8. ENVIRONMENTAL IMPACT DESCRIPTION AND EVALUATION

8.1 Introduction

This section of the report describes and evaluates the potential impact of the proposed development on the environment. The impact of the development has to be assessed in terms of the following development phases:

- **Planning and design phase**
- **Construction phase**
- **Operational phase**
- **Decommissioning phase**

8.2 Evaluation of impacts

The evaluation of impacts is conducted in terms of the following criteria:

- **Nature of impact**

- **Extent of impact**

Site	Effect limited to the site and its immediate surroundings
Local	Effect limited to within 3-5 km of the site
Regional	Effect will have an impact on a regional scale

- **Duration of impact**

Short	Effect lasts for a period 0 to 5 years
Medium	Effect continues for a period between 5 and 10 years
Long	Effect will cease after the operational life of the activity either because of natural process or by human intervention
Permanent	Where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient

- **Probability**

Improbable	Less than 33% chance of occurrence
Probable	Between 33 and 66% chance of occurrence
Highly probable	Greater than 66% chance of occurrence
Definite	Will occur regardless of any prevention measures

- **Significance of impact**

Low	Where the impact will have a relatively small effect on the environment and will not have an influence on the decision
Medium	Where the impact can have an influence on the environment and the decision and should be mitigated
High	Where the impact definitely has an impact on the environment and the decision regardless of any possible mitigation

- **Status**

Positive	Impact will be beneficial to the environment
Negative	Impact will not be beneficial to the environment
Neutral	Positive and negative impact

It must be noted that many of the potential negative consequences can be mitigated successfully. It is however, necessary to make a thorough assessment of all possible impacts in order to ensure that environmental considerations are taken into account, in a balanced way, as far as possible, supporting the aim of creating a healthy and pleasant environment.

8.3 Planning and design phase

The planning and design phase involved office work and site surveys with regards to the development of the proposed Klarinet Phase 2 residential area and the Environmental Impact Assessment. It also involves obtaining the necessary authorisations for the said development.

Apart from the existing activities on site, no actual construction work took place regarding the proposed Klarinet Phase 2 residential area.

8.4 Construction phase

8.4.1 Klarinet residential area development

The impact assessment will be based on Alternative Layout no. 5 (Figure 7.4), the preferred layout plan, as indicated in Section 7.2.5.

Alternative layout 5 (Figure 7.4) does not provide for the 'in-situ' upgrading of the MNS informal settlement present on site. In this option, residents would temporarily be relocated to a 'transit camp' (Portion 156 of the farm Blesboklaagte 296 JS (Klarinet x9); Figure 2.1) until the development has taken place.

As indicated in Figure 7.4, the Old Blesboklaagte Colliery/Wescoal area was zoned as Public Open Space and forms part of the 35 stands zoned for this purpose.

According to the information provided, the proposed development will be divided into the following three (3) phases as indicated in Figure 8.1:

- Phase 1 (Klarinet x10; Figure 8.1) will consist of the construction of buildings on Residential 1 stands, the Residential 3 stand, the Business stand and the Institutional stand (church). A Municipal stand is also provided for the proposed new Intake Substation next to the Eskom servitude. Services (water, sewer, electricity) will be installed and the proposed internal roads will be constructed.
- Phase 2 (Klarinet x11; Figure 8.1) will consist of the construction of buildings on Residential 1 stands, the Residential 3 stand, the Business stand (proposed mall), the 5 Institutional stands (2 churches, 1 community facility, secondary school and clinic) and the 3 Government stands (taxi rank, police station, substation). The existing substation will be located on the one Government stand. Public Open Spaces will be provided as indicated in Figure 8.1. Services (water, sewer, electricity) will be installed and the proposed internal roads will be constructed. The development of the Residential 1 stands located in the southern part of Klarinet x11 adjacent to the Zaaihoek Road (Figure 8.1) will also form part of Phase 2.
- Phase 3 (Klarinet x 12; Figure 8.1) will consist of the construction of buildings on Residential 1 stands, the two Residential 3 stands, the two Business stands and the five Institutional stands (3 churches, 2

crèche's). Public Open Space will be provided as indicated in Figure 8.1. Services (water, sewer, electricity) will be installed and the proposed internal road will be constructed.

Figure 8.1 provides a schematic representation of the above-mentioned phasing of the development. It should be noted that in order to commence with Phase 2 (i.e. Klarinet x11; Figure 8.1) the residents of the MNS settlement must be moved to the transit camp located at Klarinet x9.

For each of the above-mentioned phases, the construction phase will involve the pegging of the stands, installation of services and construction of the buildings and associated infrastructure. This will involve the following:

- Clearing of vegetation;
- Levelling of the site;
- Excavation of trenches;
- Installation and connection of services;
- Construction of access road and parking area;
- Laying of the required foundations;
- Building of the outer structure;
- Installation of the required internal fittings;
- Rehabilitation of the disturbed areas (i.e. landscaping).

8.4.2 Northern sewer line (Figure 5.1)

This will be constructed as part of Phase 1 (i.e. Klarinet x10; Figure 8.1) and will involve:

- Clearing of vegetation along the sewer line route;
- Excavation of trench;
- Installation and connection of services;
- Backfilling of trench;
- Rehabilitation of the disturbed areas (i.e. landscaping).

8.4.3 Northern storm water trench (Figure 5.1)

This will be constructed as part of Phase 3 (i.e. Klarinet x 12; Figure 8.1) and will involve:

- Clearing of vegetation along the storm water trench route;
- Excavation of trench;
- Installation and connection of services;
- Backfilling of trench;
- Rehabilitation of the disturbed areas (i.e. landscaping).

8.4.4 Eastern storm water trench (Figure 5.1)

This will be constructed as part of Phase 3 (i.e. Klarinet x12; Figure 8.1) and will involve:

- Clearing of vegetation along the storm water trench route;
- Excavation of trench;
- Installation and connection of services;
- Backfilling of trench;
- Rehabilitation of the disturbed areas (i.e. landscaping).

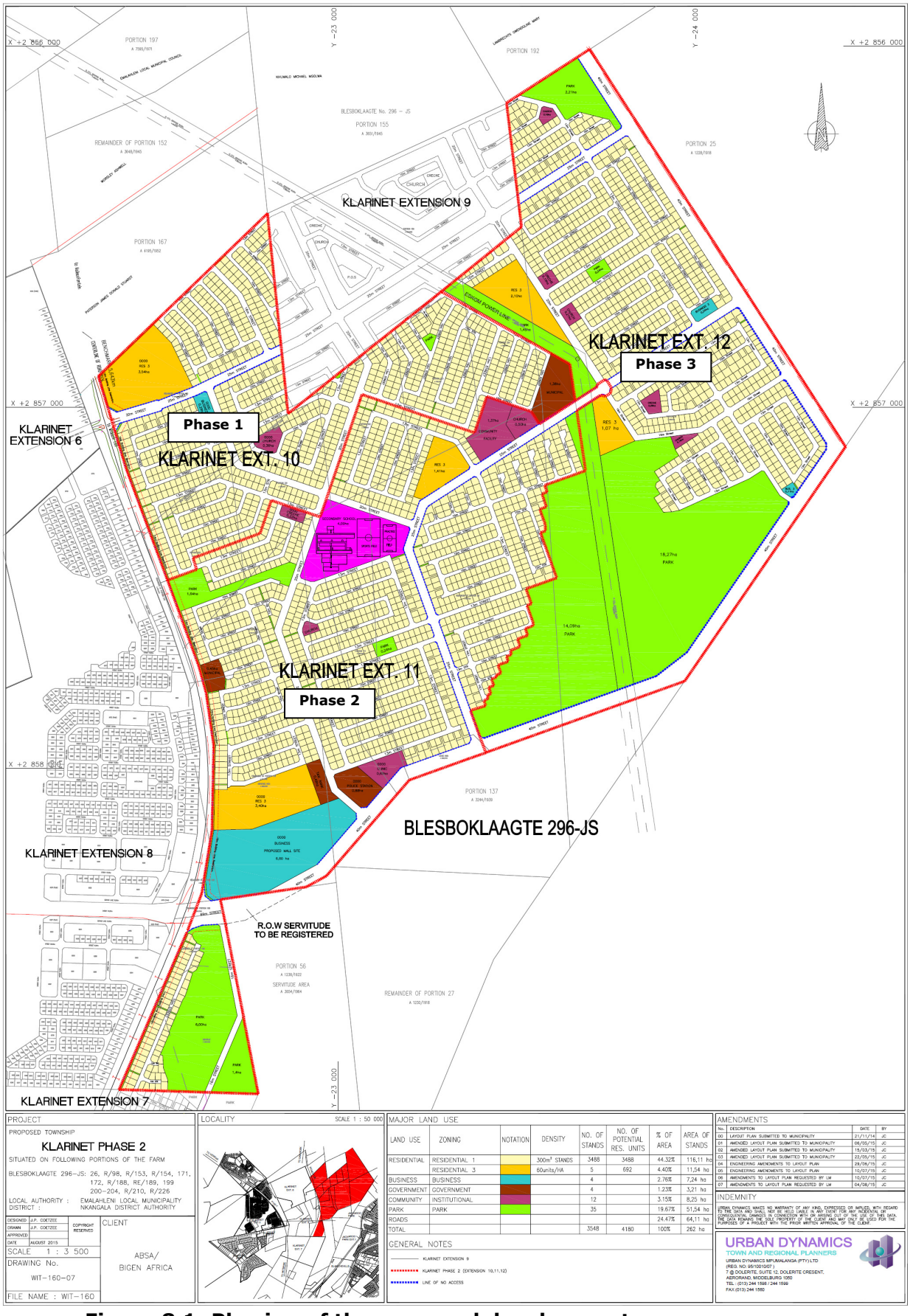

Figure 8.1: Phasing of the proposed development

8.4.5 Eastern sewer line (Figure 5.1)

This will be constructed as part of Phase 3 (i.e. Klarinet x12; Figure 8.1) and will involve:

- Clearing of vegetation along the sewer line route;
- Excavation of trench;
- Installation and connection of services;
- Backfilling of trench;
- Rehabilitation of the disturbed areas (i.e. landscaping).

8.4.6 Bulk water line and reservoir

This will be constructed as part of Phase 1 (i.e. Klarinet x10; Figure 8.1) and will involve:

- Clearing of vegetation along the bulk water line route and at the proposed reservoir site;
- Excavation of trench along route and foundations at reservoir site;
- Construction of reservoir;
- Installation and connection of services;
- Backfilling of trench;
- Rehabilitation of the disturbed areas (i.e. landscaping).

8.4.7 OR Tambo extension

This will be constructed as part of the overall Klarinet Phase 2 project and will involve:

- Clearing of vegetation along the proposed route;
- Construction of the road and bridge over the railway line;
- Rehabilitation of the disturbed areas (i.e. landscaping).

Section 8.7 provides further details with regards to potential impacts identified as a result of the above-mentioned activities.

8.5 Operational phase

The operational phase would involve the utilisation of the various buildings and facilities associated with the Klarinet Phase 2 residential area. This would also include the utilization of the bulk water pipeline, reservoir, and OR Tambo extension.

Section 8.7 provides further details with regards to potential impacts identified as a result of the utilisation of the facilities provided.

8.6 Decommissioning phase

If required, this phase would involve the decommissioning of the buildings and facilities constructed as part of this project (see Section 8.4).

The decommissioning phase will not be discussed in detail. It is recommended that at the time of decommissioning, a specific Environmental Management Plan (EMP) be compiled which specifically addresses this phase. This EMP would have to address issues such as the removal of building rubble and the rehabilitation of the site. Soil conservation measures would also have to be implemented.

8.7 Identification of potential impacts

The following tables provide an indication of the environmental features that will be impacted (directly and indirectly) during the construction, operational and decommissioning phases of the proposed project as indicated above.

8.7.1 Klarinet residential area development

The impact assessment will be based on Alternative Layout no. 5 (Figure 7.4), the preferred layout plan, as indicated in Section 7.2.5.

Alternative layout 5 (Figure 7.4) does not provide for the 'in-situ' upgrading of the MNS informal settlement present on site. In this option, residents would temporarily be relocated to a 'transit camp' (Portion 156 of the farm Blesboklaagte 296 JS (Klarinet x9); Figure 2.1) until the development has taken place.

As indicated above, the Klarinet residential area will be developed in three (3) phases (Figure 8.1) namely:

PHASE	TOTAL AREA (ha)	TO BE DEVELOPED (ha)	PUBLIC OPEN SPACE (ha)
1	51.87	51.33	0.54
2	105.58	95.36	10.22
3	104.55	63.76	40.79
TOTAL (ha)	**262.00**	**210.45**	**51.55**
PERCENTAGE (%)	**100%**	**80%**	**20%**

As indicated in Figure 7.4, the Old Blesboklaagte Colliery/Wescoal area was zoned as Public Open Space and forms part of the 35 stands zoned for this purpose.

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																	
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
TOPOGRAPHY	**Phase 1: Klarinet x10 (Installation of services, roads and buildings):** The topography of the Phase 1 area has had minimal impact in terms of previous agricultural activities, gravel roads, etc. The development of the Phase 1 area would directly impact on the topography of an area of 51.87 ha that is affected by a catchment divide resulting in runoff flowing either to the Blesbokspruit or the tributaries of the Olifants River. The construction activities (e.g. removal of vegetation, sloping of the site, paving of the area, construction of buildings, surfacing of roads/parking area, etc.) would result in changed runoff patterns and an increased risk of soil erosion if mitigation measures are not implemented. The risk of soil erosion is however, low due to the relatively flat nature of the site.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	**Phases 1 to 3 (Utilization of services, roads and buildings):** During the operational phase, the direct impact on topography (262 ha) will continue in terms of slope, changed runoff patterns and an increased risk of soil erosion. Due to the flat nature of the site the risk of soil erosion is low.	SITE	LONG	PROBABLE	LOW NEGATIVE	LOW NEGATIVE	**Phases 1 to 3 (Decommissioning of the services, roads and buildings):** During decommissioning, the buildings and associated infrastructure will be demolished and removed from site. The site will be top soiled and shaped to conform to the original slope of the area, which will have a positive impact on the runoff from the site.	SITE	LONG	DEFINITE	LOW POSITIVE	LOW POSITIVE
	Phase 2: Klarinet x11 (Installation of services, roads and buildings): The topography of the Phase 2 area has already been impacted by the development of the MNS informal settlement and various gravel roads in the central portion of the site. The development of the Phase 2 area would directly impact on the topography of an area of 95.36 ha that is affected by a catchment divide resulting in runoff flowing either to the Blesbokspruit or the tributaries of the Olifants River. The existing structures on site has already impacted on the said runoff patterns. The construction activities (e.g. removal of vegetation, sloping of the site, paving of the area, construction of buildings, surfacing of roads/parking area, etc.) would result in changed runoff patterns and an increased risk of soil erosion if mitigation measures are not implemented. The risk is however, low due to the relatively flat nature of the site.	SITE	LONG	DEFINITE	LOW NEGATIVE	LOW NEGATIVE												

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																	
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
TOPOGRAPHY	**Phase 2: Klarinet x11 (Installation of services, roads and buildings):** Underground mining activities (opencast/underground) have impacted on the topography of the southern part of the Phase 2 resulting in subsidence being present and making the said area unsafe for development purposes. Coal washing activities have also impacted on the topography of this area. As per Layout Plan 5 (Figure 7.4), residential stands are only indicated adjacent to the Zaaihoek Road with the rest of the site zoned Public Open Space. The development of the said residential stands could be located on an area where subsidence is present and could thus be impacted. A road is indicated to extend through the Public Open Space area that could be impacted by subsidence. The main access road and the proposed mall stand could also be located on an area where subsidence is presented and this could impact on the proposed buildings and infrastructure. The exact extent of the undermining will have to be determined and permission for the development of this portion of the site would have to be obtained from the Department of Mineral Resources.	SITE	LONG	DEFINITE	HIGH NEGATIVE	MEDIUM NEGATIVE	**Phases 1 to 3 (Utilization of services, roads and buildings):** During the operational phase, the direct impact on topography (262 ha) will continue in terms of slope, changed runoff patterns and an increased risk of soil erosion. Due to the flat nature of the site the risk of soil erosion is low.	SITE	LONG	PROBABLE	LOW NEGATIVE	LOW NEGATIVE	**Phases 1 to 3 (Decommissioning of the services, roads and buildings):** During decommissioning, the buildings and associated infrastructure will be demolished and removed from site. The site will be top soiled and shaped to conform to the original slope of the area, which will have a positive impact on the runoff from the site.	SITE	LONG	DEFINITE	LOW POSITIVE	LOW POSITIVE
	Phase 3: Klarinet x12 (Installation of services, roads and buildings): The development of the residential area of Phase 3 would directly impact on the topography of an area of 63.76 ha. The construction activities (e.g. removal of vegetation, sloping of the site, paving of the area, construction of buildings, surfacing of roads/parking area, etc.) would result in changed runoff patterns and an increased risk of soil erosion if mitigation measures are not implemented. The risk is however, low due to the relatively flat nature of the site.	SITE	LONG	DEFINITE	LOW NEGATIVE	LOW NEGATIVE												
	Phase 3: Klarinet x12 (Installation of services, roads and buildings): The topography of the Phase 3 area (Figure 8.1) has already been impacted in terms of the presence of the defunct opencast mining operation that was not rehabilitated. As per Layout Plan no. 5 (Figure 7.4), the defunct opencast mining area is zoned Public Open Space and will therefore not be developed. The said area will be properly rehabilitated for use by the community.	SITE	LONG	DEFINITE	MEDIUM POSITIVE	MEDIUM POSITIVE												
	Phase 3: Klarinet x12 (Installation of services, roads and buildings): As per Layout Plan no.5, the main access road extending from the Zaaihoek Road through Phase 2 and then through Phase 3 could be located over previously mined areas which could be subject to subsidence. The extent of the subsidence/undermining will have to be determined and if necessary, permission from the Department of Mineral Resources obtained in order to develop the said infrastructure according to their requirements.	SITE	LONG	DEFINITE	HIGH NEGATIVE	MEDIUM NEGATIVE												

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																		
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
SOIL	**<u>Phase 1: Klarinet x 10 (Installation of services, roads and buildings):</u>** In general, construction activities within the Phase 1 area would impact on approximately 45 ha of Moderate potential arable land. Only a small section along the northern boundary is indicated as High potential arable land. A small area (5.86 ha) of shallow rocky soils with a low agricultural potential would also be impacted by construction activities. The excavation activities, the stockpiling of topsoil, subsoil, overburden and rocks would directly impact on the soil of the area (52 ha) in terms of soil structure, nutritional and chemical values when the vegetation and topsoil are removed, the site sloped and the infrastructure constructed. It could also result in changed runoff patterns and an increased risk of soil erosion if mitigation measures are not implemented. The risk is however low due to the relatively flat nature of the site.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	**<u>Phase 1: Klarinet x10 (Utilization of services, roads and buildings):</u>** Direct impact on soil will continue (52 ha) i.t.o. soil structure, nutritional and chemical values and soil compaction as a result of the presence of the infrastructure.	SITE	LONG	DEFINITE	LOW NEGATIVE	LOW NEGATIVE	**<u>Phase 1 (Decommissioning of the services, roads and buildings):</u>** In general, the decommissioning and rehabilitation of the site would have a positive impact on the soil of the site since the infrastructure will be removed and the site will be topsoiled and shaped to conform to the original slope of the area. The revegation of the site would lead to a decrease in surface water runoff velocity and a smaller risk of erosion and sedimentation of the nearby surface water environments.	SITE	LONG	HIGHLY PROBABLE	LOW POSITIVE	LOW POSITIVE
	Phase 1 construction activities could lead to soil pollution if: • the construction vehicles are not maintained/repaired resulting in oil leaks and fuel spills; • waste management measures are not implemented, • proper ablution and sanitation facilities are not provided for the site workers to use on site.	SITE	LONG	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	Soil pollution could take place if: • sewage is allowed to overflow; • waste management measures are not implemented for the overall development.	SITE	LONG	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	Soil pollution may occur if: • The vehicles are not maintained/ repaired resulting in oil leaks and fuel spills; • Waste management measures are not implemented; • Proper sanitation and ablution facilities are not provided for use by site workers. The removal of any polluted soil and proper rehabilitation of the site after decommissioning will however, have a positive impact on the soil.	SITE	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE
	<u>Phase 2: Klarinet x11 (Installation of services, roads and buildings):</u> The development of the Phase 2 area would directly impact on the soil of an area of approximately 95.36 ha. However, the soil of the said area has already been impacted in terms of the MNS informal settlement (presence of structures, roads, pit latrines, dumping of waste) and previous mining activities (undermined areas, opencast areas, coal washing activities). The construction activities (e.g. removal of vegetation, sloping of the site, paving of the area, construction of buildings, surfacing of roads, etc.) as well as the stockpiling of topsoil, subsoil, overburden and rocks would directly impact on the soil of the area in terms of soil structure, nutritional and chemical values when the vegetation and topsoil are removed, the site sloped and the infrastructure constructed. It could also result in changed runoff patterns and an increased risk of soil erosion if mitigation measures are not implemented. The risk is however, low due to the relatively flat nature of the site.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	**<u>Phase 2: Klarinet x11 (Utilization of services, roads and buildings):</u>** Direct impact on soil will continue (95.36ha) i.t.o. soil structure, nutritional and chemical values and soil compaction as a result of the presence of the infrastructure.	SITE	LONG	DEFINITE	LOW NEGATIVE	LOW NEGATIVE	**<u>Phase 2 (Decommissioning of the services, roads and buildings):</u>** In general, the decommissioning and rehabilitation of the site would have a positive impact on the soil of the site since the infrastructure will be removed and the site will be topsoiled and shaped to conform to the original slope of the area. The revegation of the site would lead to a decrease in surface water runoff velocity and a smaller risk of erosion and sedimentation of the nearby surface water environments.	SITE	LONG	HIGHLY PROBABLE	LOW POSITIVE	LOW POSITIVE

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																	
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
SOIL	Soil pollution has already taken place at various points within the Phase 2 area as a result of the MNS informal settlement (pit latrines, dumping of waste) and previous mining activities. Phase 2 construction activities could lead to further soil pollution if: • Polluted soil from the coal washing area is not removed and disposed of properly; • the construction vehicles are not maintained/repaired resulting in oil leaks and fuel spills; • waste management measures are not implemented, • proper ablution and sanitation facilities are not provided for the site workers to use on site.	SITE	LONG	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	Soil pollution could take place if: • sewage is allowed to overflow; • waste management measures are not implemented for the overall development.	SITE	LONG	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	Soil pollution may occur if: • The vehicles are not maintained/ repaired resulting in oil leaks and fuel spills; • Waste management measures are not implemented; • Proper sanitation and ablution facilities are not provided for use by site workers. The removal of any polluted soil and proper rehabilitation of the site after decommissioning will however, have a positive impact on the soil.	SITE	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE
	Phase 3: Klarinet x12 (Installation of services, roads and buildings): The soil of the Phase 3 area has already been impacted in terms of the previous mining activities (underground and opencast), the coal washing activities and roads. This has resulted in the soil being polluted. The development of the Phase 3 area would directly impact on the soil of an area of 63.76 ha. The construction activities (e.g. removal of vegetation, sloping of the site, paving of the area, construction of buildings, surfacing of roads, etc.) as well as the stockpiling of topsoil, subsoil, overburden and rocks would directly impact on the soil of the area in terms of soil structure, nutritional and chemical values when the vegetation and topsoil are removed, the site sloped and the infrastructure constructed. It could also result in changed runoff patterns and an increased risk of soil erosion if mitigation measures are not implemented. The risk is however, low due to the relatively flat nature of the site.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	**Phase 3: Klarinet x12 (Utilization of services, roads and buildings):** Direct impact on soil will continue (63.76 ha) i.t.o. soil structure, nutritional and chemical values and soil compaction as a result of the presence of the infrastructure.	SITE	LONG	DEFINITE	LOW NEGATIVE	LOW NEGATIVE	**Phase 3: Klarinet x12 (Decommissioning of the services, roads and buildings):** In general, the decommissioning and rehabilitation of the site would have a positive impact on the soil of the site since the infrastructure will be removed and the site will be topsoiled and shaped to conform to the original slope of the area. The revegation of the site would lead to a decrease in surface water runoff velocity and a smaller risk of erosion and sedimentation of the nearby surface water environments.	SITE	LONG	HIGHLY PROBABLE	LOW POSITIVE	MEDIUM POSITIVE
	The soil of the site has already been polluted as a result of the previous mining and coal washing activities. Phase 3 construction activities could lead to further soil pollution if: • Polluted soil from the coal washing area is not removed and disposed of properly; • Dumped waste is not collected and disposed of properly; • Construction vehicles are not maintained/repaired resulting in oil leaks and fuel spills; • Waste management measures are not implemented, • Proper ablution and sanitation facilities are not provided for the site workers to use on site.	SITE	LONG	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	Soil pollution could take place if: • sewage is allowed to e overflowing; • waste management measures are not implemented for the overall development.	SITE	LONG	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	Soil pollution may occur if: • The vehicles are not maintained/ repaired resulting in oil leaks and fuel spills; • Waste management measures are not implemented; • Proper sanitation and ablution facilities are not provided for use by site workers. The removal of any polluted soil and proper rehabilitation of the site after decommissioning will however, have a positive impact on the soil.	SITE	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																	
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
GEOLOGY	**Phase 1: Klarinet x 10 (Installation of services, roads and buildings):** The geology associated with the Phase 1 area is sandstone, conglomerate and quartzite of the Wilgerivier Formation, Waterberg Group (Celliers and Hansmeyer, 2014). The said area has not been subjected to any mining activities (i.e. underground and/or opencast). The direct impact on geology will depend on the depth of the excavations required for the construction of the buildings and installation of infrastructure over an area of 51.33 ha. The possible impact on the underlying geology cannot be mitigated.	SITE	PERMANENT	HIGHLY PROBABLE	LOW NEGATIVE	LOW NEGATIVE	**Phase 1: Klarinet x 10 (Utilization of services, roads and buildings):** NONE. No further construction would take place.						**Phase 1: Klarinet x10 (Decommissioning of the services, roads and buildings):** NONE. No further impact since no further construction would take place.					
	Phase 2: Klarinet x11 (Installation of services, roads and buildings): The geology associated with the Phase 2 area is older tillite of the Dwyka Formation and sandstone, shale, gritstone and coal measures (if present) of the Vryheid Formation (Celliers and Hansmeyer, 2014). The majority of the said area has not been subjected to any mining activities (i.e. underground and/or opencast). The direct impact on geology will depend on the depth of the excavations required for the construction of the buildings and installation of infrastructure over an area of 95.36 ha. The possible impact on the underlying geology cannot be mitigated.	SITE	LONG	HIGHLY PROBABLE	LOW NEGATIVE	LOW NEGATIVE	**Phase 2: Klarinet x11 (Utilization of services, roads and buildings):** The structures will continue to be impacted upon through the operational phase if the geotechnical mitigation measures were not implemented and if stands/infrastructure is developed on previously mined ground without the permission of the Department of Mineral Resources.	SITE	LONG	HIGHLY PROBABLE	HIGH NEGATIVE	MEDIUM NEGATIVE	**Phase 2: Klarinet x12 (Decommissioning of the services, roads and buildings):** NONE. No further impact since no further construction would take place.					
	A portion of the proposed mall stand, police station, clinic and possibly some residential stands will be located on previously mined/rehabilitated land. Permission for these stands and infrastructure on rehabilitated ground would have to be obtained from the Department of Mineral Resources. Mitigation measures would be required.	SITE	LONG	DEFINITE	HIGH NEGATIVE	MEDIUM NEGATIVE											
	Residential stands located on the southern portion of the site (Erf 5017) would be located on an area that has been mined by opencast method. Permission for these stands and infrastructure on previously mined ground would have to be obtained from the Department of Mineral Resources. Mitigation measures would be required.	SITE	LONG	DEFINITE	HIGH NEGATIVE	MEDIUM NEGATIVE											
	The main access road to the site, part of the proposed mall site and potentially some residential stands and a road located in the southern portion of the site adjacent to the Zaaihoek Road would be located on undermined areas. Permission for these stands and infrastructure on undermined ground would have to be obtained from the Department of Mineral Resources. Mitigation measures would be required.	SITE	LONG	DEFINITE	HIGH NEGATIVE	MEDIUM NEGATIVE											
	Some of the residential stands and roads are located within the previously mined Blesboklaagte Colliery area. Permission for these stands and infrastructure on previously mined ground would have to be obtained from the Department of Mineral Resources. Mitigation measures would be required.	SITE	LONG	HIGHLY PROBABLE	HIGH NEGATIVE	MEDIUM NEGATIVE											
	The main access road to the site extending along the southern boundary of Phase 2 were subjected to previous mining activity. Permission for this road on previously mined ground would have to be obtained from the Department of Mineral Resources. Mitigation measures would be required.	SITE	LONG	HIGHLY PROBABLE	HIGH NEGATIVE	MEDIUM NEGATIVE											

