

ENVIRONMENTAL MANAGEMENT PLAN

Osona 20 MW Solar Photovoltaic Power Plant – JCM Power



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Executive Summary

This Environmental Management Plan (EMP) provides the practical and enforceable framework for managing environmental and social risks associated with the proposed Osona 20 MW Solar Photovoltaic Power Plant, to be developed by JCM Power in the Osona–Okahandja–Gross Barmen area. The proposed project footprint is approximately 90 hectares, and the facility will connect to the grid at the Osona Substation, located approximately 500 metres from the planned site. The EMP translates the commitments and assumptions from the environmental assessment process into implementable mitigation measures, monitoring requirements, roles and responsibilities, and performance standards to ensure that construction, operation, and eventual decommissioning of the project are undertaken in compliance with applicable Namibian requirements and authorisation conditions.

The EMP applies to all activities within the approved project footprint and associated infrastructure, including the PV array field (modules and mounting structures), inverter and transformer stations, internal electrical reticulation, internal access roads, laydown and storage areas, construction camp and temporary facilities (if required), hazardous materials and refuelling areas, waste storage and handling areas, stormwater and erosion controls, and rehabilitation and closure works. The location context includes access from the A1 national road when travelling from Windhoek, with a turn-off onto the D1972 road toward Gross Barmen, and the project is situated within an infrastructure corridor influenced by existing roads and grid infrastructure, including an existing 132 kV line in the wider area. The EMP is applicable across all lifecycle phases—pre-construction/mobilisation, construction, operations and maintenance, and decommissioning and closure—ensuring continuity of controls and accountability.

Key environmental and social risks addressed by the EMP include unnecessary footprint disturbance and vegetation loss across the ~90 ha site, soil compaction and topsoil degradation affecting rehabilitation success, erosion and sediment transport associated with stormwater runoff and disturbed ground, dust and noise nuisance generated by earthworks and vehicle movements, pollution risks from fuels, oils and hazardous substances, improper handling of solid and hazardous waste, fauna entrapment in open trenches, traffic and community safety risks associated with increased construction traffic on public roads, and potential chance-finds of heritage resources during excavations. These risks are managed using the mitigation hierarchy, prioritising avoidance through strict footprint demarcation and no-go zones

(particularly for drainage buffers), minimisation through method statements and operational controls, and restoration through progressive rehabilitation and verified reinstatement of disturbed areas.

The EMP establishes clear governance and implementation arrangements. JCM Power retains overall accountability for EMP performance and compliance, while the EPC contractor is responsible for day-to-day implementation and subcontractor management. A contractor-appointed Site Environmental Officer (SEO) is responsible for routine inspections, maintaining registers, and embedding environmental requirements into daily supervision and toolbox talks. An independent Environmental Control Officer (ECO) provides oversight through inspections and audits, verifies compliance evidence, and supports corrective action tracking. Environmental performance is managed through structured recordkeeping and reporting, including waste manifests and disposal certificates, spill registers and incident reports, stormwater and erosion inspection logs (including post-rainfall inspections), training and induction registers, grievance records, and rehabilitation completion records supported by photographic evidence. Any material changes to the layout or project methodology—such as the introduction of battery storage—must be managed through a formal Management of Change (MoC) process to ensure risk controls are updated and approvals remain valid.

Monitoring and verification requirements are consolidated in the Mitigation & Monitoring Table (Annexure MM-01), which functions as the compliance backbone of the EMP by defining measurable indicators, responsibilities, monitoring frequencies, evidence requirements, and corrective action triggers across all phases. Through disciplined footprint control, robust pollution prevention, proactive stormwater and erosion management, effective labour and community safeguards, and closure-focused rehabilitation planning, this EMP provides an auditable management framework to ensure that the Osona 20 MW Solar Power Plant can be implemented responsibly while protecting environmental and social receptors and maintaining compliance throughout the project lifecycle.

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1. Purpose and Scope

1.1 Purpose

This EMP defines the management measures, monitoring requirements, roles and responsibilities, performance standards, and compliance mechanisms required to avoid, minimise, manage, and rehabilitate environmental and social impacts associated with the Osona 20 MW Solar Power Plant across the full lifecycle. It converts assessment commitments into enforceable site controls for the EPC contractor and the operations team and establishes auditable records and corrective action processes to demonstrate compliance with authorisation conditions and applicable Namibian requirements.

1.2 Scope

The EMP applies to all activities within the project footprint and all associated infrastructure, including the PV array field, mounting structures, inverter stations, transformers, internal MV/LV reticulation, grid connection works, internal access roads, laydown and storage areas, refuelling and hazardous storage areas, waste management areas, temporary facilities and construction camp (if used), water supply and sanitation, stormwater and erosion controls, and all rehabilitation and closure works. It applies to all personnel, subcontractors, and service providers working on behalf of JCM Power.

1.3 Applicable Phases

The EMP applies to pre-construction/mobilisation, construction, operations and maintenance, and decommissioning and closure, recognising that risk pathways differ by phase and require phase-specific controls and monitoring.

2. Policy, Legal and Standards Framework

2.1 Namibian Legal Framework

This Environmental Management Plan (EMP) has been prepared to ensure that the Osona 20 MW Solar Photovoltaic Power Plant is implemented in accordance with Namibia's statutory environmental management requirements and any conditions attached to the Environmental Clearance Certificate (ECC) issued for the project. The EMP is aligned with the Environmental Management Act, 2007 (Act No. 7 of 2007), which establishes the overarching duty to prevent and mitigate environmental harm and to ensure that listed activities are authorised prior to implementation, and with the Environmental Impact Assessment Regulations, 2012 (Government Notices 30–32), which prescribe procedural and substantive requirements for environmental authorisation, public participation, reporting, and ongoing compliance. In practical terms, the EMP operationalises the commitments made during the environmental assessment process by translating them into enforceable site controls (method statements, demarcation, no-go zones, pollution prevention procedures, monitoring indicators, and rehabilitation requirements) and by establishing auditable recordkeeping and reporting systems that can demonstrate compliance to the competent authority.

Beyond environmental authorisation requirements, the EMP incorporates other relevant Namibian legal and regulatory obligations that apply to the project's construction and operational activities. Public health and sanitation requirements are addressed through provisions for adequate ablution facilities, hygienic waste handling, prevention of nuisance conditions (such as uncontrolled litter, odours, or stagnant water), and disciplined housekeeping, with service schedules and evidence records maintained to verify compliance. Labour and working conditions requirements are incorporated by requiring lawful employment practices, fair and safe working conditions, worker welfare provisions, training and competency controls, and accessible grievance mechanisms for workers, consistent with the intent of Namibian labour legislation and good practice for contractor management. Roads and traffic obligations are addressed through the requirement for a Traffic Management Plan, driver induction, speed control, road safety signage, escort arrangements for abnormal loads where applicable, and incident reporting—particularly where construction traffic interfaces with public roads and nearby receptors. Water protection requirements are embedded through measures that prevent contamination of soils and drainage features, control wash-water and

greywater, manage sanitation effluent, ensure lawful water sourcing (where water is abstracted or supplied), and implement spill prevention and response measures that protect surface and shallow subsurface environments. Where permits, licences, or approvals may be required for specific activities (e.g., abnormal load movements, waste transport/disposal, water abstraction, or work near electrical infrastructure), the EMP requires that these be obtained prior to commencement and retained in the project's controlled document file, with responsibilities assigned for permit compliance and renewals where applicable.

