L E A P

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CLAYVILE X71, X76, X77, X78, X79 AND X80 SITUATED ON PORTION 207 (A PORTION OF PORTION 183) OF THE FARM OLIFANTSFONTEIN 410 J.R
GAUT 002/14-15/0097

EMP

Environmental Management Plan

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Undertaking to Implement the EMP

Undertaking by the Developer

I, ……, acting on behalf of …….. (the Developer), for:

Clayville X71, X76, X77, X78, X79 and X80 on Portion 207 (a portion of portion 183) of the Farm Olifantsfontein 410 J.R

hereby indicate that I have read through the Environmental Management Plan and understand the measures required to be implemented in terms of the EMP. I hereby undertake to implement these measures and carry out my duties as specified herein.

Signed on at …….. on ……..(date)

Contractor's Environmental Representative Signature ……..

Witness……..

Witness……..

Undertaking by the Contractor

I, ……, acting on behalf of …….. (the Contractor), for

Clayville X71, X76, X77, X78, X79 and X80 on Portion 207 (a portion of portion 183) of the Farm Olifantsfontein 410 J.R

hereby indicate that I have read through the Environmental Management Plan and understand the measures required to be implemented in terms of the EMP. I hereby undertake to implement these measures and carry out my duties as specified herein.

Signed on at …….. on ……..(date)

Contractor's Environmental Representative Signature ……..

Witness……..

Witness……..

Undertaking by the Environmental Control Officer

I, ……., the Environmental Control Officer appointed by

……., for:

Clayville X71, X76, X77, X78, X79 and X80 on Portion 207 (a portion of portion 183) of the Farm Olifantsfontein 410 J.R

hereby indicate that I have read through the Environmental Management Plan, and understand the measures required to be implemented in terms of the EMP and hereby undertake to fulfil my duties as specified herein.

Signed on at …….. on ……..(date)

Environmental Control Officer Signature ……..

Witness……..

Witness……..

EMP

1.0 INTRODUCTION

The purpose of an Environmental Management Plan (EMP) is to guide the planning and design, construction and operational phases of the construction of Porcupine Park Avenue. The EMP should be developed in parallel with the planning and design phase, which enables environmental guidelines and criteria to be incorporated into the detailed design. This is done to eliminate or mitigate the various possible risks to the environment and its surrounding inhabitants during the planning and pre-construction phase. And it will subsequently ensure that minimal damage will occur to these areas during the construction and operational phases of a project.

2.0 PHASES, ROLES & RESPONSIBILITIES

2.1 Phases of the Project

The Point of departure for any EMP is to take a pro-active route by addressing and minimising any potentially significant problem before it occurs. In particular this EMP deals with the following phases:

2.1.1 Planning or Design Phase

It is essential that possible problematic situations be eliminated or mitigated during the planning phase, to ensure that contingency plans are prepared for any possible accidental situation that may arise during the construction phase. By having these contingency plans in order before construction starts it will limit any further potentially detrimental impacts to the environment and its surrounding inhabitants.

2.1.2 Construction Phase

The majority of possible impacts on a site would occur during the construction phase, and most of them will have immediate effect (e.g. dust pollution, fuel spillage). It is therefore vital that the site is monitored on a continual basis during this phase, as it would be possible to identify and correct these impacts as they occur, thus minimising their possible impact.

2.1.3 Operational Phase

By being pro-active during the design and construction phases, potentially harmful impacts originating in the operational phase will be minimised or eliminated. For the Clayville X71, X76, X77, X78, X79 and X80 Project the following aspect are important during operations and is more thoroughly addressed under Items as indicated

- Waste management – 11.3.2
- Deliveries – 11.13
- Storm water management -11.1 and 11.2.2 and 11.12
- Maintenance of the wetlands – 11.14
- Noise – 11.6
- Traffic – 11.13
- Safety and security – 11.1 and 11.7

2.1.4 Decommissioning Phase

Thoughtful design, thorough monitoring and strict adherence to the EMP during the construction and operational phases will ensure that the decommissioning phase (if and when applicable) will be done efficiently and with minimal damage to the bio-physical and social environments.

2.2 Roles and Responsibilities

Various role players have a range of responsibilities to perform during the different phases of a project:

2.2.1 Project Manager (PM) (Developer Representative)

- The PM will be responsible for overseeing the contract from initiation to completion of construction on the site
- The PM will appoint a team of contractors, which will be responsible for the construction of the entire project
- The PM will be responsible for ensuring that the development is implemented according to the requirements as set out in the EMP
- The PM should ensure that sufficient resources are available to the other role players to efficiently perform their tasks in terms of the EMP
- The PM must appoint an independent ECO to ensure strict adherence to the EMP

2.2.2 Resident Architects (RA)

Only architects approved by the PM will be allowed to work on the project and will oversee the individual contracts between the owners of the entire site or portions thereof and the contractors.

2.2.3 Resident Engineer (RE)

A resident engineer act as a direct, on-site resource for all technical aspects related to the development. He is available on the construction site at all times, overseeing all phases of the construction activities.

2.2.4 Consulting Engineer (CE)

The engineer consulted during the construction period. They are not available on site at all times, but were part of the specialist team during the design of the proposed development.

2.2.5 Environmental Control Officer (ECO)

The ECO will be appointed at the start of the construction phase and is mandated to do the following:

- Ensure that all contractors/subcontractors/employees are fully aware of their environmental responsibilities. This will take the form of an initial environmental awareness-training program in which requirements of this document will be explained
- Any damage to the environment must be repaired as soon as possible after consultation between the ECO, Consulting Engineer and Contractor
- The ECO shall monitor their actions to ensure that the developer staff and/or contractor are adhering to all stipulations of the EMP
- The ECO shall be responsible for monitoring the construction activities throughout the project by means of site visits and meetings. This should be documented as part of the site meeting minutes
- The ECO must sign off that the PM certify that they shall ensure that all clean-up and rehabilitation or any remedial action required, are completed prior to transfer of properties
- A post construction environmental audit is to be conducted to ensure that all conditions in the EMP have been adhered to

2.2.6 Community Liaison Officer (CLO)

Where necessary / required a representative of the community, as nominated by the community, will be the CLO and has the role of representing the community and managing all communication between the ECO, the Contractor and the community (I&APs). (The details of the CLO are to be forwarded to the Ward Municipality or for the area.)

3.0 IMPLEMENTATION AND MONITORING

3.1.1 Auditing/Inspections

- The appointed ECO on a regular basis, and also ad hoc basis will inspect the site where necessary
- The PM as well as the contractor's representative will accompany the ECO, on site inspections
- The contractor will use the formats presented in this EMP to report to the PM as to the compliance to this document

When, in the opinion of the ECO, a construction activity will result in environmental damage, the ECO will issue instructions to the PM, who will in turn order the Contractor to halt the activity. Spot fines or penalties may be levied for non-compliance.

3.1.2 Methods Statements

Methods statements from the contractor will be required for specific sensitive actions on request of the authorities or ECO. All method statements will form part of the EMP documentation and are subject to all terms and conditions contained within the EMP document. For each instance wherein it is requested that the contractor submit a method statement to the satisfaction of ECO, the format should clearly indicate the following:

- What – a brief description of the work to be undertaken
- How – a detailed description of the process of work, methods and materials
- Where – a description / sketch map of the locality of work
- When – the sequencing (phases) of actions with commencement date and completion date estimates

The contractor must submit the method statement before any particular construction activity is due to start. Work may not commence until the method statement has been approved by the ECO.

3.1.3 Record Keeping

All records related to the implementation of this management plan (e.g. site instruction book, ECO diary, methods statements etc.) must be kept together in an office where it is safe. Records should be kept for two years and at any time be available for scrutiny by any relevant authority.

4.0 STANDARDS

- The ECO will keep written and photographic records of the site and it's surrounding before, after and during construction on the site
- The Contractor will keep records of construction activities, instructions received from the ECO and PM concerning environmental matters
- The ECO will keep records of cases of non-compliance and remedial actions taken
- Where no quantitative standards are applicable, visual standards will apply
- The contractor will rehabilitate the site to a condition acceptable to the ECO, and respond timeously to any complaints and instructions regarding construction activities

5.0 EMP OBJECTIVES

This EMP must be used during the pre-construction, construction and operational phases of the proposed project.

The objectives of this plan are to:

- Ensure all environmental safeguards are carried out correctly
- Manage site activities effectively and coordinate with other trades
- Minimise adverse impacts on the environment
- Ensure that environmental mitigation measures are in place from the start of the project
- Minimise disruption to fauna and flora
- Monitor the project

6.0 EMP CONTEXT AND ENVIRONMENTAL AUTHORISATION CONDITIONS

This EMP fits into the overall planning process of the project and should be implemented by the developer as soon as the authorities have approved it. A copy of the EMP should always be available on site. All contractors and sub-contractors are to be familiar with the EMP and its contents.

Specific conditions of the ROD pertaining to the project are included in the ROD (Appendix C)

The layout as approved in the ROD are attached as Appendix D

7.0 LEGISLATION

The EMP is compiled in order to comply with the following legislative documents:

- National Monuments Act, 1969 (Act 28 of 1969)
- National Parks Act, 1976 (Act 57 of 1976)
- Environmental Conservation Act, 1989 (Act 73 of 1989)
- National Environmental Management Act, 1998 (Act No. 107 of 1998)
- Atmospheric Pollution Prevention Act, 1965 (Act 45 of 1965)
- The National Water Act, 1998 (Act 36 of 1998)
- Mine Safety and Health Act, 1996 (Act 29 of 1996)
- The Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)
- Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)
- Animal Protection Act, 1962 (Act 71 of 1962)
- Local Municipality By-Laws
- Municipal Systems Act, 2000 (Act 32 of 2000)
- Municipal Structures Act, 1998 (Act 117 o 1998)

8.0 PROJECT OVERVIEW

The proposed project entails the mixed use development to be known as Clayville X71, X76, X77, X78, X79 and X80 on Portion 207 (a portion of portion 183) of the Farm Olifantsfontein 410 J.R. This proposed project forms part of a larger development project in the Clayville area known as the Clayville-Tembisa Mega-Housing Project (one of 14 mixed housing development projects invested in by the Gauteng Province and supported by the Premier).

The Clayville-Tembisa Mega-Housing project also includes the proposed Clayville Extensions 71 and 76-80 Townships, Clayville X50 and the densification of the existing Clayville Extension 45 Township. Together the Clayville-Tembisa Mega-Housing Project will contribute to approximately 14,000 additional stands and units within the Ekurhuleni Metropolitan Municipality – making this one of the priority housing projects for the Metropolitan and the Province at large.

The proposed development will accommodate the informal settlements of Winnie Mandela Park, Madelakufa and Tembisa.

The development proposal in respect of Clayville X71, X76, X77, X78, X79 and X80 entails the mix use development is proposed to be zoned as follows:

- Residential 2
- Residential 4
- Business 2
- Special
- Social services
- Public services
- Public Garage
- Community facility
- Public open space
- Streets

Figure 1: Location map

9.0 TIMEFRAMES

The expected construction period will be phased with an estimated timeframe of approximately 3 years.

10.0 RECEIVING ENVIRONMENT

The results of the specialist investigations include the following:

10.1 Geotechnical Assessment

The site is underlain by granite-gneiss bedrock of the Johannesburg-Pretoria granite inlier. The residual soils of these Basement Complex granites are typically silty and clayey sands and sandy silts frequently open-textured and having collapse potential: Sub-angular joint blocks and weathered core-stores are also a common feature in Basement Complex granites.

The surficial colluvial materials contain thin horizons of hardpan ferricrete. Degrees of ferruginisation are also present in the underlying residual silty and clayey sands that originate from decomposition of the granite-gneiss bedrock. Extensive areas of rock sub outcrop, a characteristic of the bedrock underlying the site.