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																		
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
GEOLOGY	**Phase 3: Klarinet x12 (Installation of services, roads and buildings):** The geology associated with the Phase 3 area is sandstone, conglomerate and quartzite of the Wilgerivier Formation, Waterberg Group, older tillite of the Dwyka Formation and sandstone, shale, gritstone and coal measures (if present) of the Vryheid Formation (Celliers and Hansmeyer, 2014). The majority of the said area has not been subjected to any mining activities (i.e. underground and/or opencast). The direct impact on geology will depend on the depth of the excavations required for the construction of the buildings and installation of infrastructure over an area of 63.76 ha. The possible impact on the underlying geology cannot be mitigated.	SITE	LONG	HIGHLY PROBABLE	LOW NEGATIVE	LOW NEGATIVE	**Phase 3: Klarinet x12 (Utilization of services, roads and buildings):** The structures will continue to be impacted upon through the operational phase if the geotechnical mitigation measures were not implemented and if stands/infrastructure is developed on previously mined ground without the permission of the Department of Mineral Resources.	SITE	LONG	PROBABLE	HIGJH NEGATIVE	LOW NEGATIVE	**Phase 3: Klarinet x12 (Decommissioning of the services, roads and buildings):** NONE. No further impact since no further construction would take place.					
	Some of the residential stands and roads are located on previously mined ground. Permission for these stands and infrastructure on previously mined ground would have to be obtained from the Department of Mineral Resources. Mitigation measures would be required.	SITE	LONG	HIGHLY PROBABLE	HIGH NEGATIVE	MEDIUM NEGATIVE											
	The main access road to the site extending along the southern boundary of Phase 3 would extend over previous mined ground. Permission for this road over previously mined ground would have to be obtained from the Department of Mineral Resources. Mitigation measures would be required.	SITE	LONG	DEFINITE	HIGH NEGATIVE	MEDIUM NEGATIVE											

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																	
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
GEOTECHNICAL ASPECTS	**Phase 1: Klarinet x 10 (Installation of services, roads and buildings):** According to Celliers and Hansmeyer (2014), the Phase 1 area is developable from a geotechnical perspective as Geotechnical Zones 1A; 1B; 1C and 2A (Figure 5.2d) are present. A small area of Geotechnical Zone 2B (Figure 5.2d), comprising of shallow bedrock, was also identified which could impact on construction and require boulder removal and/or blasting. The structures could be impacted if the geotechnical mitigation measures (normal founding methods, modified normal construction methods, comprehensive modified construction methods) with regards to the above-mentioned are not implemented as part of the construction phase.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	**Phase 1: Klarinet x 10 (Utilization of services, roads and buildings):** The structures will continue to be impacted upon through the operational phase if the geotechnical mitigation measures were not implemented.	SITE	LONG	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	**Phase 1: Klarinet x10 (Decommissioning of the services, roads and buildings):** NONE. No further impact since no further construction would take place.					
	Phase 2: Klarinet x11 (Installation of services, roads and buildings): According to Celliers and Hansmeyer (2014), the Phase 2 area is developable from a geotechnical perspective as Geotechnical Zones 1B; 1C; 2A and 4A (Figure 5.2d) are present on the majority of the site. However, the structures could be impacted if the geotechnical mitigation measures (normal founding methods, modified normal construction methods, comprehensive modified construction methods) with regards to the above-mentioned are not implemented as part of the construction phase.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	**Phase 2: Klarinet x11 (Utilization of services, roads and buildings):** The structures will continue to be impacted upon through the operational phase if the geotechnical mitigation measures were not implemented and if stands/infrastructure is developed on previously mined ground without the permission of the Department of Mineral Resources.	SITE	LONG	HIGHLY PROBABLE	HIGH NEGATIVE	MEDIUM NEGATIVE	**Phase 2: Klarinet x11 (Decommissioning of the services, roads and buildings):** NONE. No further impact since no further construction would take place.					
	A portion of the proposed mall stand, police station, clinic and possibly some residential stands will be located on Geotechnical Zone 3A: Rehabilitated area. Celliers and Hansmeyer (2014) indicted that the said area is developable after remediation is done. However, if previously mined then permission for these stands and infrastructure on rehabilitated ground would have to be obtained from the Department of Mineral Resources. Mitigation measures would be required.	SITE	LONG	DEFINITE	HIGH NEGATIVE	MEDIUM NEGATIVE											
	Residential stands located on the southern portion of the site (Erf 5017) would be located on Geotechnical Zone 3B – this area is filled with a mixture of unknown origin. However, this area has in actual fact been mined by opencast method and should therefore also be zoned as Geotechnical Zone 4C. Celliers and Hansmeyer (2014) indicated no development for this geotechnical zone and that the area should be rehabilitated. Permission for these stands and infrastructure on previously mined ground would have to be obtained from the Department of Mineral Resources. Mitigation measures would be required.	SITE	LONG	DEFINITE	HIGH NEGATIVE	MEDIUM NEGATIVE											
	According to Celliers and Hansmeyer (2014), no development is to take place within the Geotechnical Zone 4B: Undermined areas. The main access road to the site, part of the proposed mall site and potentially some residential stands and a road located in the southern portion of the site adjacent to the Zaaihoek Road would be located on undermined areas. Permission for these stands and infrastructure on undermined ground would have to be obtained from the Department of Mineral Resources. Mitigation measures would be required.	SITE	LONG	DEFINITE	HIGH NEGATIVE	MEDIUM NEGATIVE											

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																			
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
GEOTECHNICAL ASPECTS	Some of the residential stands and roads are located within Geotechnical Zone 4C: Opencast area currently backfilled with coal fines from wash plant. Celliers and Hansmeyer (2014) indicated no development for this area and that the area should be rehabilitated. Permission for these stands and infrastructure on previously mined ground would have to be obtained from the Department of Mineral Resources. Mitigation measures would be required.	SITE	LONG	HIGHLY PROBABLE	HIGH NEGATIVE	MEDIUM NEGATIVE	**Phase 2: Klarinet x11 (Utilization of services, roads and buildings):** The structures will continue to be impacted upon through the operational phase if the geotechnical mitigation measures were not implemented and if stands/infrastructure is developed on previously mined ground without the permission of the Department of Mineral Resources.	SITE	LONG	HIGHLY PROBABLE	HIGH NEGATIVE	MEDIUM NEGATIVE	**Phase 2: Klarinet x12 (Decommissioning of the services, roads and buildings):** NONE. No further impact since no further construction would take place.					
	The main access road to the site extending along the southern boundary of Phase 2 would extend over Geotechnical Zones 4B, 3B and 4C – all zones that were subjected to previous mining activity and in actual fact not suitable for development purposes. Permission for this road on previously mined ground would have to be obtained from the Department of Mineral Resources. Mitigation measures would be required.	SITE	LONG	HIGHLY PROBABLE	HIGH NEGATIVE	MEDIUM NEGATIVE											
	Phase 3: Klarinet x12 (Installation of services, roads and buildings): According to Celliers and Hansmeyer (2014), the majority of the Phase 3 area is developable from a geotechnical perspective as Geotechnical Zones 1A; 1C and 2A (Figure 5.2d) are present. A small area of Geotechnical Zone 2B (Figure 5.2d), comprising of shallow bedrock, was also identified which could impact on construction and require boulder removal and/or blasting. However, the structures could be impacted if the geotechnical mitigation measures (normal founding methods, modified normal construction methods, comprehensive modified construction methods) with regards to the above-mentioned are not implemented as part of the construction phase.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	**Phase 3: Klarinet x12 (Utilization of services, roads and buildings):** The structures will continue to be impacted upon through the operational phase if the geotechnical mitigation measures were not implemented and if stands/infrastructure is developed on previously mined ground without the permission of the Department of Mineral Resources.	SITE	LONG	PROBABLE	HIGH NEGATIVE	LOW NEGATIVE	**Phase 3: Klarinet x12 (Decommissioning of the services, roads and buildings):** NONE. No further impact since no further construction would take place.					
	Some of the residential stands and roads are located within Geotechnical Zone 4C: Opencast area currently backfilled with coal fines from wash plant. Celliers and Hansmeyer (2014) indicated no development for this area and that the area should be rehabilitated. Permission for these stands and infrastructure on previously mined ground would have to be obtained from the Department of Mineral Resources. Mitigation measures would be required.	SITE	LONG	HIGHLY PROBABLE	HIGH NEGATIVE	MEDIUM NEGATIVE											
	The main access road to the site extending along the southern boundary of Phase 3 would extend over Geotechnical Zones 3A and 4C – all zones that were subjected to previous mining activity and in actual fact not suitable for development purposes. Permission for this road on previously mined ground would have to be obtained from the Department of Mineral Resources. Mitigation measures would be required.	SITE	LONG	DEFINITE	HIGH NEGATIVE	MEDIUM NEGATIVE											

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																		
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
NATURAL VEGETATION/ ANIMAL LIFE	**<u>Phase 1: Klarinet x 10 (Installation of services, roads and buildings):</u>** The development of the Phase 1 area would impact on natural vegetation covering an area of 51.33 ha. The following vegetation units identified (Figure 5.12) by McCleland and de Castro (2015) will be impacted by the development of the Phase 1 area: • **Degraded Secondary Grassland** (Figure 5.12) with a **Moderate Biodiversity Conservation Value or Ecological Sensitivity** (Figure 5.13). • **Untransformed Grassland** (Figure 5.12): A small area of this vegetation unit is present (Figure 5.12) which has a **High Biodiversity Conservation Value or Ecological Sensitivity** (Figure 5.13). • **Untransformed Rocky Grassland** (Figure 5.12): This vegetation unit is associated with the rocky outcrop identified on site and has a **High Biodiversity Conservation Value or Ecological Sensitivity** (Figure 5.13). **This is the only area within the overall Klarinet Phase 2 area where this vegetation unit was identified.**	SITE	PERMANENT	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	**<u>Phases 1 to 3 (Utilization of services, roads and buildings):</u>** No further direct impact on vegetation or animal life since no further construction activities will take place. Alien plants could be introduced into areas disturbed by construction, which are not rehabilitated. Alien plants could also spread from the existing Transformed vegetation units included as part of the Public Open Space system if an alien eradication programme is not implemented. If alien plants are utilized in the gardens, they could spread and impact on the surrounding vegetation.	SITE	LONG	HIGHLY PROBABLE	LOW NEGATIVE	LOW NEGATIVE	**<u>Phases 1 to 3 (Decommissioning of the services, roads and buildings):</u>** During the decommissioning phase, building rubble and any polluted soil will be removed from the site and disposed of accordingly. The said area will then be rehabilitated in order to establish a vegetation cover and prevent soil erosion. This could result in the creation of artificial habitats for animal life within the rehabilitated area. Alien plants could be introduced into areas rehabilitated as part of the decommissioning phase. This could impact on the vegetation of the surrounding area.	SITE LOCAL	LONG LONG	PROBABLE PROBABLE	MEDIUM POSITIVE MEDIUM NEGATIVE	MEDIUM POSITIE LOW NEGATIVE
	The removal of this vegetation type could impact on potential habitat of 8 mammal species (Southern African hedgehog, black-backed jackal, yellow mongoose, Cape porcupine, serval, steenbok, grey duiker), 32 bird species and 2 reptile species (Cape skink, speckled rock skink) that could be associated with the Grassland Assemblage habitat as identified by McCleland and de Castro (2015). The Serval and Southern African Hedgehog are both classified as Near Threatened and are likely to be present in very low numbers in untransformed habitat, highlighting the value of conserving the remaining untransformed grassland in the study area.	SITE	PERMANENT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE											
	<u>Phase 2: Klarinet x 11 (Installation of services, roads and buildings):</u> The development of the Phase 2 area will impact on natural vegetation covering an area of 105.58 ha. As indicated by McCleland and de Castro (2015), this vegetation is highly disturbed and consists mainly of the following **Transformed vegetation units (Figure 5.12) having a Low to Very Low Biodiversity Value or Ecological Sensitivity** (Figure 5.13): • Transformed – Residential (Figure 5.12): due to the MNS informal settlement; • Transformed – mines and quarries (Figure 5.12): due to activities associated with defunct mines and quarries; • Transformed – alien plantations (Figure 5.12). This could also have a positive impact as alien vegetation would be removed reducing the potential impact on the remaining surrounding vegetation.	SITE	PERMANENT	DEFINITE	LOW NEGATIVE	LOW NEUTRAL											

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																		
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
NATURAL VEGETATION/ ANIMAL LIFE	As indicated in Figure 5.12, the development of Phase 2 will however, also impact on: • **Degraded Secondary Grassland** (Figure 5.12) that has a Moderate Biodiversity Conservation Value or Ecological Sensitivity (Figure 5.13). • **Untransformed Grassland** (Figure 5.12): A small area of this vegetation unit is present (Figure 5.12) which has a **High Biodiversity Conservation Value or Ecological Sensitivity** (Figure 5.13). Only two areas of this vegetation unit were identified within the overall Klarinet Phase 2 area (Figure 5.12) totalling an area of 12.2 ha or 4% of the overall area. The removal of this vegetation type could impact on potential habitat of 8 mammal species (Southern African hedgehog, black-backed jackal, yellow mongoose, Cape porcupine, serval, steenbok, grey duiker), 32 bird species and 2 reptile species (Cape skink, speckled rock skink) that could be associated with the Grassland Assemblage habitat as identified by McCleland and de Castro (2015).	SITE	PERMANENT	DEFINITE	HIGH NEGATIVE	MEDIUM NEGATIVE	**<u>Phases 1 to 3 (Utilization of services, roads and buildings):</u>** No further direct impact on vegetation or animal life since no further construction activities will take place. Alien plants could be introduced into areas disturbed by construction, which are not rehabilitated. Alien plants could also spread from the existing Transformed vegetation units included as part of the Public Open Space system if an alien eradication programme is not implemented. If alien plants are utilized in the gardens, they could spread and impact on the surrounding vegetation.	SITE	LONG	HIGHLY PROBABLE	LOW NEGATIVE	LOW NEGATIVE	**<u>Phases 1 to 3 (Decommissioning of the services, roads and buildings):</u>** During the decommissioning phase, building rubble and any polluted soil will be removed from the site and disposed of accordingly. The said area will then be rehabilitated in order to establish a vegetation cover and prevent soil erosion. This could result in the creation of artificial habitats for animal life within the rehabilitated area. Alien plants could be introduced into areas rehabilitated as part of the decommissioning phase. This could impact on the vegetation of the surrounding area.	SITE LOCAL	LONG LONG	PROBABLE PROBABLE	MEDIUM POSITIVE MEDIUM NEGATIVE	MEDIUM POSITIE LOW NEGATIVE
	<u>Phase 3: Klarinet x 12 (Installation of services, roads and buildings):</u> The development of the Phase 3 area will impact on natural vegetation covering an area of 63.76 ha. As indicated in Figure 5.12, the development of Phase 3 (including the attenuation dam in the north eastern corner) will mainly impact on: • **Degraded Secondary Grassland** (Figure 5.12) that has a Moderate Biodiversity Conservation Value or Ecological Sensitivity (Figure 5.13). The removal of this vegetation type could impact on potential habitat of 8 mammal species (Southern African hedgehog, black-backed jackal, yellow mongoose, Cape porcupine, serval, steenbok, grey duiker), 32 bird species and 2 reptile species (Cape skink, speckled rock skink) that could be associated with the Grassland Assemblage habitat as identified by McCleland and de Castro (2015).	SITE	PERMANENT	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE												
	The following **Transformed vegetation units (Figure 5.12)** having a Low to Very Low Biodiversity Value or Ecological Sensitivity (Figure 5.13) occur within the area where mining activities have taken place: • Transformed – mines and quarries (Figure 5.12): due to activities associated with defunct mines and quarries; • Transformed – alien plantations (Figure 5.12). Most of this area would be included as part of the Public Open Space system (are = 40.79 ha). However, some of this vegetation would be impacted in terms of the proposed residential stands. This could also have a positive impact as alien vegetation would be removed reducing the potential impact on the remaining surrounding vegetation.	SITE	PERMANENT	HIGHLY PROBABLE	LOW NEGATIVE	LOW NEUTRAL												
	The development of the attenuation dam in the eastern corner of the site could impact on a small, highly degraded wetland that is as a result of acid mine drainage from the unrehabilitated Blesboklaagte Colliery. Very little wetland vegetation is present due to the presence of the acidic water. This has also resulted in the wetland having lost much of it functional integrity. This wetland therefore has a Low Biodiversity Value or Ecological Sensitivity.	SITE	PERMANENT	HIGHLY PROBABLE	LOW NEGATIVE	LOW NEGATIVE												

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																	
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
SURFACE WATER/ SENSITIVE LANDSCAPES	**Phase 1: Klarinet x10 (Installation of services, roads and buildings):** Construction activities associated with Phase 1 will not impact directly on any surface water environments (e.g. rivers, streams, dams, etc.) located on site. Construction activities will also not directly impact on wetlands identified within 500m of the development site (Grobler, 2015) as indicated in Figure 5.16. No sensitive landscapes will thus be impacted as a result of the construction activities.						**Phase 1 (Utilization of services, roads and buildings):** NONE.						**Phases 1 to 3 (Decommissioning of the services, roads and buildings):** During the decommissioning phase, building rubble and any polluted soil will be removed from the site and disposed of accordingly. The said area will then be rehabilitated in order to establish a vegetation cover and prevent soil erosion. This would result in clean runoff from the site. It would thus have a positive impact on surface water.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM POSITIVE	MEDIUM POSITIVE
	As indicated in Figure 5.14, a catchment divide extends through the Phase 1 area resulting in half the site draining towards the west in the direction of the Blesbokspruit (quaternary catchment B11K) and half the site draining towards the east/northeast towards the tributaries of the Olifants River (quaternary catchment B11J). The presence of this catchment divide will impact in terms of the installation of the services and the provision of stormwater management measures. The removal of vegetation, earthworks and stockpiling activities would have minimal impact on the runoff patterns of the area due to the flat nature of the site. It is not anticipated that this would impact (in terms of water quantity and quality) on Seepage Wetland no. 5 (Figure 5.16) located downstream from the site.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	During the operational phase, increased yields could be expected due to increased paved areas and buildings, which would facilitate increased run-off quantities due to quicker run-off and less infiltration into the soil. This could lead to soil erosion if proper storm water control measures are not implemented. The catchment divide extending through the Phase 1 site could continue to impact on surface water runoff, the storm water management system and other services if this was not taken into account during the construction phase.	SITE	LONG	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE						
	Phase 2: Klarinet x11 (Installation of services, roads and buildings): Construction activities associated with Phase 2 will not impact directly on any surface water environments (e.g. rivers, streams, dams, etc.) located on site. Construction activities will also not directly impact on wetlands identified within 500m of the development site (Grobler, 2015) as indicated in Figure 5.16. No sensitive landscapes will thus be impacted as a result of the construction activities.						**Phase 2 (Utilization of services, roads and buildings):** NONE.											

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																		
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
SURFACE WATER/ SENSITIVE LANDSCAPES	As indicated in Figure 5.14, a catchment divide extends through the Phase 2 area resulting in most of the site draining towards the west in the direction of the Blesbokspruit (quaternary catchment B11K) and the rest of the site draining towards the east/northeast towards the tributaries of the Olifants River (quaternary catchment B11J). The presence of this catchment divide will impact in terms of the installation of the services and the provision of stormwater management measures. The removal of vegetation, earthworks and stockpiling activities would have minimal impact on the runoff patterns of the area due to the flat nature of the site. It is not anticipated that this would impact (in terms of water quantity and quality) on Seepage Wetland no. 5 (Figure 5.16) located downstream from the site.						During the operational phase, increased yields could be expected due to increased paved areas and buildings, which would facilitate increased run-off quantities due to quicker run-off and less infiltration into the soil. This could lead to soil erosion if proper storm water control measures are not implemented. The catchment divide extending through the Phase 2 site could continue to impact on surface water runoff, the storm water management system and other services if this was not taken into account during the construction phase. It is possible that the storm water from the Phase 2 area could ultimately impact on Seep Wetland no. 5 (Figure 5.16) located within Klarinet x 8 if mitigation measures are not implemented. This Seep Wetland could also be indirectly impacted in terms of surface water runoff if the sewage system does not have sufficient capacity, is not maintained on a regular basis and proper waste management measures (littering takes place) are not implemented on site.	SITE	LONG	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	**<u>Phases 1 to 3 (Decommissioning of the services, roads and buildings):</u>** During the decommissioning phase, building rubble and any polluted soil will be removed from the site and disposed of accordingly. The said area will then be rehabilitated in order to establish a vegetation cover and prevent soil erosion. This would result in clean runoff from the site. It would thus have a positive impact on surface water.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM POSITIVE	MEDIUM POSITIVE
	<u>Phase 3: Klarinet x12 (Installation of services, roads and buildings):</u> In general, construction activities associated with Phase 3 will not impact directly on any surface water environments (e.g. rivers, streams, dams, etc.) located on site or on wetlands identified within 500m of the development site (Grobler, 2015). No sensitive landscapes will thus be impacted as a result of the construction activities.						**Phase 3 (Utilization of services, roads and buildings):** No direct impact on any streams, rivers, wetlands, etc. during the operational phase. During the operational phase, increased yields could be expected due to increased paved areas and buildings, which would facilitate increased run-off quantities due to quicker run-off and less infiltration into the soil. This could lead to soil erosion if proper storm water control measures are not implemented. This could ultimately impact on Seep Wetland no. 1 and no. 2 (Figure 5.16) as a result of the utilisation of the proposed attenuation pond in the northeastern portion of the site and the northern storm water pipe (see Section 8.7.? for further details regarding this potential impact). These Seep Wetlands could also be indirectly impacted in terms of surface water runoff if the sewage system does not have sufficient capacity, is not maintained on a regular basis and proper waste management measures (littering takes place) are not implemented on site. Mitigation measures will have to be implemented.	LOCAL	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE						

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																	
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
SURFACE WATER/ SENSITIVE LANDSCAPES	The construction of the attenuation dam in the eastern portion of Phase 3 will impact on Seep Wetland no. 3 (Figure 5.16) identified by Grobler (2015). This wetland has a PES category of Seriously to Critically modified (i.e. category E/F) and an EIS category of Low. This wetland is as a result of acid mine drainage from the unrehabilitated Blesboklaagte Colliery area.	SITE	LONG	HIGHLY PROBABLE	LOW NEGTAIVE	LOW NEGATIVE	The acid mine drainage could continue to impact on the attenuation dam and the eastern storm water pipe (see Section 8.7.?) if mitigation measures (e.g. rehabilitation of the Blesboklaagte Colliery) are not implemented. Surface water runoff from this area could ultimately impact on Channelled valley bottom no. 4 (Figure 5.16) that extends through Jackaroo Park and eventually flows into the Olifants River. These systems could also be indirectly impacted in terms of surface water runoff if the sewage system does not have sufficient capacity, is not maintained on a regular basis and proper waste management measures (littering takes place) are not implemented on site. Mitigation measures will have to be implemented.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	**<u>Phases 1 to 3 (Decommissioning of the services, roads and buildings):</u>** During the decommissioning phase, building rubble and any polluted soil will be removed from the site and disposed of accordingly. The said area will then be rehabilitated in order to establish a vegetation cover and prevent soil erosion. This would result in clean runoff from the site. It would thus have a positive impact on surface water.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM POSITIVE	MEDIUM POSITIVE
GROUNDWATER	**<u>Phase 1: Klarinet x10 ; Phase 2: Klarinet x11; Phase 3: Klarinet x12 (Installation of services, roads and buildings):</u>** Grobler (2015) concluded that no wetland area or other watercourse type (as defined by the National Water Act (Act 36 of 1998) overlaps with the development site. Construction activities associated with Phase 1, Phase 2 and Phase 3 will therefore not impact on a perched water table associated with wetlands.						**<u>Phases 1 to 3 (Utilization of services, roads and buildings):</u>** NONE.						**<u>Phases 1 to 3 (Decommissioning of the services, roads and buildings):</u>** NONE.					
	<u>Phases 1 to 3 (Installation of services, roads and buildings):</u> The geotechnical study identified a fluctuating seasonal water table and sub-surface seepage associated with Geotechnical Zone 3A (Figure 5.2d) that covers an area of 139.18 ha and affects portions of the Phase 1, the Phase 2 and the Phase 3 areas. The structures could be impacted if the geotechnical mitigation measures (modified normal construction methods, provision of subsurface drainage) with regards to the above-mentioned are not implemented as part of the construction phase.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	**<u>Phases 1 to 3 (Utilization of services, roads and buildings):</u>** The structures will continue to be impacted upon through the operational phase if the geotechnical mitigation measures were not implemented.	SITE	LONG	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	**<u>Phases 1 to 3 (Decommissioning of the services, roads and buildings):</u>** During the decommissioning phase, building rubble and any polluted soil will be removed from the site and disposed of accordingly. The said area will then be rehabilitated in order to establish a vegetation cover and prevent soil erosion. This would result in clean runoff from the site. It would thus have a positive impact on groundwater.	SITE	LONG	PROBABLE	LOW POSITIVE	LOW POSITIVE
	<u>Phases 1 to 3 (Installation of services, roads and buildings):</u> The geotechnical study identified a fluctuating seasonal water table and sub-surface seepage associated with Geotechnical Zone 3A (Figure 5.2d) that covers an area of 139.18 ha and affects portions of the Phase 1, Phase 2 and Phase 3 areas. Groundwater (quality) could be indirectly impacted upon if proper sanitation facilities and waste management (especially hazardous waste e.g. oil, diesel, etc.) measures are not put in place and maintained during the construction phase.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	**<u>Phases 1 to 3 (Utilization of services, roads and buildings):</u>** Groundwater (quality) could be indirectly impacted upon if proper sanitation facilities and waste management measures are not put in place and maintained during the operational phase. This would impact on the residents in the surrounding area using the said water for drinking and agricultural purposes.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE						
	<u>Phase 3: Klarinet x12 (Installation of services, roads and buildings):</u> The construction of the attenuation dam in the eastern portion of Phase 3 will impact on an area where acid mine drainage emanates from the unrehabilitated Blesboklaagte Colliery area.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	The acid mine drainage could continue to impact on the attenuation dam and the eastern storm water pipe (see Section 8.7.5) if mitigation measures (e.g. rehabilitation of the Blesboklaagte Colliery) are not implemented.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE						

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																			
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
GROUNDWATER	**Phase 1: Klarinet x10 (Installation of services, roads and buildings):** Phase 1 construction activities will impact on borehole BH1, a vandalised borehole, present on site. This borehole is no longer used.	SITE	LONG	DEFINITE	LOW NEGATIVE	LOW NEGATIVE	During the operational phase, the development will obtain water from the eMalahleni Local Municipality. Groundwater will not be abstracted for use by the overall development.						**Phases 1 to 3 (Decommissioning of the services, roads and buildings):** During the decommissioning phase, building rubble and any polluted soil will be removed from the site and disposed of accordingly. The said area will then be rehabilitated in order to establish a vegetation cover and prevent soil erosion. This would result in clean runoff from the site. It would thus have a positive impact on groundwater.	SITE	LONG	PROBABLE	LOW POSITIVE	LOW POSITIVE
	Phase 2: Klarinet x11 (Installation of services, roads and buildings): Phase 2 construction activities could impact on borehole BH2 (a monitoring borehole) if the said borehole is not clearly demarcated and protected from construction activities. This would impact on the water monitoring system of the Wescoal site. This borehole is not used for water supply purposes.	SITE	LONG	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE												
	Phase 3: Klarinet x12 (Installation of services, roads and buildings): Phase 3 construction activities would not impact on any known boreholes.																
SITES OF ARCHAEOLOGICAL /CULTURAL INTEREST	**Phase 1: Klarinet x 10 (Installation of services, roads and buildings):** The development of the Phase 1 area will impact on the following sites of cultural heritage significance as identified by Van Vollenhoven and Collins (2015): • Site 2 – possible grave (Figure 5.18): High cultural significance. Field rating of Local Grade IIIB. • Site 3 – graveyard consisting of 3 graves (Figure 5.18): High cultural significance. Field rating of Local Grade IIIB. • Site 4 – single grave (Figure 5.18): High cultural significance. Field rating of Local Grade IIIB. Mitigation measures as recommended by Van Vollenhoven and Collins (2015) must be implemented before commencement of construction activities.	SITE	SHORT	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	**Phases 1 to 3: Utilization of services, roads and buildings:** NONE i.e. if all graves are relocated to other graveyards off site. However, if all graves are moved to the Site 5 graveyard and included as part of the Public Open Space system impact could take place if the graveyard is not fenced and access controlled.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	**Phases 1 to 3: Decommissioning of the services, roads and buildings:** If graves were moved to the Site 5 graveyard and included as part of the Public Open Space system impact as a result of decommissioning activities could take place if the graveyard is not fenced and access controlled.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE
	Phase 2: Klarinet x 11 (Installation of services, roads and buildings): The development of the Phase 2 area could impact on the following site of cultural heritage significance as identified by Van Vollenhoven and Collins (2015): • Site 5 – grave yard (Figure 5.18) consisting of at least 84 graves: High cultural significance. Field rating of Local Grade IIIB. Mitigation measures as recommended by Van Vollenhoven and Collins (2015) must be implemented before commencement of construction activities.	SITE	SHORT	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE												
	Phase 3: Klarinet x 12 (Installation of services, roads and buildings): The development of the Phase 3 area could impact on the following site of cultural heritage significance as identified by Van Vollenhoven and Collins (2015): • Site 1 – building foundations of an old building made from stone (Figure 5.18): Low cultural significance. Field rating of General Protection C (IV C). In other words, the said site may be destructed if needed. However, since it is likely to be older than 60 years, a permit from the Mpumalanga Provincial Heritage Agency is required before commencement of construction activities.	SITE	SHORT	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE												

