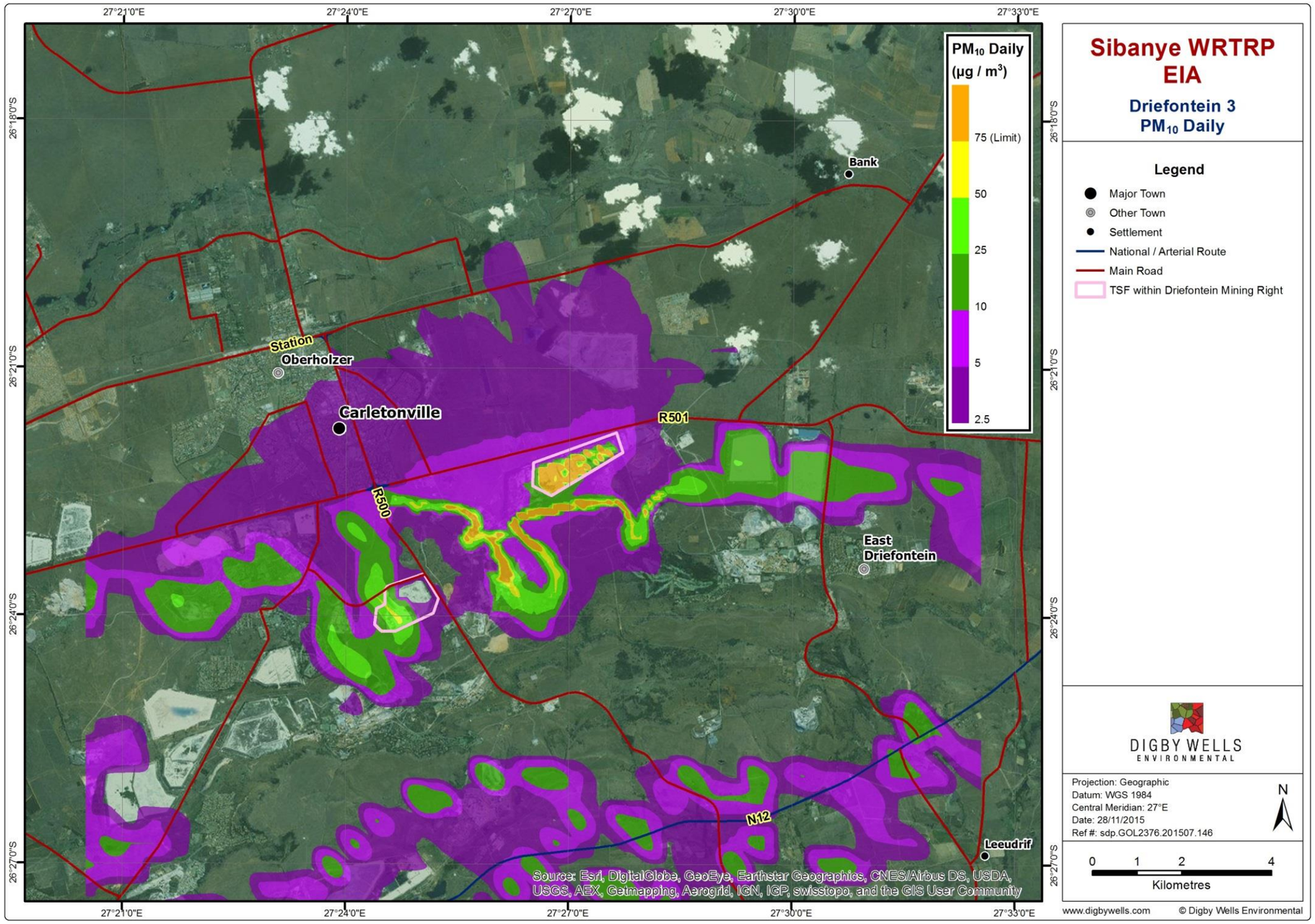

Figure 8-21: Predicted 24-Hour Average PM_{10} Concentrations, 99th Percentile (µg/m^3)

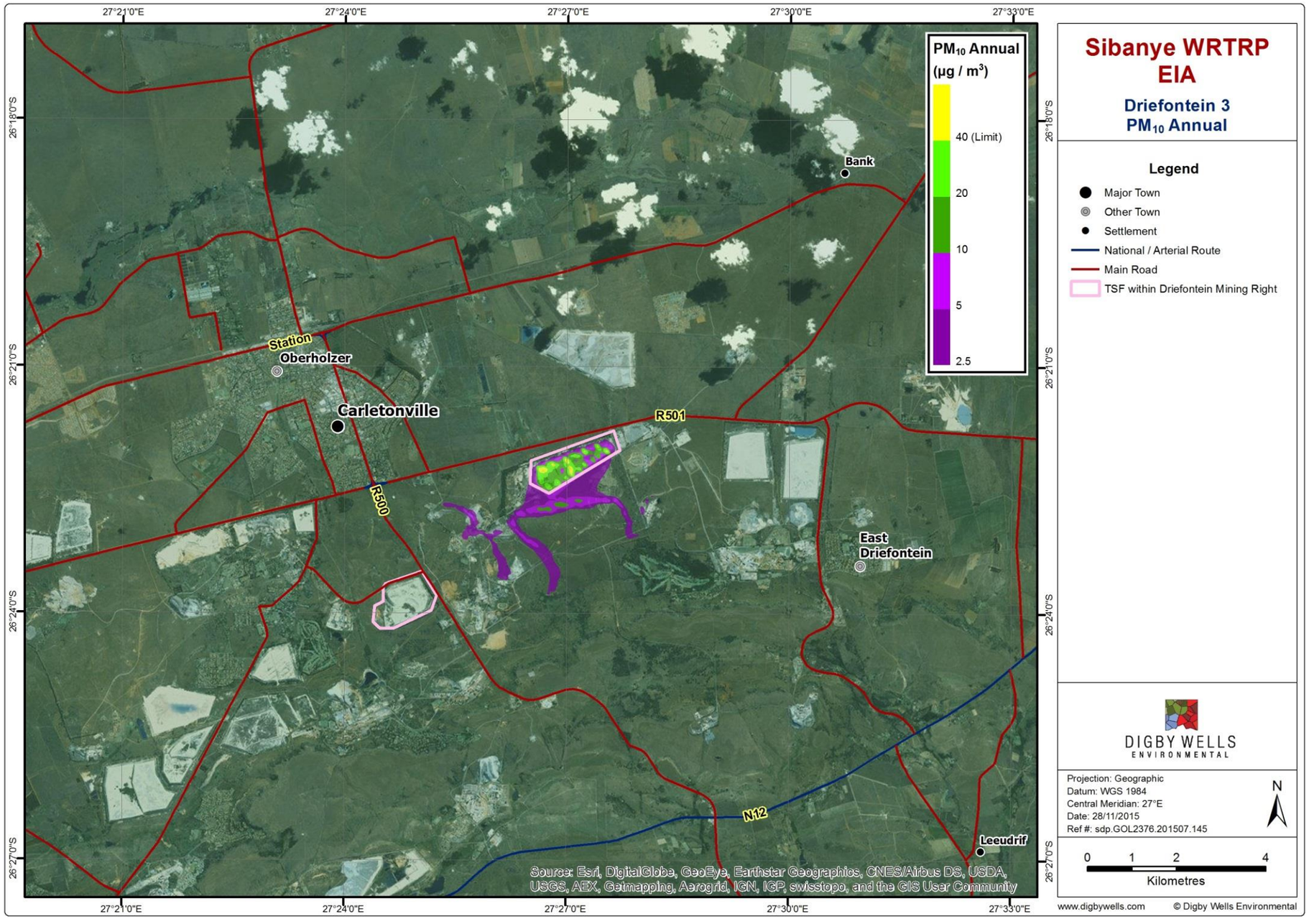

Figure 8-22: Predicted Annual Average PM_{10} Concentrations, 100th Percentile (µg/m^3)

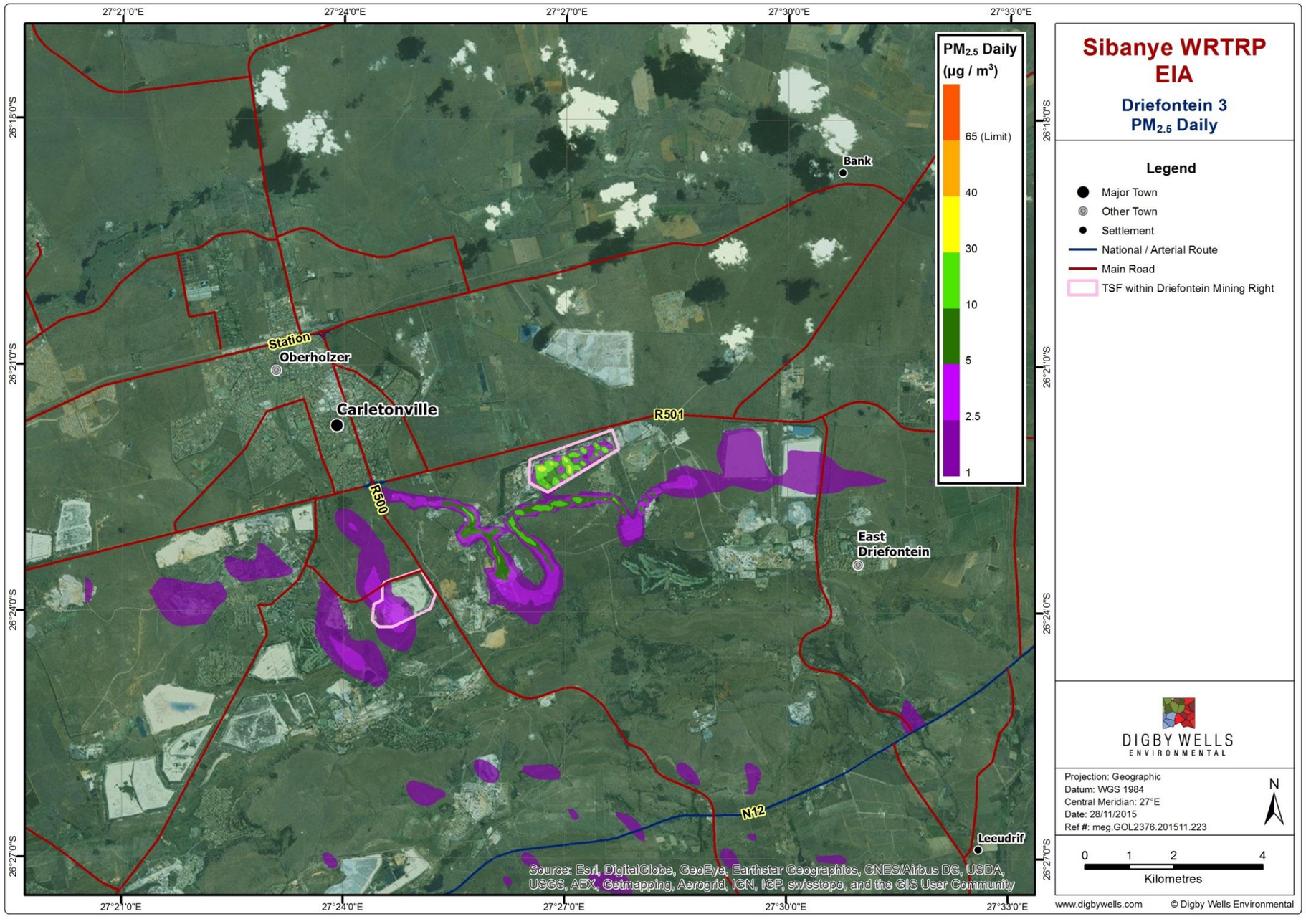

Figure 8-23: Predicted 24-Hour Average $PM_{2.5}$ Concentrations, 99th Percentile (µg/m^3)

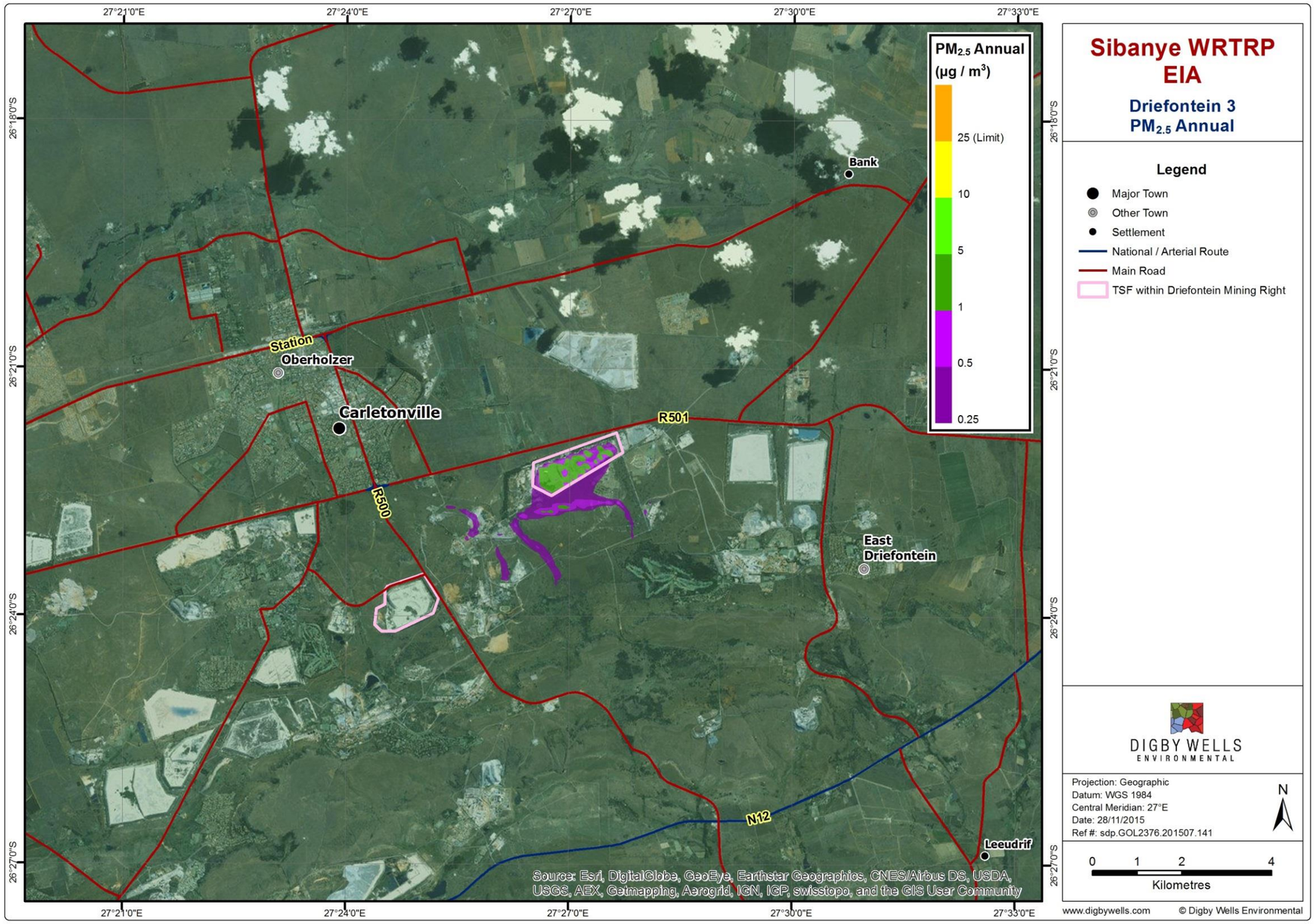

Figure 8-24: Predicted Annual Average $PM_{2.5}$ Concentrations, 100th Percentile (µg/m^3)

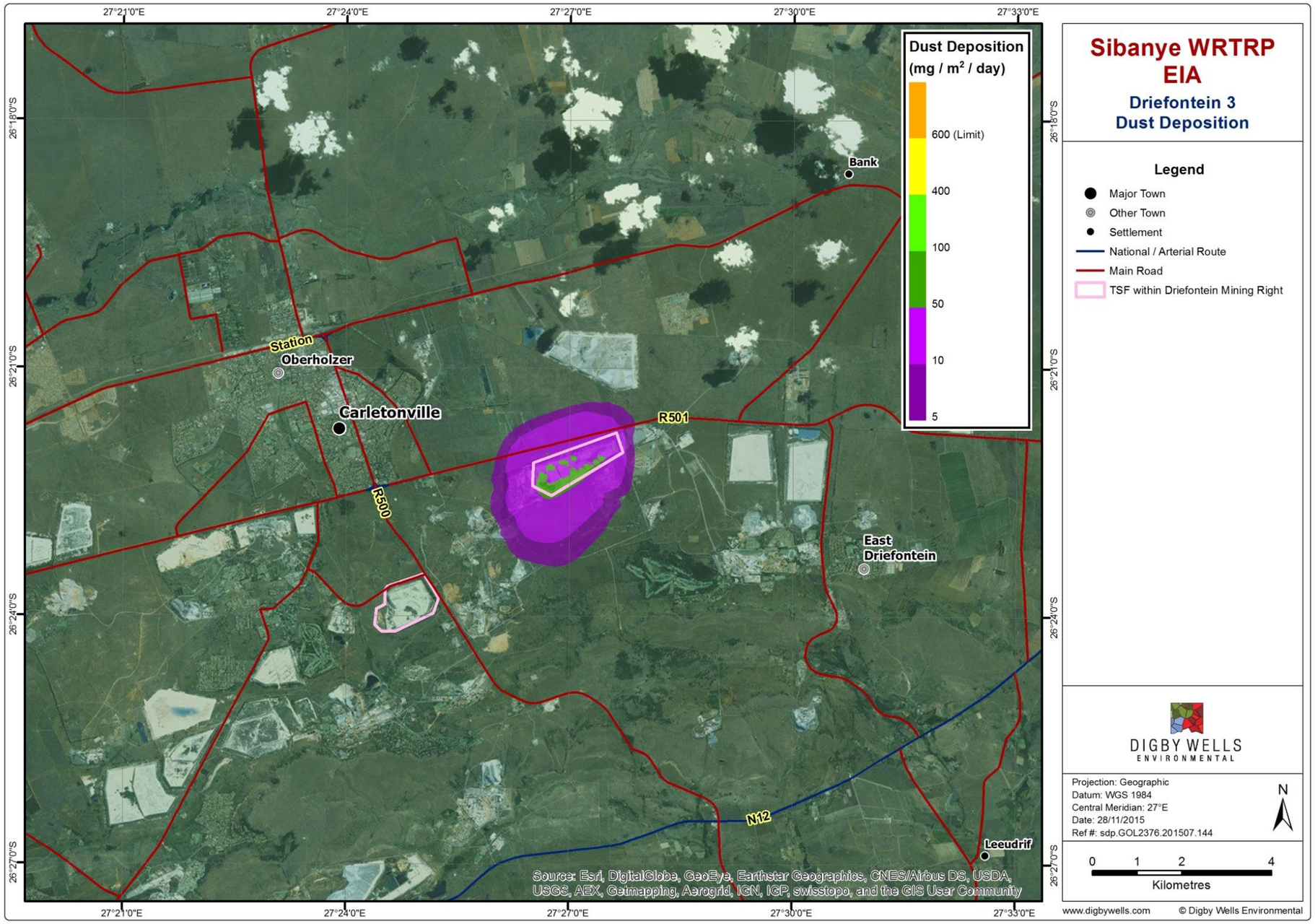

Figure 8-25: Predicted Maximum (100th percentile) Dust Deposition (mg/m^2/day)

8.2.2 Driefontein 5 TSF

PM_{10} Predicted Impacts

The isopleth plot of predicted 99th percentile 24-hour concentration of PM_{10} attributed to wind erosion from the existing Driefontein 5 TSF is presented in Figure 8-26. The maximum predicted ground level concentration of 170 µg/m³ is in exceedance of the limit of 75 µg/m³. Ambient PM_{10} levels at a nearby receptor i.e. Mponeng 8.5 µg/m³ is well within the standard.

The predicted PM_{10} levels are the likely contribution from the existing Driefontein 5 TSF to surrounding atmosphere due to wind erosion and not cumulative impact from all the existing sources in the area. This is the current and worst case scenario. The remaining (predicted impacts as wet reclamation progresses), will subside from the worst case until this source is removed completely.

The predicted highest annual concentration of PM_{10} anticipated from Driefontein 5 TSF is presented in Figure 8-27. The annual highest ground level concentration of 20 µg/m³ is within the standard of 40 µg/m³. The predicted concentration at Mponeng of 4.9 ug/m^3 is not in exceedance of the current standard.

$PM_{2.5}$ Predicted Impacts

The predicted 24-hour concentration of $PM_{2.5}$ is presented in Figure 8-28. The maximum predicted ground level concentration of 14 µg/m³ is within the recommended standard (40 µg/m³). The ground level concentration predicted for nearby residential receptor of Mponeng of 0.18 µg/m³ is well within the daily limit.

The predicted highest annual concentration of$PM_{2.5}$ is presented in Figure 8-29. The predicted annual concentration of 1.7 µg/m³ is within the annual limit of (20 µg/m³).

Dust fallout Impacts

The predicted dust deposition rate attributed to Driefontein 5 TSF from wind erosion is presented (Figure 8-30). A maximum dust deposition rate of 692 mg/m2/day was predicted. This maximum was at the centre of the TSF and deposition rates decreased to about 100 mg/m2/day some 600 m from the edge of the TSF. Emissions from wind erosion are not anticipated to violate the recommended residential and non-residential standards of 600 mg/m^2/day and 1 200 mg/m^2/day respectively.