2.2 International Good Practice

Where lender expectations, corporate commitments, or stakeholder requirements apply, this EMP is designed to be consistent with Good International Industry Practice (GIIP) and recognised international environmental and social management frameworks. In this context, the EMP is aligned with the IFC Performance Standards (PS1–PS8), which require a structured approach to environmental and social risk management across the project lifecycle. This includes establishing a management system with clear accountabilities (PS1), ensuring fair labour and working conditions and worker grievance processes (PS2), protecting community health and safety through traffic and access controls and emergency preparedness (PS4), conserving biodiversity and managing impacts on habitats and protected species through footprint discipline and fauna protection measures (PS6), and protecting cultural heritage through a robust chance-find procedure and stop-work controls (PS8), among other relevant performance requirements.

The EMP also reflects the intent of the World Bank Group Environmental, Health and Safety (EHS) Guidelines, particularly the General EHS Guidelines and any relevant guidance for electrical infrastructure and construction activities. This is achieved through incorporating pollution prevention and control measures (waste, hazardous substances, spill prevention), occupational health and safety systems (permit-to-work, lockout/tagout, excavation safety, lifting plans, PPE), community safety provisions (traffic management, signage, access control), and emergency response planning with drills and clear reporting lines. In addition, the EMP is structured around ISO 14001 management system principles, ensuring that environmental performance is not treated as a one-off compliance exercise but as a continuous management process. Accordingly, the EMP includes requirements for competency and training, controlled documentation and recordkeeping, routine monitoring and inspections, internal and independent audits, and a formal Corrective and Preventive Action (CAPA) system that

identifies non-conformances, investigates root causes, and closes out corrective actions within defined timeframes. Together, these international good practice elements strengthen governance, improve audit readiness, and provide confidence to regulators and stakeholders that environmental and social risks are being managed systematically and transparently throughout construction, operation, and closure.

3. Project Description

3.1 Key Components

The project comprises a 20 MW utility-scale PV solar facility including PV modules and mounting structures, inverter stations and transformers, internal electrical reticulation, and MV connection infrastructure to the grid interconnection point (insert substation / line tie details). Supporting infrastructure includes internal access roads, perimeter fencing and controlled access points, stormwater drainage features, and temporary construction infrastructure such as laydown areas, storage yards, temporary offices/ablutions, and (if required) a construction camp.



3.2 Typical Construction Activities

Construction typically includes surveying and pegging; demarcation of footprint and no-go areas; minimal vegetation clearing; topsoil stripping and stockpiling where needed; earthworks for roads and equipment pads; piling/foundations; installation of mounting structures and PV modules; cable trenching and electrical works; substation/interface works; commissioning and testing; demobilisation; and progressive and final rehabilitation.

4. Environmental and Social Baseline Summary

The EMP-level baseline identifies the sensitivities that directly inform controls. Wind and dry-season conditions can elevate dust risks, requiring speed limits, watering protocols, and work scheduling. Storm events can drive runoff and erosion, requiring early stormwater measures and post-rain inspections. Topography and ephemeral drainage necessitate protection of natural flow paths and stable road crossings. Soils may be susceptible to compaction and erosion, requiring controlled trafficking, topsoil segregation, and ripping during rehabilitation. Biodiversity risks include unnecessary clearing, fauna entrapment in trenches, and invasive species spread, requiring strict footprint discipline, trench checks/escape ramps, and vehicle hygiene. Land use and receptors (road users, nearby farms, settlements, workers) require traffic safety, dust/noise controls, and grievance channels. Heritage chance-finds may occur during excavations, requiring stop-work and notification procedures.

5. Impact Pathways and Mitigation Hierarchy

Impacts occur through pathways such as direct land disturbance (clearing, grading, trenching), erosion and sediment transport, pollution and nuisance (dust/noise), hazardous substances handling (fuels/oils), waste generation, traffic and community safety risks, and chance-find heritage impacts. The EMP applies the mitigation hierarchy—avoid, minimise, rehabilitate/restore, and manage residual risks through adaptive controls—implemented via method statements, supervision, monitoring indicators, and corrective actions.

6. Roles and Responsibilities

JCM Power retains overall accountability for compliance and performance. The EPC contractor is responsible for day-to-day implementation and subcontractor control. An independent Environmental Control Officer (ECO) conducts inspections/audits, verifies compliance evidence, and issues non-conformance requirements. A contractor-appointed Site Environmental Officer (SEO) manages daily implementation, maintains registers, and conducts toolbox talks. The HSE Officer ensures integration of safety controls (PTW, electrical safety, excavations, traffic, emergency response). Operations responsibilities transfer to the Operations Manager (OM) during O&M, who maintains inspection schedules, stormwater controls, waste/oils handling, security interface, and reporting.

7. Method Statements and Contractor Deliverables

The EPC must submit activity-specific method statements (approved before works begin), including: footprint control and no-go zones; clearing/topsoil handling; stormwater/erosion controls; dust and traffic management; refuelling/fuels/spill response; waste management (general + hazardous); trenching and fauna protection; concrete washout (if applicable); rehabilitation/demobilisation; and working near electrical infrastructure. Documents must be version-controlled, and any layout or method change must be managed through a Management of Change (MoC) process approved by JCM/ECO.

8. Management Measures by Aspect

8.1 Footprint Control and Access Management

8.1.1 The EPC Contractor shall demarcate the full approved project footprint (~90 ha) and all ancillary areas (access roads, laydown areas, storage yards, refuelling and hazardous stores, waste areas, temporary facilities and camp if used) prior to any vegetation clearing, stripping, earthworks, or trenching.

8.1.2 The SEO shall ensure that demarcation includes clearly marked no-go areas, drainage buffers, and any sensitive features identified during pre-start walkdowns, using pegs, high-visibility tape/fencing, and signage.

8.1.3 All vehicles and plant shall use only approved routes and designated work areas; off-road driving shall be prohibited except in genuine emergencies.

8.1.4 Any emergency route deviation shall be recorded (date, location, reason, photos), assessed by the SEO, reported to the ECO, and rehabilitated as soon as practicable.

8.1.5 Speed limits shall be posted and enforced across the site and on internal roads to reduce dust, collision risk, and road degradation.

8.1.6 The SEO shall conduct daily footprint/access inspections and the ECO shall verify compliance through scheduled audits; any encroachment shall trigger immediate corrective action and CAPA close-out.

8.2 Vegetation Clearing and Fauna Protection

8.2.1 Vegetation clearing shall be limited strictly to demarcated areas required for construction and operation and shall not extend beyond the authorised footprint or approved ancillary areas.

8.2.2 The SEO and ECO shall conduct a pre-clear walkdown to confirm boundaries, drainage buffers, and no-go zones, and to identify any avoidance requirements before clearing begins.

8.2.3 Clearing shall be undertaken in a staged manner where practicable to allow fauna to move away from disturbance, and buffers to drainage features shall be maintained at all times.

8.2.4 All personnel shall be prohibited from hunting, trapping, harassing wildlife, or collecting plants/animals; this requirement shall be included in the Code of Conduct and induction.

8.2.5 Open trenches shall be managed to prevent fauna entrapment, including limiting open lengths, providing escape ramps, and conducting early-morning trench inspections prior to

work resuming.

8.2.6 Any fauna injury or mortality incident shall be recorded, investigated, and addressed through CAPA; repeated incidents shall trigger retraining and procedural changes.

8.3 Soil Conservation and Topsoil Management

8.3.1 Topsoil shall be stripped only where required and only within demarcated areas; unnecessary stripping shall be avoided.

8.3.2 Topsoil shall be kept separate from subsoil at all times, and topsoil stockpiles shall be clearly identified and protected.

8.3.3 Stockpiles shall be located away from drainage lines and runoff pathways and shall be protected from erosion and contamination (fuels, oils, cement wash water, waste).

8.3.4 Vehicle and plant movement shall be restricted to approved routes and work areas to minimise compaction.

8.3.5 Progressive rehabilitation shall be implemented, including ripping/decompaction of compacted surfaces, recontouring, topsoil reinstatement, and surface stabilisation.

