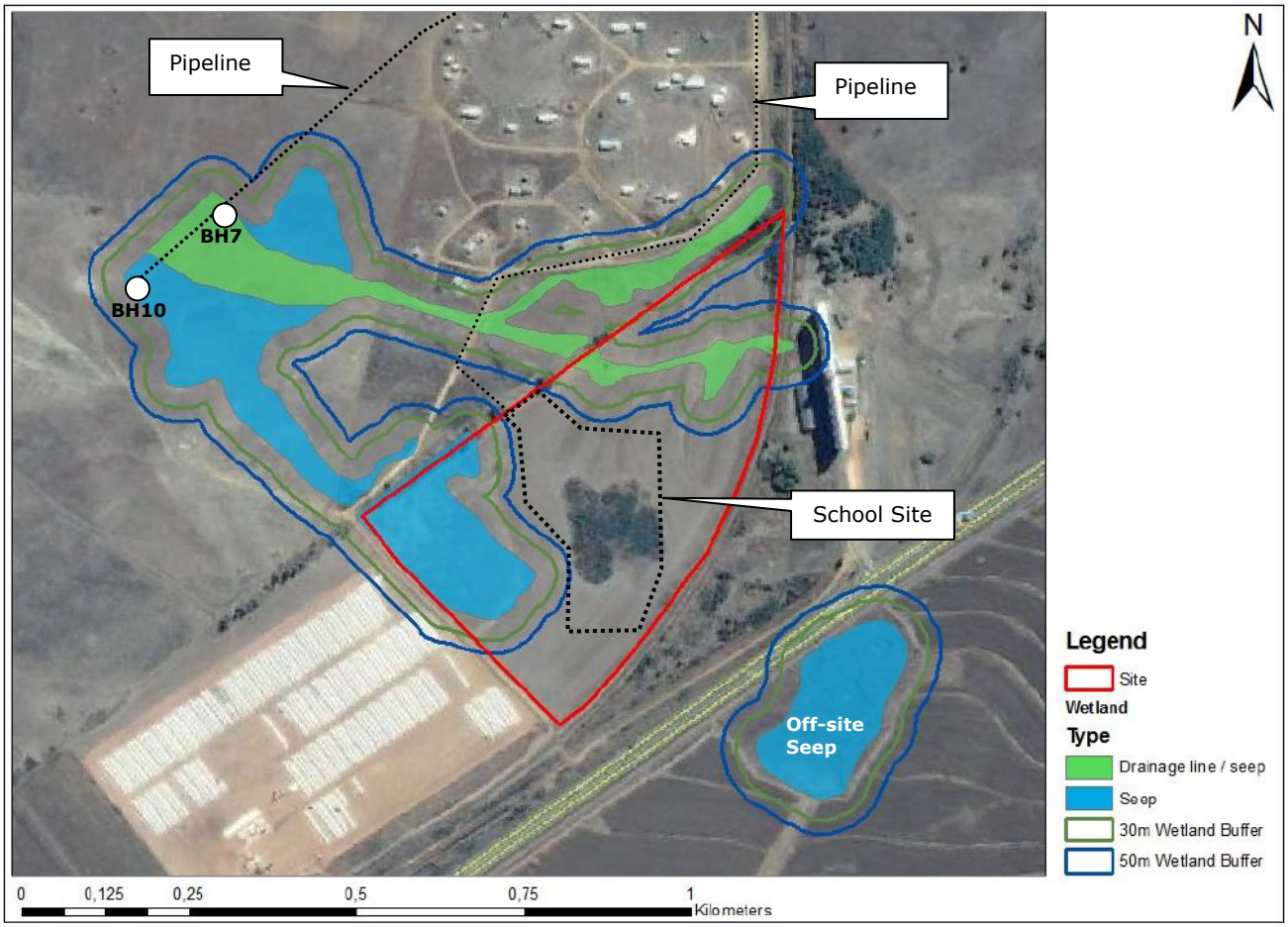



**Figure 5.16: Wetland units identified (taken from Venter, 2016)**

**<u>Temporary to Seasonal Seep (Figure 5.16)</u>**

As indicated in Figure 5.16, this seep is located on the western boundary of the proposed school site and drains towards the north west. Borehole 10 (BH10) and a portion of the western water pipeline will be located within this seasonal seep.

The seep was previously cultivated and currently comprises planted pastures and kikuyu (Photo 5.17). An earthen trench (Photo 5.17) was excavated along the eastern boundary of the seep, possibly to drain the seep or to divert water to the drainage area in the north. Several artificial canals/berms are present within the seep wetland, which has resulted in a change in the overland flow patterns.

According to Venter (2016), it appears that the gravel road located north of the site leads to some damming of water. This has resulted in the seep being wider south of the gravel road (Figure 5.16).

The soil in the seep consists of a brown sand becoming greyish with depth. Orange and/or yellow mottling is present, indicating a temporary wetland area. No signs of permanent wetness were observed (Venter, 2016).

The vegetation is indicative of disturbance and included species such as *Paspalum dilatatum, Sonchus sp., Pennisetum clandestinum* and *Verbena bonariense.*

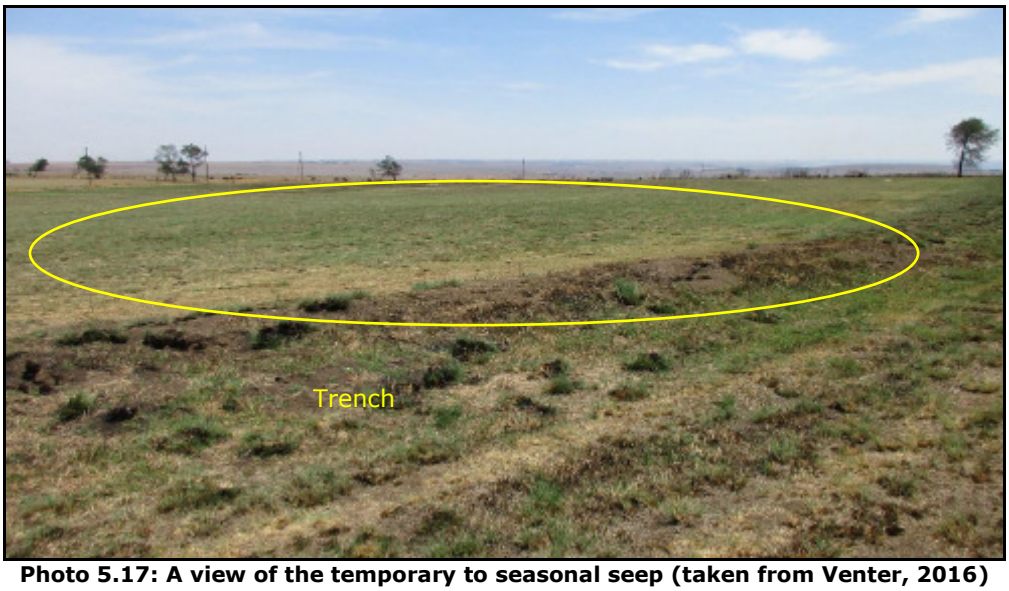



**Photo 5.17: A view of the temporary to seasonal seep (taken from Venter, 2016)**

**Drainage line/seep wetland (Figure 5.16)**

As indicated in Figure 5.16, this drainage line/seep is located on the northern boundary of the proposed school site. It appears to receive storm water from the silos and railway line and extends in a north westerly direction. Borehole 7 (BH7) and a portion of the water pipeline will be located within this drainage line/seep.

The drainage line/seep wetland (Photo 5.18) has been impacted upon by agriculture (planted pastures), the excavation of a small dam, the construction and utilization of a gravel road, grazing, increased canalisation (Photo 5.19), Eskom powerlines and activities associated with Generaalsdraai Village.

According to Venter (2016), the soil in the drainage line consists of a brown sand becoming greyish with depth. Orange and/or yellow mottling is present, indicating a temporary wetland area. No signs of permanent wetness were observed.

The vegetation is indicative of disturbance and included species such as *Chenopodium album, Paspalum dilatatum, Pennisetum clandestinum, Ricardia braziliense* and *Verbena bonariense.*

**Photo 5.18: A view of drainage line/seep located on the northern boundary of the school site. Note the alien trees in the background (taken from Venter, 2016)**


**Photo 5.19: The channel and Eskom powerline present within the drainage line/seep**

**Off-site Seep (Figure 5.16)**

According to Venter (2016), a seep is present south of the N4 national road between cultivated fields (Figure 5.16). The proposed school is unlikely to impact on this seep since it is located on the other side of the railway line and N4 national road as well as in a different catchment.

### 5.9.3.2 Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS)

Table 5.11 provides a summary of the Present Ecological State (PES) classes as calculated by Venter (2016).

The temporary to seasonal seep wetland located on the western boundary of the school site (Figure 5.16) has been moderately modified (Class C; Table 5.11) as a result of agriculture (planted pastures), the excavation of a trench and construction of a gravel road.

The drainage line/seep wetland located north of the school site (Figure 5.16) was found to be largely modified (Class D; Table 5.11) as a result of numerous impacts such as cultivation, the excavation of a small dam, the excavation of canals, the construction of a road, the railway line and additional storm water from the silos.

**Table 5.11: PES classes of the wetland units located within the study area (taken from Venter, 2016)**

| Unit | Hydrology | Geomorphology | Vegetation | Combined |
|---|---|---|---|---|
| Drainage line | D/E | B | E | D |
| Temporary to Seasonal Seep | A/B | A | E/F | C |

Table 5.12 provides the Ecological Importance and Sensitivity (EIS) for the identified wetland units as calculated by Venter (2016).

**Table 5.12: EIS of the various wetland units located on the property (taken from Venter, 2016)**

| Aspect | Importance | Confidence |
|---|---|---|
| Ecological Importance & Sensitivity | 0.6 | 3.4 |
| Hydro-functional Importance | 1.5 | 3.0 |
| Direct Human Benefit | - | 4.0 |

According to Venter (2016), the EIS for both wetland units is Low (Table 5.12). The altered state of the vegetation and the temporary status of the wetlands means that these wetlands are unlikely to provide habitat for species of conservation importance. The wetlands also have limited ecological functions and the cultural importance is low as they do not appear to have any direct human benefit.

However, the wetlands may assist with streamflow regulation in terms of storm water runoff and may have some pollution assimilation function in terms of receiving fertilizer from agricultural activities (Venter, 2016).

According to Venter (2016), all wetland areas are considered to be sensitive and of conservation importance, even if they have been disturbed. Subsequently, a 50 m buffer zone is recommended around the wetland units for all impermeable structures (e.g. buildings), whilst a 35 m buffer zone can be applied for aspects of the development that do not require foundations (e.g. sports field).

## 5.10 Groundwater

Engeolab cc was appointed to conduct a geohydrological investigation to determine where water can be sourced for the proposed school and what the sustainability of the water source would be in terms of quality and quantity. The feasibility geohydrological investigation was completed in October 2016 and the complete geohydrological report (referred to as Cilliers, 2017) in September 2017. The geohydrological report is provided in Appendix 7 and should be consulted in terms of methodology used.

The investigation included a data search, site survey, hydrocensus, drilling of new boreholes, pump testing/aquifer testing, the measurement of the groundwater level at existing boreholes and the collection and analysis of groundwater samples.

### 5.10.1 Hydrogeological setting

Geology

The catchment area consists of mainly shale, sandstone, gritstone and coal measures of the Vryheid formation. Basalt and andesite of the Dullstroom Formation is present in the centre of the farm and gabbro, norite and anorthosite of the Rustenburg Layered Suite to the north. No major prominent geological structures were found on site, except for the geological contact zones present towards the central and northern parts of the farm. The overall rating in terms of the geological setting and geological lineaments of the site was deemed Average (Cilliers, 2017).

Aquifer types

According to Cilliers (2017), aquifers occurring in the above-mentioned geological formations are normally fractured rock, secondary aquifers. Both the porosity and the hydraulic permeability of these rocks are known to be low to moderate. The preferential movement of groundwater is mostly in secondary openings formed by fractures, geological lineaments (such as faults) or along igneous intrusions (such as dolerite dykes or sills).

The regional hydrogeological information indicates a low groundwater potential for the area with average borehole yields of 0.1 l/s - 0.5 l/s (Cilliers, 2017). Good yield potential could however, be expected in geological contact zones or where dolerite intrusions are present.

Hydrochemical setting

According to Cilliers (2017), the regional composition of the groundwater in the area indicates groundwater of good quality (i.e. Class 1 - suitable for long-term domestic use to Class II which is short term use only).

Recharge

Cilliers (2017) estimated recharge on site as 'moderate infiltration' due to soft side slopes, good vegetation cover resulting in slower run-off, less erosion, low to moderate permeable residuum and exposed pedogenic materials along the drainage systems.

Recharge at the drainage features appears to be good when associated with weathered bedrock (Cilliers, 2017). Recharge could however, be impeded by closed fractures, causing a near surface perched water table with springs and seeps along the strike of bedrock outcrops.

Reserve determination

Information from the South African Reserve Determination classification system indicates that the study area seems relatively unstressed in terms of groundwater abstraction with a recharge rate of 54.95 million $m^3$/annum (5%). Cilliers (2017) calculated the effective catchment as 4 $km^2$ or 0.275 million $m^3$/annum. Recharge could however, be less since the site is located near the boundary of two quaternary catchments and a local watershed.

Cilliers (2017) assigned an overall hydrogeological setting rating of Average to the proposed site.

Potential zones for geophysical investigation

As indicated above, the catchment area comprises mainly shale, sandstone, gritstone and coal measures with Dolerite intrusions. These formations are generally weathered to a depth of ±6-12 mbgl, which contributes to a low recharge value and an average allocatable groundwater component (Cilliers, 2017). If the catchment is of fairly good extent, the actual groundwater component is moderate.

During periods of high rainfall, springs are normally present on the contact zone between the shale/sandstone and the intrusive rocks (dolerite). These areas are however, not always considered sustainable in terms of potential drilling sites.

Cilliers (2017) subsequently assigned a rating of Average in terms of potential geophysical investigation zones.

### 5.10.2 Hydrocensus

The existence of two (2) boreholes within a 1 km radius of the farm boundary were verified by Cilliers (2017) during the desktop study. These boreholes are located on the farms Wintershoek and Generaalsdraai. Yields range from 0.1l/s to 0.2l/s and on average around 0.15l/s.

A field survey (hydrocensus) was subsequently conducted to locate other boreholes in the area. Cilliers (2017) identified six (6) boreholes in the vicinity of the proposed school site as indicated in Figure 5.17. **No boreholes are present on site**. The results of the hydrocensus are provided in Table 5.13.

**Table 5.13: Boreholes identified as part of hydrocensus (taken from Cilliers, 2017)**

| Source Number | Latitude WGS84 | Longitude | Source Type | Depth | Yield | Static Water Level | Existing Equipment | Condition / Status | Electricity available |
|---|---|---|---|---|---|---|---|---|---|
| | | | | (m) | (l/s) | (mbgl) | | | Approx distance (m) |
| Afgri | S 25°47'46.4" | E 29°54'40.0" | Borehole | 18.4 | 0.3-0.7 | 0.8 | Submersible | Working | Yes - 240m |
| BH1 | S 25°47'45.1" | E 29°54'16.7" | Borehole | 24.5 | 0.5-1.0 | 7.4 | None | Not working, solar stolen | No - Solar |
| BH2 | S 25°47'31.8" | E 29°54'32.7" | Borehole | 45 | 0.1-0.3 | 14 | Submersible | Working | No - Solar |
| BH3 | S 25°47'23.9" | E 29°54'7.8" | Borehole | 100 | 0.1-0.3 | 35.1 | Submersible | Working | No - Solar |
| BH4 | S 25°46'38.8" | E 29°53'53.2" | Borehole | 85 | 0.1-0.3 | 13 | None | Not working | No - Solar |
| BH5 | S 25°47'5.3" | E 29°54'1.8" | Borehole | 73 | 0.1-0.3 | 4.6 | None | Not working, solar stolen | No - Solar |

As indicated in Table 5.13, electricity is only available at the Afgri borehole, which is located approximately 240 m south east of the site (Figure 5.17). This borehole is in working order. The other 5 boreholes (BH1 - BH5; Figure 5.17) operate with solar power. However, only 2 of these boreholes are in working order. In two instances, the solar panels were stolen and the third borehole is not operational (Table 5.13).

The borehole depths range between 18.4 m (Afgri) to 100 m (BH3) (Table 5.13). The boreholes located closest to the site (BH1 and BH2; Figure 5.17) have depths of 24.5m and 45 m respectively.

The highest yielding borehole was found to be BH1 with a yield of 0.5 - 1 l/s, with the second highest yielding borehole being Afgri at 0.2 - 0.7 l/s (Table 5.13 and Figure 5.17).

### 5.10.3 Potential borehole sites

Cilliers (2017) identified 4 potential borehole sites in the area by using the results of the feasibility study, aerial photographs, magnetic and electromagnetic methods. Figure 5.17 indicates the location of the geophysical traverses (T1 - T10) and the potential borehole sites identified (Site 1 to Site 4).

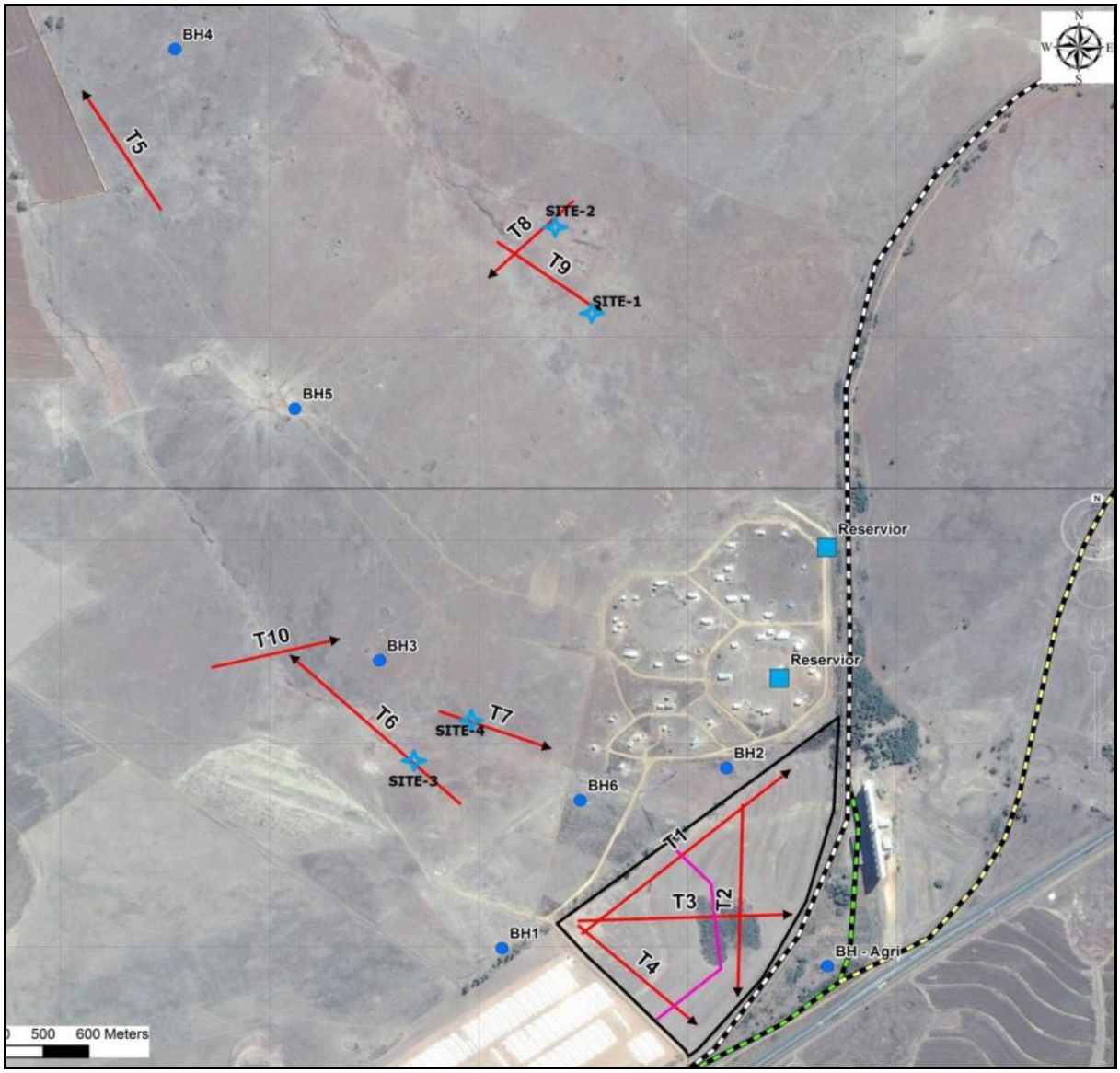



**Figure 5.17: Location of geophysical traverses, existing boreholes and potential borehole sites identified (taken from Du Preez, 2016)**

As indicated in Figure 5.17, the 4 potential borehole sites are located on geophysical traverses T6, T7, T8 and T9. Cilliers (2017) rated each of the potential boreholes in terms of yield potential and determined the drilling priority as indicated in Table 5.14. Site 1 and Site 2 (located north of the site; Figure 5.17) were identified as the first and second priority boreholes with a yield potential of Good.

**Table 5.14: Geophysical investigation results (taken from Cilliers, 2017)**

| Geophysical Traverse | Site at Station | Geological Site Type | Name on Map | Site Rating |
|---|---|---|---|---|
| T6 | 120m; ALT 390m | Contact zone | Site 3 | Good (Priority 3) |
| T7 | 75m; ALT 165m | Contact zone | Site 4 | Average (Priority 4) |
| T8 | 105m | Geological lineament | Site 2 | Good |

| Geophysical Traverse | Site at Station | Geological Site Type | Name on Map | Site Rating |
|---|---|---|---|---|
| | | | | (Priority 2) |
| T9 | 295m | Contact zone | Site 1 | Good (Priority 1) |

### 5.10.4 Drilling of boreholes (source development)

The rotary air flush percussion drilling method was utilized to drill all four (4) boreholes identified during the geophysical survey (Figure 5.17). Figure 5.18 indicates the location of the newly drilled boreholes (green markers; BH7, BH8, BH9 and BH10) in relation to the proposed school site.

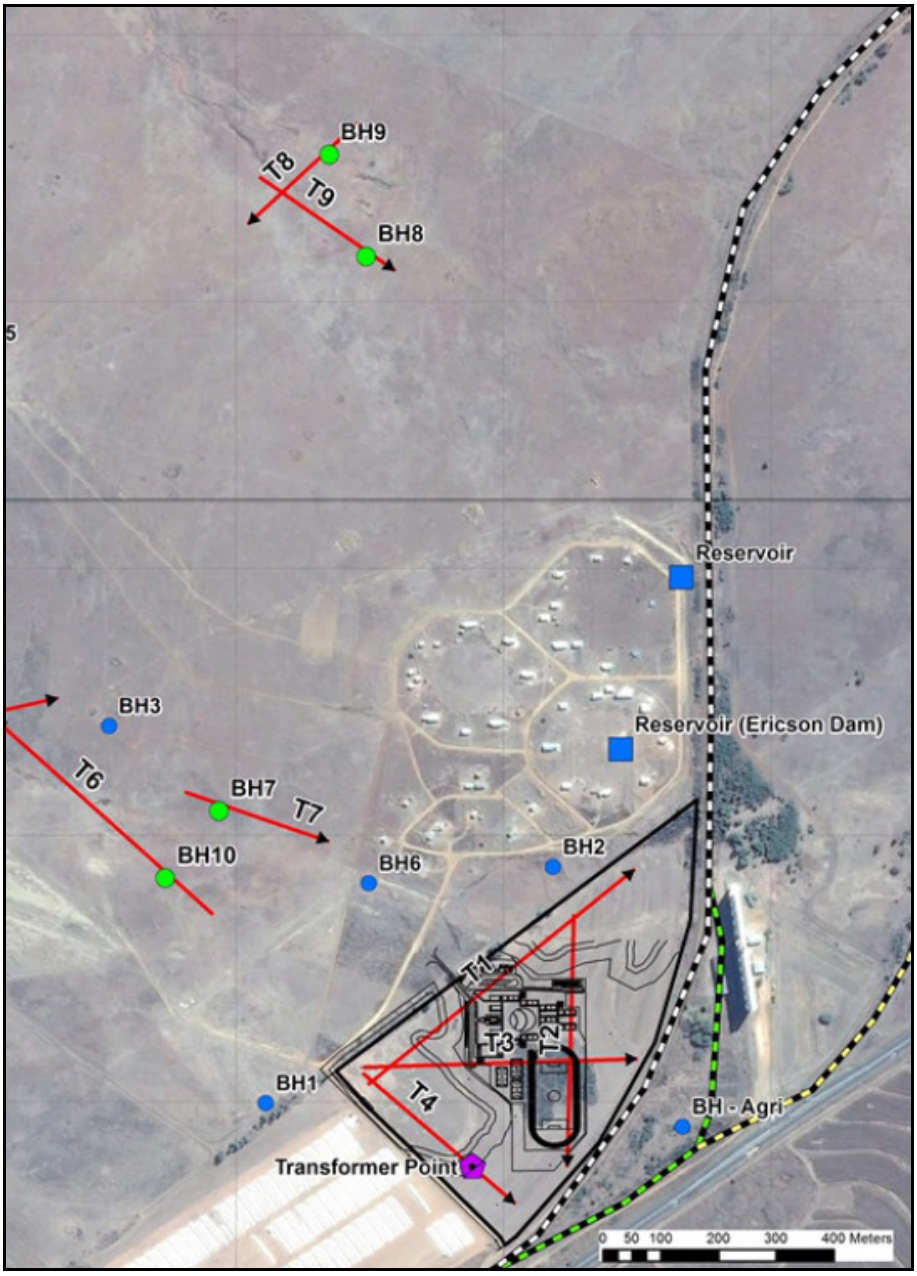



**Figure 5.18: Location of the newly drilled boreholes (taken from Du Preez, 2017)**

All four (4) boreholes (BH7 - BH10; Figure 5.18) intersected weathered fractures and change in geological formations between basalt and andesite (Cilliers, 2017). The depth of each water strike (including seepage) as well as the blow yield was recorded by the drilling contractor, since this information is required for the testing and equipping of the borehole. Table 5.15 indicates the drilling results.

Borehole 9 (BH9; Figure 5.18) produced the best results with a blow yield of 25 000 liters/hour (Cilliers, 2017). Water strikes were recorded at 5m, 43m, 64m and 87m with a final borehole depth of 90m (Table 5.15).

Borehole 7 (BH7; Figure 5.18) produced the second highest blow yield of 2800 liters/hour. This borehole was drilled to a depth of 100m with a water strike at 15m (Table 5.15).

Borehole 8 (BH8; Figure 5.18) was drilled considerably deeper to a depth of 150m. Water strikes were recorded at 34m and 144m with a final blow yield of 2500 liters/hour (Table 5.15).

The lowest blow yield of only 200 liters/hour was recorded at Borehole 10 (BH10; Figure 5.18). This borehole was drilled to a depth of 100m with only one water strike at 77m (Table 5.15).

**Table 5.15: Drilling results summary (taken from Cilliers, 2017).**

| Area | Borehole Number | Lat (S) | Long (E) | Borehole Depth (mbgl) | Solid Mild Steel Casing Depth (3mm wall thickness – 165mm diameter) (m) | Slotted Mild Steel Casing Depth (3mm wall thickness – 165mm diameter) (m) | Water Strike Depth (mbgl) | Rest Water Level (mbgl) | Blow Yield (l/hr) |
|---|---|---|---|---|---|---|---|---|---|
| Morelig School | BH7 | S 25°47'28.5" | E 29°54'14.1" | 100 | 12 | 6 | 15 | 2.9 | 2800 |
| Morelig School | BH8 | S 25°46'57.3" | E 29°54'22.2" | 150 | 5 | 6 | 34, 144 | 6.1 | 2500 |
| Morelig School | BH9 | S 25°46'51.5" | E 29°54'20.2" | 90 | 16 | - | 5, 43, 64, 87 | 0.5 | 25000 |
| Morelig School | BH10 | S 25°47'32.3" | E 29°54'11.1" | 100 | 16 | - | 78 | 77.7 | 200 |

### 5.10.5 Pump testing

Cilliers (2017) conducted 24 hour test pumping on the existing and newly drilled boreholes to determine whether the new boreholes would be able to provide a sustainable water source of good quality for the proposed school.

The pump testing consisted of the following (Cilliers, 2017):

| Type of Test | Objective | Description |
|---|---|---|
| Step Discharge Test | To ascertain the potential borehole yields | Four (4) steps of 60 minutes each at increasing rates, followed by recovery and drawdown |

| Type of Test | Objective | Description |
|---|---|---|
| | | measurements. |
| Constant Discharge Test | Assess the productivity of the aquifer according to its response to the abstraction of water | Pumping of borehole for a period of 24 hours at a single pumping rate. |
| Recovery Monitoring | To determine the ability of a borehole and groundwater system to recover from the stress of abstraction. | The boreholes are left to recover for 24 hours or until the water level recovered within 95% of its original level. |

The test pumping results (i.e. borehole depth, test pump setting, constant discharge rate, drawdown, recovery % and recovery time) are indicated in Table 5.16.

**Table 5.16: Test pumping results summary (taken from Cilliers, 2017)**

| Borehole Number | Lat (S) | Long (E) | Borehole Depth | Test Pump Setting (mbgl) | Constant Discharge Rate | Maximum Drawdown after Constant Discharge (m) | Recovery % and |
|---|---|---|---|---|---|---|---|
| | WGS84 | | (mbgl) | | (l/hr) | | Recovery Time |
| Afgri | S 25°47'46.4" | E 29°54'40.0" | 18 | 17.5 | 1.01 | 17.1 | 95% 840min |
| 1 | S 25°47'45.1" | E 29°54'16.7" | 24.5 | 21.5 | 2.1 | 11.9 | 37% 840min |
| 2 | S 25°47'31.8" | E 29°54'32.7" | 45 | 40 | 0.21 | 38.44 | 97% 360min |
| 3 | S 25°47'23.9" | E 29°54'7.8" | 100 | 80 | 0.34 | 43.51 | 71% 1440min |
| 4 | S 25°46'38.8" | E 29°53'53.2" | 85 | 82 | 0.21 | 69.8 | 14% 60min |
| 5 | S 25°47'5.3" | E 29°54'1.8" | 73 | 69.5 | 0.61 | 23.77 | 89% 780min |
| 6 | S 25°47'32.7" | E 29°54'22.4" | 60 | 55 | 0.22 | 48.79 | 99% 90min |
| 7 | S 25°47'28.5" | E 29°54'14.1" | 100 | 80 | 0.72 | 29.01 | 96% 150min |
| 8 | S 25°46'57.3" | E 29°54'22.2" | 150 | 72.5 | 0.56 | 54.92 | 98% 300min |
| 9 | S 25°46'51.5" | E 29°54'20.2" | 90 | 72.5 | 6.93 | 45.56 | 99% 1440min |

As is evident from Table 5.16, no results are available for BH10. It is assumed that BH10 was not pump tested due to the low yield of the borehole (i.e. 200 liters/hour; Table 5.15).

