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| **Department:** | HEALTH, SAFETY, ENVIRONMENTAL AND QUALITY DEPARTMENT | |
| **Title:** | **Annexure 11: GROUP INTEGRATED ANNUAL ENVIRONMENTAL REPORT: FY 2020** | |
| **Procedure Nr:** | HSEQ-GP-PO-18 | |
| **Distribution:** | Petra Diamonds Ltd | |
| **Originator:** | Group HSEQ Environmental Lead | |
| **Responsible HOD:** | Group HSEQ Environmental Lead | |
| **References:** | HSEQ-GP-PO-40 | |
| **Annexures:** | none | |
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| **Original Date:** | 20 August 2014 | **Revision Date:** | 29 August 2019 |
| **Revision number:** | 03 | **Next Revision Date:** | August 2020 |
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| **Approved:** | Original signed off | **Authorised:** | Original signed off |
| **Name of official:** | JM Reynecke | **Name of official:** | P Nkuna |
| **Designation:** | HSEQ Environmental Lead | **Designation:** | HSEQ Manager |
| **Approval date:** | 30 August 2019 | **Authorisation Date:** | 2 September 2019 |
|  | |  | |

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| **RACIE** | **Record** |
| Responsible &  Accountable | Name: J M Reynecke  Job Title: Group Environmental Lead  Signed:    Date: 30 July 2020 |
| Endorsed | Name: Pat Nkuna  Job Title: Group Health, Safety, Environmental and Quality Manager  Date: |

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| 29/07/2020 | EC | HSE Manager: A Douglas | FDM |
| 29/07/2020 | EC | Environmental Specialist: E Cilliers | FDM |
| 29/07/2020 | EC | HSE Manager: S van Wyk (acting) | KDM |
| 29/07/2020 | EC | Environmental Specialist: | KDM |
| 29/07/2020 | EC | HSE Manager: D Mukungu | WDL |
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| 29/07/2020 | EC | J Breytenbach | | Bryanston |
| 29/07/2020 | EC | E Klapwijk | | Bryanston |
| 29/07/2020 | EC | C Kraus | | Bryanston |
| 29/07/2020 | EC | A Holder | | Cullinan |
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| 29/07/2020 | EC | H van den Heever | | Kimberley |
| 29/07/2020 | EC | C van der Walt | | Cullinan |
| 29/07/2020 | EC | A van Deventer | | Cullinan |
| 29/07/2020 | EC | M le Roux | | Kimberley |

# EXECUTIVE SUMMARY

This is the environmental report for FY 2020. During the period under review, the following is noteworthy:

**Compliance:**

* Petra met its KPI of a maximum of 1 legal instruction/directive per organisation for FY 2020 as no directives have been issued to any of the organisations.
* Five external statutory audits had been conducted in FY 2020: Closure liability audits at CDM, FDM and KDM; Water Use License audit at CDM and an External Statutory Environmental audit at WDL.
* A total of twelve authority audits, inspections and visits were conducted at Petra organisations during this period.
* Five external complaints were lodged at the Petra Organisations during FY 2020.
* Under general compliance the following are noteworthy:

1. CDM received an Environmental authorisation for the re-routing of the 88kV power line.
2. CDM has initiated the process of obtaining an environmental authorisation and an amendment to their Water Use License for the reconstruction of the damaged infrastructure or the development of new infrastructure at the Wilge River Dam
3. FDM submitted to the authorities all the documentation required to apply for an environmental authorisation to dismantle the BSP surface plant.
4. KDM experienced several challenges regarding the management of the paddocks and preventing them from overflowing during the extended load shedding period.
5. WDL received permits for the construction of the starter wall of phase II of the WDL Fine Residue Slimes facility, as well as for the extension of the coarse residue dump conveyor.

**Assurance:**

* Petra met its target of all the South African organisations retaining their ISO 14001:2015 certification.
* Petra will meet its KPI that requires 100% finalisation of all legislated documentation for mine closure and rehabilitation as all the organisations have received their technical rehabilitation plans and will submit their final information to the Group Rehabilitation and Closure Specialist by September 2020 for finalisation of all documentation by December 2020.
* Petra met its KPI of zero Major environmental incidents for the current financial year. The only significant environmental incidents reported were medium incidents: two at CDM, one at KDM.
* The FY 2020 Closure Liability Assessment for each of the South African organisations had been updated and submitted to the DMRE

**Monitoring:**

* The water quality results for most of the mines indicate non-conformances to the standards as included in the Water Use Licenses.
* Some water monitoring results were not available, as the laboratory analysis of water samples are done by external SANAS accredited laboratories with a month lag time.
* PM10, PM2.5 and environmental noise are monitored annually at all South African organisations, usually in Q4. Due to Covid -19 restrictions it could not be done at FDM.
* WDL conducted water sampling at several surface water localities. High Total coliform counts at the waste water settling ponds indicate that the ponds are not functioning effectively. WDL did not do any groundwater monitoring in FY 2020.

**Performance:**

* It is to be noted that WDL’s water data changed significantly after it has been re-aligned to the water source definitions as per the Common Vocabulary in March 2020. These definitions became effective on the 1st July 2019 and are aligned to the Department of Water Affairs’ Water Demand and Conservation definitions. These definitions exclude recycled water from total water use.
* No or lower production impacted on the achievement of several of the KPIs due to lower or no production during April. Although the impact was lower as expected, the KPI performance of the different organisations and Petra have been indicated for both a normal twelve month period and for an eleven month period that excludes the April data. The 11 month data is indicated in brackets in the relevant tables. It could not be done for the carbon footprint KPI tracking.
* *The KPI set by Petra Diamonds for a reduction of at least 1% in total water consumption (m3/t) on a year on year basis* was met by FDM and WDL, as well as Petra Diamonds with a decrease of 5% in total water consumption per ton treated. This was measured against the KPI value based on the FY 2019 annual water consumption.
* *Petra Diamonds set a KPI of a 1% improvement on the total percentage of water recycled on a year on year basis that was met by CDM and WDL, as well as Petra Diamonds. The overall increase in the use of recycled water was 9% measured against the KPI value.*
* *Electricity consumption is a key performance area and a 1% improvement in the electricity use efficiency in kWh/t was set as KPI. Only CDM met the KPI.* Petra Diamonds did not meet the KPI as the electricity consumption of the Group increased by 11% as compared to the KPI value based on the electricity consumption for FY 2019.
* *A new KPI was set by Petra Diamonds for a 1% improvement in TMM diesel use per ton treated. It was met by all the organisations, resulting in Petra Diamonds’ TMM diesel use /ton treated, decreasing by 10% as compared to the KPI value based on the TMM diesel use per ton treated for FY 2019*
* *The KPI for a year on year reduction in waste sent to landfill of 1%* has been met by both CDM and FDM. Petra Diamonds’ also met the target as the waste disposed to landfill decreased by 23% as compared to the KPI value based on the total waste sent to landfill in FY 2019.
* *Petra Diamonds also set a KPI of a 1% reduction in its carbon footprint (tCO2-e/ct) on a year on year basis that was met every year from 2015 to 2019. Although the total tCO2-e/ct decreased over this period by 16%, Petra Diamonds did not meet the KPI in FY 2020 as the total tCO2-e/ct increased by 9% as compared to FY 2019.*

**ENVIRONMENTAL COMPLIANCE, ASSURANCE, PERFORMANCE**

**FY 2020**

Table 1: Summary

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Paragraph** | **KPI** | **TARGET** | **CDM** | **FDM** | **KDM** | **WDL** | **PETRA** |
| **COMPLIANCE** | | | | | | | |
| **1.1** | **Directives and Instructions** | **≤1 directive/**  **instruction per org.** | 0 | 0 | 0 | 0 | 0 |
| **1.2** | **External Statutory audits** |  | WUL  Closure Liability | Closure Liability | Closure Liability | 3rd party env audit |  |
| **1.3** | **Authority Audits and Inspections** |  | PHRA-G  DMRE  GDARD | DMR  DWS | DWS x 2 | GCLA  MOM  NEMC  TMC x 2 |  |
| **1.4** | **EMPR commitments** |  |  |  |  |  |  |
| **1.5** | **Legal Compliance: other** |  | 6 issues | 6 issues | 4 issues | 2 issues |  |
| **1.6** | **External Complaints** |  | 3 | 1 | 1 | 0 | 5 |
|  | | | | | | | |
| **2.1** | **ISO 14001: 2015 Certification – all South African operations** | **100 %** | 3 non-conformances | 7 non-conformances | 3 non-conformances | N/A |  |
| **2.2** | **Reporting of Environmental Incidents (total incidents)** |  | 481 | 1440 | 29 | 396 | 2346 |
| **2.3** | **Significant Environmental Incidents** | **0 Major incidents** | 2 med |  | 1 med |  | 3 med |
| **2.4** | **Internal Audits and Assessments** |  | WUL  CAP  WML  GHG | CAP  GHG | CAP  GHG | GHG  HSEQ | GHG |
| **2.6** | **Mine Closure and Rehabilitation: Completion of closure and rehabilitation documents** | **100%** |  |  |  |  |  |
| **2.8** | **Implementation of Group Environmental Strategies:**  **Integrated Water Management**  **Waste Optimisation**  **Ecological Management** | **100% according to schedule** |  |  |  | N/A |  |
| **MONITORING** | | | | | | | |
| **3** | **Non-conformances to monitoring standards:**  **Surface water** |  |  |  |  |  |  |
| **3** | **Non-conformances to monitoring standards:**  **Ground water** |  |  |  |  |  |  |
| **3** | **Non-conformances to monitoring standards:**  **Air quality** |  |  | Fall-out dust |  | Groundwater |  |
| **3** | **Non-conformances to monitoring standards: Environmental noise** |  |  | PM10  PM 2.5; Noise |  |  |  |
| **3** | **Non-conformance to monitoring program** |  |  |  |  |  |  |
| **PERFORMANCE** | | | | | | | |
| **4.2** | **Land Management (increase/decrease of footprint since previous year)** |  |  |  |  | +3.13ha | +3.13ha |
| **4.3** | **Water management: total water consumption per ton treated-**  **year on year improvement ( measured against KPI value = FY 2019-1%)** | **≥ 1%** | +23% | -10% | +31% | -11% | -5% |
| **4.3** | **Water management/Resource consumption**  **Percentage water recycled- year on year improvement** (measured against KPI value = FY 2019+1%) | **≥ 1%** | AHARP | -0.34% | -9% | +49% | +9% |
| **4.4** | **Effluent Management** |  |  |  |  |  |  |
| **4.5** | **Energy Management, Electricity efficiency-**  **Year on year improvement (Measured against KPI value = FY 2019-1%)** | **≥ 1%** | -7% | +2% | +6% | +13% | +11% |
| **4.5** | **Energy Management, Diesel use (TMM) efficiency-**  **Year on year improvement (Measured against KPI value = FY 2019-1%)** | **≥ 1%** | -16% | -25% | -18% | -2% | -10% |
| **4.6** | **Materials consumption: FeSi consumption per ton treated** |  | -11% | -22% | -8% | +28% | -6% |
| **4.7** | **Percentage change in total tonnage of waste to landfill (hazardous and general):**  **year on year improvement (Measured against KPI value= FY 2019-1%)** | **≥ 1%** | -35% | -79% | +12% | +2% | -23% |
| **4.8** | **Biodiversity Management** |  |  |  |  |  |  |
| **4.9** | **Ozone depleting substances** |  |  |  |  |  |  |
| **4.10** | **Carbon footprint: Reduction in carbon emissions (FY 2015- FY 2020)** | **1%pa (tCO2-e /Ct)** | +7% | +2% | -7% | +64% | +9% |
| **`**  **LEGEND** | | | | | | | |
|  | **Meet KPI / no concern** |  |  |  |  |  |  |
|  | **Small deviation from KPI/ monitor** |  |  |  |  |  |  |
|  | **Material deviation from KPI/ concerned** |  |  |  |  |  |  |
|  | **Not applicable/ No information** |  |  |  |  |  |  |

# COMPLIANCE

The compliance of Petra’s Organisations is measured against the applicable environmental legislation in the respective countries of operation. The section below is dedicated to identify any non-compliances by the organisations.

## 1.1 Directives and Instructions

There is an array of environmental legislation that allows for the issuing of either Administrative instructions or Corrective Directives. Relevant legislation includes the National Environmental Management Act and National Water Act. Instructions and directives issued under these pieces of legislation are done through the Environmental Management Inspectorate (EMI’s), also known as the “Blue” and “Green Scorpions”.

In Tanzania this function is performed by either inspectors from the Ministry of Energy and Minerals (MEM) or the Tanzanian Mining Audit Authority (TMAA) in terms of the Environmental Management Act of 2004.

Note that “Pre-directives” or “Intentions to issue directives” have been added to the statistic below.

