I – Impact Assessment

PROJECT IMPACT ASSESSMENT, SIGNIFICANCE AND MITIGATION MEASURES SUMMARY

The following impact rating approach used by Enviro Africa CC is a basic exponential rating system to assess actual and potential negative environmental impacts.

Positive environmental impacts are also listed. All positive impacts need to be enhanced or increased where possible but positive impacts are not rated or given a score since the rating is based on risks.

Environmental activities or aspects are identified, based on:

- the phases of the project,
- the nature (or description) of the actual and potential impacts of the activities.

For every project activity or aspect, various environmental impacts are listed. Every negative impact is allocated a value as per each of the following criteria:

- Likelihood (Probability)
- Extent (Severity)
- Duration (Frequency)
- Consequence (Receiving Environment and Toxicity)

Once a value is allocated for each of the criterion, the scores are averaged to determine the final impact rating see Table 1 below.

Enviro Africa then further assesses environmental significance, based on the nature of the impact, as per the score and colour key which forms part of Table 1 below. This results in impacts having either a low (indicated in green), medium (indicated in yellow) or high (indicated in orange and red) significance.

Note: i. One environmental aspect or project activity e.g. site clearance may have multiple impacts in different areas.

ii. The various impacts per aspect/project activity are documented under the following project phases:

A. Transport of Equipment/Material to Site
B. Site Clearance
C. Site Establishment
D. Construction
E. Operation and Maintenance
F. Decommissioning/Demolition

iii. As a baseline, impact rating values/scores are allocated taking the **worst case** scenario into account i.e. with no mitigation. The baseline rating is compared with those after mitigation has been taken into account i.e. the post-mitigation rating. **Post mitigation rating is used for the actual impact assessment.**

Environmental Significance Rating Methodology (rating criteria and significance key):

SIGNIFICANCE CRITIERIA	Very High	Moderately High	Medium	Moderately Medium	Low	Very Low	Score
Value	**32**	**16**	**8**	**4**	**2**	**1**	
Likelihood / Probability (L/P)	Impact will definitely occur	Very likely for impact to occur	Impact may occur once annually	Impact may occur less than once annually but at least twice every five years	Impact may occur one to two times (maximum) in project's life	Very unlikely for impact to occur / Impact will not occur	
Extent / Severity (E/S)	Impact potentially reaches beyond national boundaries	Impact has definite provincial potential national consequences	Impact will a potentially affect neighbouring province	Impact confined to local province	Impact confined to local region but not province wide	Impact confined to project property / site	
Duration / Frequency (D/F)	Continual / daily occurrence	Impact will occur once a week	Impact will occur once a month	Impact will occur once a year	Impact will occur once every ten years	Possible that impact will never occur in Project's	
Consequence: Receiving environment (C: RE)	Very sensitive, pristine area – protected site or species permanently or seasonally present	Unused industrially zoned area containing only indigenous fauna / flora species	Unused industrially zoned area containing indigenous and alien fauna / flora species	Semi-disturbed area already rehabilitated / recovered from prior impact	Disturbed area undergoing rehabilitation / recovering from prior impacts	Disturbed area, already in need of rehabilitation prior to impact	
Consequence: Toxicity (C:T)	Impact is poisonous to natural environment and is not contained - no rehabilitation possible - permanent irreversible impact	Impact is potentially poisonous to natural environment and is not contained – only partial rehabilitation possible – potential permanent irreversible impact	Impact is potentially poisonous to natural environment and is partially contained – some rehabilitation possible and is potentially reversible	Impact is potentially poisonous to natural environment and is partially contained – complete rehabilitation possible	Impact is potentially poisonous to natural environment but is completely contained	Impact is not poisonous to natural environment	
FINAL RATING (average score)							

ENVIRONMENTAL RATING SIGNIFICANCE KEY:

SIGNIFICANCE	RATING	Final rating score / value range
Very Significant	Very High	25 to 32
Significant	High	19 to <25
Increasing Significance	**Medium**	13 to <19
	Moderately Medium	6 to <13
Insignificant	Low	3 to <6
	Very Low	1 to <3