Table 8-5 shows a summary of the model simulations for Driefontein 5 TSF, with the maximum predicted ground level concentrations compared against the current standards for the various pollutants.

Table 8-5: Summary of Dispersion Modelling Results (Driefontein 5 TSF)

Air Contaminant	Averaging Period	Ambient Air Quality Standard (µg/m^3)	Maximum GLC (µg/m^3	Levels at receptors (µg/m^3)	
				Mponeng	
Inhalable Particulates (PM_{10})	24 hour	75	170	8.5	
	Annual	40	20	4.9	
Fine Particulate ($PM_{2.5}$)	24 hour	40	14	0.18	
	Annual	20	1.7	0.41	
Dust fall (mg/m^2/day)					
Dust Deposition	monthly	600	692	16.7	

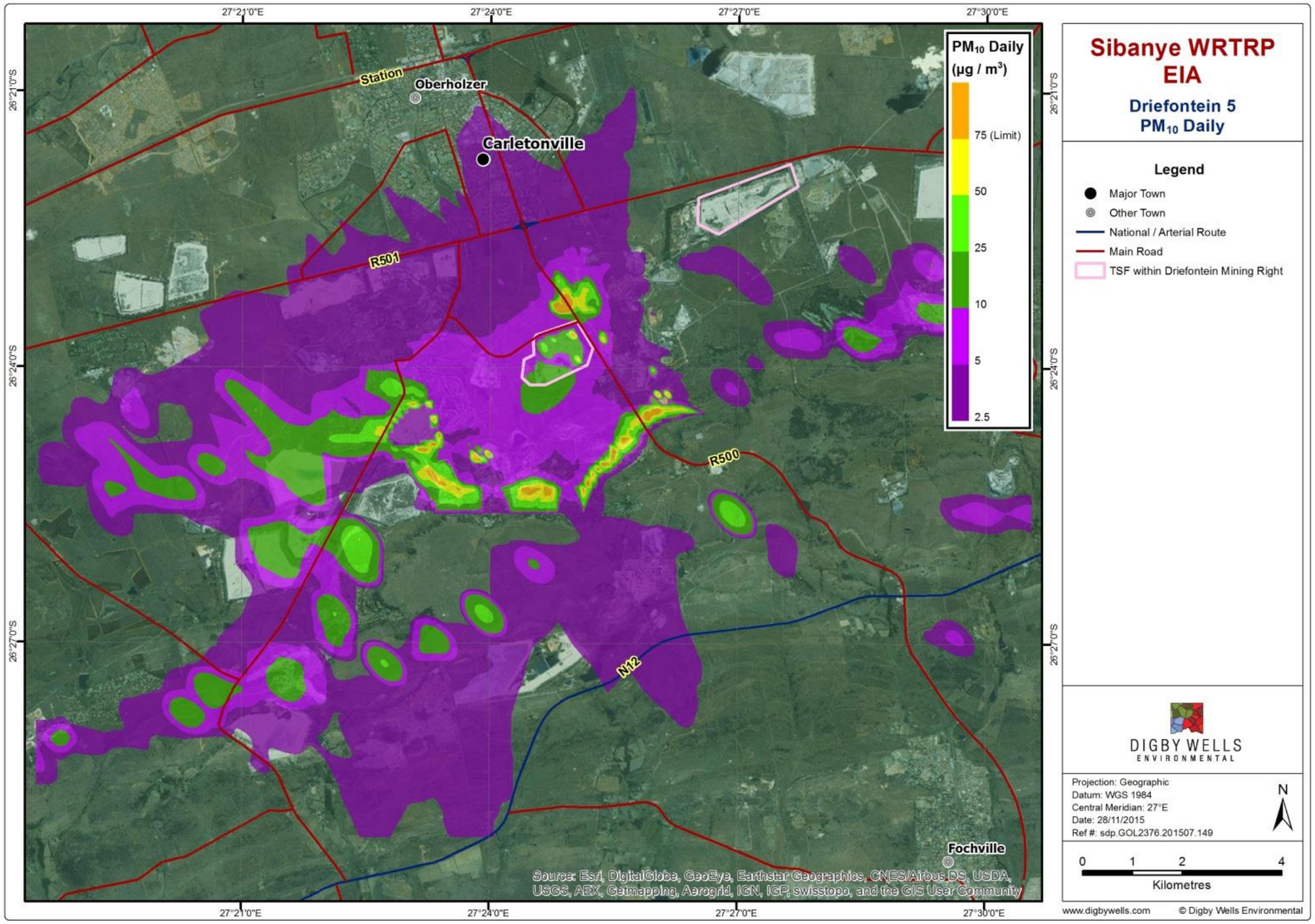

Figure 8-26: Predicted 24-Hour Average PM_{10} Concentrations, 99th Percentile (µg/m^3)

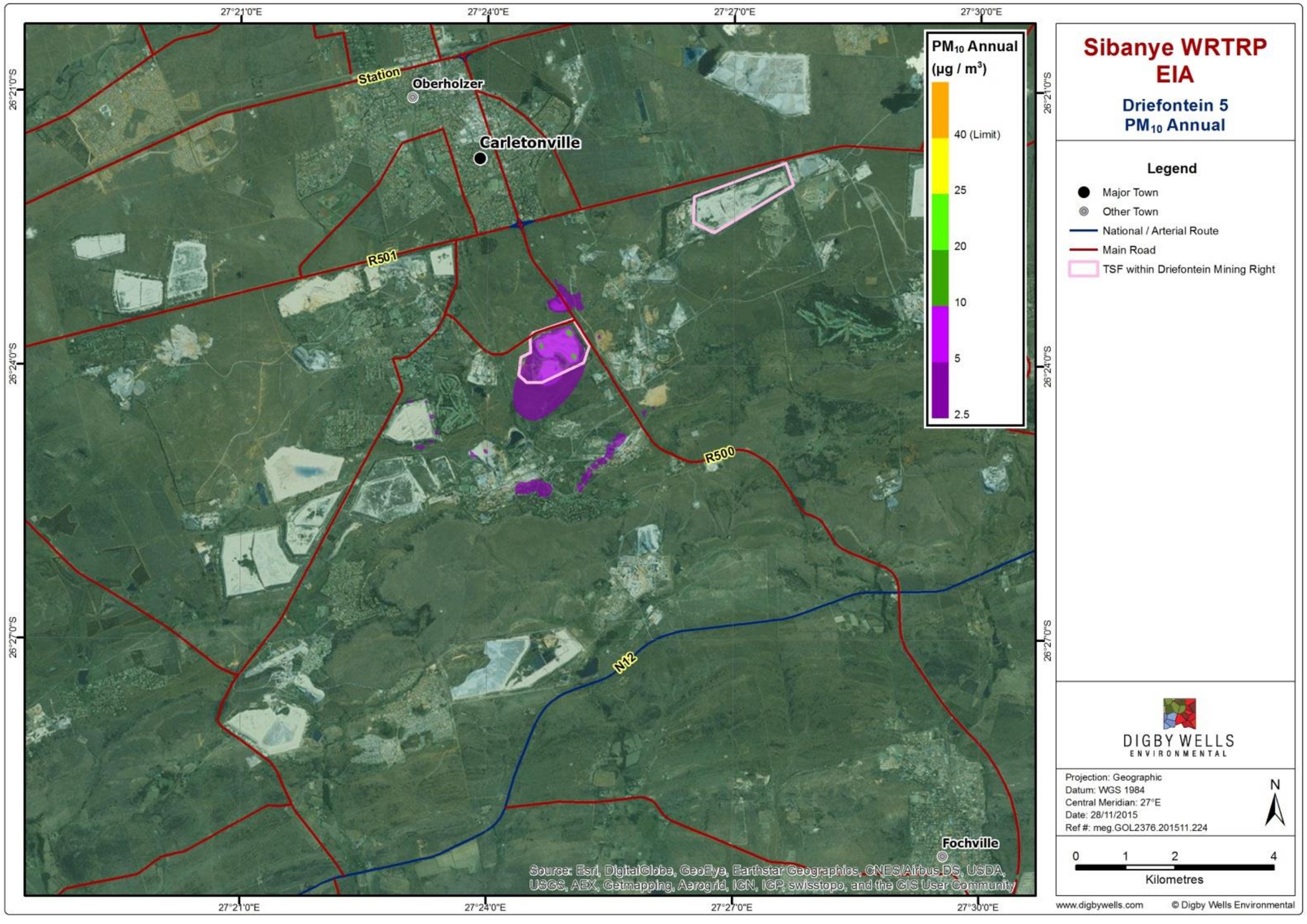

Figure 8-27: Predicted Annual Average PM_{10} Concentrations, 100th Percentile (µg/m^3)

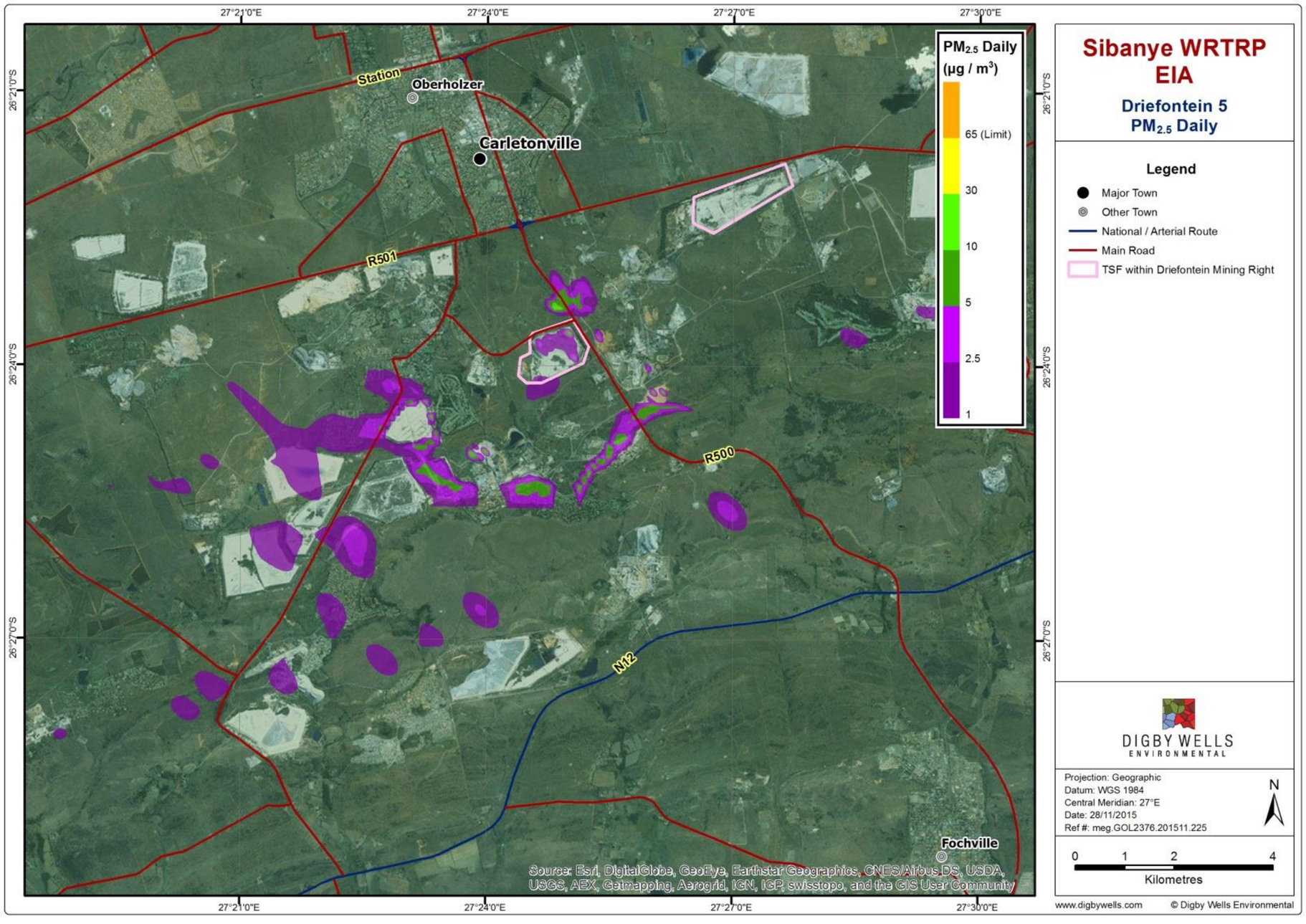

Figure 8-28: Predicted 24-Hour Average $PM_{2.5}$ Concentrations, 99th Percentile (µg/m^3)

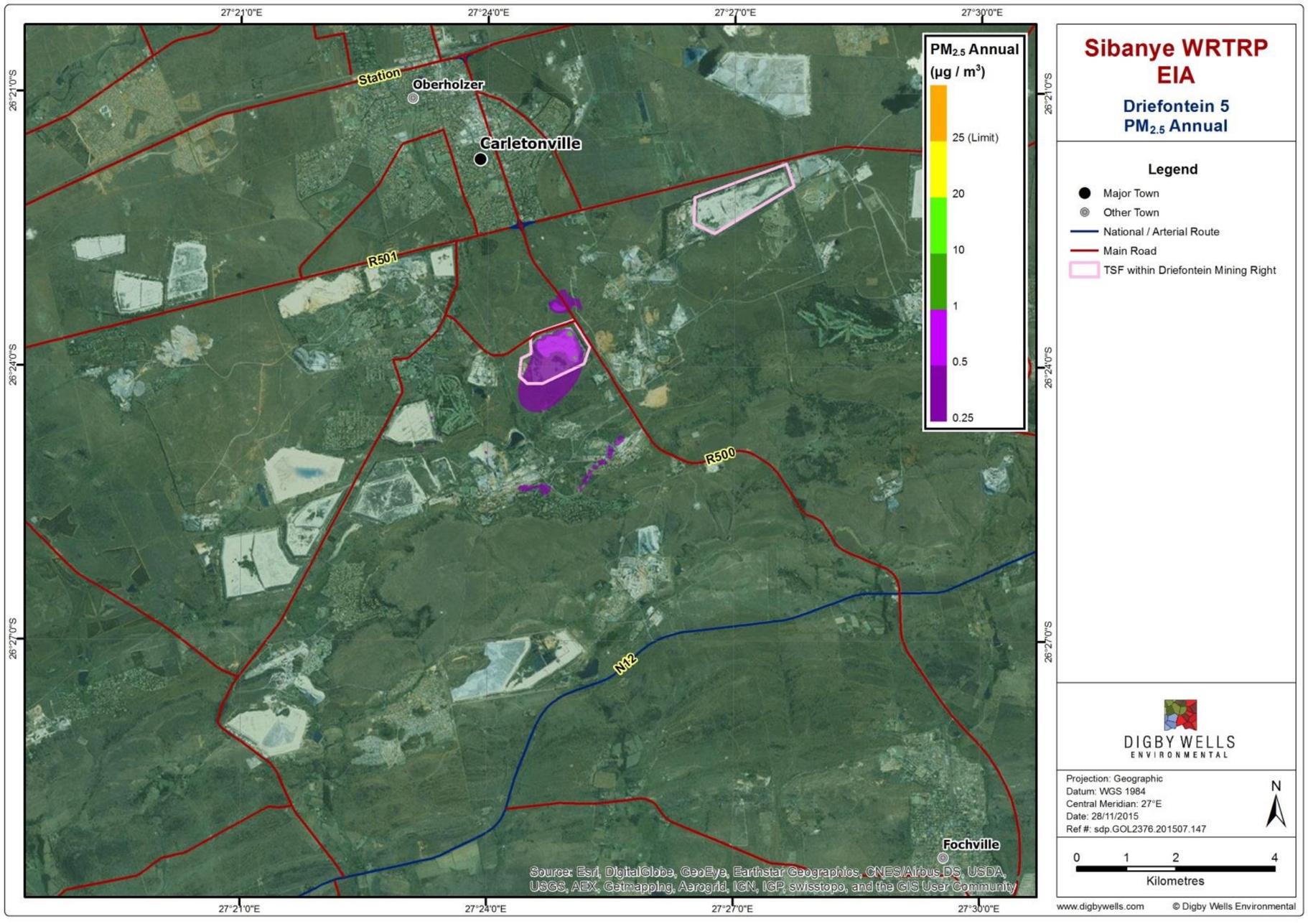

Figure 8-29: Predicted Annual Average $PM_{2.5}$ Concentrations, 100th Percentile (µg/m^3)

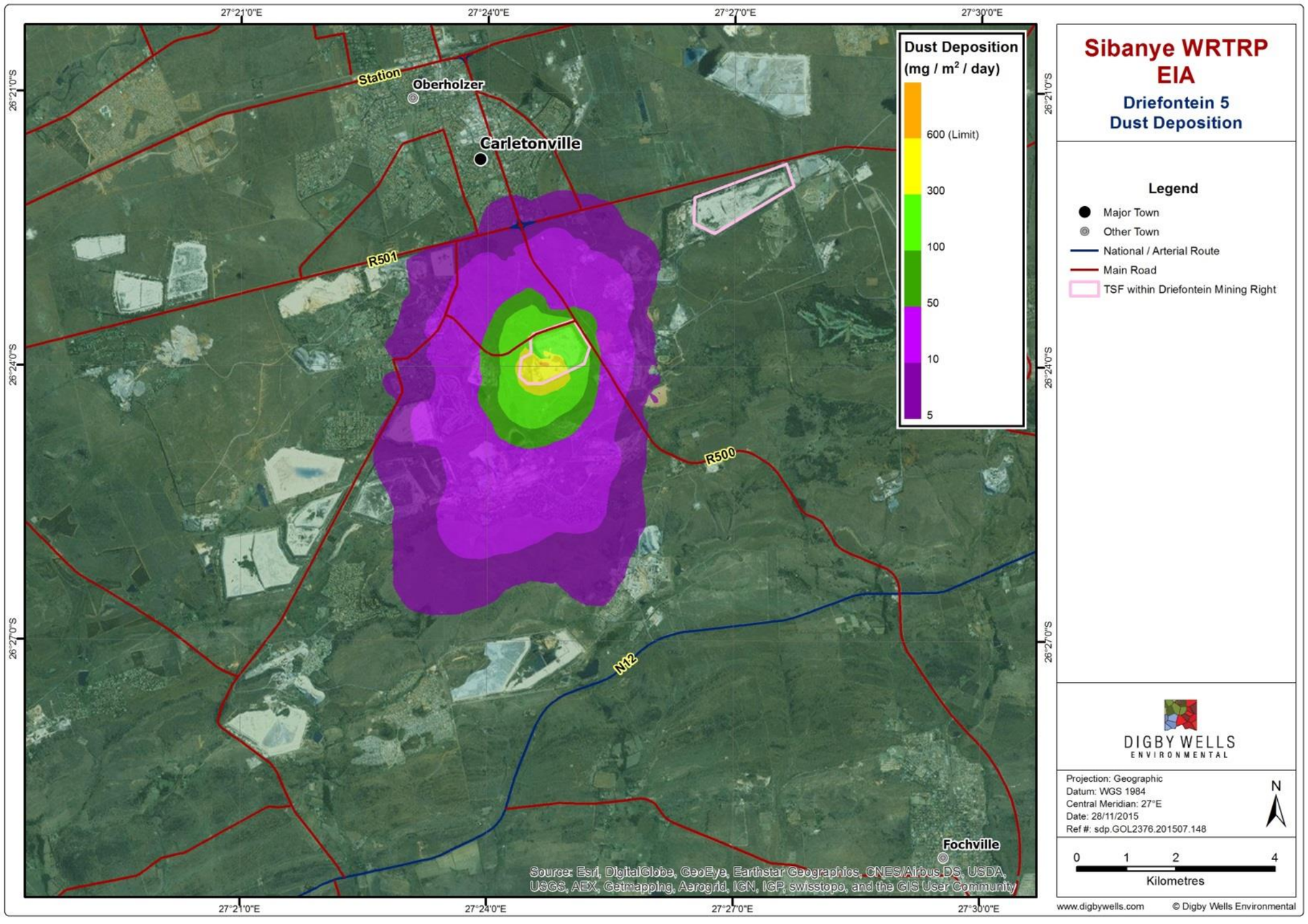

Figure 8-30: Predicted Maximum (100th percentile) Dust Deposition (mg/m^2/day)

8.3 Cooke Mining Right Area

8.3.1 Cooke TSF

PM_{10} Predicted Impacts

The predicted 99th percentile 24-hour (daily) concentration of PM_{10} attributed to wind erosion from the existing Cooke TSF is presented in Figure 8-31. The maximum predicted ground concentration of 634 µg/m³ occurred at the middle of the TSF is in exceedance of the limit 75 µg/m³. However, outside the TSF boundary, surrounding areas are within compliance. Model prediction for a residential development south of the Cooke TSF (about 800 from the edge of the TSF) was ~10.4 µg/m³.

The predicted PM_{10} level is the likely contribution from the existing Cooke TSF to surrounding atmosphere due to wind erosion and not cumulative impact from all the existing sources in the area. Construction of pipeline will across the Cooke MRA, however, this will have minimal impact on air quality of the area.

The predicted highest annual concentration of PM_{10} anticipated from Cooke TSF is presented in Figure 8-32. The maximum predicted ground level concentration of 82 µg/m³ occurred at the middle of the TSF and in exceedance of the standard of 40 µg/m³.

$PM_{2.5}$ Predicted Impacts

The isopleth plot of predicted 24-hour (daily) concentration for $PM_{2.5}$ at the proposed Project is presented in Figure 8-33. The maximum predicted ground level concentration of 53 µg/m³ is within the standard of 40 µg/m³. The ground level concentration predicted for nearby residential areas Bekkersdal and Mohlakeng are reported (Table 8-6).