8.3.6 The SEO shall maintain a soil/topsoil register (locations, volumes where practicable, protection measures, reinstatement progress) and corrective actions shall be tracked in CAPA.

8.4 Stormwater Management and Erosion Control

8.4.1 Natural drainage lines and ephemeral channels shall be maintained; blocking, infilling, or diversion shall not occur unless specifically approved and engineered to maintain flow capacity.

8.4.2 Stormwater and erosion controls shall be installed early, particularly where roads and pads intercept runoff, including cut-off drains, berms, check dams, and cross-drainage structures.

8.4.3 The SEO shall inspect stormwater controls routinely and shall conduct inspections after rainfall events to identify damage, blockage, or erosion.

8.4.4 Erosion features (rilling, gully, scour at crossings) shall be repaired promptly within defined timeframes based on severity (e.g., major within 48 hours; minor within 7 days).

8.4.5 Sediment-laden runoff shall not be discharged off-site; evidence of sediment leaving the site shall trigger immediate corrective actions and review of controls.

8.4.6 All stormwater/erosion inspections and repairs shall be documented and closed out through CAPA where non-conformances occur.

8.5 Dust and Air Quality

8.5.1 Speed limits shall be enforced, and internal roads shall be maintained to reduce dust generation.

8.5.2 Water carts or equivalent dust suppression shall be used when required; overwatering that causes runoff/erosion shall be avoided.

8.5.3 Dusty loads shall be covered or secured during transport.

8.5.4 High-dust activities shall be scheduled with weather awareness where practicable and may be temporarily paused during high-wind conditions if dust becomes uncontrolled.

8.5.5 The SEO shall maintain a dust log including observations, watering actions, and complaints, and shall implement corrective actions promptly.

8.5.6 Dust complaints shall be recorded and closed out within defined timeframes (e.g., initial response within 24 hours; close-out within 48 hours unless complex).

8.6 Noise Management

8.6.1 Construction equipment shall be maintained in good working order, including mufflers/silencers where applicable.

8.6.2 High-noise activities shall be limited to daytime hours where practicable, and unnecessary idling shall be minimised.

8.6.3 Worker noise exposure shall be managed through task risk assessments and provision/enforcement of hearing protection where required.

8.6.4 The SEO/HSE shall record noise complaints and implement adaptive controls where required.

8.6.5 Repeated noise complaints shall trigger investigation of root causes and additional controls or scheduling changes.

8.6.6 Noise-related non-conformances shall be tracked and closed out through CAPA.

8.7 Waste Management (General and Hazardous)

8.7.1 The Contractor/Operator shall implement a waste hierarchy approach and shall segregate waste streams (general, recyclables, scrap, hazardous).

8.7.2 Waste receptacles shall be covered, labelled, and secured to prevent windblown litter and wildlife scavenging.

8.7.3 Burning or burying of waste shall be prohibited.

8.7.4 Waste shall be disposed of only at authorised facilities using authorised transporters, and disposal certificates/manifests/weighbridge slips shall be retained.

8.7.5 Hazardous waste shall be stored in sealed, labelled containers within a bunded, locked hazardous store with SDS available.

8.7.6 The SEO/OM shall maintain waste registers and evidence files, and gaps in chain-of-custody shall trigger CAPA actions.

8.8 Hazardous Substances, Fuels and Spill Response

8.8.1 Fuels, oils and chemicals shall be stored in bunded facilities sized to at least 110% of the largest container, secured and signed.

8.8.2 Refuelling shall occur only in designated areas using drip trays; refuelling near drainage features shall be prohibited.

8.8.3 Spill kits shall be available at fuel points and in service vehicles and shall be inspected and restocked routinely.

8.8.4 Spills shall be managed using the procedure: stop source, contain, recover, prevent migration to drains, dispose of contaminated materials via authorised routes.

8.8.5 All spills (including minor) shall be recorded, investigated, and closed out through CAPA with root-cause analysis for significant events.

8.8.6 Repeated spills or uncontrolled releases shall trigger procedural revision, retraining, and enhanced supervision.

8.9 Water Use and Sanitation

8.9.1 Water shall be sourced from authorised supplies and used efficiently; water use for dust suppression shall be managed to avoid wastage.

8.9.2 Adequate sanitation facilities shall be provided for workforce numbers and shall be serviced according to a defined schedule, with records retained.

8.9.3 Open defecation shall be prohibited and enforced through site rules and inspections.

8.9.4 Greywater and wash water shall be controlled and shall not be discharged into drainage features.

8.9.5 Where concrete works occur, washout shall be contained in lined washout areas; cement wash water shall not be discharged to soil.

8.9.6 Sanitation and water system inspections shall be documented, and recurring failures shall be managed through CAPA.

8.10 Community Health and Safety, Traffic, Security and Grievance

8.10.1 A Traffic Management Plan shall be implemented for the A1/D1972 interface and internal site roads, including signage, speed control, driver induction, and incident reporting.

8.10.2 Abnormal loads (if any) shall be managed through escorts and required permits and scheduling controls.

8.10.3 Site fencing, gates, and warning signage shall be maintained to prevent unauthorised entry and reduce public safety risks.

8.10.4 Community-facing interactions shall be governed by a Code of Conduct and coordinated communications where required.

8.10.5 A grievance mechanism shall be maintained and communicated to stakeholders; grievances shall be logged, investigated, responded to, and closed out within defined timeframes.

8.10.6 Significant community safety incidents or repeated complaints shall trigger review of controls and CAPA close-out.

8.11 Heritage Chance-Find Procedure

8.11.1 If suspected heritage resources or graves are discovered, work shall stop immediately in the affected area and the area shall be cordoned off.

8.11.2 The ECO shall be notified without delay and shall advise on notification to the relevant heritage authority.

8.11.3 No artefacts or materials shall be removed, disturbed, or collected.

8.11.4 Work shall resume only after written clearance or instruction is obtained through the ECO process.

8.11.5 All workers shall receive chance-find awareness training during induction.

8.11.6 Chance-find actions shall be recorded in a register and retained in the environmental file.

8.12 Fire Prevention and Emergency Readiness

8.12.1 Open fires shall be prohibited unless specifically authorised and controlled.

8.12.2 Hot works shall be managed through a permit system, with fire watches and appropriate fire equipment available.

8.12.3 Fire extinguishers shall be correctly rated, positioned, inspected regularly, and serviced, with records retained.

8.12.4 Emergency contacts, muster points, communications procedures, and incident reporting lines shall be established prior to works.

8.12.5 Emergency drills shall be conducted at defined intervals and lessons learned shall be implemented.

8.12.6 Fire or emergency-related incidents shall be recorded and closed out through CAPA.

8.13 Labour and Working Conditions

8.13.1 The Contractor/Operator shall prohibit child labour and forced labour and shall apply non-discrimination in recruitment and employment practices.

8.13.2 Workers shall have written terms of employment and access to a confidential grievance mechanism without retaliation.

8.13.3 The HSE system shall include task risk assessments, competent supervision, PPE, and control of high-risk activities (PTW, LOTO, lifting, excavations, electrical works).

8.13.4 Fitness-for-work controls shall be enforced, including prohibition of alcohol/drug impairment and fatigue management for drivers and critical tasks.

8.13.5 Where worker accommodation is used, minimum welfare standards shall be applied (potable water arrangements, sanitation, waste removal, housekeeping, security).

8.13.6 A Code of Conduct shall be implemented and enforced, with disciplinary measures for repeated non-compliance.

8.14 Operations-Specific Controls

8.14.1 The Operator shall maintain stormwater and erosion controls through routine inspections and post-rain inspections, with repairs implemented within defined timeframes.

