: Aquatic systems surrounding the proposed site

Table 1: Environmental Aspects and Impacts during the construction phase

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	**Time-frame**	**Responsibility**
Clearing of vegetation and excavation activities	Impacts on surface water (negative): The excavation of the pond walls might lead to increased sedimentation of the drainage line which could in turn affect other downstream aquatic resources.	Construction Measures • No stockpiles of excavated material or topsoil to be within 50 m of a watercourse; • Disturbed areas should be rehabilitated immediately after construction in the relevant area (using topsoil); • Rehabilitated areas should be monitored and measures must be implemented to ensure that topsoil does not wash away; • Control measures to prevent erosion of the construction footprint during rehabilitation must be implemented. As a minimum these should include scarifying the topsoil on the construction footprint in a direction that is parallel to the drainage line (i.e. along the contours) in order to limit sedimentation from washing into and along the drainage line; and • If sedimentation and erosion of the site is observed, erosion berms in the pipeline servitude are recommended to be installed and/ or sediment barriers (e.g. silt fences, sandbags or hay bales) immediately downstream of active work areas (particularly on channel banks) as necessary, to trap any excessive sediments generated during construction.	Duration of construction and defects liability period	Contractor and ECO
	Archaeological and Palaeontological disturbance (Negative): There is a a possibility that damage or destruction to paleontological resources may occur due to earthworks and excavations during construction, should anything be found on site. The destruction of the possible in situ or collections of stone artefacts and/or other associated archaeological material below ground that are not immediately visible on the surface.	Construction Measures • All workers on site should be informed of the types of paleontological resources that may be found and the correct procedure to follow should any paleontological resources be found; • Should fossil remains be discovered during construction, these should be safeguarded (preferably in situ) and the ECO should alert the Eastern Cape Provincial Heritage Resources Authority (ECPHRA. Contact details: Mr Sello Mokhanya, 74 Alexander Road, King Williams Town 5600; Email: smokhanya@ecphra.org.zaso) so that appropriate mitigation (e.g. recording, sampling or collection) can be taken by a professional palaeontologist. • If concentrations pre-colonial archaeological heritage material and/or human remains (including graves and burials) are uncovered during construction, all work must cease immediately and be reported to the Albany Museum (046 622 2312) and/or the Eastern Cape Provincial Heritage Resources Agency (ECPHRA) (043 745 0888) so that systematic and professional investigation/excavation can be undertaken. Phase 2 mitigation in the form of test-pitting/sampling or systematic excavations and collections of the pre-colonial shell middens and associated artefacts will then be conducted to establish the contextual status of the sites and possibly remove the archaeological deposit before development activities continue. • A person must be trained as a site monitor to report any archaeological sites found during the development. Construction managers/foremen and/or the Environmental Control	Duration of construction	Contractor and ECO

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	**Time-frame**	**Responsibility**
		Officer (ECO) should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.		
Storage and handling of environmentally hazardous materials	Groundwater Impacts (Negative): The storage and handling of environmentally hazardous materials during the construction phase (e.g. cement, oils and fuels) has the potential to impact on surface and/or groundwater resources if not correctly managed.	Design Measures • It is recommended that the clay layer below the base of the ponds must be between 300 and 600 mm in thickness across the entire Site; and • The clay must also be present on the sidewalls of the ponds in order to prevent lateral movement in e.g. the sand or gravel material Construction Measures • Locate the construction site camp further than 50 m from the drainage line or any watercourse and preferably further away if possible; • The proper storage and handling of hazardous substances (hydrocarbons and chemicals) needs to be administered; • No storage or maintenance of machinery within 50 m of a watercourse; • Appropriate solid waste management facilities must be provided on-site during construction and adequate signage be provided; • Spillages should be cleaned up immediately and any contaminated soil from the construction site must be removed and disposed of at a permitted waste disposal facility; • No wash water from washing of mechanical plant or equipment to be discharged to any water course; • No mixing of cement within 50 m of a watercourse; • No stockpiles of excavated or spoil material or topsoil to be within 50 m of a watercourse;	Design and duration of construction	Contractor Monitoring by ECO
Construction and domestic waste generated during construction	Waste Management Impacts (Negative): General construction waste will be generated during the construction period. Lack of proper management of the waste on the site may lead to dumping and wind-blown litter creating a negative visual impact as well as impacting on the surrounding natural ecosystems.	Construction Measures • All waste generated on site shall be collected in waste receptacles fitted with lids and appropriately and regularly disposed of at a registered municipal landfill site; • All staff shall be trained on correct waste management; and • Records of disposal of all waste generated on site shall be maintained for auditing purposes.	Duration of construction	Contractor
Workers on site	Socio-economic impact (positive): The development will result in	Construction Measures: • Local contractors and labour should be considered for the construction phase.	Duration of construction	Contractor

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	Time-frame	Responsibility
	the creation of temporary job opportunities for the local labour force. This will also involve transfer of skills and the improvement of the quality of life for families of individuals employed.			