The predicted highest annual concentration for $PM_{2.5}$ dispersion across the landscape is presented in Figure 8-34. The annual maximum concentration of 8 µg/m³ occurred within the TSF boundary. This maximum is within the current standard of 20 µg/m³.

Dust fall Impacts

The predicted dust deposition rates attributed to Cooke TSF from wind erosion is presented (Figure 8-35). The maximum predicted deposition rate of 73 mg/m^2/day is within the TSF area. This maximum is within the residential and non-residential limits of 600 mg/m^2/day and 1 200 mg/m^2/day. The deposition rates decreases to less than 20 mg/m^2/day, 500 m from the edge of the TSF. Exposure will be very low beyond these areas. The dust deposition rates predicted for Bekkersdal and Mohlakeng, nearby receptors are reported in Table 8-6.

Table 8-6: Summary of Dispersion Modelling Results (Cooke TSF)

Air Contaminant	Averaging Period	Ambient Air Quality Standard (µg/m^3)	Maximum GLC (µg/m^3	Levels at receptors (µg/m^3)	
				Bekkersdal	Mohlakeng
Inhalable Particulates (PM_{10})	24 hour	75	634	5.4	3.2
	Annual	40	81	0.62	0.11
Fine Particulate ($PM_{2.5}$)	24 hour	40	53	0.04	0.02
	Annual	20	6.8	0.02	0.01
Dustfall (mg/m^2/day)					
Dust Deposition	monthly	600	73	0.24	0.14

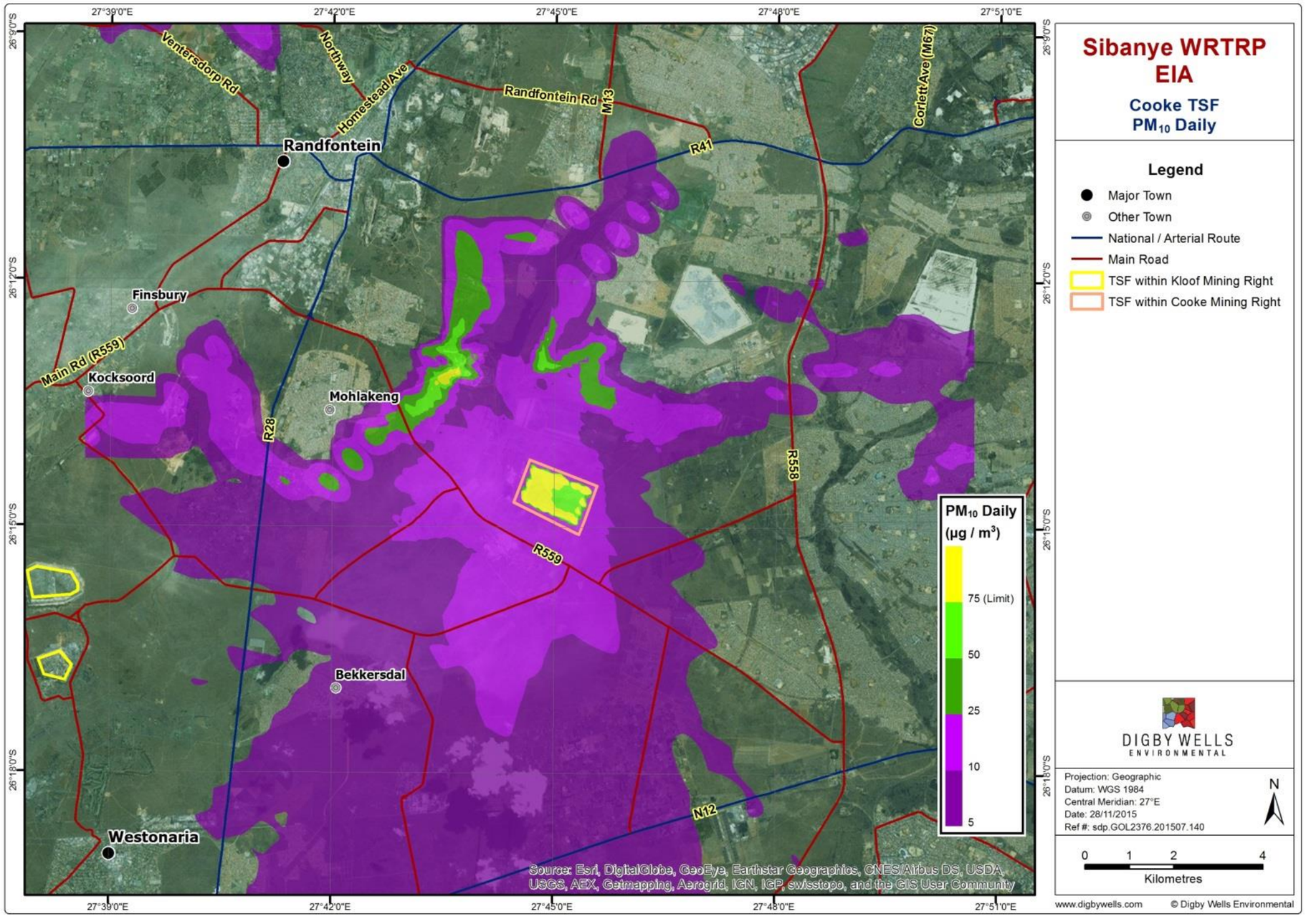

Figure 8-31: Predicted 24-Hour Average PM_{10} Concentrations, 99th Percentile (µg/m^3

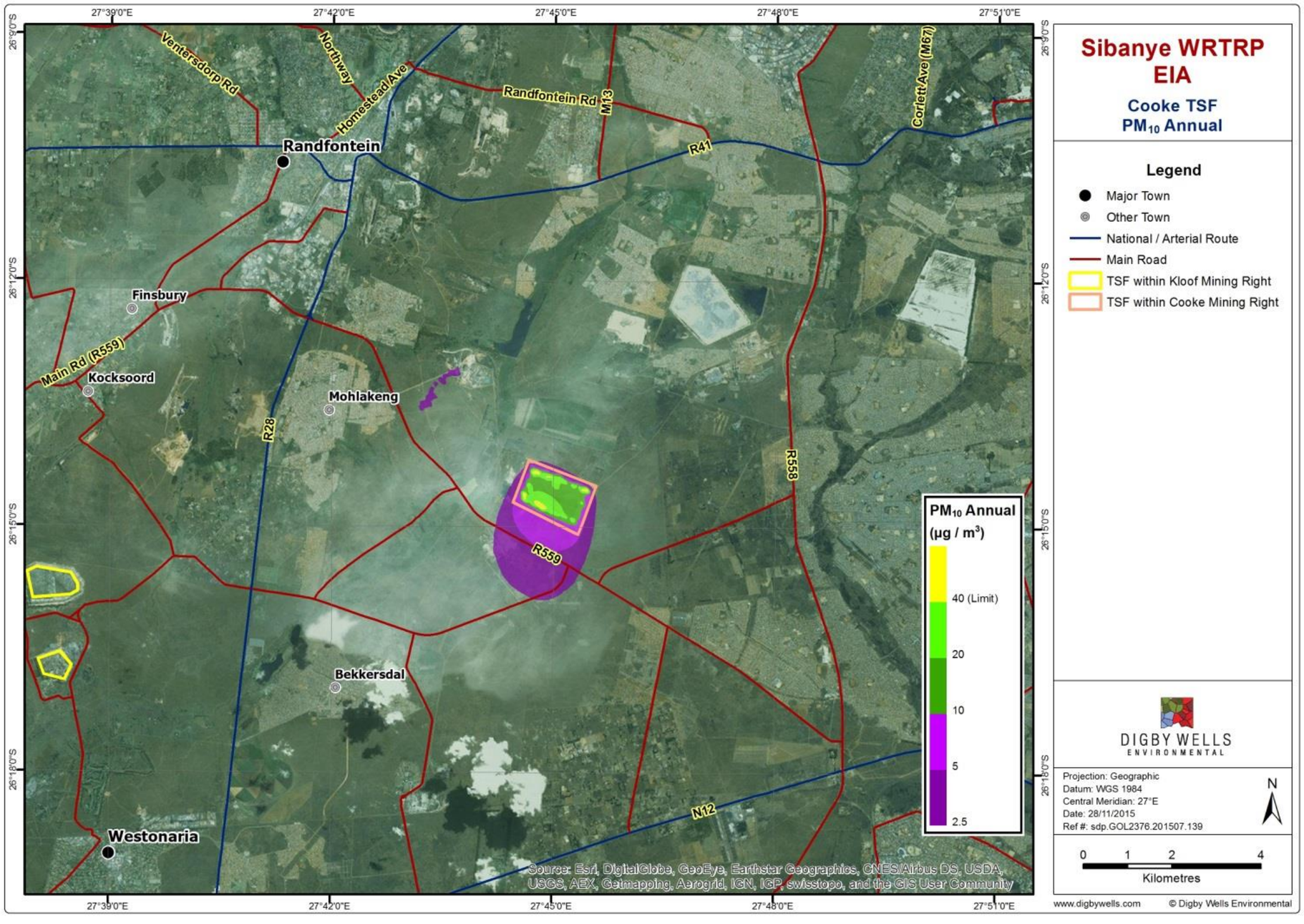

Figure 8-32: Predicted Annual Average PM_{10} Concentrations, 100th Percentile (µg/m^3)

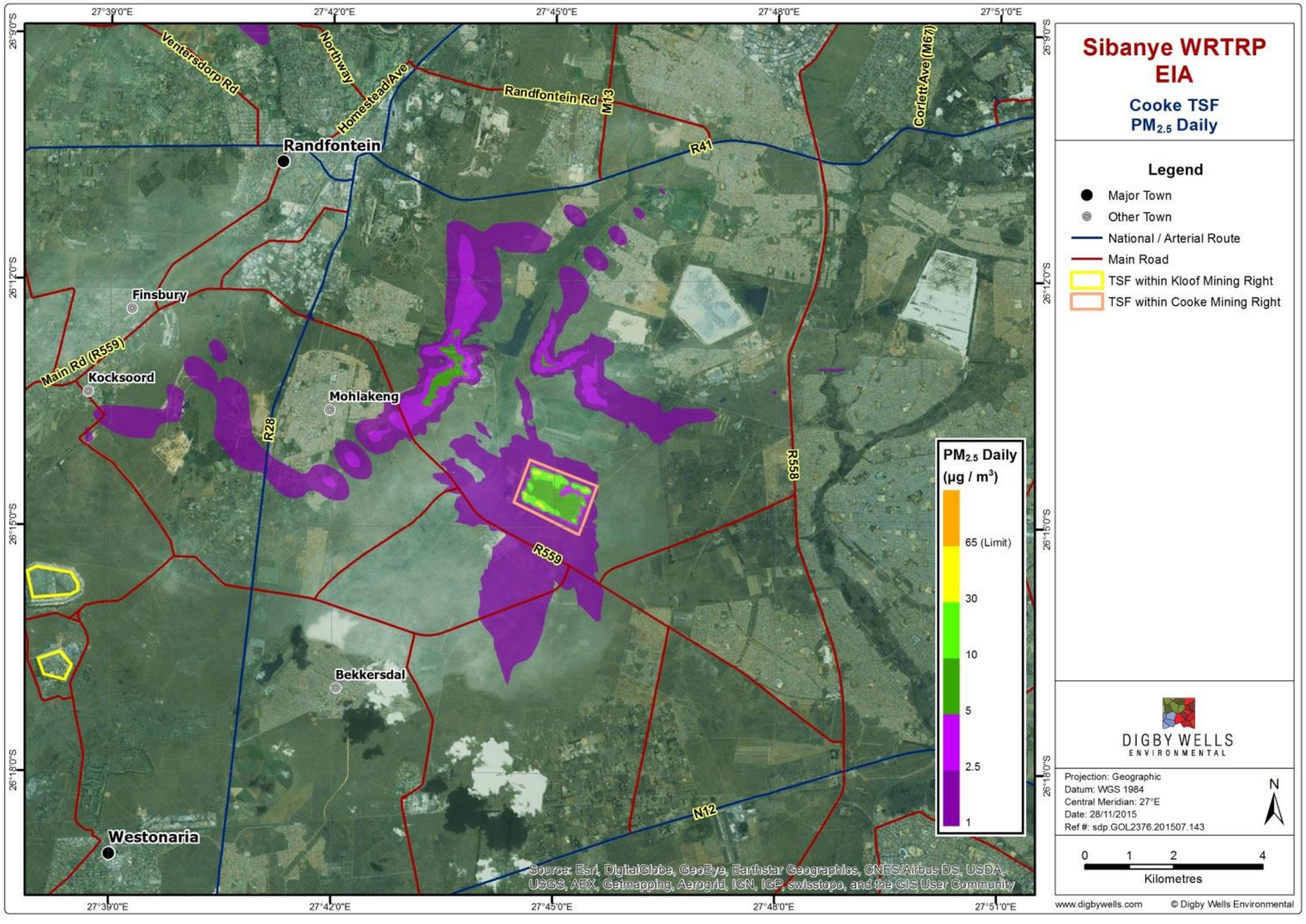

Figure 8-33: Predicted 24-Hour Average $PM_{2.5}$ Concentrations, 99th Percentile (µg/m^3)

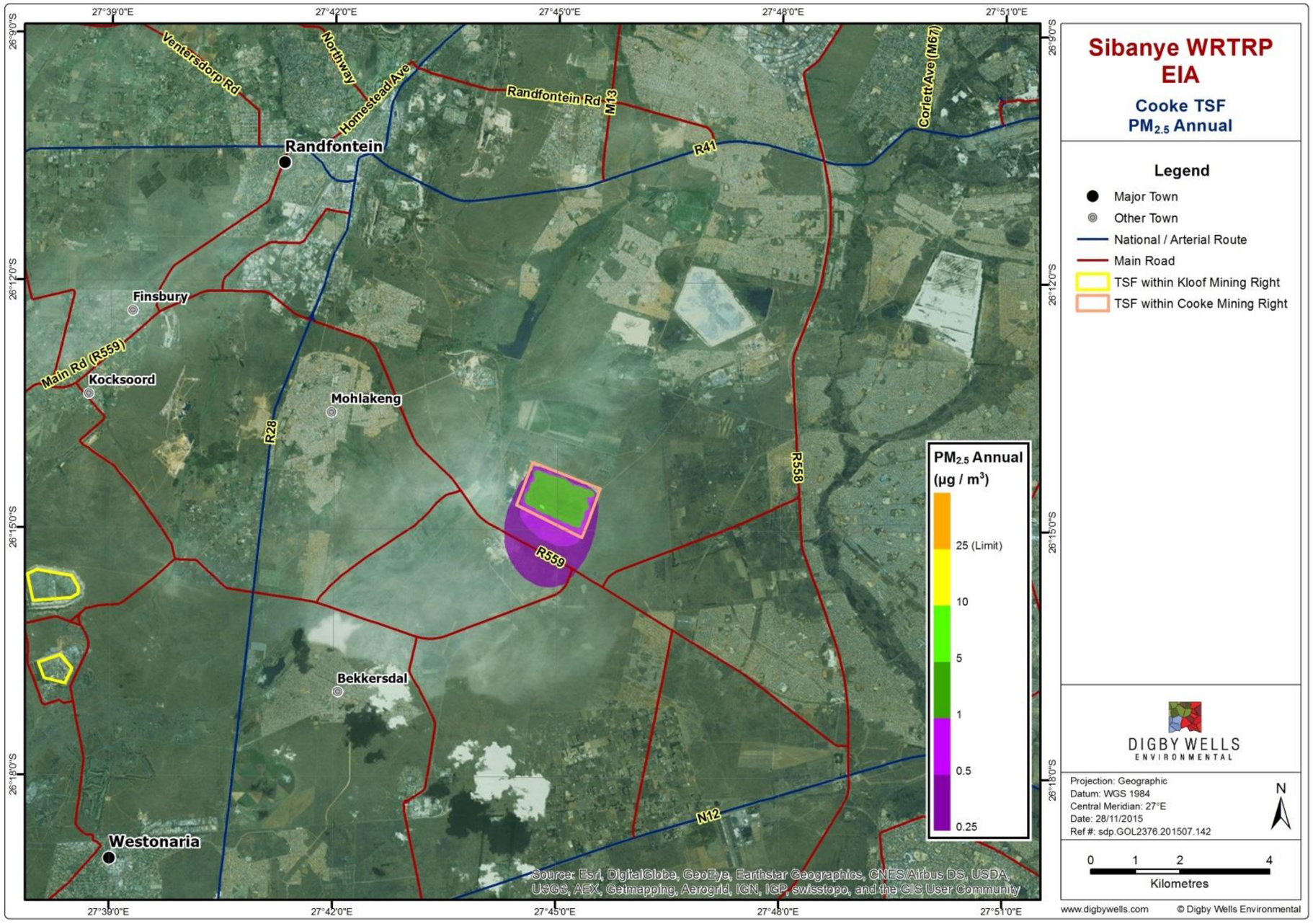

Figure 8-34: Predicted Annual Average $PM_{2.5}$ Concentrations, 100th Percentile (µg/m^3)

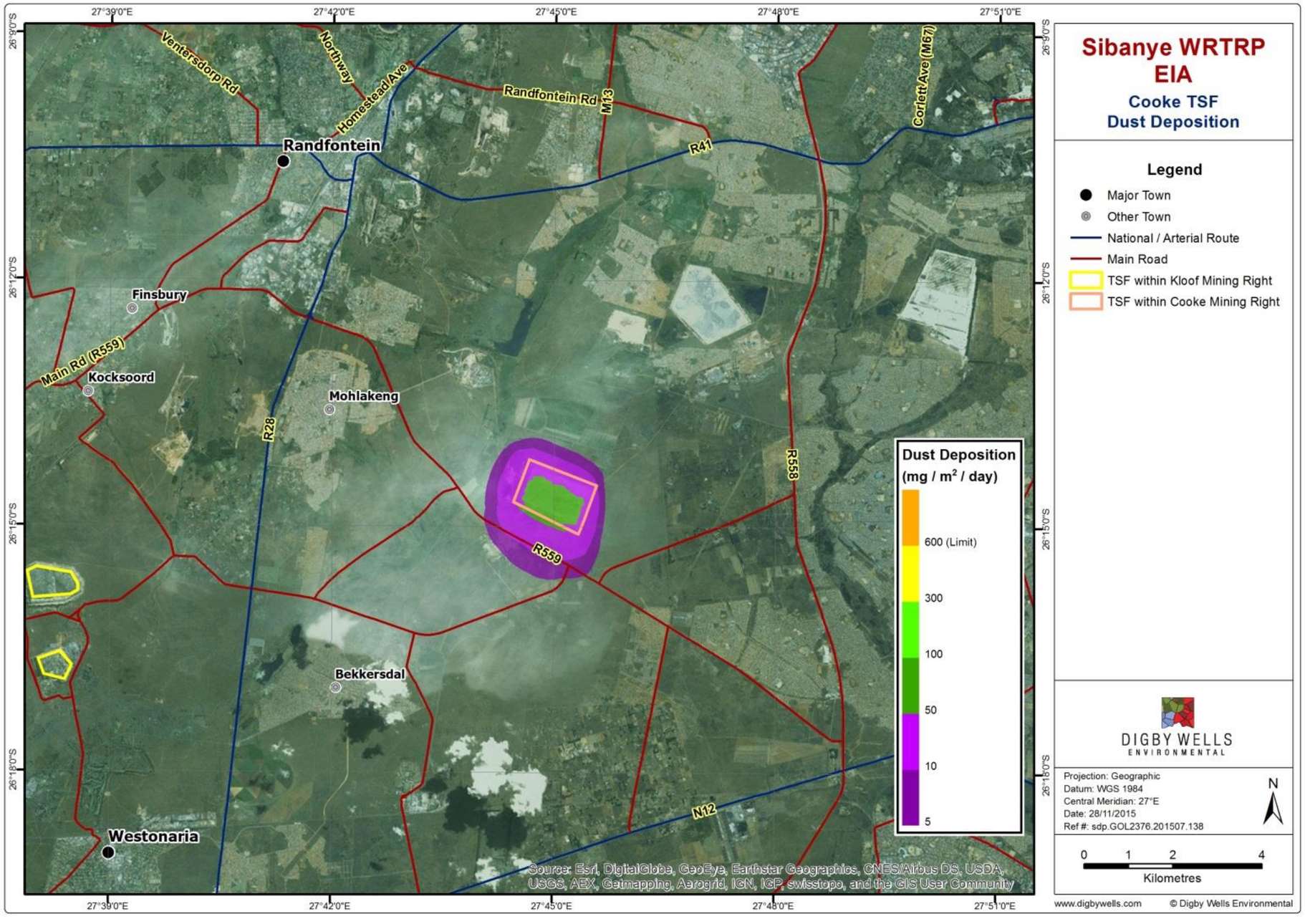

Figure 8-35: Predicted Maximum (100th percentile) Dust Deposition (mg/m^2/day

8.3.2 C4S TSF

PM_{10} Predicted Impacts

The predicted 99th percentile 24-hour (daily) concentration of PM_{10} attributed to wind erosion from the existing C4S TSF is presented in Figure 8-36. The maximum predicted ground level concentration of 115 µg/m³ at any point outside the TSF boundary is in exceedance of the limit 75 µg/m³. This is the current and worst case scenario. Future concentrations i.e. predicted impacts as wet reclamation progresses, will subside progressively until this source is removed completely.

Daily PM_{10} levels predicted for nearby residential areas i.e. Waterpan (89 µg/m³) and Hillshaven (8 µg/m³) are presented.