10.2 Agricultural Potential

According to the Gauteng Agricultural Potential Atlas (GAPA Version 3), the site of the proposed development is mostly classified as having a moderate agricultural potential.

An Agricultural Potential study was completed by Index

Rainfall can be expected throughout the year at an average of approximately 623 mm. The average daily maximum temperature is 28,5°C with the daily minimum at 4,8°C, averaging out to 18°C per day throughout the year. Wind speeds can reach a mean of 8,3km/h. The most intense wind occurs during spring. This may adversely affect certain crops.

The average yield of boreholes is estimated at 0,5 to 2,0 lt per second. The normal expected borehole yield is not sufficient for irrigated crop production. The total dissolved solids are expected to be between 200 and 600 mg/kg. The levels where crops and animals start being influenced are at 1 200 and 4 000 mg/l respectively.

There is no usable surface water available on the property.

The area is mainly grassland with small portions encroached with black wattle. Most land on the farm is natural or disturbed veld with a grazing capacity of 6 hectares per large stock unit. Taking the quarry and eroded areas into consideration the farm can accommodate approximately 40 LSUs. According NDA criteria, a viable farm should be able to carry at least 60.

The property is underlain by granite and gneiss, a rock that generally weathers into shallow course-grained sandy soils. Five soil types were found, (1) deep and moderately deep red soils classified as Hutton. (2) moderately deep yellow and greyish brown colour soils classified as Avalon, (3) shallow greyish brown soils on partially weathered granite, classified as Glenrosa, (4) deep, dark waterlogged soil along the river classified as Longlands and Escourt; and (5) excavations.

A detailed soil and land analysis found that none of the soil types found can be described as high or medium potential.

Agricultural potential assumes that the property would sustain the commercial farmer and that the net farm income is positive. The following were found:

- Most crops fail to yield a positive margin.
- The preferred land use would be livestock, which can provide the farmer with a gross farming income of R143 076 before overheads and repayment of land. This is not sufficient to cover overheads or repay a bond if the land had to be bought. A farming loss of R57 648 is projected if this was a farming unit.

The following conclusions can be made:

- No land is presently under irrigation, there is also no water available.
- The property has only 21 hectare medium to high potential soil. Further, no land was found to be high potential for rainfed cropping according to the departmental guidelines.
- The site is suitable for livestock, but the income that can be derived from the number of cattle that the property can keep, is not high enough to cover overhead costs if the farm was managed as a financial venture.

In conclusion, the property is not a viable farming unit.

10.3 Ecology

10.3.1 Vegetation Assessment

The site is situated in the Bankenveld Veld Type as described by Acocks (1988). Low & Rebelo described the vegetation of the area also as Rocky Highveld Grassland. In the new vegetation map of South Africa (Mucina & Rutherford. 2006) the area falls within the Egoli Granite Grassland.

The area is topographically a uniform, slightly sloped plain, mostly covered with old fields, planted pasture, secondary Anthropogenic grassland and wattle plantations. .

Due to decades of habitation, the natural vegetation was long ago transformed into agricultural fields now replaced by secondary grassland, wattle plantations and sand and granite mining activities.

Other relevant studies in the area include those of Bredenkamp & Brown (2003), Bredenkamp et al. (2006) and Grobler et al. (2006).

The following vegetation units were identified on the site:

1. Old Fields & *Eragrostis* Planted Pasture (low sensitivity)
2. Secondary Anthropogenic *Hyparrhenia* Grassland (low sensitivity)

3. Transformed Secondary Grassland (low sensitivity)
4. Extremely disturbed areas (low sensitivity)
5. Alien Plantations (low sensitivity)

6a. Pan Wetland (high sensitivity)

6b. *Eragrostis*Wetland Fringe (high sensitivity)

6c. *Stoebe* Disturbed Pan Area (high sensitivity)

7. Old Mining Area (low sensitivity)
8. Spruit (high sensitivity)

- The following applies to the proposed site:
- There are no ridges on the site.
- The site does not fall within a conservancy.
- The site does not fall within a protected area.
- The site does fall within a dolomite area.
- There are wetland areas on the site, mainly a pan and man-made quarries, and a small portion of a stream
- There are no sensitive terrestrial areas on the site.

Apart from the pans and the spruit, the entire site is highly disturbed or transformed. It is suggested that the development can be supported, provided that the pans and spruit be protected in green areas within the development plan.

10.3.2 Fauna

The majority of the study area has undergone transformation due to the historic and on-going anthropogenic activities within the study area as well as immediate surroundings. This has led to the reduction of viable faunal habitat for indigenous species, resulting in only species, which have adapted to cohabitate with humans or be tolerant of habitats affected by anthropogenic disturbance presently expected within the study area.

Due to the location of the study area as well as the current habitat conditions no SCC (Species of Conservational Concern) are expected to inhabit the study area. However the presence of the Giant Bullfrogs *Pyxicephalus adspersus* was confirmed. According to the IUCN Red List the Giant bullfrog is listed as least concern. However an amphibian assessment was completed.

10.3.3 Amphibian Assessment

The proposed site includes the habitat for the Giant Bullfrogs *Pyxicephalus adspersus.*

Surrounding land use includes industry to the south, fragmented small holdings to the west open areas to the north and townships on the east.

The assessment completed by VC Management Services assessed the potential impact of the proposed development on amphibians, especially Giant Bullfrogs and made recommendations for the mitigation of the impacts.

The proposed route for the K109 route passes through the site. The impact of the road on the Giant Bullfrog population would be considerable and is also considered.

Giant Bullfrogs require four types of specialized habitat in order to survive, namely breeding sites, burrowing soils, foraging grounds and dispersal corridors. The study site currently provides all four of these habitats.

The proposed development will have the following impacts if no mitigation steps are taken:

- Breeding sites will be disturbed / damaged
- Foraging grounds and burrowing habitats will be reduced
- Road kills and general disturbance will reduce Giant Bullfrog population will be confined to a genetically isolated "island" surrounded by impenetrable development.
- Excavation will damage the perched water table and wetland seepage system.

The impact of the K109 road would be considerable. No mitigating action by the Clayville X50 project will be adequate in the long term if the K109 is authorised in its proposed form. However the road is not part of the Clayville Ext 50 application and the developers are not in a position to implement recommendations made in the Amphibian Assessment regarding the road.

The application for Environmental Authorisation in respect of the K109 road is currently being undertaken by Lokisa Environmental Consulting (Ref: GAUT: 002/14-15/0243).

The K109 road will be 4.9km in length with a reserve of 48.4 metres. The construction involves the upgrading of a portion of Dale Road to K route standards. The rest of the road traverses open ground until it joins Road K127.

The design will be done as a Dual Carriageway though only one carriageway will be constructed. The Gauteng Department of Roads and Transport has not indicated when the other carriageway will be built.

The K109 forms part of the Gauteng Department of Roads and Transport's future road network planning aimed to enhance connectivity within the province and to other provinces. The route alignment for this road is fixed. No location alternative for this development was considered

Culverts at least 500mm high and 500mm wide must be installed underneath roads crossing the biodiversity corridors to serve as migration tunnels for giant bullfrogs and other small faunal species.

Along the K109 where the road crossing the open space area is wide grates allowing light to pass through must be placed in the median between the lanes and culverts to ensure that enough light is provided.

This must be completed in conjunction with an amphibian specialist and the Gauteng Department of Agriculture and Rural Development during the construction phase.

10.4 Wetland Assessment

A Wetland Delineation and Assessment was completed by *Wetland Consulting Services (Pty) Ltd* in 2009. The aforementioned Wetland Delineation and Assessment was verified by *Limosella Consulting* in 2014. Take note that both wetland delineations were carried out for the original Portion 183 of the Farm Olifantsfontein 410 J.R, which has now been subdivided.

- Wetland delineation and assessment by Wetland Consulting Services

The wetlands on site form part of a larger water resource system that drains into both Kaalspruit and Olifantspruit and into the Hennops River.

The PES assessment indicated wetlands that range from largely natural to seriously modified systems (rating B/C to E.

The Gauteng Department of Agriculture and Rural Development (GDARD) requires that wetlands be designated as sensitive habitats as they provide goods and services as well as contributing to biodiversity support that are of value to society.

It is recommended that a 32m buffer be provided surrounding wetlands.

- Verification of wetland delineation by Limosella Consulting

Batchelor (2009) describes five wetlands on the site, including a section of Glen Austin Pan which encroaches onto the site. The current assessment found that four of the wetlands remained on site, with approximately the same extent and Present Ecological Status as was recorded in 2009. The easternmost seepage wetland could not be verified since topsoil has been lost and the hard plinthic layer (ferricrete) has been exposed in this area, to such a degree as to remove any remaining wetland indicators (both soil and vegetation). Wetland conditions were however recorded in the center of the site, in the form of seepage water with a rusty brown/oily colour. Various hydrophytic plant species such as sedges were also recorded here. This wetland area was not reflected in Batchelor (2009).

10.5 Heritage and Paleontological Impact Assessments:

The proposed development site is flat highveld grassland with patches of exotic trees. The site is used for illegal dumping especially near Sebokeng. Near the middle of the site is a natural pan and nearby two Ndebele farm settlements. Both settlements date from the late 1940's and are important from a local heritage point of view.

Except for the two Ndebele farm workers settlements no other important cultural heritage resources or graves have been found on the proposed development site.

The two farm workers settlements are important and should be fully recorded in a Phase II cultural heritage resources impact assessment before an application can be made for demolishing permit.

If during construction any cultural heritage resources or graves are unearthed all work has to be stopped until the site has been inspected and mitigated by a cultural heritage practitioner.

The impact of the development on fossil heritage is insignificant or zero and therefore mitigation or conservation measures are not necessary for this development. A Phase 1 Palaeontological Assessment will not be recommended. The rocky outcrops, overburden and inter-burden need not be surveyed for fossiliferous outcrops. Special care must be taken during the excavation of foundations, footings and channels, only if the presence of the Transvaal Supergroup is suspected.