According to Cilliers (2017), the number of low yielding boreholes (e.g. BH2 – BH8; Table 5.16) is an indication of the low groundwater potential in the area. The highest yielding boreholes were the Afgri borehole (1.01 liters/hour), BH1 (2.1 liters/hour) and BH9 (6.93 liters/hour). The total abstraction from the tested boreholes (excluding the Afgri borehole) amounted to 320 000 l/day.

Although BH1 had a relatively high constant discharge rate, the recovery percentage was only 37% after 14 hours. The Afgri borehole recovered to 95% within 14 hours and BH9 recovered to 99% within 24 hours (Table 5.16).

Based on the test pumping results, Cilliers (2017) recommended that of the 4 new boreholes drilled (BH7 to BH10; Figure 5.18), only BH8 and BH9 be equipped and utilized.

### 5.10.6 Groundwater levels and flow

Cilliers (2017) plotted the static water levels and water level elevation as recorded during the pump testing as indicated in Figures 5.19 and 5.20 in order to determine the hydraulic characteristics of the aquifer.

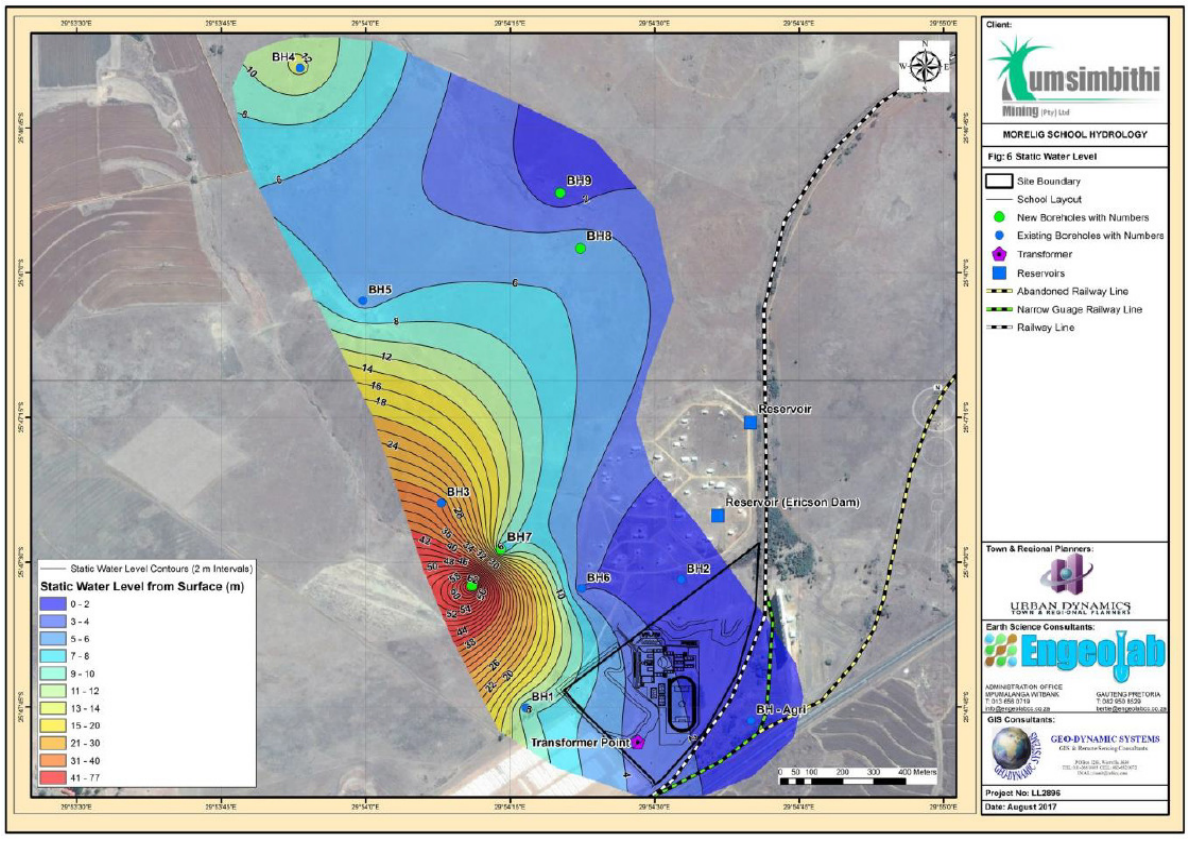



**Figure 5.19: Static water level contour lines (taken from Cilliers, 2017)**

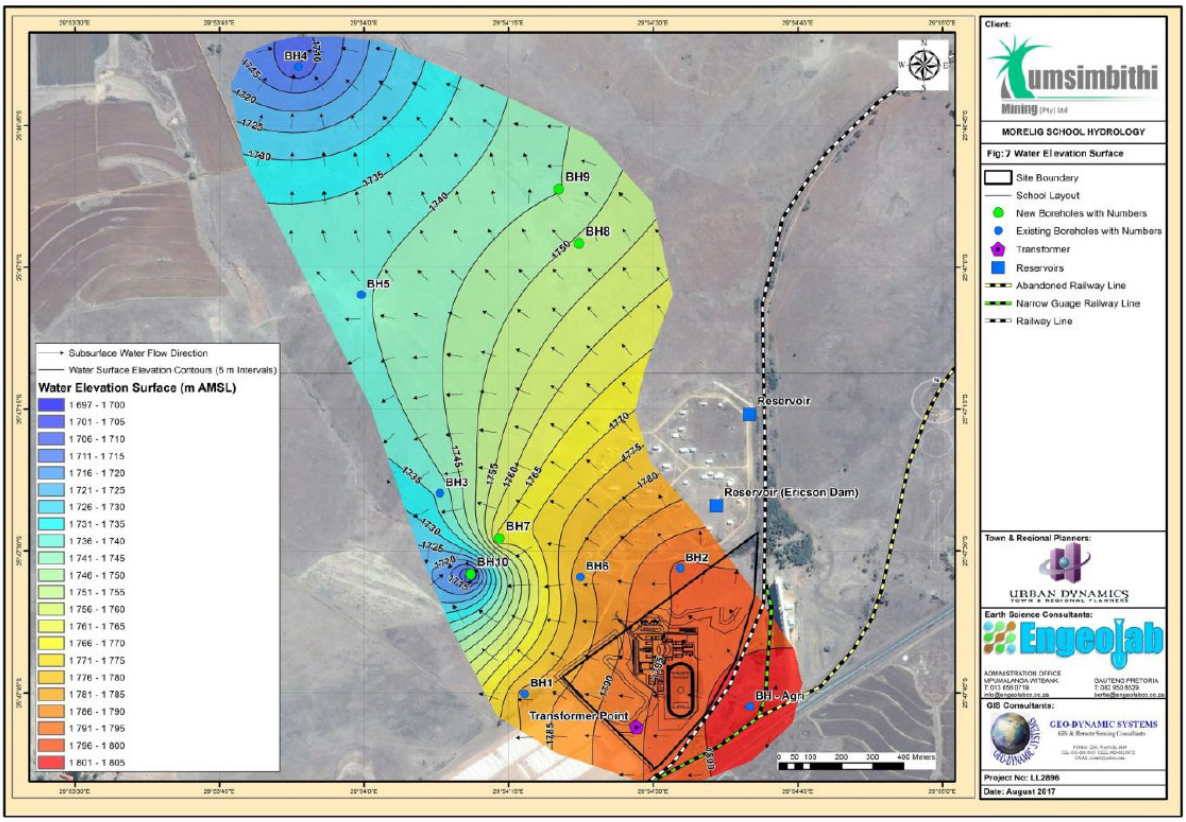



**Figure 5.20: Water elevation surface (taken from Cilliers, 2017)**

As indicated in Figure 5.19, the static groundwater levels in the area vary between 2m to 77m below surface. The static groundwater level is relatively shallow in the eastern portion of the investigated area and gradually becomes deeper towards the west, specifically at the BH10 location (Figure 5.19).

The subsurface flow direction is inferred to simulate surface drainage patterns which are in a north north westerly direction as indicated in Figure 5.20.

### 5.10.7 Sustainability of boreholes

According to Cilliers (2017), substantial abstraction from numerous sources in a specific area may influence the total baseflow of the catchment.

The test pumping and recovery monitoring enabled Cilliers (2017) to estimate the sustainable yield of the existing and new boreholes and provided information on pump installation depths, safe abstraction rates, pumping and recovery duration cycles as indicated in Table 5.17.

The sustainable daily yield of BH2, BH3, BH4 and BH6 were found to be relatively low between 2.3 and 4.8 $m^3$/day (Table 5.17). BH9 (Figure 5.18) has the highest sustainable daily yield of 225 $m^3$/day. The recommended daily pump cycle for all the boreholes is 9 hours, except for BH8 which is 12 hours (Table 5.17).

As indicated in Table 5.17, the recommended abstraction rate of all the boreholes (except for Afgri, BH 7 and BH9) is well below 1 liter/second with the lowest being BH4 at 0.07 liters/second. BH9 has the highest recommended abstraction rate of 7 liters/second.

**Table 5.17: Hydraulic parameters calculation summary (taken from Cilliers, 2017)**

| Borehole Number | Lat (S) | Long (E) | Borehole Depth | Static Water Level | Recommended Pump Set depth | Recommended Abstraction Rate | Recommended Daily Pump Cycle (hr) | Sustainable daily Yield |
|---|---|---|---|---|---|---|---|---|
| | WGS84 | | (mbgl) | (mbgl) | (mbgl) | (l/s) | | (m3/day) |
| Afgri | S 25°47'46.4" | E 29°54'40.0" | 18 | 0.8 | 17.5 | 1 | 9 | 32.1 |
| 1 | S 25°47'45.1" | E 29°54'16.7" | 24.5 | 7.4 | 21.5 | 0.6 | 9 | 19.2 |
| 2 | S 25°47'31.8" | E 29°54'32.7" | 45 | 14 | 40 | 0.22 | 9 | 4.8 |
| 3 | S 25°47'23.9" | E 29°54'7.8" | 100 | 35.1 | 80 | 0.14 | 9 | 4.6 |
| 4 | S 25°46'38.8" | E 29°53'53.2" | 85 | 13 | 82 | 0.07 | 9 | 2.3 |
| 5 | S 25°47'5.3" | E 29°54'1.8" | 73 | 4.6 | 69.5 | 0.42 | 9 | 13.5 |
| 6 | S 25°47'32.7" | E 29°54'22.4" | 60 | 1.4 | 55 | 0.1 | 9 | 3.1 |
| 7 | S 25°47'28.5" | E 29°54'14.1" | 100 | 2.9 | 80 | 1 | 9 | 32.5 |
| 8 | S 25°46'57.3" | E 29°54'22.2" | 150 | 6.35 | 45 | 0.56 | 12 | 24.2 |
| 9 | S 25°46'51.5" | E 29°54'20.2" | 90 | 0.5 | 45 | 7 | 9 | 225 |

According to Cilliers (2017), one has to determine the zone of influence of individual boreholes on each other in order to determine the effect of simultaneous abstraction and the impact/risk to the various sources. Since the new and existing boreholes are located within a 2.5 km radius of each other, the cumulative drawdown that may occur with combined pumping also need to be assessed. The transmissivity, storativity and zone of influence of each borehole was subsequently calculated to determine the impact/risk to surrounding sources as indicated in Table 5.18.

**Table 5.18: Impact/Risk to surrounding sources (taken from Cilliers, 2017)**

| Borehole Number | Lat (S) | Long (E) | Quaternary Catchment & assumed direction | Calculated Transmissivity (Early T) | Calculated Storativity (S) | Calculated Zone of Influence | Nearest Borehole | Impact / Risk to surrounding sources |
|---|---|---|---|---|---|---|---|---|
| | WGS84 | | | (m2/day) | (l/s) | (m) | Distance (m) | |
| Afgri | S 25°47'46.4" | E 29°54'40.0" | X11C to X11D (eastwards) | 4.1 | 0.0051 | 25 | 560 | Low |
| 1 | S 25°47'45.1" | E 29°54'16.7" | B41A to B41B ( northwards) | 8.0 | 0.0007 | 26 | 400 | Low |
| 2 | S 25°47'31.8" | E 29°54'32.7" | B41A to B41B ( northwards) | 0.8 | 0.0027 | 17 | 280 | Low |
| 3 | S 25°47'23.9" | E 29°54'7.8" | B41A to B41B ( northwards) | 0.6 | 0.0038 | 27 | 260 | Low |
| 4 | S 25°46'38.8" | E 29°53'53.2" | B41A to B41B ( northwards) | 0.1 | 0.0007 | 12 | 750 | Low |
| 5 | S 25°47'5.3" | E 29°54'1.8" | B41A to B41B ( northwards) | 1.1 | 0.0068 | 39 | 650 | Low |
| 6 | S 25°47'32.7" | E 29°54'22.4" | B41A to B41B ( northwards) | 0.1 | 0.0007 | 17 | 280 | Low |
| 7 | S 25°47'28.5" | E 29°54'14.1" | B41A to B41B ( northwards) | 3.0 | 0.0091 | 11 | 260 | Low |
| 8 | S 25°46'57.3" | E 29°54'22.2" | B41A to B41B ( northwards) | 1.4 | 0.0060 | 15 | 200 | Low |
| 9 | S 25°46'51.5" | E 29°54'20.2" | B41A to B41B ( northwards) | 12.0 | 0.043 | 15 | 200 | Low |

According to Cilliers (2017), the hydraulic gradient (Figure 5.20) seems to indicate a north north-west dipping trend, which confirms the quaternary drainage direction proposed by the literature. It is therefore expected that

abstraction at BH8 and BH9, which is located further north and geohydrologically down gradient from existing boreholes, (Figure 5.18) will not significantly impact on BH2, BH3, BH5 and the Afgri borehole (Figure 5.18) in terms of water level and abstraction (Cilliers, 2017).

The expected and calculated risk to surrounding boreholes can be summarized as low based on distances between boreholes, zone of influence and equipment type as indicated in Table 5.18.

However, ample recovery time must be allowed, pumping cycles must be staggered and the recommended pumping volumes and durations must not be exceeded (Table 5.17). In addition, the proposed equipment (windmills) must have a maximum abstraction of less than the sustainable yields of the individual & combined abstraction in order to mitigate extensive draw down.

In order to prevent damage to the boreholes and aquifer, the boreholes should never be over pumped. Cilliers (2017) recommended that monthly monitoring takes place to ensure this.

### 5.10.8 Groundwater quality

Groundwater samples were collected from all 10 boreholes (i.e. 6 existing and 4 new; Figure 5.17) in order to determine the quality of the groundwater in the area.

A summary of the water quality information is presented in Table 5.19. The water quality results for each of the 10 boreholes are provided in Appendix F of Appendix 7.

As indicated in Table 5.19, the following was found regarding the groundwater quality in the area:

- The water quality is Acceptable in terms of the SANS classification.
- Turbidity levels exceed the threshold values in BH1, BH3, BH4, BH6, BH7, BH8, BH10 and Afgri BH. Filtering will be required.
- Iron levels exceed the operational limits for human consumption in BH1 and BH9. Aeration, reverse osmosis and filtering will be required to lower iron concentrations to an acceptable level.
- The water quality of BH9 is allowable for human consumption for 7 years according to the SANS Specifications.
- Elevated Manganese levels were recorded in BH1.

**Table 5.19: Summary of water quality results (taken from Cilliers, 2017)**

| Sample at Borehole Number | Lat (S) WGS84 | Long (E) | Water Quality Classification Aesthetic & Health | Substance | Comments | Recommendations |
|---|---|---|---|---|---|---|
| Afgri | S 25°47'46.4" | E 29°54'40.0" | Class I - Health<br>Class III - Aesthetic | Turbidity | Suitable for human consumption | Turbidity levels exceed the threshold values and filtering will be required. |
| 1 | S 25°47'45.1" | E 29°54'16.7" | Class III - Health<br>Class II - Health<br>Class III - Aesthetic | Iron<br>Manganese<br>Turbidity | Unacceptable - Not Suitable for human consumption unless treated | Normal coagulation and flocculation sedimentation and filtration Oxidation by aeration and pH adjustment or addition of chemical oxidants, followed by sedimentation. |
| 2 | S 25°47'31.8" | E 29°54'32.7" | Class I - Health<br>Class I - Aesthetic | | Suitable for human consumption | |
| 3 | S 25°47'23.9" | E 29°54'7.8" | Class I - Health<br>Class II - Aesthetic | Turbidity | Suitable for human consumption | Turbidity levels exceed the threshold values and filtering will be required. |
| 4 | S 25°46'38.8" | E 29°53'53.2" | Class I - Health<br>Class III - Aesthetic | Turbidity | Suitable for human consumption | Turbidity levels exceed the threshold values and filtering will be required. |
| 5 | S 25°47'5.3" | E 29°54'1.8" | Class I - Health<br>Class I - Aesthetic | | Suitable for human consumption | |
| 6 | S 25°47'32.7" | E 29°54'22.4" | Class I - Health<br>Class III - Aesthetic | Turbidity | Suitable for human consumption | Turbidity levels exceed the threshold values and filtering will be required. |
| 7 | S 25°47'28.5" | E 29°54'14.1" | Class I - Health<br>Class II - Aesthetic | Turbidity | Suitable for human consumption | Turbidity levels exceed the threshold values and filtering will be required. |
| 8 | S 25°46'57.3" | E 29°54'22.2" | Class I - Health<br>Class II - Aesthetic | Turbidity | Suitable for human consumption | Turbidity levels exceed the threshold values and filtering will be required. |
| 9 | S 25°46'51.5" | E 29°54'20.2" | Class II - Health<br>Class I - Aesthetic | Iron | Suitable for human consumption - Allowable for 7 years | Normal coagulation and flocculation sedimentation and filtration Oxidation by aeration and pH adjustment or addition of chemical oxidants, followed by sedimentation. |
| 10 | S 25°47'32.3" | E 29°54'11.1" | Class I - Health<br>Class III - Aesthetic | Turbidity | Suitable for human consumption | Turbidity levels exceed the threshold values and filtering will be required. |

### 5.10.9 Conclusion and recommendations

Based on the literature review and field assessment, Cilliers (2017) made the following recommendations:

- Of the 4 new boreholes drilled (BH7 to BH10; Figure 5.18), only BH8 and BH9 should be equipped and utilized.
- Both BH8 and BH9 can be equipped with a suitable windmill capable of delivering the water required by the school. Recommendations in this regard are provided in Section 8 (EMP).
- Abstraction at BH8 and BH9, which are located further north and geohydrologically down gradient from existing boreholes, (Figure 5.18)

will not significantly impact on BH2, BH3, BH5 and the Afgri borehole (Figure 5.18) in terms of water level and abstraction.
- The maximum abstraction duration from the boreholes is 9 hours/day pumping cycle.
- The boreholes should be allowed to recover for the remainder of the day.
- The boreholes should never be over pumped as this could damage the boreholes, aquifer and negatively impact on any future abstraction.
- In order to prevent the water level from dropping below the critical drawdown depth of 36.1 mbgl, it is recommended that the overflow from the storage tanks be routed back to the borehole to recharge.
- The boreholes should be monitored on a monthly basis by installing a monitoring facility next to the windmill. Monitoring of the water levels is required to ensure optimal abstraction and to protect the boreholes from over exploitation.
- The water should be sampled and analysed on a regular basis to prevent any outbreak of waterborne diseases.
- The water quality classification is acceptable in terms of human consumption. However, iron and manganese levels in BH1 and iron levels in BH9 exceed the operational limits. Aeration, reverse osmosis and filtering will be required to lower the high concentration to an acceptable level.
- The water quality should be resampled in terms of turbidity levels. If turbidity levels are found to still be high, the water should be filtered before consumption.
- Treatment methods should be discussed with accredited professionals in the water treatment industry.

## 5.11 Air quality

The air quality of the site and immediate surrounding area is predominately governed by agricultural practices and mining activities.

Activities in the surrounding area that could potentially impact on the air quality of the site include the following:
- Dust generated as a result of vehicles utilizing the adjacent gravel roads (Figure 5.2).
- Emissions from vehicles travelling on the various roads in the area (i.e. N4 national road, gravel roads).
- Dust as a result of surrounding agricultural (ploughing, seeding, harvesting, etc.) and mining activities;
- Smoke emitted from veld fires;
- Smoke from cooking fires at the adjacent Generaalsdraai Village.

## 5.12 Noise

The proposed school will be located in a rural area.

The site is bordered by a railway line to the south and east (Figure 5.3). Generaalsdraai Village is located north of the site and the Afgri Silos towards the east. The N4 national road is present south of the site. BKB Graanberging (bag silos) operates towards the west (Figure 5.3). The other dominant land use in the area is agriculture.

In general, the ambient noise level of the site and immediate surrounding area is impacted by the railway line, N4 national road, Generaalsdraai Village and agricultural activities. The mining activities in the area are located more than 6 km from the site and should not impact on the ambient noise levels, except when blasting.

## 5.13 Sites of archaeological and cultural interest

### 5.13.1 Cultural Heritage sensitivity

A Phase I Heritage Impact Assessment (HIA) as required in terms of Section 38 of the National Heritage Resources Act (Act 25 of 1999) was undertaken by Dr. A. van Vollenhoven, an accredited archaeologist of the company Archaetnos (referred to as Van Vollenhoven, 2017). A copy of the report is provided in Appendix 8. For a description of the methodology used as well as an explanation of terminology used, please refer to Appendix 8.

Van Vollenhoven (2017) indicated that the environment around Wonderfontein and Belfast is not known for containing Stone Age Sites. The closest recorded sites are at Carolina, Badplaas and Machadodorp. **No Stone Age sites were noted** within the proposed school site or along the proposed pipeline routes.

**In addition, no sites from the Historical Age (including graves)** were noted within the proposed school site or along the pipeline routes.

In the area around Wonderfontein, Belfast, Lydenburg, Nelspruit, Machadodorp and Badplaas, a total of 1792 Late Iron Age sites have been recorded. However, **no Iron Age sites were identified** within the proposed school site or along the proposed pipeline routes. Some Late Iron Age stone walling were noted on Google Earth images towards the north and west of the pipeline routes as indicated in Figure 5.21. These sites are however, located more than 100 m away from the proposed pipeline routes and should therefore not be affected by construction activities.

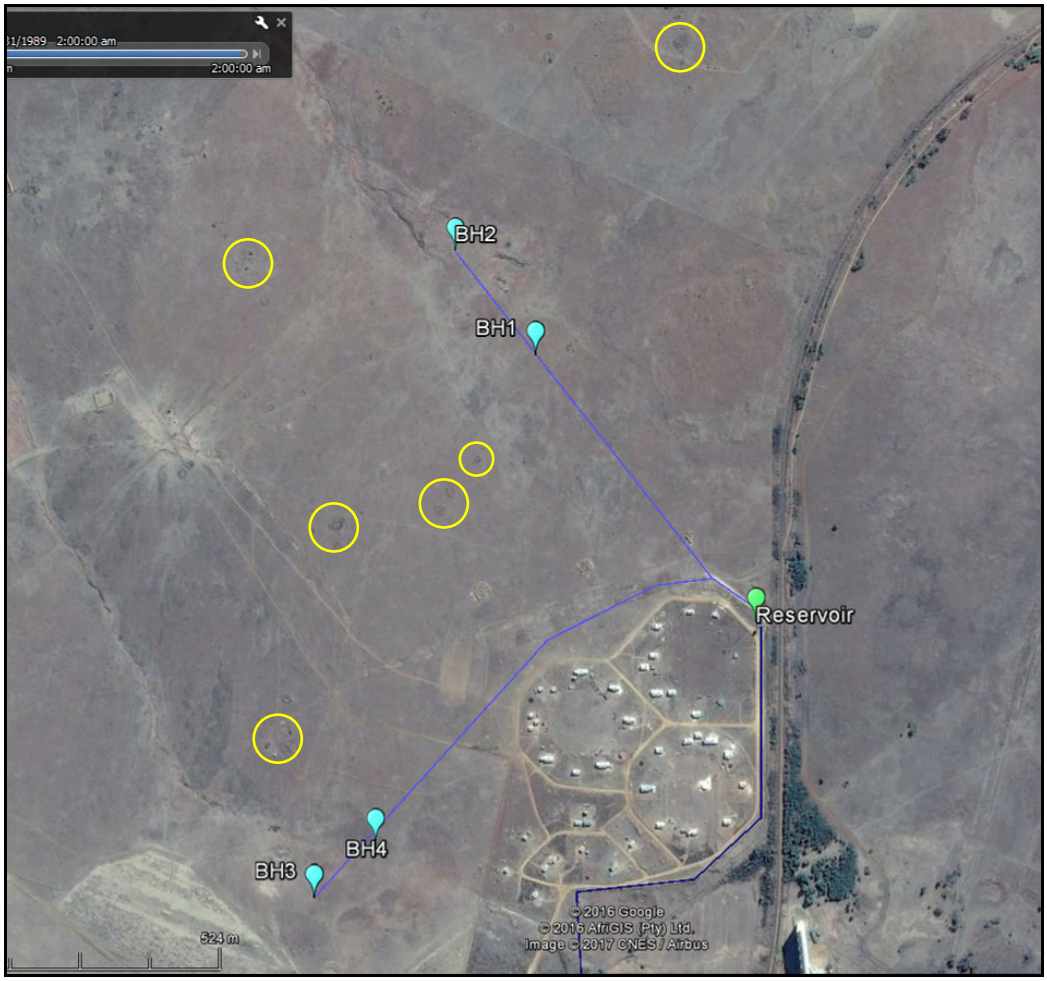



**Figure 5.21: Possible Late Iron Age stone walling located near the pipeline routes**

Van Vollenhoven (2017) indicated that since no sites of cultural heritage significance are located on the school site or along the pipeline routes, the development may continue subject to obtaining approval from SAHRA.

However, the applicant should be aware that the subterranean presence of archaeological and/or historical sites, features or artefacts is always a distinct possibility. Sites may also have been overlooked due to the dense vegetation. Operating controls and monitoring should therefore be aimed at the possible unearthing of features and mitigation measures would have to be implemented.

### 5.13.2 Palaeontological sensitivity

According to the palaeontological map supplied by the South African Heritage Resources Agency (SAHRA, 2014), the palaeontological sensitivity of the proposed school site and most of the pipeline route is deemed as very high (area indicated in red; Figure 5.22). In view of this, a field assessment and protocol for finds are required as indicated in Figure 5.22.

A portion of the pipeline route falls within an area of insignificant/zero sensitivity (area indicated in grey; Figure 5.22). This area is underlain by basalt and andesite of the Dullstroom Formation.

Dr. Heidi Fourie (Heidi Fourie Consulting) was appointed to conduct a Palaeontological Impact Assessment – Field Study (referred to as Fourie, 2017). A copy of the said report is provided in Appendix 9 and should be consulted with regards to the methodology used.

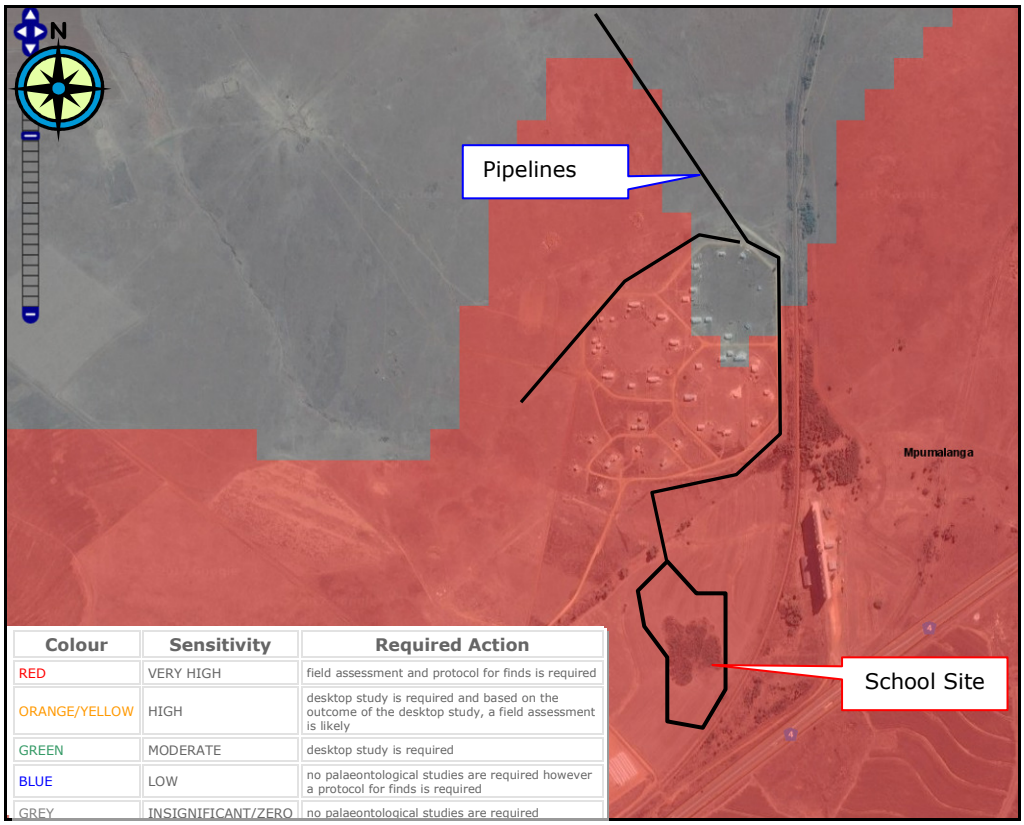



**Figure 5.22: Requirement for palaeontological study (taken from SAHRA, 2014)**

According to Fourie (2017), the proposed school site and sections of the water pipeline routes are underlain by shale, shaly sandstone, grit and sandstone of the Vryheid Formation, Ecca Group, Karoo Supergroup. This was confirmed by the presence of a sandstone bank on site (Photo 5.10).