The model predictions are the likely contribution from the existing C4S TSF to surrounding atmosphere due to wind erosion and not cumulative impacts from all the existing sources in the area.

The predicted highest annual concentration of PM_{10} anticipated from C4S TSF is presented in Figure 8-37. The predicted ground level concentration of 9 µg/m³ at any point outside the TSF boundary is within the standard of 40 µg/m³. The model simulations show concentration at the nearby residential area of Waterpan and Hillshaven of 1.2 µg/m³ and 0.4 µg/m³.

$PM_{2.5}$ Predicted Impacts

The highest 24-hour (daily) concentration of $PM_{2.5}$ attributed to the C4S TSF is presented in Figure 8-38. The maximum predicted ground level concentration outside the TSF boundary of 13 µg/m³ is within the current standard (40 µg/m³). The ground level concentrations predicted for nearby residential areas i.e. Waterpan (2.6 µg/m³) and Hillshaven (0.8 µg/m³) are presented.

The predicted highest annual concentration of$PM_{2.5}$ outside the TSF boundary is presented in Figure 8-39. The predicted annual concentration 1.4 is well within the limit of 20 µg/m³. At Waterpan and Hillshaven the annual ground level concentrations of 0.04 µg/m³ and 0.02 µg/m³ were predicted.

Dust fall Impacts

The predicted dust deposition rates attributed to C4S TSF from wind erosion are presented (Figure 8-40). The maximum predicted deposition of 84 mg/m2/day is well within the residential (600 mg/m2/day) and non-residential limit of 1 200 mg/m^2/day (NDCR 2013).

It should be noted that isopleth plots reflecting averaging periods contain only the highest predicted ground level concentrations for that averaging period, over the entire period for which simulations were undertaken.

Table 8-7: Summary of Dispersion Modelling Results (C4S)

Air Contaminant	Averaging Period	Ambient Air Quality Standard (µg/m^3)	Maximum GLC (µg/m^3	Levels at receptors (µg/m^3)	
				Waterpan	Hillshaven
Inhalable Particulates (PM_{10})	24 hour	75	115	102	8
	Annual	40	9	1.2	0.8
Fine Particulate ($PM_{2.5}$)	24 hour	40	13	2.6	0.8
	Annual	20	0.7	0.04	0.02
Dust fall (mg/m^2/day)					
Dust Deposition	monthly	600	84	5.7	0.3

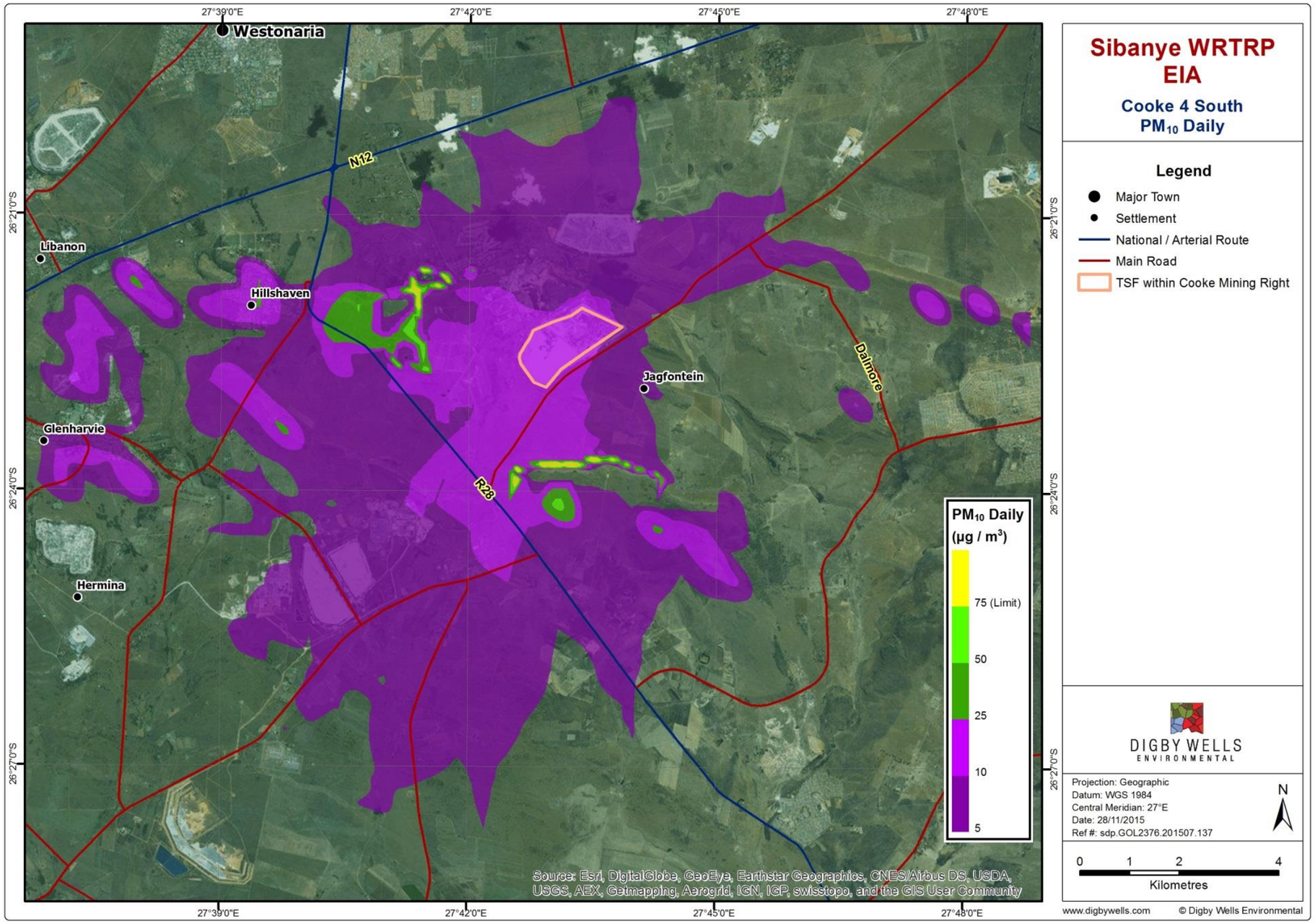

Figure 8-36: Predicted 24-Hour Average PM_{10} Concentrations, 99th Percentile (µg/m^3)

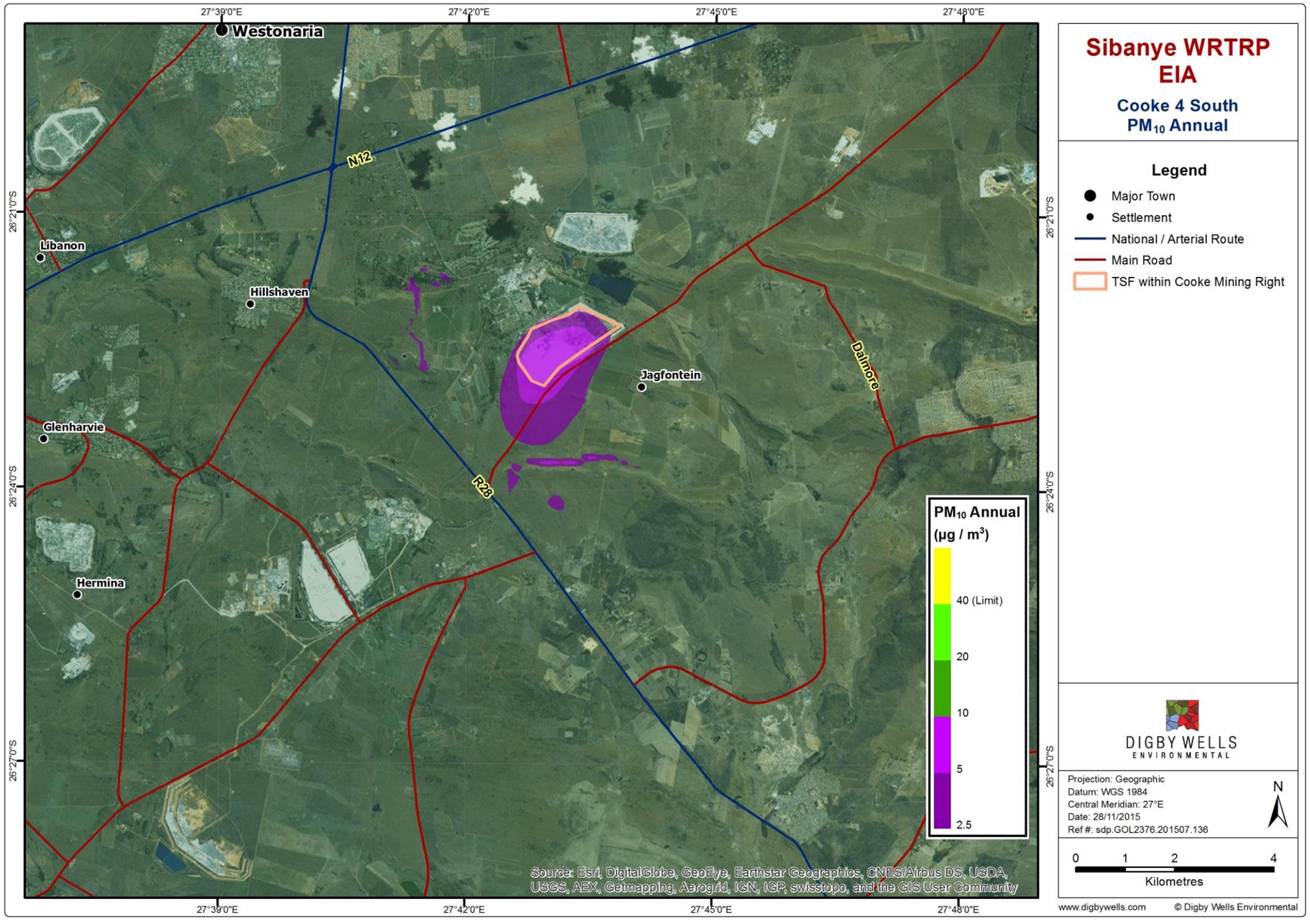

Figure 8-37: Predicted Annual Average PM_{10} Concentrations, 100th Percentile (µg/m^3)

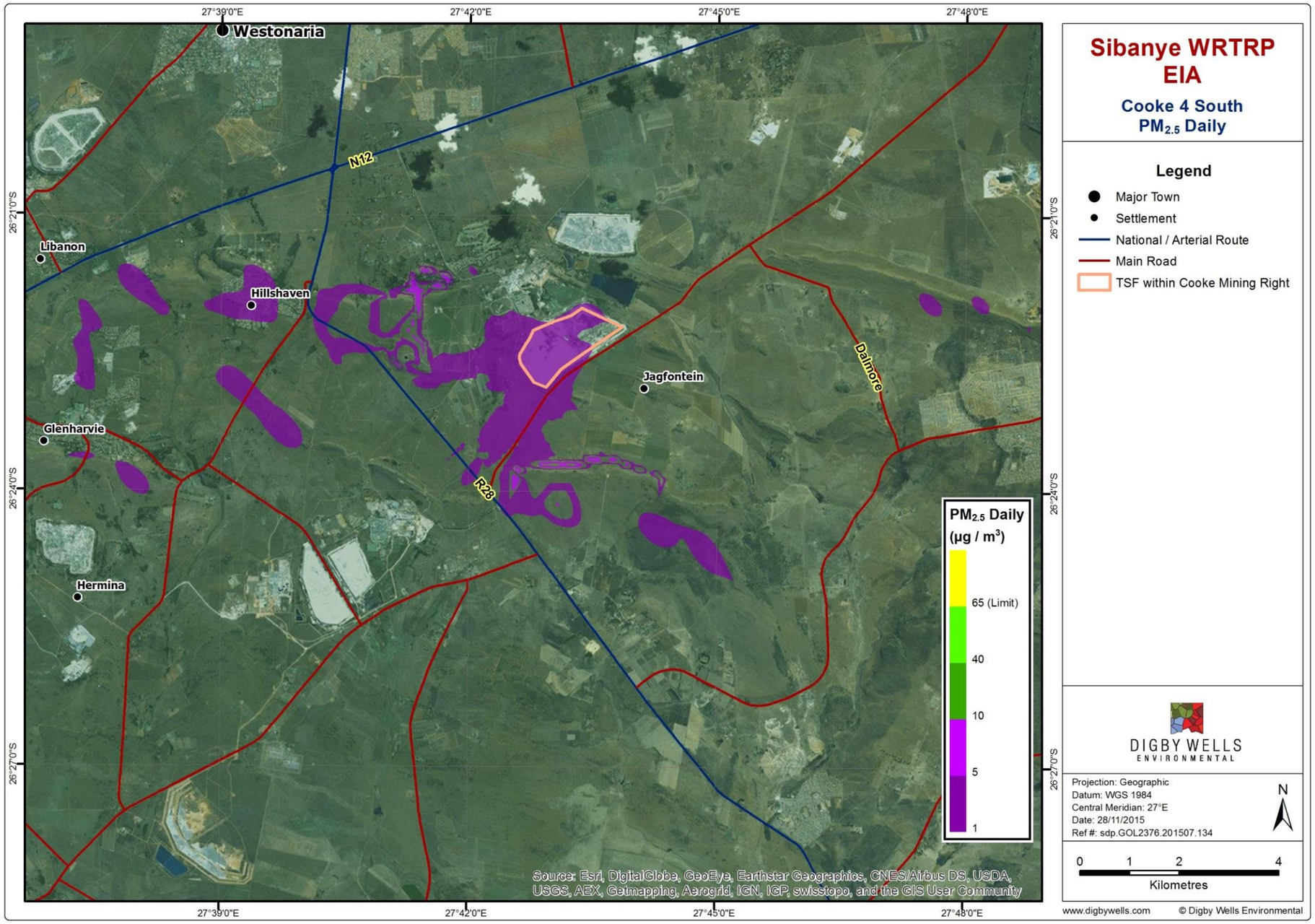

Figure 8-38: Predicted 24-Hour Average $PM_{2.5}$ Concentrations, 99th Percentile (µg/m^3)

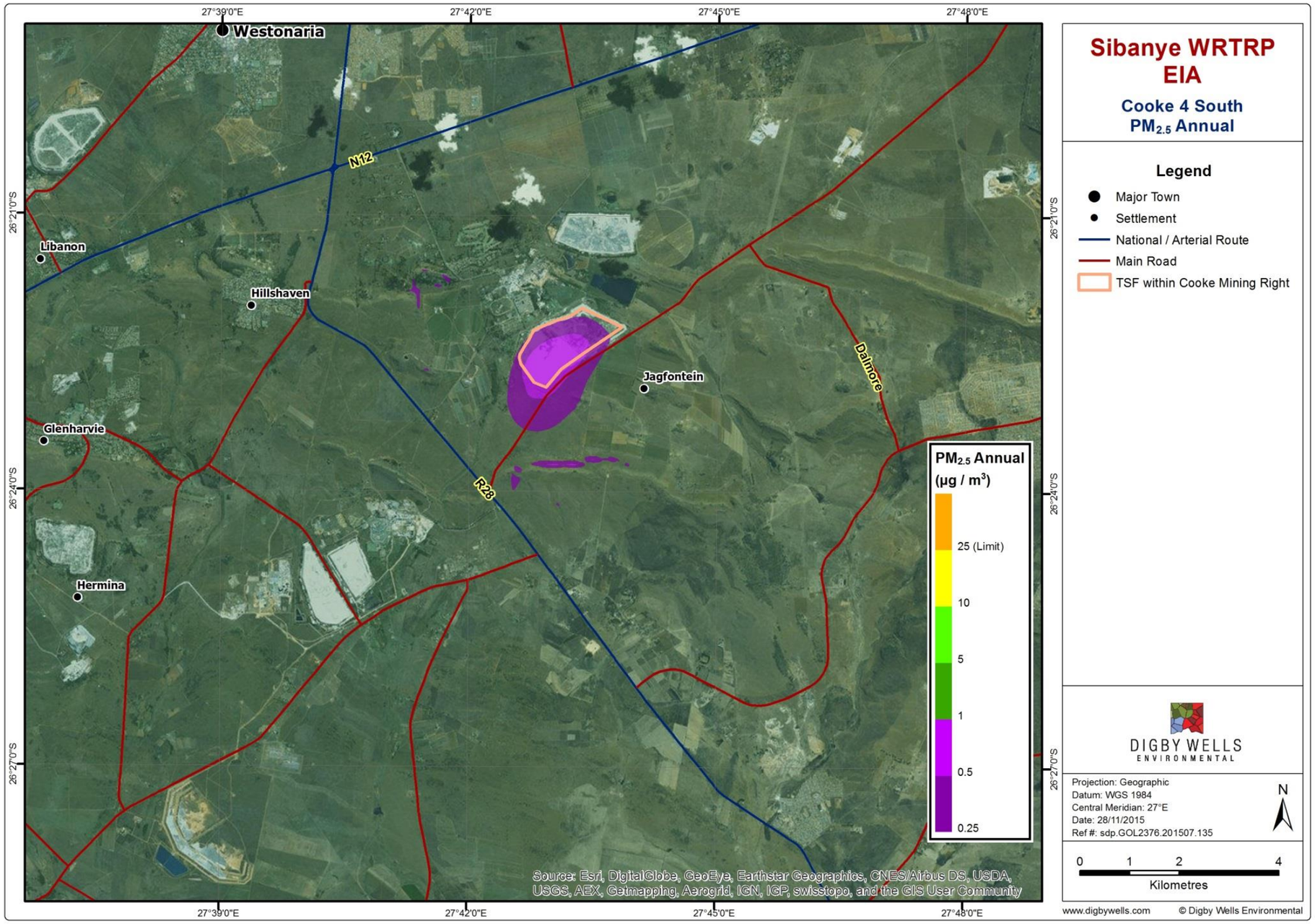

Figure 8-39: Predicted Annual Average $PM_{2.5}$ Concentrations, 100th Percentile (µg/m^3)

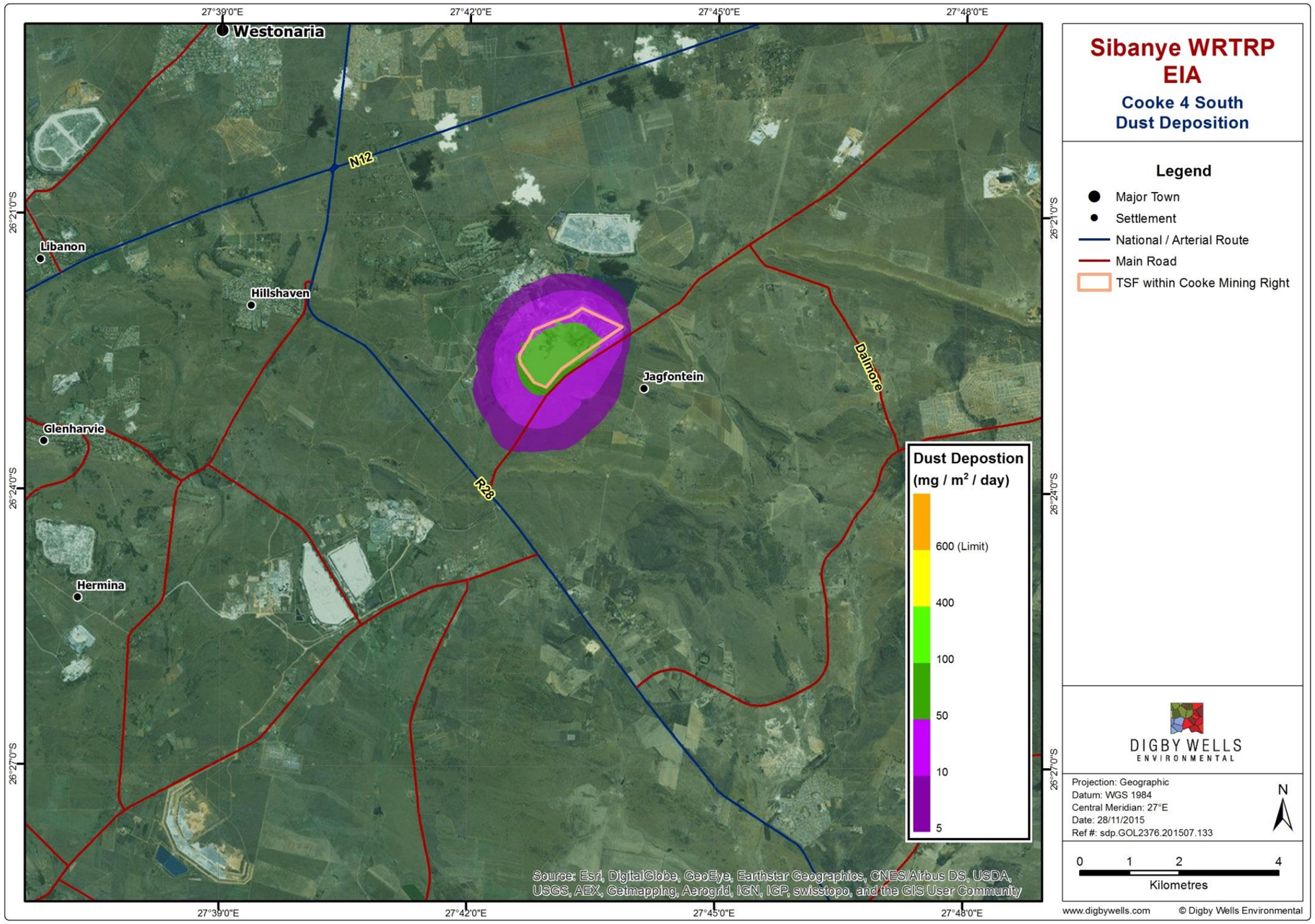

Figure 8-40: Predicted Maximum (100th percentile) Dust Deposition (mg/m^2/day)

8.4 Ezulwini Mining Right Area

None of the TSFs proposed for reclamation falls within the Ezulwini Mining Right Area, hence further discussions are not necessary. Although there will be pipeline construction across the MRA, this will have minimal impact on air quality of the area.