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																			
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
SITES OF PALAEONTOLOGICAL INTEREST	**<u>Phase 1: Klarinet x10 (Installation of services, roads and buildings):</u>** The construction activities would impact on sandstone, conglomerate and quartzite of the Wilgerivier Formation, Waterberg Group (Celliers and Hansmeyer, 2014). Fourie (2015) indicated no objection to the proposed development of the said site. The impact on fossil heritage would be Low.	SITE	SHORT	IMPROBABLE	LOW NEGATIVE	LOW NEGATIVE	**<u>Phases 1 to 3: Utilization of services, roads and buildings:</u>** NONE. No further construction will take place.						**<u>Phases 1 to 3: Decommissioning of the services, roads and buildings:</u>** NONE. No further construction will take place.					
	<u>Phase 2: Klarinet x11 (Installation of services, roads and buildings):</u> The construction activities would mainly impact on older tillite of the Dwyka Formation and sandstone, shale, gritstone and coal measures (if present) of the Vryheid Formation (Celliers and Hansmeyer, 2014). According to Fourie (2015), the impact of the development on fossil heritage is Low for the Dwyka Formation. However, the impact of development on fossil heritage is Very High for the Vryheid Formation. The thin inlier of shale is problematic. Fourie (2015) however indicated no objection to the proposed development of the site. Mitigation measures must be implemented.	SITE	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE												
	<u>Phase 3 (Installation of services, roads and buildings):</u> The construction activities would impact on sandstone, conglomerate and quartzite of the Wilgerivier Formation, Waterberg Group, older tillite of the Dwyka Formation and sandstone, shale, gritstone and coal measures (if present) of the Vryheid Formation (Celliers and Hansmeyer, 2014). According to Fourie (2015), the impact of the development on fossil heritage is Low for the Wilgerivier and Dwyka Formations. However, the impact of development on fossil heritage is Very High for the Vryheid Formation. The thin inlier of shale is problematic. Fourie (2015) however indicated no objection to the proposed development of the site. Mitigation measures must be implemented.	SITE	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE												

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																	
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
AIR QUALITY	**Phase 1: Klarinet x10 (Installation of services, roads and buildings):** The development of the Phase 1 area would result in the clearance of vegetation from a 51.33 ha area resulting in dust generation and vehicle emissions (use of heavy machinery). The construction activities within the Phase 1 area could impact on the site workers, adjacent land owners (JDS Paterson, MM Khumalo), the MNS and Klarinet x6 and x8 residents as well as the users of the Zaaihoek Road in terms of dust generation and vehicle emissions (use of heavy machinery). The extent of the impact would depend on the time of year, wind direction and velocity and portion of the property being developed. Mitigation measures would have to be implemented.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	**Phases 1 to 3: Utilization of services, roads and buildings:** During the operational phase, no direct impact on the air quality is anticipated due to the development being supplied with electricity. In addition, no noxious (scheduled processes) industries would be permitted on the business stands. The air quality of the site and surroundings could be impacted in terms of odours if: • The sewer system does not have capacity and is not maintained; • Proper waste management measures are not implemented.	SITE	LONG	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	**Decommissioning of the services, roads and buildings:** Dust generation and vehicle emissions due to decommissioning activities and use of heavy machinery could impact on site workers and the residents of the surrounding area. The extent of the impact would depend on the time of year, wind direction, wind velocity and portion of property. Once rehabilitated, the impact on air quality is expected to be positive in terms of reduced dust generation as the area will then be revegetated.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE
	Phase 2: Klarinet x11 (Installation of services, roads and buildings): The development of the Phase 2 area would result in the clearance of vegetation from a 95.36 ha area resulting in dust generation and vehicle emissions (use of heavy machinery). These construction activities could impact on the site workers, adjacent land owners/users, new residents of Klarinet x10 and Klarinet x9 (relocated MNS residents), the Klarinet x6 and x8 residents and users of the Zaaihoek Road. The extent of the impact would depend on the time of year, wind direction and velocity and portion of the property being developed. Mitigation measures would have to be implemented.	SITE	SHORT	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE								SITE	LONG	DEFINITE	MEDIUM POSITIVE	MEDIUM POSITIVE
	Phase 3: Klarinet x12 (Installation of services, roads and buildings): The development of the Phase 3 area would result in the clearance of vegetation from a 63.76 ha area resulting in dust generation. This would result in dust generation and vehicle emissions (use of heavy machinery) which could impact on the site workers, adjacent land owners along the Jackaroo gravel road (Ms de Jonckheer, Mr Lambrechts), users of the Jackaroo gravel road and new residents of Klarinet x9, x10 and x11. The extent of the impact would depend on the time of year, wind direction and velocity and portion of the property being developed. Mitigation measures would have to be implemented.	SITE	SHORT	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE												
	Phase 3: Klarinet x12 (Installation of services, roads and buildings): The rehabilitation of the WesCoal area and washing plant sites would have a positive impact on surrounding landowners and users in terms of the removal of coal dust from the area.	SITE	LONG	HIGHLY PROBABLE	LOW POSITIVE	LOW POSITIVE											
VISUAL	**Phase 1: Klarinet x10 (Installation of services, roads and buildings):** The construction activities would be visible from the adjacent properties (JDS Paterson, MM Khumalo), the nearby MNS informal settlement, Klarinet x6 and the Zaaihoek road. The construction site would have to be kept neat and tidy at all times.	SITE	SHORT	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	**Phases 1 to 3: Utilization of services, roads and buildings:** The residential area will be highly visible from the Zaaihoek Road and the Jackaroo gravel road. In addition, it would be visible from the properties located adjacent to the northern and eastern boundaries (JDS Paterson, MM Khumalo, Mr Lambrechts, Ms de Jonckheer). It would thus be very important to keep	SITE	LONG	DEFINITE	MEDIUM NEUTRAL	LOW NEUTRAL	**Decommissioning of the services, roads and buildings:** During the decommissioning phase, building rubble and any polluted soil will be removed from the site and disposed of accordingly. The said area will then be topsoiled, shaped to conform to the original slope of the area and revegetated with indigenous grass	SITE	LONG	PROBABLE	LOW POSITIVE	MEDIUM POSITIVE

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																		
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
VISUAL	**Phase 2: Klarinet x11 (Installation of services, roads and buildings):** The construction activities would be highly visible from the Zaaihoek Road as well as from certain areas in Klarinet x9 and 10. It would also be visible from certain areas in Klarinet x8. It would however depend on where construction takes place. The construction site would have to be kept neat and tidy at all times.	SITE	SHORT	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	the development neat and tidy at all times and ensure that the site (including buildings) is well maintained. If well managed, the development could have a positive impact on the visual aspects of the area, since activities such as the dumping of waste, coal washing plants, unrehabilitated mine, informal settlement etc. are currently taking place on site.						species. Over time, the vegetation should revert back to natural grassland if continuous monitoring and rehabilitation takes place. If the site is rehabilitated properly it could have a positive impact in terms of visual aspects.					
VISUAL	**Phase 3: Klarinet x12 (Installation of services, roads and buildings):** The construction activities would be highly visible from the Jackaroo gravel road and from the adjacent properties (Ms de Jonckheere, Mr Lambrechts). It would also be visible from certain The construction site would however have to be kept neat and tidy at all times.	SITE	SHORT	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE												
NOISE	**Phase 1: Klarinet x10 (Installation of services, roads and buildings):** Noise generated as a result of the construction activities (including use of heavy machinery) would impact on site workers, adjacent land owners (JDS Paterson, MM Khumalo), MNS and Klarinet x6 and x8 residents.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	**Utilization of services, roads and buildings:** Noise generation would be due to noise associated with the residential and business activities and increased traffic. This would impact on residents of Klarinet x9, x10, x11 and x12 as well as residents of the surrounding smallholdings.	SITE	LONG	HIGHLY PROBABLE	LOW NEGATIVE	LOW NEGATIVE	**Decommissioning of the services, roads and buildings:** In general, the use of heavy machinery for decommissioning activities would impact on the surrounding area in terms of noise.	SITE	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE
	Phase 2: Klarinet x11 (Installation of services, roads and buildings): Noise generated as a result of the construction activities (including use of heavy machinery) would impact on site workers, adjacent land owners/users, new residents of Klarinet x10 and Klarinet x9 (relocated MNS residents), the Klarinet x6 and x8 residents adjacent land owners/users, new residents of Klarinet x10 and Klarinet x9 (relocated MNS residents), the Klarinet x6 and x8 residents.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE							Once rehabilitated, the impact on the ambient noise level is expected to be positive.	SITE	LONG	PROBABLE	MEDIUM POSITIVE	MEDIUM POSITIVE
	Phase 3 (Installation of services, roads and buildings): Noise generated as a result of the construction activities (including use of heavy machinery) would impact on site workers, adjacent land owners along the Jackaroo gravel road (Ms de Jonchkheer, Mr Lambrechts), users of the Jackaroo gravel road and new residents of Klarinet x9, x10 and x11.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE												

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																	
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TRAFFIC	**Phase 1, Phase 2 and Phase 3 (Installation of services, roads and buildings):** In general, the construction activities would not directly impact on the traffic utilizing the D1126 Zaaihoek Road or the nearby Jackaroo gravel road (along the northern boundary) since all activities will be limited to the said site. The delivery of building material during the construction period could however, lead to a slight increase in traffic on the D1126 Zaaihoek Road. This could impact on the road users of the D1126 Zaaihoek Road. The deliveries would however, not occur on a continuous basis.	SITE	SHORT	PROBABLE	LOW NEGATIVE	LOW NEGATIVE	**Phases 1 to 3: Utilization of services, roads and buildings:** The proposed accesses to the proposed development site is approved from the D1126 Zaaihoek Road directly opposite existing intersections. According to Human et al. (2015), the intersection sight distances with the specific posted speed limit of 60 km/h meet the minimum requirements.						**Phases 1 to 3: Decommissioning of the services, roads and buildings:** In general, the decommissioning of services, roads and buildings would not directly impact on traffic utilising the D1126 Zaaihoek Road or the nearby gravel road as all activities would be limited to the said site. Building rubble and other waste would have to be removed from site. This could lead to a slight increase in traffic on the road network (i.e. on site and the D1126 Zaaihoek and R544 Verena Roads). Impact on traffic after decommissioning will however, depend on the intended end land use.	SITE	SHORT	PROBABLE	LOW NEGATIVE	LOW NEGATIVE
	During the construction phase, heavy vehicles will utilise the D1126 Zaaihoek Road, the R544 Verena Road and the onsite roads for the delivery of material. Depending on the frequency of deliveries, the heavy vehicles could impact on the condition of the D1126 Zaaihoek Road, the R544 Verena Road and the onsite roads. This could impact on the road users of the R544 Verena Road and the D1126 Zaaihoek Road. The deliveries would however, not occur on a continuous basis.	SITE	SHORT	PROBABLE	LOW NEGATIVE	LOW NEGATIVE	The utilization of 500 housing units (build as part of Phase 1 of the project) would result in an increase in traffic and would impact on the Carmen Street (R544 Verena Road)/Zaaihoek (D1126) intersection (Human et al., 2015) i.e. the existing rail crossing. This rail crossing will have to be upgraded as recommended by Human et al. (2015).	LOCAL	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE						
	During the construction phase, contractors and subcontractors may access the construction site from the D1126 Zaaihoek Road at numerous places thus impacting on the general road users of the D1126 Zaaihoek Road. This could lead to an increase in accidents on the said road.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	The utilization of 501 – 1500 housing units (built as part of Phase 1 and Phase 2 of the project) would result in a further increase in traffic and would impact on the Carmen Street (R544 Verena Road)/Zaaihoek (D1126) intersection and the Intersection 8/R544 Road. The upgrading of Intersection 8/R544 Road will be required as well as the signalization of the at grade intersection as recommended by Human et al. (2015).	LOCAL	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE						
	During the construction phase, the use of heavy vehicles and other machinery (TLB, etc.) on the D1126 Zaaihoek Road will impact on the general road users in terms of slow speeds travelled by these vehicles. This could result in an increase in accidents along the said road.	SITE	SHORT	PROBABLE	MEIDUM NEGATIVE	LOW NEGATIVE	The utilization of 1501 - 3000 housing units (built as part of Phase 2 and Phase 3 of the project) would result in a further increase in traffic and would impact on the Carmen Street (R544 Verena Road)/Zaaihoek (D1126) intersection and the upgraded Intersection 8/R544 Road. The upgrading of the signalization of the at grade intersection and the OR Tambo link road as recommended by Human et al. (2015) will be required to reduce the impact on road users.	LOCAL	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE						

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																			
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TRAFFIC							The overall development would result in 1299 AM peak hour trips and 1370 PM peak hour trips. This would definitely impact on the surrounding road network. Human et al. (2015) indicated that the OR Tambo Link Road would have to be constructed in order to reduce the potential impact on the road network and the road users.	LOCAL	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	**Phases 1 to 3: Decommissioning of the services, roads and buildings:** In general, the decommissioning of services, roads and buildings would not directly impact on traffic utilising the D1126 Zaaihoek Road or the nearby gravel road as all activities would be limited to the said site. Building rubble and other waste would have to be removed from site. This could lead to a slight increase in traffic on the road network (i.e. on site and the D1126 Zaaihoek and R544 Verena Roads). Impact on traffic after decommissioning will however, depend on the intended end land use.	SITE	SHORT	PROBABLE	LOW NEGATIVE	LOW NEGATIVE
							During the operational phase there will be an increase in pedestrians along the D1126 Zaaihoek Road and the R544 Verena Road as people walk to the Emalahleni CBD. This could result in accidents involving pedestrians walking along this road. Recommendations by Human et al. (2015) with regards to pedestrian infrastructure (e.g. barrier, safe pedestrian crossings) along the D1126 Zaaihoek Road and R544 Verena Road must be implemented.	LOCAL	LONG	HIGHLY PROBABLE	MEIDUM NEGATIVE	LOW NEGATIVE					
	Contractors could decide to utilise the Jackaroo gravel road that extends over the Transnet rail line. This could result in accidents with Transnet trains. It could also result in additional traffic through Jackaroo Park. In addition, it could impact on the condition of the said gravel road which would impact on the regular road users/land owners/users living along the said road.	LOCAL	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	As the development progresses, residents could decide to utilise the Jackaroo gravel road that extends over the Transnet rail line. This could result in accidents with Transnet trains. It could also result in additional traffic through Jackaroo Park. In addition, it could impact on the condition of the said gravel road.	LOCAL	LONG	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE					
INTERESTED AND AFFECTED PARTIES	Possible impacts (e.g. dust, noise, etc.) on the surrounding landowners/users as well as road users are indicated above. In addition, the connection of the services (water, electricity, sewage) to the municipal infrastructure could impact on the residents of Klarinet x6, x7 and x8 in terms of service interruptions. The residents could also be impacted upon if the existing services do not have sufficient capacity for the proposed development.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	Possible impacts (e.g. dust, noise, etc.) on the surrounding landowners/users as well as road users are indicated above. The residents could be impacted upon if the existing services do not have sufficient capacity (e.g. Klipspruit STW and Riverview STW) for the proposed development. This could lead to pollution of surface water environments namely the Blesbokspruit and Olifants River. This would impact on surrounding landowners/users as well as downstream water users and the aquatic environment.	SITE	LONG	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	The impact of the decommissioning of the development in terms of interested and affected parties will depend on the character of the area at that time as well as the intended end land use.	SITE	LONG	HIGHLY PROBABLE	LOW NEUTRAL	LOW NEUTRAL
	Contractors working on site could be directly impacted upon if the necessary safety and occupational health measures are not adhered to.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE													
	More people in the area during the construction phase could lead to increased theft and burglaries in the area.	SITE	SHORT	PROBABLE	LOW NEGATIVE	LOW NEGATIVE													

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																				
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INTERESTED AND AFFECTED PARTIES	The change of land use from 'Agricultural' to mostly 'Residential' zoning will not impact directly on agriculture since the site is not currently used for agricultural activities.	LOCAL	LONG	HIGHLY PROBABLE	LOW NEUTRAL	LOW NEUTRAL	The land use will change from agriculture to 'Residential'. The new land use will be compatible with that of the surrounding area and will be in line with the eMalahleni Spatial Development Framework. It will address the current housing backlog and formalise the MNS informal settlement resulting in security of tenure. The site will also be managed, reducing the dumping of waste and other illegal activities taking place.	SITE	LONG	DEFINITE	LOW NEUTRAL	LOW NEUTRAL	The impact of the decommissioning of the development in terms of interested and affected parties will depend on the character of the area at that time as well as the intended end land use.	SITE	LONG	HIGHLY PROBABLE	LOW NEUTRAL	LOW NEUTRAL
	Job opportunities would be provided during the construction phase.	SITE	SHORT	DEFINITE	MEDIUM POSITIVE	MEDIUM POSITIVE	Job opportunities would be provided during the operational phase through the provision of business stands from where businesses can be operated.	SITE	LONG	DEFINITE	MEDIUM POSITIVE	MEDIUM POSITIVE								
	Eskom powerlines are located on site. Eskom and its clients could be impacted if the powerlines are damaged in any way by the construction and the stipulated conditions are not adhered to.	LOCAL	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	Eskom and its clients could be impacted if the powerlines are damaged in any way during the operational phase and the stipulated conditions are not adhered to.	LOCAL	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE								
							The Klipspruit Sewage Treatment Works currently does not have sufficient capacity to deal with the current need and requires 200% more capacity. The possible increase in sewage demand without the treatment capacity may cause pollution of the area (e.g. Blesbokspruit/Olifants River) and impact on interested and affected parties (residents, municipality, developer, downstream users, etc.).	LOCAL	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEUTRAL							
							The Riverview Sewage Treatment Works currently does not have sufficient capacity to deal with the current need. The possible increase in sewage demand without the treatment capacity may cause pollution of the area (e.g. Blesbokspruit/Olifants River) and impact on interested and affected parties (residents, municipality, developer, downstream users, etc.).	LOCAL	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEUTRAL							
							Bulk water supply not sufficient to supply the proposed development. The impact may be that houses will be built but no services will be available. This would impact on interested and affected parties (residents, municipality, developer).	LOCAL	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEUTRAL							

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																				
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INTERESTED AND AFFECTED PARTIES							The provision of bulk engineering services may have negative impact on municipal budget. This would impact on the municipality but ultimately also the interested and affected parties (residents).	LOCAL	LONG?	DEFINTE	MEDIUM NEGATIVE	LOW NEUTRAL	The impact of the decommissioning of the development in terms of interested and affected parties will depend on the character of the area at that time as well as the intended end land use.	SITE	LONG	HIGHLY PROBABLE	LOW NEUTRAL	LOW NEUTRAL
							New link roads will increase access to the surrounding area and improve the mobility and access of the area. This would have a positive impact on interested and affected parties (residents, municipality, developers).	REGIONAL	LONG	DEFINITE	HIGH POSITIVE	HIGH POSITIVE						
							Proposed installation of bulk infrastructure services will unlock the potential for future development. This would have a positive impact on interested and affected parties (residents, municipality, developers).	REGIONAL	LONG	DEFINITE	HIGH POSITIVE	HIGH POSITIVE						
							Increase in housing units and people will disturb the low intensity character of small holdings. This would have a negative impact on the surrounding land owners/users.	LOCAL	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	MEDIUM NEGATIVE						
							The MNS informal settlement will be formalised and residents provided with security of tenure. This would have a positive impact on the MNS residents.	SITE	LONG	DEFINTE	HIGH POSITIVE	HIGH POSITIVE						
							The Klarinet Phase 2 project would address the housing backlog by providing much needed houses and the development of human settlements. This would have a positive impact on residents and the municipality.	REGIONAL	LONG	DEFINTE	HIGH POSITIVE	HIGH POSITIVE						
							The Klarinet Phase 2 project will provide full spectrum of social facilities in line with the guidelines of the CSIR. This would have a positive impact on the residents.	LOCAL	LONG	DEFINTE	HIGH POSITIVE	HIGH POSITIVE						
							The installation of engineering services as part of the Klarinet Phase 2 project may have a positive impact on property values in the area. This would have a positive impact on surrounding landowners.	LOCAL	LONG	HIGHLY PROBABLE	MEDIUM POSITIVE	MEDIUM POSITIVE						

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																				
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
INTERESTED AND AFFECTED PARTIES							Through the development of the Klarinet Phase 2 project, the municipality will be able to generate revenue through the collection of rates and taxes. This would have a positive impact on the municipality.	LOCAL	LONG	DEFINITE	MEDIUM POSITIVE	MEDIUM POSITIVE	The impact of the decommissioning of the development in terms of interested and affected parties will depend on the character of the area at that time as well as the intended end land use.	SITE	LONG	HIGHLY PROBABLE	LOW NEUTRAL	LOW NEUTRAL
							If proper measures are not put into place, unemployment may rise in the Klarinet area. This could impact on the future residents of the Klarinet Phase 2 area and the MNS community as well as the surrounding land owners/users.	REGIONAL	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE						
							Conflict or tension may rise with MNS residents receiving stands while other settlements in the municipal area have not been upgraded. The impact of the tension may result in uprisings in certain communities. This would have a negative impact on surrounding land owners/users and the municipality.	REGIONAL	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE						
							Funding for the construction of additional road links has not been provided. The lack of clarity on funding may have an impact on the implementation of the proposed linkages. This could negatively impact on residents, surrounding land owners/users and the municipality.	LOCAL	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE						
							Possible utilization of Jackaroo railway crossing to gain access to the Witbank CBD. This would have a negative impact on surrounding land owners/users and the residents of Jackaroo Park.	LOCAL	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE						
							The prospecting and mining applications may result in the development not continuing. This would impact negatively on the residents, the municipality and the developers.	REGIONAL	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE						

8.7.1 DIRECT AND INDIRECT IMPACTS – DEVELOPMENT OF THE KLARINET PHASE 2 RESIDENTIAL AREA (KLARINET X10, KLARINET X 11, KLARINET X 12) CONSISTING OF VARIOUS STANDS AND ASSOCIATED SERVICES (ALTERNATIVE LAYOUT NO.5; FIGURE 7.4; FIGURE 8.1)																				
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: (PHASE 1 (KLARINET X10), PHASE 2 (KLARINET X11) & PHASE 3 (KLARINET X 12)) TIME PERIOD: 12 - 36 MONTHS ONWARDS (DEPENDS ON FUNDING) AREA: PHASE 1 (KLARINET X10) = 51.87 ha; PHASE 2 (KLARINET X11) = 105.58 ha; PHASE 3 (KLARINET X12) = 104.55 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 262 ha**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
INTERESTED AND AFFECTED PARTIES							The residents of the MNS Informal Settlement will need to be relocated to the holding area (Klarinet x9). A greenfield area allows for better planning and installation of engineering services. This would have both a positive and negative impact on the residents, municipality and developers.	LOCAL	LONG	DEFINITE	MEDIUM POSITIVE	MEDIUM POSITIVE	The impact of the decommissioning of the development in terms of interested and affected parties will depend on the character of the area at that time as well as the intended end land use.	SITE	LONG	HIGHLY PROBABLE	LOW NEUTRAL	LOW NEUTRAL
							Provision of a mixed income development aims to enhance the economic feasibility of the development. This would have a positive impact on both the residents and the municipality.	REGIONAL	LONG	HIGHLY PROBABLE	MEDIUM POSITIVE	MEDIUM POSITIVE						
							Expectation may be created with the relocation of people to Klarinet x9. If expectation cannot be satisfied it may lead to unrests in the area. This could impact negatively on residents, surrounding land owners/users and the municipality.	LOCAL	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE						

8.7.2 Northern sewer line (Figure 5.1)

The northern sewer line will be constructed as part of Phase 1 (Klarinet x10; Figure 8.1). As indicated in Section 7.4.3, this northern sewer line will form part of the gravity system (Alternative 3 – preferred alternative) following the natural drainage along the northern boundary of the Klarinet Phase 2 development but will be located outside of the township boundary as indicated in Figure 8.2.

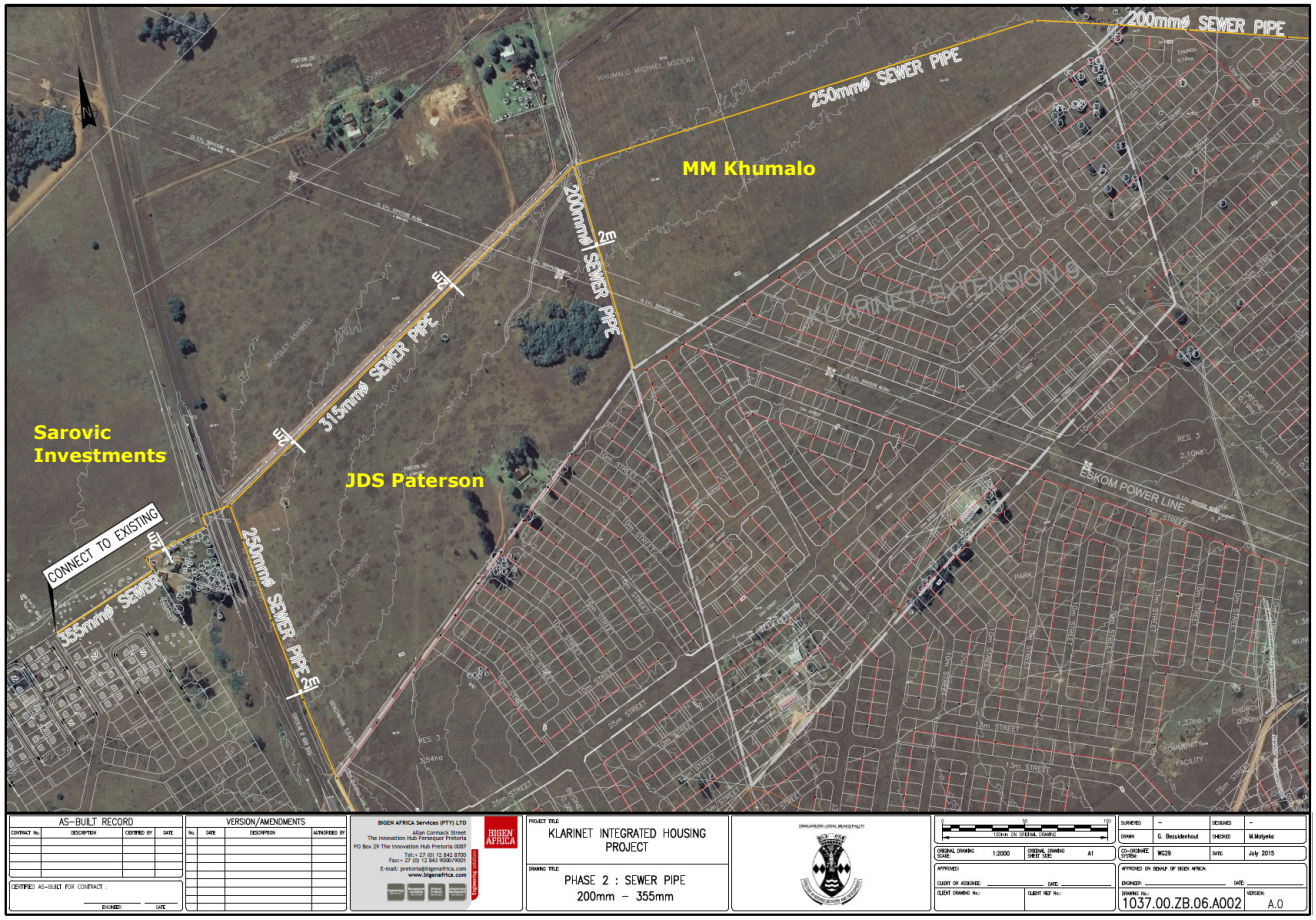

Figure 8.2: Northern sewer line route

As indicated in Section 7.4.2, sewerage generated by Klarinet x3, x4, x5, x6, x7 is collected at the northern corner of Klarinet x6 via an existing 400mm diameter outfall sewer. It is then gravitated to Pine Ridge and pumped from Pine Ridge Pump Station to Klipspruit STW through an existing 315mm diameter pumping main. The 400mm outfall sewer was recently upgraded to a 700mm diameter sewer in order to accommodate additional flows from the residential areas and the Klarinet light industrial area.

The northern link sewer line will connect to the above-mentioned outfall sewer via the existing Phase 1 link sewers. Phase 1 link sewers were designed and installed to accommodate sewerage flows from Phase 2 of the development.

As indicated in Section 7.4.3, this alternative is preferred as it:

- allows for optimal depths;
- eliminates the need for pumping;
- can be maintained with ease;

- can be implemented with cost effective conventional methods.

The northern sewer line (1600m in length) will consist of pipes of the following diameters: 200, 250, 315 and 355 mm. The internal diameters of the said pipes are therefore less than 0.36 metres. In view of this, the installation of the said sewer lines is not a listed activity.