The Vryheid Formation is known for its plant fossils and may contain assemblages of the Permian *Glossopteris* flora, rare fossil wood, diverse palynomorphs and abundant low diversity trace fossils (e.g. rare insects, non-marine bivalves, fish scales, etc.). The fossils are not very rare and also occur in other parts of the Karoo stratigraphy.

The palaeontological sensitivity for the **Vryheid Formation** is '**Very High**' as a result of the coal and shale layers.

A small section of the water pipeline route could extend over the Bushveld Complex, which has an **insignificant/zero significance** in terms of palaeontology and does not require any studies (Figure 5.22).

Fourie (2017) raised no objection to the proposed development. A Phase 2 Palaeontological Impact Assessment is not required since no surface fossils were found during the walk through. However, the topsoil, subsoil and

overburden must be surveyed for fossils during the construction phase. A protocol for finds and management plan are provided in Appendix 9.

## 5.14 Sensitive landscapes

No heritage resources (e.g. graves, historic buildings, etc.) are present as indicated in Section 5.13.

Wetlands are however, located near the proposed school site and along the pipeline routes (Figure 5.16). According to Venter (2016), the identified wetland areas are considered to be of high sensitivity as indicated in Section 5.9. Venter (2016) recommended that buildings be placed outside of the 50 m buffer zone while the sports fields, parking areas and access route be located outside of the 35m wetland buffer (Figure 5.17).

## 5.15 Visual aspects

As already indicated, the site is bordered by the Transnet railway line to the south and east (Figure 5.3). The N4 national road is also located south of the site. Generaalsdraai Village is present on the northern boundary, the Afgri Silos on the western boundary and bag silos (BKB Graanberging) on the eastern boundary (Figure 5.3).

The site is fairly flat with a gentle slope in a north westerly direction. The said site is highly visible from the railway line, Generaalsdraai Village and the agricultural land located to the east.

The visual aspect of the said site has already been impacted in terms of the infrastructure present on site and immediate surrounding area.

## 5.16 Traffic

**Road network in the study area (Figure 5.22)**
The proposed site is located in the vicinity of the following road networks:

- **N4 national road:** Located approximately 120 m south of the site (Figure 5.22). The N4 national road is a Tolled Freeway and a Class 1/2 major arterial road with two through lanes in each direction. In 2014, the weekday morning AM and afternoon PM peak hour traffic volumes were between 400 and 600 vehicles per hour (vph) in each direction (WSP, 2014).
- **D685 district road:** Located approximately 2 km west of the site (Figure 5.22). The D6865 connects Wonderfontein with the N4 national road. It is a surfaced Class 3 road to the north of the N4 for approximately 2 km, where after it turns into a gravel road. The D6865 carries very low traffic volumes of between 15 and 25 vph per direction during the weekday morning AM and afternoon PM peak hours (WSP, 2014).
- **P15/1 district road:** Located approximately 2 km west of the site (Figure 5.22). The P15/1 is a Class 2 surfaced district road extending from Wonderfontein in a southerly direction to Carolina. This road carries between 100 and 175 vph during the weekday morning AM and afternoon PM peak hours (WSP, 2014).

**Access to the proposed development**

The proposed school site, located just north of the N4 national road (Figure 5.23), is currently accessed via an existing gravel road. The existing gravel road follows the railway line towards Wonderfontein and eventually connects to the D685 district road, which connects to the N4 national road (Figure 5.23).

The existing gravel road also extends to the east towards the Afgri Silos, where it connects directly to the N4 national road after crossing the railway line (Figure 5.23).

According to a letter from SANRAL (dated: 22 December 2014) regarding access to the Generaalsdraai Village, the access route from the N4 across the railway line (near the Afgri Silos; Photo 4.2) may not be used to provide access to the village. The school will thus be accessed via the gravel road extending through Wonderfontein (Figure 5.23).

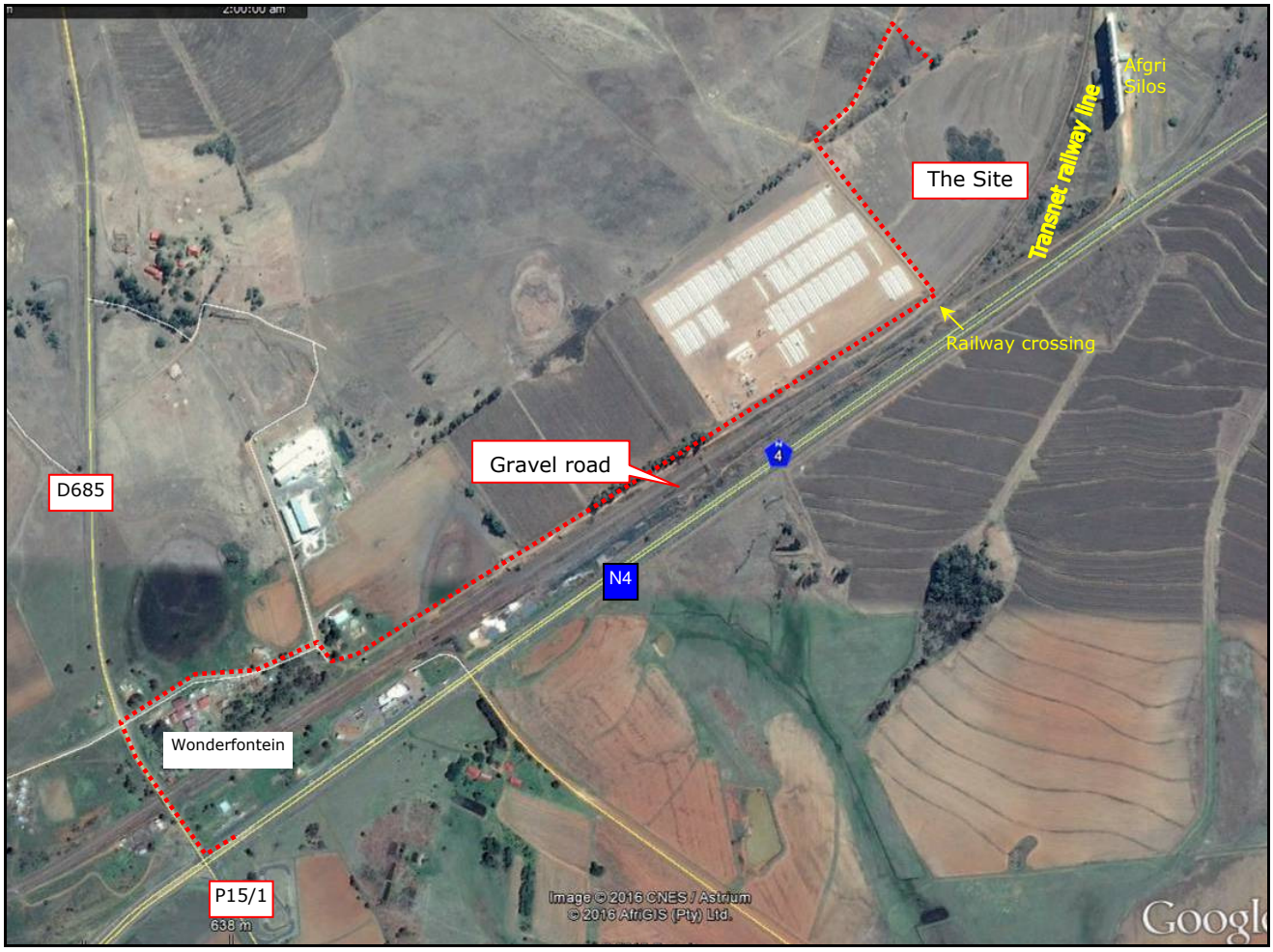



**Figure 5.23: Access road and surrounding road network**

## 5.17 Sense of place

As already indicated, the site is located in an agricultural area between Middelburg and Belfast (Figure 5.1). The surrounding properties are mainly used for maize cultivation and grazing.

The small town/service centre of Wonderfontein is located approximately 1.6 km south west of the site. The town comprises of a clinic, Tshusong Service Centre, Wonderfontein Station, TWK Agriculture, Biominerale Fosfate en Lekke factory, Puma Filling Station and George's shop, a few houses and vacant industries/businesses (e.g. Wonderfontein Mill).

Wonderfontein is indicated in the Emakhazeni Local Municipality Spatial Development Framework (2015) as a proposed Multi Purpose Centre (Figure 5.24). These centres are intended to be one stop centres for basic services such as clinics, satellite municipal offices, post offices, etc. Other uses such as retail, residential and informal trade are also provided for.

The proposed school will thus be an ancillary use to the proposed residential and public service land uses intended for Wonderfontein.

The existing Morelig Combined School is located about 5.8 km south west of the proposed site along the Carolina road (Figure 5.3). The majority of students are transported to school by bus from Belfast and farms in the area.

As indicated in Section 3.3, Morelig Combined School needs to be relocated due to mining activities of Umsimbithi Mining (Pty) Ltd. In addition, the existing school is dilapidated and cannot cater for the number of students.

The new school would be located in the same general vicinity as the existing school and should not have a big impact on the sense of place.

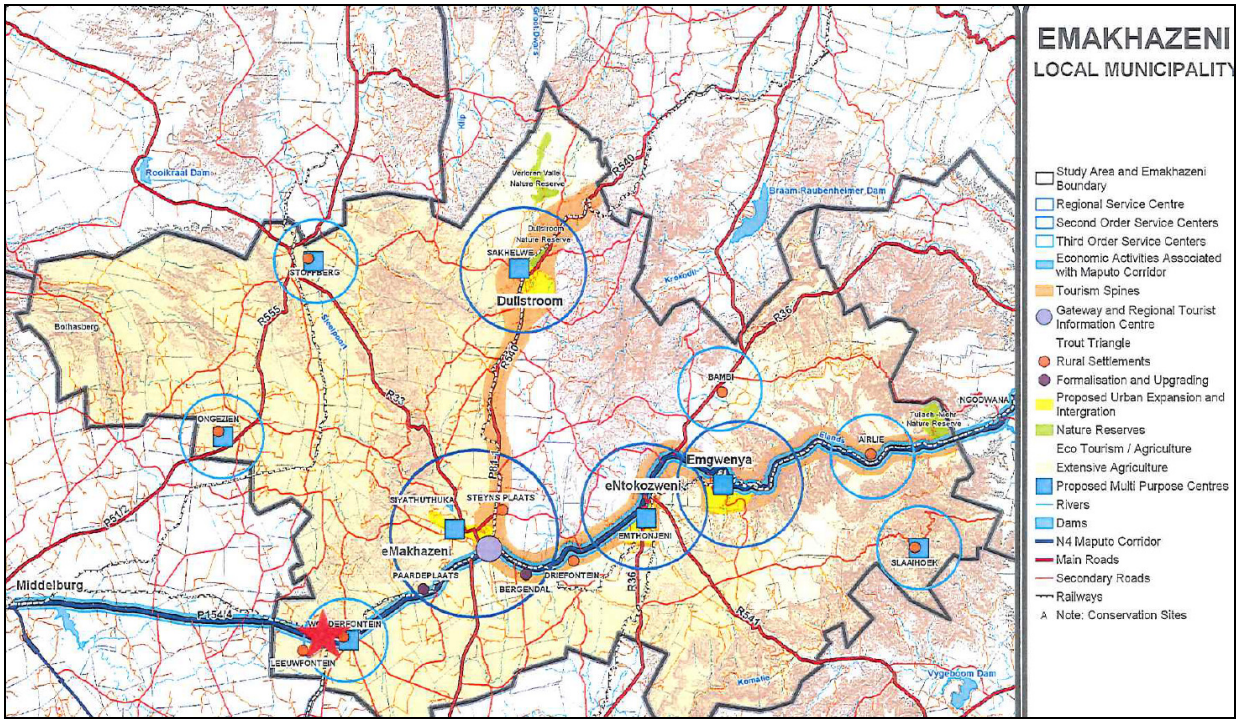



**Figure 5.24: Emakhazeni Local Municipality Spatial Development Framework (2015)**

# 6. DESCRIPTION OF THE PUBLIC PARTICIPATION PROCESS

## 6.1 Advertising of the project

### 6.1.1 Press advertising

A block advert (150mm x 95mm), according to the Environmental Impact Assessment Regulations, 2014, was placed in the local newspaper, Middelburg Observer, on Friday, 10 February 2016. A copy of the advert is provided in Appendix 10.

### 6.1.2 On-site advertising

Notices (Appendix 10) according to the Environmental Impact Assessment Regulations, 2014, were displayed at the following locations:

- On-site adjacent to the gravel access road near the railway line (A1; Figure 6.1a - Photo 1);
- On-site adjacent to the gravel access road near the Generaalsdraai Village (A1; Figure 6.1a – Photo 2);
- On the notice board at the Thusong Service Centre, Wonderfontein (A3; Figure 6.1a – Photo 3);
- At the nearby TWK Agriculture Ltd. store, adjacent to the Wonderfontein post boxes (A3; Figure 6.1a - Photo 4).

The location of the notices in relation to the site is provided in Figure 6.1b.

A copy of the notice was also loaded onto the company website: http://adienvironmental.co.za.

It should be noted that the A1 notice is 594 mm x 841 mm and the A3 notices 416mm x 295mm (A3) in size.

### 6.1.3 Informing I&APs via the internet

A copy of the following documentation was loaded onto the AdiEnvironmental cc. website (http://adienvironmental.co.za):

- Copy of the notice;
- Background Information Document (BID; Appendix 11).

This information was available on the website for the duration of the basic assessment phase.

A copy of the webpage printouts is provided in Appendix 10.

### 6.1.4 Feedback from the advertising process

Only four interested and affected parties registered in terms of the advertising process, namely:

- Giyani Enterprises (e-mail dated: 10 February 2016; Appendix 10);
- Kleinbooi Mahlangu (phoned: 3 March 2017);
- Godfrey Tshabangu (phoned: 10 March 2017);
- D Wessels (e-mail: 16 March 2018; Appendix 10).

A Background Information Document was forwarded (e-mail dated: 13 February 2016; Appendix 10) to Giyani Enterprises as requested. To date, no comment has been received.

Mr. Mahlangu indicated that he is a parent of one of the students and would get a copy of the Background Information Document from the Morelig Combined School Board. To date, no comment has been received.

A Background Information Document was forwarded (10 March 2017; Appendix 10) to Mr. G. Tshabangu. Subsequently, a completed comment sheet (dated: 10 March 2017; Appendix 10) was received (see Section 6.3.4 for more information).


Photo 1: Onsite notice - near the railway line.


Photo 2: Onsite notice


Photo 3: Notice displayed at the Thusong Service Centre., Wonderfontein


Photo 4: Notice displayed at the TWK Agriculture Ltd. store, adjacent to the Wonderfontein post boxes

**Figure 6.1a: A view of the notices displayed.**


**Figure 6.1b: Aerial view indicating where the notices were displayed**
Legend: no. 1 = near railway line; Photo 1 – Figure 6.1a; no. 2 – on site; Photo 2 – Figure 6.1a; no. 3 – Thusong Service Centre; Photo 3 – Figure 6.1a; no. 4 – TWK Agriculture LTD. Store; Photo 4 – Figure 6.1a.

## 6.2 Directly affected landowner/user

### 6.2.1 WJ Prinsloo (Figure 6.2)

The proposed school and associated infrastructure (including water pipelines) will be located on a portion of the Remainder of Generaalsdraai 429 JS (Figure 5.1) which is registered to WJ Prinsloo. A copy of the Deeds Office Property Report and a letter from the property owner giving permission for the proposed activity are provided in Appendix 1.

A Background Information Document was emailed (dated: 14 February 2017; Appendix 12) to Mr. Prinsloo in order to obtain his comments with regards to the proposed project. Subsequently, a completed comment sheet (dated: 14 February 2017; Appendix 12) was received indicating that he is the current owner of the property. No issues of concern were raised.

### 6.2.2 Umsimbithi Mining (Pty) Ltd.

The proposed boreholes and water pipelines will be located on a portion of the Remainder of Portion 16 of Generaalsdraai 423 JS as well as on the

Remainder of Generaalsdraai 429 JS (Figure 5.1). A copy of the Deeds Office Property Report is provided in Appendix 1.

The Remainder of Portion 16 of Generaalsdraai 423 JS is registered to Umsimbithi Mining (Pty) Ltd., who is also the applicant. No outside parties will thus be directly affected in terms of the installation of boreholes and water pipelines.

### 6.2.3 Generaalsdraai Village

Generaalsdraai Village is located north of the proposed school site (Figure 5.3). The community was relocated due to nearby mining activities. The Generaalsdraai Village was designed as an agricultural village, allowing for subsistence farming and the keeping of livestock. The village comprises approximately 50 houses that are provided with electricity and borehole water.

AdiEnvironmental cc was informed that consultation with the Generaalsdraai Community should take place through the Umsimbithi Mining (Pty) Ltd. community liaison officer, Mr. B. Mbonani.

Mr. Mbonani indicated (emails dated: 1 and 2 March 2017; Appendix 12) that he would consult with the community regarding the said project and distribute the Zulu notice. A copy of the Zulu notice is provided in Appendix 10.

According to Mr. Mbonani, the Zulu notices were distributed to the community on 3 March 2017 (e-mail dated: 7 March 2017; Appendix 12). He requested extension of the comment period from 10 March to 13 March 2017, which was agreed to by AdiEnvironmental cc.

To date, no comments were received from Mr. Mbonani or residents of Generaalsdraai Village.

### 6.2.4 Morelig Combined School - Parents, Teachers, Governing Body

A Background Information Document was emailed (dated: 21 February 2017; Appendix 12) to Morelig Combined School Board members, B. Mkhatshwa and P. Mthombeni.

**Comment - School Principal (Mr. S. Maseko):**

A telephonic discussion was also held with the School Principal, Mr. S. Maseko, on 10 March 2017. According to the Principal, a meeting with regards to the proposed relocation of the school was held on 16 October 2016. A total of 98 people attended the meeting. A copy of the minutes of the meeting and attendance register are provided in Appendix 12.

According to the School Principal, the parents agreed to the relocation of the school without any objections. It was however, requested that proper facilities should be provided at the new school e.g. a laboratory, hall, water, flush toilets, sports ground, etc.

**Response from AdiEnvironmental:**

As indicated in Section 3 and Section 4, the requests from the parents to provide proper facilities at the school were incorporated into the layout plan (Figure 4.5).

**Comment - School Principal (Mr. S. Maseko):**

A completed comment sheet (dated: 10 March 2017; Appendix 12) was also received from Mr. Maseko indicating the following:

*"As a school community we have seen the plan and we are relatively satisfied if it will appear the way we think we understood the plan.*

*We have seen the number of classrooms and different blocks with specialized classes like library, laboratory etc. However what we are not sure of is the number of accommodation rooms which will be used by educators who are not locally based.*

*The reason for this request (accommodation) is influenced by the fact that as a farm school, most educators are struggling with accommodation or travelling cost.*

*We assume that the school or classes are well secured and the strong room is part of the plan.*

*We are not sure if you are going to provide security personnel because in the plan, we see the security guard house.*

*We would have loved to have two sports field for soccer that could accommodate two teams at the same time since our school is a combined institution or divided into two phases i.e. secondary and primary.*

*We also assume that the admin block is divided into Principal's office, Deputy Principal's office and five HOD's offices and two admin clerk offices.*

*The school community would also like if possible to have two classes separate from school that can be used for pre-Grade R to assist the community.*

*Lastly, we also like to have the title deed of the school site so that we become the rightful owner of the school through the Department of Education"*

**Response from AdiEnvironmental:**

The following feedback was obtained from Bakopane Architects regarding the above-mentioned:

- Number of accommodation rooms - According to the layout plan (Figure 4.5), 3 residential units will be provided, comprising of 2 bedrooms each. Six (6) teachers can thus be accommodated on site.
- Strong room - Provision was made for a strong room/safe in the administration building.
- Security - The provision of security will have to be discussed with Umsimbithi Mining (Pty) Ltd. and the Department of Education.
- Sports fields for soccer - As indicated in Figure 4.5, provision is made for one large sports field and three smaller soccer fields.
- Admin block - The administration block will consist of a principal's office, a small office for the principals secretary and 5 additional offices for other personnel. A reception and cashiers office are also provided.
- Pre-Grade R classes - Two separate Grade R classes are provided for as indicated in the layout plan (Figure 4.5). Depending on the number of

learners and the need, one of the classes could be used for pre-Grade R children.
- Title Deed - Once the school has been constructed, it will be handed over to the Department of Education.

**Comment - Chairman of Morelig Combined School Board:**
The Chairman of Morelig Combined School (Mr. S. Sibanyoni) telephonically (16 October 2017) requested the following information in order to provide feedback to the parents:
- A layout plan indicating where the various structures will be built;
- Target date for construction.

**Response from AdiEnvironmental:**
The final layout plan (Figure 4.5) was subsequently forwarded to Mr. Maseko (e-mail dated: 20 October 2017; Appendix 12) as requested. In addition, the following was indicated (e-mail dated: 24 October 2017; Appendix 12) with regards to the construction of the school:

*"According to Mr. Phillip Venter of Glencore, the intention is to construct the proposed Morelig School in 2021. Installation of the services (i.e. water, roads, etc.) will commence at the beginning of the year (2021), whilst construction on the school building will start in July 2021.*

*It is estimated that the school will be completed by mid-2022."*

## 6.3 Identified local authorities/government departments and stakeholders

Table 6.1 provides an indication to which local authorities/government departments and stakeholders Background Information Documents (BIDs; Appendix 11) were forwarded in order to inform them of the proposed project and to obtain their issues of concern.

**Table 6.1: Identified local authorities/government departments and stakeholders who received BIDs**

| AUTHORITY/ STAKEHOLDER | CONTACT PERSON | CORRESPONDENCE SENT | COMMENTS |
|---|---|---|---|
| Department of Agriculture, Forestry and Fisheries (DAFF) | F Mashabela | Email (dated: 14 February 2017; Appendix 12) with BID forwarded. | Comment sheet (dated 2 March 2017; Appendix 12) received. See Section 6.3.1 for more information. |
| Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) - Directorate: Land Use and Soil Management – Ermelo | J Venter | Email (dated: 14 February 2017; Appendix 12) with BID forwarded. | Comment sheet (dated: 27 March 2017; Appendix 12) received. See Section 6.3.2 for more information. |
| Department of Co-operative Governance and Traditional Affairs (COGTA) | M Loock | Email (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| Department of Education | M Mnguni | Emails (dated: 14 February and 21 February 2017; Appendix 12) with | None. |

| AUTHORITY/ STAKEHOLDER | CONTACT PERSON | CORRESPONDENCE SENT | COMMENTS |
|---|---|---|---|
| | | BID forwarded. | |
| Department of Mineral Resources | S Mathavela | Email (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| Department of Rural Development and Land Reform (Commission on Restitution of Land Rights) | N Nkambule | Email (dated: 14 February 2017; Appendix 12) requesting if any land claims registered against property. | Letter (dated 13 February 2017; Appendix 12) received from F Mdushani. See Section 6.3.3 for more detail. |
| Department of Water and Sanitation (DWS) | P Munyai | Email (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| Emakhazeni Local Municipality (Community Services) | M Kambula | Email (dated: 21 February 2017; Appendix 12) with BID forwarded. | None |
| Emakhazeni Local Municipality (Townplanning) | M Mtshweni | Email (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| Emakhazeni Local Municipality (Tshusong Service Centre) | J Nkalane | Email (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| Emakhazeni Local Municipality (Technical Services) | N Singh | Email (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| Eskom Distribution (Land & Rights) | T Ludere | Email (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| Eskom Transmission | L Motsisi | Email (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| Mpumalanga Tourism and Parks Agency (MTPA) – Land Advisory Unit | K Narasoo | Email (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| Nkangala District Municipality | S Links<br>A Thwala | Email (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| South African National Roads Agency (SANRAL) | V Bota | Email (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| South African Heritage Resources Agency (SAHRA) | N Khumalo (SAHRA website) | Loaded BID onto SAHRA website (print out from SAHRIS website dated: 14 February 2017; Appendix 12) | Letter (dated: 14 March 2017; Appendix 12) received. See Section 6.3.4 for more detail. |
| Trans African Concessions (TRAC) | R Nkosi<br>C Davis | Email (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| Transvaalse Landbou Unie | D du Plessis | Email (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| Ward councillor | T Ngomane | Email (dated: 27 February 2017; Appendix 12) with BID forwarded. | Comment sheet (dated 13 March 2017; Appendix 12) received. See Section 6.3.5 for |

| AUTHORITY/ STAKEHOLDER | CONTACT PERSON | CORRESPONDENCE SENT | COMMENTS |
|---|---|---|---|
| | | | more detail. |
| Economic Freedom Fighters Emakhazeni | G Tshabangu | Email (dated: 10 March 2017; Appendix 12) with BID forwarded. | Comment sheet (dated: 10 March 2017; Appendix 12) received. See Section 6.3.6 for more detail. |

### 6.3.1 Department of Agriculture, Forestry and Fisheries

A completed comment sheet (dated: 2 March 2017; Appendix 12) was received from Mr. F. Mashabela indicating the following:

*"As seen on Google Earth, the area where the school will be moved is an agricultural land. Did you apply for change of land use?"*
*"How are you going to deal with the wetland at nearly centre of the area?"*

**Response from AdiEnvironmental cc**

Urban Dynamics Town and Regional Planners submitted an application for the subdivision of the said property in terms of the Subdivision of Agricultural Land Act, 1970 (Act 70 of 1970). A copy of the subdivision application is provided in Appendix 3.

In addition, an application in terms of the Emakhazeni Land Use Scheme, 2010 and the Townships Ordinance (Ordinance 15 of 1986) was submitted for the rezoning of the said site from Agriculture to Institutional. A copy of the rezoning application is provided in Appendix 3.

A wetland study was commissioned to delineate possible wetlands on site and in the surrounding area. A copy of the wetland report is provided in Appendix 6. As indicated in Section 5.9, the said school will be located outside of the identified wetland buffer zones.

### 6.3.2 Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) - Directorate: Land Use and Soil Management – Ermelo

A completed comment sheet (dated: 27 March 2017; Appendix 12) was received from Mr. J. Venter indicating the following:

*The proposed soil survey must be done on a 150 m x 150 m grid whereby the ground truthing must allow for the collective data to be captured by means of co-ordinates, soil map indicating various homogenous soil forms. Photographs of the soil form during the digging of the trench, geo-lagging of photographs are required. These photographs and geographical information together with soil information must be made available in electronic format and sent via CD or email to relevant addresses.*

**Response from AdiEnvironmental cc**

Noted. A specialist soil study was not commissioned. Only 4.8 ha will be utilized for the school. The entire farm is 486 ha in extent and will still be used for agricultural purposes. A geotechnical study (Appendix 5) was however, conducted to ensure that the site is suitable for development purposes. The soil properties of the site are indicated in Section 5.6.2 and Table 5.6.

### 6.3.3 Department of Rural Development and Land Reform (Commission on Restitution of Land Rights)

A letter (dated: 13 February 2017; Appendix 12) was received from Ms. F Mdushani indicating the following with regards to land claims on the said properties:

- *Remainder of Generaalsdraai 429 JS - No records of any land claims lodged.*
- *Remainder of Portion 16 of Generaalsdraai 423 JS - There are land claims lodged, which has been gazetted.*

*"It is not within the powers of the Commission on Restitution of Land Rights to grant or withhold permission for the development or alienation in respect of land being claimed until such a claim has been gazetted, unless such development would constitute an obstruction to the achievement of the aims and objectives of the Restitution of Land Rights Act 22 of 1994. In such instances application can be made in the Land Claims Court in terms of Section 6(3) of the Restitution Act; this can be done at any stage after the claim has been lodged - even before the publishing of such a claim in terms of Section 11 of the Restitution of Land Rights Act 22 of 1994. "*

**Response from AdiEnvironmental cc**

Noted.

The water pipelines and boreholes will be located on the Remainder of Portion 16 of Generaalsdraai 423 JS. This property is registered to Umsimbithi Mining (Pty) Ltd., who is also the applicant for this project.

According to Mr. B. Mbonani (community liaison), the mine is aware of the land claim and is in the process of assisting the Generaalsdraai community in registering a Community Property Association (CPA). Thereafter, the property will be transferred into their name.

The Generaalsdraai community was consulted as part of the process. See Section 6.2 for more details.

### 6.3.4 South African Heritage Resources Agency (SAHRA)

A letter (dated: 14 March 2017; Appendix 12) was received from the South African Heritage Resources Agency indicating the following:

*In terms of the National Heritage Resources Act, no 25 of 1999, heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are protected. They may not be disturbed without a permit from the relevant heritage resources authority. This means that before such sites are disturbed by development it is incumbent on the developer to ensure that a Heritage Impact Assessment is done. This must include the archaeological component (Phase 1) any other applicable heritage components. Appropriate (Phase 2) mitigation, which involves recording, sampling and dating sites that are to be destroyed, must be done as required.*

*Your application, received by SAHRA, provides no indication that an assessment of heritage resources including palaeontological resources was conducted. As such SAHRA requires a Heritage Impact Assessment and a Palaeontological Impact Assessment for the proposed development to be*

*conducted and submitted to SAHRA for comments. These specialists' studies can only be conducted by suitably qualified Archaeologist and Palaeontologist for the respective assessments. If you are unaware of any archaeologists and palaeontologists a list of them working within Heritage Resources Management field are provided in the following websites: (see www.asapa.org.za) and (see www.palaeontologicalsocitey.co.za).*

*If the property is heavily disturbed from previous developments then a letter of exemption from further heritage study may be submitted. This letter should be written by either an archaeologist and/or palaeontologist depending on the specific specialist studies being exempted from further assessment that is being motivated for, and the letter must be submitted to SAHRA for commenting.*

*SAHRA will comment further on this proposed development once the requested reports are submitted to the case.*

**Response from AdiEnvironmental cc**

As requested by SAHRA, a Phase 1 Heritage Impact Assessment and a Phase 1 Palaeontological Impact Assessment were commissioned. The results of the studies are detailed in Section 5.13 of this report and copies thereof provided in Appendices 8 and 9 respectively.

The said studies were also loaded (website printout dated: 19 May 2017; Appendix 12) on the SAHRIS website for evaluation. To date, no further comment has been received.