8.5 Discussion

Impacts associated with the proposed reclamation of TSFs in the different MRAs have been assessed. The proposed deposition at the RTSF was assessed in phases, first the lower compartment and the lower and upper compartments combined (worst case scenario). Also, the various stack emission sources at the CPP were appraised by embarking on model simulations of ground level concentration of pollutants. For the TSFs that were assessed at the different MRAs, the assessments represent current and worst case scenario and without mitigation measures in place. Future impacts i.e. emission as wet reclamation progresses, will always be lower than current scenario and will subside progressively until this source is removed completely.

8.5.1 Findings

The model predictions indicate that in general the Project will comply with the relevant ambient air quality standards. Background dust fallout data have shown that emission from the various TSFs in the different MRAs is inevitable. However, the quality of ambient air will not be compromised by the proposed WRTRP reclamation activities as the process is wet reclamation and with limited dust generating potential.

Model predictions of pollutant concentrations for the different averaging periods; hourly, daily and annual are summarised below:

- The maximum predicted ground level concentrations of PM_{10} daily from the various TSFs assessed are generally within the current standard of 75 µg/m³. in cases where the maximum predicted ground level concentrations are higher than the limit, they are confined to the centre of the TSFs. Predicted ground level concentrations at selected sensitive receptors were within current limit. The predicted annual concentrations were not in violation of the standard (40 µg/m³). The combined PM_{10} contribution from the CPP was within limit and not in exceedance of the standard.
- Model prediction of $PM_{2.5}$ daily and annual concentrations from the reclaimed TSFs assessed were all within the current limits of 65 µg/m³ and 25 µg/m³ respectively.
- The PM_{10} daily and annual ground level concentrations predicted for the new RTSF site and surroundings were within regulatory limits. The daily and annual $PM_{2.5}$ emissions from the proposed RTSF were within limits.
- The dust deposition rates simulated by the model were all within the residential and non-residential limits of 600 mg/m^2/day and 1 200 mg/m^2/day. Predicted ground level deposition rates were observed to be higher at the centre of the various TSFs.

- The SO_2, NO_2 and CO emissions from the CPP showed high ground level concentrations, with the major contribution coming from the coal fired boiler. The boiler will only be used only to start up the uranium plant and during routine maintenance. However, with the use of appropriate technology the emission can be lowered considerably

8.5.2 Conclusion

The AQIA study assessed the various TSFs at the different MRAs. These assessments represented current and worst case scenario. Future impacts on air quality i.e. emission as wet reclamation progresses, will always be lower than current scenario and will subside progressively until this source is removed completely. Hence, it is not anticipated that the wet reclamation process will compromise ambient air pollution at the different MRA. These are all existing TSFs that have been sources of dust for decades, and reclamation and consolidation at a central facility will ensure better air quality due to better management measures and controls.

Although the new RTSF has the potential to be a perennial source of dust due to the size, commitment on the part of the mine management, shaped by its social corporate responsibility and regulatory requirements, will ensure that better and efficient mitigation measures are employed to contained emissions from source.

Stack emissions from the CPP will add to the ambient pollutants load i.e. high ground level concentrations were predicted for SO_2, NO_2 and CO from the CPP. Since several assumptions were made on the point source emissions at the CPP, the latter should be reassessed once it is fully operational. The model predictions presented in this report have shown what the anticipated implications of the proposed construction and operation of the WRTRP on surrounding ambient air quality. However, with adequate mitigation measures suggested in this report, anticipated emissions from various sources can be reduce and thus ensure compliance with regulatory standards.

The conclusion, the operation of the WRTRP will not compromise or worsen the current air quality scenario of the neighbouring communities at the different MRAs. Impacts are considered minimal, as mining will take place by hydraulic reclamation process.

9 Impact Assessment

The impacts are assessed based on the impact's magnitude as well as the receiver's sensitivity, culminating in an impact significance which identifies the most important impacts that require management.

Based on international guidelines and South African legislation, the following criteria are taken into account when examining potentially significant impacts:

- Nature of impacts (direct/indirect, positive/ negative);
- Duration (short/medium/long-term, permanent(irreversible) / temporary (reversible), frequent/seldom);
- Extent (geographical area, size of affected population/habitat/species);
- Intensity (minimal, severe, replaceable/irreplaceable);
- Probability (high/medium/low probability); and
- Possibility to mitigate, avoid or offset significant adverse impacts.

Details of the impact assessment methodology used to determine the significance of physical, bio-physical and socio-economic impacts are provided below.

The significance rating process follows the established impact/risk assessment formula:

Significance = Consequence x Probability x Nature

Where

Consequence = Intensity + Extent + Duration

And

Probability = Likelihood of an impact occurring

And

Nature = Positive (+1) or negative (-1) impact

Note: In the formula for calculating consequence, the type of impact is multiplied by +1 for positive impacts and -1 for negative impacts

The matrix calculates the rating out of 147, whereby Intensity, Extent, Duration and Probability are each rated out of seven as indicated in Table 9-1. The weight assigned to the various parameters is then multiplied by +1 for positive and -1 for negative impacts.

Impacts are rated prior to mitigation and again after consideration of the mitigation measure proposed in this EIA/EMP Report. The significance of an impact is then determined and categorised into one of eight categories, as indicated in Table 9-2, which is extracted from Table 9-1. The description of the significance ratings is discussed in **Error! Reference source not found.**.

It is important to note that the pre-mitigation rating takes into consideration the activity as proposed, i.e. there may already be certain types of mitigation measures included in the design (for example due to legal requirements). If the potential impact is still considered too high, additional mitigation measures are proposed.

Table 9-1: Impact assessment parameter ratings

RATING	INTENSITY/REPLACABILITY		EXTENT	DURATION/REVERSIBILITY	PROBABILITY
	Negative impacts	Positive impacts			
7	Irreplaceable damage to highly valued items of great natural or social significance or complete breakdown of natural and / or social order.	Noticeable, on-going natural and / or social benefits which have improved the overall conditions of the baseline.	International The effect will occur across international borders.	Permanent: The impact is irreversible, even with management, and will remain after the life of the project.	Definite: There are sound scientific reasons to expect that the impact will definitely occur. >80% probability.
6	Irreplaceable damage to highly valued items of natural or social significance or breakdown of natural and / or social order.	Great improvement to the overall conditions of a large percentage of the baseline.	National Will affect the entire country.	Beyond project life: The impact will remain for some time after the life of the project and is potentially irreversible even with management.	Almost certain / Highly probable: It is most likely that the impact will occur. <80% probability.
5	Very serious widespread natural and / or social baseline changes. Irreparable damage to highly valued items.	On-going and widespread benefits to local communities and natural features of the landscape.	Province/ Region Will affect the entire province or region.	Project Life (>15 years): The impact will cease after the operational life span of the project and can be reversed with sufficient management.	Likely: The impact may occur. <65% probability.
4	On-going serious natural and / or social issues. Significant changes to structures / items of natural or social significance.	Average to intense natural and / or social benefits to some elements of the baseline.	Municipal Area Will affect the whole municipal area.	Long term: 6-15 years and impact can be reversed with management.	Probable: Has occurred here or elsewhere and could therefore occur. <50% probability.

RATING	INTENSITY/REPLACABILITY		EXTENT	DURATION/REVERSIBILITY	PROBABILITY
	Negative impacts	**Positive impacts**			
3	On-going natural and / or social issues. Discernible changes to natural or social baseline.	Average, on-going positive benefits, not widespread but felt by some elements of the baseline.	Local Local extending only as far as the development site area.	Medium term: 1-5 years and impact can be reversed with minimal management.	Unlikely: Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur. <25% probability.
2	Minor natural and / or social impacts which are mostly replaceable. Very little change to the baseline.	Low positive impacts experience by a small percentage of the baseline.	Limited Limited to the site and its immediate surroundings.	Short term: Less than 1 year and is reversible.	Rare / improbable: Conceivable, but only in extreme circumstances. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures. <10% probability.
1	Minimal natural and / or social impacts, low-level replaceable damage with no change to the baseline.	Some low-level natural and / or social benefits felt by a very small percentage of the baseline.	Very limited Limited to specific isolated parts of the site.	Immediate: Less than 1 month and is completely reversible without management.	Highly unlikely / None: Expected never to happen. <1% probability.

Table 9-2: Probability/Consequence Matrix

Probability	Significance																																								
7	-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147
6	-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
5	-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
4	-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
3	-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
2	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
1	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Consequence

Table 9-1: Significance Rating Description

Score	Description	Rating
109 to 147	A very beneficial impact that may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change	Major (positive)
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and / or social) environment	Moderate (positive)
36 to 72	An important positive impact. The impact is insufficient by itself to justify the implementation of the project. These impacts will usually result in positive medium to long-term effect on the natural and / or social environment	Minor (positive)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the natural and / or social environment	Negligible (positive)
-3 to -35	An acceptable negative impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the natural and / or social environment	Negligible (negative)
-36 to -72	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the natural and / or social environment	Minor (negative)
-73 to -108	A serious negative impact which may prevent the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term change to the (natural and / or social) environment and result in severe effects	Moderate (negative)
-109 to -147	A very serious negative impact which may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects. The impacts are likely to be irreversible and/or irreplaceable.	Major (negative)

9.1 Kloof Mining Right Area

Activities associated with the Kloof MRA are shown below. It is worth mentioning that only those with potential to impact on ambient air quality are assessed.

Category	Activity
Kloof Mining Right area	
Infrastructure	Pipeline routes
	Central processing Plant (CPP) incorporating Module 1 float and gold plants and uranium, roaster and acid plants.
	The Regional Tailings Storage Facility (RTSF), RTSF Return Water Dam (RWD) and the Advanced Water Treatment Facility (AWTF). Collectively known as the RTSF complex.
Processes	Disposal of the residue from the AWTF.
	Gold, uranium and sulfur extraction at the CPP (tailings to RTSF)

9.1.1 Construction Phase

9.1.1.1 Project activities assessed

As part of the Construction Phase, the following activity is identified that may impact on the ambient air quality of the area i.e. increasing particulate matter loading in the atmosphere:

- Development of surface infrastructure for the CPP, RTSF, AWTF and pipeline infrastructure.

Table 1-2: Interactions and Impacts of Developing the CPP, RTSF, AWTF and Pipelines

Interaction	Impact
Site clearing	Generation of dust from vehicle wheels
	Direct reduction in the quality of ambient air due to airborne dust
Exposure of loose soils due to loss of vegetation cover	Wind erosion of loose particulate matter
	Increased particulate matter load in the atmosphere leading to deteriorated air quality
	Soiling of surfaces due to fall out dust
	Health implications from inhalation of airborne dust

9.1.1.2 Impact description

Removal of vegetation, grading, paving and material handling takes place using a range of construction equipment. There is movement of contractor and permanent workforce, vehicle activity on access roads, and the levelling and compacting of surfaces during this activity. This often leads to the generation of fugitive dust comprising TSP, PM_{10} and $PM_{2.5}$ from the

wheels of construction equipment. There will be construction of surface infrastructure such as gold plants and uranium, roaster and acid plants at the CPP, construction of the RSTF, AWTF and pipelines.

Emissions from the construction of the CPP, RTSF, AWTF and pipelines were based on the projected area to be cleared. Based on the emission inventory, with 50% of the area cleared at a time, the PM_{10} emissions estimated are 11.3 t/y (CPP) and 374 t/y (RTSF) respectively. Impacts associated with the AWTS and pipelines were considered negligible due to the relatively small area cleared.

9.1.1.3 Management Objectives

The management objective is to ensure that nuisance and contaminated dust emissions associated with the construction of gold plants and uranium, roaster and acid plants at the CPP, RTSF, AWTS and associated pipelines comply with regulatory guidelines and standards for the protection of the environment, human health and wellbeing. In a nutshell, the management objective is to ensure that both on-site and off-site airborne dust concentrations comply with the relevant health protection criteria.

9.1.1.4 Management Actions and Targets

- The construction phase is associated with high fugitive dust generation. Hence, fine particulate monitoring programme is the primary measurement for assessing the performance of the management programme. Use of PM_{10} Aerosol Monitor and dust fall out monitoring network will provide invaluable data needed for compliance purposes.
- Surface stabilisation and the use of dust suppressants, water trucks and sprinklers.
- On-site monitoring will be undertaken daily to capture peak emissions. Monitoring will be undertaken upwind and downwind of active operation and at the site of active operation. Fine particulate monitoring for public exposure will be undertaken at the closest public area downwind.; and
- All monitoring results are to be maintained on a logging sheet for reference and proof of compliance to the air quality standards. All test results shall be assessed against the relevant standards: PM_{10} (75 ug/m^3) and dust fall (600 mg/m2/day).

9.1.1.5 Impact ratings

Table 1-3: Potential Impacts of Developing the infrastructure at the CPP, RTSF, AWTF and Pipeline on Air Quality

Activity and Interaction (Development of the infrastructure at the CPP, RTSF, AWTF and Pipeline require site clearing)			
Dimension	**Rating**	**Motivation**	**Significance**

Activity and Interaction (Development of the infrastructure at the CPP, RTSF, AWTF and Pipeline require site clearing)			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Generation of dust; Reduction in ambient air quality due to airborne dust			
Prior to mitigation/ management			
Duration	Medium term (3)	Dust will be generated the duration of the construction phase	Negligible (negative) – 21
Extent	Local (3)	Airborne dust may extend across the development site area.	
Intensity	Minimal - negative (-1)	Limited damage to minimal area is anticipated	
Probability	Unlikely (3)	There is a possibility that generated dust will impact ambient air quality.	
Nature	Negative		
Mitigation/ Management actions[1]			
▪ Application of wetting agents or dust suppressant on the dirt road and exposed areas; ▪ The area of disturbance must be kept to a minimum and no unnecessary clearing of vegetation must occur. ▪ Drop heights when loading and offloading should be minimised; and ▪ Set maximum speed limits and have these limits enforced.			
Post- mitigation			
Duration	Short term (1)	Dust generation will be limited to the area disturbed and for a few days further	Negligible (negative) – 6
Extent	Very Limited (1)	After mitigation measures are implemented, It is expected that dust impacts will be limited to isolated parts of the site.	
Intensity	Minimal - negative (-1)	Generated dust will have limited damage to minimal area and social impact	
Probability	Rare (2)	Possibility of impacting ambient air quality is very low.	
Nature	Negative		
Activity and Interaction (Development of the infrastructure at CPP, RTSF, AWTF and Pipeline			

[1] This shouldn't be long. it is a brief, bulleted description of the mitigation

Activity and Interaction (Development of the infrastructure at the CPP, RTSF, AWTF and Pipeline require site clearing)			
Dimension	**Rating**	**Motivation**	**Significance**
result in the wind erosion)			
Impact Description: Wind erosion of loose soil; Increased particulate matter in the atmosphere; Soiling of surfaces; Health implications due to inhalation of airborne dust			
Prior to mitigation/ management			
Duration	Medium term (3)	Dust will be generated for the duration of the construction phase	Negligible (negative) – 18
Extent	Limited (2)	Dust generated will be limited to the site and it immediate surroundings	
Intensity	Minimal - negative (-1)	Minimal impact on ambient air quality during construction phase	
Probability	Unlikely (3)	It is unlikely that the dust generated will impact on ambient air quality.	
Nature	Negative		
Mitigation/ Management actions[2]			
▪ Application of wetting agents or dust suppressant on the dirt road and exposed areas; ▪ The area of disturbance must be kept to a minimum; ▪ Drop heights when loaders and offloading construction materials should be minimised; and ▪ Set maximum speed limits and have these limits enforced.			
Post management			
Duration	Short term (2)	Dust will be generated for the duration of the construction phase	Negligible (negative) – 8
Extent	Very Limited (1)	After mitigation measures are implemented, it is expected that dust impacts will be limited to isolated parts of the site.	
Intensity x type of impact	Minimal - negative (-1)	Minimal impact on ambient air quality during construction phase	
Probability	Rare (2)	Possibility of impacting ambient air quality is very low.	
Nature	Negative		

[2] This shouldn't be long. it is a brief, bulleted description of the mitigation

9.1.2 Operational Phase

9.1.2.1 Project activities assessed

During the Operational Phase, the following activities may have an impact on ambient air quality:

- Gold, uranium and sulfur extraction at the CPP
- Deposition and Storage of tailings at the RTSF.

Table 1-4: Interactions and Impacts of Operating CPP and RTSF

Interaction	Impact
Emission of air pollutants	Ambient pollutants loading due to stack emissions
	Reduction in the quality of ambient air due to increased pollutants loading
Generation of dust	Reduction in air quality due to wind erosion of loose particulate matter from RTSF
	Soiling of surrounding surfaces due to fall out dust

9.1.2.2 Impact description

Gold, uranium and sulfur extraction at the CPP will be sources of gaseous emission that may lead to a reduction in air quality in the area. The model simulations show that 1-hour SO_2 and NO_2 maximum predicted ground levels concentrations of 575 µg/m^3 and 323 µg/m^3 respectively. The predicted concentrations are above standard of 350 µg/m^3 and 200 µg/m^3 respectively. However, over a longer averaging period of 24-hour for SO_2 and annual for NO_2 the model predictions were within standard. The other pollutants assessed: PM_{10} and CO were within limit. In terms of pollutant dispersal, the areas impacted were mostly to the north of the CPP.

The RTSF will be a source of dust pollution, especially during windy episodes and in the dry months. This will result in fugitive dust emissions containing TSP, PM_{10} and $PM_{2.5}$ if mitigation is not applied; however model predictions have shown that TSP, PM_{10} and $PM_{2.5}$ emissions are within the regulatory standards.

9.1.2.3 Management Objectives

The management objective is to ensure that emissions on-site and of-site from the gold plants and uranium, roaster and acid plants at the CPP and dust emissions from the RTSF comply with the relevant regulatory standards.

9.1.2.4 Management Actions and Targets

- Emissions management programme to assess performance and ensure compliance to applicable standards should be factored into the day to day operations;

- Stacks should be fitted with scrubbers and electrostatic precipitators to capture emissions;
- Isokinetic sampling of the stacks once a year and subsequent reporting to the regulatory authority;
- Ambient pollutant monitoring: gaseous and particulate emissions at upwind and downwind locations;
- Monitors will be place discretely at the nearest receptor area to assess public exposure; and
- Concentrations of measured criteria pollutants: PM_{10}, SO_2, NO_2 will be assessed against the relevant standards.