A. ASPECT / ACTIVITY: Transport of Equipment / Material to Site (pre-construction site establishment primarily at substation sites)

No.	IMPACT	L/P	E/S	D/F	C: RE	C: T	Pre-Mitigation Score (Baseline)	L/P	E/S	D/F	C: RE	C: T	Post-Mitigation Score (Impact assessment)	Short Description of Mitigation Measures
1	Particulate and gaseous emissions due to use of vehicles/machinery	32	4	32	1	32	20,2	32	1	32	1	32	19,6	Vehicles serviced regularly/well maintained. Vehicles not allowed to idle for extended periods. Fugitive particulate emissions minimised by enforcing speed limits on dirt roads. Adherence to the EMPr with regards to the appropriate use of machinery.
2	Potential impedance of normal traffic flow on main access road	16	4	16	1	1	7,6	2	2	8	1	1	2,8	If required, traffic management method statement to be in place. Comply with legislative requirements. If necessary, use traffic controllers.
3	Animal/human interaction/accident with vehicles	2	2	1	1	1	1,4	2	2	1	1	1	1,4	Training and awareness regarding road safety. Routine checks to ensure vehicles in good condition.
4	Spillages of fuel/oil/HCSs from vehicles/vehicle loads	32	2	32	1	8	15	16	2	16	1	8	8,6	Oil/fuel or any hazardous substance to be used or stored on site, must adhere to the EMPr and Standard Management Procedures/Method statements. Training and awareness regarding use and storage of fuel/oil/HCSs. Adequate drip trays and spill clean up kits provided. Routine monitoring of vehicle loads and vehicles for leaks. Adherence to the EMPr. Prevent contamination of natural environment at all cost. In the event of a spill, prompt action must be taken to clear the polluted or affected areas.
5	Noise from heavy vehicles	32	2	16	1	1	10,4	16	1	16	1	1	7	Vehicles serviced regularly/well maintained. Vehicles not allowed to idle for extended periods. Ensure vehicle exhaust pipes in good condition. Vehicles not to be used outside of normal working hours.
6	Potential littering along route from drivers/personnel in vehicles	32	16	16	8	1	14,6	16	2	16	2	1	7,4	Training and awareness regarding littering. Provision of rubbish bags for inside vehicle when travelling.
7	Impact of slowed traffic due to possible abnormal loads being transported on public roads	16	16	8	1	1	8,4	8	16	4	1	1	6	Limit transport of abnormal loads to site if possible. Avoid built up areas during peak traffic times.
8	Aesthetic/visual impact of stored/parked vehicles and equipment	32	1	32	1	1	13,4	16	1	16	1	1	7	Park vehicles and store equipment at designated areas
9	Environmental training/awareness e.g. at on-site start up													All staff must receive Environmental Awareness training as per the EMPr prior to the commencement of the activities. All staff are aware of the conditions linked to the EA and WUL within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr

B. ASPECT / ACTIVITY: Site Clearance ("grub and clear" primarily for substation footprints)

No.	IMPACT	L/P	E/S	D/F	C: RE	C: T	Pre-Mitigation Score (Baseline)	L/P	E/S	D/F	C: RE	C: T	Post-Mitigation Score (Impact assessment)	Short Description of Mitigation Measures
1	Poor access control/fencing	32	1	32	1	1	13,4	2	1	8	1	1	2,6	Secure fencing of site to take place before any materials/equipment brought to site. Access to be controlled via locked gate and security services.
2	Non adherence to demarcation of the site footprint	32	2	8	1	1	8,8	32	1	4	1	1	7,8	Site clearly defined before any material/equipment arrives on site. Area to be within the footprint applied for as part of BAR. Routine site inspection for adherence to footprint.
3	Ablutions for site labour (non-adherence to designated areas)	32	2	32	1	4	14,2	16	1	16	1	1	7	Training and awareness regarding designated ablution areas and need for adherence. Provision of sufficient ablutions area in line with legal requirements on site Adherence to the EMPr & Implementation of Standard Man agent Procedures. Methodstatement to be in place
4	Gaseous emissions due to use of vehicles/machinery	32	4	32	1	32	20,2	32	1	32	1	32	19,6	Vehicles serviced regularly/well maintained. Vehicles not allowed to idle for extended periods. Fugitive particulate emissions minimised by enforcing speed limits on dirt roads. Adherence to the EMPr with regards to the appropriate use of machinery.
5	Dust (particulate) emission generation	32	2	32	1	32	19,8	16	2	16	1	1	7,2	Fugitive particulate emissions minimised by enforcing speed limits on dirt roads. Vehicles confined to roads only. Vehicles serviced regularly/well maintained. Vehicles not allowed to idle for extended periods.
6	Topsoil removal/stockpiling	32	2	32	1	1	13,6	32	1	4	8	1	9,2	Topsoil removal/ stockpiling as per EMPr and implementation of Standard Management Procedures should topsoil be required for landscaping on site or elsewhere on erf. Method statement to be in place at on-site start up meeting. Routine site checks to ensure compliance.

7	Erosion & sedimentation from site clearance	8	1	8	1	2	4	8	1	4	1	1	3	Remain within the demarcated development footprint. Remain on access routes. Indiscriminate clearing of any area outside of the construction footprint must be avoided. Leave as much vegetation as possible Adherence to the EMPr and implementation of Standard Management Procedures in terms of erosion and sedimentation (should a rain even occur). Method statement to be in place at on-site start up meeting to install erosion and sedimentation controls before work starts and maintain these features. Leave as much vegetation as possible. All cleared material, not used for landscaping on the site/erf., must either be composted or disposed of in the correct manner.
8	Habitat loss (effect on fauna)	32	1	32	1	1	13,4	32	1	32	1	1	13,4	Due to the nature of the development, habitat loss will take place irrespective of mitigation measures. No natural vegetation will be lost as the site is transformed.
9	Loss of ecological processes or ecosystems connectivity													Loss of ecological processes will not occur and could not be rated. The development will not take place in a CBA/ ESA.
10	Loss of riparian biodiversity (flora)													Loss of ecological processes will not occur. The development will not take place in riparian habitat or near any wetlands/ watercourses,
11	Animal interaction/fatalities	2	2	1	1	1	1,4	2	2	1	1	1	1,4	Designation of no-go areas on site to be defined at on-site start up meeting. Environmental awareness/training. Routine site compliance checks.
12	Heritage discovery (archaeological or palaeontological) due to excavation	8	1	8	1	1	3,8	2	1	2	1	1	1,4	Designation of no-go areas on site to be defined at on-site start up meeting. No-go areas restricted. Environmental awareness/training. Routine site compliance checks as per EMPr. It is recommended that the HWC Fossil Finds Procedure be implemented throughout the development phase.
15	Local employment opportunities													

16	Environmental training/awareness e.g. at on-site start up meeting													All staff must receive Environmental Awareness training as per the EMPr prior to the commencement of the activities. All staff are aware of the conditions linked to the EA and WUL within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr

C ASPECT / ACTIVITY: Construction

No.	IMPACT	L/P	E/S	D/F	C: RE	C: T	Pre-Mitigation Score (Baseline)	L/P	E/S	D/F	C: RE	C: T	Post-Mitigation Score (Impact assessment)	Short Description of Mitigation Measures
1	Poor access control/fencing	32	1	32	1	1	13,4	2	1	8	1	1	2,6	Secure fencing of site to take place before any materials/equipment brought to site. Access to be controlled via locked gate and security services.
2	Non adherence to demarcation of site footprint	32	2	8	1	1	8,8	32	1	4	1	1	7,8	Site clearly defined before any material/equipment arrives on site. Area to be within the footprint applied for as part of BAR. Routine site inspection for adherence to footprint.
3	Ablutions for site labour (non-adherence to designated areas)	32	2	32	1	4	14,2	16	1	16	1	1	7	Training and awareness regarding designated ablution areas and need for adherence. Provision of sufficient ablutions area in line with legal requirements on site Adherence to the EMPr and implementation of Standard Management Procedures. Method statement to be in place
4	Littering	32	2	16	1	1	10,4	16	1	8	1	1	5,4	Training and awareness regarding littering. Provision of rubbish bags for inside vehicle when travelling.
5	Habitat loss (effect on fauna)	32	1	32	1	1	13,4	32	1	32	1	1	13,4	Due to the nature of the development, habitat loss will take place irrespective of mitigation measures. No natural vegetation will be lost as the site is transformed.