*Petra Diamonds set a KPI of a maximum of 1 legal instruction or directive per organisation for this financial year.*

Table 2: *Number of Environmental Directives/Instructions per Organisation for this period*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Mine** | **Q1** | **Q2** | **Q3** | **Q4** | **TOTAL**  **YTD** |
| **CDM** | 0 | 0 | 1 (Intention) | 0 | 1 |
| **FDM** | 1(intention) | 0 | 0 | 0 | 1 |
| **KDM** | 0 | 0 | 0 | 0 | 0 |
| **WDL** | 0 | 0 | 0 | 0 | 0 |
| **TOTAL per Quarter** | **1** | **0** | **1** | **0** | **2** |

|  |  |
| --- | --- |
| **Organisation:** | CDM |
| **Date of Directive / Instruction:** | 25/02/2020 |
| **Authority:** | Gauteng Department of Agriculture and Rural Development (GDARD) |
| **In terms of Legislation:** | Notice of Intent to issue a compliance Notice ito Section 31L of NEMA |
| **Detail of Instruction:** | Commencement of listed activities (Section 24(2) of NEMA at the Wilge River without an environmental authorisation |
| **List of Actions to Address Instruction:** | The mine responded to the notice within the required 7 days and a meeting with GDARD was scheduled for 6 March 2020 to clarify the actions required to address the Notice of Intent to Issue a Compliance Notice. |
| **Due Date of Reply:** | 18/03/2020 |
| **Status:** | Mine submitted their response. |

|  |  |
| --- | --- |
| **Organisation:** | FDM |
| **Date of Directive / Instruction:** | 27/09/2019 |
| **Authority:** | Department of Mineral Resources and Energy (DMRE) |
| **In terms of Legislation:** | Notice of Intent to issue a compliance Notice ito Section 31L of NEMA |
| **Detail of Instruction:** | Spillage management non-conformances |
| **List of Actions to Address Instruction:** | * Remove all disused vehicles from site to a properly designated area immediately * Construct a concrete floor with bund walls and/or proper containment system for placement of all disused vehicles within 30 days. * Fix all the working vehicles with minor leaks that are still in working condition within 10 days. |
| **Due Date of Reply:** | 08/11/2019 |
| **Status:** | Mine implemented all actions. |

## 1.2 External Statutory Audits

All organisations are required to conduct and submit external audits / assessments as part of a self-regulatory approach, to the various environmental authorities. This section seeks to identify the assessments required as per permit. License or any other legal requirement per organisation, the frequency of assessments, as well as outcomes as communicated to authorities, during the year.

Table 3: *External Statutory Audits conducted per organisation during this period*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Audit / Assessment** | **CDM** | **FDM** | **KDM** | **WDL** | **TOTAL** |
| **WUL[[1]](#footnote-1)** | i |  |  |  |  |
| **GNR 704** |  |  |  |  |  |
| **EMP PA[[2]](#footnote-2)** |  |  |  |  |  |
| **Waste License** |  |  |  |  |  |
| **Closure Liability** | ii | iii | iv |  |  |
| **Other:** |  |  |  | v |  |

|  |  |
| --- | --- |
| **Matrix number** | **Explanation and/or further detail** |
| **i** | On 4 February 2020, a 3rd party statutory audit was conducted on compliance to the CDM Water Use License requirements. Seven partial compliances were indicated, including:  (i) The authorised McHardy Spruit Diversion and New Return Water Dam that has not been constructed within the required time frame  (ii)The Swimming pool sump and Scavenger sump that have not been authorised yet.  CDM was advised to apply for an amendment to their WUL in order to authorise and include the Swimming Pool and Scavenger sumps. |
| **ii** | In July 2019 a closure liability audit was conducted to determine the CDM closure liability and ensure that the Financial Provision for Mine Closure is adequate. |
| **iii** | On 30 August 2019 a closure liability audit was conducted to determine the FDM closure liability. The report was submitted to DMRE on 26 February 2020. |
| **iv** | In September 2019 a closure liability audit was conducted to determine the KDM closure liability to ensure that the Financial Provision for Mine Closure is adequate. |
| **v** | On 21August 2019 an external statutory environmental audit was conducted by Efficient Consultant Company Limited. Six environmental findings were indicated, relating to:  (i) Demolished sites of monitoring boreholes  (ii) Absence of reliable flow meters  (iii) Anthropogenic activities within Songwa dam  (iv) Exceedance of water quality standards  (v) Inadequate budget for effective HSE management on mine |

## 1.3 Authority audits and inspections

Authorities are mandated to do site inspections and audits to check on compliance to permit and license conditions, as well as general compliance to all applicable legislation.

Table 4: *Authority audits and inspections*

| **Organisation** | **Authority** | **Date of Inspection** | **Scope of inspection** | **No. of Findings/Description** |
| --- | --- | --- | --- | --- |
| CDM | Provincial Heritage Resources Authority Gauteng  (PHRA-G) | 18/07/2019 | Beneficiation plant – decommission project | CDM obtained its Heritage Permit on 07 August 2019 and is required to comply with conditions of the Heritage permit during the decommissioning of the beneficiation plant |
| CDM | Department of Mineral Resources and Energy (DMRE) | 15/08/2019 | 88kV power line relocation project – Environmental assessment | 1 finding:  Amendment to the authorisation was issued on 31 January 2020. CDM to comply with conditions of the amendment. The rerouting of the power-line commenced in June 2020 and is in progress. |
| CDM | Gauteng Department of Agriculture and Rural Development | 23/12/2019 | Emergency construction of a launching ramp for a temporary floating pump station and the associated activities at Wilge dam after existing pumps and structures were washed away by flooding. | CDM applied for condonation and was issued a Notice of Intent to Issue a Compliance Notice, despite the condonation application. A clarification meeting was arranged with the Gauteng Department of Agriculture and Rural Development (GDARD) on 6 March. CDM submitted their response based on the GDARD clarification on 18 March and is awaiting response. |
| FDM | Department of Mineral Resources and Energy (DMRE) | 27/09/2019 | EMPr compliance | All actions to address the findings have been logged on Isometrix under DMR inspection #537 under the audit module. |
| FDM | Department of Water and Sanitation  (DWS) | 26/06/2020 | Water Use License | N/A |
| KDM | Department of Water and Sanitation (DWS) | 11-12/07/2019 | Compliance to the Water Use License and GNR704 requirements | Twelve findings:  An action plan to address these findings have been completed and implemented. |
| KDM | Department of Water and Sanitation (DWS) | 18/02/2020 | Follow up on the management of non-conformances identified during their annual audit conducted in 2019. | Two findings:  Water Balance to be updated and Slimes Dam Engineering Report to indicate the Free Board.  Recommendation: Water meter to be installed to measure water released from paddocks |
| WDL | Government Chemist Laboratory Authority (GCLA) | 23/08/2019 | Chemical compliance | Four findings:   * Install more fire extinguishers * Add another (Clean) washing pipe/shower * Ammonium nitrates bags shouldn’t be stored direct on the floor * Place more warning signs in all stores |
| WDL | Ministry of Minerals (Mining commission) | 15/08/2019 | * Authorisation to construct an extension fine residue slimes (FRS) facility * Authorisation to construct coarse Residue conveyor belt facility | Several conditions were to be met by the mine before the authorisation would be granted e.g. inspection of the mine by the mine inspectors. |
| WDL | National Environmental Management Council (NEMC) and Ministry of Minerals (MOM) | 17,18/09/2019 | * EMP commitments to be addressed in the Annual Monitoring * Authorisation of WDL’s application for a permit to extend the coarse residue conveyor * Authorisation of WDL’s application for a permit to construct an extension of the fine residue slimes (FRS) facility | The authorisation for the extension of the FRS was granted pending compliance to all relevant legislation and the drilling of monitoring boreholes around the proposed sites, on 28 October 2019.  Authorisation for the extension of the coarse residue conveyor required the submission of a project brief report with supporting documents to NEMC. It was granted after submission of the document. |
| WDL | Tanzanian Mining Commission | 30 /01/2020 | Compliance inspection related to the application for authorisation for waste rock dump construction | In progress |
| WDL | Tanzanian Mining Commission | 19/05/2020 | Compliance inspection | Five findings:   1. Signs of hydrocarbon spillages in the magazine area. 2. Presence of bees in the explosive's storage areas. 3. Design of the Waste Rock Dump as advised by the Executive Secretary and NMCC was not completed. 4. Study of the Acidic Rock Drainage (ARD) was not conducted. 5. Recycling of the solid waste was not effective. |

## 1.4 Environmental Management Programme Report Commitments

This section focuses on progress on commitments made in each organisation’s Environmental Management Programme (EMPR) as required by Section 24N(7)(c) of the NEMA[[3]](#footnote-3). EMP performance assessments are annually conducted by third parties and highlight commitments that have either not been implemented at all or only partially implemented. It enables the different organisations to plan and implement accordingly.

Table 5: *Progress on EMPR commitments*

|  |  |
| --- | --- |
| **Organisation** | **Progress on EMPR commitments** |
| CDM | CDM has an outstanding commitment on storm water management, relating to erosion control measures to be implemented, as well as the implementation of a storm water management action plan. The CDM EMPR is due for amendment in August 2020 and the review process has been initiated, quotations obtained and discussions already held with Dreyer Legal. Upon conclusion of the review process (30 November 2020) an Environmental Assessment Practitioner (EAP) will be appointed for lodging an amendment application with DMR by 21 June 2021. |
| FDM | FDM updated their EMPr and they evaluated all actions required. Outstanding or commitments to be amended relate to:   * The 1 m limitation in height of top- and sub soils stockpiles * Topsoil management and analysis to determine the nutrient status. * Bunding of all fuel/oil dispensing areas on surface and underground * Management of abandoned underground storage tanks * Mapping of indigenous vegetation |
| KDM | KDM was due for an EMP assessment performance audit in March 2020 as the last one was conducted in March 2019. However, due to the Covid -19 pandemic it could not be conducted and has been arranged for August 2020.  The 2019 performance assessment report indicated that “Koffiefontein mine demonstrates an acceptable level of compliance against the management commitments, and it was found that current management far exceeds the mitigation requirements as provided for in the EMPr. Concerns were identified with activities (salvage yard) not provided in the EMPr, and furthermore, the rehabilitation measures not implemented fully due to trials still being undertaken to find solutions to current challenges (e.g. topsoil shortages and slope gradients). The auditors are of option that such do not pose immediate risk to current operational compliance with the EMPr, and would recommend that the EMPr be updated “to include recommendations and shortcomings. |
| WDL | WDL has submitted an amended EMP to the Technical Advisory Committee (TAC) for review and is awaiting final feedback after the site visit by the National Environmental Management Council (NEMC) in September 2019. Thus, no outstanding EMP commitments can be reported on. |

## 1.5 General Compliance

General compliance issues that are material to the organisations for the period under review, will typically include revision of permits and licences and communication with authorities on the issuing of authorisations.

Table 6: *Material Compliance Issues*

| **Organisation** | **Compliance issues for this period** |
| --- | --- |
| **CDM** | * CDM submitted in November 2019 a final plan for a Waste Tyre Storage Area to the Waste Bureau. Despite continual follow ups, no response has been received. * CDM awaits GDARD response on the submission made in Quarter 3 in response to the pre-compliance notice issued on 13 February 2020. Geotechnical investigations for the permanent solution to the damaged water infrastructure at the Wilge Dam, have been initiated. The investigation requires test pits within 100m from the stream that has triggered a general authorisation in terms of section 39 of the National Water Act (Act 36 of 1998). CDM is in the process of appointing an environmental assessment practitioner to assist with the application. * An application for amendment of the existing CDM Water Use Licence is in progress. The processing of the application by the Department of Water Affairs has been severely affected by the lockdown. CDM continues to follow-up. * Several surface and groundwater samples exceeded the Water Use License water quality standards during FY 2020. CDM contracted a consultant to review and recommend management measures to improve on water quality objectives, as well as to assist with the WUL amendment and submission to the Department of Water and Sanitation. * A number of fall-out dust monitoring sites exceeded the standards as a result of the pit side wall failure and the excessive dust emission that accompanied it. The mine have measures in place to monitor subsidence and ground movement. * 2019 GHG emissions were submitted electronically to Department of Environment, Forests & Fisheries (DEFF) |
| **FDM** | * Dismantling of BSP surface plant: All the required documentation on obtaining authorisation for the dismantling process, has been submitted to the DMR. The mine received acknowledgement that the application is outstanding and in progress at the DMR * The development of a Legal Compliance Tool is in progress and to be completed by June 2020 * The conditions of the IWUL required an annual internal audit which is overdue, but due to the current circumstances there would be some leniency towards deadlines. The IWWMP and WCDMP are in the process of being updated before submission. * 2019 GHG emissions were submitted electronically to Department of Environment, Forests & Fisheries (DEFF) * Several fall-out dust monitoring sites exceeded the standards during FY 2020. Samples were sent to a laboratory for chemical analysis to determine the origin of the dust in order to determine appropriate actions. * Several boreholes exceeded the water use license quality standards. Quarterly sampling is conducted to collect data that will be used every five years to update the groundwater model to determine the impact from the residue deposits on the groundwater. |
| **KDM** | * 2019 GHG emissions were submitted electronically to the Department of Environment, Forests & Fisheries (DEFF) in March 2020. * Authorization for the construction of the FRD was received and a clarification letter was sent to the Department of Environment, Forests & Fisheries (DEFF) regarding a number of conditions attached to the authorisation. * Challenges regarding the management of the paddocks was a concern during the period of extended load shedding by Eskom. The situation is closely managed under load shedding conditions and numerous controls have been implemented. Paddocks was inspected twice during the shutdown period and it was found to be in good working order with no risk of overflowing * The HSE manager attended the quarterly meetings of the Modder-Riet Catchment Management Forum and the Kalkfontein Water Users Association |
| **WDL** | * On 28 October 2019, the Ministry of Water issued a construction permit for the starter wall of phase II of the WDL Fine Residue Slimes Facility, in terms of the Water Resources Management Act (Act 11 of 2009) and the Dam Safety Regulations of 2013. The permit contains several conditions that WDL will have to comply with. * WDL was also granted a permit to extend the coarse residue conveyors from the treatment plant to the previously used coarse residue dump |

## 1.6 External Complaints

External complaints from interested and affected parties are considered as very important, especially in view of the reputational implications to the relevant organisation and Petra Diamonds as a whole. Thus, all external complaints are prioritised and managed by means of thorough investigation, effective actions and prompt feedback.