9.1.2.5 *Impact ratings*

Table 1-5: Potential Impacts of Operation at the CPP

Activity and Interaction (Gold, uranium and sulfur extraction at the CPP results in pollution)			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Pollution due to stack emissions.			
Prior to mitigation/ management			
Duration	Project Life (5)	Emissions will be released to the atmosphere duration of life of the CPP	Moderate (negative) – 91
Extent	Province (5)	Emissions will affect the entire province or region.	
Intensity	Moderate - negative (-3)	Emissions generated will have moderate impact during the operational phase	
Probability	Almost Certain (7)	Almost certain that impact will occur.	
Nature	Negative		
Mitigation/ Management actions[3]			
▪ Installation of gas scrubbers; ▪ Electrostatic precipitators can be used in the absence of a gas scrubber; and ▪ Isokinetic sampling to assess pollutants and determine efficiency of mitigation.			
Post- mitigation			
Duration	Project Life (5)	Emissions will be released to the atmosphere duration gold, uranium and sulfur extraction at the CPP for the project	Negligible (negative) – 18

[3] This shouldn't be long. it is a brief, bulleted description of the mitigation

Activity and Interaction (Gold, uranium and sulfur extraction at the CPP results in pollution)			
Dimension	**Rating**	**Motivation**	**Significance**
		life.	
Extent	Local (3)	Emissions will extend across the development site area.	
Intensity	Minimal - negative (-1)	Minimal impact on ambient air quality after mitigation measures are implemented	
Probability	Rare (2)	Possibility of impacting ambient air quality is very low, due to design and implementation of adequate mitigation measures.	
Nature	Negative		
Activity and Interaction (Gold, uranium and sulfur extraction at the CPP results in poor air quality)			
Impact Description: Reduction in air quality			
Prior to mitigation/ management			
Duration	Project Life (5)	Gaseous and particulate pollution will take place for the life of mine	Moderate (negative) – 91
Extent	Province (5)	Emissions will affect the entire province or region.	
Intensity x type of impact	Moderate - negative (-3)	Emissions generated will have moderate impact during the operational phase	
Probability	Almost Certain (7)	Almost certain that impact will occur.	
Nature	Negative		
Mitigation/ Management actions			
▪ Installation of gas scrubbers; ▪ Installation of electrostatic precipitators; ▪ Installation of fabric filters; and ▪ Isokinetic sampling to assess pollutants and determine efficiency of mitigation.			
Post management			
Duration	Project Life (5)	Emissions will be released to the atmosphere duration gold, uranium and sulfur extraction at the CPP for the project life.	Negligible (negative) – 18

Activity and Interaction (Gold, uranium and sulfur extraction at the CPP results in pollution)			
Dimension	**Rating**	**Motivation**	**Significance**
Extent	Local (3)	Emissions will extend across the development site area.	
Intensity	Minimal - negative (-1)	Minimal impact on ambient air quality after mitigation measures are implemented	
Probability	Rare (2)	Possibility of impacting ambient air quality is very low, due to design and implementation of adequate mitigation measures.	
Nature	Negative		

Table 1-6: Potential Impacts of Operation at the RTSF

Activity and Interaction (Disposal of Tailings at the RTSF results in dust generation)			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Dust generation from the RTSF			
Prior to mitigation/ management			
Duration	Project Life (5)	Dust generation from tailings will take place for the life of mine	Moderate (negative) – 84
Extent	Local (3)	Airborne dust will extend across the development site area.	
Intensity	Serious Medium term - negative (-4)	Airborne dust will have serious medium term impact during the operational phase	
Probability	Almost Certain (7)	Almost certain that impact will occur.	
Nature	Negative		
Mitigation/ Management actions[4]			
▪ Vegetation of RTSF; ▪ Cladding of side walls with stone; and ▪ Application of wetting agents or dust suppressant on the dirt road and exposed areas. ▪ Concurrent rehabilitation			
Post- mitigation			

[4] This shouldn't be long. it is a brief, bulleted description of the mitigation

Activity and Interaction (Disposal of Tailings at the RTSF results in dust generation)			
Dimension	**Rating**	**Motivation**	**Significance**
Duration	Project Life (5)	Dust will be generated from the RTSF for the duration of the operations	Negligible (negative) – 16
Extent	Limited (2)	Dust will be limited to the site and immediate surroundings with adequate mitigation measures.	
Intensity	Minimal - negative (-1)	Minimal impact on ambient air quality after mitigation measures are implemented	
Probability	Rare (2)	Possibility of impacting ambient air quality is very low, due to design and implementation of adequate mitigation measures.	
Nature	Negative		
Activity and Interaction (Disposal of Tailings at the RTSF results in poor air quality)			
Impact Description: Reduction in air quality			
Prior to mitigation/ management			
Duration	Project Life (5)	Dust generation from tailings will take place for the life of mine	Moderate (negative) – 84
Extent	Local (3)	Airborne dust will extend across the development site area.	
Intensity x type of impact	Serious Medium term - negative (-4)	Airborne dust will have serious medium term impact during the operational phase	
Probability	Almost Certain (7)	Almost certain that impact will occur.	
Nature	Negative		
Mitigation/ Management actions[5]			
▪ Vegetation of side walls; ▪ Cladding of side walls with stone; and ▪ Application of wetting agents or dust suppressant on the dirt road and exposed areas.			
Post management			
Duration	Project Life (5)	Dust will be generated from the RTSF for	Negligible

[5] This shouldn't be long. it is a brief, bulleted description of the mitigation

Activity and Interaction (Disposal of Tailings at the RTSF results in dust generation)			
Dimension	**Rating**	**Motivation**	**Significance**
		the duration of the operational phase	(negative) – 16
Extent	Limited (2)	Dust will be limited to the site and immediate surroundings with adequate mitigation measures.	
Intensity	Minimal - negative (-1)	Minimal impact on ambient air quality after mitigation measures are implemented	
Probability	Rare (2)	Possibility of impacting ambient air quality is very low, due to design and implementation of adequate mitigation measures.	
Nature	Negative		

9.1.3 Decommissioning Phase

9.1.3.1 Project activities assessed

During the Decommissioning Phase, the following activities may have an impact on ambient air quality:

- Dismantling and removal of the CPP and Pipeline;
- Rehabilitation of the RTSF.

Table 1-7: Interactions and Impacts of Dismantling CPP and Pipeline and Rehabilitation of the RTSF

Interaction	Impact
Wind erosion	Generation of dust
	Reduction in the quality of ambient air

9.1.3.2 Impact description

The dismantling of old infrastructure at the CPP will involve the use of heavy machinery and vehicles similar to the construction phase. The impacts on the atmospheric environment during this phase will result in the release of fugitive dust.

At the same time, the final rehabilitation of the RTSF will make use of heavy machinery and vehicles similar to the construction phase. The landscaping and transportation of material to and off site will result in fugitive dust generation.

9.1.3.3 Management Objectives

The management objective is to ensure that emissions on-site and off-site from the dismantling process and subsequent rehabilitation of the area and the RTSF are not in exceedance of the applicable standards for the protection of the environment, human health and wellbeing.

9.1.3.4 Management Actions and Targets

- Adoption of a realistic emissions management programme to assess performance and compliance to applicable standards, is important;
- Monitoring dust levels on site, at upwind and downwind locations preferably at discrete receptors; and
- Ambient levels of dust should be assessed against the relevant standards.

9.1.3.5 Impact ratings

Table 1-8: Potential Impacts of Dismantling CPP and Pipeline and Rehabilitation of the RTSF

Activity and Interaction (Dismantling of CPP results in the generation of dust)			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Reduction in ambient air quality due to dust generation.			
Prior to mitigation/ management			
Duration	Medium term (3)	Dust will be generated during the dismantling process	Negligible (negative) – 21
Extent	Local (3)	Impact will extend across the development site area.	
Intensity	Minimal - negative (-1)	Minimal impact anticipated	
Probability	Unlikely (3)	It is unlikely that a dust impact will occur.	
Nature	Negative		
Mitigation/ Management actions[6]			
▪ The area of disturbance must be kept to a minimum; ▪ Drop heights when loading rubbles should be minimised; ▪ Dismantling should be conducted judiciously.			
Post- mitigation			

[6] This shouldn't be long. it is a brief, bulleted description of the mitigation

Activity and Interaction (Dismantling of CPP results in the generation of dust)			
Dimension	**Rating**	**Motivation**	**Significance**
Duration	Short term (2)	Dust will be generated for the duration decommissioning phase	Negligible (negative) – 10
Extent	Limited (2)	Dust generated will be limited to the site and it immediate surroundings	
Intensity	Minimal - negative (-1)	Minor impact on ambient air quality during construction phase	
Probability	Rare (2)	The possibility of dust generation is very low	
Nature	Negative		
Activity and Interaction (Rehabilitation of the RTSF results in the generation of dust)			
Impact Description: Reduction in air quality; soiling of surrounding surfaces			
Prior to mitigation/ management			
Duration	Short term (2)	Dust will be generated for the duration of this phase	Negligible (negative) – 18
Extent	Limited (2)	Dust generated will be limited to the site and it immediate surroundings	
Intensity	Minor - negative (-2)	The impact on ambient air quality will be minor	
Probability	Unlikely (3)	It is unlikely that the dust generated will impact on ambient air quality.	
Nature	Negative		
Mitigation/ Management actions[7]			
▪ Application of wetting agents or dust suppressant on the dirt road and exposed areas; ▪ The area of disturbance must be kept to a minimum; ▪ Drop heights when loading rubbles and offloading rehabilitation materials should be minimised; and ▪ Set maximum speed limits and have these limits enforced.			
Post management			

[7] This shouldn't be long. it is a brief, bulleted description of the mitigation

Activity and Interaction (Dismantling of CPP results in the generation of dust)			
Dimension	**Rating**	**Motivation**	**Significance**
Duration	Short term (2)	Dust will be generated for the duration rehabilitation activities	Negligible (negative) – 10
Extent	Limited (2)	Dust generated will be limited to the site and immediate surroundings	
Intensity	Minimal - negative (-1)	Minor impact on ambient air quality	
Probability	Rare (2)	The possibility of dust generation is very low with mitigation	
Nature	Negative		

9.1.4 Post-Closure Phase

During this phase, construction, operational and decommissioning activities will have ceased. Cessation of dust generating activities translates to no impacts on ambient air quality, therefore no post closure impacts expected and also no post closure monitoring programme is recommended.

9.2 Driefontein Mining Right Area

Activities associated with the Driefontein MRA are shown below. It is worth mentioning that only those with potential to impact on ambient air quality are assessed.

Category	Activity
Driefontein Mining Right area	
Infrastructure	**Pipeline Routes** (water, slurry and thickened tailings).
	West block Thickener (WBT) and Bulk Water Storage Facility (BWSF) complex.
	Collection sumps and pump stations at the Driefontein 3 and 5 TSFs
Processes	**Hydraulic reclamation of the Driefontein 3 and 5 TSFs.**
Pumping	Pumping water from K10 to the BWSF located next to the WBT.
	Pumping water from the BWSF to the Driefontein TSFs that will be reclaimed.(Dri3 & 5 TSFs)
	Pumping slurry from the TSF sump to the WBT (for Driefontein 3 and 5 TSFs).
	Pumping the thickened slurry from the WBT to the CPP.
Electricity	Power supply from West Driefontein 6 substation to Driefontein 3 TSF.

Category	Activity
supply	Power supply from West Driefontein Gold substation to Driefontein 5 TSF.
	Power supply from East Driefontein Shaft substation to WBT and BWSF.

9.2.1 Construction Phase

9.2.1.1 Project activities assessed

As part of the Construction Phase, the following activities are identified that may impact on the ambient air quality of the area i.e. increasing particulate matter loading in the atmosphere:

- Development of surface infrastructure i.e., WBT, BWSF, pipelines, pump stations at Driefontein 3 TSF and Driefontein 5 TSF and the pipeline leading to the CPP.
- Hydraulic reclamation of the Driefontein 3 and 5 TSFs.

Table 1-9: Interactions and Impacts of Developing WBT, BWSF, Pipeline, Pump Stations and hydraulic reclamation Driefontein 3 and 5 TSFs

Interaction	Impact
Site clearing	Reduction in the quality of air due to dust generation
Wind erosion due to loss of vegetation	Poor air

9.2.1.2 Impact description

Removal of vegetation, grading and paving will take place using a range of construction equipment while developing new pipeline routes. This often leads to the generation of fugitive dust comprising TSP, PM_{10} and $PM_{2.5}$ from the wheels of construction equipment and material handling. The area impacted is considered minimal and impacts on the atmospheric environment will cease once the construction phase ends.

There will be development of surface infrastructure e.g. WBT, BWSF, pipeline and pump stations. There is movement of workforce, vehicle activity on access roads, levelling and compacting of surfaces during this activity. The aforementioned will result in fugitive dust emissions containing TSP, PM_{10} and $PM_{2.5}$.

The initial clearing to remove vegetation from the TSF area to be reclaimed will result in fugitive dust generation, however this will be short-term before the actual hydraulic reclamation process begins. Once the later commences, impacts on ambient air quality is considered negligible due to the hydraulic reclamation.

9.2.1.3 Management Objectives

The management objective is to ensure that emissions on-site and off-site from clearing and wind erosion processes are not in exceedance of the applicable standards for the protection of the environment, human health and wellbeing.

9.2.1.4 Management Actions and Targets

- Adoption of realistic emissions management programme to assess performance and compliance to regulatory standards i.e.600 mg/m^2/day for dust fall and 75 µg/m^3 for PM_{10} and 65 µg/m^3 for $PM_{2.5}$ respectively; and
- Monitoring dust levels on site, at upwind and downwind locations preferably at discrete receptors to assess public exposure.

9.2.1.5 Impact ratings

Table 1-10: Potential impacts of Developing WBT, BWSF and Pipeline on Air Quality

Activity and Interaction: Development of WBT, BWSF and Pipeline will result in site clearing and dust generation			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Reduction in air quality due to dust generation			
Prior to mitigation/ management			
Duration	Short term (1)	Dust generation will be limited to the disturbed area and only for a few days	Negligible (negative) – 12
Extent	Local (2)	Dust generated will be limited to the site and the immediate surroundings	
Intensity	Minimal (1)	Minimal impact on ambient air quality	
Probability	Unlikely (3)	There is possibility that impact will occur.	
Nature	Negative		
Mitigation/ Management actions			
▪ Application of wetting agents or dust suppressant on the dirt road and exposed areas; ▪ ▪ The area of disturbance must be kept to a minimum and no unnecessary clearing of vegetation must occur; ▪ Drop heights when loading and offloading material should be minimised; and ▪ Set maximum speed limits and have these limits enforced.			
Post- mitigation			
Duration	Short term (1)	Dust generation will be limited to the area disturbed for a few days only.	Negligible (negative) – 6

Activity and Interaction: Development of WBT, BWSF and Pipeline will result in site clearing and dust generation			
Extent	Very Limited (1)	After mitigation measures are implemented, It is expected that dust impacts will be limited to isolated parts of the site.	
Intensity	Minimal (1)	Generated dust will have a minimal impact to a small area and may result in a minimal social impact.	
Probability	Rare (2)	Possibility of impacting ambient air quality is very low.	
Nature	Negative		
Activity and Interaction: Development of WBT, BWSF and Pipeline will result in wind erosion			
Impact Description: Reduction in air quality due wind erosion.			
Prior to mitigation/ management			
Duration	Short term (2)	Dust will be generated for the duration of the development	Negligible (negative) – 12
Extent	Very Limited (1)	Dust generated will be limited to the site and its immediate surroundings	
Intensity	Minimal (1)	Minimal impact on ambient air quality during the development	
Probability	Unlikely (3)	There possibility that impact will occur.	
Nature	Negative		
Mitigation/ Management actions			
▪ Application of wetting agents or dust suppressant on the dirt road and exposed areas; ▪ The area of disturbance must be kept to a minimum; ▪ Drop heights when loaders and offloading construction materials should be minimised; and ▪ Set maximum speed limits and have these limits enforced.			
Post management			
Duration	Short term (2)	Dust will be generated for the duration of the development	Negligible (negative) – 8
Extent	Very Limited (1)	After mitigation measures are implemented, It is expected that dust impacts will be limited to isolated parts of the site.	
Intensity	Minimal (1)	Minimal impact on ambient air quality	

Activity and Interaction: Development of WBT, BWSF and Pipeline will result in site clearing and dust generation			
		during development	
Probability	Rare (2)	Possibility of impacting ambient air quality is very low.	
Nature	Negative		

9.2.2 Operational Phase

9.2.2.1 Project activities assessed

During the Operational Phase, the following activities may have an impact on ambient air quality:

- Reclamation of Driefontein 3 TSF and Driefontein 5 TSF.

Table 1-11: Interactions and Impacts of Reclamation of Driefontein 3 TSF and Driefontein 5 TSF on Air Quality

Interaction	Impact
Wind Erosion	Dust generation
	Poor air quality due to fugitive dust emissions

9.2.2.2 Impact description

During the Operational Phase the reclamation activity of Driefontein 3 TSF and Driefontein 5 TSF may have subtle impact on ambient air quality, due to wet reclamation process and few personnel requiring transport to site. Hence, minimal impacts on fugitive dust generation.

9.2.2.3 Management Objectives

The management objective is to ensure that emissions on-site and of-site from the reclamation activity comply with the relevant regulatory standards for the protection of the environment, human health and wellbeing.

9.2.2.4 Management Actions and Targets

- Adoption of realistic emissions management programme to assess performance and compliance to regulatory standards i.e.600 mg/m^2/day for dust fall and 75 µg/m^3 for PM_{10} and 65 µg/m^3 for $PM_{2.5}$ respectively; and
- Monitoring dust levels on site, at upwind and downwind locations preferably at discrete receptors to assess public exposure.

Table 1-12: Potential impacts of Reclamation of Driefontein 3 TSF and Driefontein 5 TSF

Activity and Interaction: Reclamation of Drienfontein 3 TSF and Driefontein 5 TSF will result in dust generation			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Dust generation			
Prior to mitigation/ management			
Duration	Medium term (3)	Dust will be produced in the medium term	Negligible (negative) – 10
Extent	Very Limited (1)	Dust generated will be limited to the site and it immediate surroundings	
Intensity	Limited - negative (-1)	Limited impact on ambient air quality during reclamation	
Probability	Rare (2)	Possibility of dust generation is very low.	
Nature	Negative		
Mitigation/ Management actions			
• Application of wetting agents or dust suppressant on exposed areas; and • Set maximum speed limits and have these limits enforced.			
Post- mitigation			
Duration	Medium term (3)	Dust will be produced in the medium term	Negligible (negative) – 10
Extent	Very limited (1)	After mitigation measures are implemented, It is expected that dust impacts will be limited to isolated parts of the site.	
Intensity	Limited - negative (-1)	Limited impact on ambient air quality during reclamation	
Probability	Rare (2)	The possibility of dust generation is very low	
Nature	Negative		
Activity and Interaction: Development of WBT, BWSF and Pipeline will result poor air quality			
Impact Description: Reduction in ambient air quality			
Prior to mitigation/ management			
Duration	Medium term (3)	Dust will be produced in the medium term	Negligible (negative) – 10
Extent	Very Limited (1)	Dust generated will be limited to the site	

Activity and Interaction: Reclamation of Drienfontein 3 TSF and Driefontein 5 TSF will result in dust generation			
		and it immediate surroundings	
Intensity	Limited - negative (-1)	Limited impact on ambient air quality during reclamation	
Probability	Rare (2)	Possibility of dust generation is very low.	
Nature	Negative		
Mitigation/ Management actions			
▪ Application of wetting agents or dust suppressant on exposed areas; and ▪ Set maximum speed limits and have these limits enforced.			
Post management			
Duration	Medium term (3)	Dust will be produced in the medium term	Negligible (negative) – 10
Extent	Very limited (1)	After mitigation measures are implemented, It is expected that dust impacts will be limited to isolated parts of the site.	
Intensity x type of impact	Limited - negative (-1)	Limited impact on ambient air quality during reclamation	
Probability	Rare (2)	The possibility of dust generation is very low	
Nature	Negative		

9.2.3 Decommissioning Phase

9.2.3.1 Project activities assessed

During the Decommissioning Phase, the following activities may have an impact on ambient air quality:

- Removal of the old infrastructure; and
- Rehabilitation of old footprints.

Table 1-13: Interactions and Impacts of old Infrastructure and Rehabilitation of Footprints

Interaction	Impact
Wind erosion	Reduction in the quality of ambient air due to fugitive emissions from vehicle wheels and wind erosion
	Improved air quality; availability of land for alternative uses

9.2.3.2 Impact description

The dismantling of old infrastructure and rehabilitation of the Drienfontein 3 TSF and Driefontein 5 TSF footprint will involve the use of heavy machinery and vehicles similar to the construction phase. The impacts on the atmospheric environment during this phase will result in the release of fugitive dust emissions containing TSP, PM_{10} and $PM_{2.5}$ from the demolition process. Also, the movement of soil material during rehabilitation will result in fugitive emissions. After reclamation, the source of pollution will have been removed and land will be available for alternative land uses.

9.2.3.3 *Management Objectives*

The management objective is to ensure that emissions on-site and off-site from the dismantling process and subsequent rehabilitation of the Driefontein 3 TSF and Driefontein 5 TSF footprints are not in exceedance of the applicable standards for the protection of the environment, human health and wellbeing.

9.2.3.4 *Management Actions and Targets*

- Adoption of realistic emissions management programme to assess performance and compliance to applicable standards.
- Use of dust suppressant, monitoring dust levels on site, at upwind and downwind locations preferably at discrete receptors to assess public exposure.
- Assess ambient levels of dust against the relevant standards i.e. 600 mg/m^2/day for dust fall and 75 µg/m^3 for PM_{10} and 65 µg/m^3 for $PM_{2.5}$ respectively.

Table 1-14: Potential Impacts of

Demolition of Old Infrastructure and Rehabilitation of Driefontein 3 TSF and Driefontein 5 TSF

Activity and Interaction: Demolition of Old Infrastructure will result in dust generation			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Reduction in air quality from demolition			
Prior to mitigation/ management			
Duration	Short term (2)	Dust will be generated for the duration demolition	Negligible (negative) – 18
Extent	Limited (2)	Dust generated will be limited to the site and it immediate surroundings	
Intensity	Minor - negative (-2)	The impact will be minor	
Probability	Unlikely (3)	Possibility that the dust generated will impact on ambient air quality.	

Activity and Interaction: Demolition of Old Infrastructure will result in dust generation			
Nature	Negative		
Mitigation/ Management actions			
• Application of wetting agents or dust suppressant on the dirt road and exposed areas; • The area of disturbance must be kept to a minimum; • Drop heights when loaders off load rubble should be minimised; and • Set maximum speed limits and have these limits enforced.			
Post- mitigation			
Duration	Short term (2)	Dust will be generated for the duration of the demolition	Negligible (negative) – 10
Extent	Limited (2)	Dust generated will be limited to the site and it immediate surroundings	
Intensity	Minimal - negative (-1)	Minimal impact on ambient air quality during demolition	
Probability	Rare (2)	The possibility of dust generation is very low	
Nature	Medium term (3)	Dust will be produced in the medium term	
Activity and Interaction: Rehabilitation of old footprint will result in dust generation			
Impact Description: Reduction in ambient air quality			
Prior to mitigation/ management			
Duration	Short term (2)	Dust will be generated for the duration rehabilitation	Negligible (negative) – 18
Extent	Limited (2)	Dust generated will be limited to the site and it immediate surroundings	
Intensity	Minor - negative (-2)	The impact will be minor.	
Probability	Unlikely (3)	Possibility that the dust generated will impact on ambient air quality.	
Nature	Negative		
Mitigation/ Management actions			
▪ Application of wetting agents or dust suppressant on the dirt road and exposed areas; ▪ The area of disturbance must be kept to a minimum; ▪ Drop heights when loaders rubbles and offloading rehabilitation materials should be minimised; ▪ Set maximum speed limits and have these limits enforced; and ▪ Grassing and re-seeding areas for increased vegetation cover			

Activity and Interaction: Demolition of Old Infrastructure will result in dust generation			
Post management			
Duration	Short term (2)	Dust will be generated for the duration the rehabilitation	Negligible (negative) – 10
Extent	Limited (2)	Dust generated will be limited to the site and the immediate surroundings	
Intensity	Minimal - negative (-1)	Minimal impact on ambient air quality	
Probability	Rare (2)	The possibility of dust generation is very low	
Nature	Negative		
Activity and Interaction: Rehabilitation of old footprint will result in elimination of pollution source and make land available for alternative land uses			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Better air quality and availability of land for alternative land uses			
Prior to mitigation/ management			
Duration	Short term (2)	Dust will be generated for the duration rehabilitation process	Negligible (negative) – 18
Extent	Limited (2)	Dust generated will be limited to the site and it immediate surroundings	
Intensity	Minor - negative (-2)	The impact will be minor	
Probability	Unlikely (3)	Possibility that the dust generated will impact on ambient air quality.	
Nature	Negative		
Mitigation/ Management actions			
▪ Application of wetting agents or dust suppressant on the dirt road and exposed areas; ▪ The area of disturbance must be kept to a minimum; ▪ Drop heights when loaders off load rubble should be minimised; ▪ Set maximum speed limits and have these limits enforced; and ▪ Vegetation of footprint			
Post- mitigation			
Duration	Long term (4)	Dust will be eliminated in the area on a long-term	Moderate (positive) 78
Extent	Regional (5)	The site and the region will be exposed to	

Activity and Interaction: Demolition of Old Infrastructure will result in dust generation			
		good air quality	
Intensity	Average to intense air quality (+4)	Minimal impact on ambient air quality during demolition	
Probability	Almost Certain (6)	It is almost certain that the quality of air will improve	
Nature			

9.2.4 Post-Closure Phase

During the post-closure phase, construction, operational and decommissioning activities will have ceased. Cessation of dust generating processes means impact on ambient air quality is not anticipated, therefore no post closure impacts expected and no post closure monitoring programme is recommended.