11.0 ENVIRONMENTAL MANAGEMENT PLAN

Table 1: Environmental Management Plan

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
11.1 Planning									
a) Appointment and duties of ECO	The Developer must appoint an independent ECO who must monitor the contractor's compliance to the EMP. The developer must provide all contractors with a copy of the EMP. The priority of the ECO is to maintain the integrity of the development conditions as outlined in the EMP. The ECO must form part of the project management team and attend all relevant project meetings.	√	√			DEVELOPER, ECO, CONTRACTOR	Continuous		
b) EMP	This EMP must be made binding to the Contractor, as well as sub-contractors and should be included in the tender documentation for the construction contract. The EMP is also binding to the owner during the operations of the facilities.	√	√			DEVELOPER, PROJECT MANAGER, CONTRACTOR	Once-off		
c) Environmental incidents	The Contractor and Owner must take corrective action to mitigate an incident appropriate to the nature and scale of the incident and must also rehabilitate any residual environmental damage caused by the incident or by the mitigation measures themselves.		√			CONTRACTOR, ECO	Continuous		
d)Flooding, erosion and sedimentation	If possible, construction activities should be scheduled for the drier months to decrease the risk of erosion during heavy thunderstorms. Storm water must not be allowed to flow directly into the Pan. It	√		√		DEVELOPER, PROJECT MANAGER			

EMP

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	must be directed to the road to be accepted into the municipal system. Where upgrading of systems is required according to the stormwater management plan and the municipal guidelines must be implemented.								
e) Service systems	Care must be taken not to damage existing services infrastructure situated on the site. Should any services infrastructure be damaged it must be repaired immediately	√	√	√		PROJECT MANAGER, ENGINEER, CONTRACTOR			
f) Geology	Geological monitoring should commence during the Construction Phase by the Geotechnical engineer Site specific investigations must be conducted on all erven planned for major structures prior to design finalization and construction. Detailed geotechnical investigations must be conducted for all high-rise structures, i.e. structures exceeding conventional double-storey height and built of load bearing brickwork. It is recommended that boreholes for monitoring the ground water be installed in at least three places within the development. Ideally these should be located in the low lying area close to the river, possibly in one of the Zone D areas, in the high lying area to the west, possibly in the Zone C area and in the north. Certification of structures' foundations by a competent geotechnical professional is required once buildings are under construction before the NHBRC will issue completion certificates. All foundations should be inspected by a competent person to ensure that the desired founding medium has	√				ENGINEER, GEOLOGIST			

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	been attained and that recommendations made in the Geotechnical report have been adhered to. Careful stormwater management will be required across the site in order to remove stormwater in a speedy and efficient manner and to prevent any accumulation of surface water against or near buildings. Refer to the Stormwater Management Plan prepared by Bigen Africa Engineers. Unconsolidated solid and organic waste fill must be removed								
g) Structures	Road Infrastructure must be maintained in good standing at all times	√		√		DEVELOPER, ARCHITECT OWNER			
g) Landscape	The natural features of the site such as the Pan situated on the site should be managed in a holistic manner. Sections where vegetation has been removed as part of the construction activities must be re vegetated with indigenous vegetation.	√				DEVELOPER, LANDSCAPE ARCHITECT, ECO			
h) Crime, safety and security	The Developer must determine which security system should be utilised for the site. Entrance points of the construction site for the road must be secured. A 24 hour guard service must operate in the area and must conduct regular patrols. The intention is that the guards are visible on the streets and not only inside the facility. Workers must not be allowed to wonder through the	√	√	√		DEVELOPER, CONTRACTOR			

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	neighbourhood before, during or after working hours. Loitering must be avoided by clearly indicated signs showing NO JOBS placed around the outside of the site								
11.2 Soil									
11.2.1 Compaction									
a) Designated Routes	Designated routes shall be determined for the construction vehicles and designated areas for storage of equipment. These areas shall preferably be already disturbed. The construction camp must be situated on an already disturbed area and approved by the relevant municipal department.	√	√			PROJECT MANAGER, ECO, CONTRACTOR	Once-off		
b) Compacted areas	All areas that are compacted by machinery shall be ripped prior to them being rehabilitated with topsoil and grass seed. The compaction of the soil will be avoided by primarily using areas where existing disturbances exist at a level that precludes vegetation.		√			CONTRACTOR	Continuous		
c) Access points & routes	Clearly mark the site access point and routes on site to be used by construction vehicles and pedestrians. Provide an access map to all contractors whom in turn must provide copies to the construction workers. Instruct all drivers to use access point and determined route.	√	√			PROJECT MANAGER, ECO, CONTRACTOR	Once-off		
d) Vehicular fences	Fence off areas which are off limits to vehicles. Failure to adhere will result in spot-fines and all damage will immediately be rehabilitated at the Contractor's expense.	√	√			ECO, CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
e) Excavated areas	Mark out the areas to be excavated to ensure that only necessary areas are excavated.	√	√			ECO, CONTRACTOR	Once-off		
11.2.2 Erosion									
a) Erosion prevention	Construction activities should preferably take place during the dry months. All surface run-offs shall be managed in such a way so as to ensure erosion of soil does not occur. All surfaces that are susceptible to erosion shall be covered with a suitable vegetative cover as soon as construction is completed. Or where erosion may potentially occur, dissipaters such as gravel beds or straw bales must be installed to prevent erosion.	√	√			ENGINEER, ECO, CONTRACTOR	Continuous		
b) Surface cladding	All surfaces that are susceptible to erosion, shall be protected either by cladding with biodegradable material or with the top layer of soil being seeded with indigenous grass seed/planted with a suitable groundcover.	√	√			ECO, CONTRACTOR	Once-off		
c) Wet areas	No vehicles what so ever are allowed to move across any wet areas (especially the Pan situated on the site after rainfall events), other than those specifically designated as access, which could cause erosion scouring and compaction.		√			CONTRACTOR	Continuous		
d) Swales	Erosion caused by construction methods or unusually heavy rainstorms must be prevented and managed by building retention swales and cut-off swales to direct the water to shallow slow flowing slope.		√			CONTRACTOR	Continuous		
e) Downhill areas	Straw bales should be placed and adequately secured on all downhill locations where erosion may occur to prevent washouts and to retain siltation and topsoil from the site. A		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	supply of straw bales must be kept on site for this purpose.								
f) Clearing of large areas	Where it is necessary to clear large areas, the clearing activities must be followed by the planting of grass indigenous to the area or covering of the surface within 2 weeks.		√			CONTRACTOR	Once-off		
g) Clearing on slopes	If clearing occurs during the rainy season, an earth berm must be created along the up-slope side of the construction area, at the edge of the cleared area and should be constructed of stones from within the cleared area and covered with soil being removed within the area being cleared. For areas close to the pan on the site, it is also recommended that berms be created on the down-slope side of the cleared area to reduce the sediment load in the storm water run-off.		√			CONTRACTOR, ECO	Once-off		
h) Clearing footprints	The area being cleared of vegetation for the construction activities must be limited to a minimum. Only the footprint of the structure may be cleared. Areas should only be cleared a maximum of two weeks before construction begins.		√			CONTRACTOR, ECO	Continuous		
11.2.3 Topsoil									
a) Stripping of topsoil	The top (200-300mm) layer (as applicable) of all areas to be excavated for the purposes of construction shall be stripped and stockpiled in areas where this material will not be damaged, removed or compacted. This stockpiled material shall be used for the rehabilitation of the site. Weeds appearing on the stockpiled topsoil shall be removed by hand before seeding.	√	√			CONTRACTOR	Once-off		

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POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
b) Storing	In order to minimize erosion and siltation and disturbance to existing vegetation, it is recommended that stockpiling be done/ equipment be stored in already disturbed/exposed areas.	√	√			ECO, CONTRACTOR	Continuous		
c) Mowing of vegetation	Only areas directly affected by construction may be grubbed and stripped of topsoil. The vegetation on the remainder of the construction areas, where possible, may only be mowed short and shall not be removed.		√			CONTRACTOR	Once-off		
d) Grass component	When the stripping of topsoil takes place, the grass component shall be included in the stripped topsoil. Weeds must be removed by hand The soil will contain a natural grass seed mixture that may assist in the re-growth of grass once the soil is used for back filling and rehabilitation.		√			CONTRACTOR	Once-off		
e) Infrastructure	During the construction of road and services infrastructure, topsoil shall be kept aside to cover the disturbed areas immediately after such activities are completed. Measures should be taken to ensure that no rocks or any other materials are placed on the top layer of soil. No more than 500 meters may be excavated at any one time.		√			CONTRACTOR	Continuous		
f) Designated areas	Stockpiling will only be done in designated places where it will not interfere with the natural drainage paths of the environment.	√	√			ENGINEER, ECO, CONTRACTOR	Continuous		
g) Flood line areas	No stockpiling shall be allowed within the hillslope seepage wetland areas including the 32m buffer areas or within the transitional zones.	√	√			ECO, CONTRACTOR	Once-off		
h) Stockpile covering	Cover stockpiles and surround downhill sides with a sediment		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	fence or straw bales to stop materials washing away.								
i) Runoff prevention	Care must be taken to prevent the runoff of silt from open soil and stockpiles into the sensitive areas.		√			CONTRACTOR	Continuous		
j) Removal areas	Remove vegetation only in areas designated during the planning stage.	√	√			CONTRACTOR	Once-off		
k) Stockpile footprint	Strip topsoil at start of works and store in stockpiles no more than 2m high and 4m^2 footprints in a designated materials storage area.		√			CONTRACTOR	Continuous		
l) Traversing topsoil	No vehicles are allowed to traverse the stockpiled topsoil areas.		√			CONTRACTOR	Continuous		
11.3 Soil, surface water and groundwater pollution in respect of a filling station									
a). Soil, surface water and groundwater pollution in respect of a filling station	• The filling station must be constructed according to the regulations stipulated by the Department of Minerals and Energy • Fuel dispenser pumps must be located on a hardened surface to contain spillages • The pump, refueling and forecourt areas should all be located on a hardened surface which drains into a common drain. This drain must feed an onsite oil and water separator such as a Zorbit grease trap. • The accumulated grease and oil must be removed by an accredited company. • Overfill and spillages during tanker refueling and fuel dispensing should be prevented by the installation of automatic cut off devices • Tanker delivery driver must be present during delivery	√	√	√		CONTRACTOR OPERATOR OF FILLING STATION	Continuous		

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POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	of fuel with the emergency cut off switch. • In the event of the pump dispenser or the hoses being knocked over or ripped off, the fuel supply must be cut off by shear off valves. • Strict procedures for the management of the site must be developed and adhered to. • Staff must be trained to prevent spillages during fuel dispensing. • Staff must be trained adequately so as to identify and minimize the impacts of leaks. • Fuel stock must be monitored on a daily basis. • The underground storage tanks must comply with the relevant SANS standards with respect to tank manufacture and installation. • Underground storage tanks must have corrosion protection. • Cathodic protection will prevent corrosion in pipelines. • Leak detectors with automatic cut of valves will be installed. • Underground storage tanks must be insulated from the soil. • Subsoil cut off drain should be installed in the lower boundary of the site to catch any seepage of fuel. The drain should be deep enough to bed 100mm into the bedrock and linked to a sump that can pump out in the event of a spill. • This drain must not be connected to the stormwater system. • A proper management and monitoring programme be implemented to ensure that the groundwater								

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	resources are protected. This should include: o Drilling of at least one monitoring borehole downstream of the site. o Take water samples and analyse for microbiological, macro elements and TPH/BTEXN at least twice annually. • Dipstick readings of all the fuel tanks must be taken daily. These records must be kept on site • The occurrence of BTEXN (i.e. Benzene, Toluene, Ethyl-benzene, Xylene and Naphthalene), Sulphur and heavy metals such as Lead (PB) in soil and groundwater should also be investigated and results thereof included in the records. • Fuel stocks must be reconciled on a monthly basis. • The underground storage tanks, underground pipes and dispensing pumps should be monitored regularly for leaks. Inform authorities of any leaks or spillages.								
11.4 Waste Management									
11.4.1 Construction waste									
a) Planning	Plan the site before starting – for access, deliveries, construction areas, washout area, waste, stockpiles, and chemicals storage. Plan routes for trucks and also vehicles with limited turning ability. Indicate this on site and on maps prior to the event.	√				PROJECT MANAGER, ECO, CONTRACTOR	Once-off		
b) Storage	Temporary waste storage points on site shall be determined. These storage points shall be accessible by waste removal	√	√			PROJECT MANAGER, ECO,	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	trucks and these points should not be located in areas highly visible from the properties of the surrounding land-owners/tenants/in areas. These areas should also be already disturbed. The storage of solid waste on site, until such time that it may be disposed of, must be in the manner acceptable to the relevant Authority.					CONTRACTOR			
c) Waste Plan	The Civil engineer must prepare a Waste Management Plan. Coordinate with other trades on site and nearby businesses for potential reuse or 'waste exchange'. Coordinate with other trades working on site regarding: site management, timing of works and waste management (recycling and reuse potential).	√				CONSULTANT, ECO, CONTRACTOR	Once-off		
d) Disposal	Solid waste shall be disposed of in a manner approved by the Gauteng Department of Agriculture and Rural Development. All solid waste must be removed and transported to a recognised waste disposal site on a weekly basis.	√	√			CONTRACTOR	Continuous		
e) Record keeping	Keep records of waste reuse, recycling and disposal for future reference. Provide information to ECO.		√			CONTRACTOR	Continuous		
f) Cleaning/clearing	Avoid the cleaning of the site camp or paved surfaces with soap. All roads should be cleared of any obstruction and should be swept clean with a broom, as to avoid the waste from entering the storm water systems.		√	√		CONTRACTOR	Continuous		
g) Waste removal	On completion of works, the contractor shall clear away and remove from the site all construction paint, surplus material, foundations, plumbing and other fixtures of every kind. Areas thus cleared shall be graded and scarified to restore the ground			√		CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	as near as possible to its original profile.								
11.4.2 Household waste									
a) Storage	Temporary waste storage points on the site should be determined. These storage points should be accessible by waste removal trucks and these points should not be located in ecological sensitive areas /areas highly visible from the properties of the surrounding land-owners/ in areas where the wind direction will carry bad odours across the properties of adjacent landowners.	√	√	√		PROJECT MANAGER, CONTRACTOR	Once-off		
b) Disposal	No waste materials shall at any stage be disposed of in public areas or adjacent properties, or where the wind direction will carry bad odours across the properties of adjacent tenants or landowners. The piling of any material that could rot and release unpleasant smells into the air will not be permitted. Burning of waste is not permitted. Spot fines of up to R100 may be administered if the employees are found to be polluting the area in any way.		√	√		ECO, CONTRACTOR	Continuous		
c)Recycling	Several waste bins must be provided and clearly marked or colour coded according to industry standards to allow for recycling of waste into • Paper • Biodegradable • Glass • Plastics • General			√					