### 6.3.5 Councilor T Ngomane

A completed comment sheet (dated: 10 March 2017; Appendix 12) was received from Councillor T. Ngomane. The following was indicated:

*"The proposed school be build on Generaalsdraai farm where Msimbithi relocated families in 2012/2013 financial year. To enable them to use it for community meetings. Secondly for the school to be sustainable in terms of learners enrolment."*

**Response from AdiEnvironmental cc**

An agreement would have to be made between the Generaalsdraai community and the Morelig Combined School governing body with regards to the use of the school infrastructure for community meetings. The Principle of the school, Mr. S. Maseko, indicated telephonically (10 March 2017) that the community must submit a written request to the Morelig Combined School Board for the use of the facilities for community meetings.

Sustainability of learners enrolment - The existing Morelig Combined School currently caters for 778 students. The proposed school will be able to cater for 1000 students. An additional 222 students can thus be accommodated at the proposed school.

### 6.3.6 G Tshabangu - Economic Freedom Fighters Emakhazeni

As indicated in Section 6.1.4, Mr. G Tshabangu registered as an interested and affected party on 10 March 2017.

A Background Information Document was forwarded (10 March 2017; Appendix 12) to Mr. Tshabangu. Subsequently, a completed comment sheet (dated: 10 March 2017; Appendix 12) was received indicating the following:

*"We are kindly requesting to be involved in any activity or consultations meeting that will take place on the side. We want all the projects that are going to take place on the side to benefit Emakhazeni youth."*

An e-mail was also received from Mr. Tshabangu on 23 May 2017 (Appendix 12) enquiring about the status of the development.

**Response from AdieEnvironmental cc**
Noted.

As requested, Mr. G. Tshabangu will be kept up to date with the project and will have the opportunity to comment on the Draft Basic Assessment Report. In terms of the Emakhazeni youth, the proposed relocation and construction of a new school will directly benefit the youth since better facilities will be provided for education purposes.

## 6.4 Adjacent landowners/users

Figure 6.2 provides an indication of the adjacent landowners/users in relation to the proposed site.

In order to determine the registered owners of the various properties, a Deeds Search was conducted via the WinDeed system of the Deeds Office of South Africa. The Deeds Search Template provides information pertaining to land ownership, size and land value of each of the properties.

The adjacent landowners were informed of the proposed development through the advertising process as indicated in Section 6.1 and the distribution of Background Information Documents. A copy of the Background Information Document is provided in Appendix 6.

Comments received from the adjacent landowners in response to the advertising and distribution of the Background Information Document are indicated below.

Table 6.2 provides an indication to which adjacent landowner/user Background Information Documents (BIDs; Appendix 6) were forwarded in order to inform them of the proposed project and to obtain their issues of concern. Figure 6.2 indicates the location of the various landowners as well as the closest homesteads.

**Table 6.2: Identified adjacent land owners/users who received BIDs**

| PROPERTY (FIGURE 6.2) | LANDOWNER/ CONTACT PERSON | CORRESPONDENCE | COMMENTS |
|---|---|---|---|
| **GENERAALSDRAAI 423 JS** | | | |
| 3, 15, 16 | Umsimbithi Mining (Pty) Ltd. - E Nel | N/A - The applicant | N/A |
| 8, 14 | Johan Steele Familie Trust - J Steele | E-mail (dated: 14 February 2017; Appendix 12) with BID | None |

| PROPERTY (FIGURE 6.2) | LANDOWNER/ CONTACT PERSON | CORRESPONDENCE | COMMENTS |
|---|---|---|---|
| | | forwarded. | |
| 13 | WJ Prinsloo | E-mail (dated: 14 February 2017; Appendix 12) with BID forwarded. | Comment sheet (dated: 14 February 2017; Appendix 12) received. See Section 6.2 for more information. |
| 9, 11 | PM Britz | E-mail (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| **WONDERFONTEIN 428 JS** | | | |
| RE | Johan Steele Familie Trust - J Steele | E-mail (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| 1 | Wonderfontein Mill (Pty) Ltd - C Greyn | E-mail (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| 3 | AC van Vreden - D van Wyk | E-mail (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| 4, 8 | Wonderfontein Boerevereneging - G Janse van Rensburg | E-mail (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| 9, 27, 28, 29 | Transnet - T Mavulwana | E-mail (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| 18 | Aledlox Prop (Pty) Ltd - E Kock | E-mail (dated: 14 February 2017; Appendix 12) with BID forwarded. | Yes, see Section 6.4.1 |
| 20 | Corlouis Boerdery (Pty) Ltd. - L Bezuidenhout | E-mail (dated: 15 February 2017; Appendix 12) with BID forwarded. | None |
| 24 | Real Time Inv 515 cc - N Ryan | E-mail (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| 30 | Afrgri Operations Ltd - C van Staden | E-mail (dated: 20 February 2017; Appendix 12) with BID forwarded. | None |
| 32 | National Government of RSA - G Masuku | E-mail (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| **OTK 419 JS** | | | |
| RE | Bio-Minerale Bemarking (Pty) Ltd. - P Britz | E-mail (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |
| **OTHER** | | | |
| | TWK Agriculture Ltd. | E-mail (dated: 14 February 2017; Appendix 12) with BID forwarded. | None |

### 6.4.1 Aledlox Prop (Pty) Ltd. (E Kock)

An e-mail (dated: 15 February 2017; Appendix 12) was received from Mr. E Kock indicating the following:

> *I noticed that a new school is in planning. If you want to consider you might be interested in looking at the site where the old mill was situated. This premises is for sale and costs might be saved considering drainage and electrical supply which is in place already.*

Following the above, an e-mail (dated: 16 February 2017; Appendix 12) was received from Mr. F Barnard providing the extent (2.9950 ha) of the property and the Deed of Transfer number.

**Response from AdiEnvironmental cc**

AdiEnvironmental indicated (e-mail dated: 15 February 2017; Appendix 12) that the said information will be forwarded to the project managers and applicant for their consideration.

The said site was subsequently investigated as an alternative site (Option 4; Section 4.1.4) but discarded since the site is too small (2.995 ha) for the proposed school and associated infrastructure. According to Urban Dynamics (2016a), at least 4.8 ha is required.

## 6.5 EXM Advisory Services (Doornkop Plats (Pty) Ltd.)

EXM Advisory Services is an environmental consultancy who lodged a prospecting application with the Department of Mineral Resources on behalf of Doornkop Plats (Pty) Ltd.

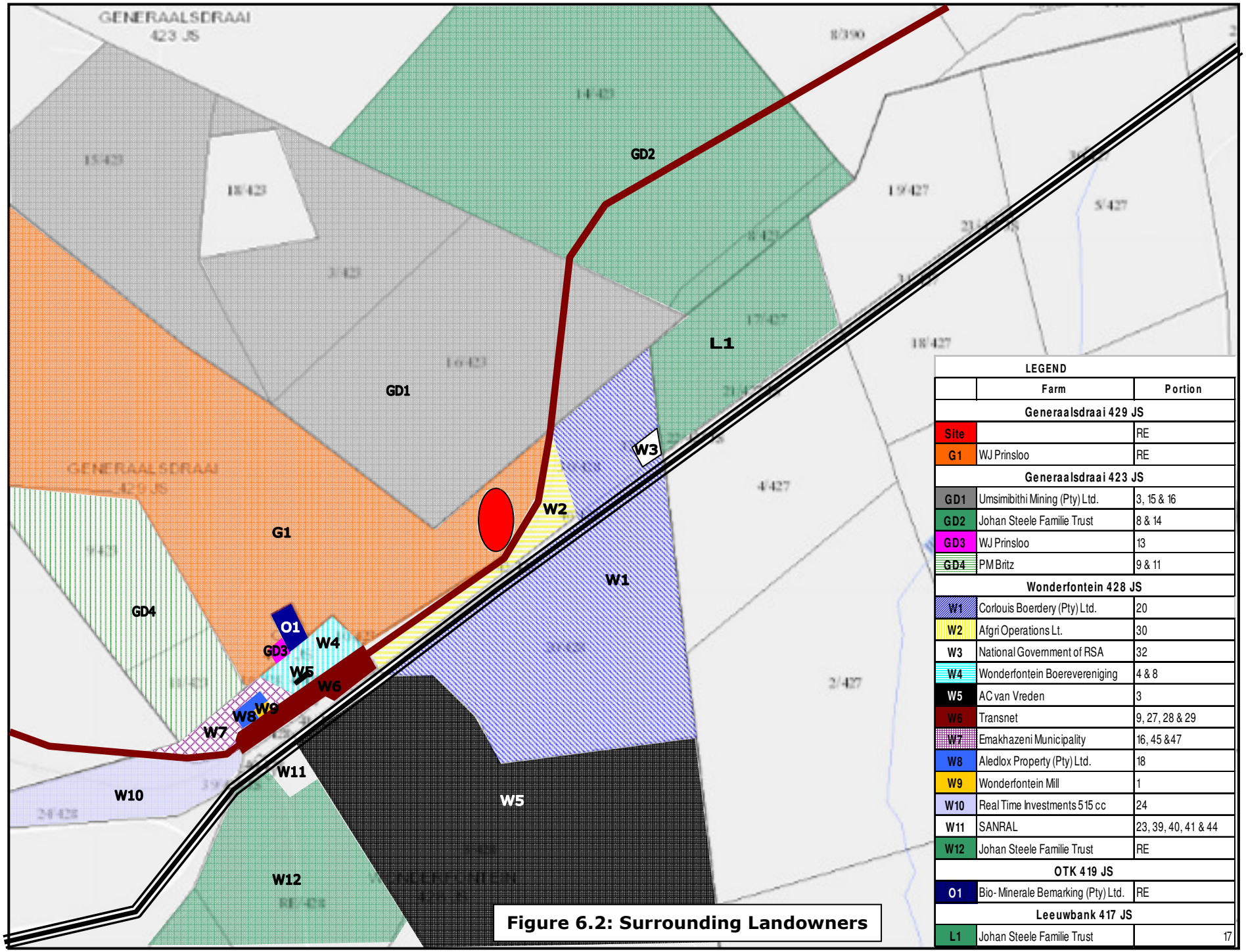
AdiEnvironmental cc registered (e-mail dated: 3 March 2017; Appendix 12) as an interested and affected party with EXM Advisory Services in order to find out if the prospecting application would impact on the proposed school.

EXM Advisory forwarded an e-mail (dated: 3 March 2017; Appendix 12) to AdiEnvironmental indicating that the Final Basic Assessment Report was submitted to the Department of Mineral Resources. A map indicating the extent/location of the application was also attached.

From the map, it was evident that the prospecting application would not impact on the proposed school.

## 6.6 Department of Agriculture, Rural Development, Land and Environmental Affairs

The project was registered with the Department of Agriculture, Rural Development, Land and Environmental Affairs on 24 April 2018 (see cover letter and application dated: 24 April 2018; Appendix 1). In addition, a date for a meeting and site visit was requested.




**LEGEND**

| | Farm | Portion |
|---|---|---|
| **Generaalsdraai 429 JS** | | |
| Site | | RE |
| G1 | WJ Prinsloo | RE |
| **Generaalsdraai 423 JS** | | |
| GD1 | Umsimibithi Mining (Pty) Ltd. | 3, 15 & 16 |
| GD2 | Johan Steele Familie Trust | 8 & 14 |
| GD3 | WJ Prinsloo | 13 |
| GD4 | PM Britz | 9 & 11 |
| **Wonderfontein 428 JS** | | |
| W1 | Corlouis Boerdery (Pty) Ltd. | 20 |
| W2 | Afgri Operations Lt. | 30 |
| W3 | National Government of RSA | 32 |
| W4 | Wonderfontein Boerevereniging | 4 & 8 |
| W5 | AC van Vreden | 3 |
| W6 | Transnet | 9, 27, 28 & 29 |
| W7 | Emakhazeni Municipality | 16, 45 &47 |
| W8 | Aledlox Property (Pty) Ltd. | 18 |
| W9 | Wonderfontein Mill | 1 |
| W10 | Real Time Investments 515 cc | 24 |
| W11 | SANRAL | 23, 39, 40, 41 & 44 |
| W12 | Johan Steele Familie Trust | RE |
| **OTK 419 JS** | | |
| O1 | Bio- Minerale Bemarking (Pty) Ltd. | RE |
| **Leeuwbank 417 JS** | | |
| L1 | Johan Steele Familie Trust | 17 |

**Figure 6.2: Surrounding Landowners**

## 6.7 List of Interested and Affected Parties

From the above public participation process, the following list of Interested and Affected Parties was compiled:

| INTERESTED AND AFFECTED PARTY LIST | |
|---|---|
| **Organisation** | **Name** |
| **Government Departments** | |
| Department of Agriculture, Forestry and Fisheries | F Mashabela |
| Department of Agriculture, Rural Development, Land and Environmental Affairs - Directorate: Land Use and Soil Management – Ermelo | J Venter |
| Department of Co-Operative Governance and Traditional Affairs | M Loock |
| Department of Education | MS Mnguni |
| Department of Mineral Resources | S Mathavela |
| Department of Rural Development and Land Reform | F Mdushani |
| Department of Water and Sanitation | P Munyai |
| Department of Agriculture, Rural Development, Land and Environmental Affairs | D Tswai |
| **Other Organisations** | |
| Eskom Distribution | T Ludere |
| Eskom Transmission | L Motsisi |
| Mpumalanga Tourism and Parks Agency (MTPA) | K Narasoo |
| South African Heritage Resources Agency (SAHRA) | N Khumalo |
| South African National Roads Agency (SANRAL) | V Bota |
| Trans African Concessions (TRAC) | R Nkosi, C Davis |
| Transvaalse Landbou Unie | D du Plessis |
| **Local Municipality and Municipal Councillor** | |
| Emakhazeni Local Municipality | N Singh, M Mtshweni, M Kambula, A Mahlangu |
| Wonderfontein Thusong Service Centre (Emakhazeni Local Municipality) | J Nkalane |
| Nkangala District Municipality | S Links, A Thwala |
| Ward councillor | T Ngomane |
| **Surrounding Landowners** | |
| **Property (Figure 6.2)** | **Landowner/Contact person** |
| Generaalsdraai community | B Mbonani (community liaison) |
| **Generaalsdraai 429 JS** | |
| Remainder (G1) | WJ Prinsloo |
| **Generaalsdraai 423 JS** | |
| 3, 15, 16 (GD1) | Umsimbithi Mining (Pty) Ltd (E Nel) |

| INTERESTED AND AFFECTED PARTY LIST | |
|---|---|
| 8, 14 (GD2) | Johan Steele Familie Trust (J Steele) |
| 13 (GD3) | WJ Prinsloo |
| 9, 11 (GD4) | PM Britz |
| **Wonderfontein 428 JS** | |
| RE (W12) | Johan Steele Familie Trust (J Steele) |
| 1 (W9) | Wonderfontein Mill (Pty) Ltd. (C Greyn) |
| 3 (W5) | AC van Vreden (D van Wyk) |
| 4, 8 (W4) | Wonderfontein Boerevereneging (G Janse van Rensburg) |
| 9, 27, 28, 29 (W6) | Transnet (T Mavulwana) |
| 16, 45, 47 (W7) | Emakhazeni Local Municipality (N Singh) |
| 18 (W8) | Aledlox Prop (Pty) Ltd (E Kock, F Barnard) |
| 20 (W1) | Corlouis Boerdery (Pty) Ltd (L Bezuidenhout) |
| 24 (W10) | Real Time Inv 515 cc (N Ryan) |
| 23, 39, 40, 41, 44 (W11) | South African National Roads Agency (V Bota) |
| 30 (W2) | Afgri Operations Ltd (C van Staden) |
| 32 (W3) | National Government of RSA (G Masuku - Department of Public Works, Roads and Transport) |
| **OTK 419 JS** | |
| RE (O1) | Bio-Minerale Bemarking (Pty) Ltd (P Britz) |
| **Leeuwbank 417 JS** | |
| 17 | Johan Steele Familie Trust (J Steele) |
| **Other** | |
| Registered as I&AP | Giyani Enterprises (registered as I&AP) |
| Registered as I&AP | D Wessels - Leads to Business (registered as I&AP) |
| Prospecting application | EXM Advisory Services o.b.o. Doornkop Plats (Pty) Ltd. (K Fairley/S Seton-Rogers) |
| Morelig Combined School<br>(Principal/Governing Body) | A Mmalihu<br>BD Mkhatshwa/PW Mthombeni/K Mahlangu/S Sibanyoni |
| Parent | K Mahlangu |
| Economic Freedom Fighters | G Tshabangu |

# 7. ENVIRONMENTAL IMPACT DESCRIPTION AND EVALUATION

## 7.1 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**

## 7.2 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.

## 7.3 Planning and design phase

The planning and design phase involved mostly office work and site surveys with regards to the design of the layout plan, the Basic Assessment Report and the specialist studies. It also involves obtaining the necessary authorisations for the said development.

During the planning and design phase, 7 test pits were excavated as part of the geotechnical study. These test pits were however, closed. Four (4) boreholes were also drilled as part of the geohydrological study to determine whether sufficient water is available in the area for the said school.

***No construction took place on site.***

## 7.4 Construction phase

**Development of the school site:**
As indicated in Section 4.2.4, Layout Plan No 4 (Figure 4.5) is the preferred layout and will be assessed as part of this impact assessment.

The construction phase would involve the following:

- clearing of vegetation and levelling of the site;
- excavation/earthworks for the required foundations/platforms, service trenches and sewage package plant;
- installation of the services (i.e. water supply, electrical connections, sewage package plant, access road, storm water trenches and berms);
- laying of the required foundations for buildings;
- building of the outer structures;
- installation of the required internal fittings;
- fencing of the site;
- surfacing/paving of parking and assembly areas;
- establishing the sports fields and constructing the pavillion;
- rehabilitation of disturbed areas;
- landscaping.

As indicated in Section 4.7, the existing gravel road extending from the N4 national road, along the D685 provincial road, through Wonderfontein town and along the railway line service road to the site (Figure 4.11) will be utilised. A new access road will not be constructed.

**Installation of water pipeline:**
As indicated in Section 4.3.2, Alternative 3 (Figure 4.8) is the preferred water pipeline route to the two new boreholes (BH8 and BH9; Figure 4.8) and will be assessed as part of this impact assessment.

The construction phase would involve the following:

- clearing of vegetation and removal of topsoil along the route;
- excavation of a trench;
- installation of the water pipeline;
- backfilling of the trench;
- rehabilitation of the disturbed area.

Section 7.7 provides further details with regards to potential impacts identified.

## 7.5 Operational phase

The operational phase would involve the following:

- The utilization of Morelig Combined School and associated infrastructure (e.g. water pipeline, boreholes, sewage package plant, sports fields, etc.)

As indicated in Section 4.7, the existing gravel road extending from the N4 national road, along the D685 provincial road, through Wonderfontein town and along the railway line service road to the site (Figure 4.11) will be upgraded and utilised.

Section 7.7 provides further details with regards to potential impacts identified.

## 7.6 Decommissioning phase

If required, this phase would involve the decommissioning of the facilities constructed as part of this project (see Section 7.4).

The decommissioning phase will not be discussed in detail. It is recommended that at the time of decommissioning, a specific Environmental Management Programme (EMPr) be compiled which specifically addresses this phase. This EMPr 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.

## 7.7 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.

| ASPECT/ ENVIRONMENTAL FEATURE(S) | ACTIVITY AND PREDICTED IMPACT CONSTRUCTION PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT OPERATIONAL PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT DECOMMISSIONING PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOPOGRAPHY | **School site**<br>• The site is fairly flat with a gentle slope in a north westerly direction.<br>• The topography of the site and surrounding area has been impacted by agricultural activities, Generaalsdraai Village, gravel roads, excavations, etc.<br>• In general, the construction activities (e.g. removal of vegetation, sloping of the site, construction of buildings, etc.) would have a direct impact on the topography and would result in changed runoff patterns and an increased risk of soil erosion if mitigation measures are not implemented. | SITE | SHORT | DEFINITE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>Direct impact on topography will continue in terms of the presence of buildings and paved/tarred areas, which in turn will impact upon the runoff from the site. | SITE | LONG | DEFINITE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site and water pipeline**<br>During decommissioning, the buildings, water pipeline and associated infrastructure will be demolished. The area will be 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 |
| | **Water pipeline**<br>• Direct impact i.t.o. the clearing of the route and excavations (trenches). The impact will however, be temporary in nature since the water pipeline will be located underground and the site will be rehabilitated to its original state. | SITE | SHORT | DEFINITE | LOW NEUTRAL | LOW NEUTRAL | **Water pipeline**<br>None. The water pipeline will be located underground. | | | | | | | | | | | |
| GEOLOGY | **School site**<br>• The site is underlain by sedimentary bedrock (shale, sandstone, gritstone) of the Vryheid Formation, Ecca Group, Karoo Sequence.<br>• The direct impact on geology will depend on the depth of the excavations required for the building foundations and service trenches. The possible impact on the underlying geology cannot be mitigated. | SITE | PERMANENT | DEFINITE | LOW NEGATIVE | LOW NEGATIVE | **School site and water pipeline**<br>NONE. No further impact since no further construction would take place. | | | | | | **School site and water pipeline**<br>NONE. No further impact since no further construction would take place. | | | | | |
| | **Water pipeline**<br>• The majority of the proposed pipeline route is underlain by sedimentary bedrock (shale, sandstone, gritstone) of the Vryheid Formation, Ecca Group, Karoo Sequence.<br>• The northern portion of the pipeline route is underlain by gabbro, norite and anorthosite of the Rustenburg Layered Suite.<br>• Trench excavation for the installation of the water pipeline could have a direct impact on the underlying geology depending on the depth of the excavations. The possible impact on the underlying geology cannot be mitigated. | SITE | PERMANENT | DEFINITE | LOW NEGATIVE | LOW NEGATIVE | | | | | | | | | | | | |
| SOILS/ GEOTECHNICAL | **School site**<br>• According to Cilliers & Meyer (2016), the site is blanketed by transported soils sequentially underlain by pedogenic and highly weathered sedimentary rock.<br>• The soil of the site has been impacted by agricultural activities (planted pastures), a storm water trench and an un-rehabilitated excavation in the centre of the site.<br>• During construction, the soil will be impacted in terms of soil structure, nutritional and chemical values when the vegetation (planted pastures) and topsoil are removed, the site is sloped and the buildings and associated infrastructure are constructed. The soil will also be impacted in terms of stockpiling of topsoil, subsoil, overburden and rocks. | SITE | LONG | DEFINITE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>Direct impact on soil will continue i.t.o. soil structure, nutritional and chemical values and soil compaction. | SITE | LONG | HIGHLY PROBABLE | LOW NEGATIVE | LOW NEGATIVE | **School site**<br>The decommissioning activities will have an initial negative impact on the soil of the site in terms of disturbance (physical and biological properties). The proper rehabilitation of the site after decommissioning will however, have a positive impact on the soil. | SITE | SHORT | PROBABLE | LOW NEUTRAL | LOW NEUTRAL |
| | **School site**<br>• Sediment transport and erosion may occur following the clearing of the site in preparation of construction. This could impact on the seep wetland located on the western boundary of the site and the seep/drainage area located on the northern boundary. The impact is expected to be minimal since the site is small and relatively flat. | SITE | SHORT | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>• Sediment transport and erosion could occur if proper storm water management systems are not in place. This could impact on the seep wetland located on the western boundary of the site and the seep/drainage area located on the northern boundary. | SITE | LONG | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>Soil erosion could occur if the site is not properly revegetated after decommissioning. | SITE | SHORT | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE |

| ASPECT/ ENVIRONMENTAL FEATURE(S) | ACTIVITY AND PREDICTED IMPACT CONSTRUCTION PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT OPERATIONAL PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT DECOMMISSIONING PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) |
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| SOILS/ GEOTECHNICAL | **School site**<br>• The majority of the school site falls in geotechnical zone 1A (Figure 5.8), where normal founding and construction techniques will apply.<br>• However, according to Cilliers & Meyer (2016) the cover soils and weathered rock might be slightly aggressive to concrete or steel piping. In addition, special precautions with regards to services and structures will be required in areas where medium active clays are present.<br>• Mitigation measures would therefore have to be implemented during the construction phase. | SITE | SHORT | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>• The buildings and associated infrastructure will continue to be impacted upon if mitigation measures in terms of the geotechnical conditions were not implemented during the construction phase. | SITE | LONG | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>NONE. The existing buildings will be decommissioned. | | | | | |
| | **School site**<br>• A small area in the south eastern corner of the site comprises moderately compressible soils with collapsing sands >750mm thick (geotechnical zone 1B; Figure 5.8). Settlement of between 10 and 20mm is expected beneath foundations if construction is not modified to accommodate these differential movements. | SITE | SHORT | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>• The buildings and associated infrastructure will continue to be impacted upon if mitigation measures in terms of the geotechnical conditions were not implemented during the construction phase. | SITE | LONG | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | | | | | | |
| | **School site**<br>• According to Cilliers & Meyer (2016), a 1.69ha area in the centre of the site (geotechnical zone 3C; Figure 5.8) was previously excavated and not backfilled. Roots and tree stumps are also present. Remediation in terms of backfilling and removal of the tree stumps will be required during the construction phase. | SITE | SHORT | DEFINITE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>• The school buildings and associated infrastructure will continue to be impacted upon if mitigation measures in terms of the geotechnical conditions were not implemented during the construction phase. | SITE | LONG | DEFINITE | MEDIUM NEGATIVE | LOW NEGATIVE | | | | | | |
| | **School site**<br>• Shallow hardpan ferricrete is present in the central and eastern portions of the site (geotechnical zone 2A; Figure 5.8). Hard ripping and powerful machinery will be required to excavate deep service trenches and foundations. | SITE | SHORT | DEFINITE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>• The school buildings and associated infrastructure will continue to be impacted upon if proper foundations and trenches were not provided during the construction phase. | SITE | LONG | DEFINITE | MEDIUM NEGATIVE | LOW NEGATIVE | | | | | | |
| | **School site**<br>Soil pollution may occur during the construction of the buildings and associated infrastructure if:<br>• the construction vehicles are not maintained/repaired resulting in oil leaks and fuel spills;<br>• waste management measures are not implemented,<br>• proper ablution and sanitation facilities are not provided for the site workers to use on site. | SITE | SHORT | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>Soil pollution could occur if:<br>• waste management measures are not implemented at the school;<br>• the sewage package plant and sewer infrastructure are not properly installed or does not have sufficient capacity resulting in leaks, overflows, etc.<br>• the sewage package plant is not operated correctly and maintained, resulting in polluted effluent being irrigated on the sports field at the school. | SITE | LONG | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>Soil pollution may occur during the decommissioning of the buildings and associated infrastructure if:<br>• the construction vehicles are not maintained/repaired resulting in oil leaks and fuel spills;<br>• waste management measures are not implemented,<br>• proper ablution and sanitation facilities are not provided for the site workers to use on site.<br>In addition, soil pollution could occur if the remaining effluent in the sewage package plant is not disposed of before decommissioning commences. | SITE | SHORT | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE |

| ASPECT/ ENVIRONMENTAL FEATURE(S) | ACTIVITY AND PREDICTED IMPACT CONSTRUCTION PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT OPERATIONAL PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT DECOMMISSIONING PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) |
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| SOILS/ GEOTECHNICAL | **Water pipeline**<br>▫ The soil will be impacted in terms of soil structure, nutritional and chemical values when the vegetation and topsoil are removed, the trench is excavated and the pipeline installed. The soil will also be impacted in terms of stockpiling of topsoil, subsoil, overburden and rocks.<br>▫ Rocky outcrops could be encountered along the proposed route requiring hard ripping and powerful machinery to excavate the depth of trench required. | SITE | LONG | DEFINITE | MEDIUM NEGATIVE | LOW NEGATIVE | **Water pipeline**<br>Direct impact on soil will continue i.t.o. soil structure, nutritional and chemical values and soil compaction. | SITE | LONG | HIGHLY PROBABLE | LOW NEGATIVE | LOW NEGATIVE | **Water pipeline**<br>The decommissioning activities will have an initial negative impact on the soil of the site in terms of disturbance (physical and biological properties). The proper rehabilitation of the site after decommissioning will however, have a positive impact on the soil. | SITE | SHORT | PROBABLE | LOW NEUTRAL | LOW NEUTRAL |
| LAND USE / SENSE OF PLACE | **School site**<br>▪ The said site is zoned for agricultural purposes and currently utilized for the cultivation of planted pastures.<br>▪ The construction activities will therefore impact on the current land use (agriculture) and agricultural potential of the site.<br>▪ However, only a small area of approximately 4.8ha will be impacted, of which 1.69ha was previously excavated and is not cultivated.<br>▪ The rest of property (481 ha) will still be utilized for agricultural purposes by the current landowner. | LOCAL | SHORT | DEFINITE | LOW NEGATIVE | LOW NEGATIVE | **School site**<br>▪ After construction, the site will no longer be available for agricultural purposes. However, the new school will have a positive impact in terms of the provision of educational facilities within this predominantly rural area.<br>▪ The proposed school will be convenient for residents at Generaalsdraai Village, Wonderfontein and surrounding farm villages.<br>▪ The proposed school will serve as an ancillary use to the proposed residential and public service land uses intended for Wonderfontein as per the eMakhazeni Local Municipality SDF. | LOCAL | LONG | DEFINITE | MEDIUM POSITIVE | MEDIUM POSITIVE | **School site**<br>The decommissioning of the buildings and rehabilitation of the site would allow for a different land use on site. The impact will depend on the existing land use in the area. | SITE | LONG | HIGHLY PROBABLE | LOW NEUTRAL | LOW NEUTRAL |
| | **Water pipeline**<br>▪ The majority of the water pipeline will be located within the road reserve of the gravel road located on the boundary of Generaalsdraai Village.<br>▪ The excavation of the trench would temporarily impact on a small area (800m x 4m) used for grazing purposes by the residents of Generaalsdraai Village.<br>▪ The impact is expected to be of short duration since the trenches will be backfilled and rehabilitated (revegetated) and once again be available for grazing purposes. | SITE | SHORT | PROBABLE | LOW NEUTRAL | LOW NEUTRAL | **Water pipeline**<br>NONE. The water pipeline would be installed underground and should therefore not impact on any land uses once construction is complete and the area rehabilitated. | | | | | | **Water pipeline**<br>The decommissioning and rehabilitation of the site would have a positive impact on land use since the water pipeline would be removed and the area will once again be available for other uses. | SITE | LONG | PROBABLE | LOW POSITIVE | LOW POSITIVE |
| NATURAL VEGETATION/ ANIMAL LIFE | **School site**<br>▪ The site currently comprises planted pastures, with remains of alien trees in the centre of the site. The vegetation on the school site has thus been significantly altered.<br>▪ No Eastern Highveld Grassland remains on the site. No natural grassland vegetation will thus be impacted upon by the construction of the proposed school. The planted pastures and remaining tree stumps will however, be removed.<br>▪ Invasive plant species could establish on site if the disturbed areas are not properly rehabilitated/revegetated. | SITE | PERMANENT | DEFINITE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>▪ No direct impact since no vegetation would be removed during the operational phase.<br>▪ An indirect impact on vegetation of the surrounding area could occur if the area was not properly rehabilitated/revegetated and invasive plant species establish on site or if alien plants are used for landscaping purposes. | LOCAL | LONG | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>Depending on the end land use of the site, proper rehabilitation and reinstatement of the vegetation after decommissioning will have a positive impact on the vegetation.<br>Invasive plant species could be establish on site if the area is not properly rehabilitated as part of the decommissioning phase. This could impact on the vegetation of the surrounding area. | SITE | LONG | PROBABLE | LOW NEUTRAL | LOW NEUTRAL |