6	Soil erosion and sedimentation	8	1	8	1	2	4	8	1	4	1	1	3	Remain within the demarcated development footprint. Remain on access routes. Indiscriminate clearing of any area outside of the construction footprint must be avoided. Leave as much vegetation as possible Adherence to the EMPr and implementation of Standard Management Procedures in terms of erosion and sedimentation. Method statement to be in place at on-site start up meeting to install erosion and sedimentation controls before work starts and maintain these features. Leave as much vegetation as possible. All cleared material on must either be stockpiled for topsoil appropriately on site/ disposed of in the correct manner.
7	Animal interaction/fatalities	2	2	1	1	1	1,4	2	2	1	1	1	1,4	Designation of no-go areas on site to be defined at on site start up meeting. Environmental awareness/training. Routine site compliance checks.
8	Aesthetic: Visual impact during construction of substations an overhead power lines	32	2	32	1	1	13,6	16	1	1	1	1	4	EMPr must be enforced and monitored by the ECO. Contractor to restrict all activities, materials, personnel to within the area specified/demarcated. Construction material to be stored in areas designated by the site agent and in a neat and orderly manner. Contractor must ensure that all structures, equipment, materials and facilities used or created on site during construction activities are removed, to the satisfaction of the ECO, once the project has been completed. Construction only to take during normal working hours.
9	Resource use: water	32	2	32	1	1	13,6	32	1	32	1	1	13,4	Training and awareness regarding sound water use/management. Storm water management plan in place at on-site start up meeting. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
10	Resource use: land	32	2	32	1	1	13,6	32	1	32	1	1	13,4	Training and awareness regarding land management on site. Ad hoc checks to ensure compliance in line with training and management plans/programmes.

11	Resource use: hydrocarbons/fuels	32	2	32	1	16	16,6	32	2	32	1	2	13,8	Training and awareness regarding efficient fuel/hydrocarbon use. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
12	Recycling of waste products where possible													
13	Potential leakage or spillage of water by runoff containing construction related substances such as cement/paint/oil/fuel etc soil & ground water	32	2	32	1	8	15	16	1	8	1	1	5,4	Cement/paint/oil/fuel or any hazardous substance to be used or stored on site, must adhere to the EMPr. Routine site and vehicle checks. Ensure all vehicles are in good working on. Prevent contamination of natural environment at all cost. In the event of a spill, prompt action must be taken to clear the polluted or affected areas.
14	Potential incorrect storage of fuels/hazardous chemical substances	32	2	32	1	1	13,6	16	1	8	1	1	5,4	Training and awareness regarding use and storage of fuel/oil/HCSs. Adequate drip trays and spill clean up kits provided. HCSs and fuel stores stored in line with legal requirements. Routine monitoring of vehicle loads and vehicles for leaks.
15	Noise from heavy vehicles	32	2	16	1	1	10,4	16	1	16	1	1	7	Vehicles serviced regularly/well maintained. Vehicles not allowed to idle for extended periods. Routine site and vehicle checks. Ensure vehicle exhaust pipes in good condition. Vehicles not to be used outside of normal working hours.
16	Training/Skills transfer													All staff must receive Environmental Awareness training as per the EMPr prior to the commencement of the activities. All staff are aware of the conditions linked to the EA and WUL within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr
17	Local employment opportunities													