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
d) Waste Bins	Waste bins with lids shall be provided on site at convenient locations. These shall also be supplied in close proximity to the area where the workers eat.		√	√		CONTRACTOR	Continuous		
e) Removal	The waste bins shall be cleared by municipal services on a weekly basis. During municipal strikes special arrangements must be made to have the waste removed via private waste removal services.		√	√		CONTRACTOR	Continuous		
11.4.3 Chemical waste									
a) Design	Design the site in such a manner that chemical wastes (such as paint, thinners, etc. are not located in close proximity to any fire. These areas shall be predetermined and located in areas that are already disturbed. These areas shall not be within 100 m from the Pan situated on the site or drainage lines. This area should be on a concrete base to avoid any possible seepage into the soil.	√		√		PROJECT MANAGER, CONTRACTOR	Once-off		
b) Contamination	Cover any wastes that are likely to wash away or contaminate storm water. Build a bund around waste storage area to stop overflow into storm water		√	√		CONTRACTOR	Continuous		
c) Containers	All hazardous waste (fuel, lubricants, chemicals, diesel, etc) shall be placed in specifically designed containers and properly sealed. Should any fuel storage tank be required on site, the Contractor shall ensure that he has complied with the necessary legal requirements for the erection of such tanks.		√	√		CONTRACTOR	Continuous		
d) Collection	All containers shall be collected on a weekly basis by certified		√	√		CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	chemical removal companies (such as OILKOL or WASTETECH).								
e) Disposal	All chemical waste shall be disposed of at a certified waste disposal site and proof of this disposal shall be sent to the contractor and ECO.		√	√		CONTRACTOR	Continuous		
11.5 Fuel, Fuelling and Maintenance									
11.5.1 Fuel storage									
a) Storage	Fuel storage shall be within the construction camp, and within a bunded area with at least 110% of the volume of the amount of fuel stored, as per agreement and approval of the ECO. No storage of any fuel will be allowed on site, other than what is approved by the applicable provincial government departments.	√	√			ENGINEER, CONTRACTOR	Once-off		
11.5.2 Fuelling									
a) Re-fuelling	Refuelling will take place in an area such designated, with sufficient surface sealing such as a plastic liner to prevent spillage and soil contamination. Where not approved by a provincial government department – refuelling will be done off-site.	√	√			ENGINEER, CONTRACTOR	Continuous		
b) Drip trays and spill kits	Drip trays (min 10cm deep) are to be placed under all vehicles if they stand for more than 3 hours. The drip tray must be able to contain 110% of the total amount/ volume of oil in the vehicle. Spill kits must be available in all vehicles that transport hydrocarbons for dispensing to other vehicles on the site. The dispensing devices (pump heads) must be compatible		√			ECO, CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	with the vehicles to which they are dispensing. In addition the dispensing devices must be fitted with the necessary valves/ apparatus that will ensure that the nozzles do not drip fuel after pumping has stopped.								
c) Decontamination	In the event of spills from vehicles, the area should be cleaned immediately using a bioremediation product, such as *Petro-Clean ™* The absorbent and soil must be placed in a bin and removed from the site by a certified company and disposed of as a hazardous waste at a licensed commercial facility. No Hydrocarbons may escape into the environment. A spill recovery kit must be on site, along with trained personnel.		√			CONTRACTOR	Continuous		
d) Notification	Applicable provincial and local government departments, local municipalities and adjacent landowners must be notified within 24 hours of a spillage or leak.		√	√		ENGINEER, CONTRACTOR			
11.5.3 Maintenance									
a) Design	The maintenance yard and secured storage area will be established as far as is practicable, outside 32m buffer areas of the pan situated on the site as determined by the wetland delineation. The maintenance yard should be indicated on the layout plan of the site.	√		√		PROJECT MANAGER, CONTRACTOR OWNER	Once-off		
b) Maintenance area	The maintenance of vehicles and equipment used for any purpose during the development will take place only in the maintenance yard. Any breakdown in the field requires the presence of a spill treatment team and equipment. This team must prevent and mitigate any spills that occur in this situation.		√			ENGINEER, ECO, CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
c) Equipment	Equipment used in the development process must be adequately maintained so that during operations it does not spill oil, diesel, fuel, or hydraulic fluid.		√			ENGINEER, CONTRACTOR	Continuous		
d) Machinery	Machinery or equipment used on the site must not constitute a pollution hazard in respect of the above substances. The main contractor or ECO shall order such equipment to be repaired or withdrawn from use if he or she considers the equipment or machinery to be polluting and irreparable.		√			ENGINEER, CONTRACTOR	Continuous		
e) Buildings and facilities	Buildings, yards, paving areas, gardens, outside fencing or walls, etc. must be maintained in good standing at all times. Maintenance must be carried out expeditiously and with care to maintain the residential character of the area at all times.	√	√	√		CONTRACTOR OWNER			
11.6 Air Pollution									
11.6.1 Dust control									
a) Water dampening	The liberation of dust into the surrounding environment shall be effectively controlled by the use of, *inter alia*, water spraying and/or other dust-allaying agents, such as dust nets. Regular and effective damping down of working areas (especially during the dry and windy periods) must be carried out to avoid dust pollution that will have a negative impact on the surrounding environment. When necessary, these working areas should be damped down every 3 - 4 hours.		√	√		CONTRACTOR	Continuous		
b) Speed of trucks	The speed of haul trucks and other vehicles must be strictly controlled to avoid dangerous conditions and excessive dust.		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	Preferably trucks should not exceed a speed of 20km/hr on any dirt roads or temporary construction roads.								
c) Fires	No burning of refuse or vegetation is permitted.		√			CONTRACTOR	Continuous		
d) Screens	The building area is to be physically screened off with a shade cloth fence at least 1.8m in height, to prevent dust from being blown onto the neighbouring properties.		√			CONTRACTOR	Continuous		
e) Clearance of vegetation	Should construction in areas that have been stripped not be commencing within a short period of time the exposed areas shall be re-vegetated or stabilised. Soil stabilising measures could include rotovating in straw bales (at a rate of 1 bale/20 m²), applying mulching or brush packing, or creating windbreaks using brush or bales.		√			CONTRACTOR	Continuous		
11.6.2 Fire									
a) Fires on site	A designated area shall be assigned for fire making by the construction workers, so as to ensure that run-away veld fires do not occur. This will reduce air pollution by excessive smoke.	√	√			CONTRACTOR	Once-off		
b) Risk of Fire and explosions in respect of the filling station	The design and construction of the filling station must conform to the following fire safety standards and legislation: o SANS 10089 (Building Code) o Hazardous Substances Act (Act 15 of 1973) o Occupational Health and Safety Act (Act 85 of 1956). o Fire Services Act (Act 99 of 1956) o National Building Regulations (Act 103 of								