8.14.2 Vegetation management shall be undertaken conservatively to maintain ground cover and protect drainage buffers; herbicide use (if any) shall be controlled and recorded.

8.14.3 Oils, lubricants and maintenance chemicals shall be stored and handled using bunding, drip trays, and spill kits, with staff trained in response.

8.14.4 Waste generated during operations shall be segregated and disposed of via authorised facilities with disposal evidence retained.

8.14.5 Security controls (fencing, signage, controlled access) shall be maintained to protect the public and prevent unauthorised entry near electrical infrastructure.

8.14.6 Periodic audits shall be conducted, and CAPA close-out discipline shall be maintained to prevent performance drift.

The management measures in Sections 8.1–8.14 shall be implemented and verified through the Mitigation & Monitoring Table (Annexure MM-01), which defines the indicators, responsibilities, monitoring frequencies, evidence requirements, and corrective action triggers for each activity and phase and functions as the primary compliance backbone of this EMP.

9. Monitoring, Inspections, Audits, CAPA and Reporting

9.1 Purpose and Approach

Monitoring and compliance verification are central to ensuring that the Osona 20 MW Solar PV project is implemented in accordance with the EMP and that ECC conditions and applicable legal requirements are met. The project shall apply a structured assurance system comprising routine inspections, formal audits, evidence-based reporting, and a corrective and preventive action (CAPA) process. This system is designed to (i) detect non-compliance early, (ii) prevent escalation of minor issues into significant incidents, (iii) provide auditable evidence of implementation, and (iv) drive continuous improvement through trend analysis and management response.

9.2 Routine Site Inspections (SEO)

Daily inspections shall be conducted by the Site Environmental Officer (SEO) during construction and during any high-activity maintenance periods, using checklists aligned to Annexure MM-01. Daily inspections shall focus on controls that are most likely to fail or cause immediate impacts, including: footprint integrity and no-go compliance; demarcation condition; housekeeping and waste segregation; hazardous storage and bund integrity; refuelling practices and spill kit readiness; dust suppression and road condition; trench management (open trenches, escape ramps, fauna checks); sanitation and hygiene; stormwater controls and erosion risk areas; and public safety signage and access control. The SEO shall record findings, assign corrective actions with responsible persons and deadlines, and verify close-out. Where daily inspections identify potentially significant non-compliance (e.g., encroachment beyond the demarcated footprint, uncontrolled spill, sediment leaving site, or unsafe electrical interface activities), the SEO shall escalate immediately to the EPC Construction Manager, HSE Officer, and JCM Power Project Manager, and shall notify the ECO.

9.3 Contractor Internal Reviews

The EPC contractor shall conduct weekly internal environmental compliance reviews, led by the SEO and attended by the Construction Manager, HSE Officer, and relevant supervisors. These reviews shall confirm implementation of method statements, evaluate compliance

against MM-01 indicators, and review all registers (waste, spills, erosion/stormwater, training, grievances, incidents, and rehabilitation). The review shall also assess upcoming work fronts and identify environmental risks associated with planned activities (e.g., new clearing areas, trenching near drainage features, major deliveries, substation tie-in works). Minutes and action trackers shall be kept, with deadlines assigned, and unresolved actions carried forward until closed.

9.4 Independent Oversight (ECO Audits)

The Environmental Control Officer (ECO) shall provide independent oversight through scheduled audits and inspections. During peak construction and earthworks periods, the ECO shall undertake weekly audits (or a frequency agreed in the ECC conditions), transitioning to monthly audits during lower-risk construction stages or during stable operations, and returning to increased frequency when high-risk activities resume (e.g., major trenching, tie-in works, or rehabilitation close-out). ECO audits shall verify compliance with demarcation and no-go zones, stormwater and erosion controls, pollution prevention, waste chain-of-custody evidence, worker welfare and sanitation conditions, incident handling, and the adequacy and implementation of method statements. The ECO shall issue written audit reports that include findings, non-conformances, corrective actions, close-out timeframes, and photographs where appropriate. Where serious non-conformance is identified, the ECO shall recommend stop-work for the affected activity until controls are restored to an acceptable standard.

9.5 Monitoring Indicators and Evidence Requirements

Monitoring shall be structured around measurable indicators defined in Annexure MM-01. Indicators may include: number of footprint encroachments; percentage of workers inducted; stormwater inspections completed (routine and post-rain); dust complaint response times; housekeeping scores; number and severity of spills; completeness of waste manifests/disposal certificates; trench inspection compliance; number of grievances and closure rates; and rehabilitation completion progress. Evidence requirements shall include: signed induction registers and training matrices; daily SEO checklists; ECO audit reports; waste manifests and disposal certificates; spill logs and incident reports; sanitation service records; stormwater/erosion inspection logs; photographic records (preferably geotagged) of key

controls, repairs, and rehabilitation; and a controlled document register for method statements and permits.

9.6 CAPA System (Corrective and Preventive Actions)

A formal CAPA system shall be implemented to ensure that non-conformances, incidents, and near misses are closed out effectively and do not recur. The CAPA register shall record: the issue description; date and location; risk severity rating; immediate containment actions; root cause; corrective action(s); preventive action(s); responsible person; deadline; verification of completion; and sign-off by the SEO and/or ECO. Severity-based close-out timeframes shall be applied (e.g., critical items within 24–48 hours; major items within 7 days; minor items within 14–30 days, unless otherwise specified). Repeat non-conformances or recurring trends shall trigger escalation to JCM Power management and revision of method statements, retraining, or increased supervision. CAPA performance (open actions, overdue actions, repeat issues) shall be a standing agenda item at weekly contractor reviews and monthly reporting.

9.7 Reporting to JCM Power and Authorities

The EPC contractor shall submit monthly environmental compliance reports to JCM Power (and to the competent authority where required by ECC conditions). Reports shall summarise environmental performance using MM-01 indicators and shall include: a narrative summary of activities undertaken; compliance status; key monitoring results; incidents and near misses; spills and waste metrics; grievances received and closed; non-conformances raised and corrective actions implemented; rehabilitation progress; and any significant stakeholder issues. Each report shall be supported by registers, disposal evidence, photographs, and audit findings. Where notifiable incidents occur (e.g., significant spill, serious injury, major non-compliance, heritage find, or community safety incident), the project shall follow the applicable notification requirements and timeframes prescribed by ECC conditions and/or relevant authorities, and shall document all notifications and follow-up actions.

9.8 Document Control and Record Retention

All environmental documentation shall be maintained in a controlled Environmental File (hardcopy and/or electronic), including the EMP, approved method statements, permits, registers, monitoring records, audit reports, incident reports, and correspondence. Documents

shall be version controlled, with clear dates, revision numbers, and approvals. Records shall be retained for the duration of construction and operations, and for the period required by law and ECC conditions, to ensure audit readiness and traceability.

10. Emergency Preparedness and Response

10.1 Objectives and Principles

Emergency preparedness aims to protect life, prevent environmental harm, minimise property damage, and ensure rapid, coordinated response to incidents. The project shall maintain an Emergency Preparedness and Response system that is appropriate to the risk profile of a 20 MW PV facility and associated construction activities, including proximity to the Osona Substation (tie-in works and electrical hazards). The response approach shall follow the principles of: immediate life safety, containment of environmental releases, clear communications, timely escalation, and documented incident management with corrective action.