Table 7: *Details of External Complaints Received per Organisation during this period*

|  |  |
| --- | --- |
| **Organisation** | **External complaints received** |
| **CDM** | 1. 6 October 2019: An external complaint was lodged regarding mud that was deposited around the North fan. The areas were cleaned, an additional dust monitoring bucket installed and the filters sent for a dust chemical analysis (results are awaited). A response was drafted and submitted to the complainant.  2. November 2019: Residents close to the pit, complained about the pit falling and the excessive dust that was caused by the October pit subsistence. The incident also received some media attention.  3. After heavy rains and flooding in December that washed away some pipelines on 10 December 2019, a complaint was received on a shortage of water supply to the Cullinan Water Treatment Works. CDM arranged for the provision of water via tankers and the construction of a launching ramp for a temporary floating pump station to supply raw water to the Cullinan Water treatment Works. |
| **FDM** | 6 November 2019: PPC lodged a complaint by e-mail regarding the amount of waste dumped at their landfill. A meeting was held with both contractors to ensure they transport the telecons to the sewage yard for recycling and as the yard was found to be too small, a letter was sent to PPC to ask permission to enlarge the area. Permission was granted and the progress report was actioned on Isometrix |
| **KDM** | October 2019: Mr Ivan Kordom sent an e-mail to remind the mine of his client’s objection (submitted 2017) regarding the presence of old graves on the mining site and the National Heritage Resources Act’s requirements in this regard. KDM responded via e-mail that they are in possession of the objection and will act within the requirements of the National Heritage Act. It was emphasises that both SAHRA and the DMRE is included in all communication regarding the legal process to relocate the graves. |
| **WDL** | None reported |

# ASSURANCE

This section of the report focuses on the internal processes and systems on mine. Areas such as certification and Group Projects / Initiatives are reported on.

## 2.1 ISO 14001 Certification

The certification body for ISO 14001 certification for all the South African organisations is BSI (British Standards Institute). All the South African Organisations migrated successfully from the ISO 14001:2004 to the ISO 14001:2015 systems during the past two years. Williamson Diamonds Limited in Tanzania is not formally certified, but the Group Environmental Lead developed a simplified Environmental Management System based on the principles of ISO 14001:2015. It was rolled out in March 2020.

*The KPI for Petra Diamonds is that all the South African organisations are to retain their ISO 14001:2015 certification for the current financial year*

Table 8: *Details of most recent ISO 14001 Audits*

|  |  |  |  |
| --- | --- | --- | --- |
| **Organisation** | **Date** | **Number[[4]](#footnote-4) of critical findings** | **Details of critical findings** |
| CDM | June 2020. | 0 | N/A |
| FDM | February 2020 | 3 | 1. No mechanism has been identified to determine the necessary competency of workers that affects or can affect FDM's environmental performance and compliance obligations i.e. to evaluate field based competency of workers.  Actions:   * Link competencies on the competence prompter to the tools required to determine competence. * Conduct gap analysis and put programme in place per section to address aforementioned gaps. * Review the environmental risk assessments to ensure that significant risks are addressed.   2. Understanding of FDM's compliance status could not be determined as several applicable national, provisional and local legislation (bylaws) were omitted from the CEM 2017/204 Environmental Legal Compliance Audit, Finsch Diamond Mine, 26 -28 February 2018. No other mechanism, was identified.  Actions:   * Draw up scope of work for next HSE legal audit to include all areas and applicable HSE legislation is covered within the certified scope of the FDM HSEms. * Obtain three quotes for HSE legal audit based on the aforementioned requirements. * Budget for HSE legal audit in 2021 FY.   3. Potential emergency situations identified in FDM-HSE-POL-38 Annexure 3 Environmental Emergency Preparedness and Response Plan includes minor chemical/oil spills, which constitutes incidents rather than emergencies, in terms of magnitude and impact. It was not clear from the emergency drills, what planned response actions were tested i.e. SOP. Records indicated no review and revision of the processes and planned response actions after the execution of the emergency drills i.e. the effectiveness of the drill, controls and mitigations measures were not determined. The emergency drills reviewed did not include notes on whether actions were taken in sequence or reaction time as per FDM-HSE-POL-38 Annexure 4 Emergency Preparedness Drill Checklists. There is limited confidence that the processes are carried out as planned.  Actions:   * Review HSE emergencies on the issue prompter. * Review FDM-EN-SOP-38 and annexures to reference the correct documents to be used for evaluating emergency drills. * Schedule reminders of timeframes of emergency drills for 2.9.2/2.15.1 appointees. |
| KDM | December 2019 | 0 | N/A |

Graph 1*: ISO 14001:2015 audit findings per organisation*

## 2.2 Incident Reporting

All environmental incidents reported, are logged on Isometrix (with the exception of WDL where a paper system is in use). Environmental incidents are rated into one of 5 severity classes with medium, high and major incidents classified as significant environmental incidents.

Graph 2: *Total Number of incidents reported per organisation for this period*

## 2.3 Significant Environmental Incidents

Only Medium, High or Major Environmental Incidents reported in this quarter, are reported on in this sub-section. The following table indicates further details of all significant environmental incidents reported.

Petra Diamonds set a KPI of zero Major Environmental Incidents for the current financial year.

Table 9: *Description of Significant Environmental Incidents*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Organisation** | **Severity** | **Description** | **Investigation Status** |
| 28/10/2019 | CDM | Medium | A pit wall failure resulted in noise, a dust plume and massive erosion of soil into the pit. It also threatened existing heritage structures located on the south western side of the pit. | Completed |
| 10/12/2019 | CDM | Medium | Flooding, due to heavy rains, caused damage to the Bronkhorstspruit river banks at the Wilge River Dam. This also resulted in permanent damage to the water conveyance system (pumping and piping infrastructure) that supplies raw water to the Mine and to the Magalies Water Board (MWB). MWB in turn is responsible for the treatment and distribution of potable water to Cullinan, Refilwe, Rayton and surrounding areas. This incident left more than 3,000 people without potable water over the festive season. Note: this is a vis major incident | Completed |
| 28 /09/2019 | KDM | Medium | On 28 September 2019 water originating from the plant, ran via the storm water channel from the mining area. An investigation found that the drain pump at the plant did not start up and the secondary pump that should have pumped the water back into the system was not functioning. It resulted in contaminated water leaving the mine area via the storm water system. It did not enter any other water bodies. | Completed |

## **2.4 Internal** Assessments

Due to legislative requirements, as well as the self –regulatory approach of ISO 14001, the organisations undergo numerous internal and external audits per year. Only assessments conducted by either on-site personnel, group personnel or consultants contracted for assessments to be used internally only, are noted in this section.

Table 10: *Internal Assessments Conducted in this period*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Organisation** | **IWWMP/ GN R704** | **Legal compliance** | **CAP[[5]](#footnote-5)** | **Internal EMS** | **Other** |
| **CDM** |  |  | Jan 2020:  12 findings | Q2: Environmental Management Audit: 4 findings | Q1: Transformer PCB compliance inspection  Q3: Waste Management License audit conducted by Group Waste and Water Specialist: 9 findings. |
| **FDM** |  |  | Dec 2019:  10 Minor non-conformances; 6 Opportunities for improvement |  |  |
| **KDM** | 27/01/2020:  Internal WUL audit conducted by HSEQ Data Analyst: 12 partial non-compliances and 8 non-compliances |  | Nov 2019:  22 Minor non-conformances; 4 Opportunities for improvement |  |  |
| **WDL** |  |  |  |  | Oct 2019:  Desk top data verification audit conducted by HSEQ Data Analyst  2-5/03/2020: HSEQ team visited the mine to amongst others:   * Introduce and assist with the implementa-tion of an ISO 14001: 2015 Environmental Management System * Clarify/ assist with environmental reporting requirements for FY 2020 * Conduct a site inspection on compliance and performance |
| **Petra** | Third Party GHG Emissions Verification Audit - August to November 2019:  A third party GHG emission verification audit was conducted at the satellite offices in Kimberley and on-line at all the mines to verify the Petra, as well as the organisational, carbon footprints  (GHG emissions). WDL was excluded from the desk top audit that verified all relevant data against source documents. Findings were addressed at all the mines and head office. The verification statement declared that: “Based on the verification process and procedures conducted, it was concluded that there is no evidence that the GHG assertion is not materially correct and is not a fair representation of the GHG data and information; and has not been prepared in accordance with the GHG Protocol’s Corporate Accounting and Reporting Standard.” | | | | |

## 2.5 Mine closure and Rehabilitation

Rehabilitation is a keystone requirement in all EMPRs and has a major impact on the financial provision for each operation. The required documentation is developed for implementation by the operations and implementation is evaluated on an annual basis with the amendments of mine closure liability assessments.

*Petra Diamonds set a KPI of 100% completion of all legislated required closure and rehabilitation documents for each of the organisations*

Table 11: *Progress on Legislated Mine Closure and Rehabilitation Documentation*

|  |  |  |
| --- | --- | --- |
| **Organisation** | **Required documents for Mine Closure and Rehabilitation** | **Progress** |
| **CDM** | Rehabilitation Plan (Technical) | Completed by Digby Wells in FY2020. Operation in process of reviewing the action plan. |
| Annual Rehabilitation Schedule | Schedule for FY2022 to be finalised in Sept 2020. |
| Mine closure plan | Document completed 2016. Updated information to be supplied in Sept 2020 |
| Mine Closure risk assessment | Draft was presented to mine for comments and has been consolidated with closure liability list. Final information to be submitted to the Group Rehab Specialist by Sept 2020. |
| Closure liability calculation 2020 | FY2021 report due end of August 2020. Closure liability survey was completed on 30 June 2020 |
| **FDM** | Rehabilitation Plan (Technical) | Completed by Digby Wells in FY2020. Operation to supply action plan. |
| Annual Rehabilitation Schedule | Schedule for FY2022 to be finalised in Sept 2020. |
| Mine closure plan | Document completed 2015. In process of reviewing closure actions as updated information to be supplied in Sept 2020 to Group Closure and Rehabilitation Specialist |
| Mine Closure risk assessment | Draft must be reviewed by operation, final information to be submitted to the Group Rehab Specialist by Sept 2020. |
| Closure liability calculation 2020 | FY2021 report due end of August 2020 |
| **KDM** | Rehabilitation Plan (Technical) | Completed by Digby Wells in FY2020. Operation to supply action plan. |
| Annual Rehabilitation Schedule | Schedule for FY2022 to be finalised in Sept 2020. A plan indicating the seeding of current rehabilitation areas is available |
| Mine closure plan | Document completed 2016. Mine n process of reviewing closure action plan as updated information to be supplied in Sept 2020 |
| Mine Closure risk assessment | Draft to be evaluated by the mine, final information to be submitted to the Group Rehab Specialist by Sept 2020. |
| Closure liability calculation 2020 | FY2021 report due end of August 2020 |
| **WDL** | Mine Closure Plan | Mine Closure plan has been updated and aligned to the new mine closure guidelines. It was submitted to the authorities for approval. |

## 2.6 Implementation of Group Environmental Strategies

Water, waste and ecological management are three pillars of environmental management in the mining industry. Petra Diamonds formulated strategies to guide and direct the Petra organisations in the management of these areas in an integrated and effective way.

Table 12: *Progress on Implementation of Group Environmental Strategies*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **CDM** | **FDM** | **KDM** | **WDL** |
| **Integrated Water Management Strategy** | Water balance project was completed in March 2020 and training provided;  Water balance is currently being updated with 2019 information  Storm water management plan completed and the action plan drafted and captured on Isometrix. Four projects have been initiated, one has been completed.  Outstanding:   * Community awareness * Water Conservation and Demand Management Plan | Implementation of Integrated Water Management strategy is around 80% as some of the commitments were scheduled for Q4 and could not be executed due to the Covid-10 Lockdown. All actions required, were captured and uploaded to Isometrix and management has been briefed on the water conservation benchmark. Outstanding:   * Update of holistic storm water plan * Water awareness campaign | Required documentation in progress as per schedule | N/A |
| **Waste Optimisation Strategy** | Implementation as per action plan.  Outstanding issues:   * Response from Waste Bureau on the registration of the waste tyre storage area plan (submitted November 2019). * Waste management training for Waste Management Control officer. * Underground historic waste removal on hold. | * 95% implementation of strategy and all actions had been uploaded on Isometrix * Procedures were aligned to the Waste Optimisation   Strategy   * A plan for the phasing out of single use plastics has been drafted. * Initiatives to recycle 99% of waste have been implemented * It was decided not to buy a glasscutter as Interwaste removes and recycle all glass waste | 25 % of Historical Underground waste has been removed in FY 2019 | N/A |
| **Ecological Management Strategy** | Implementation as per action plan.   * Biodiversity assessment. Desktop study has been conducted. Final report due July 2020.   Outstanding issues:   * Implementation of effective Alien Invasive Plants Removal Plan. * Management of game farm and related issues | * 95% of the strategy has been implemented and all requirements were uploaded to Isometrix. * Biennial progress reports were added to the monitoring sheet. * Planned Annual progress reports to be implemented * Conservation and protection programmes will be incorporated into the ecological assessment * Sensitivity mapping to be conducted in FY 2021 | In progress | N/A |

## 2.7 Financial Provision

Each organisation must annually amend the closure liability calculations and submit to the DMRE for approval. Effective and successful concurrent rehabilitation results in a decrease of the total financial provision for mine closure.

Table 13: *Progress on Financial Provision*

|  |  |  |  |
| --- | --- | --- | --- |
| **Organisation** | **Amendment for FY 2020 completed?** | **Amendment approved by DMR** | **Percentage change in total Financial Provision costs as compared to FY 2019 (increase (-); decreased (+))** |
| **CDM** | Yes | FY 2020 approved | -2.98% |
| **FDM** | Yes | FY 2020 approved | +5.59% |
| **KDM** | Yes | FY 2020 approved | -4.21% |
| **WDL** | Yes | Evaluation pending | Neutral |

# MONITORING

The section below indicates all monitoring records for the mines that are legally required to be available. It should be noted that results have a lagging time of one month to allow for analysis results to become available from external laboratories used. Most of the mines make use of SANAS accredited laboratories.