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	1977). Fire extinguishers must be easily accessible. The following signs must be installed in accordance with the Ekurhuleni Metropolitan Municipality's Fire Department: o No Smoking o No naked flame o No Cellphones The underground storage tanks, underground pipes and dispensing pumps should be monitored regularly for leaks. Staff must be trained adequately so as to identify and minimize the impacts of leaks and to deal with fires. Overfill and spillages during tanker refueling and fuel dispensing should be prevented by the installation of automatic cut off devices. In the event of the pump dispenser or the hoses being knocked over or ripped off the fuel supply must be cut off by shear off valves. Tanker delivery driver must be present during delivery of fuel with the emergency cut of switch and a fire extinguisher. Firefighting facilities must conform to the oil industry standard and be regularly inspected. The filling station management must develop an emergency plan. All staff must be adequately trained in the implementation of this plan.								
11.6.3 Machinery									
a) Exhaust fumes	Machinery or equipment used on the site must not constitute a pollution hazard in respect of air pollution via excessive exhaust fumes. This shall be inspected regularly by the contractor and		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	rectified immediately.								
b) Transporting materials	All vehicles transporting material that can be blown off (e.g. soil, rubble, etc.) must be covered with a tarpaulin, and speed limits of 20km/h must be adhered to.		√			CONTRACTOR	Continuous		
11.7 Noise Pollution									
11.7.1 Working hours									
a) Construction working hours	Construction should be limited to normal working hours, which are stipulated to be from 06h00 to 18h00, Mondays to Fridays and Saturday from 07h00 to 13h30. No work should be allowed on Sundays and Public Holidays, except in extreme emergencies and with the prior approval of the Project Manager and ECO and with notification to the direct surrounding landowners.	√	√			PROJECT MANAGER, ECO, CONTRACTOR	Continuous		
11.7.2 Staying on site									
a) Construction workers	Except for 24-hour security guards (max 2), no workforce for any of the contractors, nor their family and friends, are allowed to stay on the site.		√			CONTRACTOR	Continuous		
b) Accommodation	Alternative accommodation shall be arranged for construction workers by the contractors, should they be too far from their permanent residence, and need accommodation closer to the site.	√	√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
11.7.3 Noise on site									
a) Noise Regulations	Site workers must comply with the Provincial noise requirements as outlined in Provincial Notice No. 5479 of 1999: Noise Control Regulations. The contractor is required by contract to adhere to SABS 1200 and ISO 9000 safety measures during construction on the entire site. And to fit silencers to frilling and other machinery as required.		√	√		CONTRACTOR	Continuous		
11.8 Safety and Security									
11.8.1 Safety									
a) Site and crew	The site and crew are to be managed in strict accordance with the Occupational Health and Safety Act (85 of 1993) and the National Building Regulations.		√	√		CONTRACTOR	Continuous		
b) Informal settlement	No informal settlement will be allowed on the premises or in the adjacent roads leading to the construction site.		√	√		CONTRACTOR	Continuous		
c) Informal trading	No informal trading will be allowed at the entrances to the property, or the adjacent roads. It is the responsibility of the contractor to remove any informal traders and discourage the workers from using these informal traders.		√	√		CONTRACTOR	Continuous		
d) Dangerous areas	All dangerous areas and deep excavations should be barrier taped to ensure visibility of these areas in compliance with the Occupational Health and Safety Act (85 of 1993). In the case where demolition of buildings can pose a threat to workers or visitors to the site, emergency officers must be summoned.		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
e) Equipment and materials	The Contractor should ensure that the handling of equipment and materials is supervised and adequately instructed.		√			CONTRACTOR OWNER	Continuous		
f) Sign boards	Clear sign boards should be erected at the entrance to the site to indicate that a construction site is being entered and that OHSA safety precautions should be followed		√			CONTRACTOR OWNER	Continuous		
g) Fire extinguisher	A fire extinguisher should be accessible and the personnel should receive training in the use of a fire extinguisher. Furthermore a fire extinguisher must at all times be available wherever welding or similar activities take place and be present on all construction vehicles. A full-time fire prevention team and the associated equipment must be available on site.	√	√	√		CONTRACTOR OWNER	Continuous		
h) Emergency numbers	A list with all the relevant emergency telephone numbers shall be pasted up in the site office (hospital, fire department, police, ambulance, etc.) for easy access in the event of an accident	√	√	√		CONTRACTOR OWNER	Continuous		
i) Speed limits	Within the construction site a maximum speed limit of 20km/h must be enforced for all construction vehicles and 40km/h for light vehicles.		√			CONTRACTOR	Continuous		
j) Traffic impact	Vehicular movement beyond the property boundaries should be limited during peak hours. Access to the site must follow current and established routes. Speed limits must be adhered to at all times.		√	√		CONTRACTOR OWNER	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
11.8.2 Security									
a) Security guards	Due to the requirement for security, the construction teams will not be housed on site, and will have to travel to/from site, however security officers (max 2) will remain on site for the purpose of guarding the equipment.	√	√			CONTRACTOR	Continuous		
b) Access control	A system must be implemented where all staff will carry ID. Access control will be enforced, the site could be swept and a search could be done each night for construction workers. The provincial government departments will be allowed access to site at any time of the day	√	√	√		CONTRACTOR OWNER	Continuous		
c) Fencing	Fencing is required during the construction phase of the project to demarcate the boundaries of the construction site and work camp. Erection of the fence must occur with minimal impact on the natural environment. The fence will ensure that access to and from the site will be restricted to staff only.		√			CONTRACTOR	Once-off		
d) Casual access	No casual access to the work camp and the construction site will be allowed.		√			CONTRACTOR	Continuous		
e) Fence rehabilitation	All negative effects caused by the erection of any temporary fences must be rehabilitated after construction is complete.			√		CONTRACTOR	Once-off		
11.9 Health									
11.9.1 Chemical Toilets									
a) Number of toilets	One (1) portable chemical toilet for every 10 workers must be established on site (not all in the contractor's camp, but within reasonable walking distance from where the workers are	√	√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	working).								
b) Location	Chemical toilets shall not be in close proximity to any natural drainage channels or wetlands. Chemical toilets shall not be within 100 m of the Pan. It is important, however, that toilets be placed in areas where the largest number of workers is located on a daily basis.	√	√			ECO, CONTRACTOR	Continuous		
c) French drains	No French drain systems may be installed due to potential ground water pollution.	√				ENGINEER, CONTRACTOR	Continuous		
d) Usage	No person is allowed to use any other area than chemical toilets.		√			CONTRACTOR	Continuous		
e) Inspections	Regular inspections shall be carried out to ensure that toilets are kept in a hygienic state.		√			CONTRACTOR	Continuous		
f) Toilet paper	Toilet paper shall be supplied to all toilets.		√			CONTRACTOR	Continuous		
g) Cleaning	Toilets shall be cleaned by a certified company on a weekly basis.		√			CONTRACTOR	Continuous		
h) Locking	Toilets must be secured to the ground so that they cannot be overturned, and have a sufficient locking mechanism operational at all times.		√			CONTRACTOR	Continuous		
11.10 Blasting on Site – According to the Geotechnical Assessment blasting may be required during excavation of the site. Should blasting be required the following measures must be implemented									
a) Authorisation	In cases where blasting is required, an authorisation must be	√	√			PROJECT			

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	obtained from the Department of Minerals and the Department of Energy.					MANAGER, ENGINEER, CONTRACTOR			
a) Magazine area	The ECO, Contractor and Safety Officer will earmark a suitable area on site for a temporary magazine for the duration of the construction. This magazine however will only be used to store the daily stock and not for stock to be stored for a long period.	√	√			ECO, SAFETY OFFICER, CONTRACTOR	Once-off		
b) Blasting times	Blasting will only take place after confirmation between the ECO and Contractor.		√			ECO, CONTRACTOR	Continuous		
c) Notification	Blasting shall be limited to specific, pre-agreed periods of the day so as to minimize disturbance and shall be agreed upon with the ECO. The ECO shall be notified in writing 3 days in advance with a two weekly daily schedule of when blasting operations will take place and where so that he can notify surrounding residents of each blasting event in writing, 24 hours in advance before blasting events will take place.		√			ECO, CONTRACTOR	Continuous		
d) Safety precautions	If blasting is required, it will be covered blasting with the necessary Safety precautions of Red flags, Siren and Safety signs. Where blasting will be near a road the Metro Police must be notified to arrange traffic for duration of blasting operation.		√			ECO, CONTRACTOR	Continuous		
11.11 Fauna									
a) Regulations	All activities on site must comply with the regulations of the Animal Protection Act, 1962 and NEMPAA 2003.		√			CONTRACTOR	Continuous		

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POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
b) Sensitive areas	No construction worker activity whatsoever will be allowed outside of the specific construction area.	√	√			CONTRACTOR	Continuous		
c) Snaring / hunting	Snaring and hunting of fauna by construction workers on or adjacent to the site are strictly prohibited and the Local Municipality shall prosecute offenders. It should also be a condition of employment that any employees/ workers caught poaching will be dismissed.		√			CONTRACTOR	Continuous		
d) Training	Workers must be trained on how to deal with fauna species as intentional killing will not be tolerated. Awareness campaigns and regulations must be implemented and maintained among residents so that the corridors and buffers can double as recreational parks and public open space.		√			ECO, CONTRACTOR	Continuous		
e) Lighting	During the construction phase, artificial lighting must be restricted to areas under construction only. Where lighting is required for safety or security reasons, this should be targeted at the areas requiring attention. Yellow sodium lights or Compressed Flourescent Bulbs (CFL"s) should be prescribed as they do not attract as many invertebrates (insects) at night and will not disturb the existing wildlife. Sodium lamps require a third less energy than conventional light bulbs.		√			ECO, CONTRACTOR	Continuous		
f) Fencing	Ideally fences should not restrict the natural migratory movements of certain animals. The site offers limited suitable migratory habitat. Electric fences have a negative impact on certain animal species including Bushbabies, geckoes,		√			ECO, CONTRACTOR	Continuous		

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POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	chameleons, bullfrogs and tortoises. Palisade fencing with adequate gaps is recommended for the conserved public open spaces.								
g) Moving bullfrogs to designated open space areas prior to construction	Adult bullfrogs should be prevented from returning to the areas being transformed and developed prior to commencement of construction, preferably at the start of the rainy season and temporary fences should be erected to prevent re-dispersal back into areas of the property where construction / excavation is taking place. The frogs will be contained in the areas to be zoned as open space. Refer to appendix E attached hereto for the method.					ECO, CONTRACTOR			
h) Special mitigation measures to be implemented with regards to Giant African Bullfrogs	Designated open space areas must be used and maintained as conservation areas and grassland conditions should be kept as natural as possible with sandy areas for burrowing and habitat suitable for prey animals (insects, small rodents, etc.) to flourish. Fire management should be practiced to eliminate rank grass. Rhysomatic grasses such as Kikuyu and *Cynodo sp.* Should be avoided because they bind the soil and restrict burrowing. If trees are planted they must be widely spaced with large areas of open grassland in between. Road crossings should be regulated to prevent road kills during the short season of bullfrog surface activity. All contractor and sub-contractor staff must be trained to recognize and protect Giant African Bullfrogs. Culverts at least 500mm high and 500mm wide must be installed underneath roads crossing the biodiversity corridors to	√	√	√		AMPHIBIAN SPECIALIST ECO, CONTRACTOR			

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	serve as migration tunnels for giant bullfrogs and other small faunal species. This must be completed in conjunction with an amphibian specialist and the Gauteng Department of Agriculture and Rural Development during the construction phase.								
11.12 Flora – No Protected / Red Data floral species were found on site during the vegetation assessment									
a) Site inspection	Before any vegetation is removed, a suitably qualified person (i.e. on ECO request of a vegetation specialist) shall inspect the study area for any plant/ grass/ tree species that could be transplanted to other similar/ suitable areas. This includes all Red Data or Protected, or rare plants that may be found during the flora site assessment or during construction operations.	√	√	√		FLORA SPECIALIST, ECO, CONTRACTOR	Once-off		
b) Sensitive flora	Any medicinal/ protected/ Red Data flora that will have to be removed shall be removed by a suitably qualified specialist and relocated. The applicable responsible person at the provincial department must be notified in the event of such plants being identified, who will then advise the ECO regarding what steps need to be taken and who will be responsible for the relocation and transplantation processes.	√		√		FLORA SPECIALIST, ECO	Once-off		
c) Site access and circulation	Strictly no unauthorised access, land clearing, construction activities, vehicular traffic of any kind, pedestrian traffic or fires will be permitted external of specific construction areas or in sensitive vegetation areas.	√	√	√		ECO, CONTRACTOR	Continuous		
d) Drainage lines	No clearing of vegetation will be allowed within any the hillslope seepage wetland or the Glen Austin Pan except for the sections where the road crossings are constructed, these areas must be	√	√			ECO, CONTRACTOR	Continuous		