9.3 Cooke Mining Right Area (Cooke TSF)

Activities associated with the Cooke MRA are shown below. It is worth mentioning that only those with potential to impact on ambient air quality are assessed.

Category	Activity
Cooke Mining Right area	
Infrastructure	**Pipeline Routes** (water, slurry and thickened tailings).
	Cooke thickener and BWSF.
	Collection sumps and pump stations at the Cooke TSF.
Processes	Abstraction of water from Cooke 1 shaft.
	Hydraulic reclamation of the Cooke TSF and C4S TSF (which include temporary storage of the slurry in a sump).
Pumping	Pumping 500 kt/m of tailings from the Cooke TSF to the Cooke thickener.
	Pumping from the Cooke thickener to the CPP via Ezulwini.
Electricity supply	Power supply from the Cooke substation to the Cooke thickener.
	Power supply from the Cooke Plant to the Cooke TSF

9.3.1 Construction Phase

9.3.1.1 Project activities assessed

As part of the Construction Phase, the following activities are identified that may impact on the ambient air quality of the area i.e. increasing particulate matter loading in the atmosphere:

- Site clearing
- Development of surface infrastructure, pump station and pipeline leading to CPP
- Reclamation of Cooke TSF and C4S TSF

Table 1-15: Interactions and Impacts of Developing Surface Infrastructure and Reclamation of Cooke TSF and C4S TSF

Interaction	Impact
Site clearing	Dust generation
Wind erosion due to loss of vegetation	Poor air quality

9.3.1.2 Impact description

Removal of vegetation, grading and paving takes place using a range of construction equipment for the development of the pipeline route. This often leads to the generation of fugitive dust comprising TSP, PM_{10} and $PM_{2.5}$ from the wheels of construction equipment and

material handling. The area impacted is considered minimal and impacts on the atmospheric environment will cease once the construction phase ends. Also, hydraulic reclamation is a wet process and will have minimal impact on ambient air quality.

9.3.1.3 Management Objectives

The management objective is to ensure that emissions on-site and of-site from clearing and wind erosion processes are not in exceedance of the applicable standards for the protection of the environment, human health and wellbeing.

9.3.1.4 Management Actions and Targets

- Adoption of realistic emissions management programme to assess performance and compliance to regulatory standards; and
- Monitoring dust levels on site, at upwind and downwind locations preferably at discrete receptors to assess public exposure.

9.3.1.5 Impact ratings

Table 1-16: Potential impacts of

Developing Surface Infrastructure and Reclamation of Cooke TSF and C4S TSF on Air Quality

Activity and Interaction: Site clearing for the development of Surface Infrastructure will lead to dust generation			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Reduction in air quality due to dust generation			
Prior to mitigation/ management			
Duration	Short term (1)	Dust generation will be limited to the area disturbed and for few days	Negligible (negative) – 12
Extent	Local (2)	Dust generated will be limited to the site and it immediate surroundings	
Intensity	Minimal - negative (-1)	Minor impact on ambient air quality	
Probability	Unlikely (3)	It is unlikely that the dust generated will impact on ambient air quality.	
Nature	Negative		
Mitigation/ Management actions			
▪ Application of wetting agents or dust suppressant on the dirt road and exposed areas; ▪ The area of disturbance must be kept to a minimum and no unnecessary clearing of vegetation must occur; ▪ Drop heights when loaders and offloading material should be minimised; and			

Activity and Interaction: Site clearing for the development of Surface Infrastructure will lead to dust generation			
▪ Set maximum speed limits and have these limits enforced.			
Post- mitigation			
Duration	Immediate (1)	Dust generation will be limited to the area disturbed and for few days	Negligible (negative) – 6
Extent	Very Limited (1)	After mitigation measures are implemented, it is expected that dust impacts will be limited to isolated parts of the site.	
Intensity	Minimal - negative (-1)	Generated dust will have limited damage to minimal area and social impact	
Probability	Rare (2)	Possibility of impacting ambient air quality is very low.	
Nature	Negative		
Activity and Interaction: Construction of Surface Infrastructure Pipeline and Pump Stations will result in fugitive dust			
Impact Description: Reduction in air quality due wind erosion.			
Prior to mitigation/ management			
Duration	Short term (2)	Dust will be generated for the duration of the construction phase	Negligible (negative) – 12
Extent	Very Limited (1)	Dust generated will be limited to the site and its immediate surroundings	
Intensity	Minimal - negative (-1)	Minor impact on ambient air quality during construction phase	
Probability	Unlikely (3)	It is unlikely that the dust generated will impact on ambient air quality.	
Nature	Negative		
Mitigation/ Management actions			
▪ Application of wetting agents or dust suppressant on the dirt road and exposed areas; ▪ The area of disturbance must be kept to a minimum; ▪ Drop heights when loading and offloading construction materials should be minimised; and ▪ Set maximum speed limits and have these limits enforced.			
Post management			
Duration	Short term (2)	Dust will be generated for the duration of	Negligible (negative)

Activity and Interaction: Site clearing for the development of Surface Infrastructure will lead to dust generation			
		the construction phase	– 8
Extent	Very Limited (1)	After mitigation measures are implemented, it is expected that dust impacts will be limited to isolated parts of the site.	
Intensity	Minimal - negative (-1)	Minor impact on ambient air quality during construction phase	
Probability	Rare (2)	Possibility of impacting ambient air quality is very low.	
Nature	Negative		

9.3.2 Operational Phase

9.3.2.1 Project activities assessed

During the Operational Phase, the following activities may have an impact on ambient air quality:

- Reclamation of Cooke TSF and C4S TSF.

Table 1-17: Interactions and Impacts of Reclamation of Cooke TSF and C4S TSF on Air Quality

Interaction	Impact
Wind erosion	Reduction in the quality of ambient air due to fugitive dust emissions

9.3.2.2 Impact description

Hydraulic reclamation is a wet process; as such impact on ambient air quality will be minimal. For Cooke TSF, model predication showed that the maximum ground level concentrations of PM_{10}, daily and annual were in exceedance of the standard of 75 µg/m3 and 40 µg/m3 respectively. However, these exceedances were confined to the centre of the Cooke TSF. The predicted daily and annual $PM_{2.5}$ concentrations were within regulatory limit of 65 µg/3 and 25 µg/m3 respectively. The maximum predicted dust deposition rates were within the standard of 600 mg/m2/day.

For C4S, model simulation showed daily PM_{10} maximum predicted above the limit of 75 µg/m3, while the annual concentration was within the limit of 40 µg/m3. The predicted daily and annual $PM_{2.5}$ concentrations were within regulatory limit of 65 µg/3 and 25 µg/m3 respectively. The maximum predicted dust deposition rate was within the standard of 600 mg/m2/day.

9.3.2.3 Management Objectives

The management objective is to ensure that emissions on-site and of-site from the reclamation activity comply with the relevant regulatory standards for the protection of the environment, human health and wellbeing. The will be particularly crucial because of the high radioactivity of the Cooke TSF.

9.3.2.4 Management Actions and Targets

- Application of dust suppressants and implementation of emissions management programme to assess performance and compliance to regulatory standards; and
- Monitoring dust levels on site, at upwind and downwind locations preferably at discrete receptors to assess public exposure.

Table 1-18: Potential impacts of Reclamation of Cooke TSF and C4S TSF

Activity and Interaction: Reclamation of Cooke TSF will result in fugitive dust emissions			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Reduction in air quality from wind erosion			
Prior to mitigation/ management			
Duration	Medium term (3)	Dust will be produced in the medium term	Negligible (negative) – 10
Extent	Very Limited (1)	Dust generated will be limited to the site and the immediate surroundings	
Intensity	Limited - negative (-1)	Limited impact on ambient air quality during operational phase	
Probability	Rare (2)	Possibility of dust generation is very low.	
Nature	Negative		
Mitigation/ Management actions			
▪ Application of wetting agents or dust suppressant on exposed areas; and ▪ Set maximum speed limits and have these limits enforced.			
Post- mitigation			
Duration	Medium term (3)	Dust will be produced in the medium term	Negligible (negative) – 10
Extent	Very limited (1)	After mitigation measures are implemented, it is expected that dust impacts will be limited to isolated parts of the site.	
Intensity	Limited - negative (-1)	Limited impact on ambient air quality during operational phase	
Probability	Rare (2)	Possibility of dust generation is very low	

Activity and Interaction: Reclamation of Cooke TSF will result in fugitive dust emissions			
Nature	Negative		

9.3.3 Decommissioning Phase

9.3.3.1 Project activities assessed

During the Cooke TSF and C4S TSF Decommissioning Phase, the following activities may have an impact on ambient air quality:

- Removal of the pipeline and pump stations; and
- Rehabilitation of old footprints.

Table 1-19: Interactions and Impacts of old Infrastructure and Rehabilitation of Footprints

Interaction	Impact
Wind erosion	Fugitive dust emissions
	Improved air quality; availability of land for alternative uses

9.3.3.2 Impact description

The dismantling of old infrastructure i.e. pipelines and pump stations and the rehabilitation of the Cooke TSF and C4S TSF footprints will involve the use of heavy machinery and vehicles similar to the construction phase. The impacts on the atmospheric environment will be minimal since the phase will be short-term. Also, the movement of soil material during rehabilitation will result in fugitive emissions. After reclamation, the source of pollution will have been removed and land will be available for alternative land uses.

9.3.3.3 Management Objectives

The management objective is to ensure that emissions on-site and off-site from the dismantling process and subsequent rehabilitation of the footprints are not in exceedance of the applicable standards for the protection of the environment, human health and wellbeing.

9.3.3.4 Management Actions and Targets

- Use of dust suppressant to contain wind erosion, monitoring dust levels on site, at upwind and downwind locations preferably at discrete receptors to assess public exposure; and
- Adoption of realistic emissions management programme to assess performance and compliance to applicable standards.

Table 1-20: Potential Impacts of Demolition of Old Infrastructure and Rehabilitation of TSF footprints

Activity and Interaction: Demolition of Old Infrastructure will result in dust generation			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Fugitive emissions			

Activity and Interaction: Demolition of Old Infrastructure will result in dust generation			
Prior to mitigation/ management			
Duration	Short term (2)	Dust will be generated for the duration demolition	Negligible (negative) – 18
Extent	Limited (2)	Dust generated will be limited to the site and it immediate surroundings	
Intensity	Minor - negative (-2)	The impact will be minor	
Probability	Unlikely (3)	Possibility that the dust generated will impact on ambient air quality.	
Nature	Negative		
Mitigation/ Management actions			
• Application of wetting agents or dust suppressant on the dirt road and exposed areas; • The area of disturbance must be kept to a minimum; • Drop heights when loaders off load rubble should be minimised; and • Set maximum speed limits and have these limits enforced.			
Post- mitigation			
Duration	Short term (2)	Dust will be generated for the duration of the demolition	Negligible (negative) – 10
Extent	Limited (2)	Dust generated will be limited to the site and it immediate surroundings	
Intensity	Minimal - negative (-1)	Minimal impact on ambient air quality during demolition	
Probability	Rare (2)	The possibility of dust generation is very low	
Nature	Medium term (3)	Dust will be produced in the medium term	
Activity and Interaction: Rehabilitation of footprint will result in elimination of pollution source and make land available for alternative land uses			
Impact Description: Reduction in ambient air quality			
Prior to mitigation/ management			
Duration	Short term (2)	Dust will be generated for the duration rehabilitation	Negligible (negative) – 18
Extent	Limited (2)	Dust generated will be limited to the site and it immediate surroundings	
Intensity	Minor - negative	The impact will be minor.	

Activity and Interaction: Demolition of Old Infrastructure will result in dust generation			
	(-2)		
Probability	Unlikely (3)	Possibility that the dust generated will impact on ambient air quality.	
Nature	Negative		
Mitigation/ Management actions			
▪ Application of wetting agents or dust suppressant on the dirt road and exposed areas; ▪ The area of disturbance must be kept to a minimum; ▪ Drop heights when loaders rubbles and offloading rehabilitation materials should be minimised; and ▪ Set maximum speed limits and have these limits enforce.			
Post management			
Duration	Short term (2)	Dust will be generated for the duration the rehabilitation	Negligible (negative) – 10
Extent	Limited (2)	Dust generated will be limited to the site and the immediate surroundings	
Intensity	Minimal - negative (-1)	Minimal impact on ambient air quality	
Probability	Rare (2)	The possibility of dust generation is very low	
Nature	Negative		
Activity and Interaction: Rehabilitation of footprint will result in elimination of a pollution source and availability of land for alternative land uses			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Better air quality and availability of land for alternative land uses			
Prior to mitigation/ management			
Duration	Short term (2)	Dust will be generated for the duration demolition	Negligible (negative) – 18
Extent	Limited (2)	Dust generated will be limited to the site and it immediate surroundings	
Intensity	Minor - negative (-2)	The impact will be minor	
Probability	Unlikely (3)	Possibility that the dust generated will impact on ambient air quality.	
Nature	Negative		

Activity and Interaction: Demolition of Old Infrastructure will result in dust generation			
Mitigation/ Management actions			
• Application of wetting agents or dust suppressant on the dirt road and exposed areas; • The area of disturbance must be kept to a minimum; • Drop heights when loading and offloading rubble should be minimised; • Set maximum speed limits and have these limits enforced; • Vegetation of footprint			
Post- mitigation			
Duration	Long term (4)	Dust will be eliminated in the area on a long-term	Moderate (positive) 78
Extent	Regional (5)	The site and the region will be exposed to good air quality	
Intensity	Average to intense air quality (+4)	Minimal impact on ambient air quality during demolition	
Probability	Almost Certain (6)	It is almost certain that the quality of air will improve	
Nature			

9.3.4 Post-Closure Phase

During the Post-Closure Phase, construction, operational and decommissioning activities will have ceased. Cessation of dust generating sources mean impacts on ambient air quality is not anticipated, therefore, no post closure impacts are expected and also no post closure monitoring programme is recommended.

9.4 Ezulwini Mining Right Area

Activities associated with the Ezulwini MRA are shown below. It is worth mentioning that only those activities with potential to impact on ambient air quality are assessed.

Category	Activity
Ezulwini Mining Right area	
	Abstraction of water from Cooke shaft.
Pumping	Pumping water from Cooke 4 Shaft to the C4S TSF for reclamation.
	Pumping slurry from the TSF sump to the CPP.
Electricity supply	Power supply from Ezulwini plant to the C4S TSF

9.4.1 Construction Phase

9.4.1.1 Project activities assessed

As part of the Construction Phase, the following activities are identified that may impact on the ambient air quality of the area i.e. increased particulate matter loading in the atmosphere:

- Site clearance for the construction of pipeline and pump station

Table 1-21: Interactions and Impacts of Site Clearing and Development of surface Pipeline and Pump Stations

Interaction	Impact
Site clearing	Reduction in the quality of ambient air due to site clearing
Wind erosion due to loss of vegetation	Increased particulate matter load in the atmosphere leading to deteriorated air quality

9.4.1.2 Impact description

Removal of vegetation, grading and paving will take place using a range of construction equipment. This often leads to the generation of fugitive dust comprising TSP, PM_{10} and $PM_{2.5}$ from the wheels of construction equipment and material handling. The area impacted is considered minimal and impacts on the atmospheric environment will cease once the construction phase ends.

9.4.1.3 Management Objectives

The overall objective of management is to ensure that emissions on-site and off-site from clearing and wind erosion processes are not in exceedance of the applicable standards for the protection of the environment, human health and wellbeing.

9.4.1.4 Management Actions and Targets

- Adoption of realistic emissions management programme to assess performance and compliance to regulatory standards. Monitoring dust levels on site, at upwind and downwind locations preferably at discrete receptors to assess public exposure.

9.4.1.5 Impact ratings

Table 1-22: Potential impacts of

Site Clearing and Development of Surface Infrastructure

Activity and Interaction: Site clearing will result in dust generation			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Reduction in air quality due to dust generation			
Prior to mitigation/ management			
Duration	Short term (1)	Dust generation will be limited to the time of disturbance and for few days after	Negligible (negative) – 12
Extent	Local (2)	Dust generated will be limited to the site and it immediate surroundings	
Intensity x type of impact	Minimal - negative (-1)	Minimal impact on ambient air quality	
Probability	Unlikely (3)	It is unlikely that the dust generated will impact on ambient air quality.	
Nature	Negative		
Mitigation/ Management actions			
• Application of wetting agents or dust suppressant on the exposed areas; • The area of disturbance must be kept to a minimum and no unnecessary clearing of vegetation must occur; • Drop heights when loaders and offloading material should be minimised; and • Set maximum speed limits and have these limits enforced.			
Post- mitigation			
Duration	Short term (1)	Dust generation will be limited to the area disturbed and for few days	Negligible (negative) – 6
Extent	Very Limited (1)	After mitigation measures are implemented, It is expected that dust impacts will be limited to isolated parts of the site.	
Intensity x type of impact	Minimal - negative (-1)	Generated dust will have limited damage to minimal area and social impact	

Activity and Interaction: Site clearing will result in dust generation			
Probability	Rare (2)	Possibility of impacting ambient air quality is very low.	
Nature	Negative		
Activity and Interaction: Development of Surface Infrastructure pipeline and pump stations will result in wind erosion			
Impact Description: Reduction in air quality due wind erosion.			
Prior to mitigation/ management			
Duration	Short term (2)	Dust will be generated for the duration of the construction phase	Negligible (negative) – 15
Extent	Very Limited (1)	Dust generated will be limited to the site and it immediate surroundings	
Intensity x type of impact	Minimal - negative (-1)	Minor impact on ambient air quality during construction phase	
Probability	Unlikely (3)	It is unlikely that the dust generated will impact on ambient air quality.	
Nature	Negative		
Mitigation/ Management actions			
▪ Application of wetting agents or dust suppressant on the exposed areas; ▪ The area of disturbance must be kept to a minimum; ▪ Drop heights when loaders and offloading construction materials should be minimised; ▪ Set maximum speed limits and have these limits enforced.			
Post management			
Duration	Short term (2)	Dust will be generated for the duration of the construction phase	Negligible (negative) – 8
Extent	Very Limited (1)	After mitigation measures are implemented, It is expected that dust impacts will be limited to isolated parts of the site.	
Intensity x type of impact	Minimal - negative (-1)	Minor impact on ambient air quality during construction phase	
Probability	Rare (2)	Possibility of impacting ambient air quality is very low.	
Nature	Negative		

9.4.2 Operational Phase

9.4.2.1 Project activities assessed

During the Operational Phase, impacts are considered negligible and were not assessed.

9.4.2.2 Management Objectives

The management objective is to ensure that emissions on-site and off-site from the reclamation activity comply with the relevant regulatory standards for the protection of the environment, human health and wellbeing.

9.4.2.3 Management Actions and Targets

- Application of dust suppressants and implementation of emissions management programme to assess performance and compliance to regulatory standards; and
- Management will ensure dust monitoring is conducted on site, at upwind and downwind locations preferably at discrete receptors to assess public exposure.

9.4.3 Decommissioning Phase

9.4.3.1 Project activities assessed

During the Decommissioning Phase, the following activities may have an impact on ambient air quality:

- Removal of the pipeline and pump stations

Table 1-23: Interactions and Impacts of old Infrastructure

Interaction	Impact
Wind erosion	Reduction in the quality of ambient air

9.4.3.2 Impact description

The dismantling of old infrastructure i.e. pipelines and pump stations will involve the use of heavy machinery and vehicles similar to those used in the construction phase. The impact on the atmospheric environment during this phase is considered negligible.

9.4.3.3 Management Objectives

The management objective is to ensure that emissions on-site and of-site from the dismantling process is not in exceedance of the applicable standards for the protection of the environment, human health and wellbeing.

9.4.3.4 Management Actions and Targets

- Use of dust suppressant to contain wind erosion, monitoring dust levels on site, at upwind and downwind locations preferably at discrete receptors to assess public exposure; and
- Adoption of realistic emissions management programme to assess performance and compliance to applicable standards.