**Water quality** (surface and underground) is determined in terms of various parameters (e.g. Total dissolved solids (TDS), Electrical conductivity (EC), Total hardness, pH, sodium (Na+), chlorides (Cl-), fluorides (F-), sulphates (SO42-), Magnesium (Mg2+), nitrates (NO3-), E.coli, Biological Oxygen Demand (BOD), etc.) that can be compared to the DWS Target Water Quality Range values for different water uses. The specific standard used, is based on the planned end use of that water source.

However, as all the mines in SA have been issued with Water Use Licenses, specific water quality standards for each mine are included as license conditions and exceedances will have to be reported to the Department of Water Affairs and Sanitation (DWS). It should be noted that kimberlite crushing results in elevated values of chloride and/or fluorides and sulphates. Many relevant localities are also sampled and analysed for microbiological contaminants according to the DWS General Release standard, SANS 241:2011 Microbiological Requirements allowable for drinking water.

Environmental **Fall-out dust**, as well as **PM10** and **PM2.5**concentrations are measured against the standards set in the relevant regulations (National Dust Control Regulations (2013), National Ambient Air Quality Standards for PM2,5(2012) and National Ambient Air Quality Standards (2009)) to the National Environmental Management: Air Quality Act, Act 39 of 2004. All South African operations are registered on the National Air Environmental Information System (NAEIS) and report directly on the system.

Table 14: *Fall-out dust targets according to legislation*

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Conditions** | **Target/standard concentration** | **Permitted frequency of exceeding dust fall rate** |
| **Dust fall rate (D) in**  **(mg/m2/day, 30 days average)** | Residential area | D < 600 | Two within a year, not sequential months |
| Non-Residential area | 600 < D < 1200 | Two within a year, not sequential months |
| **PM10 (µg/m3, 24 hours average)** | 1 Dec 2015 - | PM10 < 75 | Four within a year |
| **PM 2.5 (µg/m3, 24 hours average)** | Immediate – 31 Dec. 2015 | PM 2.5  < 65 | Four within a year |
| 1 Jan 2016-31 Dec 2029 | PM 2.5  < 40 | Four within a year |

**Environmental noise** (outdoor noise) is measured against the standards set by the Department of Environmental Affairs, based on SANS 10131.

Table 15: *Typical rating levels for Environmental Noise in different districts/areas*

|  |  |  |  |
| --- | --- | --- | --- |
| **Type of District** | **Maximum rating level (*L*Req,T)**a **for ambient noise (**dBA) | | |
| Day/night (24h) | Day time  (06:00 to 22:00) | Night time (22:00 to 06:00) |
| Rural districts | 45 | 45 | 35 |
| Suburban districts with little road traffic | 50 | 50 | 40 |
| Urban districts | 55 | 55 | 45 |
| Urban districts with one or more of the following:  workshops; business premises; and main roads | 60 | 60 | 50 |
| Central business districts | 65 | 65 | 55 |
| Industrial districts | 70 | 70 | 60 |

All exceedances to the relevant monitoring standards for water quality, air quality, as well as environmental noise, are managed as *‘non-conformances to standard*’ by the different organisations.

## CDM environmental monitoring

CDM: Surface water monitoring (monthly):

All surface and groundwater samples are measured against the WUL conditions.

Table 16: *CDM Surface Water monitoring points and exceedances*

| **Point**  **No.** | **Name** | **Location** | **Exceedances to standard[[6]](#footnote-6)** |
| --- | --- | --- | --- |
| 1 | No. 1 Pollution Control Dam | 25°39'13.32"S; 28°27'59.06"E | Aug: Dissolved oxygen; EC; suspended solids; pH; Turbidity |
| Jan: Dissolved oxygen; EC; suspended solids; pH; Turbidity |
| Apr: Conductivity |
| 2 | Downstream of McHardy Dam | 25°39'30.94"S; 28°27'40.58"E |  |
|  |
| 3 | McHardy Dam | 25°39'35.17"S; 28°27'49.02"E | Aug: Dissolved oxygen |
| Jan: Dissolved oxygen; pH |
| 4 | Lapa Dam | 25°40'2.57"S; 28°28'29.18"E | Apr: EC |
| 5 | Stream between Lapa and 2PCD | 25°40'10.95"S; 28°29'9.70"E | Aug: Dissolved oxygen; EC |
| Apr: Conductivity; suspended solids |
| 6 | No. 2 Pollution Control Dam | 25°47'16.48"S; 28°45'38.56"E |  |
| 7 | Calsrue | 25°40'25.79"S; 28°28'47.80"E | Dec: Dissolved oxygen; Turbidity |
| 8 | McHardy West | 25°40'46.01"S; 28°30'28.41"E |  |
| 9 | McHardy East | 25°40'58.13"S; 28°30'50.03"E |  |
| 10 | Wilge Raw | 25°40'31.83"S; 28°31'43.27"E |  |
| 11 | 200 Ft. Reservoir | 25°39'59.78"S; 28°30'44.49"E |  |
| 12 | No. 7 Dam Pump Station | 25°39'45.84"S; 28°31'0.00"E |  |
| 13 | Dump Treatment Plant Pump station | 25°39'36.42"S; 28°30'58.41"E |  |
| 14 | No. 7 Dam S/E Corner | 25°39'21.00"S; 28°32'11.98"E |  |
| 15 | No. 7 Dam East Side | 25°39'8.92"S; 28°32'16.28"E |  |
| 16 | Refilwe WWTW final effluent | 25°38'55.48"S; 28°31'55.57"E |  |
| 17 | No. 7 Dam back of Refilwe WWTW | 25°38'57.81"S; 28°32'9.59"E |  |
| 18 | Refilwe Ext. 4 Pump station | 25°38'43.83"S; 28°31'32.93"E |  |
| 19 | No. 7 Dam North Edge | 25°38'46.12"S: 28°30'29.49"E |  |
| 20 | Premiermynloop | 25°39'6.25"S; 28°27'41.56"E | Dec: Suspended solids; Dissolved oxygen |
| Jan: Dissolved oxygen; EC; Suspended solids; turbidity |
| Apr: EC |
| May: EC; Dissolved oxygen |
| June: EC |
| 21 | Old Swimming pool sump | 25°39'49.03"S; 28°31'15.99"E |  |
| 22 | Roodeplaat Spruit Kameelfontein | 25°36'30.39"S; 28°24'12.63"E |  |
| 23 | Roodeplaat Spruit Dept of Agric | 25°36'6.98"S; 28°22'22.55"E |  |
| 24 | Upstream from pit | 25°40'42.19"S; 28°31'6.45"E |  |
| 25 | No 1 Dam | 25°47'49.81"S; 28°43'48.79"E |  |
| 26 | No 2 Dam | 25°47'16.48"S; 28°45'38.56"E |  |
| 27 | No 3 Dam | 25°47'48.95"S; 28°47'5.41"E |  |
| 28 | No 4 Dam | 25°47'54.88"S; 28°47'12.15"E |  |
| 29 | No 5 Dam | 25°48'39.31"S; 28°49'4.45"E |  |
| 30 | No 6 Suction point | 25°48'38.53"S; 28°51'3.40"E |  |
| 31 | No 7 Wilge River inflow | 25°48'51.41"S; 28°51'34.28"E |  |
| 32 | No 7 Dam seepage point | 25°39'6.07"S; 28°30'4.44"E | Aug: Dissolved oxygen; EC |
| Jan: Dissolved oxygen; EC; Suspended solids; turbidity |
| Apr: EC; Suspended solids; |
| 33 | Magalies Drinking water 1 | 25°40'29.79"S 28°31'39.02"E |  |
| 34 | Magalies Drinking water 2 | 25°40'29.09"S 28°31'40.73"E |  |
| 35 | CDM Dispensary | 25°40'3.51"S 28°30'52.47"E |  |
| 36 | Cullinan school | 25°40'41.01"S 28°31'24.00"E |  |
| 37 | Chokoe school | 25°38'49.20"S 28°31'47.12"E |  |
| 38 | Cullinan sewerage works | 25°40'51.05"S 28°30'38.70"E |  |
| 39 | Refilwe sewerage works | 25°38'57.03"S 28°32'11.36"E |  |

CDM: Groundwater monitoring (Quarterly):

Table 17: *CDM Groundwater monitoring points and exceedances*

| **Point No.** | **Name** | **Location** | **Exceedances to standard** |
| --- | --- | --- | --- |
| 1 | Nel’ Borehole | 25°38'59.34"S; 28°26'32.10"E |  |
| 2 | Du Toit’s Borehole | 25°38'54.35"S; 28°27'10.73"E | Q1: EC |
| Q4: EC |
| 3 | PM 7 | 25°39'6.84"S; 28°27'39.19"E |  |
| 4 | PM 4 | 25°39'16.98"S; 28°28'22.43"E |  |
| 5 | PM 6 | 25°39'12.19"S; 28°29'36.62" |  |
| 6 | PM 1 | 25°39'6.05"S; 28°30'5.03"E | Q2:EC |
| 7 | Lapa Borehole | 25°40'11.47"S; 28°28'25.66"E | Q1: EC |
| Q2: EC |
| Q3:EC |
| Q4: EC |
| 8 | Vorster’s Borehole | 25°40'38.12"S; 28°28'30.95"E |  |
| 9 | KL 19 C | 25°41'0.36"S; 28°29'52.90"E |  |
| 10 | KL 19 B | 25°40'54.85"S; 28°30'7.28"E |  |
| 11 | PM 2 | 25°39'53.22"S; 28°31'17.12"E |  |
| 12 | Underground Dewatering | 25°40'10.16"S; 28°30'38.40"E |  |
| 13 | PM3B (R513) | 25°40'55.03"S; 28°30'43.10"E |  |
| 14 | PM5 | 25°40'9.39"S; 28°29'20.04"E | Q1: EC; Cl; ammonia |
| Q2: EC; Cl; ammonia |
| Q3: EC; Cl; |
| Q4: EC; Cl; |
| 15 | CDM BH58 | 25°39'54.88"S; 28°29'24.29"E | Q2: Na |
| 16 | CDM BH59 | 25°38'33.45"S; 28°30'6.59"E |  |
| 17 | CDM BH 16 | 25°39'23.36"S; 28°32'22.69"E | Q1:EC; |
| Q3: EC; |
| Q4:EC; |
| 18 | CDM BH 2 | 25°40'34.12"S; 28°31'23.93"E | Q: ammonia: |

CDM: Fall out dust (quarterly), PM10 (annual) and PM2.5 (annual) monitoring

Table 18: *CDM Fall-out dust monitoring points and exceedances*

| **Point No.** | **Name** | **Location** | **Exceedances to standard** | | |
| --- | --- | --- | --- | --- | --- |
| **Fall out dust**  **(mg/m2/day)**  **Residential < 600** | **PM10**  **(ug/m3)** | **PM 2,5**  **(ug/m3)** |
| 1 | Cullinan Diamond Lodge | 25°40'22.30"S; 28°31'7.34"E | Oct: 620 |  |  |
| 2 | CDM Sewage works | 25°40'50.02"S; 28°30'41.99"E |  |  |  |
| 3 | Game Farm Gun Club | 25°40'20.72"S; 28°29'17.29"E | Feb:1306 |  |  |
| 4 | Game Farm No.7 Dam wall | 25°38'39.15"S ; 28°30'2.16"E |  |  |  |
| 5 | Group Offices | 25°40'1.29"S; 28°30'48.51"E |  |  |  |
| 6 | Refilwe Ext 4 Sewage pump station | 25°38'42.88"S; 28°31'33.20"E | Jan: 693  June: 1010 |  |  |

CDM: Environmental noise monitoring (annual):

Table 19: *CDM Environmental Noise monitoring points and exceedances*

|  |  |  |  |
| --- | --- | --- | --- |
| **Point No.** | **Name** | **Location** | **Exceedances to standard** |
| 1 | Cullinan Diamond Lodge | 25°40'22.30"S; 28°31'7.34"E | Jul: 50.6 |
| 2 | CDM WWTWs | 25°40'50.02"S; 28°30'41.99"E | Jul: 47.3 |
| 3 | Game Farm Gun Club | 25°40'20.72"S; 28°29'17.29"E | Jul: 39.3 |
| 4 | Game Farm No.7 Dam wall | 25°38'39.15"S ; 28°30'2.16"E |  |
| 5 | Group Offices | 25°40'1.29"S; 28°30'48.51"E |  |
| 6 | Refilwe Ext 4 Sewage pump station | 25°38'42.88"S; 28°31'33.20"E |  |

Graph 3*: CDM Number of monitoring sites indicating non-conformances to monitoring standards*

## 3.2 FDM environmental monitoring

FDM: Surface water monitoring: (Not a requirement in the amended Water Use License since 2018)

FDM: Groundwater monitoring (Quarterly):