EMP

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	rehabilitated with indigenous vegetation as soon as the crossings has been constructed.								
e) Exotic / invader species	All invader or exotic plant species must be removed from the site and disposed of at a landfill site. The National Department of Agriculture, Forestry and Fisheries (NDAFF) will be consulted during this process. Care should be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used During the operational phase an annual assessment should be undertaken to check that no disturbance is occurring to the river and that alien plant species are being adequately controlled in the area, especially in the more sensitive areas.		√	√		FLORA SPECIALIST, CONTRACTOR	Continuous		
f) Landscaping	The use of indigenous vegetation should be optimised during the landscaping of the development.	√	√	√		FLORA SPECIALIST, LANDSCAPE ARCHITECT, LANDSCAPE CONTRACTOR	Once-off		
g) Wood harvesting	Wood harvesting of any trees or shrubs on the study area or adjacent areas for firewood shall be prohibited and subject to a fine.		√	√		CONTRACTOR	Continuous		
h) Retaining flora	On site floral assets and tree clumps shall be identified and retained where possible. Floral assets intended to be retained	√	√	√		FLORA SPECIALIST, ECO,	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	shall be clearly marked on site and be fenced off until they have been removed.					CONTRACTOR			
i) Street trees	No street trees planted by the Local Municipality may be removed without prior approval by Urban Forestry / the relevant department.	√	√	√		FLORA SPECIALIST, CONTRACTOR	Continuous		
j) Removing flora	No indigenous trees or floral assets may be removed without permission from the specialist or in some cases a flora removal permit may be required.		√	√		FLORA SPECIALIST, CONTRACTOR	Continuous		
j) Vegetation along services	No trees, hedges or other large vegetation types may be planted along or over service pipelines/ areas, due to the risk of damage and for ease of maintenance purposes.	√	√	√		LANDSCAPE ARCHITECT, LANDSCAPE CONTRACTOR, CONTRACTOR	Continuous		
11.13 Storm water – a stormwater management plan has been completed by Bigen Africa Engineers and must be implemented in addition the following mitigation measures must be implemented to manage stormwater during the construction phase									
a) Covering of wastes	Cover any wastes that are likely to wash away or contaminate storm water		√	√		CONTRACTOR OWNER	Continuous		
b) Bunded area	Build a bund around waste storage area to stop overflow into storm water		√	√		CONTRACTOR OWNER	Once-off		
c) Natural flow	Natural storm water must flow freely, either as sheet flow or where necessary in open grass swales, to allow for infiltration and retention. Natural veld grass must be left undisturbed as far as possible, to allow natural drainage.		√	√		ENGINEER, CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
d) Piping of flow	Natural storm water must not be piped other than in areas where it runs perpendicularly cross the roadway.		√	√		ENGINEER, CONTRACTOR	Continuous		
e) Drainage channels	Drainage channels must be constructed along the road every 50m to divert runoff during construction period.	√	√	√		ENGINEER, CONTRACTOR	Continuous		
f) Energy dissipaters	Energy dissipaters (gabions/strawbales etc.) must be installed at all potential large flow volume areas, especially during the construction phase where large areas will be open soil.		√	√		ENGINEER, CONTRACTOR	Once-off		
g) Engineering report	The stormwater management plan completed by Bigen Africa Engineers specifically address storm water to the satisfaction of the Ekurhuleni Metropolitan Municipality. This report will be set submitted to the Ekurhuleni Metropolitan Municipality once the development has been approved. This storm water design (as per civil engineers) for all hard surfaces will ensure the proper management and precautionary measures are taken into account.	√		√		ENGINEER	Once-off		
h) Vegetated swales	Where feasible the use of vegetated swales should be used to accommodate surface runoff during construction, in order to increase infiltration into the soil. The swales should be vegetated with indigenous, wetland vegetation in order to provide habitat for bird life and other aquatic and semi-aquatic species. Where feasible, the swales should be provided adjacent to the property boundaries along the natural gradient.	√	√	√		ENGINEER, ECO, CONTRACTOR	Continuous		
i) Retention ponds	Retention ponds should be constructed. Retention ponds manage storm water runoff to prevent flooding and downstream	√		√		ENGINEER	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	erosion, and to improve water quality in adjacent water bodies.								
j) Alkaline soils	Where alkaline soils occur and the design of the development permits, swales should be used to infiltrate surface runoff, as this promotes the removal of metals from runoff. Especially runoff from parking areas should by filtered in this fashion before passing into the underground storm water sewer system.	√	√	√		ENGINEER, CONTRACTOR	Continuous		
k) Design of swales	The cross-section of the swale should be parabolic or trapezoidal in shape with side slopes no steeper than 1:3, to maximise the wetted channel perimeter. It is recommended that the longitudinal slope not exceed 2% where possible and that a maximum slope of 4% be used. Where a 4% slope must be exceeded, check dams should be provided at a minimum interval of 17m. As a rule of thumb the total surface area of the swale must be 1% of the area that drains into the swale. The surface of the swale must be carefully constructed, to avoid compaction, which will inhibit dense vegetation growth and effective runoff infiltration. The installation of vegetated filter strips parallel to the top of the channel banks can help to treat sheet flows entering the swale.	√		√		ENGINEER	Once-off		
l) Maintenance of swale	Maintenance of the swale should include periodic mowing of the grass (never shorter than the design flow depth of the channel). Bare areas should be re-seeded and debris and blockages regularly removed. Sediment depositions should be regularly removed from the swale, to prevent pollution of the runoff from contaminants contained therein.		√	√		CONTRACTOR	Continuous		
m) Hydrological Engineer	Please note that the recommendations for the design of the	√		√		CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	swales are guidelines only and that the designs of the swales, sedimentation ponds and check dams must be done by a hydrological engineer.								
n) Wetland	Storm water outflows will not enter directly into the wetland into the Pan.	√		√		ENGINEER	Continuous		
o) DWS approval	Both storm water and excess effluent intended for irrigation must be purified according to DWS standards. Approval must be obtained from DWS for the abstraction of groundwater.	√		√		ENGINEER	Once-off		
11.14 Traffic Impact									
a)Departmental requirements	All requirements from the provincial roads and traffic departments and the Local Municipality must be adhered to and precautionary measures taken to provide safe and effective traffic management.	√		√		ENGINEER OWNER	Once-off		
b) Delivery trucks	Deliveries by large vehicles may only take place during weekdays and pre-warning of at least one day prior to delivery must be given to the facility manager to ensure adequate space and manoeuvrability inside the facility and in the adjacent roads. . Large delivery trucks should not be scheduled at the same time as events.		√	√		CONTRACTOR OWNER	Continuous		
c) Site access	The access of large trucks will be investigated by the PM to provide a suitable access route that does not become a nuisance to surrounding residents. Only a specified number of trucks at any one time will be allowed onto the property as		√			ENGINEER, CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	agreed to between the PM and the ECO based on the capacity of the site to carry the number of trucks.								
d) Wheel wash	Establish an all-weather site access and wheel wash or shake down to prevent soil and materials from being tracked onto the road.		√			CONTRACTOR	Continuous		
e) Peak traffic hours	Construction vehicles and activities must aim to avoid peak hour traffic times (weekdays 7-8am and 5-6pm)		√	√		CONTRACTOR OWNER	Continuous		
f) Legislation	Access roads and traffic planning will adhere to Gautrans and the Local Municipality requirements.	√				ENGINEER	Once-off		
g) Established tracks	Access and travelling on site must follow current and established tracks only.		√			CONTRACTOR	Continuous		
h) Road construction	Where roads cross open areas the traffic calming features will have a 300mm pipe sleeve under it for potentially occurring amphibians and mammals to cross under the road in safety.	√	√			ENGINEER, CONTRACTOR	Once-off		
11.15 Sensitive Areas									
11.15.1 Pan & Valley bottom wetland									
a) Flood line and wetland buffer areas	No activities may be allowed within the 32m buffer zones surrounding the Pan or clearly definable drainage area.	√	√	√		CONTRACTOR OWNER	Continuous		
b) Fencing of the Pan	During construction the Pan affected by the construction of Clayville X71, X76, X77, x78, X79 and X80 must be fenced off. The fence must be erected on a conservation line determined by the ECO. No construction worker or vehicular access shall	√	√	√		CONTRACTOR OWNER	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	be allowed within this area, unless authorised by the ECO.								
c) No dumping	No dumping will be allowed within any drainage areas, the Pan. No bins shall be located within 50m of these areas.		√			CONTRACTOR	Continuous		
d) No toilets	No chemical toilets shall be situated within 100m from the natural drainage areas or the Pan		√			CONTRACTOR	Continuous		
e) Surface runoff	Surface runoff must be directed away from the Hillslope Seepage Wetland and the Glen Austin pan and must be filtered or put into a municipal system prior to being released. All surface runoff shall be managed in such a way as to ensure that erosion of soil does not occur.	√	√	√		ENGINEER, CONTRACTOR OWNER	Continuous		
f) Vehicle access	No vehicles whatsoever are allowed to move across or within the 32 meter buffer zones of the Pan.		√			CONTRACTOR	Continuous		
g) No stockpiling	No topsoil stockpiling, or stockpiling of any other material, shall be allowed within the 32 metre buffer zones surrounding the Pan.		√			CONTRACTOR	Continuous		
h) Siltation ponds	Where natural drainage channels join up with man-made channels, siltation ponds/ stilling basins shall be implemented in order to allow for the sediments to settle before the water is dispersed into the natural system.	√	√	√		ENGINEER, CONTRACTOR	Continuous		
i) Longitudinal connectivity	No activity is allowed that will impede the longitudinal connectivity of drainage areas, as this will hamper efficiency and flow.	√	√			WETLAND SPECIALIST, CONTRACTOR	Continuous		

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POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
j) No bathing	No bathing will be allowed in any of the water bodies (Pan) on or adjacent to the site.		√			CONTRACTOR	Continuous		
k) No washing	No washing of clothes will be allowed in any water bodies (the Pan) on or adjacent to the site.		√			CONTRACTOR	Continuous		
l) No taking of water	No taking of water from water bodies (the Pan) for drinking or cooking purposes will be allowed, as potable water should be available on site.		√			CONTRACTOR	Continuous		
m) No urinating	No urinating will be allowed anywhere on site, as this will result in an immediate fine.		√			CONTRACTOR	Continuous		
n) Sensitive zones rehabilitation	Considerable attention must be given to avoid any unnecessary vegetation disturbance within any natural drainage habitat zones, or the Pan. All potential disturbances within these areas shall immediately be reported to the ECO and rehabilitated with appropriate vegetation (a specialist must be consulted in this regard).		√			WETLAND SPECIALIST, CONTRACTOR	Continuous		
o) Biodiversity offset plan in respect of the Valley bottom wetland	A biodiversity offset plan including a rehabilitation plan must be compiled in conjunction with GDARD prior to commencement of construction to offset the loss of the degraded valley bottom wetland and rehabilitated and improve the current state of the open space system to be provided	√	√	√		WETLAND SPECIALIST, ECO APPLICANT			