Table 2: environmental Aspects and Impacts during the operational phase

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	Time-frame	Responsibility
Disposal of wasterwater into new lined effluent ponds	Groundwater impacts (negative): The project engineer has designed the ponds to be founded in the clay layer underlying the site. The clays are practically impermeable and, should the layer be laterally consistent, will create a barrier to prevent the effluent from seeping into the groundwater. However, should the clay layer not be laterally present across the site, then contaminants from the effluent may reach the groundwater	Design Measures: • During excavation to found the ponds, it must be ensured that the clay is present throughout the base of the ponds; • It is recommended that the clay layer below the base of the ponds must be between 300 and 600 mm in thickness across the entire Site; • The clay must also be present on the sidewalls of the ponds in order to prevent lateral movement of pollutants in e.g. the sand or gravel material; and • Should fractured bedrock be exposed during excavation, then excess clay that has been exposed in other parts of the site must be used to cover the fractured bedrock completely.	Design phase	Client
	Social and economic impact (positive): Upgrading the evaporation ponds will result in the plant being able to process more fruit, be more profitable, and thereby making it possible to increase the labour force and transfer of skills.	Operational Measures: • Local contractors and labour should be considered for the operational phase.	Operational phase	Client
Stormwater	Stormwater, erosion and	Design measures:	Design to	Client, contractor

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	**Time-frame**	**Responsibility**
management	surface water impacts (negative): Due to the large volume of runoff and coupled with the fairly steep slope of the channel velocities in excess of 3.0m/s is expected. This will lead to scouring and routine maintenance will be required to prevent erosion.	• The channel will have side slopes of 1V:1H and will be a minimum of 1m deep; • The upstream and downstream slope of the berm will be 1V:1H and have a crest width of 500m; • The height of the berm will be 1m above the natural ground level; • The effluent channels will be lined with clay and be trapezoidal in shape; Construction Measures • The in situ clay material in the channels will be ripped and compacted to form a clay liner; • The berms will be grassed to prevent erosion; Operational measures • Routine maintenance of stormwater channels will be required to prevent erosion.	operational phase	

5 Monitoring, Reporting and Auditing

Site inspections by an Environmental Control Officer (ECO) must be conducted once a month during construction to ensure continued compliance with the conditions of the environmental authorisation and the measures contained in the approved EMPr.

Monthly audit reports are to be prepared by the ECO and submitted to the developer, engineering representative, contractor, and competent authority.

6 Environmental Awareness Plan

On-site training must be provided for all contractors and personnel during both the construction and operational phases of the project. No personnel may be allowed onto site without having been instructed on the requirements of the approved EMPr and the Environmental Authorisation conditions.

The training must deal specifically with triggers that would require the implementation of mitigation measures contained in the EMPr. These include, but are not limited to:

- Identification and avoidance of environmentally sensitive features on/ near the site, specifically watercourses;
- Identification of potential heritage resources (see app for guidelines for the identification of archaeological and historical material);
- Materials handling practices; and
- Waste management practices.

It is incumbent upon the contractor to convey the sentiments of the EMPr to all personnel involved in the construction operations (including sub-contractors) and the specific provisions of the EMPr. This should be done via regular toolbox talks as well as more formal training sessions, and attendance registers maintained for auditing purposes.

7 Organisational Structure

The general roles and responsibilities of various parties are outlined below.

7.1 The Developer: Granor Passi Langkloof (Pty) Ltd.

Granor Passi shall ultimately be responsible for the implementation of the EMPr and shall appoint a representative, the Responsible Person (RP), who shall:

- Ensure that the Contractor is duly informed of the EMPr and associated responsibilities and implications of this EMPr;
- Monitor the Contractor's activities with regard to the requirements outlined in the EMPr;
- Act as a point of contact for local residents and community members;
- Ensure that the Contractor remedies problems in a timely manner and to the satisfaction of the authorities; and
- Notify the authorities and the Environmental Control Officer (ECO) should problems arise that are not remedied effectively, or of any change in the development or changes in project specification that could significantly impact negatively on the environment.

7.2 The Contractor

The contractor will be responsible for:

- Ensuring all activities on the site are undertaken in accordance with the EMPr;
- Informing all employees and sub-contractors of their roles and responsibilities in terms of the EMPr;

- Ensuring that all employees and sub-contractors comply with this EMPr; and
- The Contractor has a duty to demonstrate respect and care for the environment in which they are operating. They will be responsible for the cost of rehabilitation, to the satisfaction of the ECO, of any environmental damage that may result from non-compliance with the EMPr, environmental regulations and relevant legislation.

7.3 The Environmental Control Officer (ECO)

An Environmental Control Officer (ECO) who is a qualified environmental professional with the relevant environmental expertise, and independent of the RP, shall be appointed for the duration of the construction activities. The ECO's duties are as follows:

- The ECO shall undertake an initial site visit in conjunction with the Contractor, during which sensitive areas that should be avoided will be identified, and environmental concerns discussed;
- Photographs should be taken of the construction area and area allocated for the construction camp from logged (co-ordinate) points by the ECO before construction commences and after construction has been completed;
- Undertake monthly audits on the implementation of the EMPr and submit audit reports to the project engineer, the developer and the environmental authorities on request; and
- Undertake a post-construction inspection, which may result in recommendations for additional clean-up and rehabilitation measures.