| ASPECT/ ENVIRONMENTAL FEATURE(S) | ACTIVITY AND PREDICTED IMPACT CONSTRUCTION PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT OPERATIONAL PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT DECOMMISSIONING PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) |
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| NATURAL VEGETATION/ ANIMAL LIFE | **Water pipeline**<br>▪ The majority of the water pipeline will be located within the road reserve of the gravel road (located on the boundary of Generaalsdraai Village) that consists mostly of weedy vegetation.<br>▪ To the north of Generaalsdraai Village, a section of the pipeline (approximately 800m x 4m) will however, extend across disturbed natural grassland vegetation, which would be removed as part of the excavation activities. Once installed, the trench will be closed and the area rehabilitated/revegetated.<br>▪ Invasive plant species could however, establish on site if the area is not properly rehabilitated. | SITE | SHORT | DEFINITE | MEDIUM NEGATIVE | LOW NEGATIVE | **Water pipeline**<br>▪ No further direct impact on vegetation since the water pipeline will be located underground and the area rehabilitated after construction.<br>▪ An indirect impact on vegetation could however, occur if the area was not properly rehabilitated and invasive plant species establish on site. | SITE | LONG | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **Water pipeline**<br>The excavation of the water pipeline will result in the removal of any vegetation that re-established along the pipeline route during the operational phase. However, after rehabilitation, the impact would be positive since the area would be revegetated. An indirect impact on vegetation could occur if the area was not properly rehabilitated and invasive plant species establish on site. | SITE | LONG | PROBABLE | LOW NEUTRAL | LOW NEUTRAL |
| | **School site**<br>• A seasonal seep wetland is present on the western boundary of the site and consists of planted pastures, kikuyu and other invasive species.<br>• The construction activities would therefore not impact directly or indirectly on wetland vegetation. | | | | | | **School site**<br>▪ No direct or indirect impact on wetland vegetation since all operational activities of the school will be located outside the seasonal seep wetland and associated buffer. | | | | | | **School site**<br>NONE. The decommissioning activities will take place outside of the seasonal seep and associated buffer. | | | | | |
| | **School site**<br>• The construction activities would not impact directly on the disturbed wetland vegetation of the drainage line/seep located on the northern boundary of the site.<br>• An indirect impact could take place should vehicles and workers inadvertently traverse the wetland area during the construction phase.<br>• Mitigation measures in this regard must be implemented. | SITE | SHORT | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>▪ No direct impact on wetland vegetation since all operational activities of the school will be located outside the drainage line/seep wetland and associated buffer. | | | | | | **School site**<br>NONE. The decommissioning activities will take place outside of the drainage area/seep wetland and associated buffer. | | | | | |
| | **Water pipeline**<br>▪ A small section of the water pipeline will extend across the drainage line/seep wetland and its associated buffer zone.<br>▪ The construction activities could impact on wetland vegetation should construction activities extend outside of the culvert and gravel road area. | SITE | SHORT | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **Water pipeline**<br>▪ None since no further construction will take place. | | | | | | **Water pipeline**<br>The excavation of the water pipeline could impact on the drainage line/seep wetland vegetation should the excavation activities extend outside the existing gravel road and culvert area. | SITE | SHORT | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIE |
| | **School site**<br>▪ No animal species were noted on site during the site visits. It is highly unlikely that larger animal species would inhabit the site since the site comprises planted pastures.<br>▪ Smaller species such as rodents, insects, scrub hare, birds, etc. may frequent/pass through the planted pastures and surrounding cultivated lands. These species will be displaced during the construction activities. | SITE | SHORT | HIGHLY PROBABLE | LOW NEGATIVE | LOW NEGATIVE | **School site**<br>▪ No further direct impact on animal habitat since no further construction activities will take place. | | | | | | **School site**<br>No further direct impact on animal habitat since no further construction activities will take place. | | | | | |
| | **Water pipeline**<br>▪ The majority of the water pipeline will be located within the road reserve of the gravel road (located on the boundary of Generaalsdraai Village) that consists mostly of weedy vegetation and thus very little (if any) habitat for animals.<br>▪ To the north of Generaalsdraai Village, a section of the pipeline (approximately 800m x 4m) will however, extend across disturbed natural grassland vegetation, which could provide habitat for smaller species (birds, reptiles, etc.). High noise levels during construction could lead to the displacement of these animals. | SITE | SHORT | HIGHLY PROBABLE | LOW NEGATIVE | LOW NEGATIVE | **Water pipeline**<br>▪ No further direct impact on animal habitat since no further construction activities will take place and the area will be rehabilitated/revegetated. | | | | | | **Water pipeline**<br>The excavation activities to remove the water pipeline will impact on the re-established vegetation along the route and subsequently on potential animal habitats. Once the pipeline has been removed, the excavation would be backfilled and rehabilitated, which would have a positive impact on animal habitat. | SITE | SHORT | PROBABLE | LOW NEGATIVE | LOW NEGATIVE |

| ASPECT/ ENVIRONMENTAL FEATURE(S) | ACTIVITY AND PREDICTED IMPACT CONSTRUCTION PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT OPERATIONAL PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT DECOMMISSIONING PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) |
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| SURFACE WATER/SENSITIVE LANDSCAPES | **School site**<br>▪ Venter (2017) identified a highly impacted seasonal seep wetland on the western boundary of the site and a drainage line/seep wetland on the northern boundary (Figure 5.16). The Present Ecological State (PES) of the seasonal seep wetland is Class C (moderately modified) and that of the drainage line/seep wetland a Class D (largely modified). The Ecological Importance and Sensitivity of both these wetlands is Low.<br>▪ The construction activities will have no direct impact on the identified wetlands since the buildings will be located outside of the identified 50m buffer zone and the sports field, parking areas and access route outside of the 35m buffer zone as recommended by the wetland specialist.<br>▪ The hydrology of the wetlands may however be indirectly altered through changed runoff patterns and erosion/siltation as a result of the removal of the vegetation and earthworks during the construction phase.<br>▪ In addition, the wetlands could be impacted upon if the wetland areas are not demarcated and construction vehicles or workers move into these areas.<br>▪ Mitigation measures to be implemented to ensure that the wetlands are not impacted during the construction phase. | SITE | SHORT | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>▪ The operational activities of the school will not have a direct impact on any surface water environments since no surface water environments (rivers/streams/wetlands) are present on site.<br>▪ The seasonal seep wetland located west of the site and the drainage line/seep wetland located north of the site could however, be impacted as a result of changes in the hydrology of the area due to altered storm water runoff. It is expected that the buildings and parking areas will increase the impermeable surfaces on site and decrease the infiltration into the soil resulting in increased runoff from the site.<br>▪ Should the sports fields not be vegetated, runoff from the southern portion of the site could lead to erosion and sedimentation of the seasonal seep wetland located on the western boundary.<br>▪ Mitigation measures to be implemented to ensure that the wetlands are not impacted during the operational phase. | SITE | LONG | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>During the decommissioning phase, the wetlands could be impacted upon if the wetland areas are not demarcated and construction vehicles or workers move into these areas.<br>After decommissioning, the site will be rehabilitated in order to establish a vegetation cover and restore water flow across the site, which would have a positive impact on the adjacent wetlands. | SITE | LONG | PROBABLE | MEDIUM NEUTRAL | LOW NEUTRAL |
| | **Water pipeline**<br>• A small section of the water pipeline will extend across a drainage line/seep wetland with a PES of Class D (largely modified) and an EIS of Low (Figure 5.16). The water pipeline will however, be located adjacent to an existing gravel road and will cross the drainage line/seep wetland at an existing culvert.<br>• The construction activities could have a direct impact on the drainage line/seep wetland in terms of hydrology should the construction activities extend beyond the culvert and gravel road boundaries and/or a trench be excavated through the wetland.<br>• The excavation activities could also result in changed/increased runoff patterns, which could lead to erosion of the gravel road and erosion/siltation of the drainage line/seep wetland and thus impact on the surface water quality of the site and downstream area.<br>• Mitigation measures to be implemented to minimize the potential direct and indirect impacts on the drainage line/seep wetland during construction. | SITE | SHORT | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **Water pipeline**<br>• Soil erosion could occur where the water pipeline crosses the drainage line/seep wetland if the site was not properly rehabilitated after installation. This could impact on the surface water quality of the site and downstream area. | SITE | LONG | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **Water pipeline**<br>The excavation of the water pipeline could impact on the drainage line/seep wetland should the excavation activities extend beyond the gravel road and culvert boundaries.<br>Once the water pipeline has been removed, the area will be rehabilitated and revegetated, which will have a positive impact on water flow through the wetland. | SITE | SHORT | PROBABLE | MEDIUM NEUTRAL | LOW NEUTRAL |

| ASPECT/ ENVIRONMENTAL FEATURE(S) | ACTIVITY AND PREDICTED IMPACT CONSTRUCTION PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT OPERATIONAL PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT DECOMMISSIONING PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) |
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| SURFACE WATER/SENSITIVE LANDSCAPES | **<u>School site and water pipeline</u>**<br>Surface water runoff may be polluted if:<br>• waste management measures are not implemented;<br>▪ proper ablution and sanitation facilities are not provided for the site workers to use on site;<br>▪ the construction vehicles are not maintained/repaired resulting in oil leaks and fuel spills.<br>This could impact on the seasonal seep wetland located on the western boundary and drainage line/seep wetland located on the northern boundary of the site as well as the surface water quality of the drainage line and downstream area. | SITE | SHORT | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **<u>School site and water pipeline</u>**<br>At the school site, indirect pollution of surface water runoff could take place if:<br>• waste management measures are not implemented at the school;<br>• the sewage package plant and sewer infrastructure are not properly installed or does not have sufficient capacity resulting in leaks, overflows, etc.<br>• the sewage package plant is not operated correctly and maintained, resulting in polluted effluent being released and irrigated at the school.<br>This could impact on the seasonal seep wetland located on the western boundary and drainage line/seep wetland located on the northern boundary of the site as well as the surface water quality of the drainage line and downstream area.<br>▪ No pollution potential exists during the operation of the water pipeline. | SITE | LONG | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **<u>School site and water pipeline</u>**<br>Surface water runoff may be polluted if:<br>• the heavy vehicles used during decommissioning are not maintained/repaired resulting in oil leaks and fuel spills;<br>• waste management measures are not implemented;<br>• the sewage package plant is not emptied properly before decommissioning or damaged, leading to spillages. | SITE | SHORT | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE |
| | | | | | | | **<u>School site</u>**<br>The continual irrigation of a particular area (e.g. one sports field) with effluent from the sewage package plant could result in waterlogged conditions and the establishment of wetland plant species on site. Surface water runoff could also be impacted in terms of quality and quantity. This could impact on the seasonal seep wetland located on the western boundary and drainage line/seep wetland located on the northern boundary of the site as well as the surface water quality of the drainage line and downstream area. This would depend on the size of the area irrigated and the volume of plant effluent irrigated on that particular area per day. | SITE | LONG | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **<u>School site</u>**<br>NONE since no irrigation will take place during the decommissioning phase. | | | | | |
| GROUNDWATER | **<u>School site</u>**<br>▪ Cilliers & Meyer (2017) did not encounter a seasonal perched water table, sub-surface or surface seepage on site.<br>▪ The construction activities will have no direct impact on the identified wetlands since the buildings will be located outside of the identified 50m buffer zone and the sports field, parking areas and access route outside of the 35m buffer zone as recommended by the wetland specialist.<br>▪ It is therefore not anticipated that the general construction activities (foundations, trenches, excavation for sewage package plant) would impact on the groundwater of the site. | SITE | SHORT | PROBABLE | LOW NEGATIVE | LOW NEGATIVE | **<u>School site</u>**<br>▪ Groundwater pollution could take place if the sewage package plant:<br>• does not have sufficient capacity and overflows on a regular/continual basis;<br>• is not properly operated and maintained resulting in poor quality effluent being released into the drainage line and/or irrigated on the sports field.<br>▪ In the long term, this could impact on the groundwater associated with the drainage line/seep wetland located on the northern boundary of the site as well as the downstream groundwater users (e.g. BH6), depending on the depth to groundwater. | LOCAL | LONG | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **<u>School site</u>**<br>The potential impact on the groundwater would depend on the end land use of the site. | | | | | |

| ASPECT/ ENVIRONMENTAL FEATURE(S) | ACTIVITY AND PREDICTED IMPACT CONSTRUCTION PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT OPERATIONAL PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT DECOMMISSIONING PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GROUNDWATER | **Water pipeline**<br>• It is expected that the groundwater level will be shallow where the water pipeline crosses the drainage line/seep wetland.<br>• The impact on groundwater would depend on the depth of the excavations required and the depth to static groundwater level in the specific area of excavation.<br>• The impact cannot be mitigated. | SITE | LONG | HIGHLY PROBABLE | LOW NEGATIVE | LOW NEGATIVE | **Water pipeline**<br>• The presence of the water pipeline will continue to impact on the groundwater flow, depending on the depth of the water pipeline and groundwater.<br>• No pollution potential exists since the pipeline will be transporting clean water. | SITE | LONG | HIGHLY PROBABLE | LOW NEGATIVE | LOW NEGATIVE | **Water pipeline**<br>During decommissioning, the water pipeline will be removed and disposed of accordingly. The excavation activities will once again impact on the groundwater flow. After rehabilitation, natural groundwater flow should return depending on the geological and soil changes that took place. | SITE | LONG | PROBABLE | LOW NEUTRAL | LOW NEUTRAL |
| | **School site**<br>▪ NONE. | | | | | | **School site**<br>▪ The abstraction of groundwater from the two boreholes (BH8 and BH9) for the school will not significantly impact on the surrounding boreholes (BH2, BH3, BH5 and BH-Afgri; Figure 5.17) if pumped at a sustainable rate (Cilliers, 2017).<br>▪ However, the aquifer and boreholes (BH8 and BH9) could be negatively impacted should the boreholes be over pumped. This will impact on water provision to the school.<br>▪ Mitigation measures would have to be implemented. | SITE | LONG | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>None since the boreholes will no longer be utilized. | | | | | |
| | **School site**<br>▪ NONE. | | | | | | **School site**<br>▪ According to Cilliers (2017), the water quality classification is acceptable in terms of human consumption.<br>▪ However, turbidity levels exceed the threshold values in BH8.<br>▪ In addition, iron levels exceed the operational limits in BH9.<br>▪ The water quality could impact on the personnel and students should the water not be treated as recommended by Cilliers (2017). | SITE | LONG | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>None since the boreholes will no longer be utilized. | | | | | |
| SITES OF ARCHAEOLOGICAL/ CULTURAL INTEREST | **School site and water pipeline**<br>NONE. Van Vollenhoven (2017) indicated that no sites of cultural heritage significance are located on the school site or along the pipeline route. | | | | | | **School site and water pipeline**<br>NONE. No further construction will take place and no sites of cultural heritage significance are located on site. | | | | | | **School site and water pipeline**<br>NONE. No sites of archaeological/cultural interest are known to be present on site. | | | | | |
| | **School site and water pipeline**<br>▪ The proposed school site and sections of the water pipeline route are underlain by shale, shaly sandstone, grit and sandstone of the Vryheid Formation, which has a 'Very High' palaeontological sensitivity.<br>▪ The direct impact on the palaeontology will depend on the depth of the excavations required for the buildings, water pipelines, sewage package plant and associated infrastructure.<br>▪ Mitigation measures in terms of a protocol for finds would have to be implemented should any fossils be unearthed during the construction phase. | SITE | PERMANENT | IMPROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site and water pipeline**<br>NONE. The operational activities will have no direct or indirect impact on the palaeontology of the site as no further construction will take place. | | | | | | **School site and water pipeline**<br>NONE. The decommissioning activities will have no direct or indirect impact on the palaeontology of the site as no further construction will take place. | | | | | |

| ASPECT/ ENVIRONMENTAL FEATURE(S) | ACTIVITY AND PREDICTED IMPACT CONSTRUCTION PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT OPERATIONAL PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT DECOMMISSIONING PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AIR QUALITY | **School site**<br>▪ Dust generation and vehicle emissions due to construction activities could impact on site workers, the residents of Generaalsdraai Village, Transnet railway line, Afgri Silos and workers at BKB Graanberging. The extent of the impact would depend on the time of year, wind direction and velocity.<br>▪ Due to the distance of the site from the N4 national road, it is highly unlikely that dust generated during construction would impact on motorists utilising this road. | SITE | SHORT | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>• NONE. During the operational phase, no direct impact on the air quality is anticipated as the school will be supplied with electricity. | | | | | | **School site**<br>Dust generation and vehicle emissions due to decommissioning activities and use of heavy machinery could impact on site workers and the adjacent land users.<br>The extent of the impact would depend on the time of year, wind direction and velocity. | SITE | SHORT | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE |
| | **Water pipeline**<br>• Dust generation and vehicle emissions due to construction activities could impact on site workers and the residents of Generaalsdraai Village. The extent of the impact would depend on the time of year, wind direction and velocity.<br>• Afgri Silos, BKB Graanberging, the N4 national road and the Transnet railway line should not be impacted due to the distance. | SITE | SHORT | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **Water pipeline**<br>• NONE. The water pipeline will be located underground and no further construction activities will take place. | | | | | | **Water pipeline**<br>Dust generation and vehicle emissions due to decommissioning activities and use of heavy machinery could impact on site workers and the adjacent land users.<br>The extent of the impact would depend on the time of year, wind direction and velocity. | SITE | SHORT | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE |
| | **School site**<br>The air quality of the site and surroundings (e.g. Generaalsdraai Village, BKB Graanberging and Afgri Silos) could be impacted in terms of odours if:<br>o the chemical toilets used during construction are not maintained;<br>o proper waste management measures are not implemented. | SITE | SHORT | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>• The air quality of the site and surroundings could be impacted in terms of odours if:<br>o the sewage package plant was not installed properly, does not have capacity and is not maintained resulting in sewage leaks/overflows;<br>o the sewage package plant is not operated correctly and maintained, resulting in polluted effluent being released and irrigated at the school.<br>o proper waste management measures are not implemented.<br>This could impact on the teachers and students at the school, residents of Generaalsdraai Village, workers at BKB Graanberging and Afgri Silos. | SITE | LONG | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>People on site and surroundings could be impacted in terms of odours if the sewage package plant is not emptied before decommissioning and sewage spills take place. | SITE | SHORT | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE |
| VISUAL | **School site**<br>▪ Due to the flat topography of the area, the construction activities will be highly visible from all the adjacent properties (i.e. Generaalsdraai Village, BKB Graanberging, Afgri Silos, Transnet railway line).<br>▪ Due to the distance of the site from the N4 national road, it is highly unlikely that construction activities would have a visual impact on motorists utilising this road.<br>▪ The site should thus be kept neat and tidy during the construction phase. | SITE | SHORT | DEFINITE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>▪ Due to the flat topography of the area, the school and associated activities will be highly visible from all the adjacent properties (i.e. Generaalsdraai Village, BKB Graanberging, Afgri Silos, Transnet railway line).<br>▪ Due to the distance of the site from the N4 national road, it is highly unlikely that the school would have a visual impact on motorists utilising this road.<br>▪ It would however, be important to keep the site neat and tidy at all times and ensure that the school is well maintained to prevent any visual impacts on the adjacent landowners/users and general road user. | SITE | LONG | DEFINITE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>The decommissioning activities could impact on adjacent land owners and road users depending on the land use of the area at the time of decommissioning. If the site is rehabilitated and not developed again, the removing of building rubble and revegetation of the site could have a positive impact in terms of visual aspects. | SITE | LONG | PROBABLE | LOW NEUTRAL | LOW NEUTRAL |

| ASPECT/ ENVIRONMENTAL FEATURE(S) | ACTIVITY AND PREDICTED IMPACT CONSTRUCTION PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT OPERATIONAL PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT DECOMMISSIONING PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VISUAL | **<u>Water pipeline</u>**<br>▪ The installation of the southern section of the water pipeline will be highly visible from all the adjacent properties (i.e. Generaalsdraai Village, BKB Graanberging, Afgri Silos, Transnet railway line).<br>▪ Due to the topography, the installation of the northern portion of the water pipeline and the windmills will only be visible from Generaalsdraai Village.<br>▪ The site should thus be kept neat and tidy during the construction phase. | SITE | SHORT | DEFINITE | MEDIUM NEGATIVE | LOW NEGATIVE | **<u>Water pipeline</u>**<br>▪ The water pipeline would be located underground and the said area rehabilitated/revegetated.<br>▪ The windmills installed at BH8 and BH9 could be visible from certain points within Generaalsdraai Village and surrounding area. | SITE | LONG | PROBABLE | LOW NEGATIVE | LOW NEGATIVE | **<u>Water pipeline</u>**<br>During the decommissioning phase, the water pipeline would be excavated and removed. The construction activities would be visible to the surrounding residents at that time. 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 | **<u>School site</u>**<br>▪ Heavy machinery used during the construction phase (and possibly blasting) will contribute to increased ambient noise levels in the area, which could impact on the construction workers, residents at Generaalsdraai Village, Afgri Silos and workers at BKB Graanberging. It is highly unlikely that motorist travelling along the N4 national road would be impacted. | SITE | SHORT | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **<u>School site</u>**<br>▪ The operational activities at the school could impact on the ambient noise level of the site and surrounding area. The impact is expected to be insignificant due to the operational hours of the school and the site being located adjacent to Generaalsdraai Village, the Transnet railway line and the N4 national road. | SITE | LONG | PROBABLE | LOW NEGATIVE | LOW NEGATIVE | **<u>School site</u>**<br>In general, the use of heavy machinery for decommissioning activities would impact on the surrounding landowners/users in terms of noise. | SITE | SHORT | PROBABLE | LOW NEGATIVE | LOW NEGATIVE |
| | **<u>Water pipeline</u>**<br>▪ Heavy machinery used during the construction phase (and possibly blasting) will contribute to increased ambient noise levels in the area, which could impact on the construction workers, residents at Generaalsdraai Village, Afgri Silos and workers at BKB Graanberging. It is highly unlikely that motorist travelling along the N4 national road would be impacted. | SITE | SHORT | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **<u>Water pipeline</u>**<br>• The utilization of the water pipeline will not impact on the ambient noise levels of the site since the water pipeline will be located underground.<br>• However, the windmills located at BH8 and BH9 could increase noise levels during operation should these windmills not be kept in good repair. | SITE | LONG | PROBABLE | LOW NEGATIVE | LOW NEGATIVE | **<u>Water pipeline</u>**<br>In general, the use of heavy machinery for decommissioning activities would impact on the surrounding landowners/users in terms of noise. | SITE | SHORT | PROBABLE | LOW NEGATIVE | LOW NEGATIVE |
| TRAFFIC | **<u>School site and water pipeline</u>**<br>▪ All construction activities will take place within the school site/along the demarcated route and will not directly impact on traffic.<br>▪ However, the delivery of building material during the construction period could lead to a slight increase in traffic through Wonderfontein and along the existing gravel access road. The deliveries would however, not occur on a continuous basis.<br>▪ SANRAL and Transnet could also be impacted should the access road from the N4 national road across the railway line be used for deliveries.<br>▪ The upgrading of the existing gravel access road from Wonderfontein to the said site (to provide access for busses) could impact on existing road users, namely residents of Generaalsdraai Village and BKB Graanberging. An alternative access road is available across the railway line which could be utilized by these road users during the construction period. Utilizing this access road could however, impact on Transnet and SANRAL. | SITE<br><br>SITE | SHORT<br><br>SHORT | PROBABLE<br><br>DEFINITE | LOW NEGATIVE<br><br>MEDIUM NEGATIVE | LOW NEGATIVE<br><br>LOW NEGATIVE | **<u>School site and water pipeline</u>**<br>▪ The utilization of the existing access road between Wonderfontein and Generaalsdraai Village by school busses and teachers could lead to a slight increase in traffic along this road. Other road users (i.e. residents of Generaalsdraai Village and BKB Graanberging) could be impacted upon if the gravel road was not upgraded during the construction phase.<br>▪ In addition, SANRAL, motorists on the N4 national road and Transnet could be impacted upon if the access road from the N4 national road across the railway line is utilized by the school.<br>▪ The water pipeline will be located underground and will have no impact on traffic during the operational phase | LOCAL | LONG | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **<u>School site and water pipeline</u>**<br>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. The impact would depend on traffic volumes in the area at the time.<br>Impact on traffic after decommissioning will however, depend on the intended end land use. | SITE | SHORT | PROBABLE | LOW NEGATIVE | LOW NEGATIVE |
| INTERESTED AND AFFECTED PARTIES | **<u>School site and water pipeline</u>**<br>▪ ±100 temporary job opportunities would be provided during the construction phase. | SITE | SHORT | DEFINITE | MEDIUM POSITIVE | MEDIUM POSITIVE | **<u>School site and water pipeline</u>**<br>▪ The existing staff of Morelig Combined School would retain their permanent job opportunities. | SITE | LONG | DEFINITE | MEDIUM POSITIVE | MEDIUM POSITIVE | **<u>School site and water pipeline</u>**<br>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. | | | | | |

| ASPECT/ ENVIRONMENTAL FEATURE(S) | ACTIVITY AND PREDICTED IMPACT CONSTRUCTION PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT OPERATIONAL PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT DECOMMISSIONING PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) |
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| INTERESTED AND AFFECTED PARTIES | **School site and water pipeline**<br>▪ 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 | **School site and water pipeline**<br>▪ The students could be impacted upon if the necessary safety measures are not implemented at the school in terms of access control, food preparation, fire hazards, etc. | SITE | LONG | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site and water pipeline**<br>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. | | | | | |
| | **School site and water pipeline**<br>NONE. | | | | | | **School site**<br>▪ The existing Morelig Combined School is in a dilapidated state with poor hygiene and ventilation. A new school will thus improve the current situation.<br>▪ In addition, the relocation of the school will allow the mining company to continue with its expansion plans.<br>▪ The proposed school will also be convenient for residents at Generaalsdraai Village, which is located adjacent to the said site.<br>▪ An additional 222 students could be accommodated by the new school, thereby ensuring that new students in the area do not have to stay in Boarding Schools or travel for hours to schools in Middelburg or Belfast. | LOCAL | LONG | HIGHLY PROBABLE | MEDIUM POSITIVE | MEDIUM POSITIVE | | | | | |
| | **School site**<br>Eskom and its customers could be impacted upon during the connection of electricity in terms of service interruptions. | LOCAL | SHORT | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>▪ Teachers and students could be impacted upon if the Eskom transformer does not have sufficient capacity for the school, leading to outages. | SITE | LONG | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | | | | | | |
| | **School site**<br>▪ NONE. | | | | | | **School site**<br>▪ According to Cilliers (2017), the abstraction of groundwater from the two boreholes (BH8 and BH9) for the school will not significantly impact on the surrounding boreholes (BH2, BH3, BH5 and BH-Afgri; Figure 5.17) and the groundwater users (Generaalsdraai Village, Afgri Silos, BKB Graanberging) if pumped at the recommended sustainable rate.<br>▪ Mitigation measures will have to be implemented to prevent overpumping. | SITE | LONG | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | | | | | | |
| | **School site**<br>▪ NONE. | | | | | | **School site**<br>▪ According to Cilliers (2017), the water quality classification is acceptable in terms of human consumption.<br>▪ However, turbidity levels exceed the threshold values in BH8.<br>▪ In addition, iron levels exceed the operational limits in BH9.<br>▪ The water quality could impact on the personnel and students should the water not be treated as recommended by Cilliers (2017). | SITE | LONG | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | | | | | | |

| ASPECT/ ENVIRONMENTAL FEATURE(S) | ACTIVITY AND PREDICTED IMPACT CONSTRUCTION PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT OPERATIONAL PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) | ACTIVITY AND PREDICTED IMPACT DECOMMISSIONING PHASE<br><br>AREA:<br>School site – 4.8 ha<br>(Layout Plan no. 4; Figure 4.5)<br><br>Water pipeline - 2 km x 4 m<br>(Alternative 3; Figure 4.8) | EXTENT | DURATION | PROBABILITY | SIGNIFICANCE (PRE-MITIGATION) | SIGNIFICANCE (POST MITIGATION) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INTERESTED AND AFFECTED PARTIES | **School site**<br>○ NONE. | | | | | | **School site**<br>Teachers and students at the school could be impacted upon in terms of health if the sewage package plant is not installed properly and maintained, resulting in overflows. | SITE | LONG | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site and water pipeline**<br>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. | | | | | |
| | **Water pipeline**<br>• Residents of Generaalsdraai Village and cattle could be impacted upon during the excavation of the trench for the water pipeline should the necessary safety measures not be implemented.<br>• In addition, residents of Generaalsdraai Village could be impacted upon in terms of access to their houses during excavation. | SITE | SHORT | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **Water pipeline**<br>▪ Residents of Generaalsdraai Village and cattle could be impacted upon in terms of safety if the trench was not properly closed and rehabilitated during the construction phase. | SITE | SHORT | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | | | | | | |
| | **School site**<br>• If the access route from the N4 national road across the railway line is utilized for the delivery of building material, it could impact on SANRAL and Transnet. | LOCAL | SHORT | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>• SANRAL and motorists on the N4 national road and Transnet could be impacted upon if the access road from the N4 national road across the railway line is utilized. | LOCAL | LONG | HIGHLY PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | | | | | | |
| | **School site**<br>• Transnet could be impacted upon if the school site is not fenced prior to construction commencing and site workers gain access to the adjacent railway line possibly resulting in accidents with passing trains and thus affecting the Transnet service. | LONG | SHORT | PROABLE | MEDIUM NEGATIVE | LOW NEGATIVE | **School site**<br>• Transnet could be impacted upon if the school site is not fenced and students gain access to the adjacent railway line possibly resulting in accidents with passing trains and thus affecting the Transnet service. | LOCAL | LONG | PROBABLE | MEDIUM NEGATIVE | LOW NEGATIVE | | | | | | |
| | • Other impacts in terms of the natural environment, noise, visual, traffic, etc. are indicated in the above-mentioned sections. | | | | | | • Other impacts in terms of the natural environment, noise, visual, traffic, etc. are indicated in the above-mentioned sections. | | | | | | | | | | |

## 7.8 'No project' impacts

The 'no project option' is the alternative of not going ahead with the proposed development. The 'no project option' is only considered if it is found that the development will have significant negative impacts on the environment, which cannot be mitigated or managed.