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POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
11.15.2 Heritage / Cultural / Archaeological Sites – Except for the two Ndebele farm workers settlements no other important cultural heritage resources or graves have been found on the proposed development site. The two farm workers settlements are important and should be fully recorded in a Phase II cultural heritage resources impact assessment before an application can be made for demolishing permit.									
a) Discovery of artefacts	Should any other Cultural / Archaeological artefacts be discovered during construction activities, construction shall immediately cease and the National, Cultural and History Museum shall be contacted for investigation. The area must be barrier taped immediately until the ECO can communicate appropriate methods of protection to the contactor.		√			CONTRACTOR, HERITAGE SPECIALIST, ECO	Continuous		
b) Fencing	Any archaeological sites present on site shall be fenced and at least 5 metres around it should be safeguarded from construction and development.	√	√			CONTRACTOR	Once-off		
c) Structures older than 60 years	No buildings / structures older than 60 years shall be damaged / demolished, or archaeological artefacts removed, without written authorisation from SAHRA.	√	√			CONTRACTOR	Continuous		
d) Burial grounds	Any burial ground or grave found on site will be reported immediately to the Contractor, ECO and Project Manager. An undertaker must also be contacted who will place advertisements in the newspapers. This should be investigated by a specialist and recommendations made.		√			PROJECT MANAGER, CONTRACTOR, ECO	Continuous		
e) Suspicious artefacts	The ECO will be notified of any suspicious artefacts prior to it being moved or removed.		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
11.16 Services									
11.16.1 Disruption in services									
a) Informing ECO	If any disruption in services (electricity, water, sewage) are foreseen during the construction of Clayville X50, the contractor must inform the ECO at least 4 days prior to these activities, to enable the ECO to inform the surrounding land owners of such possible disruptions.		√			CONTRACTOR	Continuous		
b) Existing storm water channels and other services	Existing storm water channels and services are not to be impacted upon in any way during the course of construction of Clayville X50, except when part of the construction scope of works. Any damage repairs shall be for the Contractor's account. No littering or dumping of rubble shall be permitted in the storm water channel and all potential blockages shall be removed immediately. Where necessary these areas should be clearly fenced off with white poles at 5m centres, with blue wire and orange barrier netting.		√			CONTRACTOR	Continuous		
11.17 Contractor's Site Camp									
a) Establishment of site camp	A work site will be established and maintained for storing construction equipment on a non-sensitive area to be agreed upon by the ECO and contractor. The contractor shall furnish the Engineer on site with a site plan indicating the layout of site offices, facilities, such as chemical toilets, areas for stockpiling of materials and provision of containers, prior to commencement of construction.		√			CONTRACTOR, ECO	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
b) Fencing	The site camp shall be fenced and all materials shall be stored within this camp. All hazardous materials i.e. fuel, polyethylene liners, etc. shall be stored in an appointed area that is fenced off and has restricted access.		√			CONTRACTOR	Continuous		
c) Camp location	The site camp shall not be situated within a natural drainage line or within 50m from the Pan. It should also be situated in an area that is already disturbed.		√			CONTRACTOR	Once-off		
d) Rehabilitation of camp	The area where the camp was established must after the construction period be rehabilitated to guidelines in this document or as otherwise directed by the ECO.		√			CONTRACTOR, VEGETATION SPECIALIST, ECO	Once-off		
11.18 Environmental Awareness Training									
a) Training program	An environmental awareness-training program must be organized as part of the EMP to ensure that each employee knows his/her responsibilities regarding the EMP and the environment in general. Attendance certificates must be issued. Additional training as required, i.e. encounters with Red Data or other fauna should be arranged and provided.	√	√			CONTRACTOR, ECO	Once-off		
b) Appropriate activities	The employees, construction workers and maintenance crews will receive instruction in the appropriate activities that could take place among the natural resources of the area.		√			ECO	Once-off		
11.19 Rehabilitation & Landscaping									
a) Master Plan	A Landscape Master Plan will be prepared that stipulates that the existing indigenous vegetation must be retained on site. This plan should be strictly adhered to. A landscaping	√				LANDSCAPE ARCHITECT	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	programme is to be submitted to the applicable Provincial and Local Government department together with the construction programme.								
b) Landscaping	The use of indigenous vegetation should be optimised during the landscaping of the development. Landscaping should enhance the aesthetic appeal of the development/ mitigate the visual impact as far as possible.	√				LANDSCAPE ARCHITECT	Once-off		
c) Compacted areas	All compacted areas (including backfilled trenches) should be ripped prior to them being rehabilitated.		√			CONTRACTOR	Continuous		
d) Reseeding	Stored topsoil and reseeding must be used to rehabilitate all open soil areas following construction activities. Any proclaimed weed or alien invader plant shall be cleared by hand before seeding. All rehabilitated areas must be maintained and irrigated as required to ensure sufficient vegetation coverage. Re-seeding may be required if sufficient coverage has not been achieved after 6 months and shall be at the Contractor's expense.		√			LANDSCAPE ARCHITECT, CONTRACTOR	Once-off		
e) Timeframe	Rehabilitation/ landscaping is to be done immediately after the involved works are completed.		√			CONTRACTOR	Once-off		
f) Rehabilitation by Sub-contractors	The Contractor is responsible for the actions and works of the sub-contractors and is required to complete the rehabilitation work if the sub-contractor fails to do so. Payment may be withheld from the sub-contractor in the event that the work must be completed by the main contractor.		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
g) Completion of work	On completion of works, the contractor shall clear away and remove from the site all construction paint, surplus materials, foundations, plumbing and other fixtures, rubbish and temporary works of every kind. Areas thus cleared shall be graded and scarified to restore the ground to its original profile as near as practicable before topsoil placement.		√			CONTRACTOR	Once-off		
h) Cement mixing	Cement mixing shall be done only at specifically selected sites. After construction activities ended the cement shall be crushed and removed from the site. This mixing area shall then be ripped and rehabilitated.		√			CONTRACTOR	Continuous		
i) Natural features	The natural features of the site should be managed in a holistic manner.	√				LANDSCAPE ARCHITECT	Continuous		
11.20 Advertising									
a) Design	A graphic design of the advertisement will be subject to the approval of the Directorate of Integrated Environmental Management, Directorate of Marketing, Directorate of Local Economic Development and Directorate of Public Safety.	√				ARCHITECT, CONTRACTOR	Once-off		
b) Requirements	Advertisements will not obstruct traffic view, movement of pedestrians, cause visual pollution or appear to be unsightly. It will be tastefully low key, as will be defined by the Local Municipality and will not unrightfully interfere with other existing advertising rights.	√		√		ARCHITECT, CONTRACTOR	Continuous		
c) Lease	The lease of the advertising space will be valid for a period of 12 months after which the applicant can request for renewal.	√		√		PROJECT MANAGER	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
11.21 Penalties									
a) Payment of penalties	Any person who contravenes any of the provisions of the laws and by-laws will be guilty of an offence and on conviction liable to a fine not exceeding R20 000 (Twenty-thousand Rand) or in default of payment, to imprisonment for a period of not exceeding 6 months.	√	√	√		DEVELOPER, ENGINEER, CONTRACTOR, ARCHITECT, ECO	Continuous		

APPENDIX A
ABBREVIATIONS AND DEFINITIONS

ARCH	Architect
CE	Consulting Engineer
CO	Construction
DE	Demolition
DS	Design
DWS	The Department of Water and Sanitation – both national office and their various regional offices, which are divided across the country on the basis of water catchment areas.
ECA	Environment Conservation Act (Act 73 of 1989)
ECO	Environmental Control Officer
EIA	An Environmental Impact Assessment as contemplated in the national Environmental Management Act (Act 107 of 1998)
EMI (E.g. GDARD)	Environmental Monitoring Inspector – from Provincial Government
EMP	Environmental Management Plan
FAUNA	All living biological creatures, usually capable of motion, including insects and predominantly of protein-based consistency.
FENCE	A physical barrier in the form of posts and barbed wire or any other concrete construction, ("palisade"- type fencing included), constructed with the purpose of keeping humans and animals within or out of defined boundaries.
FLOOD LINE	The line or mark to which a flood could rise, every 50 (1:50 year flood line), or 100 (1:100 year flood line) years
FLORA	All living plants, grasses, shrubs, trees, etc., usually incapable of easy natural motion and capable of photosynthesis.
GDARD	Gauteng Department of Agriculture and Rural Development
IEM	Integrated Environmental Management
MPRDA	The Mineral and Petroleum Resources Development (Act 28 of 2002)
NEMA	National Environmental Management Act (Act 107 of 1998)
NHRA	National Heritage Resources Act (Act 25 of 1999)
NWA	National Water Act (Act 36 of 1998)
OP	Operational
PENALTY	A fine against the contractor by the PM as per request from the ECO. This could also be used for the benefit of the labourers (such as a camp braai).
PM	Project Manager
RA	Resident Architect

ROD	Record of Decision (approval or dismissal of project) as issued by GDACE
SABS	South African Bureau of Standards
SAHRA	South African Heritage Resource Agency
SAMOAC	South African Manual for Outdoor Advertising Control
SPOTFINE	A fine against a labourer by the PM as per request from the ECO. This fine should be used for the labourers' benefit.
SWALE	A depression between slopes that provides for drainage
TLB	Tractor, Load & Backhoe
TOPSOIL	The layer of soil covering the earth which- (a) provides a suitable environment for the germination of seed; (b) allows the penetration of water; (c) is a source of micro-organisms, plant nutrients and in some cases seed; and (d) is not of a depth of more than 0,5 metres or such depth as the Minister may prescribe for a specific prospecting or exploration area or mining area.
VEGETATION	Any and all forms of plants, see also Fauna
WETLAND	A wetland is defined as land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which under normal circumstances supports or would support vegetation typically adapted to life in saturated soil (Water Act 36 of 1998).

APPENDIX B

EMP Checklist

1	Environmental Management System	
1.1	Latest revision of signed Environmental policy is on display in office and on notice boards	
1.2	Declaration of understanding has been signed	
1.3	A site specific Aspects and Impacts Register has been compiled	
1.4	Site Specific Objectives and Targets completed. Action plan in place	
1.5	An Environmental Officer has been appointed	
1.6	All employees, subcontractors and management has completed the Environmental Induction within the last 12 months	
1.7	The complaints register is available and up to date	
1.8	Relevant Environmental Method Statements have been completed and signed off by the project manager	
1.9	The Incident register is available and up to date	
1.10	The Start-up and Monthly Checklist is up to date and has been signed off by the project manager	
1.11	The Facilities Checklist is up to date and has been signed off by the project manager	
1.12	Waste Management Checklist has been completed	
1.13	Borrow pit and spoil Checklist has been completed	
1.14	All NCR's have been closed and addressed	
1.15	The NCR's register is available and up to date	
1.16	Internal Audit report action plan has been completed and signed off by the project manager	
1.17	Internal Environmental Inspection report has been communicated, actioned and signed off by the project manager	
1.18	Environmental Monthly report has been submitted to head office	

1	Legal Documentation	
2.1	Is a copy of the EMP and ROD stored on the site for easy reference?	
2.2	DWS permits obtained for river, stream or wetland crossing?	
2.3	DWS permits obtained for the removal of protected species of plants?	
2.4	DWS permits obtained for abstraction of construction water from rivers, dams or boreholes	
2.5	DMR permits obtained for the use of borrow pits, spoil areas, sand mines and materials used for batching and ready mix	
2.6	Environmental file on site, transmittal note signed off	
2.7	Have audits and incident records being made available to the authorities?	

3	Environmental awareness Training	
3.1	Employees have general understanding of EMP/ROD trough toolbox talks (ENV 3.5) and additional environmental awareness is on display on notice boards	
3.2	Records of training kept up to date	
3.3	Specific training on awareness	
3.4	Specific training on legal liability	

4	Site Establishment and Demarcation	
4.1	Site configuration/ method statement corresponds with approved plan	
4.2	Site fencing and demarcation of facilities remain intact	
4.3	Sewage and effluent infrastructure intact	
4.4	Work areas properly and safe guarded/ barricading	
4.5	Designated smoking areas with designated bin – no paper	

5	Access and Traffic	
5.1	Construction routes clearly defined and contractor is making use of existing roads as far as possible	
5.2	Entry and exit points strategically placed to ensure as little impact on traffic as possible	
5.3	Entry and exit points controlled by security	
5.4	All construction vehicles must be clearly marked (yellow light)	
5.5	Access points clearly indicated by signage	
5.6	40km/h speed limit on access roads	
5.7	Nobody allowed driving in the veld, causing damage to vegetation or creating new access road within written permission	
5.8	All deliveries and construction traffic within construction hours	
5.9	All visitors to report on site office, no unauthorised persons on construction site	

6	Borrow Pit and Spoil Areas	
6.1	Topsoil, Overburden and Primary STOCKPILE CLEARLY DEMARCATED ON SITE DRAWING, FENCED OFF AND SECURE	
6.2	Designated spoil areas separate and identified by means of site drawing	
6.3	Top soil berms not exceed 2m in height and area indicated onsite drawing	
6.4	Topsoil not compacted or driven over	
6.5	Dust suppression in place	
6.6	Documentation as per checklist ENV 4.1.5 is on file	

6.7	All stockpiled material to be minimum of (2) meters from any excavation	

7	Waste Management	
7.1	No littering on site allowed	
7.2	Enough bins available to manage waste	
7.3	Waste and scrap areas clearly demarcated	
7.4	Waste and scrap areas have adequate capacity	
7.5	Is waste being separated and recycled (paper, glass, plastic, e-waste)	
7.6	Separated waste stored in separated labelled containers	
7.7	Waste equipment (bins, skips) in good condition	
7.8	Loose waste material covered or tied down (skip nets)	
7.9	Is construction waste recycled and re-used (steel, wood, building rubble)	
7.10	Excess concrete to be dumped in designated area and truck to wash out at area.	
7.11	Waste regularly disposed of	
7.12	Documentation as per checklist is on file	
7.13	Training on waste recycling and disposal through toolbox talks	