D ASPECT / ACTIVITY: Operation and Maintenance

No.	IMPACT	L/P	E/S	D/F	C: RE	C: T	Pre-Mitigation Score (Baseline)	L/P	E/S	D/F	C: RE	C: T	Post-Mitigation Score (Impact assessment)	Short Description of Mitigation Measures
1	Poor access control/fencing	32	1	32	1	1	13,4	2	1	8	1	1	2,6	Secure fencing of site to take place before any materials/equipment brought to site. Access to be controlled via locked gate and security services.
2	Littering	32	2	16	1	1	10,4	16	1	8	1	1	5,4	Training and awareness regarding littering. Provision of sufficient rubbish bins on site.
3	Habitat loss (effect on fauna)	32	1	32	1	1	13,4	32	1	32	1	1	13,4	Due to the nature of the development, habitat loss will take place irrespective of mitigation measures. No natural vegetation will be lost as the site is transformed.
4	Resource use: land (particularly for substation development)	32	2	32	1	1	13,6	32	2	32	1	1	13,6	Training and awareness regarding land management on site. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
5	Resource use: water	32	2	32	1	1	13,6	32	1	32	1	1	13,4	Training and awareness regarding sound water use/management. Storm water management plan in place at on-site start up meeting. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
6	Aesthetic: Visual impact for 400kV steel pylon overhead power line (OPL)	32	2	32	1	1	13,6	32	2	32	1	1	13,6	Due to height and size, pylons will not be 'camouflaged' or obsecured by large trees along parts of the OPL route. since it will be out of context. EMPr must be enforced and monitored by the ECO during contruction and the applicant/proponent landowner suring operation. Bird-flappers to reduce bird collisions with OPL required.
7	Aesthetic: Visual impact for 275kV steel pylon OPL	32	2	32	1	1	13,6	16	2	32	1	1	10,4	Due to slightly lower height and size than the 400kV OPL support structures, even though the pylons will not be 'camouflaged' or obsecured by large trees along parts of the OPL route, the visual impact will be less. Negative bird impacts due to collisions will be reduced with mitigation (bird-flappers). EMPr must be enforced and monitored by the ECO during contruction and the applicant/proponent and landowners during operation..
8	Aesthetic: Visual impact for 132kV steel pylon OPL	16	2	32	1	1	10,4	16	2	16	1	1	7,2	Lowest form of OPL supprt structures with least visual impact. Nonetheless, the EMPr must be enforced and monitored by the ECO during construction and by the applicant/proponent and landowner during operation. Sensitivity to potential bird collisions must be mitigated as per the avi-faunal specialists recommendations i.e. bird-flappers

9	Erosion & Sedimendation Control (positive impact)													Remain within the demarcated development footprint. Remain on access routes. Indiscriminate clearing of any area outside of the construction footprint must be avoided. Leave as much vegetation as possible Adherence to the EMPr and implementation of Standard Management Procedures in terms of erosion and sedimentation (during rain events). Method statement to be in place at on-site start up meeting to install erosion and sedimentation controls before work starts and maintain these features. Cleared areas to be rehabilitated must be revegetated with indigenous species, as far as possible.
10	Training/Skills transfer (positive impact)													
11	Local employment opportunities (positive impact)													
12	Reduction in country's greenhouse gas emissions due to less dependance on coal fired power generation.													
13	Socio-economic - increased access to electricity and renewable energy input into national grid (cumulative positive impact)													