Table 1-24: Potential Impacts of Demolition of Old Infrastructure

Activity and Interaction: Demolition of Old Infrastructure will result in dust generation			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Reduction in air quality from demolition			
Prior to mitigation/ management			
Duration	Short term (2)	Dust will be generated for the duration this phase	Negligible (negative) – 18
Extent	Limited (2)	Dust generated will be limited to the site and it immediate surroundings	
Intensity x type of impact	Minor - negative (-2)	The impact on will be minor	
Probability	Unlikely (3)	It is unlikely that the dust generated will impact on ambient air quality.	
Nature	Negative		
Mitigation/ Management actions			
• The area of disturbance must be kept to a minimum; • Drop heights when loading and offloading rubble should be minimised;			
Post- mitigation			
Duration	Short term (2)	Dust will be generated for the duration for the duration of the decommissioning phase	Negligible (negative) – 10
Extent	Limited (2)	Dust generated will be limited to the site and it immediate surroundings	
Intensity x type of impact	Minimal - negative (-1)	Minor impacts on ambient air quality during decommissioning phase	
Probability	Rare (2)	The possibility of dust generation is very low	
Nature	Negative		

9.4.4 Post-Closure Phase

The Post-closure Phase, construction, operational and decommissioning activities will have ceased. Cessation of dust generating activities mean impacts on ambient air quality is not anticipated, therefore no post closure impacts expected and also no post closure monitoring programme is recommended.

10 Cumulative Impacts

Air quality data from the existing dust monitoring network: Kloof, Driefontein, Cooke and Ezulwini show deposition rates that are representative of background. Few exceedances of the residential limit (600 mg/m2/day), and sometimes industrial limit (1200 mg/m2/day) were observed across the MRAs. In general, monthly dust deposition rates are within limit. The analysed PM_{10} data for 2013 and 2014 collected at the Driefontein Monitoring Station were within the daily limit of 75 µg/m^3 for most of the time. This is not to say there were no exceedances, but rather a general statement. Ambient levels in the vicinity of the RTSF will be influence by other TSFs in the area i.e. South Deep TSF and the Gold Fields TSF.

The operational phase of the Project at the different MRAs will have localised impacts in the immediate vicinity. Predicted ground level concentrations are low and generally within limit values. Also, the mining method is hydraulic reclamation, with minimal impact on the ambient environment. It is not envisaged that the proposed project will compromise the current ambient air quality scenario and cumulative impacts are not anticipated.

One of the key objectives of the ultimate project is to re-mine and thus physically remove the historical sources of dust. The hydraulic reclamation process is in itself mitigation due to the use of water. The RTSF will be rehabilitated concurrently. The current dust issues will disappear once reclamation commences. Impacts will be negligible and confined to the project areas during reclamation. The newly planned RTSF will be rehabilitated concurrently, with negligible emissions to the surrounding atmosphere.

11 Unplanned Events and Low Risks

Information on the likelihood of occurrence of unplanned events was drawn from statistics in the industry and related organisations. Data on the type of incidents and frequency will assist in establishing the nature i.e. risk levels, geographic spread and appropriate mitigation measures to adopt in the event of one. Highlighted below are some likely unplanned events related to projects of this nature and the associated management measures to address them (Table 11-1).

Table 11-1: Unplanned Events, Low Risks and their Management Measures

Unplanned event	Potential impact	Mitigation/ Management/ Monitoring
Operational error at any of plants at the CPP	Poor air quality - release of pollutants i.e. SO_2, NO_2 over allowable limits	Strict adherence to "Standard Operating Procedure" Emergency preparedness and response in

		place
Leaks or failure in gas handling or emission control system at any of the plants in CPP i.e. malfunctioning scrubbers, electrostatic precipitators	Poor air quality - release of pollutants above allowable limits	Emergency preparedness and response in place Ambient air quality monitoring
Dust storm episode (erosion of the TSFs)	Poor air quality	Vegetation of tailings, use of dust suppressants on exposed areas, dust monitoring

12 Environmental Management Plan

The objective of an Environmental Management Plan (EMP) is to present mitigation to (a) avoidable adverse impacts associated with the development of a project and (b) to enhance potential positives.

12.1 Project Activities with the most Significant Air Quality Impacts

This section lists the aspects that are expected to impact more on ambient air quality for each phase of the operation (Table 12-1).

Table 12-1: Most Significant Impacts

Aspects	Potential Significant Impacts
Kloof Mining Right Area	
Operation of the CPP	*Releases of air emissions to ambient air*
Operation of the RTSFs	*Due to the concurrent rehabilitation, dust storm episodes will have minimal impact on air quality.*
Driefontein Mining Right Area	
Construction and dismantling of surface infrastructure: pipelines and pump station	*Dust generation, resulting in poor air quality.*
Rehabilitation of old footprint	*Dust generation, resulting in poor air quality. Rehabilitation leading to improve quality of air.*
Cooke Mining Right Area	
Dismantling of surface infrastructure: pipeline and pump station	*Dust generation, resulting in poor air quality.*

Aspects	Potential Significant Impacts
Rehabilitation of old footprint	*Dust generation, resulting in poor air quality. Rehabilitation leading to improve quality of air.*
Ezulwini Mining Right Area	
Dismantling of surface infrastructure: pipeline and pump station	*Dust generation, resulting in poor air quality.*

12.2 Summary of Mitigation and Management

Table 12-1 provides a description of the most significant impacts anticipated during the construction, operational and decommissioning phases. Table 12-2 to Table 12-4 provide a summary of the proposed project activities, environmental aspects and impacts on the receiving environment. Information on the frequency of mitigation, relevant legal requirements, recommended management plans, timing of implementation, and roles / responsibilities of persons implementing the EMP. The prescribed environmental standards are listed in Table 12-5.

Table 12-2: Impacts

Activities	Phase	Size and scale of disturbance	Mitigation Measures	Compliance with Standards	Time period for Implementation
▪ CPP	▪ Construction	▪ Hectares and impact is limited to the site and immediate surroundings.	▪ Application of wetting agents or dust suppressant on the dirt roads and exposed areas during construction i.e. using water bowser; ▪ The area of disturbance must be kept to a minimum; and ▪ Set maximum speed limits and have these limits enforced.	▪ National Environmental Management: Air Quality Act, Act.39 of 2004, 2004; ▪ National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) - National Dust Control Regulations (2013).	▪ Prior to start of operation and for the project life.
	▪ Operational	▪ Hectares and impact is regional extending across the site to nearby settlements and beyond.	▪ Enclosure and use of fabric filters; ▪ Electrostatic precipitator (ESP); ▪ Gas scrubbers.	▪ National Environmental Management: Air Quality Act, Act.39 of 2004, 2004; ▪ Ambient air quality - Limits for common pollutants, SANS1929:2005. ▪ National Environmental Management: Air Quality Act (Act.39 of 2004) – Listed Activities and Associated Minimum Emission Standard, 2013.	▪ Prior to the start of operation and for the project life.
	▪ Decommissioning	▪ Hectares and impact is limited to the site and immediate surroundings.	▪ The dismantling area disturbed must be kept to a minimum; ▪ Drop heights when loading rubbles and offloading must be minimised; ▪ Long-term exposed areas should be sprayed wetting agent	▪ National Environmental Management: Air Quality Act, Act.39 of 2004, 2004; ▪ National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), National Dust Control Regulations (2013).	▪ During the decommissioning operation and few month after it ends.
▪ RTSF	▪ Construction	▪ Hectares and impact is limited to the site and immediate surroundings.	▪ Application of wetting agents or dust suppressant on the dirt roads and exposed areas during the construction of RTSF; ▪ The area of disturbance must be kept to a minimum; ▪ Set maximum speed limits and have these limits enforced; ▪ Long-term exposed areas should be sprayed with wetting agents.	▪ National Environmental Management: Air Quality Act, Act.39 of 2004, 2004; ▪ National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), National Dust Control Regulations (2013).	▪ Prior to the start of operation and for the project life.

Activities	Phase	Size and scale of disturbance	Mitigation Measures	Compliance with Standards	Time period for Implementation
	▪ Operational	▪ Hectares and impact is local extending across the site to nearby settlements.	▪ Vegetation or cladding of side walls; ▪ Application of wetting agents or dust suppressant on the dirt road; ▪ Set maximum speed limits and have these limits enforced. ▪ Application of wetting agents or dust suppressant on the beach of the RTSF.	▪ National Environmental Management: Air Quality Act, Act.39 of 2004, 2004; ▪ Ambient air quality - Limits for common pollutants, SANS1929:2005. ▪ National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) - National Dust Control Regulations (2013).	▪ Prior to the start of operation and for the project life.
	▪ Decommissioning	▪ Hectares and impact is limited to the site and immediate surroundings.	▪ Application of wetting agents or dust suppressant on the dirt i.e. water bowsers; ▪ The area of disturbance must be kept to a minimum; ▪ Drop heights when loading and offloading rehabilitation materials should be minimised; and ▪ Set maximum speed limits and have these limits enforced.	▪ National Environmental Management: Air Quality Act, Act.39 of 2004, 2004; ▪ National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), National Dust Control Regulations (2013).	▪ During rehabilitation and few month after it ends

Table 12-3: Objectives and Outcomes of the EMP

Activities	Potential impacts	Aspects affected	Phase	Mitigation	Standard to be achieved/objective
▪ CPP	▪ Poor air quality due to site clearing and wind erosion	▪ Air	▪ Construction	▪ Application of wetting agents or dust suppressant on the dirt road and exposed areas; ▪ The area of disturbance must be kept to a minimum; ▪ Drop heights when loading and offloading topsoil should be minimised; ▪ Set maximum speed limits and have these limits enforced; The existing dust monitoring network in the area be maintained pre, during and post operation, as records obtained will aid management in the decision making process to limit potential impacts.	▪ South African National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) - National Dust Control Regulations (2013).
	▪ Reduced air quality due to stack emissions	▪ Air	▪ Operational	▪ Use of fabric filters; ▪ Use of electrostatic precipitator (ESP); ▪ Use of gas scrubbers; ▪ Implement a continuous air quality monitoring programme for ambient PM_{10} and $PM_{2.5}$, SO_2, NO_2 and other criteria pollutants; ▪ Designate a qualified person to act as the Air Quality Officer, as required in terms of the Act (National Atmospheric Emissions Reporting Regulations, 2012); ▪ Incorporate air quality information into the environmental management information system. Establish a reporting structure to the DEA as required by regulations currently in force; ▪ Establish a community communication strategy that facilitates reporting of environmental concerns by community members to the mine management; ▪ Monitor the adopted air quality management measures and information to ensure that adopted measures are sufficient to achieve current and future air quality standards at the closest receptors for the duration of the project.	▪ South African National Environmental Management: Air Quality Act, Act.39 of 2004, 2004. ▪ National Environmental Management: Air Quality Act (Act.39 of 2004) – Listed Activities and Associated Minimum Emission Standard, 2013 ▪ National Atmospheric Emissions Reporting Regulation, 2015
	▪ Reduced air quality due to dust generation	▪ Air	▪ Decommissioning	▪ The area of disturbance must be kept to a minimum; ▪ Drop heights when loading and offloading rubble material should be minimised; ▪ the existing dust monitoring network in the area be maintained pre, during and post mining, as records obtained will aid management in the decision making process to limit potential impacts.	▪ South African National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), National Dust Control Regulations (2013).
▪ RTSF	▪ Poor air quality due to dust generation from site clearing and wind erosion	▪ Air	▪ Construction	▪ Application of wetting agents or dust suppressant on the dirt road and exposed areas; ▪ The area of disturbance must be kept to a minimum; ▪ Drop heights when loading and offloading topsoil should be minimised; ▪ Set maximum speed limits and have these limits enforced;	▪ South African National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), National Dust Control Regulations (2013).

				▪ the existing dust monitoring network in the area be maintained pre, during and post mining, as records obtained will aid management in the decision making process to limit potential impacts; ▪ Implement a continuous air quality monitoring programme for ambient PM_{10} and $PM_{2.5}$;	
	▪ Reduced air quality due to dust from wind erosion	▪ Air	▪ Operational	▪ Vegetation or cladding of side walls from the onset when benches are complete or can be accessed; ▪ Application of wetting agents or dust suppressant on the dirt road; ▪ Set maximum speed limits and have these limits enforced; ▪ Application of wetting agents or dust suppressant on the beach of the RTSF; ▪ the existing dust monitoring network in the area be maintained pre, during and post mining, as records obtained will aid management in the decision making process to limit potential impacts; ▪ Implement a continuous air quality monitoring programme for ambient PM_{10} and $PM_{2.5}$; and ▪ Establish a community communication strategy that facilitates reporting of environmental concerns by community members to the mine management.	▪ South African National Environmental Management: Air Quality Act, Act.39 of 2004, 2004. ▪ National Environmental Management: Air Quality Act (Act.39 of 2004) – Listed Activities and Associated Minimum Emission Standard, 2013.
	▪ Reduced air quality due to dust from rehabilitation and wind erosion	▪ Air	▪ Decommissioning	▪ Application of wetting agents or dust suppressant on the dirt i.e. water bowsers; ▪ The area of disturbance must be kept to a minimum; ▪ Drop heights when loading and offloading rehabilitation materials should be minimised; ▪ Set maximum speed limits and have these limits enforced.	▪ South African National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), National Dust Control Regulations (2013).

Table 12-4: Mitigation

Activities	Potential impacts	Aspects affected	Mitigation type	Time period for implementation	Compliance with standards
▪ CPP	▪ Reduce air quality due to dust generation and gaseous emissions from the stacks	Air	▪ Limit the area of disturbance to a minimum, dust control measures (application of wetting agents); ▪ Management control and monitoring; ▪ Vegetation of open areas, ▪ Fitting of point sources with fabric filters; ▪ electrostatic precipitator (ESP); and gas scrubbers	▪ Must be carried out concurrently i.e. cessation of individual activity ▪ Must be carried out concurrently with the operation of the CPP	▪ Implementation of the mitigation measure will ensure dust emissions are contained within regulatory standard (South African National Environmental Management: Air Quality Act, 2004, Act No. 39 of 2004 - , National Dust Control Regulations, 2013). ▪ The minimum emission standards prescribed in National Environmental Management: Air Quality Act (Act.39 of 2004) – Listed Activities and Associated Minimum Emission Standard, 2013.
▪ RTSF	▪ Poor air quality due to dust generation	▪ Air	▪ Limit the area of disturbance to a minimum, dust control measures (application of wetting agents); ▪ Management control and monitoring; ▪ Vegetation of open areas to reduce wind erosion and stabilise the soil.	▪ Must be carried out concurrently with the operation of the RTSF	▪ Implementation of the mitigation measure will ensure dust emissions are contained within regulatory standard (South African National Environmental Management: Air Quality Act, 2004, Act No. 39 of 2004 ▪ National Dust Control Regulations, 2013).

Table 12-5: Prescribed Environmental Management Standards, Practice, Guideline, Policy or Law

Specialist field	Applicable standard, practice, guideline, policy or law
Air quality	National Environmental Management: Air Quality Act, Act.39 of 2004, 2004
	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) - National Dust Control Regulations (2013)
	National Environmental Management: Air Quality Act (Act.39 of 2004) – Listed Activities and Associated Minimum Emission Standard (2013).

12.3 Monitoring Plan

12.3.1 Dust Monitoring Programme

The existing dust monitoring networks in the area: Kloof, Driefontein, Cooke and Ezulwini, should be maintained during the life of the WRTRP as they stand in the different Mining Right Area. There should be a monitoring programme in place to ensure regular review and update of these networks and to assess the data collected against regulatory standards. With the later, tailored mitigation measures can be applied to problematic sources.

12.3.2 PM_{10} Monitoring Programme

WRTRP management should install additional PM_{10} Monitors – at least one for each Mining Right Area to establish ambient levels of this pollutant. Such data will be useful, if in future the Project comes under scrutiny from regulatory authorities. Monitoring sites should be placed judiciously downwind and preferably at a residential receptor site(s). There must be a programme in place to ensure the monitors are calibrated annually to ensure the integrity of the measured data.

12.3.3 Gaseous Monitoring Programme

It is recommended that once operation commences, isokinetic sampling of stacks at the CPP be conducted at least once a year. In addition to the aforementioned, ground level concentrations of gaseous pollutants i.e. sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and volatile organic compounds (VOCs), CO, and CO_2 should be monitored. The proposed ambient monitoring must be a continuous process for the life of the WRTRP to assess public exposure at the nearest residential receptor(s).

13 Consultation Undertaken

No consultation, outside of the formal stakeholder engagement process, was undertaken. This report is made available for public comment and any consultation required as a result will be undertaken.

14 Comments and Responses

The comment and response received from the municipality and land owners during the public participation process are highlighted in Table 14-1 verbatim as it appears in the comment response report. It is anticipated that more comments will be received after a review of the impact assessment report into the public domain. These comments will be addressed accordingly when they are received.

Table 14-1: Comment and Response on Air Quality

Issues	Response
There are a lot of health issues because of the amount of dust and this is an issue/concern. A lot of watering will need to be done.	Dust and PM_{10} monitoring is in place already to assess current scenario and future impacts associated with these pollutants. A dispersion model will be run during the EIA phase, after which mitigation measures will be recommended to curtail potential impacts. Mitigation measures will be put in place to curtain dust i.e. vegetation of tailings, application of dust suppressants on mine dirt roads – water, dust-a-side etc.
When the west wind blows the whole area is white with dust. Trucks from Eight Shaft don't water for dust suppression and same for 10 Shaft.	Once dedicated mitigation measures are in place, dust emission will be reduced drastically, hence lowering exposure to respirable fractions that result in health problems. Schedule to increase watering if wind increases certain speeds.
There is dust and we have to breathe it in causing health issues.	An air quality impact assessment will be undertaken during the EIA phase. Mitigation measures will be agreed to reduce impacts. I&APs have inputs into this process.

15 Conclusion and Recommendation

Based on an initial screening assessment of TSFs and nearby residential receptors in the different Mining Right Areas it is unlikely that the proposed operation will make the area non-compliant to existing air quality standards. There are no sensitive areas within the WRTRP domain because the areas have been impacted by previous/existing mining activities and pollution sources. The wet reclamation mining process will not compromise current air quality conditions. The findings reported here are combinations of analysed, measured and modelled data for the WRTRP area. The report discussed the background and predicted impacts of pollutants likely to be emitted from the operation of the Project. The current and worst case scenario are presented for the various TSF to be reclaimed. The remaining (predicted impacts), will continue to decrease from what was predicted now, and continues until source is removed completely.

The main outcome of this air quality impact assessment is that the dispersion model predictions indicate that in general the Project will comply with the relevant ambient air quality standards. Although the maximum ground level concentrations for some pollutants are higher than the recommended standard, they were limited to facility boundaries or the immediate vicinity, except for the RTSF PM_{10}. The daily impact is worse around 4 km north of the proposed TSF. However, with suitable monitoring and mitigation measures in place, it

will be possible to manage these impacts and for them to fall within current and anticipated air quality standards.

Based on the results presented in this report, the following recommendations are made:

- The reclamation process will not compromise the current ambient air quality conditions in the different MRAs;
- The project should continue as it will remove numerous sources of pollution scattered across the different Mining Right Areas and consolidate them into an improved, well managed central RTSF;
- The reclaimed TSF footprints will make land available for alternative land uses; and
- An air quality management plan and information system will be in place to ensure that measures adopted are sufficient to achieve current and future air quality standards for the duration of the project.

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Appendix A: CV of Air Quality Specialist

MATTHEW OJELEDE

Unit Manager: Atmospheric Sciences, Division Natural Sciences, Digby Wells Environmental

Education

- Bachelor of Science (Hons): Majored in Geology (University of Benin)
- MSc Environmental Science (University of the Witwatersrand)
  - Environmental Chemistry;
  - Environmental Management;
  - Air Quality –Physics and Chemistry of the Urban Atmosphere;
  - Global Environmental Change: Adaptation and Mitigation;
  - Geographic Information System; and
  - Mining and the Environment.
- PhD Environmental Management (University of Johannesburg)

Courses

- Basic Fire Fighting – Accreditation number: HW591PA0808095
- NACA – AERMOD Air Dispersion Modelling (March 2014)
- Computer Foundation – Advanced GIS Course (May 2011)
- CALPUFF Advanced techniques in Dispersion Modelling (October 2010)

Professional Affiliations

- National Association for Clean Air (NACA)
- South African Society for Atmospheric Sciences (SASAS)
- Geo Information Society of South Africa (GISSA)
- International Association of Impact Assessment South Africa (IAIAsa)

Employment

June 2012 – September 2012 University of Johannesburg (Researcher)

October 2012 to present Digby Wells Environmental

Experience

- Air dispersion modelling.
- Air quality impact assessments.
- Air quality management plans.
- Preparation of tender proposals, quotes and technical documents.
- Assisting with project management.
- Processing meteorological data.
- Compiling emissions inventories.
- Air quality information unit operational activities: development, implementation, maintenance and support.

Appendix B: Specialist Declaration of Independence

I, Matthew Ojelede, declare that I –

- Act as the independent specialist for the undertaking of a specialist section for the project;
- Do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2006;
- Do not have nor will have a vested interest in the proposed activity proceeding;
- Have no, and will not engage in, conflicting interests in the undertaking of the activity; and
- Undertake to disclose, to the competent authority, any information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the Environmental Impact Assessment Regulations, 2006.

Matthew Ojelede

Name of the Specialist

Signature of the Specialist

Digby Wells Environmental

Name of Company

20/11/2015

Date