8	Hydrocarbons	
8.1	Oils, fuels and greases inventory list and bund capacity on display	
8.2	Relevant MSDS available in MDSDS register	
8.3	Property stored in impermeable bunded areas with roof	
8.4	Bunded area able to contain 110% in case of spill	
8.5	Proper decanting equipment used to prevent spills (hand pump, funnels)	
8.6	Spill response material/ equipment on site with adequate absorbents. No natural material used to absorb spills	
8.7	Spills recorded on Incident report reported and properly cleaned up	
8.8	Spilled material stored properly and disposed of at approved disposal site	
8.9	Documentation as per Checklist is on file	
8.10	Spill response plan available and display	
8.11	Training on spill management – toolbox talk	
8.12	Regular cleaning of oil separators and disposal of old oil, oil filters and rags	

9	Hazardous/Flammable Materials	
9.1	Hazardous substance store separate with bunded area, roof, good ventilation, fire prevention and lockable	

9.2	Hazardous material inventory list and bund capacity on display	
9.3	Relevant MSDA available in MSDS register	
9.4	Bunded area able to contain 110 % in case of spill or client requirements	
9.5	Proper decanting equipment used to prevent spills (hand pump, funnels)	
9.6	Spill response material/ equipment on site with adequate absorbents. No natural material used to absorb spills	
9.7	Spills recorded on Incident report reported and properly cleaned up	
9.8	Spilled material stored properly and disposed of at approved disposal site	
9.9	Documentation as per Checklist is on file	
9.10	Spill response plan available and display	
9.11	Training on spill management – toolbox talk	
9.12	Cement stored in lockable container / covered area to prevent dust contamination	
9.13	Oxygen and acetylene must be kept separate from other substances and they must be kept separate from each other	
9.14	Empty cylinder separate from full ones	
9.15	Cylinders always upright and chained	

10	Diesel Storage	
10.1	Capacity fuel within legal limits in bunded area as per SANS specs	
10.2	Permits on site for over 48 000 litters	
10.3	Refuelling conducted by appointed staff in dedicated area	
10.4	Soil protected from contamination by concrete slab or drip tray	
10.5	Spill response equipment on hand with adequate absorbents, no material used to absorb spills	
10.6	Spill recorded on incident report reported and properly cleaned up	
10.7	Fire fighting equipment at hand	

11	Vehicle and Plant Refuelling	
11.1	Conducted by appointed staff in dedicated areas	
11.2	Soil protected from contamination by slab, drip tray or absorbent mattress	
11.3	Spill response equipment on hand with adequate absorbents, no material used to absorb spills	
11.4	Spill recorded on incident report reported and properly cleaned up	
11.5	Fire fighting equipment at hand	

12	Vehicle and Plant maintenance	

12.1	Conducted by trained staff in dedicated workshop areas	
12.2	Soil protected from contamination by concrete slab or drip trays	
12.3	Spill response equipment on hand with adequate absorbents, , no material used to absorb spills	
12.4	Spill recorded on incident report reported and properly cleaned up	
12.5	Fire fighting equipment at hand	
12.6	Service truck crew to be specifically trained for maintenance on site	

13	Wash Bays	
13.1	Impermeable sloping concrete basis	
13.2	Bunded walls in tact and efficient	
13.3	Proper constructed silt trap	
13.4	3 Stage oil separator, installed correctly	
13.5	Unblocked drains to oil separator	
13.6	Water use monitored – no wastage	
13.7	All wheeled plant to be washed in the constructed wash bay	
13.8	All tracked plant to be washed on site with cold water after excess oil and grease have been removed	
13.9	Proper temporary storm water control	

14	Batching Plants/ mixing Areas	
14.1	Impermeable concrete basis or surface	
14.2	Filters / socks on silo's in working order	
14.3	Bunded curing compound area	
14.4	Sedimentation / containment ponds for wash water	
14.5	Designated spoil area for excess concrete	
14.6	Bunded was bay for mixer trucks	
14.7	Wash water is disposed into sewer or removed by an approved contractor and correctly disposed	
14.8	Unblocked drains	
14.9	Drip trays for parked plant	
14.10	Proper temporary storm water control	

15	Sewage and Sanitation	
15.1	Enough toilets provided (1 per 30 persons)	
15.2	Safety and conveniently accessible (within 100m)	

15.3	Ablutions not placed within 50 m of river, stream, storm water channel or wetland	
15.4	Ablution facilities in tact and working – not leaking	
15.5	Separate screened / facilities toilets for men and woman	
15.6	Seats and doors intact and working	
15.6	Toilet paper available	
15.7	Chemical toilets are placed level and secured to prevent spillage	
15.9	Facilities are regularly emptied and cleaned	
15.10	Documentation per checklist is on file	
15.11	Facilities to be used at all times – no urination and / or deification n site	

16	Supply of water for Human Consumption	
16.1	Proof of water is fit for human consumption	
16.2	Water taken from approved points	
16.3	Water supply to working area on site	
16.4	Water use monitored – no wastage	
16.5	Contamination of water points reported, recorded, addressed	

17	Eating Areas	
17.1	Demarcated undercover seating	
17.2	Dust free well illuminated and clean	
17.3	Refuse bins available with secured lids	
17.4	No accumulation of food scraps outside bins	
17.5	No open fires for food preparation	

18	Change Areas	
18.1	Sufficient space provided for bags and clothes	
18.2	Sufficient lighting and ventilation	
18.3	Sufficient privacy from outside	
18.4	Area clean and disinfected	
18.5	All sub-contractors have space available for a change area	
18.6	Refuse bins available with secured lids	

19	Shower/ Washing Areas	
19.1	Sufficient privacy from outside	

19.2	Area kept clean and hygienic	
19.3	Hot and cold water available	
19.4	Containment tank for shower / wash water	
19.5	Regular emptied and cleaning of tank	
19.6	Prevention of stagnant water	

20	Hostels / Accommodation	
20.1	Rooms clean and hygienic	
20.2	Leak free and in state of good repair	
20.3	Refuse bins available with secured lids	
20.4	Fire only in designated and constructed areas	

21	Storm Water Management	
21.1	Temporary drainage infrastructure in place and should include sediment filtration measures	
21.2	Sedimentation traps / filtration infrastructure is being maintained	
21.3	Erosion gullies are repaired after rainfall events	
21.4	Stagnant water to be cleared out where possible	
21.5	Storm water contamination to be reported and recorded	
21.6	Municipal storm water inlets to be protected by biddim	

22	Ground water management	
22.1	Protective infrastructure in place – bunded areas, drip trays, mixing trays, sedimentation ponds	
22.2	Protective equipment (drip trays) available on site	
22.3	No geyser drip trays are in sue on site	
22.4	Spills recorded on Incident report reported and properly cleaned up	
22.5	Contaminated spoil disposed of correctly and documentation on file	

23	Air Pollution Management	
23.1	Dust suppression equipment working & available	
23.2	Vehicle speed adjusted to condition of unpaved roads	
23.3	Water for dust suppression taken from approved points	
23.4	No excessive smoke from vehicles and plant	
23.5	No excessive cement dust from filling silo's	
23.6	No excessive dust from moving aggregate to batch plant and loads to be covered to minimise	

	dust	
23.7	Dust reported, recorded and corrective action taken	

24	Noise Management	
24.1	Noise generating equipment list available on site and is on display	
24.2	Noise generating equipment in good working order	
24.3	After hours work has been authorised	
24.4	Noise levels recorded to ensure compliance	
24.5	Noise incidents reported, recorded and addressed	

25	Fire Prevention	
25.1	Fire prevention equipment in good order – serviced	
25.2	Fire breaks in place where needed	
25.3	No fire allowed on site unless in a designated area and permission has been obtained	
25.4	Fire emergency contact numbers available on site	
25.5	Fire incidents reported, documented and addressed	
25.6	Fire awareness training through toolbox talks	

26	Sensitive Areas	
26.1	Sensitive areas demarcated and fenced off	
26.2	Relevant signage posted	
26.3	Environmental awareness training on sensitive areas through induction and toolbox talks	
26.4	Encroachment on sensitive areas reported	

27	Fauna	
27.1	Identification of protected species	
27.2	Identification of potential dangerous species	
27.3	Rules communicated to employees through induction and toolbox talks	
27.4	Incident reported and recoded	
27.5	Follow – up training to be given after incident	
27.6	Disciplinary procedures in place for offenders	

28	Flora	
28.1	Identification of protected species	

28.2	construction footprint kept to the minimal regarding clearing of vegetation	
28.3	Rules communicated to employees through induction and toolbox talks	
28.4	Incident reported and recoded	
28.5	Follow – up training to be given after incident	
28.6	Disciplinary procedures in place for offenders	
28.7	Identification and eradication of invader species	

29	Protection of heritage Resources	
29.1	Before work commences in specific area, final check for heritage resources to be done	
29.2	Procedure to report finds in place	
29.3	Work stopped and area secured	
29.4	Relevant parties informed of finds	

30	Rehabilitation	
30.1	Rehabilitation method statements in place	
30.2	Rehabilitation conducted according to MS and EMP	
30.3	Rehabilitated area monitored as construction continue	
30.4	Encroachment and access on rehabilitated area restricted	

Compliance summary	
Score:	Count:
4 (excellent)	
3 (Good)	
2 (Average)	
1 (Poor)	
0 (Very Poor)	

EMS COMPLIANCE	
LEGAL COMPLIANCE	

RESULTS SUMMARY	
1. Environmental Management System	
2. Legal Documentation	
3. Environmental Awareness	

4. Site Establishment and Demarcation	
5. Access and Traffic	
6. Borrow Pits and Spoil Areas	
7. Waste Management	
8. Hydrocarbons	
9. Hazardous / Flammable Materials	
10. Diesel Storage	
11. Vehicle and Plant Refuelling	
12. Vehicle and Plant Maintenance	
13. Wash bays	
14. Batch Plant / Mixing Areas	
15. Sewage and Sanitation	
16. Supply of Water for Human Consumption	
17. Eating Areas	
18. Change Areas	
19. Shower / Washing Area	
20. Hostels / Accommodation	
21. Storm Water Management	
22. Ground Water Management	
23. Air Pollution Management	
24. Noise Management	
25. Fire Prevention	
26. Sensitive Areas	
27. Fauna	
28. Flora	
29. Protection of heritage Resources	
30. Rehabilitation	

APPENDIX C
Record of Decision

APPENDIX D

Layout as approved in Record of Decision

APPENDIX E Handling giant bullfrogs found on site

APPENDIX 2

HANDLING GIANT BULLFROG FOUND ON SITE

If a frog is found on site these steps should be followed. Note: Giant Bullfrogs are listed as a protected species under the Threatened or Protected Species regulations (TOPS) of NEMBA and a TOPS permit will be required from GDARD should capture, relocation, etc. of Giant Bullfrogs be contemplated.

Step 1

Spray water gently around the frog until the ground is soft and the frog can be lifted out of the soil without difficulty. A bullfrog unearthed while hibernating during the dry season will generally be encased in a keratin cocoon. Take care to avoid damaging the cocoon. Do not spray water directly onto the frog as this will damage the protective cocoon.

Step 2

Use both hands to lift the frog. Hold it firmly but gently around the middle. Allow the limbs to hang free and avoid letting the frog push itself free with its hind legs. Even if the frog has been injured it should be rescued, as injured frogs are capable of healing. Take care not to let the frog bite while being handled.

Step 3

Place the frog in a bucket with a secure-fitting lid that has been punctured with breathing holes. Place a damp (not wet) cloth on the bottom of the bucket. Keep the bucket in a cool, shady place at all times. Do not put more than one frog in a bucket at the same time. Place it in the care of an informed biologist until the start of the summer rains when it can be released. Transfer the frog in the bucket to the selected new location on the same day it was captured.

Step 4

Release the frog at the designated new site within the wetland buffer zone. Before releasing it, dig up and loosen a patch of soil about 2 m^2 and about 300 mm deep. Place the frog gently into a depression in the loose sand and partially cover it with soil. Do not disturb the frog after release - let it conceal itself in its own time.