The sewer line route was however investigated as part of the overall impact assessment in order to determine if any sensitive environments would be impacted.

According to McCleland and de Castro (2015), the majority of the sewer line route consists of Degraded Secondary Grassland that has a Moderate Botanical conservation value or Ecological Sensitivity. The sewer line route could provide some habitat for animals identified that would possibly use the surrounding Grassland Assemblage habitat. The construction of the sewer line will thus impact on an area of 1600m x 4m of the above-mentioned vegetation unit as well Transformed vegetation of Low Botanical Conservation Value. Further, the construction of the sewer line would not impact on any streams, rivers, wetlands, etc. as identified by Grobler (2015) or any sites of archaeological and/or cultural importance (including graves) as identified by Van Vollenhoven and Collins (2015). The construction of this sewer line would thus have a low impact on the environmental features of the area.

The following should however, be noted:

⇒ *The sewer line installed to the east of the Zaaihoek Road (Figure 8.2) will be located on the following properties and will thus impact on the following private landowners:*
- *Portion 167 of the farm Blesboklaagte (belonging to JDS Paterson);*
- *Portion 155 of the farm Blesboklaagte (belonging to MM Khumalo);*
- *Portion 192 of the farm Blesboklaagte (belonging to GM Lambrechts).*

⇒ *The sewer line installed to the west of the Zaaihoek Road (Figure 8.2) will extend across Portion 162 of the farm Blesboklaagte belonging to JDS Paterson. It will then connect to an existing sewer line located on the northern boundary of Klarinet x6 (Figure 8.2).*

⇒ *It is possible that a portion of Portion 79 of the farm Blesboklaagte belonging to Sarovic Investments (Pty) Ltd. could also be impacted by the proposed construction of the said sewer line.*

⇒ *The sewer line will also cross underneath Eskom powerlines. Eskom and its users could thus be impacted upon should Eskom's conditions not be adhered to and the required permissions not obtained.*

⇒ *The sewer line will also impact on the Zaaihoek Road depending on the construction method implemented. Permission would have to be obtained from the Department of Public Works, Roads and Transport.*

The eMalahleni Local Municipality (ELM) will negotiate servitudes with the above-mentioned landowners. This will happen once the final commitments and agreements have been signed between Absa, ELM and the Mpumalanga Department of Human Settlements.

8.7.3 North eastern storm water pipe (Figure 5.1)

The north eastern storm water pipe will be constructed as part of Phase 3 (Klarinet x12; Figure 8.1).

A storm water attenuation dam will be located in the north eastern corner of the site within a site zoned as Public Open Space (Figure 8.1 and 8.3). From this attenuation dam, the storm water pipe (900 mm diameter concrete pipe) will extend. It should be noted that the said pipe will be covered and thus be located underground.

As indicated in Section 7.6, an alternative plan (Figure 7.7 and 8.3) regarding the proposed northern storm water pipe was provided in view of the issues of concern received during the scoping phase. The northern storm water pipe will extend across property belonging to Mr. Lambrechts and not that of Ms. De Jonckheer as previously indicated. In addition the storm water pipe will not discharge water into the downstream dam (belonging to Dithebe CPA) but into the veld adjacent to the dam (Figure 7.7 and 8.3) on property belonging to Span Kalbasfontein Trust.

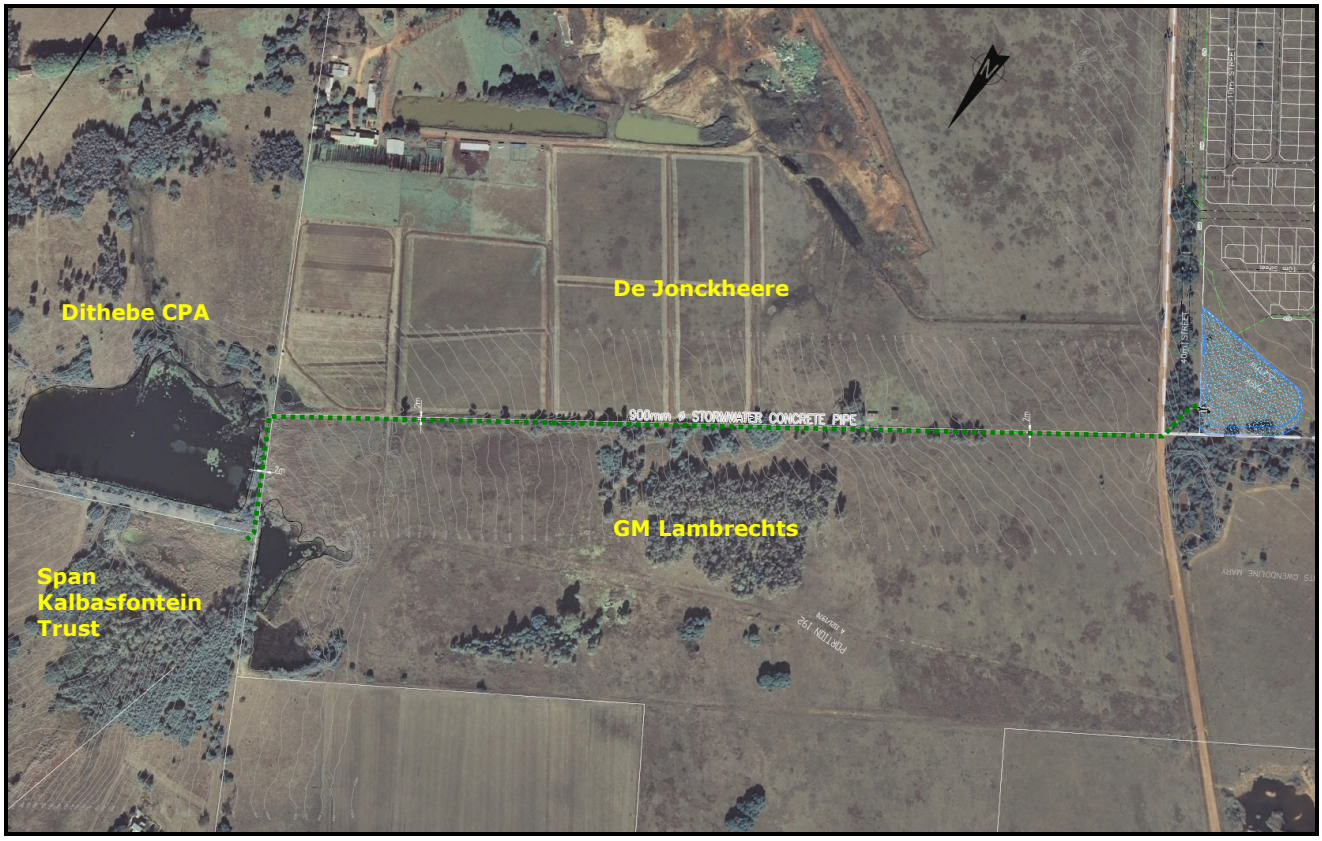

Figure 8.3: North eastern storm water pipe route

The storm water pipe will thus impact on properties belonging to the following private landowners:

- Portion 192 of the farm Blesboklaagte 296 JS (belonging to GM Lambrechts; Figure 8.3);
- Portion 3 of the farm Kalbasfontein 284 JS (belonging to Dithebe CPA; Figure 8.3);
- Portion 11 of the farm Kalbasfontein 284 JS (belonging to Span Kalbasfontein Trust; Figure 8.3).

The eMalahleni Local Municipality (ELM) will negotiate servitudes with the above-mentioned private landowners. This will happen once the final commitments and agreements have been signed between Absa, ELM and the Mpumalanga Department of Human Settlements.

8.7.3 DIRECT AND INDIRECT IMPACTS – CONSTRUCTION AND OPERATION OF THE NORTHERN STORM WATER PIPE (FIGURE 8.3)

ENVIRONMENTAL FEATURE(S)	PREDICTED IMPACT CONSTRUCTION PHASE: PHASE 3 (KLARINET X12) TIME PERIOD: 12 MONTHS AREA: 1 200 m X 4 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 1 200 m X 2 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 1 600 m X 4 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)
TOPOGRAPHY	Direct impact i.t.o. the clearing of the site and excavations (trenches). The impact will however, be temporary in nature since the storm water pipe will be located underground and the site will be rehabilitated to its original state.	SITE	LONG	DEFINITE	LOW NEGATIVE	LOW NEGATIVE	NONE. The storm water pipe will be located underground.	SITE	LONG	DEFINITE	LOW NEGATIVE	LOW NEGATIVE	Initially, the decommissioning of the storm water pipe would have a negative impact on the topography since the storm water pipe would have to be excavated and the pipes removed. However, after rehabilitation the site would conform to the original slope of the area.	SITE	LONG	DEFINITE	LOW NEUTRAL	LOW POSITIVE
GEOLOGY/ GEOTECHNICAL ASPECTS	The proposed storm water route is underlain by older tillite of the Dwyka Formation and could fall into the Geotechnical Zone 1A that is developable (Celliers and Hansmeyer, 2014). The said route has not been subjected to any mining activities. The construction of the storm water pipe will impact on the underlying geology and may require blasting in places. The possible impact on the underlying geology cannot be mitigated.	SITE	PERMANENT	HIGHLY PROBABLE	LOW NEGATIVE	LOW NEGATIVE	NONE. No further impact since no further construction activities will take place.						NONE. The decommissioning of the storm water pipe will not have any impact on the underlying geology.					
SOILS	The soil of the storm water route has already been impacted by previous agricultural activities (e.g. cultivation, etc.) and the presence of a road (gravel road to Jackaroo Park). The construction of the storm water pipe as well as the stockpiling of topsoil, subsoil, overburden and rocks would directly impact on the soil of the area in terms of soil structure, nutritional and chemical values when the vegetation and topsoil are removed, the site sloped and the storm water pipe constructed. The risk of soil erosion is however low due to the relatively flat nature of the site.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	The continual discharge of water during the operational phase could result in the erosion of the downstream wetland system.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	Initially, the decommissioning of the storm water pipe would have a negative impact on the soil since the storm water pipe would have to be excavated and removed. Soil pollution could also take place in view of waste, polluted soil, etc. still in the pipes. However, after rehabilitation, the impact would be positive since the area would be shaped to conform to the original slope of the area and revegetated.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEUTRAL	MEDIUM NEUTRAL
	Soil pollution could take place if: • the construction vehicles are not maintained/repaired resulting in oil leaks and fuel spills; • waste management measures are not implemented, • proper ablution and sanitation facilities are not provided for the site workers to use on site.	SITE	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	Soil pollution could take place if waste management measures are not implemented on the Klarinet Phase 2 site resulting in waste being washed down the storm water pipe. In addition, soil pollution could result if the Klarinet Phase 2 sewer system does not have sufficient capacity resulting in sewage flowing into the stormwater system and polluting the soil at the end of the storm water pipe.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE					
LAND USE/LAND CAPABILITY/ AGRICULTURAL POTENTIAL	In terms of land capability, the proposed storm water pipe will have a limited (4 m x 1200 m) impact on high potential arable land located on the Lambrechts property. However, the said property is currently not used for agricultural activities.	SITE	SHORT	HIGHLY PROBABLE	LOW NEGATIVE	LOW NEGATIVE	The storm water pipe would be installed underground and should therefore not impact on any land uses once construction is complete. However, the presence of the storm water pipe would mean that no other infrastructure can be constructed along or over the said route.	SITE	LONG	DEFINITE	LOW NEGATIVE	LOW NEGATIVE	The decommissioning and rehabilitation of the site would have a positive impact on land use since the storm water pipe would be removed and the area will once again be available for other uses.	SITE	LONG	HIGHLY PROBABLE	LOW POSITIVE	LOW POSITIVE
	It would also have a limited impact on wetland land capability on property belonging to the Dithebe CPA and Span Kalbasfontein Trust.	SITE	SHORT	PROBABLE	LOW NEGATIVE	LOW NEGATIVE	No further impact since the storm water pipe would be installed underground and the water discharged into an existing wetland.											

8.7.3 DIRECT AND INDIRECT IMPACTS – CONSTRUCTION AND OPERATION OF THE NORTHERN STORM WATER PIPE (FIGURE 8.3)

ENVIRONMENTAL FEATURE(S)	PREDICTED IMPACT CONSTRUCTION PHASE: PHASE 3 (KLARINET X12) TIME PERIOD: 12 MONTHS AREA: 1 200 m X 4 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 1 200 m X 2 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 1 600 m X 4 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)
NATURAL VEGETATION/ ANIMAL LIFE	According to McCleland and de Castro (2015), the proposed storm water pipe route would extend through Degraded Secondary Grassland with a Moderate Botanical conservation value or Ecological Sensitivity. It would also impact on Wetland vegetation units with a High Botanical Conservation Value or Ecological Sensitivity. The construction activities would also impact on animal life associated with the Grassland and Wetland Assemblage identified by McCleland and de Castro (2015). The proposed storm water pipe would however, have a limited (1 200 m x 4 m) impact on the said vegetation units and associated animal habitats.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	No further direct impact on vegetation or animal life since no further construction activities will take place. However, if the disturbed areas are not properly rehabilitated it could lead to erosion and the establishment of invader species that could impact on the surrounding natural vegetation.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	During decommissioning, the storm water pipe would have to be excavated and removed. Any vegetation that has established along the route would thus be removed and the area once again rehabilitated.	SITE	LONG	PROBABLE	MEDIUM NEUTRAL	MEDIUM NEUTRAL
	In addition, it would impact on Transformed vegetation units (Cultivation and Alien Plantation) with a Low to Very Low Botanical Conservation Value or Ecological Sensitivity. The removal of this vegetation could result in the removal of alien plant species that could impact on the surrounding vegetation.	SITE	LONG	DEFINITE	LOW NEUTRAL	LOW NEUTRAL												
SURFACE WATER/SENSITIVE LANDSCAPES	Grobler (2015) indicated that approximately 377 m of the storm water pipe will impact on Seep Wetland no. 1 (Figure 5.16). The said wetland is 28.80 ha in extent and 34.97 ha when combined with the dam belonging to the Dithebe CPA. Seep Wetland no. 1 has a PES of D/E (i.e. Largely modified to Seriously modified) and an EIS of Moderate (i.e. ecologically important and sensitive on a provincial or local scale – the biodiversity of these wetlands is not usually sensitive to flow and habitat modifications). It could also impact on the Channelled Valley Bottom Wetland No. 2 (Figure 5.16) located downstream of Seep Wetland no. 1. This wetland is 8.75 ha in extent with a combined area of 10.45 ha with the nearby dam. This wetland has a Largely modified PES (D category) with an EIS of Moderate (i.e. ecologically important and sensitive on a provincial or local scale – the biodiversity of these wetlands is not usually sensitive to flow and habitat modifications). In general, the removal of the vegetation and the earthworks required during the construction phase would impact directly on the functioning of Seep Wetland no. 1 and Channelled Valley Bottom Wetland no. 2.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	The discharge of water from the storm water pipe during the operational phase would continue to impact on Seep Wetland no. 1 and the downstream Channelled Valley Bottom Wetland no. 2 as well as the nearby dams associated with these systems. Water pollution could take place if waste management measures are not implemented on the Klarinet Phase 2 site resulting in waste being washed down the storm water pipe into the said wetland systems. In addition, water pollution could result if the Klarinet Phase 2 sewer system does not have sufficient capacity resulting in sewage pollution of the identified wetland systems. This would impact on the associated aquatic environment, bird life and water quality of the downstream system and could eventually impact on the Olifants River. It could also impact on the game belonging to Span Kalbasfontein drinking water from the said system.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	During the decommissioning phase, the storm water pipe would have to be excavated, which would lead to the removal of vegetation. The said area will then be rehabilitated in order to establish a vegetation cover and prevent soil erosion. This would result in clean runoff from the site entering the surrounding area.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEUTRAL	MEDIUM NEUTRAL
GROUNDWATER	The construction activities would impact on groundwater associated with Seep Wetland no. 1 and Channelled Valley Bottom Wetland no. 2 which could impact on the overall functioning of the said wetland systems.	SITE	LONG	DEFINITE	MEIUDM NEGATIVE	LOW NEGATIVE	The presence of the storm water pipe would continue to impact on the groundwater flow and therefore the functioning of the said wetland systems. Groundwater pollution could take place if waste management measures are not implemented on the Klarinet Phase 2 site resulting in waste being washed down the storm water pipe into the said wetland systems. In addition, groundwater pollution could result if the Klarinet Phase 2 sewer system does not have sufficient capacity resulting in sewage pollution of the identified wetland systems.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	During the decommissioning phase, the storm water pipe will be excavated, removed from site and disposed of accordingly. The excavation activities and removal of the pipe will once again impact on the groundwater flow of the site. After rehabilitation, natural groundwater flow should return depending on the geological and soil changes that took place.	SITE	LONG	PROBABLE	LOW NEUTRAL	LOW NEUTRAL

8.7.3 DIRECT AND INDIRECT IMPACTS – CONSTRUCTION AND OPERATION OF THE NORTHERN STORM WATER PIPE (FIGURE 8.3)

ENVIRONMENTAL FEATURE(S)	PREDICTED IMPACT CONSTRUCTION PHASE: PHASE 3 (KLARINET X12) TIME PERIOD: 12 MONTHS AREA: 1 200 m X 4 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 1 200 m X 2 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 1 600 m X 4 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)
SITES OF ARCHAEOLOGICAL/ CULTURAL INTEREST	The construction of the storm water pipe will NOT have a direct impact on any sites of archaeological and/or cultural interest according to Van Vollenhoven and Collins (2015). However, 3 graves are located on the Span Kalbasfontein Trust property, which could be indirectly impact upon during the construction phase if the graves are not demarcated.	SITE	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	NONE. No further construction activities would take place.						NONE.					
SITES OF PALAEONTOLOGICAL INTEREST	NONE. The proposed storm water route is underlain by older tillite of the Dwyka Formation (Celliers and Hansmeyer, 2014). Fourie (2015) indicated no objection to the proposed development of the said site.						NONE. No further construction activities would take place.											
AIR QUALITY	Dust generation and vehicle emissions due to construction activities and use of heavy machinery could impact on site workers, natural vegetation, animal life, wetlands and nearby farmworker's residences (located on property belonging to Ms de Jonckheer). The extent of the impact would depend on the time of year, wind direction and velocity and portion of the property being developed. Mitigation measures would have to be implemented.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	During the operational phase, no direct impact on the air quality is anticipated since no construction activities will take place.						Dust generation and vehicle emissions due to decommissioning activities and use of heavy machinery could impact on site workers and the residences of the farm workers. The extent of the impact would depend on the time of year, wind direction and velocity. Once rehabilitated, the impact on air quality is expected to be positive in terms of reduced dust generation as the area will then be revegetated.	SITE	SHORT	PROBABLE	MEDIUM NEUTRAL	MEDIUM POSITIVE
VISUAL	The construction activities would be highly visible from the nearby farmworker's residences (on property belonging to Ms de Jonckheer) as well as the adjacent properties (belonging to Lambrechts, Dithebe CPA and Span Kalbasfontein Trust) as well as from the gravel road to Jackaroo Park. The construction site would have to be kept neat and tidy at all times.	SITE	SHORT	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	NONE. The storm water pipe would be located underground and would thus not be visible.						During the decommissioning phase, the storm water pipe would be excavated and removed. The construction activities would be visible to the surrounding properties and the gravel road to Jackaroo Park. However, if the site is rehabilitated properly it could have a positive impact in terms of visual aspects.	SITE	LONG	PROBABLE	LOW NEUTRAL	LOW POSITIVE
NOISE	Noise generation due to construction activities and use of heavy machinery could impact on site workers, animal life and farmworkers living on the adjacent property (belonging to Ms de Jonckheer) Construction activities should be limited to daylight hours.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	NONE. No further impact - no further construction activities.						In general, the use of heavy machinery for decommissioning activities would impact on the surrounding area in terms of noise.	SITE	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE
TRAFFIC	Traffic utilising the gravel road to Jackaroo Park could be impacted in terms of the construction of the storm water pipe across the said road. This would depend on the method used (e.g. pipe jacking or trenching). Access to the proposed sewer line would be obtained from the gravel road to Jackaroo Park as indicated in Figure 8.3. The delivery of building material during the construction period could however, lead to a slight increase in traffic on the gravel road to Jackaroo Park and the Zaaihoek Road. This could impact on the road users of the said roads. The deliveries would however, not occur on a continuous basis.	SITE	SHORT	PROBABLE	LOW NEGATIVE	LOW NEGATIVE	NONE. No further impact - no further construction activities.						The pipeline would have to be removed from site. This could lead to a slight increase in traffic on the gravel road to Jackaroo Park and the Zaaihoek Road.	SITE	SHORT	PROBABLE	LOW NEGATIVE	LOW NEGATIVE

8.7.3 DIRECT AND INDIRECT IMPACTS – CONSTRUCTION AND OPERATION OF THE NORTHERN STORM WATER PIPE (FIGURE 8.3)

ENVIRONMENTAL FEATURE(S)	PREDICTED IMPACT CONSTRUCTION PHASE: PHASE 3 (KLARINET X12) TIME PERIOD: 12 MONTHS AREA: 1 200 m X 4 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 1 200 m X 2 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 1 600 m X 4 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)
INTERESTED AND AFFECTED PARTIES	Possible impacts (e.g. dust, noise, etc.) on the surrounding landowners/users as well as road users are indicated above.						The discharge of water from the storm water pipe would impact on downstream interested and affected parties if water pollution takes place as a result of waste management measures not being implemented on the Klarinet Phase 2 site, resulting in waste being washed down the storm water pipe into the downstream wetland systems. In addition, water pollution could result if the Klarinet Phase 2 sewer system does not have sufficient capacity resulting in sewage pollution of the identified downstream wetland systems. This would impact on the associated aquatic environment, bird life and water quality of the downstream system and could eventually impact on the Olifants River. It could also impact on the game belonging to Span Kalbasfontein Trust drinking water from the said system.	SITE	LONG	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	The impact of the decommissioning of the storm water pipe in terms of interested and affected parties will depend on the character of the area at that time as well as the intended end land use.					
	The construction of the storm water pipe will impact on the following properties, landowners and associated activities: ▪ Portion 192 of the farm Blesboklaagte 296 JS (belonging to GM Lambrechts); ▪ Portion 3 of the farm Kalbasfontein 284 JS (belonging to Dithebe CPA); ▪ Portion 11 of the farm Kalbasfontein 284 JS (belonging to Span Kalbasfontein Trust). The eMalahleni Local Municipality (ELM) will negotiate servitudes with the above-mentioned private landowners. This will happen once the final commitments and agreements have been signed between Absa, ELM and the Mpumalanga Department of Human Settlements.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEUTRAL											
	Contractors working on site could be directly impacted upon if the necessary safety and occupational health measures are not adhered to. Injury to pedestrians/animals if the necessary safety precautions are not taken (e.g. barricading of trenches, etc.). Risk of vehicular accidents if the excavations across access roads are not clearly demarcated.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE											
	The construction phase could provide job opportunities.	SITE	SHORT	DEFINITE	MEDIUM POSITIVE	MEDIUM POSITIVE											

8.7.4 Eastern sewer line (Figure 5.1)

The eastern sewer line will be constructed as part of Phase 3 (Klarinet x12; Figure 8.1). This eastern sewer line will form part of a gravity system by linking up to the existing sewer system in Jackaroo Park as indicated in Figure 8.4.

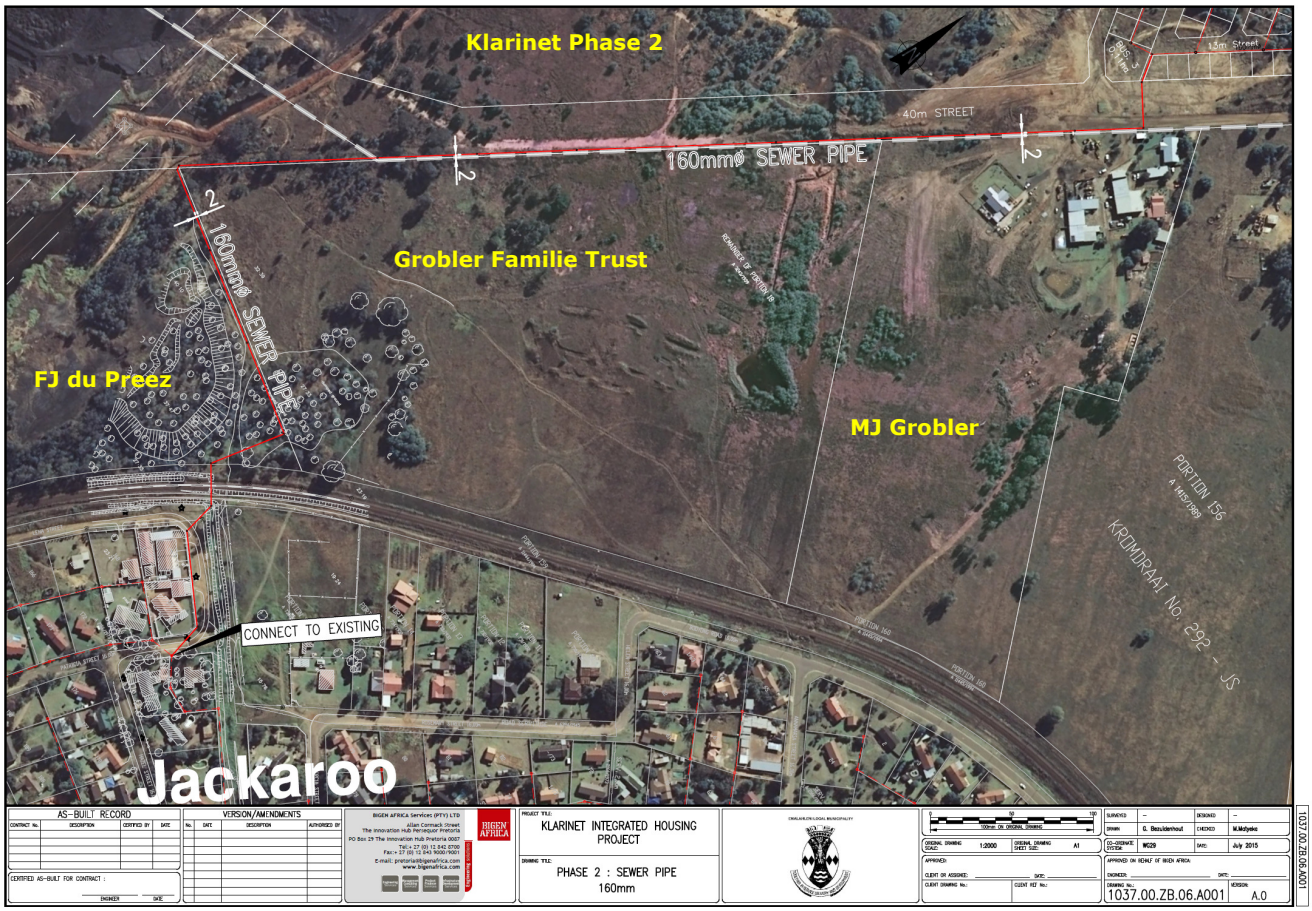

Figure 8.4: Eastern sewer line route

The eastern sewer line (1 200 m in length) will consist a 160 mm diameter pipe as indicated in Figure 8.4. In view of this, the installation of the said sewer line is not a listed activity. The sewer line route was however investigated as part of the overall impact assessment in order to determine if any sensitive environments would be impacted.

McCleland and de Castro (2015) indicated the vegetation associated with the sewer line route as Transformed – mines and quarries that has a Very Low Botanical Conservation Value or Ecological Sensitivity. Further, the construction of the sewer line would not impact on any streams, rivers, wetlands, etc. as identified by Grobler (2015) or any sites of archaeological and/or cultural importance (including graves) as identified by Van Vollenhoven and Collins (2015). The construction of this sewer line would thus have a low impact on the environmental features of the area.

The following should however, be noted:

⇒ *The sewer line will be located along the south eastern boundary of Phase 3 (i.e. Klarinet x12; Figure 8.1). It will extend over Portion 2 of the farm Kromdraai 292 JS (Figure 8.4), registered to a private land*

owner, Mr. FJ du Preez. This part of the sewer line route might extend over property that has been subjected to mining activities (opencast and/or undermining) requiring permission from the Department of Mineral Resources before construction takes place.

- ⇒ *The sewer line will extend under the Transnet railway line (Figure 8.4) at an existing storm water trench and will thus impact on the servitude associate with the Transnet railway line. Permission for the construction of the said reservoir would have to be obtained from Transnet.*
- ⇒ *Part of the sewer line route (to the west of the railway line; Figure 8.4) could be located over or adjacent to previous mining activity (undermining). The extent of the mining activities would have to be determined in order to locate the sewer line on stable ground. Alternatively, permission for the construction of the sewer line would have to be obtained from the Department of Mineral Resources.*
- ⇒ *Acid mine drainage is known to be problematic in the area through which the sewer line route will extend. This could impact on the construction activities and the pipeline if mitigation measures are not implemented.*
- ⇒ *Contract workers on site could be directly impacted if the necessary safety and occupational health measures are no adhered to especially in terms of working in or near AMD.*
- ⇒ *Construction activities could impact on two internal roads of Jackaroo Park in terms of the sewer line extending across these roads as well as home accesses.*

The eMalahleni Local Municipality (ELM) will negotiate servitudes with affected landowners. This will happen once the final commitments and agreements have been signed between Absa, ELM and the Mpumalanga Department of Human Settlements.