If the 'no project option' in terms of the proposed project was exercised, it would mean that:

- The applicant would have to investigate alternative sites for the proposed school, which would lead to substantial delays in the project.
- The applicant would have to discard the mining expansion plans which could impact on the mine workers in terms of job losses.
- The students would be impacted in terms of hygiene and safety should the mining expansion plans be discarded and the school remain as is in its dilapidated state (see Section 4.10).
- According to the Urban Dynamics (2016a), the Department of Education has a new policy in place of replacing small farm schools with Boarding Schools. If the no project option is implemented, the existing Morelig Combined School could be decommissioned and the students sent to Boarding Schools. Sending the students to Boarding Schools could have a significant socio-economic impact on the 778 students and their families.
- The existing staff members (32 people) would loose their jobs if the school is closed down and the students sent to Boarding School.
- Job opportunities created by the project applicant (construction phase: 100 employees) would be lost.

## 7.9 Cumulative impacts

The proposed development will **not** lead to an overall loss of Eastern Highveld Grassland vegetation and associated animal habitat, since the site already comprises planted pastures. The development will thus not result in the cumulative loss of Eastern Highveld Grassland vegetation.

The development of the said site will not have a direct impact on any surface water environments (river/stream/wetland) since the site is located outside of the identified wetlands (seasonal seep wetland and drainage line/seep) and their associated wetland buffer zones. The development will thus not result in the cumulative loss of wetlands.

The hydrology of the wetlands may however be indirectly altered through changed runoff patterns as a result of the increase in impermeable areas (due to buildings and associated infrastructure) and decrease in infiltration into the soil. If not well managed, increased runoff could impact on the nearby wetlands in terms of erosion and increased sediment load ultimately impacting on the surface water quality and aquatic environment of the downstream area.

If the proposed sewage package plant is not properly installed, operated and maintained, it could result in the final effluent being of poor quality or sewage overflowing from the system. This could lead to soil pollution, surface and groundwater pollution, which over time could have a cumulative impact on

these environments. Downstream water users (e.g. Generaalsdraai Village, Morelig Combined School, adjacent landowners, etc.) could also be affected.

Groundwater (boreholes) will be utilized at the school as no municipal services are available in the area. The aquifer and boreholes (BH8 and BH9) could be negatively impacted should the boreholes be over pumped. This will impact on future abstraction and water provision to the school. It could also impact on surrounding groundwater users. In addition, the teachers and school children could be impacted upon in terms of health if the water quality is not monitored on a regular basis and treated to ensure that it is fit for consumption.

No cumulative impact on traffic is expected since the children will be brought to school by bus.

The existing Morelig Combined School is in a dilapidated state with poor hygiene and ventilation. A new school will thus improve the current situation. The new school will also be able to accommodate an additional 222 students, thereby ensuring that new students in the area do not have to stay in boarding schools or travel for hours to schools in Middelburg or Belfast. The proposed school will also be convenient for residents at Generaalsdraai Village, which is located adjacent to the said site.

In addition, the proposed school will serve as an ancillary use to the proposed residential and public service land uses intended for Wonderfontein as per the eMakhazeni Local Municipality SDF.

Job opportunities will be created during the construction phase and the existing employees at Morelig Combined School will remain employed.

# 8. ENVIRONMENTAL MANAGEMENT PROGRAMME

## 8.1 Definition and objectives

The Environmental Management Programme (EMPr) was compiled in accordance with Appendix 4 of the Environmental Impact Assessment (EIA) Regulations, 2014 as well as the Western Cape Guideline for Environmental Management Plans (Lochner, 2005).

According to the Western Cape Guideline, an Environmental Management Programme (EMPr) can be defined as:

> *An environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced.*

*According to the EIA Regulations, 2014, an EMPr must include-*
*(d) A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed or mitigated as identified through the environmental impact assessment process for all phases of the development including -*
*(i) planning and design;*
*(ii) pre-construction and construction activities;*
*(iii) operation or undertaking of the activity;*
*(iv) rehabilitation of the environment; and*
*(v) closure, where relevant.*

This section therefore provides an indication of the mitigation measures to be implemented by the site operator (and site workers) in order to reduce the potential impacts identified (see Section 7).

## 8.2 Contact details

*An EMPr must include -*
*(a) details of-*
*(i) the EAP who prepared the environmental management programme; and*
*(ii) the expertise of that person to prepare an environmental management programme, including a curriculum vitae.*

The contact details and expertise of the environmental consultant are provided in Section 2 of this report.

The applicant will be responsible for the implementation of the EMPr. The contact details are provided in Section 2.

## 8.3 Description of the proposed project

*An EMPr must provide -*
*(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.*
*(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers.*

A detailed description of the proposed development is provided in Section 3 of this report. Section 4 provides a detailed description of the various alternatives investigated.

The following layout plans must be implemented in terms of the proposed development:

- Layout Plan No 4 (Figure 4.5) indicating the position of the school infrastructure.
- Alternative 3 (Figure 4.8) indicating the preferred water pipeline route.
- Figure 4.11 indicating the preferred access road to the school.

Section 5 provides a description of the biophysical environment of the site. No sensitive environments (e.g. wetlands, sites of cultural significance, etc.) will be directly impacted by the proposed school as indicated in Figure 8.1.

Venter (2016) however identified the following wetland units adjacent to the school site (Figure 8.1):

- Seasonal seep wetland;
- Drainage line/seep wetland.

Although these wetlands have been impacted as indicated in Section 5.9, they are still considered to be of high sensitivity.

In view of this, Venter (2016) recommended that buildings be placed outside of the 50 m wetland buffer zone while the sports fields, parking areas and access route be located outside of the 35 m wetland buffer zone (Figure 8.1).

Indirect impacts (e.g. increased runoff, erosion, etc.) could take place which would necessitate the implementation of mitigation measures as indicated in Section 8.5.

As indicated in Figure 8.1, a small section of the proposed water pipeline will extend across the drainage line/seep wetland and will be located within the 50m wetland buffer zone. Mitigation measures would have to be implemented as indicated in Section 8.5.

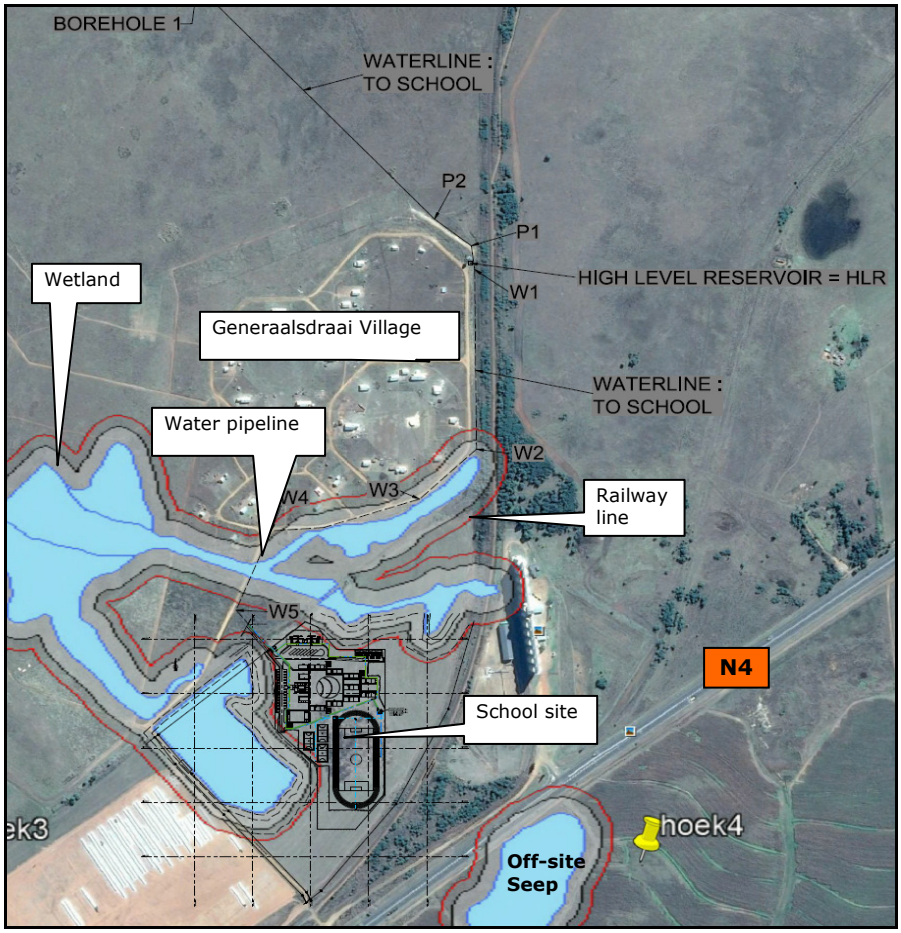


**Figure 8.1: Sensitive landscapes identified**

## 8.4 Phases of the development and timeframe

### 8.4.1 Planning and design phase and pre-construction activities

The planning and design phase involved mostly office work and site surveys with regards to the design of the layout plan, the Basic Assessment Report and the specialist studies. It also involves obtaining the necessary authorisations for the said development.

During the planning and design phase, 7 test pits were excavated as part of the geotechnical study. These test pits were however, closed. Four (4) boreholes were also drilled as part of the geohydrological study to determine whether sufficient water is available in the area for the said school.

No construction took place on site, therefore no mitigation measures need to be implemented.

### 8.4.2 Construction phase

Section 7.7 provides further details with regards to potential impacts identified. Mitigation and management measures are indicated in Section 8.5.

**Construction timeframe:**
6 – 12 months

### 8.4.3 Operational phase

Section 7.7 provides further details with regards to potential impacts identified. Mitigation and management measures are indicated in Section 8.5.

**Operational timeframe:**
Unknown.

### 8.4.4 Decommissioning and rehabilitation phase

This phase would involve the decommissioning of the buildings and infrastructure (including water pipeline) already constructed on site at that particular date, if ever required. This phase will not be discussed in detail. It is recommended that at the time of decommissioning, a specific Environmental Management Programme (EMPr) be compiled which specifically addresses this phase. This EMPr would have to address issues such as the removal of building rubble, ripping of the soil, the sowing of seed and the maintenance of the vegetation until it is established. Soil conservation measures would also have to be implemented.

## 8.5 Mitigation and management measures to be implemented

*An EMPr must include -*
*(f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to -*
*(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;*
*(ii) comply with any prescribed environmental management standards or practices;*
*(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and*
*(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.*

### 8.5.1 Construction site office

Impact management outcome:
1) *To ensure that an appropriate site is selected for the construction site office and that the site office is managed in an environmentally responsible manner with the least impact on the natural environment, site workers and adjacent landowners/users.*

Mitigation and management measures:
a. A suitable site must be selected, demarcated and fenced for the construction site office within the demarcated school site boundaries. This construction site office must be utilized during the construction of the school and the installation of the water pipeline.
b. The construction office may not be located within the seasonal seep wetland (west of the site), the drainage line/seep wetland (north of the

### 8.5.1 Construction site office

site) or the associated wetland buffer zones.

c. Chemical toilets must be provided for use by the site workers. These must be serviced on a regular basis. No long drop toilets may be allowed.
d. Potable water must be made available to site workers.
e. The waste management measures as indicated in Section 8.5.6 must be implemented.
f. An area for the parking of construction vehicles and other vehicles should be clearly demarcated. When not in use, all vehicles should be parked within this area. The demarcated parking area should be located within or in close proximity to the construction site office.
g. As far as practically possible, vehicles must not be serviced/repaired on site. However, should it not be possible to take the vehicle to a service centre in town for repair, the contractor must ensure that the vehicles are serviced/repaired on a cement slab and that drip trays are utilized. Waste oil, filters, etc. must be properly disposed of (see Section 8.5.6).

### 8.5.2 General construction principles

Impact management outcome:

1) *To ensure that the activities that occur during the construction phase have the least impact on the natural environment, site workers and adjacent landowners/users.*

Mitigation and management measures:

a. All relevant authorisations must be obtained before construction commences.
b. Layout Plan No 4 (Figure 4.5) to be implemented with regards to the position of the school infrastructure.
c. Alternative 3 (Figure 4.8) to be implemented with regards to the water pipeline route.
d. Figure 4.11 to be implemented with regards to the access road.
e. Any significant changes to the layout plans would necessitate approval from the Department of Agriculture, Rural Development, Land and Environmental Affairs before commencing with construction.
f. Before any construction commences, the school site must be fenced.
g. All construction activities must be limited to the fenced school site and the water pipeline route. The said areas should be properly demarcated and the footprint kept as small as possible.
h. No construction activities may take place within the seasonal seep wetland (west of the site), the drainage line/seep wetland (north of the site) or the associated wetland buffer zones.
i. The wetland boundaries and wetland buffers as identified by Venter (2016) must be clearly marked in the field with signs and/or highly visible flagging until construction-related activities are complete.

### 8.5.2 General construction principles

j. The wetlands located outside of the footprint area must be clearly demarcated as NO-GO AREAS. All contractors to be informed of these NO-GO AREAS through the environmental awareness programme and to be made aware of penalties (fines to be paid) to be imposed due to infringements.

k. Since the water pipeline route extends across the drainage line/seep wetland, it is not possible to avoid the wetland unit altogether. However, all additional construction related activities (such as the construction site office (including material storage)) must be located 50 m outside of the delineated wetland.

l. A water use licence in terms of the National Water Act, 1998 (Act 36 of 1998) to be obtained before the water pipeline is installed across the drainage line/seep wetland. A wetland rehabilitation plan to be included as part of the water use licence application.

m. No construction vehicles to utilize the access road from the N4 national road across the railway line.

n. Only one access point should be provided for construction vehicles from the northern boundary of the site as indicated in the layout plan (Figure 4.5). No vehicles to obtain access from the western boundary of the site across the seasonal seep wetland and its associated wetland buffer zone.

o. No members of the general public should be allowed at the construction site.

p. No unnecessary removal of vegetation should take place.

q. An area must be selected within the fenced school site and demarcated for the stockpiling of spoil (e.g. rocks, soil, etc.) until rehabilitation, or until the spoil is disposed of.

r. The excavated material (soil, rocks, etc.) along the water pipeline route must be separately stockpiled within the construction footprint (4 m wide) until rehabilitation, or alternatively disposed off.

s. Should any animals (e.g. reptiles or small mammals) be found during the construction phase, a specialist should be contacted immediately to ensure the safe removal of the specimen(s).

t. The applicant/contractor must appoint a Safety Officer and Environmental Control Officer (ECO) in order to ensure compliance with the legislation.

u. Contractors to be informed to keep to low speeds on site (especially once the site has been cleared) to reduce the amount of dust.

v. Dust suppression measures must be implemented during dry and windy periods.

w. Construction activities to be restricted to daylight hours (7am - 6pm) and weekdays (Monday to Friday).

x. Sufficient fire extinguishers must be provided as required by legislation.

y. All machinery used during the construction phase must be properly muffled and maintained so as to reduce noise generation to a minimum.

z. All pollution incidents must be reported to the Department of

### 8.5.2 General construction principles

Agriculture, Rural Development, Land and Environmental Affairs and the Department of Water and Sanitation within 24 hours of occurrence.

aa. If any archaeological remains are exposed during the construction phase, the construction must be terminated immediately and the Provincial Heritage Resources Authority (SAHRA) must be notified in this regard. The applicant must take note of the requirements in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999).

bb. If any graves are discovered during construction, the discovery must be reported to the SA Police Service and/or SAHRA or an archaeologist must be called in to handle the matter.

cc. Topsoil, subsoil and overburden must be surveyed for fossils (Vryheid Formation) as per the Protocol for Finds (Appendix 9).

dd. If any palaeontological material is exposed during digging, excavating, drilling or blasting SAHRA must be notified and mitigation measures in terms of a protocol for finds would have to be implemented. All construction activities must be stopped and a palaeontologist must be called to site.

### 8.5.3 Rehabilitation of the environment after construction

Impact management outcome:

1) *To ensure that the area disturbed due to construction activities is properly rehabilitated and maintained.*
2) *To control the growth of declared weeds and/or invader plants.*
3) *To ensure that any declared weeds and/or invader plants do not establish on site and spread to the adjacent seasonal seep wetland area (located west of the site) or the drainage line/seep wetland (located north of the site).*

Mitigation and management measures:

a. Before construction, topsoil must be removed and stockpiled in a demarcated area within the fenced school site for rehabilitation of the area surrounding the buildings.

b. The topsoil along the water pipeline route must also be removed and stockpiled in a demarcated area along the route (i.e. within the 4m footprint area) for rehabilitation. The topsoil layer generally has a high organic content and carries the seed bank. It is invaluable for post-development rehabilitation.

c. Once construction has been completed, all temporary structures, excess materials, equipment and waste must be removed from site.

d. All residual stockpiles must be removed to spoil or spread on site as directed by the ECO.

e. The disturbed areas must be top soiled and re-vegetated (i.e. rehabilitated) as soon as possible in order to prevent soil erosion and the establishment of alien vegetation.

### 8.5.3 Rehabilitation of the environment after construction

f. The reinstated soil (excluding the topsoil) must be sufficiently compacted to ensure stability.

g. Proper storm water control measures and erosion control must be implemented to prevent erosion of the newly rehabilitated areas during heavy rainfall.

h. Temporary erosion control measures (e.g. geo-textile silt fences, diversion ditches, sediment traps, sandbags, etc.) and temporary seeding with fast growing annuals to be kept in place to control erosion until the long-term erosion control methods are established and functioning.

i. If soil erosion is noted, appropriate remediation measures must be implemented.

j. For rehabilitation purposes, a seed mix comprising of grass species indigenous to the area should be used. Grass seeds can be collected from the surrounding area and used on site. Mowed grass with seeds can be used for mulching while brush packing can be used on bare areas trampled by livestock.

k. The planting of any alien plant species (e.g. Kikuyu) as part of landscaping should be prohibited in order to prevent the spread of invasive and weedy species from the site.

l. The regulations in terms of Alien Invasive Species, the Conservation of Agricultural Resources Act, 1983 and the Mpumalanga Nature Conservation Act, 1998 (Act 10 of 1998) with regards to declared alien species must be noted and complied with.

m. An alien and invasive species control and monitoring plan as required in terms of the Alien and Invasive Species Regulations under the National Environmental Management Biodiversity Act (Act 10 of 2004) should be compiled and implemented.

n. Regular site inspections to be conducted to identify any declared weeds and/or invader plants. If identified, the plants to be eradicated using appropriate methods.

o. Several alien and invasive species resemble indigenous species, especially as seedlings. Care must be taken not to control indigenous species during the control of invasive species.

p. It is advisable to consult the latest edition of 'A guide to the use of herbicides' or contact the National Department of Agriculture, Forestry and Fisheries with regards to the latest information pertaining to the application of herbicides. If pesticides or herbicides are to be used, the product should be chosen responsibly. Storage, administering and disposal must be done according to the prescribed methods.

q. A post-construction audit must be conducted to ensure that any shortcomings are identified and addressed.

### 8.5.4 General operational principles

Impact management outcome:

1) *To ensure that the activities that occur during the operational phase have the least impact on the natural environment, site workers and adjacent landowners/users.*

Mitigation and management measures:

a. All operational activities must be limited to the fenced school site. No activities may take place within the seasonal seep wetland (west of the site), the drainage line/seep wetland (north of the site) or the associated wetland buffer zones.

b. Regular inspections of the water pipeline route to take place during the operational phase to ensure that no trees are growing within the servitude, which could damage the water pipeline.

c. The following **energy saving** initiatives must be implemented in order to reduce the carbon footprint of the development:
   - *Energy efficient lighting (e.g. LED lighting) to be installed where possible;*
   - *Designing the buildings in such a way as to maximize the use of daylight (e.g. skylights, large windows, etc.);*
   - *Solar geysers to be installed where feasible;*
   - *Gas stoves to be used in the kitchen if feasible.*

d. The following measures to minimize **water use** during the operational phase must be implemented:
   - *Regular maintenance of the water infrastructure and water pipeline to ensure that there are no leakages;*
   - *Harvested storm water to be used for irrigation of gardens/sports fields if possible;*
   - *Water usage to be monitored;*
   - *Waterwise signage to be displayed in the kitchen, ablution facilities and staff accommodation;*
   - *Waterwise taps to be installed in the ablution facilities.*

e. The waste management measures provided in Section 8.5.6 of this report to be implemented.

### 8.5.5 Soil management

Impact management outcome:

1) *To ensure that the activities that occur during the construction phase have the least impact on the soils in terms of soil quality, structure and erosion potential.*
2) *To reduce the potential impact of storm water drainage from the site on the surrounding properties and roads in terms of soil erosion during the construction and operational phases.*

Mitigation and management measures:

a. Before construction, topsoil must be removed and stockpiled in a demarcated area for rehabilitation or landscaping purposes once construction has been completed. The topsoil layer generally has a high organic content and carries the seed bank. It is invaluable for post-development rehabilitation.
b. Stripping of vegetation and topsoil for construction must occur in a phased manner and must be restricted to the construction and excavation footprint to reduce the risk of erosion during precipitation.
c. Topsoil stockpiles must be located on a flat area and must not be higher than 2 m.
d. An area must be selected within the fenced school site and demarcated for the stockpiling of spoil (e.g. rocks, soil, etc.).
e. Any stockpile, which is likely to remain for 12 months or more, must be vegetated.
f. The topsoil along the water pipeline route to be removed and stockpiled in a demarcated area along the route (i.e. within the 4m footprint area) for rehabilitation. Subsoil, rocks, etc. also must be stockpiled separately in demarcated areas along the pipeline route (i.e. within the 4m footprint area).
g. All residual stockpiles must be removed to spoil or spread on site as directed by the ECO.
h. Appropriate soil conservation and storm water management measures to be provided in order to prevent soil erosion.
i. In terms of the installation of the water pipeline through the drainage line/seep wetland, sediment barriers (e.g. geo-textile silt fences) should be installed immediately after initial disturbance and must be maintained throughout the construction phase until the area is rehabilitated.
j. The water management measures as indicated in Section 8.5.7 must be implemented during both the construction and operational phases.
k. Monitor for erosion and intervene and/or rehabilitate where necessary.

Impact management outcome:

3) *To reduce potential soil pollution as a result of construction and operational activities.*

Mitigation and management measures:

a. The waste management measures as indicated in Section 8.5.6 must

**8.5.5 Soil management**

be implemented during both the construction and operational phases.

b. The water management measures as indicated in Section 8.5.7 must be implemented during both the construction and operational phases.
c. Regular maintenance of the sewage infrastructure to reduce the potential for blockages and leaks and thus prevent potential soil pollution.
d. A service provider should be appointed to undertake the maintenance of the sewage package plant. Maintenance activities should include the following:
    - Checking for sewage leaks or overflows, blockages and un-degradable waste;
    - Checking the electricity supply;
    - Inspecting and cleaning the screens;
    - General inspection of any pumps or motors;
    - Checking effluent discharged from the plant;
    - Taking samples of effluent for analysis;
    - When required, sludge to be vacuumed out of the plant and disposed of at a hazardous waste site. (The on-site disposal of sludge is not advisable since it could cause odour and fly problems if the sludge is not sufficiently stabilised).
e. The supplier of the sewage package plant should provide the school with an operations and maintenance manual that includes a troubleshooting section.
f. If any soil or surface water contamination is noted, appropriate remediation measures must be implemented immediately. An environmental incident report must be completed indicating the date of the incident, description of incident and action taken. The Department of Agriculture, Rural Development, Land and Environmental Affairs and the Department of Water and Sanitation must be informed of the event within 24 hours. A copy of the environmental incident report must be kept on file at the site office.

Impact management outcome:

4) *To ensure that the geotechnical recommendations are taken into account during the construction phase in order to prevent impact on structures during the operational phase.*

Mitigation and management measures:

As indicated in Figure 5.8, the school site comprises four (4) geotechnical zones. According to Cilliers & Meyer (2016), the following construction methods would apply to the identified geotechnical zones:

a. Zone 1A - Normal Founding: Normal precautions including adequate drainage away from the buildings, flexible water connections, grass, or concrete aprons around the buildings and moderate compaction in the base of foundation excavations prior to the casting of the foundations.
b. Zone 1B - Modified Normal Construction: Precautions including, but not limited to compaction to a least 93% MOD AASTHO density to a depth of 1.5 times the foundation width, light reinforcement in

**8.5.5 Soil management**

foundations and masonry, articulated joint at doors and lintels and additional drainage, service and plumbing precautions.

c. Zone 2A - Shallow Hardpan Ferricrete: Hard ripping and powerful machinery to excavate service trenches required.
d. Zone 3C - Remediation: Trunks and roots of wattle trees that were cut down to be removed and the excavations backfilled with suitable material and compacted to 93% MOD AASTHO density at -1% to +2% of optimum moisture content. Foundations should not span residual soils and un-compacted fill, since fill that is not adequately compacted, can translate into significant differential settlement even with light loads and minimal total settlement (<15mm). Where this is unavoidable, the Engineer's design should accommodate total settlement as differential settlement. Compaction control is a prerequisite.

Cilliers & Meyer (2016) also made the following general recommendations:

e. The transported soils are not recommended as a general founding layer without some remedial action due to the soil's consistencies.
f. The pedogenic material are considered suitable for founding of single storey buildings, provided they are in the dense substrate, otherwise compaction of the foundation materials will be required.
g. It is recommended from the predicted settlement analysis that spread and/or strip footings be founded at a depth not less than 0.5m below surface, and that bearing pressures not exceed 75 kPa.
h. Footing bases should be compacted prior to constructing the foundations, where these footings are still in loose substrate.
i. As an approximate guide, footing excavations should be deepened by some 100mm for every additional 10kPa contemplated above 75kPa.
j. In the deep colluvial areas in the southern and southwestern portions of the site, pre-compaction of foundation excavations will be required, or stiffened soil rafts and/or reinforced structures.
k. Separate investigations will be required for heavier loads.
l. Deep service trenches within shallow hardpan ferricrete and sedimentary rock will require hard ripping and powerful excavators.
m. The transported, pedogenic and highly weathered sedimentary rock generally classify as G8 to G6 class pavement construction material, and are mainly suitable for sub-base, fill or selected layers.
n. The pebble marker (classified as G5 class construction material) is suitable for base and subbase layers.
o. It is recommended that the materials for the base course of the roads and concrete aggregate be imported for construction purposes.
p. Surface water should be collected and disposed of in well-designed storm water channels to minimize ingress, the wetting of foundation soils and to nullify future heaving of cohesive soils subjected to loadings.
q. Should the building foundations be positioned on/over the test pit excavation, the backfilled material must be properly compacted to prevent differential settlements.
r. The cover soils and weathered rock might be slightly aggressive to concrete or steel piping and the use of plastic pipes for waterborne services is required.
s. The excavation of terraces and road cuts, and the placement of

### 8.5.5 Soil management

engineered fills must be controlled with suitable field tests to ensure that the required densities are achieved during compaction, and that the quality of the fill material is within specification.

t. A competent person should inspect all foundation excavations at the time of construction to ensure that the materials are adequate for the proposed structures and that they are in accordance with the recommendations stated in this report.

### 8.5.6 Waste management

Impact management outcome:

1) *To ensure the proper storage, management and disposal of waste during the construction phase.*
2) *To reduce potential soil, surface water and groundwater pollution as a result of waste management activities during the construction phase.*

Mitigation and management measures:

**General/building waste**

a. Proper waste management measures must be implemented at the site.

b. No waste may be burnt, buried or dumped on site or the surrounding area.

c. Waste skips to be provided for placement of general waste, building rubble, etc.

d. Promote source separation through the provision of waste bins clearly marked for recycling and general waste. These bins should be emptied on a regular basis and disposed of accordingly (i.e. sent for recycling, taken to a licensed waste disposal site, etc.).

e. The applicant will have to ensure that the contractor removes the building rubble and any domestic waste to a licensed waste disposal site.

f. Waste and building rubble not to be placed on the soil stockpiles resulting in the contamination of the soil.

g. Building rubble must be disposed of at a site specifically earmarked for that purpose. No building rubble to be disposed of in a haphazard way in the area surrounding the development site.

h. During the construction phase, cement/concrete should be mixed in either demarcated areas or on metal sheeting or conveyor belts. If mixed in demarcated areas, these areas will have to be ripped and the cement/concrete removed on completion of construction activities.

i. Site workers must be instructed to collect windblown rubbish which may collect in the surrounding area on the said site. This will assist with the overall visual appearance of the site.

j. The applicant/contractor must ensure that all site workers receive appropriate training with regards to the overall waste management

**8.5.6 Waste management**

measures to be implemented for the said site.

k. Site workers must be aware of the importance of the implementation of the waste management measures.

l. Continually reduce resource waste by applying the waste hierarchy (i.e. waste avoidance, reduction, reuse, recycling and disposal).