Table 20: *FDM - Environmental Groundwater monitoring points and exceedances*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Point No** | **Name** | **Location** | **Exceedance to Standards** | Point No | **Name** | **Location** | **Exceedance to Standards** |
| 1 | E12 | 28o23'28.00563"S  23o44'28.42474"E |  | 31 | G3 | 28 o 23'43.69053"S  23 o 39'49.44610"E | . |
| 2 | E3 | 28 o 23'31.85721"S  23 o 44'42.83714"E | **Q1: Mn** | 32 | G9 | 28 o 24'09.69813"S  23 o 39'41.35072"E |  |
| **Q2: Mn** |
| **Q3: Mn** |
| 3 | E2 | 28 o 23'33.05818"S  23 o 44'47.41747"E |  | 33 | E22 | 28o23'43.69053"  23 o 39'12.84793"E |  |
| 4 | E1 | 28 o 23'34.08485"S  23 o 44'50.71502"E |  | 34 | E23 | 28 o 23'37.43179"S  23 o 38'27.34915"E |  |
| 5 | E4 | 28 o 23'36.09824"S  23 o 44'58.36776"E | **Q1: EC; Total Alkalinity; Mg; Cl; SO42-; TDS** | 35 | E31 | 28 o 23'28.87604"S  23 o 40'19.13009"E | **Q2: Mn** |
| **Q2: EC; Total Alkalinity; Mg; Cl; SO42-; TDS** | **Q3 : Na** |
| **Q3: EC; Total Alkalinity; Mg; Cl; SO42-; TDS** | **Q4 : Na** |
| **Q4: EC; Total Alkalinity; Mg; Na; Cl; SO42-; TDS** |
| 6 | GA01b | 28 o 23'24.51109"S  23 o 43'45.80567"E |  | 36 | E17 | 28 o 23'23.15291"S  23 o 40'48.23312"E |  |
| 7 | M3 | 28 o 23'36.27072"S  23 o 44'27.02623"E | **Q1: EC; Cl; TDS** | 37 | Britz-A | 28 o 23'08.11688"S  23 o 40'21.09036"E |  |
| **Q2: EC; Cl; TDS** |
| **Q3: EC; Cl; TDS** |
| **Q4: EC; Cl; TDS; Na; SO42-** |
| 8 | GA04b | 28 o 23'42.24701"S  23 o 44'18.58745"E |  | 38 | E15 | 28 o 23'02.64976"S  23 o 39'43.69512"E |  |
| 9 | GA04a | 28 o 23'42.00705"S  23 o 44'18.86307"E | **Q4: EC; Total alkalinity; Fe; Mn** | 39 | G2 | 28 o 22'25.66606"S  23 o 39'34.04351"E |  |
| 10 | GA03 | 28 o 23'39.63678"S  23 o 43'42.08237"E | **Q1: EC; Total Alkalinity; Mg; Cl; TDS** | 40 | G6 | 28 o 22'59.62129"S  23 o 40'11.20020"E |  |
| **Q2: EC; Total Alkalinity; Mg; Cl; TDS** |
| **Q3: EC; Total Alkalinity; Mg; Cl; TDS** |
| **Q4: EC; Total Alkalinity; Mg; Cl; TDS** |
| 11 | E24 | 28 o 23'47.65371"S  23 o 43'11.27136"E | **Q1: EC; Mg; Na; Cl; SO42-; TDS** | 41 | G5 | 28 o 23'00.76669"S  23 o 40'22.01364"E |  |
| **Q2: EC; Mg; Na; Cl; SO42; TDS** |
| **Q3: EC; Mg; Na; Cl; SO42; TDS** |
| **Q4: EC; Mg; Na; Cl; SO42; TDS** |
| 12 | GA02a | 28 o 23'59.52706"S  23 o 43'57.99822"E | **Q4: EC** | 42 | G4 | 28 o 23'01.83544"S  23 o 40'34.21829"E |  |
| 13 | KLM4 | 28 o 23'56.63097"S  23 o 44'30.93337"E |  | 43 | E14 | 28 o 23'01.24271"S  23 o 41'20.23331"E |  |
| 14 | F5 | 28 o 24'19.65519"S  23 o 44'45.05890"E |  | 44 | E29 | 28 o 23'07.61607"S  23 o 41'25.45655"E | **Q1; Mn** |
| **Q2; Mn** |
| **Q3; Mn** |
| 15 | KLM6 | 282 o 4'19.45361"S  23 o 44'32.59405"E | **Q1: EC; Total Alkalinity; Na; SO42-; TDS** | 45 | E19 | 28 o 23'21.47197"S  23 o 41'51.20554"E | **Q1: Na; Mn** |
| **Q2: EC; Total Alkalinity; Na; SO42-; TDS** | **Q2: Na; Mn** |
| **Q3: EC; Total Alkalinity; Na; SO42-; TDS** | **Q3: Na; Mn** |
| **Q4: EC; Total Alkalinity; Na; SO42-; TDS** | **Q4: Na; Mn** |
| 16 | KLM3 | 28 o 24'24.60790"S  23 o 44'34.26990"E |  | 46 | E16 | 28 o 23'26.75581"S  23 o 41'43.28828"E |  |
| 17 | KLM5 | 28 o 24'43.08773"S  23 o 44'28.19314"E | **Q1: EC; Mg; Na; Cl; ; TDS; SO42-** | 47 | M1 | 28 o 23'09.12375"S  23 o 42'11.79054"E | **Q1: EC; Cl** |
| **Q2: EC; Mg; Na; Cl; ; TDS; SO42-** | **Q2: EC; Cl** |
| **Q3: EC; Mg; Na; Cl; ; TDS; SO42-** | **Q3: EC; Cl** |
| **Q4: EC; Mg; Na; Cl; Mn; TDS; SO42-** | **Q4: EC; Cl** |
| 18 | KLM2 | 28 o 24'48.52211"S  23 o 44'12.71579"E |  | 48 | M9 | 28 o 23'07.07696"S  23 o 42'14.58210"E | **Q4: EC; Cl** |
| 19 | E27 | 28 o 24'44.51336"S  23 o 43'47.71892"E | **Q1; EC; Total Alkalinity; Mg; SO42-; TDS;** | 49 | M6 | 28 o 23'06.01339"S  23 o 42'19.60651"E |  |
| **Q2; EC; Total Alkalinity; Mg; SO42-; TDS** |
| **Q3; EC; Total Alkalinity; Mg; SO42-; TDS** |
| **Q4: EC; SO42-; TDS** |
| 20 | F6 | 28 o 24'53.81121"S  23 o 44'59.68721"E |  | 50 | M5 | 28 o 22'56.91842"S  23 o 42'26.55652"E |  |
| 21 | BA2 | 28 o 24'58.15607"S  23 o 45'01.40355"E | **Q!: EC; Total Alkalinity; Mg; Na; Cl; SO42-; TDS** | 51 | M8 | 28 o 22'44.41166"S  23 o 42'27.10376"E | **Q4: Mn** |
| **Q2:EC; Total Alkalinity; Mg; Na; Cl; SO42-; TDS** |
| **Q3;EC; Total Alkalinity; Mg; Na; Cl; SO42-; TDS** |
| **Q4: EC; Total Alkalinity; Mg; Na; Cl; SO42-; TDS** |
| 22 | E25 | 28 o 24'20.62314"S  23 o 42'46.23965"E | **Q1: EC; Na; Cl; SO42-; TDS; Mn** | 52 | M4 | 28 o 23'07.41281"S  23 o 42'45.88686"E | **Q1: EC: TDS** |
| **Q2: EC; Na; Cl; SO42-; TDS; Mn** | **Q2 EC: TDS** |
| **Q3: EC; Na; Cl; SO42-; TDS; Mn** | **Q3: EC: TDS** |
| **Q4: EC; Na; Cl; SO42-; TDS; Mn** | **Q4: EC: TDS** |
| 23 | E26 | 28 o 24'12.46412"S  23 o 42'42.39871"E | **Q1: EC; Mg; Na; Cl; SO42-; TDS; Mn** | 53 | E30 | 28 o 23'16.78296"S  23 o 42'30.54717"E | **Q1: EC; Cl** |
| **Q2: EC; Mg; Na; Cl; SO42-; TDS; Mn** | **Q2: EC; Cl** |
| **Q3: EC; Mg; Na; Cl; SO42-; TDS; Mn** | **Q3: EC; Cl** |
| **Q4: EC; Cl** |
| 24 | E21 | 28 o 24'42.34213"S  23 o 41'40.92247"E | **Q1: EC; Total Alkalinity; Mg; SO42-; TDS; Mn** | 55 | E9 | 28 o 23'16.03612"S  23 o 42'47.74634"E |  |
| **Q2: EC; Total Alkalinity; Mg; SO42-; TDS; Mn** |
| **Q3: EC; Total Alkalinity; Mg; SO42-; TDS; Mn** |
| **Q4: EC; Total Alkalinity; Mg; SO42-; TDS; Mn** |
| 25 | E20 | 28 o 24'34.70365"S  23 o 41'30.72792"E | **Q1: EC; Total Alkalinity; Mg; Mn** | 56 | E7 | 28 o 23'15.86001"S  23 o 42'44.67559"E |  |
| **Q2: EC; Total Alkalinity; Mg; Mn** |
| **Q3: EC; Total Alkalinity; Mg; Mn** |
| **Q4: EC; Total Alkalinity; Mg; Mn** |
| 26 | E18 | 28 o 23'57.79602"S  23 o 41'32.58272"E | **Q1: EC; Mg; SO42-; TDS** | 57 | F4 | 28 o 23'21.79813"S  23 o 43'03.30231"E |  |
| **Q2: EC; Mg; TDS; SO42-** |
| **Q3: EC; Mg; SO42-; TDS** |
| **Q4: EC; Mg; SO42-; TDS** |
| 29 | G10 | 28 o 24'44.91664"S  23 o 39'28.80923"E |  | 58 | F8 | 28 o 23'21.08275"S  23 o 43'03.93050"E |  |
| 30 | G11 | 28 o 24'25.18637"S  23 o 9'41.60973"E |  | 59 | GA05 | 28 o 23'08.52468"S  23 o 43'32.57014"E |  |
| 60 | E28 | 28 o 22'48.49461"S  23o44'13.18276"E | **Q1: EC; Na; Cl; SO42-; TDS** | 61 | GOB02 |  |  |
| **Q2: EC; Na; Cl; SO42-; TDS** |
| **Q3: EC; Na; Cl; SO42-; TDS** |
| **Q4: EC; Na; Cl; SO42-; TDS** |
| 62 | GOB03 | -28.40807112  23.47731664 | **Q4: Mn** | 63 | GOB05 |  |  |
| 64 | GOB4 |  |  | 65 | BA1 | 28.40423 S  23.48485 E | **Q1: EC** |
| **Q1: EC** |
| **Q1: EC** |
| **Q1: EC: Cl** |
| 66 | GOB4 |  |  | 67 | GOB06 | 28.41006924 S  23.46572223 | **Q1: Total alkalinity; Mn** |
| **Q2: Total alkalinity; Mn** |
| **Q3: Total alkalinity; Mn** |
| **Q4: Mn** |
| 68 | GA01a | 28.37925 S  23.47183333 E | **Q1: EC; Total alkalinity** |  |  |  |  |
| **Q2: EC; Total alkalinity** |
| **Q3: EC; Total alkalinity** |
| **Q4: EC; Total alkalinity** |

FDM: Fall-out dust (monthly), PM10 and PM 2.5 monitoring (annual)

Table 21: *FDM-Environmental Fall-out dust, PM10 and PM2.5 monitoring points and exceedances*

| **Point No.** | **Name** | **Location** | **Exceedances to standard** | | |
| --- | --- | --- | --- | --- | --- |
| **Fall out dust(mg/m2/day)**  **Residential < 600** | **PM10**  **(ug/m3)** | **PM 2,5**  **(ug/m3)** |
| 1 | Five Mission | S 28°22’50.671”; E 23°27’46.502” |  | Done annually in Q4, but equipment was sent oversees for calibration and could not be returned in time as a result of Covid restrictions | |
| 2 | Norfin | S 28°22’19.686”; E 23°27’52.877” | Jul: 1253 |
| Dec: 695 |
| Feb: 613 |
| 3 | Lime Acres Village | S 28°21’52.589”; E 23°27’46.213” | Feb: 600 |
| 4 | Lime Acres Finville –(Hostel) | S 28°22’42.319”; E 23°26’27.369” | Oct: 616 |
| 6 | Bonza Quarry | S 28°25’00.289”; E 23°29’09.624” | Jan:1459 |
| 6 | Bonza Farm | S 28°24’19.652”; E 23°29’08.774” |  |
| 7 | South Brits | S 28°23’31.885”; E 23°25’50.205” |  |
| 8 | West Brits | S 28°24’11.919”; E 23°25’25.754” |  |
| 9 | Bergplaas | S 28°24’13.919”; E 23°28’02.917” |  |
| 10 | LA Bosbok |  | **Jan 653** |

FDM: Environmental noise monitoring points and exceedances (annual):

Table 22: *FDM-Environmental Noise monitoring points and exceedances*

| **Point No.** | **Name** | **Location** | **Exceedances to standard** |
| --- | --- | --- | --- |
| 1 | No 1 | S28°22.506; E23°26.672 | Done annually in Q4, but equipment was sent oversees for calibration and could not be returned in time as a result of Covid restrictions |
| 2 | No 2 | S28°22.941; E23°25.849 |
| 3 | No 3 | S28°23.607; E23°26.579 |
| 4 | No 4 | S28°23.635; E23°27.557 |
| 5 | No 5 | S28°22.630; E23°27.207 |
| 6 | No 6 | S28°22.506; E23°26.672 |

Graph 4: *FDM Number of monitoring sites indicating non-conformances to monitoring standards*

## KDM environmental monitoring

KDM: Surface water monitoring (monthly):

All surface water samples are measured against the KDM WUL parameters.