Please note: The sewer line will no longer extend through property belonging to the Highveld Association for the Physically Disabled (located in Jackaroo Park) or the Grobler Familie Trust as originally indicated in the Scoping Report.

8.7.5 Eastern storm water pipe (Figure 5.1)

The eastern storm water pipe will be constructed as part of Phase 3 (Klarinet x12; Figure 8.1).

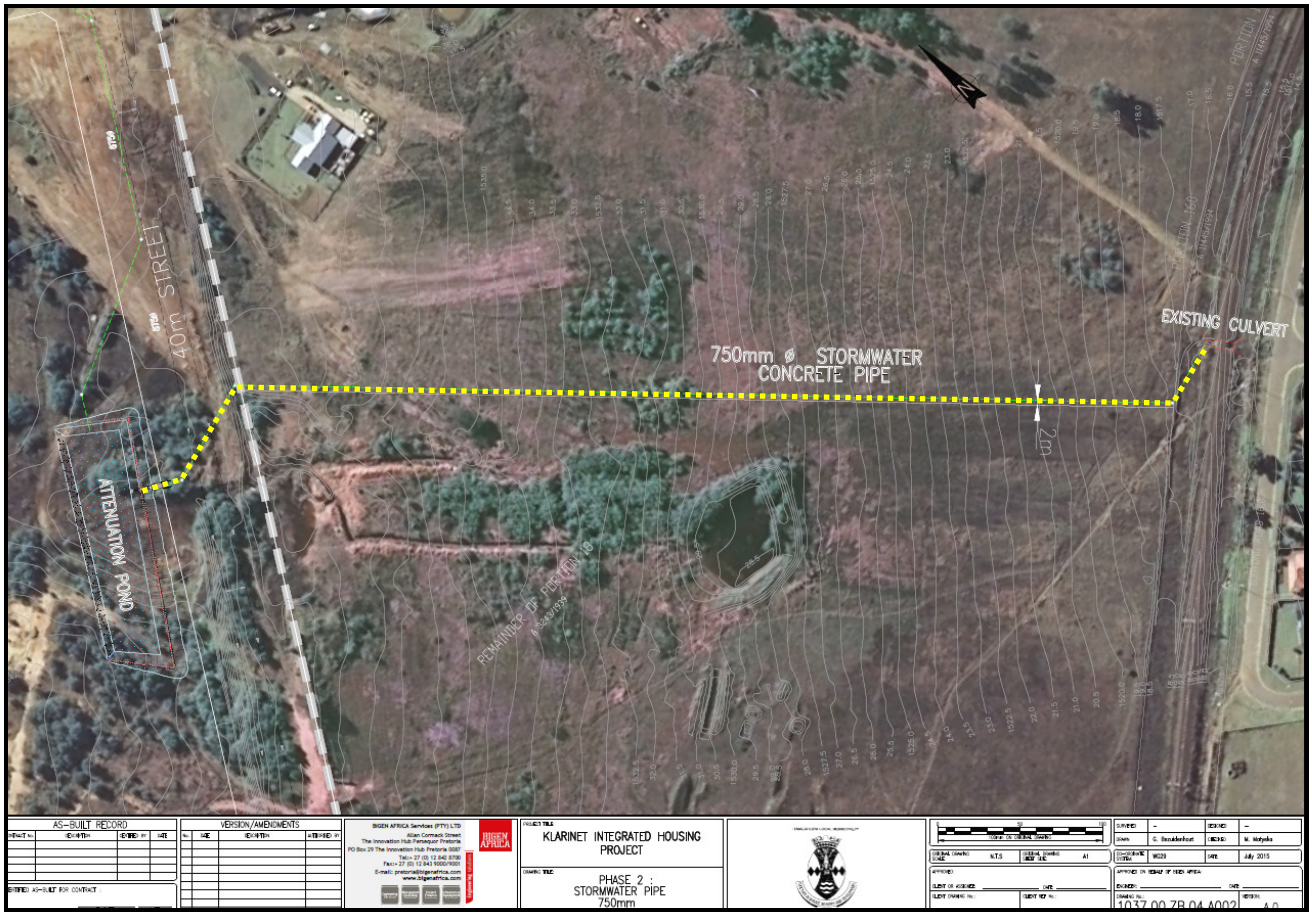

Figure 8.5: Eastern storm water pipe route

The north eastern storm water pipe will consist of a 750 mm diameter concrete pipe extending over a distance of approximately 500 m. The construction thereof does constitute a listed activity in terms of the Environmental Impact Assessment Regulations, 2010.

A storm water attenuation dam will be located in the eastern corner of the site within a site zoned as Public Open Space (Figure 8.1).

From this attenuation dam, the storm water pipe will extend across Portion 105 of the farm Kromdraai 292 JS belonging to MJ Grobler (Figure 8.5).

The storm water pipe will extend under the railway line at an existing culvert (Figure 8.5) and will thus impact on the servitude associate with the Transnet railway line. The storm water will be dispersed by culvert located at Booyong/Annemarie T-junction in Jackaroo Park.

The eMalahleni Local Municipality (ELM) will negotiate servitudes with the above-mentioned private land owners. This will happen once the final commitments and agreements have been signed between Absa, ELM and the Mpumalanga Department of Human Settlements.

According to the engineers, the post development flow rate will be the same as the pre-development flow rate due to the use of the storm water attenuation dam. No impact on Jackaroo Park is thus expected in terms of storm water.

8.7.5 DIRECT AND INDIRECT IMPACTS – CONSTRUCTION AND OPERATION OF THE EASTERN STORM WATER PIPE (FIGURE 8.5)

ENVIRONMENTAL FEATURE(S)	PREDICTED IMPACT CONSTRUCTION PHASE: PHASE 3 (KLARINET X12) TIME PERIOD: 12 MONTHS AREA: 500 m X 4 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 500 m X 2 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 500 m X 4 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)
TOPOGRAPHY	Direct impact i.t.o. the clearing of the site and excavations (trenches). The impact will however, be temporary in nature since the storm water pipe will be located underground and the site will be rehabilitated to its original state.	SITE	LONG	DEFINITE	LOW NEGATIVE	LOW NEGATIVE	NONE. The storm water pipe will be located underground.	SITE	LONG	DEFINITE	LOW NEGATIVE	LOW NEGATIVE	Initially, the decommissioning of the storm water pipe would have a negative impact on the topography since the storm water pipe would have to be excavated and the pipes removed. However, after rehabilitation the site would conform to the original slope of the area.	SITE	LONG	DEFINITE	LOW NEUTRAL	LOW POSITIVE
GEOLOGY/ GEOTECHNICAL ASPECTS	The proposed storm water route is underlain by sandstone, shale, gritstone and coal measure of the Vryheid Formation. The said route has not been subjected to any mining activities but is impacted by Acid Mine Drainage as a result of the unrehabilitated Blesboklaagte Colliery. The construction of the storm water pipe will impact on the underlying geology and may require blasting in places. The possible impact on the underlying geology cannot be mitigated.	SITE	PERMANENT	HIGHLY PROBABLE	LOW NEGATIVE	LOW NEGATIVE	NONE. No further impact since no further construction activities will take place.						NONE. The decommissioning of the storm water pipe will not have any impact on the underlying geology.					
SOILS	The soil of the storm water route has been impacted as a result of the gravel road, Transnet railway line and road in Jackaroo Park. In addition, the soil has been impacted by Acid Mine Drainage as a result of the unrehabilitated Blesboklaagte Colliery. The construction of the storm water pipe as well as the stockpiling of topsoil, subsoil, overburden and rocks would directly impact on the soil of the area in terms of soil structure, nutritional and chemical values when the vegetation and soil are removed, the site sloped and the storm water pipe constructed.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	The Acid Mine Drainage as a result of the unrehabilitated Blesboklaagte Colliery could continue to impact on the storm water pipe if mitigation measures are not implemented.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	Initially, the decommissioning of the storm water pipe would have a negative impact on the soil since the storm water pipe would have to be excavated and removed. Soil pollution could also take place in view of waste, polluted soil, etc. still in the pipes. However, after rehabilitation, the impact would be positive since the area would be shaped to conform to the original slope of the area and revegetated.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEUTRAL	MEDIUM NEUTRAL
	Soil pollution could take place if: • the construction vehicles are not maintained/repaired resulting in oil leaks and fuel spills; • waste management measures are not implemented, • proper ablution and sanitation facilities are not provided for the site workers to use on site.	SITE	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	Soil pollution could take place if waste management measures are not implemented on the Klarinet Phase 2 site resulting in waste being washed down the storm water pipe. In addition, soil pollution could result if the Klarinet Phase 2 sewer system does not have sufficient capacity resulting in sewage flowing into the stormwater system and polluting the soil at the end of the storm water pipe.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE						
LAND USE/LAND CAPABILITY/ AGRICULTURAL POTENTIAL	The land use, land capability and agricultural potential of the storm water pipe route has been impacted in terms of Acid Mine Drainage emanating from the unrehabilitated Blesboklaagte Colliery and draining towards Jackaroo Park. As a result, this area has a wetland land capability. In addition, a gravel road and Transnet railway line have also impacted on the land use, land capability and agricultural potential.	SITE	SHORT	HIGHLY PROBABLE	LOW NEGATIVE	LOW NEGATIVE	The storm water pipe would be installed underground and should therefore not impact on any land uses once construction is complete. However, the presence of the storm water pipe would mean that no other infrastructure can be constructed along or over the said route.	SITE	LONG	DEFINITE	LOW NEGATIVE	LOW NEGATIVE	The decommissioning and rehabilitation of the site would have a positive impact on land use since the storm water pipe would be removed and the area will once again be available for other uses.	SITE	LONG	HIGHLY PROBABLE	LOW POSITIVE	LOW POSITIVE

8.7.5 DIRECT AND INDIRECT IMPACTS – CONSTRUCTION AND OPERATION OF THE EASTERN STORM WATER PIPE (FIGURE 8.5)

ENVIRONMENTAL FEATURE(S)	PREDICTED IMPACT CONSTRUCTION PHASE: PHASE 3 (KLARINET X12) TIME PERIOD: 12 MONTHS AREA: 500 m X 4 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 500 m X 2 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 500 m X 4 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)
NATURAL VEGETATION/ ANIMAL LIFE	According to McCleland and de Castro (2015), the proposed storm water pipe route would extend over a small, highly degraded wetland with a Low Biodiversity Conservation Value or Ecological Sensitivity. This wetland is as a result of the Acid Mine Drainage emanating from the unrehabilitated Blesboklaagte Colliery. This vegetation unit provides limited habitat to animal life associated with the Wetland Assemblage identified by McCleland and de Castro (2015). The storm water pipe would also impact on Degraded Secondary Grassland with Moderate Biodiversity Conservation Value (McCleland and de Castro, 2015). Due to the disturbed nature of the surrounding area, limited habitat would be provided to animal life associated with the Grassland Assemblage (McCleland and de Castro, 2015).	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	No further direct impact on vegetation or animal life since no further construction activities will take place. However, if the disturbed areas are not properly rehabilitated it could lead to erosion and the establishment of invader species that could impact on the surrounding natural vegetation.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	During decommissioning, the storm water pipe would have to be excavated and removed. Any vegetation that has established along the route would thus be removed and the area once again rehabilitated.	SITE	LONG	PROBABLE	MEDIUM NEUTRAL	MEDIUM NEUTRAL
SURFACE WATER/SENSITIVE LANDSCAPES	Grobler (2015) indicated that approximately 241m of the storm water pipe will impact on Seep Wetland no. 3 (Figure 5.16). The said wetland is 8.54 ha in extent. Seep Wetland no. 3 has a PES of category of E/F (i.e. Seriously to Critically modified) having been impacted in terms of Acid Mine Drainage from the unrehabilitated Blesboklaagte Colliery, dumping of waste, construction of gravel road, etc. The calculated EIS was indicated as Low (i.e. wetlands that are not ecologically important and sensitive at any scale. The biodiversity of these wetlands are ubiquitous and not sensitive to flow and habitat modifications). In general, the removal of the vegetation and the earthworks required during the construction phase would impact directly on the functioning of Seep Wetland no. 3.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	The presence of the storm water pipe would continue to impact on Seep Wetland No. 3. The discharge of water from the storm water pipe during the operational phase into the Jackaroo Park storm water system could eventually impact on the Channelled Valley Bottom Wetland No. 4 (Figure 5.16) associated with the drainage area extending through Jackaroo Park. Water pollution could take place if waste management measures are not implemented on the Klarinet Phase 2 site resulting in waste being washed down the storm water pipe into the said wetland system. In addition, water pollution could result if the Klarinet Phase 2 sewer system does not have sufficient capacity resulting in sewage pollution of the identified wetland system through the storm water system. This would impact on the associated aquatic environment, bird life and water quality of the downstream system and could eventually impact on the Olifants River.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	During the decommissioning phase, the storm water pipe would have to be excavated, which would lead to the removal of vegetation. The said area will then be rehabilitated in order to establish a vegetation cover and prevent soil erosion. This would result in clean runoff from the site entering the surrounding area.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEUTRAL	MEDIUM NEUTRAL
GROUNDWATER	The construction activities would impact on groundwater associated with Seep Wetland no. 3 which is as a result of Acid Mine Drainage from the unrehabilitated Blesboklaagte Colliery.	SITE	LONG	DEFINITE	MEIUDM NEGATIVE	LOW NEGATIVE	The presence of the storm water pipe would continue to impact on the groundwater flow and therefore the functioning of Seep Wetland no. 3. Groundwater pollution could take place if waste management measures are not implemented on the Klarinet Phase 2 site resulting in waste being washed down the storm water pipe into the Jackaroo Park storm water system and eventually the Channelled Valley Bottom Wetland No. 4 associated with the drainage area extending through Jackaroo Park. In addition, groundwater pollution could result if the Klarinet Phase 2 sewer system does not have sufficient capacity resulting in sewage pollution of the identified wetland system through the storm water system.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	During the decommissioning phase, the storm water pipe will be excavated, removed from site and disposed of accordingly. The excavation activities and removal of the pipe will once again impact on the groundwater flow of the site. After rehabilitation, natural groundwater flow should return depending on the geological and soil changes that took place.	SITE	LONG	PROBABLE	LOW NEUTRAL	LOW NEUTRAL
SITES OF ARCHAEOLOGICAL/ CULTURAL INTEREST	NONE. The construction of the storm water pipe will not impact on any sites of archaeological and/or cultural interest according to Van Vollenhoven and Collins (2015). No sensitive landscapes (graves, etc.) will thus be impacted.						NONE. No further construction activities would take place.						NONE.					

8.7.5 DIRECT AND INDIRECT IMPACTS – CONSTRUCTION AND OPERATION OF THE EASTERN STORM WATER PIPE (FIGURE 8.5)

ENVIRONMENTAL FEATURE(S)	PREDICTED IMPACT CONSTRUCTION PHASE: PHASE 3 (KLARINET X12) TIME PERIOD: 12 MONTHS AREA: 500 m X 4 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 500 m X 2 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 500 m X 4 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)
SITES OF PALAEONTOLOGICAL INTEREST	The proposed storm water route is underlain by sandstone, shale, gritstone and coal measure of the Vryheid Formation. According to Fourie (2015), the potential impact is Very High as significant fossil resources (shale) may be impacted by the construction activities. Fourie (2015) however, indicated no objection to the proposed development of the said site.	SITE	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	NONE. No further construction activities would take place.						NONE.					
AIR QUALITY	Dust generation and vehicle emissions due to construction activities and use of heavy machinery could impact on site workers, natural vegetation, animal life, wetlands, property of MJ Grobler, Transnet railway line and the houses in Booyong Street, Jackaroo Park. The extent of the impact would depend on the time of year, wind direction and velocity and portion of the property being developed. Mitigation measures would have to be implemented.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	During the operational phase, no direct impact on the air quality is anticipated since no construction activities will take place.						Dust generation and vehicle emissions due to decommissioning activities and use of heavy machinery could impact on site workers and people living in the area at the said time. The extent of the impact would depend on the time of year, wind direction and velocity. Once rehabilitated, the impact on air quality is expected to be positive in terms of reduced dust generation as the area will then be revegetated.	SITE	SHORT	PROBABLE	MEDIUM NEUTRAL	MEDIUM POSITIVE
VISUAL	The construction activities would be highly visible from the property of MJ Grobler, the Transnet railway line, the road in Jackaroo Park and the houses in Booyong Street, Jackaroo Park. The construction site would have to be kept neat and tidy at all times.	SITE	SHORT	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	NONE. The storm water pipe would be located underground and would thus not be visible.						During the decommissioning phase, the storm water pipe would be excavated and removed. The construction activities would be visible to the property belonging to MJ Grobler, the Transnet railway line and the last row of houses located in Booyong Street, Jackaroo Park. However, if the site is rehabilitated properly it could have a positive impact in terms of visual aspects.	SITE	LONG	PROBABLE	LOW NEUTRAL	LOW POSITIVE
NOISE	Noise generation due to construction activities and use of heavy machinery could impact on site workers, animal life, nearby residence of MJ Grobler and the houses in Booyong Street, Jackaroo Park. Construction activities should be limited to daylight hours.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	NONE. No further impact - no further construction activities.						In general, the use of heavy machinery for decommissioning activities would impact on the surrounding area in terms of noise.	SITE	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE
TRAFFIC	The construction activities will not impact directly on traffic. The delivery of building material during the construction period could however, lead to a slight increase in traffic on the road network of Jackaroo Park. This could impact on the road users of the said roads. The deliveries would however, not occur on a continuous basis.	SITE	SHORT	PROBABLE	LOW NEGATIVE	LOW NEGATIVE	NONE. No further impact - no further construction activities.						The pipeline would have to be removed from site. This could lead to a slight increase in traffic on the Jackaroo Park road network.	SITE	SHORT	PROBABLE	LOW NEGATIVE	LOW NEGATIVE

8.7.5 DIRECT AND INDIRECT IMPACTS – CONSTRUCTION AND OPERATION OF THE EASTERN STORM WATER PIPE (FIGURE 8.5)

ENVIRONMENTAL FEATURE(S)	PREDICTED IMPACT CONSTRUCTION PHASE: PHASE 3 (KLARINET X12) TIME PERIOD: 12 MONTHS AREA: 500 m X 4 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 500 m X 2 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 500 m X 4 m	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)
INTERESTED AND AFFECTED PARTIES	Possible impacts (e.g. dust, noise, etc.) on the surrounding landowners/users as well as road users are indicated above.						The discharge of water from the storm water pipe via a culvert located at the junction of Booyong and Annemarie Streets could impact on the roads and houses in this area if the post-development flow rate is not the same as the pre-development flow rate. In addition, this residential area could be impacted if waste management measures are not implemented on the Klarinet Phase 2 site, resulting in waste being washed down the storm water pipe into the Jackaroo residential area. The residential area could also be impacted if the Klarinet Phase 2 sewer system does not have sufficient capacity resulting in sewage flowing via the storm water system into Jackaroo Park. This could eventually impact on the drainage area extending through Jackaroo Park eventually also impacting on downstream users and the Olifants River. AMD from the old Blesboklaagte Colliery could also be channelled via the storm water system through Jackaroo Park into the drainage area.	SITE	LONG	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	The impact of the decommissioning of the storm water pipe in terms of interested and affected parties will depend on the character of the area at that time as well as the intended end land use.					
	The construction of the storm water pipe will impact on Portion 105 of the farm Kromdraai 292 JS belonging to MJ Grobler. The eMalahleni Local Municipality (ELM) will negotiate servitudes with the said private landowner. This will happen once the final commitments and agreements have been signed between Absa, ELM and the Mpumalanga Department of Human Settlements.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEUTRAL											
	The construction of the storm water pipe will impact on the servitude associated with the Transnet railway line. In addition, the construction of the storm water pipe under the railway line through an existing culvert could also impact on the Transnet railway line. Permission for this construction within the Transnet servitude would have to be obtained before construction takes place.	SITE	LONG	DEFINTE	MEDIUM NEGATIVE	LOW NEUTRAL											
	Contractors working on site could be directly impacted upon if the necessary safety and occupational health measures are not adhered to, especially in terms of working in or near the AMD. Injury to pedestrians/animals if the necessary safety precautions are not taken (e.g. barricading of trenches, etc.). Risk of vehicular accidents if the excavations across access roads are not clearly demarcated.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE											
	The construction phase could provide job opportunities.	SITE	SHORT	DEFINITE	MEDIUM POSITIVE	MEDIUM POSITIVE											

8.7.6 Bulk water line and reservoir (Figure 5.1)

The bulk water line and reservoir will need to be constructed as part of Phase 1 (Klarinet x10; Figure 8.1).

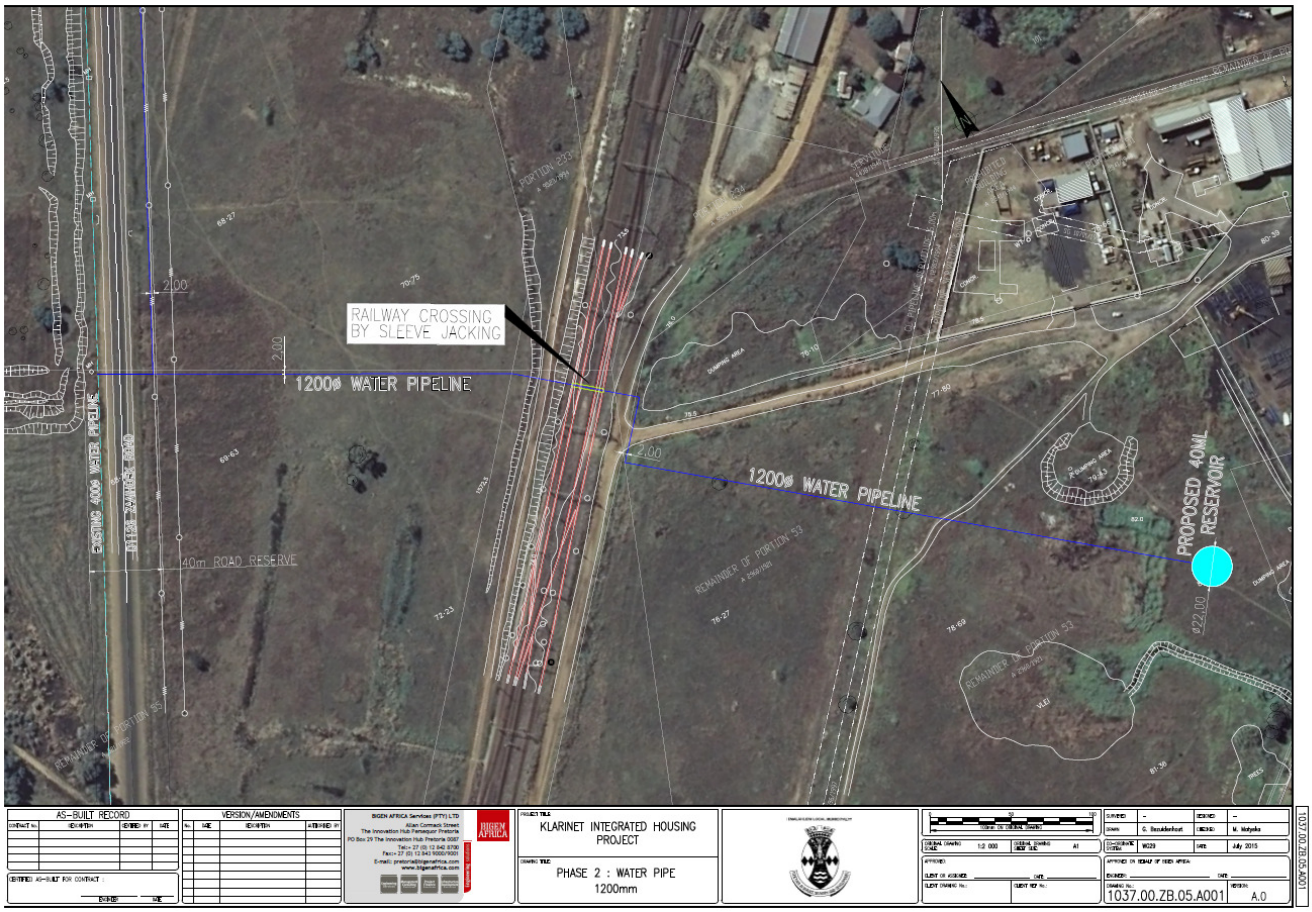

Figure 8.6: Bulk water line route and reservoir location

Reservoir

As indicated in Section 7.3.1, a new 30Ml reservoir will be required for the proposed developments (Klarinet Phase 1 and 2, Siyanqoba and potential Klarinet Phase 3). The said reservoir would be located on Portion 53 of the farm Blesboklaagte 296 JS (Figure 8.6) belonging to Ingwe Surface Holdings (Pty) Ltd. The said reservoir would be supplied from the Point A Reservoirs through a dedicated 600mm diameter feeder main from the Water Treatment (Purification) Works.

The construction and operation of a reservoir (water storage facility) is not a listed activity in terms of the Environmental Impact Assessment Regulations, 2010 and therefore an impact assessment is not required for this activity.

The siting of the said reservoir was however investigated as part of the overall impact assessment in order to determine if any sensitive environments would be impacted.

The construction of the reservoir would impact on a small area of Degraded Secondary Grassland with a Moderate Biodiversity Conservation Value or Ecological Sensitivity (McCleland and de Castro, 2015). The said site is however located within an urban area surrounded by roads, buildings,

railway line, etc. It would not provide any suitable animal habitat associated with the Grassland Assemblage as identified by McCleland and de Castro (2015). Further, the construction of the reservoir would not impact on any streams, rivers, wetlands, etc. as identified by Grobler (2015) or any sites of archaeological and/or cultural importance (including graves) as identified by Van Vollenhoven and Collins (2015).

The following however, needs to be highlighted:

- *The said reservoir will be located on Portion 53 of the farm Blesboklaagte 296 JS (Figure 8.6) belonging to Ingwe Surface Holdings (Pty) Ltd. Permission for the construction of the said reservoir would have to be obtained from Ingwe Surface Holdings (Pty) Ltd.*
- *As indicated in Figure 5.2b, the proposed reservoir site and Portion 53 of the farm Blesboklaagte 296 JS (Figure 8.6) were previously undermined. Permission for the construction of the said reservoir on undermined ground would have to be obtained from the Department of Mineral Resources and the mineral rights holder, Ingwe Surface Holdings (Pty) Ltd.*

The above-mentioned permissions are required before construction commences with regards to the said reservoir.

1300 mm ND pipeline (Figure 8.6)

As indicated in Figure 8.6, a 1300mm ND pipeline (630 m) in length) will connect to the new 30Ml reservoir and will extend across Portion 53 of the farm Blesboklaagte 296 JS (belonging to Ingwe Surface Holdings (Pty) Ltd) and Portion 55 of the farm Blesboklaagte 296 JS (belonging to Jumbo van der Merwe Trust).

Since the pipeline is less than 1 km in extent, it does not constitute a listed activity in terms of the Environmental Impact Assessment Regulations, 2010 and therefore an impact assessment is not required for this activity.

The pipeline route was however investigated as part of the overall impact assessment in order to determine if any sensitive environments would be impacted.

According to McCleland and de Castro (2015), the proposed water pipeline will have a limited impact (630m x 4m) on Degraded Secondary Grassland with a Moderate Botanical conservation value or Ecological Sensitivity. It would also have a limited impact on animal habitats associated with the Grassland Assemblage (McCleland and de Castro, 2015). Further, the construction of the water line would not impact on any streams, rivers, wetlands, etc. as identified by Grobler (2015) or any sites of archaeological and/or cultural importance (including graves) as identified by Van Vollenhoven and Collins (2015). The construction of this water line would thus have a low impact on the environmental features of the area.

The following however, needs to be highlighted:

⇒ *The construction of the 1300mm ND pipeline will impact on Portion 53 of the farm Blesboklaagte 296 JS belonging to Ingwe Surface Holdings Ltd.*

⇒ *The rest of the 1300mm ND pipeline will impact on Portion 55 of the farm Blesboklaagte 296 JS belonging to Jumbo van der Merwe Trust.*

⇒ *The eMalahleni Local Municipality will negotiate servitudes with the above-mentioned private land owners. This will happen once the final commitments and agreements have been signed between Absa, ELM and the Mpumalanga Department of Human Settlements.*

⇒ *As indicated in Figure 5.2b, the pipeline route between the Verena Road and the reservoir site was previously undermined. Permission for the construction of the pipeline on undermined ground would have to be obtained from the Department of Mineral Resources and the mineral rights holder, Ingwe Surface Holdings (Pty) Ltd.*

⇒ *The pipeline would be sleeve jacked underneath the Transnet railway line and could impact on the said railway line. Permission (wayleave) from Transnet in this regard must be obtained before installing the said pipeline. The required mitigation measures would have to be implemented.*

900 mm ND pipeline (Figure 8.6)

As indicated in Figure 7.5, a 900mm ND pipeline will connect to the 1300mm ND pipeline at the Zaaihoek/Verena road intersection and then extend northwards towards the Klarinet Phase 2 site where it will terminate in the southwestern corner of the Klarinet Phase 2 site before connecting with the internal water reticulation of the said development.