10.2 Emergency Scenarios Covered

The Emergency Plan shall address, at a minimum, the following scenarios:

- Fire (vehicle fire, fuel store fire, electrical fire, veld/grass fire)
- Spills and releases (diesel/oil spills, chemical leaks, contaminated runoff, hazardous waste release)
- Medical emergencies (injury, heat stress, dehydration, bites/stings, cardiac events)
- Severe weather (high winds, lightning, heavy rainfall, flooding, dust storms)
- Vehicle accidents (on-site collision, public road accident involving project vehicles)
- Electrical incidents (shock/electrocution, arc flash, electrical faults during substation/interface works)

10.3 Emergency Organisation, Contacts, and Communication

An emergency organisation structure shall be established, naming the Emergency Coordinator (typically the Site Manager), the HSE lead, first aiders, fire wardens, and spill response leads. A current emergency contact list shall be posted at prominent locations (site office, security

gate, fuel store, workshop) and included in induction. Communications systems shall include reliable mobile coverage arrangements and/or radios where required. The project shall define escalation thresholds and notification pathways to JCM Power management, the ECO, and external responders (ambulance, police, fire services, roads authority) as applicable.

10.4 Emergency Equipment and Readiness

Emergency equipment shall be provided, maintained, and readily accessible. This includes: appropriately rated and serviced fire extinguishers at fuel stores, generators (if used), workshops, offices, and service vehicles; spill kits at refuelling points and in service vehicles; first aid kits and trained first aiders; and any additional resources required for site-specific risks (e.g., sand/absorbent, containment booms for drainage protection where relevant). Equipment inspections shall occur on a defined schedule (e.g., weekly for spill kits and extinguishers, monthly for first aid inventories), and deficiencies shall be corrected immediately and tracked through CAPA.

10.5 Response Procedures

The emergency response procedures shall specify clear steps for each scenario. For spills: stop the source, isolate the area, contain the spill, protect drainage features, recover contaminated materials, dispose through authorised routes, and report and investigate. For fire: raise alarm, evacuate, isolate fuels/electrical sources if safe, use extinguishers only if trained and safe, contact emergency services, and prevent spread to vegetation. For medical emergencies: stabilise, call emergency services, transport only if appropriate, and record incident details. For severe weather: suspend high-risk activities (lifting, working at height), secure materials, and implement safe shelter procedures. For electrical incidents: enforce exclusion zones, isolate power through authorised PTW/LOTO procedures, and ensure only competent persons respond.

10.6 Training, Drills, and Continuous Improvement

All personnel shall receive emergency awareness training during induction, including alarm signals, muster points, roles, and first response expectations. The project shall conduct periodic drills (e.g., quarterly during construction; at least annually during operations), rotating scenarios such as spill response, fire response, medical emergency, and severe weather readiness. Drill outcomes shall be documented, including response times, equipment performance, communication effectiveness, and gaps identified. Lessons learned shall be converted into corrective actions in the CAPA register, and procedures, training, and equipment provisions shall be updated accordingly.

10.7 Incident Reporting and Investigation

All emergencies, incidents, and near misses shall be reported promptly through the project's incident reporting system. Significant incidents shall be investigated using a structured approach (e.g., root cause analysis), and corrective and preventive measures shall be implemented with assigned responsibilities and deadlines. Where ECC conditions require external notification, such notifications shall be made within specified timeframes and documented in the Environmental File.

11. Decommissioning and Closure (Expanded)

Decommissioning and closure of the Osona 20 MW Solar Photovoltaic Power Plant shall be planned and implemented to ensure that the site is left in a safe, stable, non-polluting condition, with disturbed areas rehabilitated to a standard consistent with agreed land use objectives and any ECC or authority requirements. Because closure activities can reintroduce short-term disturbance risks similar to construction (traffic, dismantling, waste handling, and civil reinstatement), this EMP requires that decommissioning be managed as a controlled phase with defined responsibilities, approved procedures, and auditable evidence of compliance.

11.1 Decommissioning Planning and Approvals

A Decommissioning Plan shall be prepared prior to closure and submitted to JCM Power for approval and, where required, to the competent authority in accordance with ECC conditions. The plan shall confirm the final decommissioning scope (full removal, partial removal, or repowering), define the programme and sequencing, and identify all permits, notifications, and third-party requirements (including grid operator requirements for disconnection from the Osona Substation). The plan shall also identify contractors, equipment, and logistics, and include a risk assessment covering occupational health and safety, pollution prevention, community safety, traffic management, and environmental impacts. Any changes from the approved operational configuration—such as the introduction of new waste streams or modified dismantling methods—shall be managed through a formal Management of Change (MoC) process prior to implementation.

11.2 Pre-Decommissioning Baseline and Site Preparation

Before dismantling begins, the operator shall compile a closure baseline record, including updated site layout, drainage controls, rehabilitated and unrehabilitated areas, and photographs

of key infrastructure and sensitive areas. Temporary laydown, waste handling, and hazardous storage areas shall be designated and demarcated for the decommissioning phase, with stormwater controls installed to prevent erosion and contaminated runoff. Emergency preparedness and response arrangements shall be updated to reflect decommissioning hazards (lifting operations, increased transport, electrical isolation activities, and bulk waste handling), and all workers shall receive decommissioning-specific induction and training.

11.3 Electrical Isolation and Grid Disconnection

Electrical safety is a critical closure requirement. All electrical works associated with shutdown and disconnection shall be undertaken by competent personnel under an approved permit-to-work system, including lockout/tagout (LOTO) and isolation procedures. Disconnection from the Osona Substation shall be coordinated with the grid operator in accordance with approved protocols, ensuring that all energised systems are safely isolated prior to dismantling. Exclusion zones and signage shall be maintained around electrical works, and records of isolation, permits, and authorisations shall be retained in the closure file.

11.4 Removal of Infrastructure and Materials Handling

Decommissioning shall include the safe dismantling and removal of PV modules, mounting structures, cabling, inverters, transformers, switchgear, fencing (where removal is required), and other ancillary infrastructure. Dismantling shall be sequenced to minimise unnecessary disturbance and to preserve stabilised surfaces where possible. Lifting operations shall follow approved lifting plans, with exclusion zones enforced. Housekeeping shall be maintained to prevent debris accumulation and windblown litter. All removed materials shall be segregated into defined waste and recyclable streams, including scrap metal, cables, packaging, and general waste, and managed through authorised pathways.

11.5 PV Panels, E-waste and Hazardous Materials

PV modules and associated electrical components shall be managed as controlled waste streams and, where feasible, directed to recycling and take-back schemes or authorised recyclers to avoid disposal of recoverable materials. Electronic waste (e-waste) such as inverters, control equipment, monitoring devices, and damaged cabling shall be segregated and transported via authorised service providers, with manifests and recycler certificates retained. Oils and lubricants associated with transformers and equipment shall be drained and stored in bunded containment, handled using drip trays, and disposed of through licensed hazardous waste channels. Any contaminated soils arising from historical spills or decommissioning

activities shall be excavated where necessary, stored as hazardous material, and disposed of at authorised facilities, with chain-of-custody evidence retained. The closure process shall include verification that no hazardous substances remain on site and that all hazardous storage areas are cleaned and reinstated.

11.6 Civil Reinstatement, Landform Reprofiling and Drainage Restoration

Following removal of infrastructure, civil reinstatement shall focus on leaving the site in a stable condition that does not concentrate runoff or create erosion pathways. Where pads, tracks, or compacted work areas are no longer required, surfaces shall be reprofiled to blend with surrounding landforms and to reinstate natural drainage patterns. Stormwater controls that are no longer required shall be removed only where doing so does not compromise stability; where necessary, stable drainage features may be retained to protect rehabilitated surfaces. Any rills, gullies, scoured crossings, or unstable slopes shall be repaired, and drainage lines shall be reinstated to safe conveyance capacity, avoiding blockages and unnatural diversions.