8 EMPr Procedure

The EMPr implementation procedure is outlined below:

- The ECO shall undertake an initial site visit in conjunction with the RP and the Contractor, during which sensitive areas that should be avoided will be identified, and environmental concerns discussed;
- Photographs should be taken of the construction area and area allocated for the construction camp from logged (co-ordinate) points by the ECO before construction commences and after construction has been completed;
- The contractor shall train his employees regarding the importance of the EMPr;
- The ECO shall undertake monthly audits of the construction activities and submit the reports to DEDEAT, the project engineer and the developer in order to ensure that the EMPr is being implemented; and
- The ECO shall undertake a final audit of the site on completion of construction and submit a Final Audit Report to DEDEAT and the developer.

Appendices

Appendix A: CV of Environmental Assessment Practitioner

Appendix B: Contractor Code of Conduct

G5 Properties (Pty) Ltd.

ENVIRONMENTAL CODE OF CONDUCT FOR BUILDING CONTRACTORS

Contractors shall ensure that all sub-contractors, employees, suppliers, agents, etc., are fully aware of the environmental issues detailed in the Environmental Management Programme. Contractors must investigate and comply with all existing regulations and laws/ bylaws unless the Relevant Authority grants specific written authority waiving compliance with any legislation.

The following list represents the basic Do's and Don'ts towards environmental awareness, which all participants in this project must consider whilst carrying out their tasks. These are not exhaustive and serve as a quick reference aid.

DO:

- Clear your work areas of litter and building rubbish at the end of each day – use the waste bins provided and ensure that litter will not blow away.
- Maintain waste removal system.
- Dispose of cigarettes and matches carefully. (These pose a fire risk and furthermore littering is an offence.)
- Use the toilet facilities provided and keep them clean.
- Report dirty or full toilet facilities.
- Prevent contamination or pollution of streams and water channels.
- Concrete batching areas should be appropriately placed and cement effluent from washing areas should be contained and evaporated and the remaining sludge disposed of at a registered disposal facility.
- Report injured animals.
- Report heritage remains immediately.
- Ensure that vehicles and machinery do not leak fuel or oils.
- Report all fuel or oil spills immediately & stop the spill continuing.
- Confine work and storage of equipment to within the immediate work area.
- Prevent excessive dust and noise.
- Use safety equipment and comply with all safety procedures.
- Ensure a working fire extinguisher is immediately at hand if any "hot work" is undertaken e.g. Welding, grinding, gas cutting etc.
- Drive on designated routes only.
- Respect existing services at all times.

DO NOT:

- Remove or damage vegetation without direct instruction.
- Injure, trap, feed or harm any animals – this includes birds, frogs, snakes, lizards etc.
- Remove any heritage remains.
- Make fires.
- Allow cement or cement bags to blow around.
- Litter or leave food lying around.
- Allow waste, litter, oils or foreign materials into streams.
- Enter any fenced off or marked area.
- Overnight on site.
- Speed or drive recklessly.

Appendix C: Guidelines for the identification of archaeological and historical material

Guidelines for the identification of archaeological and historical material

1. Human Skeletal material

Human remains, whether the complete remains of an individual buried during the past, or scattered human remains resulting from disturbance of the grave, should be reported. In general the remains are buried in a flexed position on their sides, but are also found buried in a sitting position with a flat stone capping and developers are requested to be on the alert for this.

2. Freshwater mussel middens

Freshwater mussels are found in the muddy banks of rivers and streams and were collected by people in the past as a food resource. Freshwater mussel shell middens are accumulations of mussel shell and are usually found close to rivers and streams. These shell middens frequently contain stone tools, pottery, bone, and occasionally human remains. Shell middens may be of various sizes and depths, but an accumulation which exceeds 1 m^2 in extent, should be reported to an archaeologist.

3. Stone artefacts

These are difficult for the layman to identify. However, large accumulations of flaked stones which do not appear to have been distributed naturally should be reported. If the stone tools are associated with bone remains, development should be halted immediately and archaeologists notified

4. Fossil bone

Fossil bones may be found embedded in geological deposits. Any concentrations of bones, whether fossilized or not, should be reported.

5. Large stone features

They come in different forms and sizes, but are easy to identify. The most common are roughly circular stone walls (mostly collapsed) and may represent stock enclosures, remains of wind breaks or cooking shelters. Others consist of large piles of stones of different sizes and heights and are known as isisivane. They are usually near river and mountain crossings. Their purpose and meaning is not fully understood, however, some are thought to represent burial cairns while others may have symbolic value.

6. Historical artefacts or features

These are easy to identify and include foundations of buildings or other construction features and items from domestic and military activities.

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Report No. 501573/3

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