**Hazardous waste management**

m. Proper bunded storage facilities must be provided for the storage of oils, grease, fuels, etc. to be used during the construction phase.

n. Collection containers (e.g. drip trays) must be placed under all dispensing mechanisms for hydrocarbons or hazardous liquid substances to ensure that potential contamination from leaks/spillage is reduced.

o. No hazardous substance is to be disposed of on site.

p. No bins containing organic solvents, paint tins or bins containing thinning agents may be cleaned on site, unless containers for liquid disposal are provided. The tins must be collected and rinsed at a central waste collection point, where it poses no threat to surface or ground water.

q. All spills of chemicals or hydrocarbons (oil, grease, diesel, petrol, etc.) should be cleaned with the use of suitable absorbent materials such as drizit or oclanzorb. Appropriate soil remediation measures should be implemented where soil has been contaminated with oil.

r. Contaminated soil generated as a result of fuel, oil, etc. spills to be disposed of in a specially marked drum located at the site office. An approved waste contracting firm to collect the drum and dispose of the contaminated soil at an appropriate waste disposal site.

s. Contaminated soil/fuel that cannot be removed to be treated in situ with an appropriate remedial agent. In this instance, the services of an expert may be required.

t. Waste oils collected on site should be stored in drums in a designated, bunded area and removed by an approved recycling contractor and disposed of at an appropriate licensed waste disposal facility.

u. In all instances where a firm is contracted to collect waste (e.g. Enviroserv, Wastetech, Oilkol, etc.), the site operator will ensure that the correct documentation is completed and filed for future reference.

v. Certificates of hazardous waste disposal (waybills) to be kept for auditing purposes.

w. Records of environmental related incidents should be maintained.

x. The applicant must ensure that all workers receive relevant training with regards to the handling of hazardous substances and the potential health risks thereof.

y. The contractor and/or applicant will be responsible for establishing an emergency procedure for dealing with spills.

### 8.5.6 Waste management

Impact management outcome:

3) *To reduce potential soil, surface water and groundwater pollution as a result of waste management activities during the operational phase.*

Mitigation and management measures:

a. The waste collection area must be kept clean and tidy at all times. This area should not be littered with waste lying outside of the waste bins/skips.
b. Rubbish bins for domestic waste to be provided in the kitchen and various other areas for use by the students and personnel. These rubbish bins to be emptied as soon as full and the contents disposed in metal skips located in a waste collection area.
c. The waste skips to be collected on a regular basis and the waste disposed of at a licensed waste disposal site.
d. Where possible, recycling of waste to be encouraged and appropriate bins provided for the recycling initiative.
e. A grease trap must be provided in the kitchen and cleaned on a regular basis.
f. Hazardous waste to be separated from general waste, stored separately in appropriate containers and disposed of at a licensed hazardous waste disposal facility or certified recycling facility. No hazardous substance to be disposed of on site.
g. Site workers to be instructed to collect windblown rubbish that may collect within the surrounding landscaped, paved or undeveloped areas on the said site. This will assist with the overall visual appearance of the site.
h. The principal to ensure that all personnel/students receive appropriate training with regards to the overall waste management measures to be implemented for the said site.
i. Personnel/students to be made aware of the importance of the implementation of the waste management measures.

### 8.5.7 Water management

Impact management outcome:

1) *To reduce the potential impact of storm water drainage from the site on the surrounding area in terms of soil erosion during the construction and operation of the school.*
2) *To avoid an impact on the seasonal seep wetland (located west of the site) and the drainage line/seep wetland (located north of the site) during the construction and operation of the school.*

Mitigation and management measures:

a. The soil management measures indicated in Section 8.5.5 must be implemented.

| **8.5.7 Water management** |
|---|
| b. The wetland boundaries and wetland buffers as identified by Venter (2016) must be clearly marked in the field with signs and/or highly visible flagging until construction-related activities are complete.<br>c. The wetlands located outside of the footprint area must be clearly demarcated as NO-GO AREAS. All contractors to be informed of these NO-GO AREAS through the environmental awareness programme and to be made aware of penalties (fines to be paid) to be imposed due to infringements.<br>d. No construction activities may take place within the seasonal seep wetland (west of the site), the drainage line/seep wetland (north of the site) or the associated wetland buffer zones.<br>e. The recommended wetland buffer zones (i.e. 50m for buildings and 35m for sports fields, parking areas and access route) must be adhered to during the construction and operational phases.<br>f. If possible, construction to take place during the dry season to prevent soil erosion.<br>g. Appropriate soil conservation and storm water management measures to be provided in order to prevent soil erosion and loss of topsoil.<br>h. Increased run-off during construction must be managed using berms and other suitable structures to ensure flow velocities are reduced.<br>i. The parking areas to be paved and sloped as per the approved storm water management plan.<br>j. Permeable surfaces should be used as far as possible and the total sealing of the surface must be avoided (Venter, 2016).<br>k. Storm water from the school site may not enter the adjacent drainage line and wetlands directly, but must be attenuated before exiting the storm water system. Storm water may not be concentrated into the seasonal seep or the drainage line/seep wetlands but must be spread over a wide area.<br>l. The storm water management measures must be inspected on a regular basis in order to ensure that the structures are functional (not blocked) and not resulting in ponding. This will be of particular importance at the start of the rainy season and during the rainy season.<br>m. The following additional measures should be implemented: debri and rubbish to be removed from kerb inlets and conduits during routine inspections; sediment to be removed especially after the first couple of months of installation as un-surfaced areas contribute a lot of sand/debri; stone pitching or gabion work to be repaired after major flooding; structural integrity of kerb inlets to be checked (damaged kerb inlets could lead to uncontrolled erosion downstream). |
| <u>Impact management outcome:</u><br><br>*3) To minimize the impact of the installation of the water pipeline on the surface water environment and wetland habitat at the drainage line/seep wetland crossing.* |
| |

### 8.5.7 Water management

Mitigation and management measures:

a. Alternative 3 (Figure 4.8) to be implemented with regards to the water pipeline route.
b. Since the water pipeline route extends across the drainage line/seep wetland, it is not possible to avoid the wetland unit altogether. However, all additional construction related activities (such as the construction site office (including material storage)) must be located 50m outside of the delineated wetland.
c. If possible, the water pipeline must be attached to the existing culvert to avoid excavations in the drainage line/seep wetland.
d. A water use licence in terms of the National Water Act, 1998 (Act 36 of 1998) to be obtained before any construction activities take place within the drainage line/wetland. A wetland rehabilitation plan to be included as part of the water use licence application.
e. The wetland boundaries and wetland buffers as identified by Venter (2016) must be clearly marked in the field with signs and/or highly visible flagging until construction-related activities are complete.
f. Only necessary construction activities (i.e. pipeline crossing) may take place in the wetland area and wetland buffer zone (i.e. within the 4m footprint area).
g. The wetlands located outside of the footprint area must be clearly demarcated as NO-GO AREAS. All contractors to be informed of these NO-GO AREAS through the environmental awareness programme and to be made aware of penalties (fines to be paid) to be imposed due to infringements.
h. Do not clear the vegetation outside of the 4m wide footprint area.
i. Limit excavation and modification of the drainage line/seep wetland to a minimum, this will improve success during rehabilitation.
j. Place excavated material well away from the drainage line/seep wetland to minimize erosion back into the wetland.
k. Increased run-off during construction/excavation must be managed using berms and other suitable structures as required to ensure flow velocities are reduced and to prevent soil erosion. This is of special importance at drainage line/seep wetland crossing.
l. Only the existing crossing to be utilized by construction vehicles.
m. Limit compaction by not working in wet conditions and limiting vehicular access.
n. Sediment barriers (e.g. geo-textile silt fences) should be installed immediately after initial disturbance. These silt fences should be installed along the bases of fills and cuts, on the downhill side of soil stockpiles, and along wetlands adjacent to cleared areas. They should be installed along a contour, and be entrenched and staked. They should extend the full width of the cleared area.
o. The sediment barriers to be maintained throughout the construction phase and until the area is rehabilitated.
p. Use sandbags for contour berms to limit erosion along the water pipeline route. The contour berms can be removed by hand as soon as vegetation cover is sufficient.

**8.5.7 Water management**

q. Stabilize and rehabilitate the disturbed area as soon as possible.
r. No water may be abstracted from the drainage line/seep wetland for construction activities.

Impact management outcome:

4) *To ensure that the construction and operational phases do not impact on the surface water run-off quality of the site and downstream area.*

Mitigation and management measures:

a. The soil management measures indicated in Section 8.5.5 must be implemented.
b. The waste management measures as indicated in Section 8.5.6 must be implemented during both the construction and operational phases.
c. Portable toilets should be located outside of wetland areas and the wetland buffer zones.
d. No construction vehicles should be serviced/repaired within the seasonal seep wetland (west of the site), the drainage line/seep wetland (north of the site) or the associated wetland buffer zones.
e. All equipment should be parked overnight at the construction site office and refuelled at least 100 meters from any wetland.
f. Drip trays (minimum of 10cm deep) must be placed under all vehicles and generators that stand for more than 24 hours. Vehicles suspected of leaking must not be left unattended, drip trays must be utilised.
g. Drip trays must be utilised during repairs and maintenance of all machinery. The depth of the drip tray must be determined considering the total amount / volume of oil in the vehicle. The drip tray must be able to contain the volume of oil in the vehicle.
h. A detailed storm water management plan to be drafted and implemented for the site and proposed access road.
i. Regular maintenance of the sewage infrastructure to reduce the potential for blockages and leaks and thus prevent potential water pollution.
j. A service provider should be appointed to undertake the maintenance of the sewage package plant.
k. Care should be taken not to add products to the sewage system that can be harmful to the biological processes of the sewage package plant. This could lead to the release of untreated water from the system.
l. Monthly monitoring of the sewage package plant effluent to be undertaken in order to ensure compliance with the requirements of the Department of Water and Sanitation.
m. Only the sports field located outside of the 50 m wetland buffer may be irrigated with effluent from the sewage package plant as recommended by Venter (2016).
n. Monthly inspection of areas irrigated with effluent from the sewage package plant to be undertaken in order to ensure that the soil

### 8.5.7 Water management

quality (e.g. waterlogging) is not being impacted.

o. If any soil or surface water contamination is noted, appropriate remediation measures must be implemented immediately. An environmental incident report must be completed indicating the date of the incident, description of incident and action taken. The Department of Agriculture, Rural Development, Land and Environmental Affairs and the Department of Water and Sanitation must be informed of the event within 24 hours. A copy of the environmental incident report must be kept on file at the site office.

### 8.5.8 Groundwater management measures

Impact management objective:

1) *To ensure that groundwater abstraction during both the construction and operational phases do not impact on the groundwater quantity of the site and surrounding areas.*

Mitigation and management measures:

a. According to Cilliers (2017), the boreholes can be equipped with windmills and will be capable of delivering the following:

| BH | Volume/day | Pumping Rate | Duration | Dynamic water level |
|---|---|---|---|---|
| **8** | 24.2 kl/day | 0.56 l/s | 12 hrs/day | 23.8 mbgl |
| **9** | 225 kl/day | 7 l/s | 9 hrs/day | 31.6 mbgl |
| **Total volume of water available per day: 249.2 kl/day** | | | | |

b. The recommendations of Cilliers (2017) in terms of sustainable groundwater abstraction, i.e. the boreholes may only be pumped for 9 hours per day and must be allowed to recover for the remainder of the day (15 hours), must be implemented and adhered to.

c. A monitoring facility must be installed to ensure that over abstraction does not take place.

d. The overflow from the water storage tanks to be routed back to the boreholes in order to recharge and prevent the water level from dropping below the critical drawdown of 36.1mbgl as recommended by Cilliers (2017).

### 8.5.8 Groundwater management measures

Impact management objective:

2) *To ensure that the groundwater quality does not impact on the personnel and students at the school.*

Mitigation and management measures:

a. Groundwater sampling and analysis to take place prior to human consumption as treatment might be required (e.g. BH9 is high in iron and turbidity levels exceed the threshold values in BH8) as indicated by Cilliers (2017).
b. Quarterly groundwater sampling and analysis to take place to ensure that the borehole water is fit for human consumption and meets the requirements of the Department of Water and Sanitation.

### 8.5.9 Interested and affected parties

Impact management outcome:

*1) To ensure that the site workers are not impacted in terms of the construction work being performed.*

Mitigation and management measures:

a. The applicant/contractors must ensure that the necessary protective gear (PPE) is worn at all times and that signs are erected to warn workers to use hearing protection as well as any other hazards.
b. The applicant/contractor must adhere (at all times) to the requirements of the Occupational Health and Safety Act, 1993 (Act 85 of 1993), the Construction Regulations, 2003 and any other applicable legislation.
c. If blasting is required, the requirements of the Explosives Act, 2003 (Act 15 of 2003) must be put in place in order to prevent any impact on site workers.
d. The waste management measures as indicated in Section 8.5.6 must be implemented during the construction phase in order to keep the site neat and tidy at all times.
e. All machinery used on site must be properly muffled and maintained so as to reduce noise generation to a minimum.
f. Dust suppression measures to be implemented to reduce the potential impact on site workers in terms of air quality.
g. All construction principles as indicated in this EMPr must be implemented.

### 8.5.9 Interested and affected parties

Impact management outcome:

2) *To ensure that the adjacent landowners and residents of Generaalsdraai Village are not impacted in terms of the construction work being performed.*

Mitigation and management measures:

a. Before construction, the school site must be fenced to prevent an impact on Transnet in terms of site workers wandering onto the railway line.
b. No members of the general public should be allowed at the construction site.
c. Residents of Generaalsdraai Village must be notified in advance that construction will commence along the water pipeline route and at the school.
d. Surrounding residents must be informed before blasting takes place and mitigation measures must be implemented to limit the impact of blasting on property, domestic animals and residents.
e. For safety purposes, excavations must not be undertaken until such time as all required materials are available and services can be laid.
f. Excavations should be closed as soon as is practically possible.
g. The excavations must be enclosed with danger tape to ensure that it is very visible during the day and night and to prevent domestic animals and residents from falling into the excavations.
h. The rights and conditions of Eskom with regards to their powerlines must be respected and adhered to at all times.
i. The waste management measures as indicated in Section 8.5.6 must be implemented during the construction phase in order to keep the site neat and tidy at all times.
j. All machinery used on site must be properly muffled and maintained so as to reduce noise generation to a minimum.
k. Contractors will be informed to keep to low speeds along the gravel roads to reduce the amount of dust.
l. Dust suppression measures must be implemented during dry and windy periods to prevent air-borne dust deposition on the remaining natural vegetation, adjacent properties and the wetlands.
m. Construction activities must be limited to daylight hours (7am - 6pm) and weekdays (Monday to Friday) in order to minimize the impact on Generaalsdraai Village in terms of noise and dust.
n. The footprint area of the construction activities along the water pipeline (i.e. 4m x 2km) must be demarcated and well marked to ensure that construction activities stay within the footprint area.
o. The adjacent landowners/users must be provided with contact numbers with whom complaints or concerns can be discussed.
p. All construction principles as indicated in this EMPr must be implemented.

### 8.5.9 Interested and affected parties

Impact management objective:

3) *To ensure that the potential impacts on personnel, students and adjacent landowners/users are minimized during the operational phase.*

Mitigation and management measures:

a. All construction and operational management principles as indicated in this EMPr must be implemented.
b. Layout Plan No 4 (Figure 4.5) to be implemented with regards to school buildings and infrastructure.
c. The services (i.e. water, sewage, electricity, access road, waste management) as indicated in Section 3.2 to be installed and implemented.
d. The access road as indicated in Figure 4.11 to be utilized to prevent an impact on SANRAL and Transnet.
e. The access road across the level crossing may not be utilized. Parents, teachers and bus drivers must be instructed by the principal not to utilize this road to access the site.
f. Sufficient fire extinguishers and fire hydrants must be provided as required by legislation.
g. The principal must ensure that the fire extinguishers are serviced on a regular basis and that the fire hydrants are operational.
h. All teachers must receive appropriate firefighting and emergency medical training.
i. An emergency assembly point should be identified on or near the site and clearly marked.

Impact management outcome:

4) *To ensure good relations with all interested and affected parties by creating open channels of communication to address matters of concern that may arise.*

Mitigation and management measures:

a. Communication between Morelig Combined School and the various interested and affected parties will be established and maintained.
b. In order to provide feedback with regards to complaints/concerns received, a complaints register will be kept at the site office during the construction phase.
c. The complaints register will record the following: Date when complaint/concern was received; Name of person to whom the complaint/concern was reported; Nature of the complaint/concern reported; the way in which the complaint/concern was addressed (date to be included).
d. Any complaints regarding the said project will be brought to the attention of the Department of Agriculture, Rural Development, Land and Environmental Affairs within 24 hours after receiving the complaint.

| 8.5.9 Interested and affected parties |
|---|
| e. The complaints register will be kept up to date for inspection by members of the Department of Agriculture, Rural Development, Land and Environmental Affairs. |

## 8.6 Implementation and monitoring of the EMPr

**Implementation and monitoring of the EMPr**

*An EMPr must include -*
*(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);*
*(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);*
*(i) an indication of the persons who will be responsible for the implementation of the impact management actions;*
*(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;*
*(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);*
*(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;*

The implementation of the Environmental Management Programme (EMPr) as part of the daily construction and operational activities is crucial and requires commitment from all levels of management and the site workers. The successful implementation of an EMPr has the following advantages:

- Meeting legal obligations;
- Contributes to environmental awareness of the staff;
- Can facilitate the prevention of environmental degradation;
- Can minimize impacts when they are unavoidable;
- Can ensure good environmental performance and improve community relations.

An approved contractor should be appointed to do the necessary construction on the said site. The contractor and site workers must be aware of their environmental responsibilities. Penalty clauses, in terms of the environment, must be built into the contracts and must be implemented. Monitoring of the environmental management programme must take place on a regular basis in order to ensure compliance.

The contractor must inform all site workers of their environmental responsibility during the construction phase. Measures to protect the environment and mitigation measures formulated in this EMPr must be implemented by the contractor and the site workers. The contractor must thus ensure that the site workers are aware of the Environmental Authorisation and this EMPr and understand the contents thereof.

In order to achieve the above-mentioned, the contractor and site workers should undergo basic environmental awareness training with regards to the

contents of this EMPr. Environmental awareness training is critical for the contractor and site workers to understand how they can play a role in achieving the objectives specified in the EMPr. The contractor must ensure that the site workers undergo the necessary environmental awareness training (see Section 8.9.1) before commencing with activities on the site.

This section must be completed on acceptance of the appointment.

| MANAGEMENT ACCOUNTABILITY | | |
|---|---|---|
| **Accountability** | **Title** | **Name** |
| | | |
| | | |

**MANAGEMENT DECLARATION**

I, the undersigned in my capacity as designated above hereby undertake to ensure that the conditions and recommendations in terms of the Environmental Authorisation and Environmental Management Plan (EMPr) are implemented and assume responsibility and accountability in this respect.

I further understand that officials from eMakhazeni Local Municipality, Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA), Department of Water and Sanitation (DWS) and Department of Education may (at any time) conduct an inspection of the development in order to ensure compliance with the conditions and recommendations in the EMPr.

**CONTRACTOR**

……
Name and Designation

……
Signature:

……

Date:

**EMPLOYER**

……
Name and Designation:

……
Signature:

……
Date:

### 8.6.1 Environmental Awareness Plan (EAP)

*An EMPr must include -*
*(m) An environmental awareness plan describing the manner in which-*
- *(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and*
- *(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment.*

It is recommended that the employees receive basic environmental awareness training. In order to ensure proper training, the applicant/site operator must develop and implement an Environmental Awareness Plan (EAP). This section provides an overview of what the proposed EAP will contain and how it will be implemented.

The following components would form an essential part of an Environmental Awareness Plan (EAP): -

- Identification of environmental impacts/risks and mitigation measures;
- Environmental training, awareness and competence;
- Environmental communication and reporting.

**Identification of environmental impacts / risks and mitigation measures**
Environmental impacts/risks in terms of the development are indicated in Section 7 of this document while mitigation measures to be implemented are provided in Section 8.

Activities or work procedures that could have a significant impact on the environment have thus been identified and mitigation measures proposed in order to avoid pollution or the degradation of the environment.

This information must be communicated to the employees/contractors/site workers and thus forms the basis for developing an Environmental Awareness Plan (EAP) in order to ensure effective environmental management.

**Environmental training, awareness and competence**
Training is necessary in order to advance the competency of employees in implementing the Environmental Policy and the EMPr and to ensure effective overall environmental management.

The applicant must inform the contractors/site workers of their environmental responsibilities in terms of this Environmental Management Programme (EMPr). Measures to protect the environment and mitigation measures formulated in this EMPr must thus be implemented by the applicant/site operator and contractors/site workers.

The applicant must ensure that the site workers undergo the necessary environmental awareness training before commencing with activities on the site. The applicant must thus ensure that the site workers are aware of the Environmental Authorisation and this EMPr and understand the contents thereof.

In addition, job specific training must be conducted that will be appropriate to the activity and the responsibility of the individuals. Ad-hoc training will be undertaken as required.

Through training/awareness, the applicant will also make the contractors/site workers aware of:

- the importance of conformance with the Environmental Policy and the requirements of the EMPr;
- the significant environmental impacts, actual or potential, of their work activities and the environmental benefits of improved personal performance;
- their roles and responsibilities in achieving conformance with the environmental policy and the requirements of the EMPr, including emergency preparedness and response requirements; and
- the potential consequences of departure from the specific operating procedures and/or mitigation measures specified in the EMPr.

Environmental training and development needs of contractors/site workers must be identified on a regular basis through:

- Identification of significant environmental impacts;
- Analysis of non-conformance and incident reports;
- Audit reports.

**Environmental communication and reporting**

Environmental communication and reporting form an integral part of an Environmental Awareness Plan. It is important to maintain effective communication internally and to ensure that external communication (e.g. with government departments or adjacent landowners) is maintained.

In general, environmental communication and reporting must aim to:

- Ensure that the relevant parties understand the Environmental Policy and objectives;
- Ensure that information is communicated and readily accessible to the relevant parties;
- Improve feedback of operational and environmental performance to management;
- Ensure effective and constructive communication with relevant government departments and adjacent landowners/users (if applicable);
- Ensure that records are kept of environmental communication and interaction.

The following are some of the topics that should be discussed:

- Cleaning of area and the importance thereof;
- Emergency procedures;
- Environmental awareness (e.g. water, fires, noise, dust, waste management, etc.).

The applicant must conduct regular inspections to check the onsite conditions and to provide training when necessary to ensure that the mitigation measures are being implemented and that the environment is carefully looked after.

### 8.6.2 Site documentation and record keeping

The following documentation must be available (at all times) at the site office:

- A copy of the Basic Assessment Report and Environmental Management Programme (EMPr);
- A copy of the Environmental Authorisation;
- A copy of the Environmental Policy;
- A copy of site audit reports;
- A copy of any other permits/approvals and/or service agreements from other authorities.

The documents should be kept as hard copies as well as in electronic format.

**Complaints Register**

A complaints register must be kept at the site office during both the construction and operational phases. Any complaints received with regards to the project must be recorded in the complaints register. The following information must be recorded:

- Date complaint recorded;
- Nature of complaint;
- Details of complainant (name, address, telephone number, etc.);
- Manner in which complaint was dealt with;
- Date when complaint was reported to the Department of Agriculture, Rural Development, Land and Environmental Affairs and the Department of Water and Sanitation.

**Emergency numbers**

Emergency numbers (e.g. police, fire department, ambulance, etc.) must be prominently displayed at the office.

Contact details of adjacent landowners/users must also be kept on file.

**Other legislation**

The following should also be displayed at the office:

- Occupational Health and Safety Act, 1993 (Act 85 of 1993) as amended;
- Basic Conditions of Employment Act, 1997;
- Summary of the Employment Equity Act.

The applicant must also ensure compliance to any other relevant legislation (including the byelaws of the eMakhazeni Local Municipality).

**Supplementary documentation**

The following supplementary documentation should also be kept at the site office:

- Site instructions;
- Emergency preparedness and response procedures;
- Incident reports;
- Training records;
- Site inspection, monitoring and auditing reports.

### 8.6.3 Auditing and corrective action

Environmental audits identify existing and potential environmental problems and determine what action is needed to comply with legal requirements and the Environmental Management Programme (EMPr). Subsequent audits then

confirm that corrective actions have been taken and assess the effectiveness of such actions.

Construction phase:
The applicant must appoint an Environmental Control Officer (ECO) who will have the responsibility of monitoring and reporting on compliance with the conditions of the Environmental Authorisation as well as monitoring and reporting on the implementation of the EMPr.

The ECO must be appointed before the commencement of construction and must remain employed until all rehabilitation measures as well as site clean-up are completed.

The ECO will be responsible to:

- Monitor and audit the construction activities on a weekly basis;
- Keep a record of each site inspection and the findings thereof;
- Make a register of the environmental monitoring and auditing results available for inspection at the construction site office;
- Keep records relating to the compliance and non-compliance with the conditions of the Environmental Authorization;
- Make these records available to the Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) within seven (7) working days of the date of the written request by the Department for such records.

A good approach to facilitate legal enforceability of the EMPr during the construction phase is to integrate the EMPr into the tender and contract document (i.e. between the project applicant and the contractors) as a set of environmental specifications. The contractor will thus be informed prior to being appointed of his environmental responsibilities.

Penalties in terms of the environment should be implemented upon non-compliance. This will ensure that the project applicant does not sit with an environmental liability at the end of the contract.

A post-construction audit should be conducted prior to the contractors leaving site.

There are several levels at which corrective action can be affected, namely verbal instructions, written instructions and contract notices.

Level 1: The problem is discussed with the contractor and a solution is worked out together. The discussion is minuted for record purposes and the solution implemented.

Level 2: When a more serious infringement is observed, the contractor is notified in writing and given a deadline by which the issue must be rectified. Costs to be borne by the contractor.

Level 3: The contractor will be ordered to suspend all or part of the work until such time as the problem is rectified or remedial measures put in place. Costs to be borne by the contractor and no extension of time will be granted.

Level 4: Breach of contract and/or termination of employment. The applicant may also institute legal proceedings against the contractor.

An example of a penalty schedule is provided below.

**PENALTY SCHEDULE**

| Level | Description | Penalty | Offences |
|---|---|---|---|
| 1 | Minor offence | R1000 first offence<br>R2000 second offence<br>And R1000/per day that offence continues beyond notification of offence | • Littering; inadequate or inappropriate on-site waste management or sanitation<br>• Uncontrolled noise and dust nuisance<br>Poaching on site<br>• Inadequate soil / water protection controls for fuel storage & dispensing areas, vehicle parking areas |
| 2 | Moderate offence | R5000 first offence<br>R10 000 second offence<br>And R5000 per day that the offence continues beyond notification of offence | • Trespassing onto neighbours properties<br>• Removal of indigenous trees marked for conservation purposes without the permission of the ECO, or trees in demarcated sensitive environmental zones<br>• Disposal of any form of waste to a non-approved dump site<br>• Any illegal /non-permitted abstraction or use of water from a natural resource<br>• The withholding of pertinent information or provision of false information to the ECO or Project Manager |
| 3 | Significant offence | R30 000 first offence<br>R50 000 second offence<br>And R30 000 per day that the offence continues beyond notification of offence | • Non-compliance with any risk or safety management requirements<br>• Significant spillage of hazardous materials<br>• Use of natural materials not sourced from a legally permitted source<br>• Construction or use of roads/access across rivers, streams or wetlands that has not been authorized by the Project Manager and ECO |
| 4 | Serious offence | Up to R500 000 or total cost of rehabilitating damaged environment | • Any serious pollution event or accident<br>• Any serious encroachment into demarcated sensitive environmental zones, by accident or on purpose<br>• Any serious stormwater damage that could have been avoided through appropriate management interventions |

In addition to the schedule of penalties, a portion of the Retention on all contracts could be apportioned to compliance with the EMPr.

Operational phase:
The Department of Education/Department of Public Works, Roads and Transport and Morelig Combined School Governing Body will be responsible for auditing and corrective action during the operational phase of the development.

# 9. ENVIRONMENTAL IMPACT STATEMENT

## 9.1 Introduction

Umsimbithi Mining (Pty) Ltd. intends to relocate Morelig Combined School to the Remainder of Generaalsdraai 429 JS, Wonderfontein (Figure 5.1). The site is located west of the Afgri Silos and is 4.8777 ha in extent.

As indicated in Section 3.3, Morelig Combined School needs to be relocated due to mining activities of Umsimbithi Mining (Pty) Ltd. In addition, the existing school is dilapidated and cannot cater for the number of students.

## 9.2 Alternatives investigated

Section 4 provides an overview of the various alternatives investigated in terms of this project.

**School site**
As indicated in Section 4.1, four (4) alternative sites (Figure 4.1) were investigated in terms of the relocation of the Morelig Combined School.

Option 2 (an 8 ha site located west of the Afgri Silos) was found to be the most preferable in view of the following:

- The existing Morelig Combined School is located only 5.8 km south west of the site. The proposed site is therefore located in the same general vicinity as the existing school.
- The majority of students are transported to school by bus from Belfast and farms in the area. The proposed site is therefore desirable due to the close proximity to major traffic routes (e.g. N4 national road) within the rural area.
- Access to the site can be obtained from an existing gravel road that connects to Wonderfontein and the D685 provincial road. This access road does not cross the Transnet railway line.
- Direct access from the N4 national road would not be required since an existing access road is available.
- The site is located adjacent to Generaalsdraai Village providing easy access to school facilities for the residents.
- Students from the Generaalsdraai Village would not have to cross the Transnet railway line to get to school.
- The site is large enough for the establishment of a school and associated infrastructure.
- The property owner (W.J. Prinsloo) has agreed to sell the proposed site to the applicant.
- The topography of the site is suitable for a school. It is relatively flat, which will minimize the need for earthworks.
- The site is not affected by the 1:100 year floodline. There is thus no flood risk to the proposed school.
- No impact on natural vegetation since the said site comprises planted pastures.
- Only a few Wattle Tree stumps are present in the centre of the site, which should not have serious cost implications in terms of construction.

- Easy access to electricity as existing Eskom powerlines are located near the site and supplies Generaalsdraai Village.
- Sufficient capacity of nearby boreholes to cater for the required water demand.

**School layout**
Four (4) alternative layout plans were drafted for the proposed new school site as indicated in Section 4.2.

Layout Plan No 4 (Figure 4.5) was indicated as the preferred option as it ensures optimal usage of the site while adhering to the recommended wetland buffer zones (i.e. 50m for buildings and 35m for sports fields, parking areas and access route) and addressing issues raised by the Morelig Combined School Governing Body and the Department of Education.

**Provision of services**
The proposed school site is located within a rural agricultural area that is not serviced by the Emakhazeni Local Municipality. Water, electricity, waste removal, etc. must therefore be provided. Various alternatives in terms of service provision were investigated as indicated in Section 4.3 to 4.7.

Groundwater will be utilized to supply the school with potable water. The groundwater will be abstracted from two (2) new boreholes (BH8 and BH9) located north west of the site. These boreholes will be fitted with windmills. According to Cilliers (2017), the two boreholes will be able to provide sufficient water to the proposed school. The water will be pumped via a bulk water pipeline to a high level water reservoir in Generaalsdraai Village, from where it will gravitate to storage tanks located within the proposed school site.