The length of the said pipeline will be approximately 2 km. The said pipeline will be located within the road reserve to the east of the D1126 Zaaihoek Road. Since the said pipeline will be located within the road reserve, it does not constitute a listed activity in terms of the Environmental Impact Assessment Regulations, 2010 and therefore an impact assessment is not required for this section of the pipeline.

The route of the said water pipeline was however investigated as part of the overall impact assessment in order to determine if any sensitive environments would be impacted.

The construction of the water pipeline within the road reserve would impact on the Transformed – Road Reserve vegetation unit with a Very Low Biodiversity Conservation Value or Ecological Value (McCleland and de Castro, 2015). Due to the disturbed nature of this vegetation no animal habitats would be impacted. Further, the construction of the water line would not impact on any streams, rivers, wetlands, etc. as identified by Grobler (2015) or any sites of archaeological and/or cultural importance (including graves) as identified by Van Vollenhoven and Collins (2015). The construction of this water line would thus have a low impact on the environmental features of the area.

The following however, needs to be highlighted:

- *The proposed water line will be located within the road reserve of the D1126 Zaaihoek Road. Permission (a wayleave) must be obtained from the Department of Public Works, Roads and Transport in order to construct the said pipeline within the road reserve of the D1126 Zaaihoek Road.*
- *The water line could be impacted in terms of Acid Mine Drainage (AMD) emanating from the adjacent previously mined areas depending on the depth of the said water line. Mitigation measures in order to protect the said water line from the impact of the AMD may be required.*

- *Contract workers on site could be directly impacted if the necessary safety and occupational health measures are no adhered to especially in terms of working in or near AMD.*

The above-mentioned permission is required before construction commences with regards to the said water pipeline.

8.7.7 OR Tambo extension (Figure 5.1)

As indicated in Section 7.7, the existing OR Tambo Road will be extended in order to connect to the Verena/Zaaihoek Roads as indicated in Figure 5.1.

Only one location and route with regards to this proposed route was provided as indicated in Figure 8.7.

Figure 8.7: Proposed OR Tambo extension

The proposed road would be approximately 1.1km in length with a 40m road reserve and would constitute a listed activity in terms of the Environmental Impact Assessment Regulations, 2010.

8.7.7 DIRECT AND INDIRECT IMPACTS – CONSTRUCTION AND OPERATION OF THE OR TAMBO EXTENSION (FIGURE 8.7)

ENVIRONMENTAL FEATURE(S)	PREDICTED IMPACT CONSTRUCTION PHASE: PHASE 1 (KLARINET X10) TIME PERIOD: 12 MONTHS AREA: 1.1 km X 40 m road	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 1.1 km X 40 m road	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 1.1 km X 40 m road	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)
TOPOGRAPHY	The topography of the OR Tambo extension route has already been impacted by previous mining activities, gravel roads, Eskom powerlines and the Transnet railway line. The construction of the said road would have a direct impact on this disturbed area i.t.o. the clearing of the site and excavations for road building purposes.	SITE	LONG	DEFINITE	LOW NEGATIVE	LOW NEGATIVE	The presence of the road would continue to impact on the general topography of the surrounding area.	SITE	LONG	DEFINITE	LOW NEGATIVE	LOW NEGATIVE	Initially, the decommissioning of the road would have a negative impact on the topography since the road would have to be excavated and the various layers removed before rehabilitation can take place. However, after rehabilitation the site would conform to the original slope of the area.	SITE	LONG	DEFINITE	LOW NEUTRAL	LOW POSITIVE
GEOLOGY/ GEOTECHNICAL ASPECTS	The proposed OR Tambo extension would extend across a previously undermined area as well as an area previously mined by opencast methods. This could impact on the construction of the proposed road in terms of geotechnical stability, possible underground fires and possible acid groundwater. Permission for construction of the road over mined ground will have to be obtained from the mineral rights holder (Ingwe Surface Holdings Ltd) and the Department of Mineral Resources before any construction takes place.	SITE	PERMANENT	DEFINITE	HIGH NEGATIVE	MEDIUM NEGATIVE	The OR Tambo extension could continue to be impacted in terms of extending across previously undermined ground if mitigation measures are not implemented.	SITE	LONG	HIGHLY PROBABLE	HIGH NEGATIVE	MEDIUM NEGATIVE	NONE. The decommissioning of the OR Tambo extension will not have any impact on the underlying geology.					
SOILS	The soil of the OR Tambo extension route has already been impacted by previous mining activities, gravel roads, Eskom powerlines and the Transnet railway line. The stockpiling of topsoil, subsoil, overburden and rocks would directly impact on the soil of the area in terms of soil structure, nutritional and chemical values when the vegetation and soil are removed, the site sloped and the road constructed. The risk of soil erosion is however low due to the relatively flat nature of the site.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	NONE. No further construction will take place.						Initially, the decommissioning of the OR Tambo extension would have a negative impact on the soil since the road would have to be excavated and the various layers removed before rehabilitation can take place. However, after rehabilitation, the impact would be positive since the area would be shaped to conform to the original slope of the area and revegetated.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEUTRAL	MEDIUM NEUTRAL
	Soil pollution could take place if: • the construction vehicles are not maintained/ repaired resulting in oil leaks and fuel spills; • waste management measures are not implemented, • proper ablution and sanitation facilities are not provided for the site workers to use on site.	SITE	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE											
LAND USE/LAND CAPABILITY/ AGRICULTURAL POTENTIAL	In terms of land capability, the proposed OR Tambo extension will impact on moderate potential arable land. However, undermining has impacted on the land use of the site resulting in the said property being vacant and unused (i.e. other than for mining purposes, gravel roads, railway line, Eskom line, etc.).	SITE	SHORT	DEFINTE	LOW NEGATIVE	LOW NEGATIVE	NONE. No further construction will take place.						The decommissioning and rehabilitation of the road would have a positive impact on land use since the constructed road would be removed and the area will once again be available for other uses.	SITE	LONG	HIGHLY PROBABLE	LOW POSITIVE	LOW POSITIVE
NATURAL VEGETATION/ ANIMAL LIFE	According to McCleland and de Castro (2015), the OR Tambo extension will impact mainly on the Transformed vegetation units (mines and quarries; road reserve, alien plantations) with a Very Low Biodiversity Conservation Value or Ecological Sensitivity. A small portion of Degraded Secondary Grassland with a Moderate Botanical conservation value or Ecological Sensitivity would also be impacted in terms of the construction of the said road. In view of the highly disturbed nature of the area, limited impact on animal habitats associated with the Grassland Assemblage (McCleland and de Castro, 2015) is anticipated.	SITE	LONG	DEFINITE	LOW NEGATIVE	LOW NEGATIVE	No further direct impact on vegetation or animal life since no further construction activities will take place. However, if the disturbed areas are not properly rehabilitated it could lead to erosion and the establishment of invader species that could impact on the surrounding natural vegetation.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	During decommissioning, the road would have to be excavated and the various layers removed. Any vegetation that has established along the route would thus be removed and the area once again rehabilitated.	SITE	LONG	PROBABLE	MEDIUM NEUTRAL	MEDIUM NEUTRAL

8.7.7 DIRECT AND INDIRECT IMPACTS – CONSTRUCTION AND OPERATION OF THE OR TAMBO EXTENSION (FIGURE 8.7)

ENVIRONMENTAL FEATURE(S)	PREDICTED IMPACT CONSTRUCTION PHASE: PHASE 1 (KLARINET X10) TIME PERIOD: 12 MONTHS AREA: 1.1 km X 40 m road	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 1.1 km X 40 m road	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 1.1 km X 40 m road	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)
SURFACE WATER/SENSITIVE LANDSCAPES	NONE. No surface water environments (rivers, streams, wetlands, etc.) as identified by Grobler (2015) will be impacted as a result of the construction of the OR Tambo extension.						NONE. No further construction will take place.						During the decommissioning phase, the road would have to be excavated and the various layers removed. The said area will then be rehabilitated in order to establish a vegetation cover and prevent soil erosion. This would result in clean runoff from the site entering the surrounding area.	SITE	LONG	HIGHLY PROBABLE	MEDIUM NEUTRAL	MEDIUM NEUTRAL
GROUNDWATER	NONE. No impact on groundwater is anticipated.						NONE.						NONE.					
SITES OF ARCHAEOLOGICAL/ CULTURAL INTEREST	NONE. The construction of the OR Tambo extension will not impact on any sites of archaeological and/or cultural interest according to Van Vollenhoven and Collins (2015). No sensitive landscapes (graves, etc.) will thus be impacted.						NONE. No further construction activities would take place.						NONE.					
SITES OF PALAEONTOLOGICAL INTEREST	The OR Tambo extension route is underlain by the Vryheid Formation (Celliers and Hansmeyer, 2014). According to Fourie (2015), the potential impact is Very High as significant fossil resources (shale) may be impacted by the construction activities. Fourie (2015) however, indicated no objection to the proposed development of the said site.	SITE	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	NONE. No further construction activities would take place.						NONE.					
AIR QUALITY	Dust generation and vehicle emissions due to construction activities and use of heavy machinery could impact on site workers, natural vegetation, the Transnet railway line, Verena road and the nearby houses. The extent of the impact would depend on the time of year, wind direction and velocity and portion of the property being developed. Mitigation measures would have to be implemented.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	During the operational phase, no direct impact on the air quality is anticipated since no construction activities will take place.						Dust generation and vehicle emissions due to decommissioning activities and use of heavy machinery could impact on site workers, Transnet railway line and Verena Road. The extent of the impact would depend on the time of year, wind direction and velocity. Once rehabilitated, the impact on air quality is expected to be positive in terms of reduced dust generation as the area will then be revegetated.	SITE	SHORT	PROBABLE	MEDIUM NEGATIVE	MEDIUM POSITIVE
VISUAL	The construction activities would be highly visible from the Transnet railway line, adjacent properties, the nearby houses as well as the Zaaihoek and Verena Roads. The construction site would have to be kept neat and tidy at all times.	SITE	SHORT	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	The presence of the road will continue to impact on the visual appearance of the area.	SITE	LONG	DEFINITE	LOW NEGATIVE	LOW NEGATIVE	During the decommissioning phase, the road would be excavated and the various layers removed. The construction activities would be visible to the surrounding properties, Transnet railway line, the nearby houses as well as the Zaaihoek and Verena Roads. However, if the site is rehabilitated properly it could have a positive impact in terms of visual aspects.	SITE	LONG	PROBABLE	LOW NEUTRAL	LOW POSITIVE
NOISE	Noise generation due to construction activities and use of heavy machinery could impact on site workers and surrounding area. Construction activities should be limited to daylight hours.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE	NONE. No further impact - no further construction activities.						In general, the use of heavy machinery for decommissioning activities would impact on the surrounding area in terms of noise.	SITE	SHORT	PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE

8.7.7 DIRECT AND INDIRECT IMPACTS – CONSTRUCTION AND OPERATION OF THE OR TAMBO EXTENSION (FIGURE 8.7)

ENVIRONMENTAL FEATURE(S)	PREDICTED IMPACT CONSTRUCTION PHASE: PHASE 1 (KLARINET X10) TIME PERIOD: 12 MONTHS AREA: 1.1 km X 40 m road	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 1.1 km X 40 m road	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)	PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 1.1 km X 40 m road	EXTENT	DURATION	PROBABILITY	SIGNIFICANCE (PRE-MITIGATION)	SIGNIFICANCE (POST MITIGATION)
TRAFFIC	The construction of the OR Tambo extension would impact on the gravel servitude road associated with the Transnet railway line and used for maintenance purposes as well as the various gravel roads providing access to the houses on site.	SITE	SHORT	PROBABLE	LOW NEGATIVE	LOW NEGATIVE	NONE. No further impact - no further construction activities.											
	In addition, it will impact on the Verena and Zaaihoek Roads when the said road is linked to both of these roads. This could impact on the general road users utilising these roads.	SITE	SHORT	DEFINITE	MEDIUM NEGATIVE	LOW NEGATIVE	The utilisation of the OR Tambo extension would provide the residents of Klarinet and surrounding areas with an alternative route over the Transnet railway in order to gain access to the Central Business District of Witbank and other areas. It would relief the pressure on the current rail crossing that is currently experiencing heavy traffic volumes.	SITE	LONG	DEFINITE	MEDIUM POSITIVE	MEDIUM POSITIVE	The impact of the decommissioning of the OR Tambo extension in terms of interested and affected parties will depend on the character of the area at that time as well as the intended end land use.					
INTERESTED AND AFFECTED PARTIES	Possible impacts (e.g. dust, noise, etc.) on landowners/users as well as road users are indicated above.						The utilisation of the OR Tambo extension would provide the residents of Klarinet and surrounding areas with an alternative route over the Transnet railway in order to gain access to the Central Business District of Witbank and other areas. It would relief the pressure on the current rail crossing that is currently experiencing heavy traffic volumes.	SITE	LONG	DEFINITE	MEDIUM POSITIVE	MEDIUM POSITIVE	The impact of the decommissioning of the OR Tambo extension in terms of interested and affected parties will depend on the character of the area at that time as well as the intended end land use.					
	The construction of the OR Tambo extension will impact on the following landowners and their activities: • Portion 21 of the farm Blesboklaagte 296 JS (Ingwe Surface Holdings Ltd). • Portion 105 of the farm Blesboklaagte 296 JS (Hilkru Family Trust); • Portion 136 of the farm Blesboklaagte 296 JS (eMalahleni Local Municipality); • Portion 161 of the farm Blesboklaagte 296 JS (JF Barnard); • Portion 162 of the farm Blesboklaagte 296 JS (K. Singh); • Portion 235 of the farm Blesboklaagte 296 JS (Transnet Limited); • Portion 29 of the farm Joubertsrus 310 JS (eMalahleni Local Municipality). The eMalahleni Local Municipality will negotiate servitudes with the above-mentioned private land owners. This will happen once the final commitments and agreements have been signed between Absa, ELM and the Mpumalanga Department of Human Settlements.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEUTRAL											
	The OR Tambo extension would extend over the Transnet railway line and could impact on the said railway line, its associated infrastructure (e.g. overhead electrical lines) and its servitude. Permission (wayleave) from Transnet in this regard must be obtained before commencing with construction activities. The required mitigation measures would have to be implemented.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEUTRAL											
	The OR Tambo extension could impact on the servitudes associated with the Eskom powerlines extending across the property. Permission from Eskom in this regard must be obtained before commencing with construction activities. The required mitigation measures would have to be implemented.	SITE	LONG	DEFINITE	MEDIUM NEGATIVE	LOW NEUTRAL											

8.7.7 DIRECT AND INDIRECT IMPACTS – CONSTRUCTION AND OPERATION OF THE OR TAMBO EXTENSION (FIGURE 8.7)																	
ENVIRONMENTAL FEATURE(S)	**PREDICTED IMPACT CONSTRUCTION PHASE: PHASE 1 (KLARINET X10) TIME PERIOD: 12 MONTHS AREA: 1.1 km X 40 m road**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT OPERATIONAL PHASE TIME PERIOD: UNKNOWN AREA: 1.1 km X 40 m road**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**	**PREDICTED IMPACT PHASE: DECOMMISSIONING PHASE TIME PERIOD: UNKNOWN AREA: 1.1 km X 40 m road**	**EXTENT**	**DURATION**	**PROBABILITY**	**SIGNIFICANCE (PRE-MITIGATION)**	**SIGNIFICANCE (POST MITIGATION)**
	Contractors working on site could be directly impacted upon if the necessary safety and occupational health measures are not adhered to. Injury to pedestrians/animals if the necessary safety precautions are not taken (e.g. barricading of trenches, etc.). Risk of vehicular accidents if the excavations across access roads to adjacent properties are not clearly demarcated and barricaded.	SITE	SHORT	HIGHLY PROBABLE	MEDIUM NEGATIVE	LOW NEGATIVE											
	The construction phase could provide job opportunities.	SITE	SHORT	DEFINITE	MEDIUM POSITIVE	MEDIUM POSITIVE											

9. DISCUSSION AND CONCLUSION

9.1 Potential impacts on land owners

Through the public participation process it was established that there is a perception that properties will be bought/taken for the purpose of the proposed development. However, this is not the case.

The majority of the site belongs to the project applicant, Absa Prop Development (Pty) Ltd., with 4 portions belonging to the eMalahleni Local Municipality, who forms part of the project team with regards to the proposed residential development. **No properties will be bought or taken in order to facilitate the proposed residential development.** No other interested and affected party will thus be directly impacted by the proposed residential development.

Where services (roads, water pipelines, sewer lines, etc.) will extend onto adjacent properties, negotiations will take place in order to register a servitude across the said properties for the purposes of the said services. **The eMalahleni Local Municipality will negotiate servitudes with the following private land owners once the final commitments and agreements have been signed between Absa, ELM and the Mpumalanga Department of Human Settlements:**

SERVICE	CONSTRUCTION PHASE	PROPERTY DESCRIPTION	LANDOWNER
Main access road from the D1126 Zaaihoek Road	Phase 2	Portion 56 of the farm Blesboklaagte 296 JS	Khula Brick and Sand (Pty) Ltd
Northern sewer line (Figure 8.2)	Phase 1	Portion 167 of the farm Blesboklaagte 296 JS	JDS Paterson
		Portion 155 of the farm Blesboklaagte 296 JS	MM Khumalo
North eastern storm water pipe (Figure 8.3)	Phase 3	Portion 192 of the farm Blesboklaagte 296 JS	GM Lambrechts
Eastern sewer line (Figure 8.4)	Phase 3	Portion 2 of the farm Kromdraai 292 JS	FJ du Preez
		Transnet servitude	Transnet Limited
Eastern storm water pipe (Figure 8.5)	Phase 3	Portion 105 of the farm Blesboklaagte	MJ Grobler
Reservoir and bulk water line (Figure 8.6)	Phase 1	Portion 53 of the farm Blesboklaagte 296 JS	Ingwe Surface Holdings (Pty) Ltd
		Portion 55 of the farm Blesboklaagte 296 JS	Jumbo van der Merwe Trust
		Transnet servitude	Transnet Limited
		Road reserve	Department of Public Works, Roads and Transport
OR Tambo link road extension (Figure 8.7)	Phase 1	Portion 21 of the farm Blesboklaagte 296 JS	Ingwe Surface Holdings (Pty) Ltd.
		Portion 105 of the farm Blesboklaagte 296 JS	Hilkru Family Trust
		Portion 161 of the farm Blesboklaagte 296 JS	FJ Barnard
		Portion 162 of the farm Blesboklaagte 296 JS	K Singh

SERVICE	CONSTRUCTION PHASE	PROPERTY DESCRIPTION	LANDOWNER
		Portion 235 of the farm Blesboklaagte 296 JS	Transnet Limited

In terms of the northern sewer line, a small portion of the sewer line may impact on Portion 79 of the farm Blesboklaagte 296 JS (belonging to Sarovic Investments (Pty) Ltd) before it connects to the existing sewer line located on the northern boundary of Klarinet x6. The need for a servitude over this property will have to be determined once the final design plans are available.

It should be noted that the north eastern storm water pipe will no longer be located on Portion 25 of the farm Blesboklaagte 296 JS (belonging to Ms de Jonckheer) and therefore the farmworker's houses will not be impacted.

This impact assessment recommends (see Section 6.2.3) that the north eastern storm water pipe only be located on Portion 192 of the farm Blesboklaagte 296 JS. Portion 3 (belonging to the Dithebe CPA) and Portion 11 (belonging to Span Kalbasfontein) would therefore not be directly impacted in terms of the construction of the north eastern storm water pipe. This would reduce the impact on the game farming and other agricultural activities taking place on the said farms. Mitigation measures recommended would however have to be implemented. It would therefore not be necessary to negotiate servitudes over these properties.

The eastern sewer line will no longer extend through property belonging to the Highveld Association for the Physically Disabled (located in Jackaroo Park) as originally indicated in the Scoping Report.

The above-mentioned negotiations must be concluded before any construction takes place. As indicated above, the said services will be installed during different phases of the project.

In addition to the above-mentioned, the following permissions would also be required before construction commences:

- Principal Inspector of Mines (Department of Mineral Resources): reservoir and bulk water line, eastern sewer line, OR Tambo link road extension, main access road from the D1126 Zaaihoek Road.
- Department of Public Works, Roads and Transport: northern sewer line crossing the D1126 Zaaihoek Road, the bulk water line within the D1126 road reserve.
- Transnet Limited: eastern sewer line, eastern storm water pipe, bulk water line, OR Tambo link road extension.
- Eskom: OR Tambo link road extension.

It should be noted that the proposed Klarinet Phase 2 residential development will not impact on the Eskom powerlines extending through the said site. This Eskom servitude was included as part of the overall Public Open Space system (Figure 7.4).

9.2 Potential environmental impacts identified

9.2.1 Geotechnical investigation

From a geotechnical aspect, the majority of the central, northern and northeastern portions of the proposed development site (approximately 190

ha) is developable subject to the implementation of mitigation measures as recommended by Celliers and Hansmeyer (2014).

Historically the area to the south of the proposed development site (including Erf 5017) was mined for coal using underground mining methods. These areas were not rehabilitated. Subsidence and sinkholes are present. Underground fires are also known to be present within this area while acid mine drainage is also a problem. In recent years, portions of this area have been mined by opencast mining methods. In cases, rehabilitation has also not taken place.

The old Blesboklaagte Colliery is located in the eastern corner of the proposed development site (i.e. on Portion 26 and the Remainder of Portion 98 of the farm Blesboklaagte 296 JS). This opencast mine has not been rehabilitated resulting in open voids and bare ground being present within this area. Over the past few years, two companies operated coal washing plants on site resulting in the construction of slurry ponds and the open voids being filled with discard. In areas, burning discard/coal is evident. Acid mine drainage (AMD) emanates from the site and drains towards Jackaroo Park. To date, no rehabilitation of this area has taken place. As per the lease agreement with the landowner (ABSA Devco), a Closure and Rehabilitation Plan is currently being compiled in order to rehabilitate the said area.

From the geotechnical investigation, it is evident that an area of 70.50 ha of the site was subjected to previous mining activities (i.e. 21.61 ha previously mined and rehabilitated (Geotechnical Zones 3A and 3B; Figure 5.2d), 9.73 ha is undermined (Geotechnical Zone 4B; Figure 5.2d), 39.16 ha opencast mining (Geotechnical Zone 4C; Figure 5.2d)).

Celliers and Hansmeyer (2014) indicated that Geotechnical Zones 3A, 3B and 4C (Figure 5.2d) could be remediated and possibly developed after remediation has taken place. This affects the proposed residential stands in the southern portion of the site (i.e. adjacent to the Zaaihoek Road; Erf 5017), the proposed mall site, the proposed clinic site, the proposed police station site as well as some of the residential stands adjacent to the main access road extending through Phase 2 and Phase 3 along the southern boundary.

It should however, be noted that the majority of Geotechnical Zone 4C (old Blesboklaagte Colliery area used for opencast mining and coal washing activities) has been demarcated Public Open Space (Figure 7.4) where no development will take place. However, from Layout Plan no. 5 (Figure 7.4) it is evident that it is possible that a few residential stands could extend into this area.

Celliers and Hansmeyer (2014) indicated no development should take place within Geotechnical Zone 4B (undermined area; Figure 5.2d). This affects the proposed residential stands in the southern portion of the site (i.e. adjacent to the Zaaihoek Road – Erf 5017), the proposed mall site and the main access road extending from the Zaaihoek Road through Phase 2 and Phase 3 along the southern boundary of the site.

The Department of Mineral Resources indicated in a letter (dated: 7 September 2015; Appendix 20) that according to available information underground mining operations had taken place within a horizontal distance

of 100 metres from the proposed Klarinet Phase 2 development. In view of this, there is a possibility of pillar failure.

In terms of Regulation 17(7) and 17(8)(b) of the Mine Health and Safety Act, 1996 (Act 29 of 1996), the Department of Mineral Resources cannot allow township development on the area in question unless permission is granted by the Principal Inspector of Mines. In order to obtain permission from the Principal Inspector of Mines, a well-motivated application must be submitted to the Department of Mineral Resources in which it is clearly indicated what restrictions will be imposed on the development of the said area. This application must be accompanied by:

- a report (including recommendations),
- a risk assessment from a suitably qualified Rock Engineer,
- three plans of a suitable scale indicating the exact location of the underground workings in relation to the proposed surface structures,
- detailed borehole logs indicating the type and thickness of super incumbent strata and the exact depth and mining height of the coal seam.

The Department further indicated that if permission is granted, all plans of buildings and structures in this area must carry the annotation: *'This building/structure is designed in the knowledge that the site is undermined and that surface subsidence may occur. The design is of such a nature that, should subsidence occur, danger to persons and property may result'.* The said annotation must be signed by an Architect or a Professional Engineer.

It is understood that permission must also be obtained from the Principal Inspector of Mines (Department of Mineral Resources) in order to construct buildings and infrastructure on areas previously mined by opencast method.

As already indicated, the geotechnical investigation indicated that an area of 70.50 ha of the development site had been affected by previous mining activities. Permission from the Principal Inspector of Mines will thus have to be obtained before any construction takes place within this area.

If permission for the construction of the residential stands and infrastructure on previously mined ground is not granted, then an alternative layout plan for the development would have to be investigated.

The following infrastructure would also extend over previously mined ground (undermined (Figure 5.2b)/opencast) namely, the proposed reservoir and bulk water line, eastern sewer line, OR Tambo link road extension and the main access road from the D1126 Zaaihoek Road. Permission from the Principal Inspector of Mines will thus also have to be obtained before any construction of this infrastructure takes place.

If permission for the construction of the reservoir, bulk water line and OR Tambo link road extension is not granted by the Principal Inspector of Mines, then alternative sites for this infrastructure would have to be investigated.

According to our knowledge, permission from the Principal Inspector of Mines has not been obtained to date.

9.2.2 Ecological investigation (natural vegetation and animal life)

McCleland and de Castro (2015) indicated the Ecological State of much of the Klarinet Phase 2 development area to be Low because of previous and current land-use activities within and adjacent to the said site. McCleland and de Castro (2015) provided the following reasons for this rating:

- 50% of the study area has been transformed through alien tree plantations and construction of housing and infrastructure, while 44% has previously been transformed through cultivation and now comprises degraded Secondary Grassland.
- Transformed Areas have no possibility of supporting species of conservation concern and have little or no ecological functional value; these areas have been assessed as having Very Low biodiversity conservation value.
- Secondary Grassland, while having Low botanical value (since it has been ploughed historically and is unlikely to ever retain its original plant species diversity), it does still provide functional habitat for some fauna species of conservation concern and has a Moderate biodiversity conservation value.
- The two untransformed grassland vegetation units (Untransformed Rocky Grassland and Untransformed Grassland, (comprising 6% of the area) are moderately representative of Eastern Highveld Grassland, an Endangered vegetation type and potentially support a few plant species of conservation concern. These grassland fragments are also likely to be important "stepping stone" fragments for movement of pollinators of many of the grassland plants and are thus of high value for the viability of larger grassland patches outside of the study area. Untransformed Rocky Grassland and Untransformed Grassland are thus allocated High biodiversity conservation value.

According to the guidelines and recommendations contained in the Mpumalanga Biodiversity Sector Plan, Heavily Modified or Moderately Modified: Old Lands would be the preferred categories for land uses that result in transformation of natural habitat, such as mining or township establishment. McCleland and de Castro (2015) indicated that while the Untransformed Grassland remaining in the study area is classified as Other Natural Areas (i.e. a category that allows for land use options such as township developments in natural habitat), the transformation of these grassland fragments through township establishment is not advised due to the High biodiversity conservation value thereof.

In terms of the proposed Klarinet Phase 2 development, 2.92 ha (1% of the total area) of Untransformed Rocky Grassland vegetation unit will be impacted in terms of the Phase 1 (Klarinet x10) development while 12.2 ha (5% of the total area) of the Untransformed Grassland vegetation unit will be impacted in terms of the Phase 1 (Klarinet x10) and Phase 2 (Klarinet x11) development. In total, the Klarinet Phase 2 project would impact on 15.12 ha (6% of the total area) of untransformed grassland vegetation units. Layout Plan no. 5 (Figure 7.4) does not include these areas as part of the Public Open Space system.

Based on the abovementioned, the in situ conservation of any threatened or Near Threatened plant species within the development site would not be possible.

Of particular concern is the possible presence of threatened, Near Threatened and Declining plant species within the untransformed grassland. According to McCleland and de Castro (2015), the five threatened species (listed in

Appendix 2 of Appendix 14) have a Low likelihood of occurrence because of occurring in vegetation types or geology types not represented in the study area, and/or being visible species that would not have been overlooked during fieldwork .

Of the eleven other species of conservation concern,

- eight have a Low or Very Low likelihood of occurring,
- two Declining species (*Eucomis autumnalis* subsp. *clavata*, *Hypoxis hemerocallidea*) have a Moderate likelihood of occurring – suitable habitat present within proposed development site,
- one Declining species, *Callilepis leptophylla*, has a High likelihood of occurring in the study area – a population has been confirmed to occur on the farm Blesboklaagte 296 JS (MTPA threatened species data, M Lotter *pers comm.*).