Table 23: *KDM-Surface Water monitoring points and exceedances*

|  |  |  |  |
| --- | --- | --- | --- |
| **Point No.** | **Name** | **Location** | **Exceedances to standards** |
| 1 | Abel se quarry | X:25.002051 Y:-29.437551 | Not sampled any more |
| 2 | Mine to Lake | X:25.010835 Y:-29.421765 | Jul: Cl, TDS (dry – not sampled thereafter) |
| 3 | Kalkfontein | X:25.013140 Y:-29.421944 | Jul , Sept: Cl, TDS, pH ; Cl, TDS,  Aug: Cl; TDS |
| Oct, Nov: Cl; TDS |
| Jan, Feb, March: Cl; TDS |
| May, June: Cl; TDS |
| 4 | Lake | X:25.010787 Y:-29.419473 |  |
| 5 | River 1 | X:25.017182 Y:-29.421819 | Jul, Aug: Cl, TDS, LSI, N, K  Sept : Cl; TDS |
| Oct, Nov: Cl; TDS; LSI |
| Jan: Cl; TDS, LSI  Feb, March: Cl, TDS |
| May, June: Cl; TDS |
| 6 | River 2 | X:25.009493 Y:-29.401787 | Jul, Sept: Cl, TDS  Aug; Cl, TDS, LSI, N, K |
| Oct, Nov: Cl; TDS |
| Jan Feb, March: Cl; TDS |
| May, June: Cl; TDS |
| 7 | Paddocks 2 | X:25.006067 Y:-29.422650 | Jul, Aug, Sept: Cl, TDS |
| Oct, Nov: Cl, TDS |
| Jan, Feb, March: Cl; TDS |
| May, June: Cl; TDS |
| 8 | Municipality | X:24.996207 Y:-28.410439 |  |
| 9 | Holding dam | X:24.997363 Y:-29.423683 | Jul-Sept: Cl, TDS |
| Oct, Nov: Cl, TDS |
| Jan, Feb, March: Cl, TDS |
| May, June: Cl; TDS |

KDM: Groundwater monitoring (monthly):

Table 24: *KDM - Groundwater monitoring points and exceedances*

|  |  |  |  |
| --- | --- | --- | --- |
| **Point No** | **Name** | **Location** | **Exceedances to Standards** |
| 1 | Plaashuis | X:24.979562 Y:-29.444915 | Not sampled |
| 2 | Cement | X:24.946977 Y:-29.421942 | Not sampled |
| 3 | Gronddam | X:24.947815 Y:-29.443807 | Not sampled |
| 4 | Rooidam | X:24.972123 Y:-29.412096 | Not sampled |
| 5 | KFM 6 | X:25.000753 Y:-29.436664 | Jul-Aug: Cl, TDS; SO4 2- ; Total Hardness; Sept: TDS; SO4 2- ; Total Hardness |
| Oct, Nov: TDS, Total Hardness, Sulphate |
| Jan-March: TDS, Total Hardness, Sulphate |
| May, June: TDS, Total Hardness, Sulphate |
| 6 | KFM 5 | X:25.004579 Y:-29.433401 |  |
| 7 | KFM 3 | X:24.996191 Y:-29.427004 | Jul-Sept: TDS; SO4 2- ; |
| Oct: TDS, Total Hardness, Sulphate  Nov: TDS; SO4 2- |
| Jan-March: Cl, TDS, Total Hardness, Sulphate |
| May, June: TDS, Total Hardness, Sulphate |
| 8 | KFM 1 | X:25.001373 Y:-29.423933 | Jul-Aug: Cl; TDS; SO4 2- ; Total Hardness; |
| Oct: Cl, TDS, Total Hardness, Sulphate |
| Jan-March: Cl, TDS, Total Hardness, Sulphate |
| May, June: Cl, TDS, Total Hardness, Sulphate |
| 9 | KFM 2 | X:25.005480 Y:-29.424202 | Jul-Aug: Cl; TDS; SO4 2- ; Total Hardness; |
| Oct: Cl, TDS, Total Hardness, Sulphate |
| Jan-March: Cl, TDS, Total Hardness, Sulphate |
| May, June: Cl, TDS, Total Hardness, Sulphate |
| 10 | KFM 4 | X:25.010725 Y:-29.407300 | Not sampled |

KDM: Fall out dust (annual), PM10 (annual) and PM2.5 (annual) monitoring:

Table 25: *KDM-Fall-out dust, PM10 and PM2.5 monitoring points and exceedances*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Point No.** | **Name** | **Location** | **Exceedances to standards** | | |
| **Fall out dust**  **(mg/m2/day)** | **PM10**  **(ug/m3)** | **PM 2,5**  **(ug/m3)** |
| 1 | DB1 | 29⁰25’24.56’’S, 25⁰00’27.26’’E |  |  |  |
| 2 | DB2 | 29⁰25’31.40’’S, 25⁰00’35.95’’E |  |  |  |
| 3 | DB3 | 29⁰26’03.50’’S, 25⁰00’16.36’’E |  |  |  |
| 4 | DB4 | 29⁰26’17.52’’S, 24⁰59’58.83’’E |  |  |  |
| 5 | DB5 | 29⁰25’32.21’’S, 24⁰58’54.27’’E |  |  |  |
| 6 | DB6 | 29⁰24’40.38’’S, 24⁰59’45.03’’E |  |  |  |
| 7 | DB7 | 29⁰24’55.17’’S, 24⁰59’53.32’’E |  |  |  |
| 8 | DB8 | 29⁰25’09.94’’S, 25⁰00’32.81’’E |  |  |  |

KDM: Environmental noise monitoring (annual):

Table 26: *KDM - Environmental noise monitoring points and exceedances*

|  |  |  |  |
| --- | --- | --- | --- |
| **Point No.** | **Name** | **Location** | **Exceedances to standards[[7]](#footnote-7)** |
| 1 | DB01 | 29⁰25’24.56’’S, 25⁰00’27.26’’E |  |
| 2 | DB02 | 29⁰25’31.40’’S, 25⁰00’35.95’’E |  |
| 3 | DB03 | 29⁰26’03.50’’S, 25⁰00’16.36’’E | 57.1 |
| 4 | DB04 | 29⁰26’17.52’’S, 24⁰59’58.83’’E | 50.0 |
| 5 | DB05 | 29⁰25’32.21’’S, 24⁰58’54.27’’E | 65.8 |
| 6 | DB06 | 29⁰24’40.38’’S, 24⁰59’45.03’’E | 59.4 |
| 7 | **DB07** | 29⁰24’55.17’’S, 24⁰59’53.32’’E |  |
| 8 | DB08 | 29⁰25’09.94’’S, 25⁰00’32.81’’E | 53.1 |

Graph 5: *KDM Number of monitoring sites indicating non-conformances to monitoring standards*

## 3.4 WDL environmental monitoring

WDL: Surface water monitoring (Quarterly):

Table 27: *WDL Surface Water monitoring points and exceedances*

| **Point No.** | **Name** | **Location** | **Exceedances to standards** |
| --- | --- | --- | --- |
| 1 | Alamasi Dam (AD) | 572612 E; 9612279 N | Q1: BOD; Fe, Cl , pH |
| Q2: BOD; Fe |
| Q3: pH; Fe |
| Q4: pH |
| 2 | WDL Guest House | 567585E9609246N |  |
| 3 | Main Hospital (Z-RBT) | 566639 E; 9609079 N |  |
| 4 | Williamson Plant (WDL-P) | 566897 E; 9610638 N |  |
| 5 | Western Township (W/TOWNSHIP) | 564606 E; 9610681 N | Q1: colour |
| 6 | Main Gate oxidation pond (MGP) | 564379 E; 96110271 N | Q1: pH, P, Total coliforms |
| Q2: COD; Total coliforms |
| Q3: Total coliforms |
| Q4: |
| 7 | Mine Crescent oxidation pond (MCP) | 565038 E; 9610722 N | Q1: colour |
| Q2: BOD; COD; Total coliforms |
| Q3: Total coliforms |
| 8 | Kawawa oxidation pond (KP) | 566468 E; 9610186 N | Q1: TSS; BOD; COD; Colour; Total coliforms |
| Q2: TSS; BOD; COD; Colour; Total coliforms |
| Q3: Total coliforms |
| Q4: Total coliforms |
| 9 | Slimes Dam No. 3 (SD-3) | 565652 E; 9610370 N |  |
| 10 | Supernatant pond | 568651E9609735N |  |
| 11 | New Alamasi oil water separator(NAL-OS) | 570189 E; 9611200 N |  |
| 12 | Oryx fuel station oil water separator (ORYX-OS) | 565659 E; 9610263 N |  |
| 13 | Power house oil water separator (PH-OS) | 565652 E; 9610370 N |  |
| 14 | Caspian workshop oil/water separator (CSP –OS) | 565596 E; 9610049 N |  |
| 15 | Vehicle workshop oil water separator(VW-OS) | 565610 E; 9609925 W |  |
| 16 | Nhumbu Dam (ND) | 557011 E;9612840 N | Q1: Fe |
| Q2: Fe |
| Q3: Fe |
| Q4: |
| 17 | Songwa Dam (SD) | 559906 E:9611039 N | Q1: BOD; Fe |
| Q2: BOD; Fe |
| Q3: Fe |
| Q4: |
| 18 | Recovery Dam No 3 (RD-3) | 568651 E; 9609735 N | Q1:pH; NO3-; colour, Cl |
| Q2: pH; NO3-; total coliforms |
| Q3: pH |
| Q4: pH; TSS; sulphate, colour; Total coliforms |
| 19 | Haileselasie No 5 (H-05) | 567585 E; 9609246 N | Q1:Colour; |
| Q2:Colour; BOD |
| Q3: Colour |
| Q4; |
| 20 | Main gate pond |  |  |
| 21 | Plant run-off |  | Q1: TSS; Colour; Total coliforms |
| Q2: TSS; Total coliforms; Colour |
| Q3: |
| Q4: |
| 22 | Biringi Well |  | Q1: Colour, Turbidity |
| Q2: Colour, Mg, Ba |
| Q3: Colour, Mg, Ba |
| Q4: Colour, Mg, Ba |

WDL: Ground water monitoring (Bi-annually):

Table 28: *WDL Ground Water monitoring points and exceedance*

|  |  |  |  |
| --- | --- | --- | --- |
| **Point No.** | **Name** | **Location** | **Exceedances to standards** |
| 1 | Explosive Magazine (OB1) | 567703 E; 9612811 N | Ground water monitoring was not conducted in FY 2021 |
| 2 | New slimes dam/Waste (OB2) | 568361 E; 9610113 N |  |
| 3 | New slimes dam (OB3) | 568449 E; 9610075 N |  |
| 4 | Main gate Oxidation Pond (OB4) | 564299 E; 9610630 N |  |
| 5 | Kawawa Oxidation Pond (OB5) | 566398 E; 9610574 N |  |
| 6 | Mine crescent oxidation pond (OB6) | 564971 E; 9611094 N |  |
| 7 | Main gate oxidation Pond (WSP 3) | 564387 E; 9610230 N |  |
| 8 | Kawawa oxidation Pond (WSP 1) | 566461 E; 9609982 N |  |
| 9 | Mine Crescent oxidation Pond (WSP 2) | 565170 E; 9610544 N |  |
| 10 | 1200FT shaft (WW 5.1) | 567124 E; 9611170.9 N |  |
| 11 | Area close to reservoir No. 1 (WW4.2) | 567331.8 E; 9611737 N |  |
| 12 | North dyke (WW3.2) | 567930.6 E; 9611999.3 N |  |
| 13 | Wind sock (WW2.2) | 568368.4 E; 9610747.9 N |  |
| 14 | South dyke (WW 1.2) | 567859.6 E; 9610106.4 N |  |

WDL: Environmental noise monitoring:

WDL does not monitor environmental noise, but only occupational noise on a monthly basis

## PERFORMANCE

This section seeks to describe the progress made by the organisations regarding their physical performance in the implementation of sound environmental management principles. The physical performance of the Petra organisations are measured against: Waste Management, Mine Rehabilitation and Land and Biodiversity Management, Water and Effluent Management, Energy Management, Materials Consumption and Waste Management. Ultimately, environmental performance is measured against the carbon footprint or total Green House Gas emissions of each organisation, as well as the Group, as it determines the impact of our diamond mining and recovery activities on a National and International scale. It is on this contribution to Global Warming and Climate Change that Petra Diamonds will be taxed when the first carbon tax in SA is due for the period 1 June 2019 to 31 December 2019. *To be noted that due to the Covid -19 pandemic, the initial due date of 31 July 2020 has been postponed to 31 October 2020.*

The Covid-19 pandemic and lockdown in April with no or lower production at the different operations, impacted on the achievement of performance KPIs. In order to demonstrate the impact of the lockdown, it was decided to report all performance KPI figures for two scenarios:

1. Normal twelve month period

2. Eleven month period, excluding all April data

## 4.1 Production

Most consumption figures will be normalised by using the Group’s official production figures.

Table 29: *Production figures*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Element** | **Unit** | **Quarter 1** | **Quarter 2** | **Quarter 3** | **Quarter 4** | **YTD** |
| **Ore Treated**  **ROM** | Tonnes | 3 646 642 | 3 399 013 | 3 203 121 | 1 315 438 | 11 564 214 |
| **Ore Treated from Dumps** | Tonnes | 261 429 | 228 549 | 169 587 | 112 092 | 771 657 |
| **Total**  **Production** | Tonnes | 3 908 071 | 3 627 562 | 3 372 708 | 1 427 530 | 12 335 871 |
| **Overburden Moved** | Tonnes | 38 095 | 71 871 | 22 775 | 1 873 | 134 615 |
| **Waste tonnes hoisted** | Tonnes | 944 680 | 582 436 | 862 851 | 29 874 | 2 419 841 |
| **Carats**  **Recovered** | Carats | 1 082 764 | 987 476 | 932 457 | 586 391 | 3 589 176 |

## 4.2 Land Management

This section indicates the progress towards concurrent rehabilitation as implemented via the Mine Rehabilitation Focus area. It should be noted that those organisations that actively undertake concurrent rehabilitation, are also actively decreasing their final closure costs and closure liabilities on Petra Diamonds, as concurrent and final closure costs are inversely proportional to each other.