Due to the remoteness of the site and the number of students, the use of conservancy tanks was not recommended as the regular emptying of the conservancy tanks could be problematic and costly. A Biological Sewage Treatment Plant will thus be provided in the north western corner of the site adjacent to the access road.

Electricity will be obtained from existing Eskom powerlines located on the western boundary of the site that currently supply the nearby Generaalsdraai Village.

Arrangements for the collection and disposal of waste at the licensed Belfast Waste Disposal Site or another licenced waste disposal site will have to be made by the school.

An existing access road that extends from Wonderfontein along the Transnet railway line to the site will be utilized. As indicated, this gravel road will be upgraded to accommodate the school busses. SANRAL and Transnet could be impacted should the alternative access road from the N4 national road across the railway line be utilized. Parents, teachers and bus drivers will need to be instructed not to utilize this road in order to gain access to the school.

## 9.3 Potential impacts identified

The environmental features of the site and surrounding area are described in Section 5 of this report. Potential impacts on the environment (both positive and negative) that are expected to take place are detailed in Section 7.

The proposed school site is zoned for agricultural purposes and currently used for the cultivation of planted pastures. No infrastructure (e.g. buildings, boreholes, powerlines, access roads, etc.) or servitudes are present on the school site.

The development of the school will result in the site no longer being available for agricultural purposes. However, only a small portion of the overall farm (i.e. 4.8 ha of 486 ha) will be impacted. As indicated in Section 3.1.1, the proposed school site will be subdivided from the overall property and rezoned (Institutional). It should be noted that the rezoning of the proposed school site has already been approved by the Nkangala District Municipality.

A new land use namely 'education' will be created on the said property, which would have a positive impact in terms of the social environment. The proposed school will be convenient for residents at Generaalsdraai Village, Wonderfontein and surrounding farm villages. Job opportunities will be created and the existing students and teachers will be able to work and study in a safer, cleaner and more modern facility. In addition, the proposed school will serve as an ancillary use to the proposed residential and public service land uses intended for Wonderfontein as per the eMakhazeni Local Municipality SDF.

A section of the proposed water pipeline route will extend across a grassland area currently used for grazing purposes by the Generaalsdraai Village residents. The majority of the pipeline will however, be located adjacent to an existing gravel road. During construction, the excavation activities could temporarily impact on the availability of grazing north of Generaalsdraai Village. Residents of Generaalsdraai Village and cattle could also be impacted upon in terms of safety if the trench is not properly demarcated during construction and rehabilitated/closed afterwards.

From a topographical point of view, the proposed site is suitable for development purposes as the site is relatively flat with a gentle slope in a north westerly direction. The proposed site is also suitable from a geotechnical point of view provided that the mitigation measures as indicated by Cilliers and Meyer (2016) and included in Section 8 are implemented. It should be noted that the geotechnical investigation did not identify seepage and/or a perched water table on site.

The proposed school site currently comprises planted pastures, with remains of alien trees in the centre of the site. The vegetation on the school site has thus been significantly altered. No Eastern Highveld Grassland and associated natural animal habitats will thus be impacted upon.

The majority of the water pipeline will be located within the road reserve of the gravel road (located on the boundary of Generaalsdraai Village) that consists mostly of weedy vegetation. To the north of Generaalsdraai Village, a section of the pipeline (approximately 800m x 4m) will however, extend across disturbed natural grassland vegetation, which would be removed as

part of the excavation activities. Once installed, the trench will be closed and the area rehabilitated/revegetated.

No surface water environments (e.g. rivers, streams, wetlands, etc.) are present on the proposed school site. The construction and operational activities of the school will therefore have no direct impact on any surface water environments.

Venter (2016) identified two wetlands adjacent to the school site, namely a seasonal seep located on the western boundary and a drainage line/seep located on the northern boundary (Figure 5.16). The Present Ecological State (PES) of the seasonal seep wetland is Class C (moderately modified) and that of the drainage line/seep wetland a Class D (largely modified). The Ecological Importance and Sensitivity of both these wetlands is Low. According to Venter (2016), all wetland areas are considered to be sensitive and of conservation importance, even if they have been disturbed.

As per the recommendations of Venter (2016), the buildings will be located outside of the 50 m wetland buffer, while the parking areas and access route will be located outside of the 35 m wetland buffer. It should be noted that the sports field is also located outside of the 50 m wetland buffer. The construction and operation of the school will thus not have a direct impact on the wetlands.

However, both the seasonal seep and drainage line/seep wetlands could indirectly be impacted upon by the construction and operational activities of the school if mitigation measures as indicated in Section 8 are not implemented. Of particular importance is the implementation of a detailed storm water management plan in order to reduce the potential impact on the downstream surface water environments in terms of increased runoff, sedimentation, etc.

Soil, surface water and groundwater pollution could also take place if the sewage package plant and sewer infrastructure are not properly installed, does not have sufficient capacity, is not operated correctly and maintained resulting in leaks, overflows and polluted effluent being released. Regular maintenance of the sewage infrastructure will be very important to reduce the potential for blockages and leaks and thus prevent potential water pollution.

In terms of irrigation, only the sports field located outside of the 50m wetland buffer may be irrigated with effluent from the sewage package plant as recommended by Venter (2016). The continual irrigation of a particular area (e.g. one sports field) with effluent from the sewage package plant could not only impact on the soil and surface water quality but could also result in waterlogged conditions and the establishment of wetland plant species on site. The mitigation measures indicated in Section 8.5 will have to be implemented.

A small section of the water pipeline will extend across the drainage line/seep wetland and within the 50 m wetland buffer zone (Figure 4.8). No alternative in this regard is available since the drainage line/seep wetland is located between the school and the boreholes (BH8 and BH9). In order to minimize the potential impact on the wetland, it was decided to cross the wetland at an existing culvert and to install the water pipeline adjacent to an existing gravel

road as far as possible. The construction activities could still have a direct impact on the drainage line/seep wetland should the construction activities extend beyond the culvert and gravel road boundaries and/or a trench is excavated through the wetland. Mitigation measures as indicated in Section 8 must therefore be implemented in order to reduce this potential impact.

Cilliers & Meyer (2017) did not encounter a seasonal perched water table, sub-surface or surface seepage on site. It is therefore not anticipated that the general construction activities (foundations, trenches, excavation for sewage package plant) would impact on the groundwater of the site.

As already indicated, groundwater (boreholes) will be utilized to supply the school with potable water. According to Cilliers (2017), the boreholes can be equipped with windmills and will be capable of delivering the following:

| BH | Volume/day | Pumping Rate | Duration | Dynamic water level |
|---|---|---|---|---|
| **8** | 24.2 kl/day | 0.56 l/s | 12 hrs/day | 23.8 mbgl |
| **9** | 225 kl/day | 7 l/s | 9 hrs/day | 31.6 mbgl |
| **Total volume of water available per day: 249.2 kl/day** | | | | |

As indicated in Section 3.2.1, the estimated Daily Water Demand for the school is 20 000 l/day (based on 1000 learners using 20l each). Since BH8 and BH9 can deliver 249.2 kl/day, more than enough water is available for the school.

According to Cilliers (2017), the boreholes should never be over pumped, either initially or at any other stage as this could seriously damage the boreholes, the aquifer and negatively impact on any future abstraction. The maximum abstraction duration from the boreholes is regarded as the 9 hours per day pumping cycle with 15 hours allowed for recovery.

During the operational phase, the abstraction of groundwater from the two boreholes (BH8 and BH9) for the school will not significantly impact on the surrounding boreholes (BH2, BH3, BH5 and BH-Afgri; Figure 5.17) if pumped at a sustainable rate (Cilliers, 2017). However, the aquifer and boreholes (BH8 and BH9) could be negatively impacted should the boreholes be over pumped. This would impact on water provision to the school. Mitigation measures as indicated in Section 8 would have to be implemented.

In order to prevent the water level from dropping below the critical drawdown depth of 36.1 mbgl, Cilliers (2017) recommended that the overflow from the storage be routed back to the borehole (i.e. to recharge).

In terms of water quality, Cilliers (2017) indicated that the water quality classification is acceptable in terms of human consumption. However, turbidity levels exceed the threshold values in BH8 and iron levels exceed the operational limits in BH9. The water quality could therefore impact on the personnel and students should the water not be treated prior to human consumption as recommended by Cilliers (2017). Also of importance is regular sampling and analysis of the water to prevent any potential outbreak of waterborne diseases.

In terms of sites of archaeological and/or cultural interest, Van Vollenhoven (2016) indicated that no sites of cultural heritage significance are present within the proposed school site or along the water pipeline route. In terms of

Palaeontological Sensitivity, Fourie (2016) indicated no objection and that the development may go ahead. Mitigation measures included in Section 8 must however be implemented during the construction phase.

## 9.4 Public participation

The public participation process followed is described in Section 6 of this report.

No objections to the proposed school were received. The School Principal indicated that the parents agreed to the relocation of the school without any objections. It was however, requested that proper facilities should be provided at the new school e.g. a laboratory, hall, water, flush toilets, sports ground, etc.

The development of the proposed school will directly impact on land currently registered to WJ Prinsloo. Umsimbithi Mining (Pty) Ltd. intends to purchase the portion of the property on which the school will be located from the landowner. A copy of the Deeds Office Property Report and a letter from the property owner giving permission for the proposed activity are provided in Appendix 1.

The proposed water pipeline will be located on property registered to Umsimbithi Mining (Pty) Ltd., who is also the applicant. No outside parties will thus be directly affected in terms of the installation of boreholes and water pipelines.

Comments were received from the following government departments, stakeholders and interested and affected parties:

- Department of Agriculture, Forestry and Fisheries (F. Mashabela);
- Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) - Directorate: Land Use and Soil Management – Ermelo (J. Venter);
- Department of Rural Development and Land Reform (Commission on Restitution of Land Rights);
- South African Heritage Resources Agency (SAHRA);
- Morelig Combined School Principal (S. Maseko);
- Chairman of Morelig Combined School Board (S. Sibanyoni);
- Councilor T Ngomane;
- Economic Freedom Fighters Emakhazeni (G Tshabangu);
- Aledlox Prop (Pty) Ltd. (E Kock)

Issues of concern received through this public participation process and the way in which these issues were addressed are detailed in Section 6.

According to Urban Dynamics (2016a), the need for a new school as well as the proposed location and design of the school have already been discussed with the Department of Public Works, Roads and Transport and the Department of Education.

The proposed project would have a positive impact in terms of the social environment. The existing Morelig Combined School currently caters for 778 students. The proposed school will be able to cater for 1000 students. An additional 222 students could thus be accommodated.

Job opportunities will be created and the existing students and teachers will be able to work and study in a safer, cleaner and more modern facility. In addition, the proposed school will be convenient for residents at Generaalsdraai Village, Wonderfontein and surrounding farm villages.

The mining company indicated that they will construct the new school and upon completion, donate the land and school to the Department of Public Works, Roads and Transport or the Department of Education.

## 9.5 Conclusion and recommendation.

Based on the findings of this Basic Assessment Report, it is felt that the proposed project could be approved subject to the implementation of the mitigation measures proposed in the Environmental Management Programme (EMPr) provided in Section 8 of this report.

Regular monitoring and auditing of the activities should take place during both the construction and operational phases to ensure that the mitigation measures are implemented. The school must be managed in such a way that it is environmentally sustainable, acceptable to the community and complies with the objectives of the National Environmental Management Act, 1998 (Act 107 of 1998).

In view of the findings of this Basic Assessment, the following listed activities can be approved:

| Listing | Activity |
|---|---|
| Listing Notice 1 (GN R327 of 7 April 2017; previously GN R983 of 4 December 2014)<br><br>Listed Activity 12: | The development of (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or **(ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a water course;-** excluding (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared. |
| Listing Notice 1 (GN R327 of 7 April 2017; previously GN R983 of 4 December 2014)<br><br>Listed Activity 19: | The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock **of more than 10 cubic metres from a watercourse** but excluding where such infilling, depositing, dredging, excavation, removal or moving – (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan (c) falls within ambit of activity 21 in this Notice, in which case that activity applies; (d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies. |
| Listing Notice 1 (GN R327 of 7 April 2017; previously GN R983 of 4 December 2014) | Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 1 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. |

| Listing | Activity |
|---|---|
| Listed Activity 28: | |
| Listing Notice 3 (GN R324 of 7 April 2017; previously GN R985 of 4 December 2014)<br><br>Listed Activity 14: | The development of (i) dams or weirs, where the dam or weir including infrastructure and water surface area exceeds 10 square metres or (ii) **infrastructure or structures with a physical footprint of 10 square metres or more;** where such development occurs - (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.<br>In Mpumalanga - (i) Outside urban areas in (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. |

The following conditions should be included in the Environmental Authorisation:

- *Before construction, approval must also be obtained from:*
  - *Department of Agriculture, Rural Development, Land and Environmental Affairs - subdivision of agricultural land;*
  - *eMakhazeni Local Municipality – rezoning of the site;*
  - *Eskom - provision of electricity.*
- *Water use license in terms of the National Water Act, 1998 (Act 36 of 1998) to be obtained with regards to the following:*
  - *Groundwater abstraction (Section 21(a));*
  - *Proposed school and water pipeline to be located within 500m from wetlands (Section 21(c) and (i)).*
  - *Discharge of effluent and irrigation of treated wastewater from the sewage package plant (Section 21(g)).*
- *The management and monitoring measures as indicated in Section 8 (EMPr) of the Basic Assessment Report must be implemented.*

# 10. EVALUATION OF BASIC ASSESSMENT REPORT

## 10.1 Availability of Basic Assessment Report

The Draft Basic Assessment Report (dated: April 2018) will be submitted to the Department of Agriculture, Rural Development, Land and Environmental Affairs for evaluation purposes. A hard copy of the document will also be forwarded to the following authorities for evaluation (30-day period):

- Department of Water and Sanitation;
- eMakhazeni Local Municipality;
- Mpumalanga Tourism and Parks Agency.

A hard copy and electronic copy of the Draft Basic Assessment Report will be made available during the above-mentioned period to the interested and affected parties and stakeholders consulted and/or registered as part of the Basic Assessment Process (refer to Section 10.2).

The various departments, stakeholders and interested and affected parties will be requested to forward any comments on the report to the consultant within the 30-day period provided. A register will be kept of all comments received in terms of the evaluation of the report.

A hard copy of the Draft Basic Assessment Report (dated: April 2018) will be made available at the Wonderfontein Thusong Service Centre and at the existing Morelig Combined School for evaluation purposes. An electronic version will also be made available on the company website (www.adienvironmental.co.za) and on compact disc (cd) (on request).

The Final Basic Assessment Report (incorporating comments from I&APs) will be submitted to the Department of Agriculture, Rural Development, Land and Environmental Affairs for final decision making.

## 10.2 Informing Interested and Affected Parties

The following interested and affected parties and stakeholders will be notified by means of facsimile, email, etc. of the availability of the reports for evaluation:

| **INTERESTED AND AFFECTED PARTY LIST** | |
|---|---|
| **Organisation** | **Name** |
| **Government Departments** | |
| Department of Agriculture, Forestry and Fisheries | F Mashabela |
| Department of Agriculture, Rural Development, Land and Environmental Affairs - Directorate: Land Use and Soil Management – Ermelo | J Venter |
| Department of Co-Operative Governance and Traditional Affairs | M Loock |
| Department of Education | MS Mnguni |
| Department of Mineral Resources | S Mathavela |
| Department of Rural Development and Land Reform | F Mdushani |

| INTERESTED AND AFFECTED PARTY LIST | |
|---|---|
| Department of Water and Sanitation | P Munyai |
| Department of Agriculture, Rural Development, Land and Environmental Affairs | D Tswai |
| **Other Organisations** | |
| Eskom Distribution | T Ludere |
| Eskom Transmission | L Motsisi |
| Mpumalanga Tourism and Parks Agency (MTPA) | K Narasoo |
| South African Heritage Resources Agency (SAHRA) | N Khumalo |
| South African National Roads Agency (SANRAL) | V Bota |
| Trans African Concessions (TRAC) | R Nkosi, C Davis |
| Transvaalse Landbou Unie | D du Plessis |
| **Local Municipality and Municipal Councillor** | |
| Emakhazeni Local Municipality | N Singh, M Mtshweni, M Kambula, A Mahlangu |
| Wonderfontein Thusong Service Centre (Emakhazeni Local Municipality) | J Nkalane |
| Nkangala District Municipality | S Links, A Thwala |
| Ward councillor | T Ngomane |
| **Surrounding Landowners** | |
| **Property (Figure 6.2)** | **Landowner/Contact person** |
| Generaalsdraai community | B Mbonani (community liaison) |
| **Generaalsdraai 429 JS** | |
| Remainder (G1) | WJ Prinsloo |
| **Generaalsdraai 423 JS** | |
| 3, 15, 16 (GD1) | Umsimbithi Mining (Pty) Ltd (E Nel) |
| 8, 14 (GD2) | Johan Steele Familie Trust (J Steele) |
| 13 (GD3) | WJ Prinsloo |
| 9, 11 (GD4) | PM Britz |
| **Wonderfontein 428 JS** | |
| RE (W12) | Johan Steele Familie Trust (J Steele) |
| 1 (W9) | Wonderfontein Mill (Pty) Ltd. (C Greyn) |
| 3 (W5) | AC van Vreden (D van Wyk) |
| 4, 8 (W4) | Wonderfontein Boerevereneging (G Janse van Rensburg) |
| 9, 27, 28, 29 (W6) | Transnet (T Mavulwana) |
| 16, 45, 47 (W7) | Emakhazeni Local Municipality (N Singh) |
| 18 (W8) | Aledlox Prop (Pty) Ltd (E Kock, F Barnard) |
| 20 (W1) | Corlouis Boerdery (Pty) Ltd (L Bezuidenhout) |

| INTERESTED AND AFFECTED PARTY LIST | |
|---|---|
| 24 (W10) | Real Time Inv 515 cc (N Ryan) |
| 23, 39, 40, 41, 44 (W11) | South African National Roads Agency (V Bota) |
| 30 (W2) | Afgri Operations Ltd (C van Staden) |
| 32 (W3) | National Government of RSA (G Masuku - Department of Public Works, Roads and Transport) |
| **OTK 419 JS** | |
| RE (O1) | Bio-Minerale Bemarking (Pty) Ltd (P Britz) |
| **Leeuwbank 417 JS** | |
| 17 | Johan Steele Familie Trust (J Steele) |
| **Other** | |
| Registered as I&AP | Giyani Enterprises (registered as I&AP) |
| Registered as I&AP | D Wessels - Leads to Business (registered as I&AP) |
| Prospecting application | EXM Advisory Services o.b.o. Doornkop Plats (Pty) Ltd. (K Fairley/S Seton-Rogers) |
| Morelig Combined School<br>(Principal/Governing Body) | A Mmalihu<br>BD Mkhatshwa/PW Mthombeni/K Mahlangu/S Sibanyoni |
| Parent | K Mahlangu |
| Economic Freedom Fighters | G Tshabangu |

### 10.3 Comments received

This section will be completed after the completion of the above-mentioned evaluation period.

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- **National Water Act, 1998 (Act No 36 of 1998).** Republic of South Africa, Cape Town.

- **South African Heritage Resources Information System (SAHRIS).** 2015. [www.sahra.org.za/sahris].

- Strydom & Malan. 2016. **Development of the Proposed New Morelig School: Design Report.** Report compiled by Strydom & Malan Consulting Engineers. Report dated: 5 December 2016. Report reference: 134/00/J01/out.

- Urban Dynamics. 2016a. **Motivating Memorandum in Support of an Application for the Rezoning of a Portion of the Remainder of the Farm Generaalsdraai 429 JS (Amendment Scheme B0057).** Prepared by: Urban Dynamics Mpumalanga (Pty) Ltd. Report dated: 1 December 2016.

- Urban Dynamics. 2016b. **Amended Motivating Memorandum in Support of an Application for the Subdivision of the Remainder of the Farm Generaalsdraai 429 JS.** Prepared by: Urban Dynamics Mpumalanga (Pty) Ltd. Report dated: 13 December 2016.

- Uthingo Environmental Services. 2016. **Technical Report for a Proposed Waste Water Treatment Plant.** Report compiled by: Uthingo Environmental Services.

- Van Vollenhoven, A.C. 2017. **A report on a Cultural Heritage Impact Assessment for the Construction of a School and Associated Water Pipeline on the Remainder of the Farm Generaalsdraai 429 JS and the Remainder of Portion 16 of Generaalsdraai 423 JS, Wonderfontein, Mpumalanga Province.** Report prepared by: Archaetnos Culture and Cultural Resource Consultants. Report dated: 17 March 2017. Report number: AE01706V.

- Venter, I. 2016. **Wetland Assessment for the Proposed School on a Portion of the Remainder of the Farm Generaalsdraai 429 JS.** Report prepared by: Kyllinga Consulting.

# APPENDIX 1:

# APPLICATION FORM

- Cover letter (dated: 24 April 2018; Ref: BA 2017/01) from AdiEnvironmental cc to the Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) regarding submission of application form.
- Copy of the application form.

# APPENDIX 2:

# CURRICULUM VITAE

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

# APPENDIX 3:

# TOWNPLANNING MEMORANDUM

- Urban Dynamics. 2016a. **Motivating Memorandum in Support of an Application for the Rezoning of a Portion of the Remainder of the Farm Generaalsdraai 429 JS (Amendment Scheme B0057).** Prepared by: Urban Dynamics Mpumalanga (Pty) Ltd. Report dated: 1 December 2016.
- Urban Dynamics. 2016b. **Amended Motivating Memorandum in Support of an Application for the Subdivision of the Remainder of the Farm Generaalsdraai 429 JS.** Prepared by: Urban Dynamics Mpumalanga (Pty) Ltd. Report dated: 13 December 2016.
- Letter from Urban Dynamics Mpumalanga (Pty) Ltd (dated: 13 December 2016; Ref: LH/MID357/mdb) to Department of Agriculture, Forestry and Fisheries regarding the subdivision.
- Letter from Nkangala District Municipality (dated: 19 June 2017) to Urban Dynamics regarding the rezoning application.
- Letter from the South African National Roads Agency (dated: 22 December 2014) to WSP SA Civil and Structural Engineers.

# APPENDIX 4:

# SERVICES REPORT

- Strydom & Malan. 2016. **Development of the Proposed New Morelig School: Design Report.** Report compiled by Strydom & Malan Consulting Engineers. Report dated: 5 December 2016. Report reference: 134/00/J01/out.
- LTZ Consulting. 2016. **Morelig School - Electrical Services Report Rev. B.** Report compiled by: Marius Stolz. Report dated: 7 December 2016.
- Uthingo Environmental Services. 2016. **Technical Report for a Proposed Waste Water Treatment Plant.** Report compiled by: Uthingo Environmental Services.

# APPENDIX 5:

# GEOTECHNICAL STUDY

- Cilliers, B and M. Meyer. 2016. **Phase 1 Engineering Geological Investigation for Morelig School, Generaalsdraai No.429-JS Wonderfontein, Mpumalanga.** Report compiled by: Engeolab. Report dated: October 2016. Report number: LL2716. Volume 1 and Volume 2.

# APPENDIX 6:

# WETLAND ASSESSMENT

- Venter, I. 2016. **Wetland Assessment for the Proposed School on a Portion of the Remainder of the Farm Generaalsdraai 429 JS.** Report prepared by: Kyllinga Consulting.

# APPENDIX 7:

# GEOHYDROLOGICAL STUDY

- Cilliers, B. 2017. **Geohydrological Investigation Completion Report: Morelig School, Generaalsdraai - Wonderfontein, Mpumalanga.** Report prepared by Engeolab. Report dated: 22 October 2017. Report number: 17-LL2896.

# APPENDIX 8

# HERITAGE IMPACT ASSESSMENT

- Van Vollenhoven, A.C. 2017. **A report on a Cultural Heritage Impact Assessment for the Construction of a School and Associated Water Pipeline on the Remainder of the Farm Generaalsdraai 429 JS and the Remainder of Portion 16 of Generaalsdraai 423 JS, Wonderfontein, Mpumalanga Province.** Report prepared by: Archaetnos Culture and Cultural Resource Consultants. Report dated: 17 March 2017. Report number: AE01706V.

# APPENDIX 9:

# PALAEONTOLOGICAL IMPACT ASSESSMENT

- Fourie, H. 2017. **The Construction of a School and Associated Water Pipeline, Emakhazeni Local Municipality, Mpumalanga Province. Farm: Remainder of Generaalsdraai 429 JS and the Remainder of Portion 16 of Generaalsdraai 423 JS. Palaeontological Impact Assessment: Phase 1 Field Study.** Report compiled by: Dr. H. Fourie. Report dated: 5 April 2017.

# APPENDIX 10

# ADVERTISING OF THE PROJECT

- A copy of the advertisement published in the Middelburg Observer, 10 February 2017.
- A copy of the on-site notice (English and Zulu).
- Printout of company website page www.adienvironmental.co.za – Document Downloads.
- E-mail (dated: 13 February 2017) from Giyani Enterprises.
- E-mail (dated: 16 March 2017) from D. Wessels (Leads to Business).

# APPENDIX 11:

# BACKGROUND INFORMATION DOCUMENT

# APPENDIX 12:

# CORRESPONDENCE WITH THE AUTHORITIES AND INTERESTED AND AFFECTED PARTIES

- E-mail from AdiEnvironmental cc (dated: 14 February 2017) to:

| LANDOWNER/USER |
|---|
| Wonderfontein Mill (Pty) Ltd - C Greyn |
| D van Wyk |
| Aledlox Prop (Pty) Ltd - E Kock |
| Wonderfontein Boerevereneging - G Janse van Rensburg |
| Johan Steele Familie Trust - J Steele |
| National Government of RSA - G Masuku |
| Transnet - T Mavulwana |
| Real Time Inv 515 cc - N Ryan |
| PM Britz |
| TWK Agriculture Ltd. |
| WJ Prinsloo |

- Completed comment sheet (dated: 14 February 2017) from WJ Prinsloo.
- E-mails from AdiEnvironmental cc (AdiEnv) (dated: 1 March and 7 March 2017) to B Mbonani (Generaalsdraai Village community liaison).
- E-mail from B Mbonani (dated: 7 March 2017) to AdiEnv.
- E-mail from AdiEnv (dated: 21 February 2017) to B. Mkhatshwa (Morelig Combined School).
- E-mail from AdiEnv (dated: 21 February 2017) to P. Mthombeni (Morelig Combined School).
- Minutes of Morelig Combined School parents meeting (dated: 16 October 2016).
- Completed comment sheet (dated: 10 March 2017) from S. Maseko (Morelig Combined School Principal).
- E-mails from AdiEnv (dated: 20 and 24 October 2017) to Morelig Combined School.
- E-mail from AdiEnv (dated: 14 February 2017) to:

| AUTHORITY/STAKEHOLDER | CONTACT PERSON |
|---|---|
| Department of Agriculture, Forestry and Fisheries | Mashabela, F |
| Department of Agriculture, Rural Development, Land and Environmental Affairs - Directorate: Land Use and Soil Management – Ermelo | Venter, J |
| Department of Co-Operative Governance and Traditional Affairs | Loock, M |
| Department of Education | Morena, KR |
| Department of Mineral Resources | Mathavhela, S |
| Department of Rural Development and Land Reform | Nkambule, N |
| Department of Water and Sanitation | Munyai, P |
| Emakhazeni Local Municipality | N Singh, M Mtshweni, |
| Eskom Distribution | Ludere, T |
| Eskom Transmission | Motsisi, L |
| Mpumalanga Tourism and Parks Agency | Narasoo, K |
| Nkangala District Municipality | Links, S; Thwala, S |
| South African National Roads Agency (SANRAL) | Bota, V |
| | |

| AUTHORITY/STAKEHOLDER | CONTACT PERSON |
|---|---|
| Thusong Service Centre - Emakhazeni Local Municipality | Nkalane, J |
| Trans African Concessions | Nkosi, R; Davis, C |
| Transvaalse Landbou Unie | Du Plessis, D |

- E-mail from AdiEnv (dated: 21 February 2017) to Department of Education (M. Mnguni).
- E-mail from AdiEnv (dated: 14 February 2017) to Department of Rural Development and Land Reform (N. Nkambule).
- E-mail from AdiEnv (dated: 21 February 2017) to Emakhazeni Local Municipality (M. Kambula).
- Webpage printout (dated: 14 February 2017): South African Heritage Resources Information System (SAHRIS).
- Completed comment sheet (dated: 2 March 2017) from the Department of Agriculture, Forestry and Fisheries (F. Mashabela).
- Completed comment sheet (dated: 27 March 2017) from Department of Agriculture, Rural Development, Land and Environmental Affairs - Directorate: Land Use and Soil Management – Ermelo (J. Venter).
- Letter from the Commission on Restitution of Land Rights (dated: 13 February 2017; Ref: 5086) to AdiEnv.
- Letter from the South African Heritage Resources Agency (dated: 14 March 2017; Ref: 10681) to Umsimbithi Mining (Pty) Ltd.
- Webpage printout (dated: 19 May 2017): South African Heritage Resources Information System (SAHRIS).
- E-mail from AdiEnv (dated: 27 February 2017) to Councilor T. Ngomane.
- Completed comment sheet (dated: 10 March 2017) from Councilor T. Ngomane.
- E-mail from AdiEnv (dated: 10 March 2017) to G. Tshabangu (EFF).
- Completed comment sheet (dated: 10 March 2017) from G. Tshabangu.
- E-mail from G. Tshabangu (dated: 23 May 2017) to AdiEnv.
- E-mail from AdiEnv (dated: 23 May 2017) to G. Tshabangu.
- E-mail from AdiEnv (dated: 15 February 2017) to Corlouis Boerdery (Pty) Ltd. (L. Bezuidenhout).
- E-mail from AdiEnv (dated: 20 February 2017) to Afgri Operations Ltd. (C. van Staden).
- E-mail from E. Kock (dated: 15 February 2017) to AdiEnv.
- E-mail from AdiEnv (dated: 15 February 2017) to E. Kock.
- E-mail from F. Barnard (dated: 16 February 2017) to AdiEnv.
- E-mail from AdiEnv (dated: 14 February 2017) to EXM Advisory Services (K. Fairley/S. Seton-Rogers).
- E-mail from S. Seton-Rogers (dated: 3 March 2017) to AdiEnv.