In view of the abovementioned, it is therefore recommended that the untransformed grassland units be searched for the threatened, Near Threatened and Declining species (listed in Appendix 2 of Appendix 14) and the protected plant species (Table 5 of Appendix 14) prior to development thereof as recommended by McCleland and de Castro (2015).

If any of these plant species are found, then permission for their removal (permit) must be obtained from the MTPA before any construction activities take place. If required by the MTPA, appropriate ex situ conservation measures (i.e. translocation of plants to transformed (including rehabilitation areas) or degraded areas within or adjacent to the site) will be investigated or the plant species will be placed in a nursery or donated to a research institute (e.g. SANBI or regional botanical garden).

In order to further reduce impact on the surrounding vegetation, the landowner must develop an integrated alien plant control program as recommended by McCleland and de Castro (2015). This will be of particular importance for the areas to be retained as Public Open Space.

It should be noted that the proposed services (northern sewer line, northeastern storm water pipe, eastern sewer line, eastern storm water pipe, reservoir and bulk water line, OR Tambo extension; Figure 5.12) will impact on the Transformed and degraded Secondary Grassland vegetation units. No untransformed grassland vegetation units will be impacted in terms of these services.

McCleland and de Castro (2015) indicated that the wetland vegetation unit would be impacted in terms of the northeastern storm water pipe and the eastern attenuation dam and storm water pipe. Further details in this regard are provided in Section 9.2.3.

9.2.3 Wetland investigation

In general, the development of Klarinet x10, x11 and x12 (i.e. where the houses will be built) will not directly impact on any watercourses (including wetlands) as identified in terms of the National Water Act, 1998.

Grobler (2015) identified only one wetland (Seep Wetland no. 3) within the overall proposed Klarinet Phase 2 residential development area. Seep wetland no. 3 overlaps with the eastern attenuation dam and eastern storm water pipe as indicated below.

Within the 500m buffer around the proposed development site, Grobler (2015) identified the six (6) wetlands. Seep wetlands no. 5, 6 and 7 do not overlap with any of the proposed infrastructure services (i.e. OR Tambo extension, sewer lines, storm water trench, bulk water line). However, Seep wetland no. 1 and Channeled valley bottom wetlands no. 2 and 4 overlap with proposed service infrastructure as indicated below.

Seep wetland no. 3

An acid mine drainage pond is located in the northeastern corner of the proposed development site that drains onto the adjacent property and flows down towards the railway line and Jackaroo Park. This area was identified by Grobler (2015) as Seep Wetland no.3 (Figure 5.16).

The proposed eastern attenuation dam will be built within Seep wetland no. 3 (Figure 5.16). Although the said wetland is 8.54 ha in extent, only a portion thereof falls within the proposed development site (Figure 5.16). Grobler (2015) indicated that approximately 241 m of the eastern storm water pipe extending from the eastern attenuation dam will also impact on Seep Wetland no. 3. An area of 1.51 ha of the said wetland would be affected.

McCleland and de Castro (2015) indicated the wetland vegetation of this small, degraded wetland to have a Low Biodiversity Conservation Value or Ecological Sensitivity. Seep wetland no. 3 is regarded to have a Seriously to Critically modified PES (category E/F) and is the most impacted wetland within the assessed area. The calculated PES category was adjusted from an E to an E/F category for Seep wetland no. 3 based on the fact that water quality impacts are expected in the wetland as a result of leachate from dumped mining discard material and acid mine drainage from the upstream un-rehabilitated colliery. Damage to Seep wetland no. 3 is permanent and although some of the existing impacts can be mitigated, such as the removal of mining-related discard material, the PES of the wetland is unlikely to improve beyond that of a class E (Seriously modified) watercourse. Grobler (2015) further indicated the Ecological Importance and Sensitivity (EIS) category for Seep wetland no. 3 as Low (*i.e. wetlands that are not ecologically important and sensitive at any scale. The biodiversity of these wetlands is ubiquitous and not sensitive to flow and habitat modifications*).

Grobler (2015) indicated that the proposed development layout plan should be adjusted to incorporate Seep wetland no. 3 and its dam along with the surrounding 32 m buffer. In addition, discarded mined material dumped on the road crossing through the wetland and present within the wetland, should be removed to reduce further negative water quality impacts.

It should be noted that the eastern attenuation dam and storm water pipe are only scheduled to be developed as part of Phase 3 of the overall development. By this time it is anticipated that the unrehabilitated mine area (i.e. old Blesboklaagte Colliery) will be rehabilitated. This should assist in addressing the acid mine drainage emanating at Seep Wetland no. 3.

In view of this, it is suggested that the construction of the eastern attenuation dam and storm water pipe be reviewed once the Rehabilitation Plan for this area has been compiled. The proposed final rehabilitated landform could result in changes to the proposed eastern attenuation dam and storm water pipe.

Seep wetland no. 1 and Channeled valley bottom wetland no. 2

Stormwater runoff from the proposed development site could indirectly impact on a tributary of the Olifants River located downstream of the site within the Kromdraai smallholding area. This could impact on the possible wetlands and aquatic life associated with this system as well as the water quality. Farm dams located within this system could also be impacted upon as well as the associated agricultural activities.

Grobler (2015) indicated that approximately 377 m of the north eastern storm water pipe will impact on Seep Wetland no. 1. It will also impact on a small portion of the dam and the upstream section of Channeled valley bottom wetland no. 2.

McCleland and de Castro (2015) indicated that the wetland vegetation unit (associated with Seep Wetland no. 1 and the Channeled valley bottom wetland no. 2) has a High Biodiversity Conservation Value or Ecological Sensitivity that provides some habitat for animal species associated with the Grassland and Wetland Assemblages as identified by McCleland and de Castro (2015).

Grobler (20150) indicated that Seep wetland no. 1 is regarded as having a Largely modified to Seriously modified PES (category D/E) while Channeled valley bottom wetland no. 2, located downstream of Seep wetland no. 1 (Figure 5.16), has a Largely modified PES (D category). Both these wetlands have a Moderate Ecological Importance and Sensitivity (EIS) rating meaning that these wetlands are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these wetlands is not usually sensitive to flow and habitat modifications.

Grobler (2015) indicated that the alignment of the north eastern storm water pipe can be changed to help minimise overlap with Seep wetland no. 1, the dam and the downstream Channeled valley bottom wetland no. 2. In addition, Grobler (2015) indicated that the storm water pipe should not impact directly on the 32m buffer around the dam and the Channeled Valley bottom wetland.

From this impact assessment, it is evident that the north eastern storm water pipe should only be located on Portion 192 of the farm Blesboklaagte 296 JS (belonging to Mr. GM Lambrechts). It should ideally be located outside of the buffer zone associated with Seep Wetland no. 1 and should therefore not extend across the property to the downstream adjacent properties.

Grobler (2015) indicated that storm water should be dispersed/released in a controlled manner prior to entry into Seep Wetland no. 1 in order to reduce erosion by channelization (Grobler, 2015). A vegetated buffer zone should be utilized. From here, it would flow into the downstream Channeled valley bottom wetland no. 2. The project engineers indicated that the attenuation dam was designed to release water into the storm water pipe at pre-development flow rates in order to reduce the potential impact of erosion on the downstream system.

In addition, within the Klarinet Phase 2 area waste management measures must be implemented and the sewer system maintained to prevent the impact on the quality of the storm water flowing into the attenuation dam and storm water pipes flowing into the downstream wetland system.

No storm water pipe should therefore be constructed on the property belonging to the Dithebe CPA (Portion 3 of the farm Kalbasfontein 284 JS) or Span Kalbasfontein Trust (Portion 11 of the farm Kalbasfontein 284 JS). This would reduce the potential impact on game, game fencing, dams, the Channeled valley bottom wetland no. 2 and therefore the downstream aquatic environment.

In view of the above-mentioned, the design plan for the northeaster storm water pipe needs to be revised.

Channeled valley bottom wetland no. 4

Channeled valley bottom wetland no. 4, located downstream of Seep wetland no. 3 (Figure 5.16), is fragmented by the Jackaroo residential development. Storm water discharge is already being directed into the watercourse, while a small dam and weir are present as retention structures in its upstream reach. Channeled valley bottom wetland no. 4 has a Seriously modified PES (E category) while the Ecological Importance and Sensitivity (EIS) category is Low to Moderate (Grobler, 2015).

Grobler (2015) indicated that approximately 92 m of the eastern storm water pipe would directly impact on this wetland. However, it was subsequently found that the said wetland would not be directly impacted in terms of the construction of the eastern storm water pipe. It could however be impacted in terms of the volume and quality of additional storm water being discharged and directed into the said watercourse. The project engineers indicated that the attenuation dam was designed to release water into the storm water pipe at pre-development flow rates in order to reduce the potential impact of erosion on the downstream system.

In order to prevent impact on the Jackaroo residential area in terms of increased storm water runoff from the Klarinet Phase 2 area (that could cause flooding of roads and houses), the engineers must ensure that the post-development flows are the same as the pre-development flows. In addition, within the Klarinet Phase 2 area waste management measures must be implemented and the sewer system maintained to prevent the impact on the quality of the storm water flowing into the attenuation dam and storm water pipes flowing into Jackaroo Park.

For the overall development, Grobler (2015) indicated that a well-designed storm water management plan will be required to attenuate flood peak events within the property and thereby prevent erosion and sediment impacts in the adjacent wetlands identified. As a general guiding principle, discharged storm water should be released in a controlled manner with a diffuse flow pattern across as a buffered vegetation strip and be accompanied by energy dissipating interventions to prevent erosion impacts (CSIRO, 2006; Environmental Law Institute, 2008).

Grobler (2015) indicated that the storm water management plan needs to give special consideration to buffer zones in order to prevent erosion impacts and the creation of channelised flows at discharge points, which would largely negate the benefits of any buffers present. Discharged storm water should be released in a controlled manner that will not result in scouring, erosion or channelisation before it enters a wetland habitat.

It should be noted that buffer zones are not walk away solutions and need to be maintained during the operational phase of the development in order to be

effective. This includes the maintenance of a well vegetated grass cover that is free of aliens and erosion features. Any aliens and/or erosion features observed within the buffer zone need to be addressed in order to ensure buffer functioning.

In addition, Grobler (2015) indicated that storm water transported within the storm water pipes should be treated before entry into delineated wetlands, as part of the site specific stormwater plan. Mitigation measures will have to be implemented in order to prevent the impact of waste from the development on the attenuation dams and storm water pipes. In addition, the sewer system will have to be maintained in order to prevent sewage from flowing into the overall storm water system and impacting on the attenuation dam, storm water pipes and downstream identified wetlands.

In view of the above-mentioned impacts on the identified wetlands, a water use licence application (for Section 21(c) and 21(i) activities) in terms of the National Water Act, 1998 (Act 36 of 1998) must be submitted to the Department of Water and Sanitation. A storm water management plan will be a requirement in terms of this application. Approval of the said water use licence application will be required before any construction takes places.

9.2.4 Archeological and palaeontological investigations

Based on Layout Plan no. 5 (Figure 7.4), it is evident that the development of Phase 1 (Klarinet x10) will definitely impact on Site 2 (possibly grave), Site 3 (3 graves) and Site 4 (a single grave).

Van Vollenhoven and Collins (2015) recommended that Site 2 be excavated in order to determine if it is a grave. Should it be confirmed as a grave, it will have to be relocated as indicated below. If it found that Site 2 is not a grave, no mitigation measures are required.

The development of Phase 2 (Klarinet x11) would impact on Site 5, a graveyard consisting of 84 graves, as this area does not appear to have been included as part of the Public Open Space in Layout Plan no. 5 (Figure 7.4).

As already indicated, Site 3, Site 4 and Site 5 will be directly impacted by the development. In view of this Option 2 as recommended by Van Vollenhoven and Collins (2015) should be implemented. This option entails exhuming the mortal remains and the relocation thereof. For this, a specific procedure must be followed. For graves younger than 60 years, only an undertaker is needed. For graves older than 60 years and unknown graves, an undertaker and archaeologist are needed. Permits must be obtained from the Burial Grounds and Graves Unit of SAHRA. This procedure is quite lengthy and involves social consultation. An alternative site for these graves would then have to be found.

The layout plan could however be revised to include Site 5 as part of the Public Open Space system. The said site could then be rehabilitated and fenced as recommended by Van Vollenhoven and Collins (2015). In addition, a management plan for the sustainable preservation of the graves (drafted by a heritage expert) would be required as recommended by Van Vollenhoven and Collins (2015). Graves from Site 2, Site 3 and Site 4 could then be relocated to this area as per the required process.

Site 1 (building foundations of an old building made of stone) will be impacted by the development of Phase 3 (Klarinet x12). According to Van

Vollenhoven and Collins (2015), Site 1 may be destructed. However, since it is likely to be over 60 years, a permit from the Mpumalanga Provincial Heritage Resources Agency is required.

Van Vollenhoven and Collins (2015) indicated that it should be noted that the subterranean presence of archaeological and/or historical sites, features or artifacts is always a distinct possibility. If any of these are discovered during the construction process, a qualified archaeologist should be called to investigate the occurrence and make the necessary recommendations.

According to Fourie (2015), the impact of the development on fossil heritage is Very High for the Vryheid Formation. The thin inlier of shale is problematic. Fourie (2015) however indicated no objection to the proposed development of the said site. A Phase 2 Palaeontological Mitigation may be required by the South African as the Phase 1 Palaeontological Assessment identified a fossiliferous formation (i.e. Vryheid Formation). The Protocol for Finds included as part of the Environmental Management Plan (EMP; Section 10) must be implemented during the construction phase.

9.2.5 Traffic investigations

Various roads extend through the said area which would be impacted upon in terms of the proposed Klarinet Phase 2 development in view of increased traffic. This was raised as an issue of concern during the public participation process as the current road networks are already overloaded. In view of this, a traffic impact study was conducted as part of the EIA phase of the project.

The proposed Klarinet Phase 2 project will deliver approximately 4200 housing units. Human et al. (2015) indicated that the proposed development will generate an estimated additional 1299 vehicle trips during the weekday AM peak hour and 1379 vehicle trips during the weekday PM peak hours.

Human et al. (2015) indicated that several development are planned in the area and that these developments are mainly responsible for major upgrades in the said area. The proposed upgrades by the latent rights developers overlaps with the upgrades proposed by the Klarinet Phase 2 project.

Based on the capacity analyses, Human et al. (2015) indicated that the following road upgrades are considered to be the responsibility of the Klarinet Phase 2 development namely:

- Road upgrades of Intersection 8 and 12 (Figure 13d, Appendix B of Appendix 17) at the railway crossing. (Refer to Appendix A, Table 4 of Appendix 17).
- Intersections 9 and 10 (Figure 13c, Appendix B of Appendix 17). Human et al. (2015) indicated that a detailed geometric design of these intersections should be guided by the municipality.
- The all-way stop at the D1126/Flamingo Road and D1126/Verdi Avenue intersections to traffic signals when required.

Human et al. (2015) recommended the following proposed phasing of road infrastructure to accommodate the new trips on the road network in relation to the progress in construction on the project:

- 500 housing units: Carmen Street (R544)/Zaaihoek Road (D1126) intersection to be upgraded;
- 501- 1500 housing units: Upgrade Intersection 8/R544 Road and signalization of at grade intersection;

- 1501 – 3000 units: Signalization of at grade intersection and OR Tambo link road to be constructed;
- Full development: OR Tambo link road to be constructed.

According to Human et al. (2015), the existing level crossing will be upgraded to a signal crossing with two lanes per direction. A traffic signal and booms on the eastern and western side of the railway tracks will regulate the traffic across the railway line. The at-grade crossing will comply with the requirements and standards specified in SANS 3000-2-2-1:2012 Edition 1 and in conjunction with the Railway Safety Regulator Body. This will allow for an increase of the capacity of the intersection and hence allow for a number of housing units within Klarinet to be developed and the traffic to be assigned to use this intersection as the main railway crossing point in the area.

Given the road upgrades proposed by Human et al. (2015), it can be expected that the background traffic, latent developments and the trips generated by the development can be accommodated on the road network at an acceptable level of service once the OR Tambo link road is in place.

Human et al. (2015) indicated that the proposed OR Tambo link road does not necessarily follow the sequence of the development applications and thus it is proposed that a process be initiated where a master plan is developed in which responsibility for the construction of the OR Tambo link road is resolved. The developers and the ELMC need to be involved in the steering phase of the drafting of the master plan. It was further indicated that the said report should be accepted as a road master plan for road upgrades in the area to accommodate the proposed development, background traffic as well as other planned developments in the area.

Agreements should be reached between the developer and the Council/Roads authority on the phased implementation of the upgrades and the responsibility for the upgrades. The major upgrades, where agreements should be reached, includes a proposed new link road.

In addition, Human et al. (2015) recommended that critical road infrastructure should be provided within the development boundaries in terms of pedestrian infrastructure (e.g. barrier along the R544 and D1126 rods for effective channelization of pedestrian movement, safe pedestrian crossings, etc.); road infrastructure at educational facilities (e.g. adequate pedestrian walkways, etc.) and public transport facilities (e.g. taxi rank within the development, adequate sidewalks leading to taxi rank, etc.).

Based on the above-mentioned, Plan Associates (2015) indicated that the overall Klarinet Phase 2 development will result in new link roads that will increase access to the surrounding area and therefore improve mobility and access. This would have a positive impact on the residents/municipality and developers.

9.2.6 Socio-economic investigations

Plan Associates (2015) identified a number of positive and negative socio-economic impacts as a result of the proposed Klarinet Phase 2 development.

9.2.6.1 Impact: Engineering Services

The proposed Klarinet Ext 10, 11, 12 does not currently have any internal reticulation or bulk line services and these will need to be installed. The possible installation of the services for the proposed development will unlock

the development to the east of the Zaaihoek (D1126) road. The possible augmentation of the bulk services for the entire area may unlock the opportunity for other property developers to enter the market.

Plan Associates (2015) indicated that the development of the Klarinet Integrated Housing Project will definitively have an impact on the bulk supply of engineering services. If funding is not allocated for the upgrade of the bulk supply of water it may result in the beneficiaries receiving a lower level of services, which may negatively impact on their quality of life.

Water

According to the Water Services Master Plan of 2007, the bulk water supply storage facilities would have been upgraded for the Klarinet region. Plan Associates (2015) indicated that the municipal 2015/1016 IDP listed the augmentation of supply as a project. Therefore, the proposal which was made in the 2007 report has not been implemented and the current reservoirs are at full capacity.

In view of the above-mentioned, Plan Associates (2015) indicated that the bulk water supply is currently not sufficient for the proposed Klarinet Phase 2 development. This would have a negative impact on residents, municipality and developers.

The municipality has confirmed that funding has been allocated for the specific project. Funding has been provided by a Provincial Department and will therefore have a lesser impact on the budget of the municipality.

The municipality however, needs to indicate when the project will be implemented and when it will be finished.

Sewage

Klipspruit Sewage Treatment Works

The sewage (effluent) that will be generated by the proposed Klarinet Integrated Housing Project will be treated at the Klipspruit STW. The Klipspruit STW, however, has the capacity of 10ML/d and is currently running above its capacity. The Klarinet Integrated Housing Project and other planned projects will require a capacity of 20ml/d. The current capacity of the Klipspruit STW will therefore be overstretched.

According to Plan Associates (2015), the Klipspruit STW requires 200% more capacity. This would have a negative impact on residents/municipality and developers.

The Outline Scheme Report (BIGEN) indicates that Rand Water, the appointed implementing agents, are in the process to upgrade the STW to a capacity of 30ML/d which should therefore be able to address the anticipated need. It is however not clear when the construction in terms of this upgrading will be completed. The municipality needs to provide a timeline to I&APs when the construction will be completed.

Riverview Sewage Treatment Works

As indicated in Section 7.4.1, some of the effluent (sewage) from the Klarinet Phase 2 development will be treated at the Riverview Sewage Treatment Works which has a design capacity of 12 Ml/d. It is currently operating beyond its design capacity as indicated in Table 7.7.

According to the Water Master Plan (2007), the Riverview STW was to be extended from 11 Ml/d to at least 20 Ml/d in order to provide adequate treatment capacity projected up to 2017 (i.e. provided that Klarinet/Pine Ridge is eventually drained to Klipspruit). According to the Water Master Plan (2007), this figure included the flows from the proposed Lahleni Lakes golf estate development that did not materialize.

Electricity

The Outline Services report (BIGEN) indicates that the substation of Klarinet Ext 6 may have sufficient capacity to supply a portion of the development, but its capacity will be reached by 2017/2018. Therefore a new intake substation is being planned for the proposed development. However, the municipality needs to engage Eskom to ensure the substation is constructed in 2018.

Roads

Funding for the construction of the additional road links (as indicated in Section 9.2.5) has not been provided. The lack of clarity on the funding may have an impact on the implementation of the proposed linkages.

Plan Associates (2015) indicated that the municipality and the relevant role players should provide a cost schedule of the proposed road upgrades that are planned for the area. The cost schedule should be followed by an implementation framework to indicate when the upgrades will be commissioned and who will fund the respective upgrades.

9.2.6.2 Impact: Municipal Budget (Installation of Services)

Plan Associates (2015) indicated that the provision of bulk engineering services may have a negative impact on the municipal budget which would impact on the municipality.

The Municipality is the Water Services Authority in terms of Act 108 of 1997 and therefore needs to fulfil its obligation to supply the water to the proposed Klarinet development. As already indicated (Section 9.2.6.2), funding in terms of the augmentation of the bulk water has been obtained from a Provincial Department.

The municipality further needs to honour the appointment of Rand Water to increase the capacity of the Klipspruit Sewage Treatment Works.

In the ELM IDP 2015/2016 funds for the refurbishment of the Riverview STW were budgeted.

The required Eskom substation also needs to be installed in the area to ensure sufficient capacity is available for the development.

It is unclear where the funding will be obtained to upgrade the Klipspruit STW and the construction of the required substation. The possibility may exist that the Provincial Department, who is one of the role players in the project, will fund the required bulk engineering upgrades.

All the above bulk engineering projects are crucial to the successful implementation of Klarinet Ext 10, 11, and 12.

The Klarinet Phase 2 development and the Siyanqoba development are two large scale human settlement projects with local and provincial role players. The municipality in close consultation with the relevant government

departments need to indicate how the upgrade of the bulk infrastructure will be funded.

9.2.6.3 Impact: Existing mining activities and prospecting rights

Through the public participation process, it was indicated that Witbank Brickworks plans to mine the historic mining area located adjacent to the proposed residential area. It is possible that the proposed mining right area could overlap with a portion of the proposed residential area as well as the proposed OR Tambo extension.

It was also learnt that Witbank Brickworks has applied for a mining right to mine the area to the south of the proposed development site. Witbank Brickworks intends to mine the area by opencast methods and then to rehabilitate the said area. According to Witbank Brickworks, this would assist in reducing the environmental impact (e.g. unrehabilitated areas; acid mine drainage; underground fires, etc.) as a result of the historical mining of the said area.

In addition, it was discovered that a mining permit had been issued to Vandu Mining to mine a portion of land to the south of the proposed development site.

A letter from the Department of Mineral Resources (dated: 29 September 2015; Appendix 20) was received in response to the application in terms of Section 53 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002). In this letter it is indicated that the Department of Mineral Resources had issued prospecting rights to Inyosi Mining (Pty) Limited, Molokomme and Associates cc and Witbank Brickworks (1961) (Pty) Limited. In addition, it was indicated that Thamago Investments, Pop Up Investment 15 (Pty) Limited, Early Works 255 (Pty) Limited and Charles Ngobeni have applied for prospecting rights on various portions of the farm Blesboklaagte 296 JS.

The Department of Mineral Resources indicated that the applicant (i.e. ABSA Devco) must consult with all of the abovementioned holders and the relevant applicants to establish the implications of the proposed Klarinet Phase 2 development on these prospecting applications. The results of the consultation must be forwarded to the Department of Mineral Resources to enable the Department to determine possible conditions that may apply to the Klarinet Phase 2 application.

The Department also indicated that proof of the previous objection against the relevant right was to be forwarded to the Department so that they can deal with the said application.

If the prospecting right is converted into a mining right and the Minister of Mineral Resources rules in the favour of the mining company, the entire development will not be able to continue due to the legislative and safety requirements (Plan Associated, 2015). Coal mining and residential developments are two opposing land uses and cannot exist in close proximity (Plan Associates, 2015).

Plan Associates (2015) indicated that the MPRDA requires that a 500m buffer be maintained from any opencast area due to safety constraints and the effects from blasting. Therefore, if Inyosi Coal (Pty) Ltd is granted a mining right on the existing prospecting right areas it may result in the entire

development not continuing. It is important to note that eMalahleni does have a high unemployment rate and any additional economic activities should be welcomed. However, the sustainability of the activities should be weighed with the sustainability of other developments, like Klarinet Phase 2.

Coal mining and residential development are opposing land uses and the possible impact of the development not continuing will have a very negative impact on the lives of the MNS informal settlement, existing beneficiaries and the housing backlog of the municipality.

9.2.6.4 Impact: Socio Economic

Housing backlog addressed
The provision of 15% bonded housing units and 60% subsidised housing units will have a positive impact in terms of addressing the high housing backlog of 44 734. The mixed housing typology which is being planned for Ext 10, 11 and 12 will also contribute to a more diverse local economy which may boost small business. The proposed development also includes the required social facilities (schools, churches, clinics etc.), therefore the future community will be able to access social facilities without having to commute to neighbouring areas.

In view of the above-mentioned, Plan Associates (2015) indicated that the proposed development will provide the full spectrum of social facilities in line with the guidelines of the CSIR. This will have a positive impact on both the residents and the municipality.

Unemployment
Plan Associates (2015) indicated that unemployment in the Klarinet area may rise if proper measures are not put into place. This would have a negative impact on the future community as well as the MNS community.

The Klarinet Phase 2 development is based on the same principle of Phase 1 which is aimed at providing a variety of housing typologies. The development principle of Phase 1 and 2 is based on providing bonded and subsidised housing.

The development is therefore not just aimed at low cost housing. Therefore, the future inhabitants may have employment prior to moving into the area which will have a positive impact on the unemployment figure of the area.

Precautionary and pro-active measures will need to be put in place to prevent unemployment levels from rising, with the planned settlement. It is noted that primarily industrial and mining related job opportunities are available within the area. With the development of the Klarinet Ext 2 and 3 in terms of light industries and commercial activity, additional job opportunities will be created within the area.

Raphael, S and Winter-Ebmer, R. (2001) state that people who are unemployed are more likely to revert to crime. Inversely, people who gain more income from employment than from crime are less likely to get involved in crime. The possible increase in unemployment may thus lead to have an increase in crime if proper measures are not put in place.

The Local Economic Development (LED) section of the municipality needs to put mechanisms in place to ensure that employment opportunities are

created. The municipality and the private sector also need to enter into discussion on how to create additional employment opportunities.

Plan Associates (2015) indicated that contractors appointed to install the engineering services and other construction related activities should be encouraged to employ locally.

Formalisation of MNS informal settlement

The MNS informal settlement is located in the central portion of the site and will be directly impacted in terms of the proposed development. As indicated, the MNS Community is very pleased about the project and the prospect of houses and basic services.

Plan Associates (2015) indicated the following positive impacts as a result of the relocation of the MNS informal settlement:

- The MNS informal settlement will be formalised as part of the Klarinet Phase 2 area and residents will be provided with security of tenure;
- Relocation of MNS residents will allow for better planning an installation of engineering services.

In addition, Plan Associates (2015) indicated the following negative impacts as a result of the relocation of the MNS informal settlement:

- MNS residents will need to be relocated to a holding area (Klarinet x9).
- Conflict or tension may rise with MNS residents receiving stands while other settlements in the municipal area have not been upgraded;
- Expectation may be created with the relocation of people to Klarinet x9. If expectation cannot be satisfied it may lead to unrests in the area.

The eventual formalisation of the MNS settlement may have a positive impact on the residents in the light that they may have security of tenure. Security of tenure will allow the residents to invest in the portion of land that may be allocated to them to commence with the improvement of their livelihood.

The formalisation will also have a positive impact that the eMalahleni Municipality may be able to raise revenue through rates and taxes from the formalised stands.

In terms of the Upgrading of Informal Settlements Programme (UISP), the key policy objective is to facilitate a structured in-situ upgrading of an informal settlement as opposed to relocation, to achieve, amongst other complex and interrelated policy objectives, tenure security to enhance the concept of citizenship, incorporating both rights and obligations by recognizing and formalising the tenure rights of residents within informal settlements. Further, the Programme includes possible relocation and resettlement of people on a voluntary and co-operative basis as may be appropriate.

The eMalahleni Municipality guided by the key policy directives of the Upgrading of Informal Settlements Programme (UISP), resolved via a council resolution that the MNS Informal Settlement be temporarily relocated to Klarinet Ext 9 which is located north of the Klarinet Phase 2 development.