Table 30: *Concurrent Rehabilitation Figures*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Concurrent Rehabilitation Status** | **Unit** | **Quarter 1** | **Quarter 2** | **Quarter 3** | **Quarter 4** | **YTD** |
| **Total Area Disturbed** | ha | 5 383.61 | 5 386.61 | 5 388.48 | 5 389.26 | 5 389.26 |
| **Total Area Considered Rehabilitated During the Reporting Period** | ha | 0 | 3.63 | 2.22 | 86.80 | 92.65 |
| **Cumulative Area Considered as Rehabilitated** | ha | 689.92 | 693.55 | 695.77 | 695.77 | 695.77 |
| **Cumulative Area Undergoing Rehabilitation** | ha | 124.00 | 124.00 | 124.00 | 124.00 | 124.00 |
| **Total Area Still Requiring Rehabilitation** | ha | 4 569.69 | 4 569.06 | 4 568.71 | 4 569.49 | 4 569.49 |

Graph 6: *Rehabilitation as a percentage of Total Mining Area*

## 4.3 Water Management

Water Management is one of the key environmental focus areas, due to the implications for operational sustainability, as well as legal compliance. The organisations’ performance is evaluated against total water consumption and abstraction, normalised water consumption/abstraction measured against production, as well as effluent management. These three indicators are key aspects of the different Operational Water Management Strategies, as well as the Approved Water Use Licenses for CDM, FDM and KDM.

## 4.3.1 Water Abstraction and Consumption

All licensed and registered water uses are subject to authorised maximum volumes that may be extracted/ consumed per source. Exceeding these maximum volumes will result in fines. All organisations in SA will have to pay levies to DWS for all water abstracted from the resource (groundwater, rivers, wetlands, etc.) on approval of their Integrated Water Use License Applications as all water uses will then automatically be registered by DWS. Water saving on mines is and will even more so become a crucial requirement for environmental and economic sustainability.

Petra Diamonds commences using the DWS Water Demand and Conservation definitions as contained in the Common Vocabulary document in FY 2020 in order to align water management on the mines to the DWS Guidelines for The Development and Implementation of Water Conservation and Water Demand Management Plans for the Mining Sector.

It is to be noted that the WDL water consumption figures changed significantly in FY 2020 due to the re-alignment of water sources to the Common Vocabulary definitions.

*Petra Diamonds set a KPI of 1% improvement in year on year water use efficiency per operation, measured in m3/t*

*All operations will also demonstrate improved performance in resource consumption by meeting the set KPI of 1% year on year improvement in the percentage of total water recycled on site*

Table 31: *Water Consumption Figures for this period*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Water Source** | **Unit** | **CDM** | | **FDM** | | **KDM** | **WDL** | | **Petra [[8]](#footnote-8)** | |
| **Off- Mine Potable Water Consumption** | m³ | 0.00 | 1 096 059 | | 0.00 | | 1 449 634 | 2 545 693 | |
| **On-Mine Potable Water Consumption** | m³ | 169 192 | 944 141 | | 12 410 | | 1 789 125 | 2 916 408 | |
| **Raw Water** | m³ | 270 374 | 987 666 | | 618 668 | | 4 433 648 | 6 310 356 | |
| **New water intake** | m³ | 672 311 | 3 205 924 | | 1 856 645 | | 6 222 773 | 11 959 192 | |
| **Consumptive water** | m³ | 770 929 | 3 205 924 | | 1 487 631 | | 7 672 335 | 13 138 359 | |
| **Re-Used / Recycled Water** | m³ | 30 359 730 | 1 642 280 | | 1 800 000 | | 17 583 287 | 51 385 297 | |
| **Underground Dewatering used in mining circuit** |  | 232 745 | 1 274 117 | | 1 225 567 | | 0.00 | 2 732 429 | |
| **Underground Dewatering NOT used in mining circuit** | m³ | 0.00 | 247 706 | | 0.00 | | 0.00 | 247 706 | |
| **[[9]](#footnote-9)Total water use on mine** | **m³** | 672 311 | 3 205 924 | | 1 856 645 | | 6 222 773 | 11 959 192 | |
| **Rainfall** | **mm** | 814 | 333 | | 339 | | 808 | 2 294 | |
| **Total water use per production** | **m³/t** | 0.129 | **1.09** | | **2.08** | | **1.45** | 0.97 | |
| **Percentage change in total water use per ton treated (as compared to KPI value)** | **%** | **+23%**  **(+12%)** | **-10%**  **-10.1%** | | **+31%**  **(+23)%** | | **-11%**  **(-13%)** | **-5%**  **(-7%)** | |
| **Change in percentage recycled/re-used water (as compared to KPI value)** | **%** | **ALARP** | **-0.34 %**  **(-0.49 %)** | | **-9.12**  **(-7.57%)** | | **+ 49.45**  **(+49.67)** | **+8.55%**  **(+8.98%)** | |

Graph 7: *Water Consumption, Raw Water Intake and Percentage Water Recycled*

## 4.4 Effluent Management

Sewerage effluent is discharged by CDM and WDL to a surface water body and by FDM to a purification works from where it is re-used.

Table 32: *Effluent Volumes*

|  | Unit | **Max licensed volume per quarter** | **Volume discharged** |
| --- | --- | --- | --- |
| **Effluent Discharge to Surface Water Bodies** | m³ | 152 400 | 339 790 |
| **Maximum volume of discharge to a purification works** | m³ | N/A | 243 345 |

## 4.5 Energy Management

Climate change and South Africa’s signing of the Paris agreement commits the country to keep the increase of global average temperatures to “well below” 2oC. In line with the national commitment and the proposed implementation of carbon tax as a method to curb carbon emissions, Petra Diamonds must implement Energy efficiency programs. The Company partook in the Carbon Disclosure Project (CDP) since FY 2012. As part of this disclosure project, companies were asked to describe the projects and processes put in place to save energy (energy efficiency). Great emphasis is put on the savings realised through the implementation of the energy saving processes in the annual CDP questionnaire. As baseline KPIs were established in FY 2015, an improvement KPI has been set for each operation since FY 2016.

As the carbon footprint of each operation is mainly determined by its energy consumption, the implementation of energy efficiency programs is of crucial importance and all operations are required to demonstrate improved electricity use efficiency by meeting the *KPI of a 1% year on year reduction in total electricity consumption in kWh/t.*

*In order to save on fuel use, another strong contributor to the carbon footprint, Petra Diamonds also set a KPI of a 1% year on year reduction in TMM diesel consumption in l/t.*

Table 33*: Energy Consumption*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Energy Source** | **Unit** | **CDM** | **FDM** | **KDM** | **WDL** | **Petra** |
| **Diesel for vehicles** | litre | 2 411 743 | 1 854 509 | 621 224 | 4 451 842 | 9 402 346 |
| **Diesel for electricity generation** | litre | 4 035 | 768 | 1 408 | 58 780 | 64 991 |
| **Total diesel consumption** | litre | 2 415 778 | 1 855 277 | 622 632 | 4 510 622 | 9 467 337 |
| **Electricity Generated** | kWh | 26 420 | 11 | 0.00 | 181 865 | 208 296 |
| **Electricity Purchased** | kWh | 200 630 383 | 167 037 770 | 43 684 260 | 44 695 726 | 456 408 210 |
| **Total electricity use** | kWh | 200 656 803 | 167 037 781 | 43 684 260 | 44 877 591 | 456 616 506 |
| **Petrol** | Litre | 14 310 | 22 121 | 1 920 | 16 063 | 64 466 |
| **LPG[[10]](#footnote-10)** | Kg | 96 | 240 | 48 | 360 | 744 |
| **Electricity efficiency** | kWh/t | 47.43 | 56.99 | 48.99 | 10.48 | 37.02 |
| **Diesel efficiency (TMM)** | l/t | 0.570 | 0.633 | 0.697 | 1.039 | 0.762 |
| **Percentage change in Electricity use per tonne treated as compared to KPI value** | % | -7.43%  (-8.74%) | +1.57%  (-1.31%) | +5.79%  (-0.90%) | +12.64%  (+9.83%) | +11.46%  (+8.66%) |
| **Percentage change in diesel use (TMM) as compared to KPI value** | % | -16.10%  (-18.59%) | -25.38%  (-24.62%) | -18.14%  (-21.62%) | -1.66%  (-2.08%) | -9.80%  (-10.73%\_ |

Graph 8: *Electricity Consumption (kWh/t) Comparison FY 2018 - FY2020*

## 4.6 Materials Consumption

Materials Consumption impacts on the Waste Management focus area, as lower consumption results in less waste, as well as on the carbon footprint of Petra Diamonds. Paper use has a very important impact on each organisation’s carbon footprint due to the indirect environmental impact on trees /forests as major carbon dioxide consumers and oxygen generators.

Table 34: *Materials consumption*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Material** | **Unit** | **CDM** | **FDM** | **KDM** | **WDL** | **Petra** |
| **Calcium Carbonate** | kg | 0 | 0 | 0 | 64 950 | 64 950 |
| **Calcium Chloride** | kg | 77 750 | 0 | 3 500 | 0 | 81 250 |
| **Ferrosilicon** | t | 439 | 371 | 333 | 261 | 1 404 |
| **Ferrosilicon per tonne treated** | g/t | 103.78 | 126.58 | 373.44 | 60.94 | 113.81 |
| **Flocculants** | kg | 0 | 32 800 | 7 775 | 300 500 | 341 075 |
| **Grease** | kg | 10 765 | 4 133 | 2 822 | 4 340 | 22 060 |
| **Oils & Hydraulic Fluids** | Litre | 155 697 | 184 190 | 162 970 | 20 947 | 523 804 |
| **Oils & Hydraulic Fluids per tonne treated** | l/t | 0.04 | 0.06 | 0.18 | 0.005 | 0.04 |
| **Paper Bought** | kg | 12 620 | 7 043 | 5 100 | 1 650 | 27 567 |
| **Sodium Nitrate** | kg | 0 | 0 | 0 | 0 | 0 |
| **Sodium Nitrite** | kg | 0 | 0 | 213 | 0 | 213 |
| **Steel** | t | 0 | 0 | 23 | 370 | 393 |
| **Timber** | t | 8 | 0 | 0 | 0 | 8 |
| **Oxy-Acetylene** | kg | 7 052 | 958 | 504 | 10 378 | 18 892 |
| **Trichloro-ethylene[[11]](#footnote-11) (TCE)** | Litre | 200 | 966 | 131 | 893 | 2 190 |

## 4.7 Waste Management

The aim of Waste Performance Management is to drive the culture on our mines away from being “waste generators” to “waste consumers”. The international accepted waste hierarchy model of Reduce, Reuse and Recycle, is advocated at all the Petra Mines. The Waste management focus area for FY 2019 prioritises the clean-up and removal of underground waste, current and historical, as well as the increase in volumes of waste recycled, that will result in a decrease in waste to landfill sites.

*Petra Diamonds set a KPI of 2% year on year improvement in the volumes of waste recycled per operation.*

Table 35: *Petra Waste Streams per quarter FY2020 YTD*

| **Waste Generated** | **Unit** | **Q1** | **Q2** | **Q3** | **Q4** | **Total YTD** |
| --- | --- | --- | --- | --- | --- | --- |
| **Mine Waste** | | | | | | |
| **Fine (slimes)** | Tonnes | 2 184 718 | 1 922 101 | 1 728 446 | 731 700 | 6 566 966 |
| **Coarse ( tailings)** | Tonnes | 1 516 031 | 1 477 240 | 1 450 785 | 567 488 | 5 011 544 |
| **Waste Disposal ( to landfill sites)** | | | | | | |
| **Hazardous Waste Disposal** | Tonnes | 55.96 | 30.65 | 50.62 | 3.08 | 140.31 |
| **Domestic Waste Disposal** | Tonnes | 753.67 | 762.92 | 731.27 | 621.27 | 2 869.13 |
| **Total waste to landfill site** | Tonnes | **809.63** | **793.57** | **781.89** | 624.35 | 3 009.44 |
| **Recycling** | | | | | | |
| **Cardboard / Paper** | Tonnes | 1.91 | 1.47 | 2.87 | 0.00 | 6.25 |
| **Conveyor Belting** | Tonnes | 36.63 | 15.46 | 40.22 | 4.12 | 96.43 |
| **Fluorescent tubes** | Tonnes | 0 | 4.90 | 0 | 0 | 4.90 |
| **E-waste** | Tonnes | 2.24 | 1.50 | 10.14 | 0.00 | 13.88 |
| **Lead Acid Batteries** | Tonnes | 1.13 | 5.78 | 1.63 | 0.02 | 8.57 |
| **Plastic** | Tonnes | 9.50 | 28.85 | 19.04 | 0.00 | 57.39 |
| **Scrap Metal** | Tonnes | 762.23 | 556.40 | 633.31 | 152.37 | 2 104.30 |
| **Timber** | Tonnes | 26.80 | 13.78 | 19.26 | 3.58 | 63.42 |
| **Toner / Ink Cartridges** | Tonnes | 0.00 | 0.80 | 1.25 | 0.00 | 2.05 |
| **Tyres** | Tonnes | 12.25 | 11.06 | 11.48 | 2.66 | 37.45 |
| **Used Oil** | Tonnes | 20.79 | 23.68 | 17.42 | 3.67 | 65.56 |
| **Total waste recycled** | Tonnes | 873.48 | 657.99 | 756.61 | 166.43 | 2 460.20 |
| **% Waste recycled** | % | 52% | 45% | 49% | 21% | 45% |
| **Waste incineration** | | | | | | |
| **Medical Waste** | Tonnes | 2.47 | 2.55 | 2.36 | 2.32 | 9.73 |
| **Other Waste** | Tonnes | 0.63 | 1.32 | 0.64 | 0.63 | 3.22 |
| **Total Waste Incinerated[[12]](#footnote-12)** | Tonnes | **3.10** | **3.87** | **3.00** | 2.96 | 12.95 |
| **Total waste generated** | Tonnes | **1 686.21** | **1 461.12** | **1 541.5** | **793.73** | **5 482.59** |
| **Percentage change in total tonnage of waste to landfill as compared to KPI value** | % | **-17%** | **-19%** | **-20%** | **-36%** | **-23%**  **(-28%)** |

Graph 9: *Total Waste generated per organisation in tonnes FY 2020 vs FY 2019*

Graph 10: *Percentage contributions of Hazardous, Domestic and Recycled waste to Total Waste:*

## 4.8 Biodiversity Management

Biodiversity Management is crucial to the Rehabilitation focus area and it forms an integral part of all rehabilitation plans (Rehabilitation and Closure plans). Performance in this focus area can be measured against the eradication of alien, invasive species, the increase in indigenous species and the conservation of red data and protected species.