E ASPECT / ACTIVITY: Decommissioning/Demolition

No.	IMPACT	L/P	E/S	D/F	C: RE	C: T	Pre-Mitigation Score (Baseline)	L/P	E/S	D/F	C: RE	C: T	Post-Mitigation Score (Impact assessment)	Short Description of Mitigation Measures
1	Poor access control/fencing	32	1	32	1	1	13,4	2	1	8	1	1	2,6	Secure fencing of site to take place before any materials/equipment brought to site. Access to be controlled via locked gate and security services.
2	Non adherence to demarcation of site footprint	32	2	8	1	1	8,8	32	1	4	1	1	7,8	Site clearly defined before any material/equipment arrives on site. Area to be within the footprint applied for as part of BAR. Routine site inspection for adherence to footprint.
3	Ablutions for site labour (non-adherence to designated areas)	32	2	32	1	4	14,2	16	1	16	1	1	7	Training and awareness regarding designated ablution areas and need for adherence. Provision of sufficient ablutions area in line with legal requirements on site Adherence to the EMPr and implementation of Standard Managent Procedures. Method statement to be in place.
4	Littering	32	2	16	1	1	10,4	16	1	8	1	1	5,4	Training and awareness regarding littering. Provision of rubbish bags for inside vehicle when travelling.
5	Habitat loss - effect on fauna (potential for habitat gain)	32	1	32	1	1	13,4	16	1	32	1	1	10,2	Due to the nature of the development, habitat loss had taken place irrespective of mitigation measures. No natural vegetation will be lost as the site is decomissioned. However, landscaping and re-vegetation with indigenous vegetation as much as possible will create potential habitat for indigenous fauna.
7	Soil erosion and sedimentation	8	1	8	1	2	4	8	1	4	1	1	3	Remain within the demarcated development footprint. Remain on access routes. Indiscriminate clearing of any area outside of the construction footprint must be avoided. Leave as much vegetation as possible Adherence to the EMPr and implementation of Standard Management Procedures in terms of erosion and sedimentation (during rain events). Method statement for erosion and sedimentation controls to be in place before deconstruction work starts. Landscape and re-vegetate with indigenous vegetation as much as possible.

8	Animal interaction/fatalities	2	2	1	1	1	1,4	2	2	1	1	1	1,4	Designation of no-go areas on site to be defined at on site start up meeting. Environmental awareness/training. Routine site compliance checks.
9	Aesthetic: Visual impact during decommissioning of overhead power lines/pylons	32	2	32	1		13,4	16	1	1	1	1	4	EMPr must be enforced and monitored by the ECO during construction and by applicant and landowner during operation, maintenance and decomissioning. Contractor to restrict all activities, materials, personnel to within the area specified/demarcated. Demolition material to be stored in areas designated by the site agent and in a neat and orderly manner. Contractor must ensure that all structures, equipment, materials and facilities used or created on site during demolition activities are removed, to the satisfaction of the applicant/competant authority, once the project has been completed.
10	Resource use: water	32	2	32	1	1	13,6	32	1	32	1	1	13,4	Training and awareness regarding sound water use/management. Storm water management plan in place at on-site decomissioning initiation meeting. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
11	Resource use: land	32	2	32	1	1	13,6	32	1	32	1	1	13,4	Training and awareness regarding land management on site. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
12	Resource use: hydrocarbons/fuels	32	2	32	1	16	16,6	32	2	32	1	2	13,8	Training and awareness regarding efficient fuel/hydrocarbon use. Ad hoc checks to ensure compliance in line with training and management plans/programmes.
13	Recycling of waste products where possible													
14	Potential leakage or spillage of water by runoff containing construction related substances such as cement/paint/oil/fuel etc soil & ground water	32	2	32	1	8	15	16	1	8	1	1	5,4	Cement/paint/oil/fuel or any hazardous substance to be used or stored on site, must adhere to the EMPr. Routine site and vehicle checks. Ensure all vehicles are in good working on. Prevent contamination of natural environment at all cost. In the event of a spill, prompt action must be taken to clear the polluted or affected areas.

15	Potential incorrect storage of fuels/hazardous chemical substances	32	2	32	1	1	13.6	16	1	8	1	1	5.4	Training and awareness regarding use and storage of fuel/oil/HCSs. Adequate drip trays and spill clean up kits provided. HCSs and fuel stores stored in line with legal requirements. Routine monitoring of vehicle loads and vehicles for leaks.
16	Noise from heavy vehicles	32	2	16	1	1	10.4	16	1	16	1	1	7	Vehicles serviced regularly/well maintained. Vehicles not allowed to idle for extended periods. Routine site and vehicle checks. Ensure vehicle exhaust pipes in good condition. Vehicles not to be used outside of normal working hours.
17	Training/Skills transfer													All staff must be made aware of the conditions linked to the EA and WUL within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr during decomissioning activities.
18	Local employment opportunities													