The Municipality indicated in the council resolution that the inhabitants of the MNS Settlement will be absorbed in the Phase 2 development subject to the

relevant policies and applicable legislation. Due to the various categories of people residing in the MNS settlement ranging from SA nationals, foreign nationals, low and higher income groups and child headed households the council resolved as follows to accommodate inhabitants:

1. That an application be lodged with the MEC for assistance regarding the provision of temporary shelter under the Emergency Programme of the National Housing Programme, should there be a need for relocation;
2. That the allocation of subsidised houses be in line with the criteria set out in terms of the National Housing Code and the Municipal Housing Allocation Policy.
3. That the following categories of beneficiaries who do not qualify for subsidised houses be allowed to benefit in terms of the following:
   - 3.1. Illegal immigrants on the conditions prescribed by the Department of Home Affairs on a case by case basis;
   - 3.2. Households/persons with a monthly income exceeding R3500 per month / Persons without dependents/ Persons who are not first time home owners/ Persons who have previously received housing assistance and who previously owned and/or currently own a residential property may benefit through;
     - 3.2.1. A serviced stand;
     - 3.2.2. Acquire registered ownership of the stand they occupy; and
     - 3.2.3. Be required to pay a purchase price equal to the cost of the development of the stand, which comprises of;
       - Land acquisition component;
       - A component equal to the cost of the provision of the municipal engineering services; and
       - Transfer costs.
   - 3.3. Households headed by minors who are not competent to contract in collaboration with the Department of Social Development, be dealt with in terms of the provisions as stipulated in the Upgrade of the Informal Settlements Policy.

However, it should be noted that in terms of the housing subsidy programme, certain people may not quality for a house or stand due to their income level or nationality. The Human Settlement Department of eMalahleni Municipality indicated that people who are either *foreigners* or fall into a *non-qualifying income* category will be given the opportunity to *lease a property* within the formalisation area (refer to eMalahleni Local Municipality Council Resolution, 21 April 2015).

The relocation of the MNS settlement will have an impact on the social and economic circumstances of the informal dwellers. The informal dwellers may be required to obtain new material to reconstruct their homes in Ext 9 and be absent from their place of employment.

The relocation of the individuals will also have an economic impact on the municipality which will need to provide interim basic services until the people have been relocated. Even though the municipality has not committed in being able to accommodate all the informal settlements, the relocation of the units will create an expectation. Therefore if the municipality fails to provide all the people with future housing it may result in some unrests.

An additional impact of the relocation may be that some people do not qualify for a subsidised unit and may be required to purchase a serviced stand. The person may not have the resources to purchase the stand which may result in the person occupying the holding area at Klarinet x9 for an extended period of time.

Conflict or tension may rise with MNS receiving stands while other settlements in the municipal area have not been upgraded. The impact of the tension may result in uprisings in certain communities. It should be clearly communicated that the upgrading for the area was not due to land invasion of the MNS settlement but due to the need for the land and its location. The municipality should actively work towards the upgrading of the other informal settlements within its area.

The possible relocation of the MNS settlement may result in some people experiencing discomfort during the relocation process. However, the clearing of the land will allow for a more effective and economic installation of engineering services. The MNS inhabitants may also have the opportunity to obtain full tenure.

The relocation may however, also result in the removal of any permanent structure which were built illegally. The removal of the structures may result in the loss of income of some of the residents but the structures were not erected in terms of the correct legislation (Plan Associates, 2015).

Expectation may be created with the relocation of people to Klarinet x9. If expectation cannot be satisfied it may lead to unrests in the area. Municipality needs to plan pro-actively to create more residential stands and alternative accommodation. Proper law enforcement should be in place to address public unrests (Plan Associates, 2015).

The proposed relocation of the MNS settlement to Ext 9 will present a number of challenges. The following best practices should be followed during the relocation:

1. Buy in from all role players should be obtained before the process is initiated.
2. A detailed list of the beneficiaries should be compiled to determine what housing the individuals qualify for.
3. The illegal immigrants should be dealt with in terms of the processes of Department Home Affairs.
4. The proposed relocation area (Klarinet x9) should be well managed and be kept free of any land invaders. The area should be patrolled on a daily basis and any unauthorised structures removed.
5. Interim basic services should be installed at Klarinet x9 before the relocation. The prior installation of services will make the interim stay of the people more comfortable before they are allocated to the new sites.
6. The allocation of new beneficiaries should be a transparent process to prevent any uprising within the area.
7. Structures which are vacated should be removed immediately to prevent unauthorised people from occupying them again.
8. Clear lines of communication should be maintained between the residents and the municipality and any other role players.
9. Clear timeframes should be communicated.
10. Transportation should be provided to assist with relocation.

The positive impact of the relocation of MNS to the holding area will allow for the seamless installation of engineering services and the optimum utilisation of the land. The area can therefore be properly planned with the minimum of obstacles which will result in further delays. The additional positive impact of the absorption of the MNS settlement into Klarinet Phase 2 is that people will obtain security of tenure and well serviced stands.

9.2.6.5 Impact: Adjacent landowners and interested and affected parties

Impact on small holdings and property values

The I&APs of Jackaroo Park, Leeuwpoort and Kromdraai smallholdings raised the concern of the impact of Klarinet Phase 2 on their livelihood and on the agricultural activities on their land. It was recorded that the surrounding landowners/users (including residents of Jackaroo Park) are against (objected) the proposed development. It was indicated that an alternative site must be investigated.

Plan Associates (2015) indicated that based on a visual inspection of the area it is evident that minimal high impact agricultural activities are being exercised on the Leeuwpoort and Kromdraai smallholdings with some crop farming taking place on Portion 25 of the farm Leeuwpoort. The land use characteristics of the area consist of low intensity uses with houses spaced relatively far apart. The proposed development of Klarinet Phase 2 will have an effect on the land use intensity of the area with more people residing and moving around in the area and it will result in alteration of the character.

Due to the increase in population nationally and internationally, the demand for housing also increases. The livelihood of the people residing on the small holdings next to Phase 2 will be affected by the development in the sense that there will be more people moving in and around the area which may cause a disturbance to people who are used to low key activities.

Figure 6.2 as discussed in Section 6.1.3 outlines the Strategic Development Areas (SDA) contained in the SDF of the municipality. It can be noted that the Klarinet area is the largest SDA within the eMalahleni Municipality and contains some of the last developable land close to economic opportunities. Land situated closer to the CBD core and major access roads has been undermined.

The small holdings have been earmarked for future development and the possible installation of services and the augmentation of the bulk engineering services will help to unlock these parcels of land for development. The potential impact therefore exists that adjacent land owners may be able to capitalise on the existing network and link into it with future developments. The proposed development may therefore have a positive impact on the surrounding area's property values.

Plan Associates (2015) further indicated that if the residential development continues it will prevent coal mines in the area which may have a bigger negative effect on the properties than the new Phase 2 development.

Increased traffic and impact on roads

An increase in traffic along the Zaaihoek Road, the gravel road leading to Jackaroo Park as well as through Jackaroo Park and the old Middelburg Road can be expected as a result of the proposed residential development. These roads are already over utilized and the condition of the said roads would be affected. Traffic along these roads could also be impacted in terms of increased pedestrians and animals.

The traffic impact study proposes the upgrade of the at-grade link over the railway at Elizabeth Avenue and the future links across the railway at OR

Tambo Street. Therefore, the rail crossings in the area may be increased from 1 to 2 crossings. The additional crossings therefore provide alternatives if the crossing at the R544 is blocked. It is however not clear who will fund the proposed crossings and new link roads.

The traffic impact study indicates that it does not envisage that the existing link through Jackaroo Park will be used due to safety concerns and poor road quality. However, it is anticipated that the link may be utilised by future residents to gain access to the R555 which is the link between eMalahleni and Middelburg Town.

Klarinet Phase 2 is a large scale human settlement and multi-year project. The project will also be implemented from west to east due to the existing access roads and services in the west. Therefore, the Jackaroo Park link may only be utilised at a later stage. The Spatial Development Framework has further earmarked the vacant land between Jackaroo Park and Klarinet Phase 2 for residential development. Therefore, the need may arise in the future for the local municipality or developer to upgrade the Jackaroo link to unlock the identified land.

Impact of unrests and strikes on residents

Concern was also expressed regarding the potential impact of striking residents from the proposed residential area on surrounding landowners/users. This has been experienced in the past by landowners/users when residents of the MNS informal settlement barricaded roads. This could escalate with the proposed development. A further concern raised by I&APs was how will unrests and strikes impact their ability to utilise the roads.

The Klarinet Phase 2 development and the people located north of the development along the Zaaihoek road have limited options to access eMalahleni Town. The available roads is via the Zaaihoek road, the Jackaroo link (poor condition) or the R544 via Klarinet Phase 1. Access will be severely limited if strikes/unrest takes place in the area or if the roads are damaged through natural causes (rain, hail etc.).

Plan Associates (2015) indicated that the municipality/private should aim to address the challenges and grievances of the communities to prevent strikes. Proper law enforcement should be exercised in the case of the strikes to minimise the impact. A police station site has been planned as part of the Klarinet Phase 2 area.

Plan Associates (2015) indicated that the upgrading of the Jackaroo link road may also serve as an alternative if the Zaaihoek Road (D1126) or R544 roads are blocked. In addition, the upgrading of the Jackaroo link road may serve as a catalyst to unlock the area for further development.

The possible utilisation of the Jackaroo railway crossing to gain access to the Witbank CBD was raised as an issue of concern. It is noted that the Jackaroo link is not a favourable link due to the condition of the roads and safety concerns with regards to the railway crossing. However people may still decide to use it to gain access to the R555 towards Middelburg resulting in increased traffic through the Jackaroo area.

9.3 Conclusion

From an environmental point of view, it is evident that the majority of the central, northern and northeastern portions of the proposed development site (approximately 190 ha) can be developed subject to the implementation of mitigation measures.

The geotechnical investigation however, indicated that an area of 70.50 ha of the development site had been affected by previous mining activities. The Department of Mineral Resources indicated that permission from the Principal Inspector of Mines must be obtained before any construction takes place within this area.

The following infrastructure would also extend over previously mined ground (undermined/opencast) namely, the proposed reservoir and bulk water line, eastern sewer line, OR Tambo link road extension and the main access road from the D1126 Zaaihoek Road. Permission from the Principal Inspector of Mines will thus also have to be obtained before any construction of this infrastructure takes place.

If permission for the construction of the residential stands and infrastructure on previously mined ground is not granted, then an alternative layout plan for the development would have to be investigated.

Based on the findings of the Socio Economic Impact Assessment, it is evident that the development will have negative and positive impacts on the resident MNS community, bulk engineering services and the adjacent landowners.

The population in South Africa is continuously growing and therefore the need for housing will increase. The Klarinet Phase 2 residential development is aimed at addressing the housing need for low and middle income people and it's also aimed to be sustainable.

The positive impacts however, outweigh the negative impacts which can be mitigated through proper financial planning and budgeting. It should however, be highlighted that the lack of bulk engineering services may pose a challenge to the development and the surrounding community.

The possible impact of prospecting/mining within the development area may however, sterilise the area for any future development depending on the final decision of the Department of Mineral Resources in terms of the submitted Section 53 application. It should be noted that the applicant's (ABSA Devco) attorneys are currently addressing this issue with the Department of Mineral Resources.

In order for the development to proceed, the municipality, provincial department and other role players should cooperatively address the bulk engineering challenge and accordingly provide a clear time frame and implementation framework.

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APPENDIX 1:

APPLICATION FORM

- Letter from Clean Stream Environmental Services (CSES) (dated: 23 September 2014; Ref: EIA 2014/02) regarding the submission of the application form as well as the request for deviation from Regulations 15(1) and 15(3).
- Copy of application form.
- Letter from the Department of Rural Development, Land and Environmental Affairs (DARDLEA) (dated: 2 October 2014; Ref: 17/2/3N-397) acknowledging receipt of the application form.
- Letter from DARDLEA (dated: 24 February 2015; Ref: 17/2/3N-397) regarding the request for deviation from Regulations 15(1) and 15(3).
- E-mail from CSES (dated: 1 April 2015) to DARDLEA regarding the registration of Interested and Affected Parties.
- E-mail from DARDLEA (dated: 8 April 2015) regarding the registration of Interested and Affected Parties.
- E-mail from CSES (dated: 10 April 2015) regarding the site visit.
- E-mail from DARDLEA (dated: 10 April 2015) regarding the site visit.

APPENDIX 2:

CURRICULUM VITAE

- Mrs. A. Erasmus *Pr. Sci. Nat.*
- Ms. R. Janse van Rensburg
- List of projects

APPENDIX 3:

TOWNPLANNING MEMORANDUM

- Urban Dynamics Mpumalanga (Pty) Ltd. 2014. **Motivating Memorandum in Support of the Application for Township Establishment for the Proposed Klarinet Phase 2 Integrated Housing Development (Klarinet Extensions 10, 11 & 12) Situated on Portions 26, 98, 153, 154, 171, 172, 188, 189, 199-204, 210 and 226 of the Farm Blesboklaagte 296 JS.** Report dated: November 2014. Report number: WIT160

APPENDIX 4:

ENGINEERING SERVICES REPORT

- Bigen Africa Services (Pty) Ltd. 2014. **Klarinet Integrated Housing Development, Klarinet Phase 2, Engineering Services Outline Scheme Report.** Report dated: October 2014. Report number: 1037-00-00/IR02

APPENDIX 5:

ADVERTISING OF THE PROJECT

- A copy of the English and Zulu advertisement published in the Witbank News, 27 February 2015.
- A copy of the English and Zulu on-site notices.
- Printout of company website page www.cleanstreamsa.co.za – New Projects – Notices.
- Printout of company website page www.cleanstreamsa.co.za – New Projects – Background Information Documents.

APPENDIX 6:

BACKGROUND INFORMATION DOCUMENT - ENGLISH AND ZULU

APPENDIX 7:

CORRESPONDENCE WITH GOVERNMENT DEPARTMENTS AND OTHER STAKEHOLDERS

- E-mail from Clean Stream Environmental Services (CSES) (dated: 3 March 2015) to the following:

L Betha	Wildlife and Environment Society of South Africa
T Buthelezi	eMalahleni Local Municipality
B Viljoen	Department of Public Works, Roads and Transport
D du Plessis	Transvaal Landbou Unie
H Laas	Mpumalanga Landbou
E Lennox	Eskom Transmission
S Links	Nkangala District Municipality
M Loock	Department of Co-operative Governance and Traditional Affairs
N Maake	Eskom Transmission
H Maree	Mpumalanga Wetland Forum
F Mashabela	Department of Agriculture, Forestry and Fisheries
M Mokonyane	Department of Mineral Resources
M Moloko	Eskom Mpumalanga Land and Rights
KR Morena	Department of Education
L Motsisi	Eskom Transmission
K Narasoo	Mpumalanga Tourism and Parks Agency
E Nkabinde	eMalahleni Local Municipality
R Nkosi	Trans African Concessions
A Rambuda	Department of Water and Sanitation
S Singh	Department of Culture, Sports and Recreation
J Smit	Telkom
J Venter	Department of Agriculture, Rural Development and Land Administration
M Yorke-Hart	South African National Roads Agency

- E-mail (dated: 3 March 2015) to the Department of Rural Development and Land Reform (Commission on Restitution of Land Rights) - officials: ND Nkambule, T Mkhabela and GM Mathonsi.
- Webpage printout from the South African Heritage Resources Information System.
- E-mails (dated: 3 March 2015) to the Ward Councillor of Ward 12.
- E-mail (dated: 26 March 2015) to Mr. Cronje (Ward Councillor Ward 20).
- E-mail (dated: 29 March 2015) from Mr. Cronje (Ward 20).
- E-mail from CSES (dated: 30 March 2015) to Mr. Cronje.
- Letter (dated: 31 March 2015) from Eskom.
- Letter from Commission on restitution of Land Rights (dated: 16 April 2015; Ref: 1107).
- E-mail from CSES (dated: 5 March 2015) to Sasol Gas (B van den Heuvel).

APPENDIX 8:

CORRESPONDENCE WITH THE DIRECTLY AFFECTED LANDOWNERS/USERS

- E-mail and letter from Clean Stream Environmental Services (CSES) (dated: 26 February 2015) to Khula Bricks and Sand (Pty) Ltd. (Mr. J van Bruwaene).
- E-mail from Khula Bricks and Sand (Pty) Ltd. (dated: 27 February 2015).
- E-mail and letter from CSES (dated: 26 February 2015) to Ingwe Surface Holdings (Pty) Ltd. (Mr. V Dhanooklal).
- Letter from CSES (dated: 26 February 2015) to LAGC de Jonckheere.
- Completed comment sheet (dated: 15 March 2015) from L de Jonckheere.
- Letter from CSES (dated: 26 February 2015) to Jumbo van der Merwe Trust (Mr. J van der Merwe).
- E-mail and letter from CSES (dated: 26 February 2015) to Sarovic Investments cc. (S Cholich and R Sarovic).
- E-mail and letter from CSES (dated: 26 February 2015) to Hilkru Family Trust (Mr. H Kruger).
- E-mail and letter from CSES (dated: 26 February 2015) to Mr. EM Marabe.
- E-mail and letter from CSES (dated: 26 February 2015) to Mr. MM Khumalo.
- E-mails from MM Khumalo (dated: 27 February, 2 March, 7 March, 15 March and 16 March 2015) to CSES.
- Letter from CSES (dated: 26 February 2015) to JDS Paterson.
- E-mail and letter from CSES (dated: 26 February 2015) to Mr. H Lambrechts.
- E-mail and letter from CSES (dated: 26 February 2015) to Sudden Impact Inv 76 (Pty) Ltd. (Messrs Botha and Vermeulen).
- E-mail and letter from CSES (dated: 26 February 2015) to Transnet (Mr. T Mavulwana).
- Completed comment sheet from Transnet (T Mavulwana) (dated: 27 February 2015).
- E-mail and letter from CSES (dated: 26 February 2015) to Mr. F du Preez.
- E-mail and letter from CSES (dated: 26 February 2015) to the Highveld Association for the Physically Disable (Mr. HD Grobler).
- E-mail and letter from CSES (dated: 26 February 2015) to Mr. M Grobler (Grobler Familie Trust / MJ Grobler).
- E-mail from Mr. M Grobler (dated: 17 March 2015).
- E-mail and letter from CSES (dated: 26 February 2015) to Span Kalbasfontein Trust (J Fourie and P Muller).
- Letter from Johan Coetzee Incorporated (dated: 17 March 2015) to CSES - sent on behalf of Span Kalbasfontein Trust.
- Letter from CSES (dated: 18 March 2015) to Johan Coetzee Incorporated.
- E-mail from Mr. R Muller (dated: 30 March 2015).
- Completed comment sheet from Mr. R Muller (dated: 30 March 2015).
- Completed comment sheet (dated: 30 March 2015) from Mr. AD Makunyane (Dithebe Community Property Association).
- E-mail from CSES (dated: 13 March 2015) to Wescoal Mining (M du Plessis).
- E-mail from CSES (dated: 5 March 2015) to the eMalahleni Local Municipality (E Nkabinde and T Buthelezi).

APPENDIX 9:

COMMENTS FROM SURROUNDING LANDOWNERS/USERS

- Completed comment sheets received from the following:

GPN Holscher	28 March 2015
J Holscher	28 March 2015
R Holscher	28 March 2015
M Hempel	30 March 2015
B Glover	29 March 2015
W Botha	29 March 2015
Kalbasfontein/Kromdraai CPF (W Botha)	29 March 2015
J Botha	29 March 2015
L Breedt	29 March 2015
J Breedt	29 March 2015
J Breedt	29 March 2015
RW Robinson	29 March 2015
D Botha	28 March 2015
J Botha	28 March 2015
D Botha	28 March 2015
E Botha	28 March 2015
E Breedt	29 March 2015
E Blignaut	30 March 2015
E Jurgenson	30 March 2015
D Jurgenson	30 March 2015
JJD Nel	7 April 2015
MJ Jacobs	1 April 2015
H Jacobs	1 April 2015
RAR da Silva	3 April 2015
MH Jansen	30 March 2015
MM Jansen	30 March 2015
W Henning	7 April 2015
S Henning	7 April 2015
H Henning	13 April 2015
A Henning	30 March 2015
J Dreyer	30 March 2015
C Pearson	7 April 2015
H Venter	7 April 2015
J Venter	7 April 2015
D Pearson	7 April 2015
C Pearson	7 April 2015

- E-mail from CSES (dated: 24 March 2015) to the Secretary, Sector 1 CPF Kalbasfontein/Kromdraai (Mrs. SW Botha).
- E-mail from CSES (dated: 26 March 2015) to the representative of Jackaroo Park (Mrs. H Jacobs).
- E-mail from CSES (dated: 23 March 2015) to Witbank Brickworks.
- E-mail from CSES (dated: 26 March 2015) to Witbank Brickworks (Mr. W van Deventer).
- E-mail from CSES (dated: 3 March 2015) to: T Botha, BHP-Mine Closure (Ingwe Surface Holdings - P Lombard) and C Snell (Plot 36, Kromdraai).

APPENDIX 10:

CONSULTATION WITH THE MNS COMMUNITY

- Article regarding the MNS Community placed in the Witbank News on 28 February 2014.
- Agenda and attendance register of Committee meeting - 13 February 2015.
- Attendance register of Ward 12 Committee meeting - 17 February 2015.
- Confirmation letter regarding the MNS Community meeting - 23 February 2015.

APPENDIX 11:

INYANDA STAKEHOLDER FORUM

- Extract of minutes of meeting - 23 October 2014.
- Extract of minutes of meeting - 12 March 2015.

APPENDIX 12:

EVALUATION OF DRAFT SCOPING REPORT

- Letter from Clean Stream Environmental Services (CSES) (dated: 20 April 2015; Ref: EIA 2014/02) to the Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA).
- Letter from DARDLEA (dated: 24 April 2015; Ref: 17/2/3 N-397) to CSES.
- Letter from CSES (dated: 21 April 2015; Ref: EIA 2014/02) to the Department of Water and Sanitation.
- Letter from CSES (dated: 21 April 2015; Ref: EIA 2014/02) to the Mpumalanga Tourism and Parks Agency.
- Letter from CSES (dated: 23 April 2015; Ref: EIA 2014/02) to the eMalahleni Local Municipality.
- Letter from CSES (dated: 23 April 2015; Ref: EIA 2014/02) to the Ward 12 Councillor, Mr. T. Pookgoadi.
- Letter from CSES (dated: 23 April 2015; Ref: EIA 2014/02) to the MNS Community Representative, Mr. P. Sibiya.
- Example of the e-mails from CSES (dated: 23 April 2015) forwarded to the various I&APs, stakeholders and government departments.
- Copy of the notice displayed at the library.
- Copy of the register.
- A copy of the notice placed in the Witbank News, 23 April 2015.
- www.cleanstreamsa.co.za web page printouts.
- SAHRIS webpage printout.
- A copy of the article published in the Witbank News - 15 May 2015.
- A copy of the article published in the Witbank News - 22 May 2015.
- Comment sheet (dated: 7 April 2015) from Mr. J.J.D. Nel.
- Note received from Mr. E.J. Visagie on 29 April 2015.
- Letter from Johan Coetzee Inc. (dated: 5 June 2015; Ref: JC/WN) to CSES.
- E-mail from Ms. W. Nunes (dated: 5 June 2015) to CSES.
- E-mail from CSES (dated: 5 June 2015) to Ms. W. Nunes.
- E-mail from Mr. V. Dhanooklal (dated: 23 April 2015) to CSES.
- E-mails from CSES (dated: 23 and 23 April 2015) to Mr. V. Dhanooklal.
- E-mail from Mrs. N. Khumalo (dated: 22 May 2015) to CSES.
- E-mails from CSES (dated: 25 and 28 May 2015) to Mrs. N. Khumalo.
- Letter from Inyosi Mining (Pty) Ltd. (dated: 26 May 2015) to CSES.
- Letter from the Department of Agriculture, Rural Development, Land and Environmental Affairs (Mr. J. Venter) (dated: 27 May 2015) to CSES.
- Letter from the Department of Water and Sanitation (dated: 29 April 2015; Ref: 16/2/7/B100/D32/K2) to CSES.
- Letter from the South African Heritage Resources Agency (dated: 24 April 2015; Ref: 7272) to CSES.
- Letter from Telkom (dated: 4 May 2015) to CSES.

APPENDIX 13:

EVALUATION OF FINAL SCOPING REPORT

- Letter from Clean Stream Environmental Services (CSES) (dated: 11 June 2015; Ref: EIA 2014/02) to the Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA).
- Letter from DARDLEA (dated: 19 June 2015; Ref: 17/2/3 N-397) to CSES.
- E-mail from CSES (dated: 12 June 2015) to the interested and affected parties.
- Copy of the www.cleanstreamsa.co.za web page printouts.
- Completed comment sheet from Mr. B. Viljoen (Department of Public Works, Roads and Transport).
- E-mail (dated: 17 June 2015) from Mr. M. Moloko to CSES.
- Letter (dated: 15 January 2014; Ref: LD-INV/W/MM/386/2015) from Eskom Distribution to Urban Dynamics
- E-mail (dated: 6 July 2015) from CSES to Mrs. O. Fakude (DARDLEA).

APPENDIX 14:

BIODIVERSITY REPORT

- McCleland, W. and A. de Castro. 2015. Baseline biodiversity survey of the Klarinet Phase 2 Project (Emalahleni, Mpumalanga). Report prepared by: De Castro and Brits cc. Report prepared for: Clean Stream Environmental Services. Report dated: June 2015.

APPENDIX 15:

GEOTECHNICAL REPORTS

- Celliers, B. D. and P. Hansmeyer. 2014. Phase 1 geotechnical investigation Klarinet Phase 2 Witbank, Mpumalanga. Report compiled for: Bigen Africa Services (Pty) Ltd. Report compiled by: Engeolab cc. Report dated: August 2014. Report number: LL2270.
- Hansmeyer, P.G. 2008. Undermining investigation along the boundaries of Phases 1 & 2 Klarinet Integrated Housing Development, Emalahleni. Report prepared by: Engeolab cc. Report prepared for: Bigen Africa. Report dated: 9 October 2008. Report no.: LL1565.

APPENDIX 16:

HERITAGE AND PALAEONTOLOGICAL REPORTS

- Van Vollenhoven, A.C. and Z. Collins. 2015. A report on a Heritage Impact Assessment for the proposed Klarinet Phase 2 residential development, close to Emalahleni, Mpumalanga Province. Report prepared by: Archaetnos Culture and Cultural Resource Consultants. Report dated: May 2015.
- Fourie, H. 2015. Klarinet Phase 2 eMalahleni Local Municipality, Mpumalanga Province Farm: Various portions of Blesboklaagte 296 JS and portion of Erf 5017 Klarinet x7 Palaeontological Impact Assessment: Phase 1 Field Study. Report compiled by: Dr. H. Fourie. Report compiled for: Clean Stream Environmental Services. Report dated: 19 May 2015.

APPENDIX 17:

TRAFFIC REPORT

- Human, E., L. Ndou, J. Snijder and W. Bonnema. 2015. Traffic Impact Assessment – Klarinet Housing Project Phase 2. Report prepared by: ITS Engineers (Pty) Ltd. Report compiled for: Emalahleni Local Municipal Council and Bigen Africa Projects Management (Pty) Ltd. Report dated: April 2015. Report number: ITS 3525.

APPENDIX 18:

WETLAND REPORT

- Grobler, R. 2015. Baseline watercourse delineation and assessment study for the proposed Klarinet Phase 2 development (Emalahleni, Mpumalanga). Report prepared by: De Castro and Brits cc. Report compiled for: Clean Stream Environmental Services. Report dated: April 2015.

APPENDIX 19:

SOCIO-ECONOMIC REPORT

- Plan Associates. 2015. Socio Economic Impact Assessment, Klarinet Integrated Housing Project Phase 2. Report prepared for: Clean Stream Environmental Services. Report dated: December 2015.

APPENDIX 20:

OTHER COMMENTS

- E-mail (dated: 1 July 2015) from Mr. P. Muller (Span Kalbasfontein Trust) to Clean Stream Environmental Services (CSES).
- E-mail (dated: 10 June 2015) from Mr. G. Tefu (Geovicon) to CSES.
- E-mails (dated: 10 and 11 June 2015) from Mrs. N. Khumalo to CSES
- E-mail (dated: 10 September 2015) from the Mineral Resources Financing Corporation (Pty) Ltd. to CSES.
- E-mail (dated: 14 September 2015) from the Mineral Resources Financing Corporation (Pty) Ltd. to Absa DevCo and CSES.
- Letter (dated: 29 September 2015; Ref: MP 30/5/4/2/1/1108 SU) from the Department of Mineral Resources to Urban Dynamics.
- Letter (dated: 6 June 2013; Ref: 06062013/Ph2/Inyosi) from Absa DevCo to Inyosi Mining (Pty) Ltd.
- Letter (dated: 1 April 2014) from CSES to the Department of Mineral Resources.
- Letter (dated: 7 September 2015; Ref: MP 30/5/4/2/1/1108 SU 1000/15) from the Department of Mineral Resources to Urban Dynamics.
- Letter (dated: 1 July 2015; Ref: 2014_11_0116) from the Department of Agriculture, Forestry and Fisheries to Urban Dynamics.
- Letter (dated: 21 April 2015; Ref: 17/5/1/1) from the eMalahleni Local Municipality to Absa DevCo.