11.7 Soil Rehabilitation and Erosion Stabilisation

Rehabilitation shall include ripping or decompaction of compacted areas, re-spreading of topsoil stockpiles (where available and suitable), and surface stabilisation measures to prevent erosion. Stabilisation may include recontouring, roughening of surfaces, installation of erosion control structures (e.g., check berms, brush packing, or geotextiles where appropriate), and progressive rehabilitation of any remaining disturbed areas. Rehabilitation success criteria shall be defined in the Decommissioning Plan and may include stable landforms, absence of active erosion, drainage integrity, removal of waste and debris, and visual integration with surrounding land use. Where invasive species are present or risk is identified, measures shall be implemented to prevent establishment or spread during closure and post-closure.

11.8 Post-Closure Monitoring and Maintenance

Where required by ECC conditions or where rehabilitation stability is uncertain, the operator shall implement a post-closure monitoring programme for a defined period. Monitoring shall focus on erosion and drainage performance after rainfall, reappearance of unstable areas, and any residual contamination concerns. Any defects identified during post-closure monitoring shall trigger maintenance or corrective works to ensure the site remains stable. Records of post-closure inspections and remedial works shall be retained and made available to the competent authority upon request.

11.9 Closure Audit, Completion Report, and Sign-Off

A closure audit shall be undertaken by the ECO (or suitably qualified independent auditor) to verify that decommissioning and rehabilitation activities have been completed in accordance with the approved Decommissioning Plan and this EMP. The closure audit shall verify, at minimum: removal of infrastructure (as required), complete waste and hazardous material chain-of-custody documentation, absence of contamination and uncontrolled waste, reinstatement of drainage integrity, stability of rehabilitated surfaces, and completion of corrective actions. A Closure Report shall then be compiled, summarising the decommissioning activities, disposal and recycling evidence, rehabilitation outcomes, photo records, audit findings, and any residual monitoring requirements. Where required, the Closure Report shall be submitted to the competent authority to support closure sign-off and release from ongoing obligations.

Mitigation & Monitoring Table

Project footprint: ~90 ha

Grid tie: Osona Substation (~500 m)

Assumption on BESS: Not included/unknown; if introduced later, apply MoC and add BESS-specific controls.

Roles: JCM PM (Owner’s Rep), EPC (Contractor), SEO (Site Environmental Officer), ECO (Independent Environmental Control Officer), HSE (H&S Officer), OM (Operations Manager), SM (Security)

Activity	Aspect	Potential Impact / Risk	Mitigation Management Measures	Monitoring / Indicator Acceptance Criteria	Responsibility Frequency	Evidence Records	Corrective Action Trigger
Appoint key personnel	Governance	Weak implementation; poor compliance	Appoint SEO and ECO before SEO & ECO mobilisation; define reporting lines; empower stop-work recommendation for serious risk	appointed lines; (Y/N); roles JCM PM, EPC communicated (Y/N)	Once pre-start	Appointment letters; organogram	No appointments before mobilisation

Activity	Aspect	Potential Impact / Risk	Mitigation Management Measures	Monitoring / Indicator Acceptance Criteria	Responsibility Frequency	Evidence Records	Corrective Action Trigger
Pre-start meeting	Compliance readiness	Uncontrolled start	Hold pre-start meeting covering footprint, zones, statements, emergency response, grievance, interface to A1/D1972	no-go Minutes method signed (Y/N); action list closed ($\geq 90\%$ traffic before works)	JCM PM, Once EPC, ECO	Minutes; action tracker	Actions not closed before high-risk works
Final layout & constraints	Planning	Encroachment; drainage interference	Confirm 90 ha boundary; drainage identify areas; laydown/fuel/waste zones	Approved buffers; sensitive define map (Y/N)	JCM PM, Once; update MoC no-go EPC, ECO	Layout plan; via constraints map	Work starts without approved layout

Activity	Aspect	Potential Impact / Risk	Mitigation Management Measures	Monitoring Indicator Acceptance Criteria	Responsibility	Frequency	Evidence Records	Corrective Action Trigger
Demarcation & signage	Footprint control	Disturbance beyond authorised area	Peg/tape/fence footprint, access routes, laydown, fuel store, waste area; install signage incl. speed limits and no-go zones	Demarcation complete (Y/N); signage installed (Y/N)	EPC, SEO, ECO	Before disturbance; weekly	Photos; inspection checklist	Any clearing/earthworks outside demarcation
Contractor method statements	Operational control	Controls not embedded	Submit/approve method statements: clearing/topsoil; stormwater/erosion; refuelling/spills; waste; traffic/dust; trenching; washout; rehab; electrical/PTW	Approved method statements on-site (Y/N)	EPC, SEO, JCM PM	Pre-start; revise needed	Approved as MS; revision log	High-risk activity begins without MS

Activity	Aspect	Potential Impact / Risk	Mitigation Management Measures	Monitoring Indicator / Acceptance Criteria	Responsibility	Frequency	Evidence Records	Corrective Action Trigger
Induction & training	Competency	Unsafe acts; non-compliance	Induct 100% of workforce on EMP, no-go, spills, waste, fauna, heritage chance-find, traffic, grievance, Code of Conduct	Induction coverage 100%; toolbox plan issued	EPC, HSE, SEO	Pre-start; weekly toolbox	Induction register; training matrix	Any worker on site without induction
Baseline photo record	Evidence	Disputes; weak closure proof	Capture geotagged photos of footprint, drains, access roads, sensitive areas, receptors	Baseline record complete (Y/N)	SEO, ECO	Once	Photo log	Missing baseline record

B) CONSTRUCTION PHASE

Activity	Aspect	Potential Impact / Risk	Mitigation / Management Measures	Monitoring / Indicator Acceptance Criteria	Responsibility	Frequency	Evidence / Records	Corrective Trigger	Action
Site establishment	Footprint	Spread disturbance	Restrict site to demarcated 90 ha of + defined ancillary zones; no-go enforcement	Encroachment incidents = 0	EPC, SEO,	Daily; weekly audit	Inspection sheets; photos	Any encroachment outside footprint/no-go	
Vegetation clearing	Biodiversity	Habitat unnecessary clearing	Minimise clearing; loss; maintain drainage buffers; staged clearing; prohibit hunting/collectio n	Cleared area ≤ approved; buffers intact (Y/N)	EPC, SEO,	Daily during clearing	Clearing register; GPS/photos	Clearing beyond boundaries/buffers	

Activity	Aspect	Potential Impact / Risk	Mitigation / Management Measures	Monitoring / Indicator Acceptance Criteria	Responsibility	Frequency	Evidence / Records	Corrective Trigger	Action
Topsoil stripping	Soils	Loss of topsoil; rehab failure	Strip only where required; separate topsoil/subsoil; place stockpiles away from drains; protect stockpiles	Stockpiles protected ($\geq 90\%$); contamination	no EPC, SEO	Weekly; after rain	Topsoil register; photos	Stockpiles eroding/contaminated	
Earthworks & grading	Erosion	Gullyng; sediment transport	Install stormwater controls early; stabilise exposed surfaces; avoid steep cuts; progressive rehab	No uncontrolled erosion (Y/N); repairs within 48–7 days (severity-based)	EPC, SEO, ECO	Weekly; after rain	Erosion log; CAPA	Persistent erosion or sediment leaving site	

Activity	Aspect	Potential Impact / Risk	Mitigation / Management Measures	Monitoring / Indicator Acceptance Criteria	Responsibility	Frequency	Evidence / Records	Corrective Trigger	Action
Road construction/usage	Traffic/dust	Accidents; dust; road damage	Speed limits; driver induction; route discipline; maintain road crossings; signage; spotters	Speed compliance; incidents reported 100%	EPC, SEO	HSE, Daily	Driver records; incident logs	Repeated speeding/incidents	
Traffic interface (A1/D1972)	Community safety	Public accidents	Traffic Management Plan; escorts for abnormal loads; warning signage; scheduling; fatigue control	Zero serious incidents; TMP implemented (Y/N)	EPC, SEO	Daily; weekly review	TMP; logs; signage photos	Any serious miss/accident	near