Table 36: *Biodiversity Figures for each organisation for this period*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Element** | **UNIT** | **CDM** | **FDM** | **KDM** | **WDL** | **PETRA** |
| **Total Protected Area[[13]](#footnote-13)** | ha | 2 673 | 1 388 | 2014 | 906 | 6 981 |
| **Number of Invasive Plant Species** | Nr | 30 | 10 | 16 | 34 |  |
| **Number of Red Data Flora Species[[14]](#footnote-14)** | Nr | 0 | 2 | 2 | 0 | 4 |
| **Number of Red Data Fauna Species[[15]](#footnote-15)** | Nr | 1 | 0 | 5 | 0 | 6 |

## 4.9 Ozone Depleting Substances

South Africa is a signatory to the Montreal Protocol for the protection of the Ozone Layer and as Petra Diamonds aims to comply to the basic principles / requirements of the International Treaties / Conventions that the country is a signatory to, it aims to develop long-terms action plans to achieve compliance. Therefore continuous monitoring of Ozone depleting substances used on the different operations and replacement programs must be in place. No operation procures new ozone depleting substances. However, most old air-conditioners, freezers and fridges still contain ozone depleting substances as coolant gases.

Table 37: *Ozone Depleting Substances used in this period*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Element** | **Unit** | **CDM** | **FDM** | **KDM** | **WDL** | **PETRA** |
| **1,1,1-trichloroethane (TCA)** | kg | - | - | 0 | - | - |
| **Carbon Tetrachloride (CTC)** | kg | - | - | 0 | - | - |
| **Halon** | kg | - | - | 0 | - | - |
| **Methyl Bromide** | kg | - | - | 0 | - | - |
| **R 134a** | kg | 0.2 | 2.0 | 0 | - | 2.2 |
| **R 410** | kg | 40.3 | 55.0 | 0 | 6.0 | 101.3 |
| **R 507** | kg | - | 41.0 | 0 | - | 41.0 |
| **R 404** | kg |  | 30.0 | 0 | - | 30.0 |
| **Total Ozone depleting substances** | kg | 40.5 | 128.0 | 0 | 6.0 | 174.5 |
| **R 22** | kg | 13.9 | 63.0 | 0 | 18.1 | 95.0 |

## 4.10 Carbon footprint

The Carbon Footprint of an organisation is closely linked to its energy consumption. Scope 1, Scope 2 and Scope 3 activities are split up to determine direct and indirect emissions. The carbon footprint is expressed either as an absolute (gross) total tonnes of Carbon dioxide equivalent gas (CO2-e), or normalised as tonnes of CO2-e per production measure. In Petra’s case, carats are used (t CO2-e/ct).

As Petra Diamonds follows a centralised approach based on the GHG Protocol principles for the gathering of information on its GHG emissions, the organisational carbon footprints are calculated at Group level by the Group HSEQ Data Analyst and Reporting Coordinator. Emission calculations are thus standardised across all the organisations (operations), but based on data and information supplied by the organisation. The organisational reporting of verified, accurate and reliable data**/** information is key in this process. Petra Diamonds have decided on a materiality threshold of 10 %. All GHG emission calculations and reporting are based on the GHG Protocol principles of relevance, completeness, consistency, transparency and accuracy. To ensure compliance to these principles, a third party audit is conducted annually.Petra Diamonds account for and report on the emissions of Carbon Dioxide (CO2), Methane (CH4), Nitrous oxide (N2O) and Hydrofluorocarbons (HFCs)

The following Scope 1, Scope 2 and Scope 3 GHG emissions are accounted for and reported on:

Scope 1: Direct emissions from

Mobile combustion (Diesel and petrol use for company owned/controlled vehicles; jet fuel use for company owned jet); Stationary combustion (Diesel use for generation of electricity; combustion of LPG in workshops); Fugitive hydrofluorocarbon (HFC) emissions from air conditioning; Water treatment

Scope 2: Indirect emissions through electricity purchased from

Eskom in SA; Tanesco in Tanzania; UK supplier

Scope 3: Indirect emissions from

Business travel (chartered jet, employee commute, car rentals, business flights -air lines); Paper use; Waste disposed to landfill (general, hazardous, non-biomass); Scrap metal for recycling; Potable water use (pumping)

R-22 is reported on separately as required by the GHG protocol. (Must be phased out by 2020 as per Montreal Protocol requirement).

Table 38: *Carbon Footprint of Petra Diamonds YTD*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Quarter 1[[16]](#footnote-16)** | **Quarter 2** | **Quarter 3** | | **Quarter 4** | **Total YTD** |
| Scope 1 | 9 450 | 7 603 | 8 338 | | 3 160 | **28 551** |
| Scope 2 | 129 894 | 124 185 | 112 427 | | 85 297 | **451 803** |
| Scope 3 | 1 152 | 1 116 | 942 | | 619 | **3 828** |
| Total t CO2-e (Sc1 + Sc2 +Sc3) | **140 497** | **132 903** | **121 707** | | **89 076** | **484 182** |
| t CO2-e/t | 0.036 | 0.037 | 0.036 | | 0.062 | **0.039** |
| t CO2-e/ct | 0.130 | 0.135 | 0.131 | | 0.152 | **0.135** |
| Percentage change in tCO2-e as compared to FY 201 (480 248 t cO2-e) | | | | **+0.82%** | | |
| Percentage change in tCO2-e/t as compared to FY 2019 (0.0323 tCO2-e/t) | | | | **+21.52%** | | |
| Percentage change in tCO2-e/ct as compared to FY 2019 (0.1239 tCO2-e/ct) | | | | **+8.85%** | | |
| R-22 | 68 | 58 | 42 | | 4 | **172** |

Carbon emissions have a financial implication for South African operations as the first carbon tax payment in terms of the National Carbon Tax Act, is due by 31 October 2020. The first payment is due for the period 1 June to 31 December 2019. The tariff is R120 / t CO2-e for Scope 1 activities only, but with several potential rebates, including an expected 60% rebate that Petra qualifies for. It is to be noted that emission thresholds need to be exceeded before carbon tax will be due.

*In order to demonstrate Petra’s commitment to continual improvement, key performance indicators are set to improve our performance towards carbon emissions. A KPI of* ***1% reduction per year****, from the FY 2013 baseline normalised total, was set for the next 5 years (ending FY 2020). All the Petra organisations will therefore implement strategies or measures to reduce their annual emissions per carat (tCO2-e/ct) by 1 % per annum.*

*Although the total tCO2-e/ct decreased over the 5 year period by 16%, Petra Diamonds did not meet the KPI in FY 2020 as the total tCO2-e/ct increased by 9% as compared to FY 2019. It was mainly due to the combined effect of lower carats produced and the use of a more recent and accurate emission factor to calculate the GHG emissions for electricity purchased from Tanesco by WDL. The amended calculation of the WDL Scope 2 (electricity) emissions, as well as an increase in electricity use and decrease in carats resulted in the WDL GHG emissions per carat to increase by 64%. KDM is the only organisation that met the KPI.*

Graph 11: *Normalised GHG emissions per organisation (tCO2-e/ct)*

Graph 12: *Percentage contribution of total GHG emissions (tCO2e) by organisation*

# PROJECTS AND ACHIEVEMENTS

This section is used to describe all current projects and findings of completed projects, as well as any achievements or awards relevant to environmental management.

## 5.1 Research Projects

Please note any research that the operation plans to do or is busy with.

|  |  |
| --- | --- |
| **Project Description** | **KDM:**  Solar Project |
| **Service Provider** | On Mine |
| **Planned Outcome** | Use of solar energy to supplement mine with renewable energy. Reduction in Carbon Tax. |
| **Inception Date** | December 2018 |
| **Planned Due Date** | Unknown |
| **Progress** | Project restarted and discussions with General Manager are underway. Next phase will be to present the financial models proposed by the different parties and to decide a way forward. |
| **Actual Outcome** | In Progress |

## 5.2 Energy Efficiency Projects

Energy efficiency is a high level priority area within Petra. The Operations are encouraged to implement measures to save energy such as electricity and diesel on a Gross scale or to use these resources more efficiently where gross reductions are not feasible.

No new energy saving projects have been implemented this year

## 5.3 Consumption Reduction Plans

Other reduction programmes or plans implemented during the reporting period:

|  |  |
| --- | --- |
| **Project Description** | **KDM:** Water Projects in Plant |
| **Service Provider / Project Manager** | Mine |
| **Planned Outcome** | Reduce the distance that water needs to travel to be recycled, electricity and water savings |
| **Inception Date** | 2016 |
| **Planned Due Date** | Unknown |
| **Progress** | Dams Completed. Pipelines and Meters installations to be completed to keep water from Underground in the plant and reduce the distance water needs to travel to lower evaporation rates. Final phase of project will be for the construction of the V-notch to measure recyclable water. Sump has been completed and the V-notch fabricated (Steel). |
| **Actual Outcome** | Savings was observed with raw water use with a 58 % reduction from 2016 to 2017. A further saving of 207 240 KWh is also present due to the decrease in pumping hours |

|  |  |
| --- | --- |
| **Project Description** | **FDM:** Reduce Vaal Gamagara water used, by replacing Fire tank water with RAW water |
| **Service Provider / Project Manager** | Marius Cloete |
| **Planned Outcome** | R5 million and potable water savings |
| **Inception Date** | 07 February 2020 |
| **Planned Due Date** | 30 September 2020 |
| **Progress** | In progress |
| **Actual Outcome** | 10 918 m3 potable water was saved over a period of 3 months, thus on average 3 639 m3 potable water saving per month |

|  |  |
| --- | --- |
| **Project Description** | **FDM:** Reduce Vaal Gamagara water used by replacing gland service water with dewatering water |
| **Service Provider / Project Manager** | Thys Jordaan |
| **Planned Outcome** | R6.6 million and potable water savings |
| **Inception Date** | 21 February 2020 |
| **Planned Due Date** | 31 August 2020 |
| **Progress** | Implementing |
| **Actual Outcome** | Plan has not been fully implemented yet, but an estimated 17 000 m3 potable water can be saved per month with the accompanying cost saving. |

|  |  |
| --- | --- |
| **Project Description** | **FDM:** Reduce water cost by increasing water used from Quarry |
| **Service Provider / Project Manager** | Klaas Gabadise |
| **Planned Outcome** | R16 million saving and saving in potable water use |
| **Inception Date** | 01 October 2019 |
| **Planned Due Date** | 01 Jan 2020 |
| **Progress** | Completed and locked in |
| **Actual Outcome** | Potable water use was reduced by 478 200m3 resulting in cost saving, as well. |

## 5.4 Achievements

|  |  |
| --- | --- |
| **Achievement** | **WDL**  135 000 tree seedlings are grown at the WDL tree nursery; 15 500 seedlings were donated to different institutions, both government, non-government and individuals; 2300 seedlings were planted along side roads and open spaces as part of the mine camp rehabilitation plan; 1400 seedlings were planted in mined out areas as part of rehabilitation. In FY 2020 timber trees were planted as a trial to see if the soil can support different types of tree species. |
| **Awarded by** | No award |
| **Reason/Motivation** | Rehabilitation and Conservation project |
| **Award date** | N/A |

1. WUL: Water Use License [↑](#footnote-ref-1)
2. EMP PA: Environmental Management Programme Performance Assessment [↑](#footnote-ref-2)
3. National Environmental Management Act, Act 104 of 1998, as amended [↑](#footnote-ref-3)
4. Number of findings indicated in graph [↑](#footnote-ref-4)
5. CAP audits are conducted by the Group HSEQ team under control of a third party [↑](#footnote-ref-5)
6. EC: Electrical Conductivity [↑](#footnote-ref-6)
7. No specific standard. KDM targets 45dB [↑](#footnote-ref-7)
8. Total of mines does not add up to Petra total, due to potable water of head office and London office that is included in Petra total. [↑](#footnote-ref-8)
9. The sum of potable, raw and dewatering water. Recycled water is excluded as per DWS Water Demand and Conservation definitions [↑](#footnote-ref-9)
10. Note Only LPG used for energy purposes (e.g. cooking, furnace), not cutting [↑](#footnote-ref-10)
11. Carcinogenic liquid used typically for cleaning grease off concentrate surfaces and as an additive in belt splicing glues or solvents. Also known as ‘trichlor’. [↑](#footnote-ref-11)
12. Include explosive boxes [↑](#footnote-ref-12)
13. e.g. game Farms [↑](#footnote-ref-13)
14. Confirmed species only [↑](#footnote-ref-14)
15. Confirmed species only [↑](#footnote-ref-15)
16. Business use- air lines has not been included in Scope 3. [↑](#footnote-ref-16)