Activity	Aspect	Potential Impact / Risk	Mitigation / Management Measures	Monitoring Indicator / Acceptance Criteria	Responsibility	Frequency	Evidence / Records	Corrective Trigger	Action
Dust suppression	Air quality	Nuisance; visibility risk	Water carts when needed; cover loads; schedule dusty work with wind; overwatering causing runoff	Visible dust controlled within 30 min; no complaints tracked & closed	EPC, SEO	Daily	Dust log; watering log	Complaints not closed within 48 hrs	
Noise control	Noise	Nuisance; worker exposure	Maintain plant; limit noisy works to daytime; PPE for workers	PPE compliance $\geq 95\%$; PPE complaints addressed	EPC, SEO	HSE, Daily	PPE register; complaint log	Repeated complaints/unsafe exposure	
Fuel storage	Spills/fire	Soil/water contamination	Bunded storage ($\geq 110\%$); locked; drip trays; fire	Bund intact; spill kit stocked (Y/N)	EPC, HSE, SEO,	Daily; weekly audit	Bund checklist; photos	Any leak contained immediately	not

Activity	Aspect	Potential Impact / Risk	Mitigation / Management Measures	Monitoring / Indicator Acceptance Criteria	Responsibility	Frequency	Evidence / Records	Corrective / Trigger	Action
Refuelling	Spills	Localised contamination	extinguishers; SDS available Refuel only in designated area; supervision; drip trays; no refuel near drains; spill response readiness	Refuelling compliance $\geq 95\%$; spills logged 100%	EPC, SEO	Daily	Refuel log; spill register	Refuel outside designated area	
Spill response	Pollution	Spread to drains/soil	Stop–contain–recover–dispose; excavate contaminated soil if needed; report	Response time ≤ 15 min on-site; CAPA closed ≤ 14 days	EPC, SEO, ECO	As needed; monthly review	Spill forms; manifests	Repeat spills without corrective actions	

Activity	Aspect	Potential Impact / Risk	Mitigation / Management Measures	Monitoring / Indicator Acceptance Criteria	Responsibility	Frequency	Evidence / Records	Corrective / Trigger	Action
Hazardous substances	Pollution	Improper storage/disposal	and investigate; CAPA Bunded hazardous store; compatible segregation; labelling; licensed disposal	Storage compliant (Y/N); manifests complete	EPC, SEO	Weekly	Hazardous register; SDS file	Unlabelled/unbundled storage	
Waste (general)	Waste	Litter; scavenging	wildlife daily housekeeping; burning/burying; licensed disposal	Segregated covered bins; Housekeeping g score $\geq 90\%$; no disposal proof monthly	EPC, SEO	Daily; weekly	Waste register; disposal slips	Litter outside site / missing disposal proof	

Activity	Aspect	Potential Impact / Risk	Mitigation / Management Measures	Monitoring / Indicator Acceptance Criteria	Responsibility	Frequency	Evidence / Records	Corrective / Trigger	Action
Waste (hazardous)	Waste	Long-term contamination	Sealable containers; bunded storage; licensed transporter; chain-of-custody	100% manifests; no leaking containers	EPC, SEO	Weekly; monthly reporting	Hazardous manifests	Missing custody evidence	chain-of-evidence
Sanitation	Public health	Disease; odour	Adequate toilets; service schedule; no defecation; records retained	Service open compliance $\geq 95\%$	EPC, SEO	HSE, Weekly	Service certificates	Repeated failures	hygiene
Water use	Resource	Overuse; unauthorised abstraction	Use authorised source; log water; optimise dust suppression	Water log maintained (Y/N)	EPC, SEO	Weekly	Water use log	No unauthorised	records / source

Activity	Aspect	Potential Impact / Risk	Mitigation / Management Measures	Monitoring Indicator / Acceptance Criteria	Responsibility	Frequency	Evidence / Records	Corrective Trigger	Action
Trenching	Fauna safety	Entrapment; injury	Limit open trench length; escape ramps; daily checks; backfill promptly	Daily trench checks 100%; entrapment = 0 target	EPC, SEO	Daily	Trench register	Trenches left open unprotected	
Electrical works / substation tie	Safety	Electrocution; outages	PTW, LOTO; competent staff; exclusion zones; coordinate with substation operator; signage	PTW compliance 100%; zero unauthorised entries	EPC, HSE, SEO	Daily during tie-in	PTW logs; method statement	Any PTW breach	
Fire risk	Fire	Asset damage; veld fire	No open fires; hot work permits; extinguishers;	Extinguishers inspected weekly; drills completed	EPC, HSE	Weekly; quarterly drills	Fire log; permits	Any uncontrolled fire / missing equipment	

Activity	Aspect	Potential Impact / Risk	Mitigation / Management Measures	Monitoring / Indicator Acceptance Criteria	Responsibility	Frequency	Evidence / Records	Corrective / Trigger	Action
Heritage chance-find	Heritage	Damage to artefacts/graves	housekeeping; drills Stop work; cordon off; notify ECO; follow heritage authority guidance	Procedure followed 100% when triggered	EPC, SEO,	As needed	Chance-find log	Work continues after find	
Worker conduct	Social	Conflict; GBV/harassment	Code of Conduct; induction; disciplinary process; grievance	Induction coverage 100%; incidents tracked/closed	EPC, HSE	Weekly	CoC sign-offs; grievance log	Repeat offences / unclosed grievances	

Activity	Aspect	Potential Impact / Risk	Mitigation / Management Measures	Monitoring / Indicator Acceptance Criteria	Responsibility	Frequency	Evidence / Records	Corrective Trigger	Action
Progressive rehabilitation	Closure	Legacy erosion/compaction	Rip compacted surfaces; recontour; replace topsoil; stabilise; remove waste	Rehab completion vs disturbance; no active erosion	EPC, SEO, ECO	Monthly	Rehab register; photos	Disturbed areas left unstable	

C) OPERATIONS & MAINTENANCE PHASE (Grid tie at Osona Substation)

Activity	Aspect	Potential Impact / Risk	Mitigation Management Measures	Monitoring / Indicator / Acceptance Criteria	Responsibility	Frequency	Evidence Records	Corrective Action Trigger
Routine access	Dust/traffic	Dust; incidents	Maintain roads; enforce speed; limit unnecessary driving	Road condition acceptable; incidents logged	OM, SM	Monthly	Patrol logs; maintenance records	Repeated dust issues / road degradation
Stormwater upkeep	Erosion	Chronic erosion	Inspect/maintain drains and crossings; post-rain inspections; scours	No blocked drains; erosion repaired ≤ 7 days	OM	Monthly; after rain	Inspection forms; orders	Persistent work erosion recurring
Vegetation management	Biodiversity/erosion	Over-clearing; erosion	Controlled clearing; protect drainage buffers;	Clearing within plan; OM buffers intact		Quarterly	Vegetation log; photos	Clearing in buffers / erosion increase

Activity	Aspect	Potential Impact / Risk	Mitigation Management Measures	Monitoring / Indicator / Acceptance Criteria	Responsibility	Frequency	Evidence Records	Corrective Action Trigger
			maintain ground cover					
Oils and lubricants	Spills	Soil contamination	Bunded storage; drip trays; spill kits; trained staff	integrity (Y/N); spills recorded 100%	OM	Monthly	Spill register; inspection logs	Any spill not cleaned immediately
Waste from maintenance	Waste	Litter; illegal disposal	Segregate; store securely; licensed disposal; recycling of scrap metal/cables	Disposal proof 100%	OM	Monthly	Waste register; certificates	Missing disposal evidence
Security & access control	Community safety	Trespass; injury	Maintain fencing/signage;	Fence integrity;	SM, OM	Weekly	Security logs	Fence breaches not

Activity	Aspect	Potential Impact / Risk	Mitigation Management Measures	Monitoring / Indicator / Acceptance Criteria	Responsibility	Frequency	Evidence Records	Corrective Action Trigger
			controlled access; incident response	incidents tracked				repaired promptly
Emergency readiness	Safety	Delayed response	Maintain emergency contacts, fire equipment; drills	Drill completion; first aid, equipment inspections; current	OM, SM	Quarterly	Drill reports; checklists	Missed drills/expired equipment
Environmental audits	Compliance	Drift from EMP	Annual audit; ECO required	internal audit if within deadlines	OM, JCM PM	Annual	Audit report; CAPA	CAPA overdue repeatedly

D) DECOMMISSIONING & CLOSURE

Activity	Aspect	Potential Impact / Risk	Mitigation Management Measures	Monitoring / Indicator Acceptance Criteria	Responsibility	Frequency	Evidence / Records	Corrective Action Trigger
Decommissioning planning	Compliance	Unmanaged closure	Prepare decommissioning plan; pathways contracted; stakeholder notices	waste (Y/N); contracts place (Y/N)	JCM PM, OM, in ECO	Pre-start	Approved plan; notices	Decom begins without plan
Dismantling PV & structures	Waste/OSH	Injury; debris	Safe lifting plans; exclusion zones; housekeeping; PPE	Incidents tracked; housekeeping ≥90%	Decom Contractor, HSE	Daily	HSE logs; checklists	Serious incident / repeated unsafe acts
E-waste & panels	Waste	Improper disposal	Use certified recyclers/take-back where available; chain-of-custody	Manifests 100%; recycler certificates	Decom Contractor, SEO	Weekly	Manifests; certificates	Missing chain-of-custody

Activity	Aspect	Potential Impact / Risk	Mitigation Management Measures	Monitoring / Indicator Acceptance Criteria	Responsibility	Frequency	Evidence / Records	Corrective Action Trigger
				Zero				
Oils/transformers	Spills	Contamination	Drain oils; bunded handling; licensed disposal	uncontrolled spills; manifests complete	Decom Contractor, SEO	Daily	Spill log; manifests	Any oil release to soil
Civil reinstatement	Erosion/drainage	Unstable landform	Recontour; reinstate drainage; stabilise; remove roads/pads if required	Drainage stable; active erosion	Decom no Contractor, ECO	Weekly; after rain	Inspection forms; photos	Ongoing erosion not corrected
Rehabilitation	Closure	Long-term degradation	Rip compaction; re-spread topsoil; pass; erosion controls; invasive monitoring	Closure audit rehab completion evidence	ECO, JCM PM Final		Closure report; rehab cert	Closure criteria not met

Overall Conclusion

The Environmental Management Plan (EMP) for the Osona 20 MW Solar Photovoltaic Power Plant (JCM Power) provides a comprehensive, implementable, and auditable framework to manage environmental and social risks throughout the project lifecycle. The EMP is structured to meet the requirements of Namibia's environmental authorisation framework and any applicable Environmental Clearance Certificate (ECC) conditions, while also aligning with Good International Industry Practice where required. It translates the commitments from the environmental assessment process into enforceable site controls, clearly assigns responsibilities for implementation and oversight, and establishes monitoring, recordkeeping, and corrective action systems that allow performance to be verified objectively.

The principal risk pathways for the Osona project—given the approximately 90 ha footprint and the close proximity of the Osona Substation (~500 m)—relate to footprint disturbance and vegetation loss, soil compaction and topsoil degradation affecting rehabilitation success, stormwater runoff and erosion (particularly during intense rainfall events), dust and noise nuisance from construction traffic and earthworks, pollution risks from fuels, oils, and hazardous substances, improper waste handling, fauna entrapment in open trenches, and community health and safety risks associated with traffic and access control. The EMP addresses these risks using the mitigation hierarchy, prioritising avoidance and minimisation through strict footprint demarcation and no-go zones (including drainage buffers), early installation and maintenance of stormwater and erosion controls, disciplined hazardous materials and waste management, and robust HSE systems for electrical works and other high-risk construction activities. Rehabilitation and closure requirements are embedded from the outset through progressive reinstatement, defined completion criteria, and closure-focused planning.

Provided the EMP is implemented as specified—supported by approved method statements, competent supervision, independent auditing, evidence-based reporting, and prompt corrective action—the residual environmental and social risks associated with construction and operation of the Osona 20 MW Solar Power Plant are expected to remain manageable, with low likelihood of significant long-term impacts. The EMP therefore constitutes a suitable management instrument to guide compliant, safe, and environmentally responsible project delivery and operation.

Recommendations

To ensure effective implementation and to strengthen audit readiness and compliance performance, the following recommendations are made:

1. Lock down the final footprint and constraints before mobilisation. Confirm the final 90 ha boundary, internal access routes, laydown and storage areas, drainage buffers, and any sensitive areas through a pre-start walkdown and mapping, and ensure these are reflected in the site demarcation plan used by the EPC.
2. Appoint and empower environmental personnel early. Ensure the SEO and independent ECO are appointed prior to any site establishment, with clear authority to enforce controls, issue non-conformances, and recommend stop-work where serious environmental risk is present.
3. Treat method statements as mandatory “activity permits.” Require that all high-risk activities (clearing/topsoil, erosion/stormwater, refuelling/spills, waste, trenching, rehabilitation, and especially substation tie-in works) proceed only under approved, site-specific method statements, with toolbox communication and supervision proving implementation.
4. Prioritise stormwater and erosion controls as critical early works. Install and maintain drainage controls early in the programme, enforce post-rainfall inspections, and implement rapid repair timeframes to prevent gully initiation and sediment movement off-site.
5. Apply a strict pollution prevention standard. Enforce bunded fuel and hazardous storage, designated refuelling with drip trays, spill kit readiness, and a trained spill response capability. Ensure 100% waste chain-of-custody evidence (manifests, disposal certificates, weighbridge slips) for both general and hazardous waste, with zero tolerance for burning or burying waste.
6. Strengthen traffic management and public road safety controls. Implement a detailed Traffic Management Plan covering the A1/D1972 interface, driver induction, speed enforcement, signage, escorts for abnormal loads where applicable, and incident/near-miss reporting to protect public road users and nearby receptors.
7. Maintain high standards for labour and working conditions. Apply worker welfare provisions, enforce the Code of Conduct, maintain adequate sanitation and

housekeeping, implement worker grievance mechanisms, and integrate environmental controls into HSE systems (PTW, LOTO, excavations, lifting operations, electrical works).

8. Use Annexure MM-01 as the operational compliance backbone. Implement the Mitigation & Monitoring Table (MM-01) as the primary monitoring instrument and structure inspection checklists and reporting directly around its indicators, responsibilities, frequency, evidence requirements, and corrective action triggers.
9. Manage uncertainties through formal Management of Change (MoC). If the project scope changes—most notably if battery storage (BESS) is introduced—apply MoC to assess additional risks (fire, hazardous materials, emergency response requirements), update the EMP and MM-01 accordingly, and secure any additional approvals required.
10. Embed closure readiness from day one. Implement progressive rehabilitation, verify reinstatement through photo logs and ECO sign-off, and prepare an outline decommissioning approach early to ensure compliant handling of PV panels, cables, and electrical equipment at end-of-life.

With these recommendations implemented, the EMP provides a robust basis for ensuring that the Osona 20 MW Solar Power Plant is developed and operated responsibly, with measurable controls and clear accountability that support sustained compliance and protection of environmental and social receptors throughout the project lifecycle.

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